NATIONAL HIGH MAGNETIC FIELD LABORATORY









2023 Annual Report

NationalMagLab.org

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2023 Annual Report

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DIRECTOR'S EXECUTIVE SUMMARY

2023 continued to be a fruitful and exciting year for high magnetic field research across the National High Magnetic Field Laboratory.

THE NSF-FUNDED MAGLAB USER PROGRAM

Continuing to serve researchers from across the globe, the National MagLab hosted about 1,825 scientists, students, and technicians in 2023 who conducted experiments to advance society's understanding of new materials, energy solutions, the environment, and the science that underlies life.

The National MagLab's user community remains open and accessible with researchers from 338 universities, government labs, or companies using the facility to investigate interdisciplinary scientific questions that span the spectrum – from physics to biology, chemistry to engineering. Of the principal investigators in 2023, more than 23 percent were completely new to the MagLab. About 50% of the lab's 2023 user community were students and postdocs, 34% of whom identified as females. The 2023 geography of innovation around high fields featured 110 users from 28 different institutes located in 16 EPSCoR states and 89 users from 22 historically black colleges and universities, high Hispanic serving institutes, and/or women's colleges and universities.

National MagLab users also remained overwhelmingly positive about their experience in 2023. A user survey conducted in June shows continued high levels of satisfaction:

- 94% of external users are satisfied with the performance of the facilities and equipment.
- 98% of external users are satisfied with the assistance provided by technical staff.
- 95% of external users are satisfied with the proposal process.

Across the National MagLab's seven user facilities, enhancements and upgrades were made in 2023 that improved the user experience and experimental environment. These enhancements included:

- MagLab scientists developed instrumentation for performing high-resolution EPR in the highhomogeneity 36T series-connected hybrid (SCH) magnet.
- An additional LN₂ storage tank was installed at the DC Field Facility in 2023 to increase supply reliability and facility resilience. The new tank has a capacity of 49,000L, which roughly doubles the storage capacity for the DCFF.
- The NMR team installed an 850MHz platform (previously at the Medical University of South Carolina) which is now in service to users thanks to the rapid construction of a new 2.5mm MAS probe.
- Pulsed Field Facility built a new cell with the necessary safety and power infrastructure to allow for the commission of the 85T without interfering with the regular user operations of another magnet.
- In 2023, a Bluefors automated "dry" dilution refrigeration system operating at temperatures below 10mK was opened for user science in the High B/T facility.
- A ²H cryocoil (and related room-temperature coils) was developed in AMRIS to enable metabolic flux measurements in tandem with proton MRI/S measurements on the 11.1T instrument through funding from a UCGP grant.
- EMR ordered and began testing on two new superconducting magnets a 16T for the Transmission Spectrometer and a 9T for HiPER that will improve data acquisition times and increase future productivity on the EMR instruments.
- A new NEO console was installed on AMRIS' 750MHz/ 89mm wide bore system, providing significantly improved signal-to-noise over the prior hardware.
- The 600MHz wide bore/89mm was upgraded with a 1.9mm HFXY 1.9mm MAS probe, further extending its ¹⁹F NMR capabilities to solid samples.
- A new gyrotron associated with the joint EMR-NMR DNP facility was realized in 2023, generating up to 50W of CW power, as opposed to just 30W available on the older system.
- Development of a 2.5mm HX MAS probe for the 800MHz which covers 80% of NMR-active nuclides in the Periodic Table.
- A 5mm diffBB solution probe was added to the available 600MHz probes and allows for hightemperature diffusion NMR with the ease of use and high signal-to-noise of a modern solution NMR probe.
- A new NEO 7T/ 200 mm MRI system with mouse cryocoil was installed and is now available for users on a fee-for-service basis, allowing state-of-the-art rodent MR imaging.
- Two new industrial air compressors were installed in 2023 improving DC Field Facility's ability to operate hundreds of valves (water, helium, vacuum) as well as the water-cooled magnet disconnects and reversing switches for the 14MW DC power supplies.

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- A new triple-resonance 1.3mm HXY magic-angle spinning (MAS) NMR probe, dedicated for ¹Hdetection experiments and capable of spinning rates as high as 65kHz, became available to users in June 2023.
- PFF's effort to incorporate FAIR data principles into the research performed by our staff and users. Efforts thus far have primarily focused on integrating the pulsed magnet data acquisition program into OSF (Open Science Framework), which not only stores all the experimental data in an easily accessible location that can eventually be openly shared but allows for the recording of some metadata and a real-time logbook.

USER RESEARCH

More than 298 articles appeared in peer-reviewed scientific and engineering journals, many in significant journals like *Science, Nature, Physical Review Letters, Energy & Fuels, Analytical Chemistry,* and the *Proceedings of the National Academy of Sciences.* A complete database of user publications can be found at https://nationalmaglab.org/research/publications-all/peer-reviewed-publications. Important discoveries included:

- DC Field users discovered an unprecedentedly high superconducting critical current density (17MA/cm2 at 0T) in atomically thin 1T'-WS₂, exceeding those of all two-dimensional superconductors reported to date. Work like this could lead to materials that result in machines and devices that are more efficient and much smaller, such as high-field magnets and high-performance superconducting spintronics.
- EMR operations in the 36T SCH produced the first publication in the Journal of Magnetic Resonance in 2023 on a series of Gd^{III} molecular compounds known as "spin-labels." Labels can be attached to large biomolecules so that EPR can then be used to report on structural and dynamical properties that cannot be determined by other methods.
- The custom-built 21T FT-ICR MS instrument identified previously unresolved mass differences in CcHhNnOoSs formulas in soil organic matter from the Southeastern Coastal Plain of the United States providing the first molecular-level insight into dynamics in the podzolized carbon pool with more than 35,000 assigned mass spectral peaks between m/z 200 and 1300, centered at m/z 480.
- Users leveraged the high fields produced by the 75T Duplex magnet to induce magnetic breakdown
 – an effect whereby the large fields cause quasiparticles to tunnel between different Fermi surface
 sections between the CFPs and conventional Fermi-surface sections in CsV₃Sb₅, giving rise to
 Shubnikov-de Haas (SdH) oscillations. Studying these oscillations as a function of angle, the team
 was able to determine the apparent g-factor a quantity that characterizes the magnetic moment
 of the system.
- The High B/T team constructed a special cell to study the magnetic susceptibility of NaBaYb(BO₃)₂ down to 1.5mK, thereby extending the thermal parameter range by two orders of magnitude.
- AMRIS users investigated how phospholipids within the cellular environment strongly influence the response of G-protein-coupled receptors to stimulating drugs. NMR spectroscopy allowed researchers to carefully observe receptors and their responses to drugs in different membrane environments, providing new insights into the molecular mechanisms underlying receptor-lipid interactions.
- MagLab users employed pulsed field gradient (PFG) NMR spectroscopy at a high magnetic field (17.6T) to quantify self-diffusion of carbon monoxide and carbon dioxide in beds of nanoporous gold particles.
- Magneto-Raman scattering experiments and first-principles calculations were conducted by DC Field users on SrCu₂(BO₃)₂ showing four phonon modes that exhibit a strong magnetic field response. The observed Raman mode anomalies provide a direct correlation between the magnetic interaction and the Cu-O-Cu angle and identify which particular phonons facilitate this interaction between the Cu ions, work that is important to realize controllable properties in materials for future applications.
- Work in High B/T facility to explore the behavior of TmVO₄ in the zero-temperature limit provides data to discriminate between models and/or parameter values. The MagLab High B/T facility is uniquely positioned and experienced to perform these studies, extending the low-temperature limit of 120mK down to 5mK for this material.
- Researchers at the AMRIS Facility participated in a multi-institution study that developed methods to make rat brain imaging datasets more Findable, Accessible, Interoperable, and Reusable. Designated as the MultiRat collection, 65 rat brain functional magnetic resonance imaging (fMRI) datasets were collected from 45 institutions and then used to develop an optimized consensus protocol and reproducible data analysis pipeline to be used by researchers for rat brain fMRI experiments.

- A combination of far-infrared transmission and high-field electron paramagnetic resonance (EPR) spectroscopy was employed to investigate the low-temperature magnetic excitations of Na₂Co₂TeO₆ across a wide range of energies (0.2−15meV) and magnetic fields (≤ 17.5T); The measurements resulted in a detailed understanding of the magnetic excitations in Na₂Co₂TeO₆, revealing the key role of disorder associated with the sodium atoms immediately surrounding the cobalt spins.
- Researchers used an isotopically depleted growth medium to culture bacterial cells (*Escherichia coli*), resulting in isotopically depleted proteins that showed increased sequence coverage, mass measurement accuracy, and increased S/N of the monoisotopic peak by Fourier transform ion cyclotron resonance mass spectrometry analysis. *Caenorhabditis elegans* cells were then grown in a medium containing living isotopically depleted *E. coli* cells, thereby producing the first isotopically depleted eukaryotic proteins. This is the first time isotopic depletion has been implemented for four isotopes (¹H, ¹²C, ¹⁴N, and ¹⁶O), resulting in the highest degree of depletion ever used for protein analysis and further improving MS analysis.
- Relying on the incredible resolving power of the 36T SCH, ¹⁷O SSNMR continued to be of great interest to users studying H₂O molecules in hydrated calcium pyrophosphate biominerals and speciation of bridging and non-bridging oxygen atoms in alkali germanate glasses. Additional swaths of the periodic table were explored in a number of materials science and biomaterials projects, including ³⁵CI NMR of pharmaceuticals, ⁶⁷Zn NMR of soaps, ⁶⁷Zn and ³³S NMR of nanoplatelets, ⁶⁷Zn NMR of MOFs.
- Proximity detector oscillator (PDO), magnetocaloric effect (MCE), and angular dependent torque magnetometry measurements were performed at PFF on UTe₂ at fields up to 55T to provide thermodynamic evidence of phase transitions at high fields.
- A team of international researchers utilized ¹H-¹³C, ¹H-³¹P, and ¹H-³¹P-¹³C DNP CP/MAS NMR to investigate the natural phenomenon of fiber formation by studying post-translational modifications in large proteins responsible for the assembly of slime from velvet worms into a fibrous material.
- With new probe modifications and pulse sequence designs for the 900MHz, the first ever comprehensive ¹⁰³Rh SSNMR study of inorganic and organometallic compounds was undertaken, allowing increasingly routine access to unreceptive nuclides and explorations of Rh chemistry – a rare and costly platinum group element.

More 2023 science highlights can be found online at <u>https://nationalmaglab.org/research/science-highlights/</u> as well as information on our in-house research efforts in condensed matter physics, cryogenics, geochemistry, and biology/chemistry.

MAGNET-MAKING MILESTONES

In 2023, the MagLab continued work on optimizing the 40T design and validating the technologies needed for the magnet (NSF Mid-Scale Award number: NSF/DMR 2131790). Work toward the 40T in 2023 included an extensive design study on insulation approaches, crossover joint testing, and high critical current demonstrations. Quality control testing on industry supplied REBCO tapes was also performed in advance of its use in a large-scale coil fabrication expected in 2024.

Several changes and improvements have been made and implemented in the design and fabrication of large and short-pulsed magnets in 2023. Fabrication of the 60T controlled waveform (CW) and 100T multi-shot magnets is being performed at the MagLab in Tallahassee where the winding of the 60T's coil 7 is the first coil to use a new, improved conductor insulation wrapping equipment. A new conductor made of a CuCrZr alloy was used to fabricate coils for the 65T short pulse magnet. The material itself is cheaper and easier to draw than the previously used AL60 and has performed well. Significant amounts of expensive parts were designed and manufactured in-house via 3D printing techniques in 2023, significantly reducing both the lead time and the cost of structural parts used for the 65T magnet. New tooling and fabrication techniques were also developed for the 65T magnet that use two independent coils separated by a cooling gap for faster cooling time, reducing the time between full-field pulses from approximately 50 minutes to about 30 minutes (a nearly 70% improvement). Using two independent coils also enables the reuse of one of the coils in the case of a single coil failure, thus cutting the cost and lead time to manufacture an entirely new 65T magnet. While this new design has resulted in several improvements, it has also introduced new challenges that need to be addressed so tests to improve the lifetime of the outer coil, including using thicker conductors, are planned.

In-house work to support smooth resistive magnet operations was performed in 2023, including the fabrication and assembly of eight resistive spare coils in addition to over 24 maintenance actions (coil tightening, replacement or other major scheduled tasks) in the resistive magnet cells. After six years of operation, the windings of the A/B-coil assembly for the 41.5T resistive magnet were replaced after about 2,000 hours of operation at full field. This represents about double the typical lifetime of an equally highly stressed coil winding and is considered a significant success.

Building off of the "Little Big Coil's" (LBC) successful 45.5T record in 2017, ASC researchers have built additional REBCO-coated conductor coils for testing and analysis. A post-mortem on LBC3 hinted at the importance that slit edge placement may play in coil performance. In 2023, a LBC4 attained a peak field of 44.0T but quenched at 43.5T on a re-ramp of the magnet. A post-mortem on this test coil showed far less damage than LBC3 and validates the effect of the slit edge orientation on damage mitigation. The team continues to aim for 50T with their next mini magnets, LBCx, by addressing these issues and continuing to push to extremely high-field and high-stress conditions.

Beyond these in-house magnet projects, other magnet development work includes collaborations:

- ASC further tested a magnet design in which CORC®, an HTS-ReBCO cable, is wound with insulation but without epoxy or other filler. Developed by Advanced Conductor Technologies (ACT) in collaboration with the Princeton Plasma Physics Laboratory and ASC, the coil represents a potential route to manufacture high-field Ohmic Heating (OH) coils for compact fusion reactors. At the ASC, methods have been developed for deconstructing a CORC® magnet, removing the CORC® cable coils without deformation or damage, segmenting the CORC® cables without unraveling and tampering with its inner structure, and preparing the CORC® cables in standard sample pucks for polishing and imaging of its cross-section. The development of these methods will act as standards for post-mortem analysis of CORC® magnets and inform new magnet designs.
- The development of compact 25T, all superconducting, general science magnets, a project currently being worked on with Cryomagnetics Inc. and Oxford Instruments (OI). The final magnet system will consist of a 17T low-temperature superconducting (LTS) outsert with an 8T Bi-2212 coil nested inside. While the Cryomagnetics project envisions the HTS insert to be powered separately from the LTS outsert, the OI project envisions the insert to be powered in series thus requiring a specific (smaller) conductor Bi-2212 diameter.
- In 2023, ASC researchers submitted a new proposal to the National Institutes of Health for a 28T HH magnet system LTS/HTS demo NMR magnet system using Bi-2212 insert coil.
- Continued efforts on Rutherford type cabled Bi-2212 round wire for high-field solenoids and accelerator magnets were made this year. A second Bi-2212 Rutherford-cable-based solenoid ("BR-2") was designed featuring a 24mm inner diameter and 3D twist-bend supporting silver terminals. In this latest sample, ASC investigated the limits of the braiding machine to insulate a 17-strand ~8mm wide cable with pure alumina fibers so that there would be no leakage affecting the initial cable performance. It has been over-pressure reacted with no significant leakage visible on the exposed cable ends.
- Three small-size coils were built and tested in background fields of up to 31T. These "Teo" dubbed test solenoids are a cost-efficient vehicle to test Bi-2212 conductor and magnet technology including reinforcement, insulation, and filler (epoxy) materials. In the 31T background field of the MagLab's 31T resistive magnet, these coils generated peak fields of 34T at a wire current density of 464 A/mm², a current density that is sufficient to produce 25T class compact research magnets. This robust operation of multiple coils in fields >30T is an important demonstration to our collaborators including commercial partners, Cryomagnetics Inc., and Oxford Instruments (OI), which develop compact 25T class research magnets, the US-DOE Magnet Development Program which develops hybrid HTS/LTS 16T dipoles, and Princeton Plasma Physics Laboratory (PPPL) who are pursuing the development of ohmic heating solenoids within their nuclear fusion program, as well as our efforts at ASC toward high field NMR and EMR magnets.

BROADENING PARTICIPATION & EXPANDING THE STEM PIPELINE

Work to broaden participation in and appreciation of STEM continued in 2023 at the MagLab. More than 1,400 5th-12th grade students visited the National MagLab for a field trip and hands-on activity during the 2022-2023 school year, 58% of whom were from Title I schools. Summer Camps reached 42 middle-school-aged students with nearly all campers (98%) saying they learned about new STEM disciplines and 93% saying they learned more about how to achieve a career in STEM. The MagLab hosted six students in year two of the Godby Science Scholars program, a 3-week STEM enrichment program in partnership with Godby High School, a local Title I school. After completion, 83% of the participants said they were interested in pursuing a career in materials science. A yearlong High School Externship program focused on students with a career interest in STEM and paired more than a dozen Tallahassee high schoolers with a mentor at the MagLab to work on a STEM project. The Science Night Series hosted nearly 450 people at the main public library for hands-on activities themed around flight, electronics, oceans, math, engineering, and waves.

The 2023 Research Experiences for Teachers program consisted of a one-week in-person visit to the MagLab and monthly meetings to provide pedagogical support for a culmination project – a MagLab-related science lesson plan to be posted on the MagLab's website. This year's cohort of 10 RETs included four elementary teachers, three middle and three high school teachers from four different states (Alabama,

Florida, Georgia, and North Carolina), and all from Title I schools. All participants indicated that they learned ways to improve the STEM content of their lessons during the program. Beyond RET, six additional teacher training sessions were conducted for about 120 educator participants.

The MagLab hosted nine undergraduate Magnetic Momentum Scholars for a 7-week program in partnership with Florida A&M University (FAMU) in Spring 2023. Designed to expose a diverse student population to STEM careers at the MagLab, 88% of participants said that the skills they learned will help them to be successful in their future career paths. The 2023 Research Experiences for Undergraduates program hosted 12 students - 25% of whom came from Minority Serving Institutions or community colleges and all with majors that align with the lab's scientific disciplines - 50% engineering, 41.6% physical science, and 8.3% computer science. In addition to their science mentorship, students received professional development sessions to help them gain a broader understanding of various types of STEM careers, including those at the MagLab.

In 2023, the MagLab's flagship Open House event returned and hosted more than 11,700 visitors of all ages – the largest Open House in MagLab history -- for nearly 100 hands-on STEM activities. The 2023 game-themed event featured one-of-a-kind experiences including an Operation game that explained the special things that can be imaged with more powerful MRIs, an outdoor CandyLab experience teaching about colors on the visible light spectrum, a Pokémon Go Scavenger Hunt, and more. Open House survey data shows that about half of Open House visitors had never been to the lab before the event and that more than 75% agreed or strongly agreed that the event helped them better understand the science at the MagLab and how it benefits our community. The lab launched an updated website in January 2023 and in March 2023, a popular YouTube science influencer (Veritasium) released a video about the World's Strongest Magnet that has more than 11 million views and nearly 7,000 comments.

In 2023, MagLab staff gave 158 lectures, talks, and presentations to organizations around the country and the world. In addition, seven science workshops/conferences were hosted by the lab reaching more than 300 people, including the Theory Winter School, User Summer School, and RF Coil Workshop.

SECURING A HEALTHY, SAFE & INCLUSIVE LAB ENVIRONMENT

The MagLab continued to work in partnership with its host institutions to protect users, employees, visitors, and the community throughout 2023. In 2023, the MagLab strategically invested \$60,000 for safety-related equipment, supplies, security, training, and continuing education. Some of the key investments included personal protective equipment, lockout/tagout supplies and equipment used to verify hazardous energy sources, security enhancements, and monitoring devices. Safety highlights from 2023 included:

- A safe annual maintenance shutdown was completed in 2023. The MagLab's Safety Department teamed with operations, maintenance, and contractors to develop safe work plans to mitigate hazards and ensure no incidents occurred. Through careful planning and the use of integrated safety management, scopes of work were defined, hazards identified, controls implemented, and work was safely performed, including a major installation of a second LN₂ tank project.
- In August 2023, Hurricane Idalia made landfall just east of Tallahassee. Models had predicted that Tallahassee would be in its direct path and the MagLab activated its Emergency Action Plan including daily briefings to discuss weather updates, and preparedness, and to coordinate with FSU leadership. Shutdown plans were initiated to secure areas and equipment as Idalia approached with particular attention to cryogenic supplies, fuel for backup generators, computer support, communications, and overall security and safety at the MagLab. Fortunately, a shift in the storm's path yielded no damage to the MagLab, however, safety and facilities teams did assess the facility for damage and safety hazards prior to staff returning.

User safety also continues to remain a priority. Before coming to the lab, users are assigned online training specific to the experiment they are conducting and the hazards associated with each facility. When they arrive on-site, they receive additional hands-on training as needed and work with on-site user support staff to complete their experiments safely. In 2023, 99% of external users were satisfied or very satisfied with the overall safety at the MagLab.

The Diversity Committee continued to support a climate that ensures all employees feel they have equal opportunities to career development. Since 2011, the MagLab's Dependent Care Travel Grant program has offered up to \$800 per year for travel expenses for MagLab scientists traveling to conferences or MagLab users traveling to any of the three MagLab facilities. Beginning in 2023, the MagLab is proud that this program is endowed at a level enabling \$1,200 in annual grants.

LOOKING AHEAD

The lab will continue to work on the Final Design for the 40T all-superconducting magnet in 2024. A 40T Large-Scale Coil design review was held by the Technical Advisory Committee in December 2023 and the committee approved proceeding to the LSC fabrication and testing. After the design review, the materials and instruments with the longest lead times were ordered. Fabrication started in January 2024 and the testing is planned to be finished by the end of 2024.

Facility and power upgrades are also planned for 2023. The DC Field Facility's electronics shop has completed the construction, benchtop testing, and validation tests of the first-of-the-line, second-generation resistive magnet protection systems (RMPS II). These systems continuously monitor several water-cooled magnet characteristics (voltage, current, water temperature, coil temperature, water pressure, etc.), and if any of the monitored quantities exceed the predetermined limits the computer sends a signal to the power supplies to shut down, protecting the magnet and ancillary equipment. The RMPS II software will be installed in the Cell 8 35T magnet for additional testing before moving to other magnet cells. Distributed control system equipment will also be upgraded in the DC Field Facility. This system is the "brain" of the large-scale DCFF scientific infrastructure making this upgrade the equivalent of performing a brain transplant, significantly improving the performance and security of the system. Installation was begun in 2023 for a sixth magnet cooling water pump and will be completed and tested in the summer of 2024. This pump has a 670kW motor and can output 7,570L/min at 33Bar and makes our two magnet cooling water loops equivalent in terms of flow rate, pressure, and cooling power capabilities. The fabrication and assembly of a custom-designed 1.2MJ, 30kV capacitor bank will be tested for the Pulsed Field Facility at low voltages – less than 5kV. Once tests are completed, it will be shipped to the PFF where it will be installed and commissioned in a new capacitor bank enclosure separate from the already existing capacitor banks.

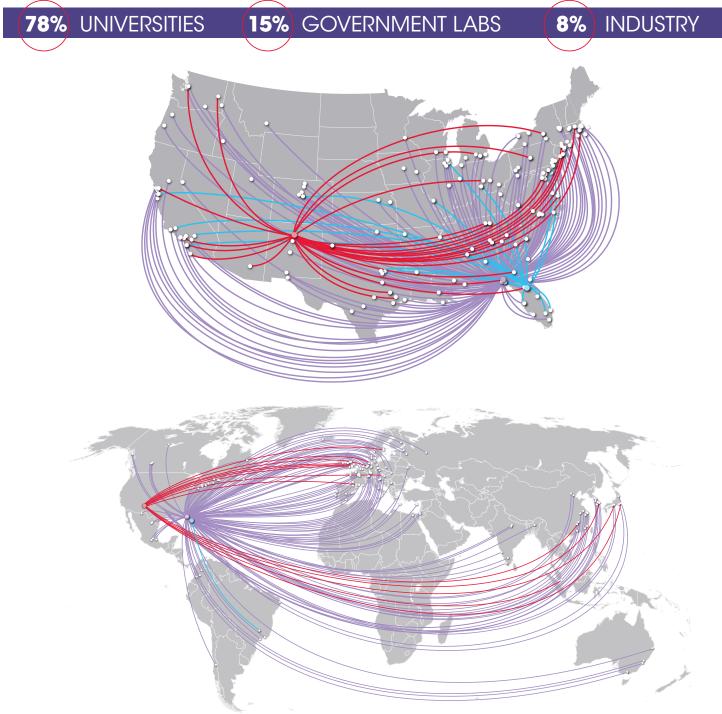
New instrumentation planned for 2024 will expand the lab's scientific capabilities including the development of new NMR probes to enable studies on pharmaceuticals and other fluorine-containing samples, expansion of ICR's MALDI imaging sampling and acquisition capabilities, LC FT-ICR MS for complex organic mixtures, and upgrade of the front-end of the 21T. The Low-E MAS probe capabilities at 800MHz will be boosted with the construction of 1.6- and 3.2-mm probes for recently added NMR systems. An 800MHz is planned for installation in the location of the retired 4.7T MR system to support MAS experiments using specially constructed Low-E MAS probes and reuse much of the retired 750MHz console. Thanks to a \$2.14M NSF Major Research Instrumentation Program grant, EMR will upgrade an aging Bruker E680 spectrometer. Delivery of the Bruker system is estimated to occur in August of this year, with delivery of the laser in April. A third dissolution DNP will be installed in spring 2024, providing access for DNP experiments on the new 7T MRI system.

Hardware capabilities will be extended on the EMR W-band pulsed spectrometer, HiPER, including the integration of an ENDOR capability, which will also improve NMR acquisition capabilities for pulsed DNP applications. A 94GHz 10 W solid-state amplifier will also allow for longer pulses, enabling more advanced pulse sequences of importance to the applications of many of our users. EMR's 240GHz pulsed spectrometer will also be upgraded in 2024 - including boosting the source power by almost an order of magnitude, from 30 to 250mW, significantly enhancing sensitivity, time resolution, and the overall user experience. A planned EMR system upgrade to an X-/Q-band configuration will open up a completely new experimental dimension to our users, for photophysical, photochemical, energy, and quantum science applications.

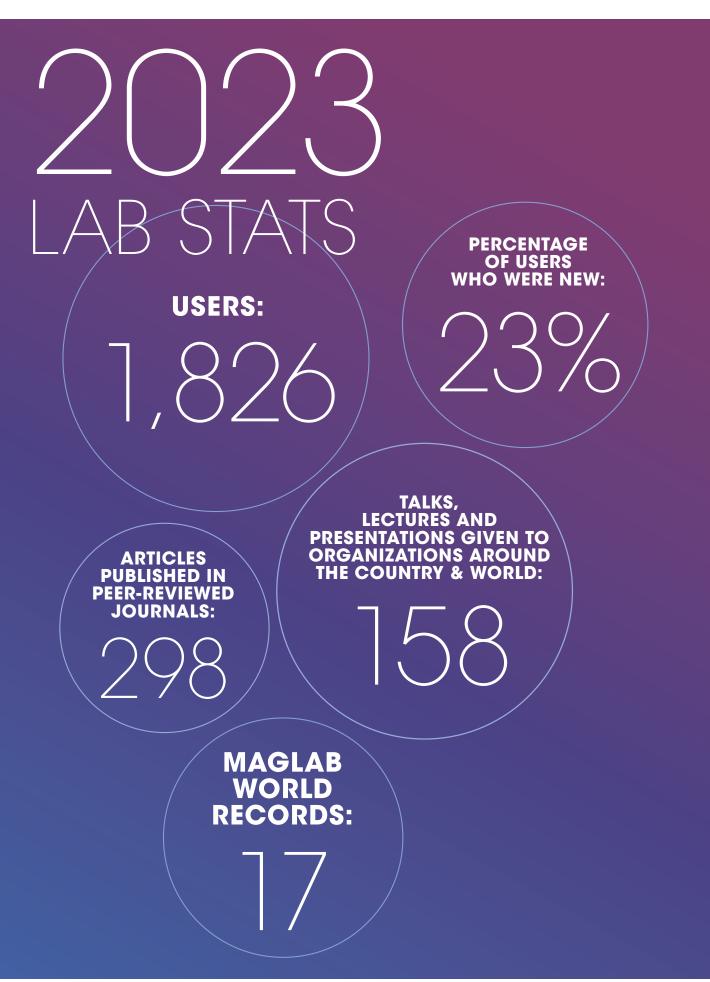
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SCIENCE KNOWS NO BOUNDARIES

Seeking the most powerful magnetic fields on Earth, scientists and engineers from around the world conduct their experiments at the National MagLab. In 2023, our **1,826** users represented **338** universities, government labs and private companies worldwide.



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2023 MagLab Annual Report

WHO OUR USERS ARE

High magnetic fields are a powerful research tool across many disciplines leading to groundbreaking discoveries that impact your life. The lab comprises 7 distinct user facilities that offer our researchers a wide range of research capabilities:

• DC Field

Steady, continuous magnetic fields up to 45 T

• Pulsed Field

Short, ultra-powerful magnetic fields up to 100 T

• High B/T

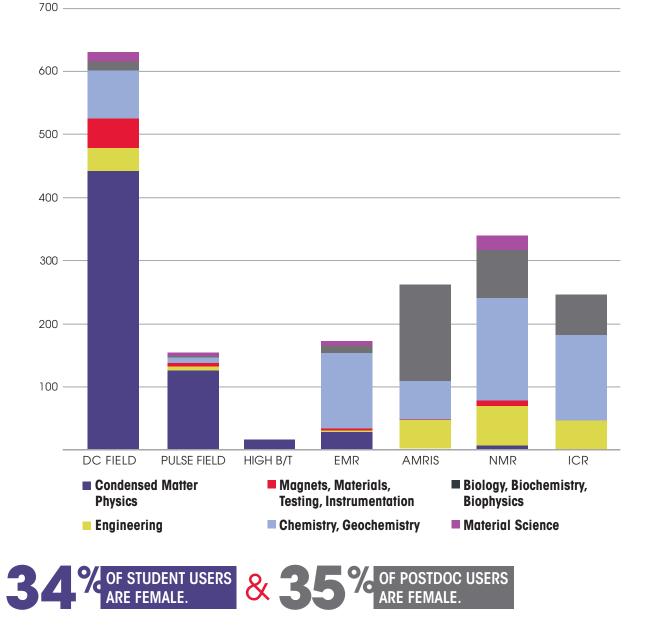
Magnetic fields up to 15 T combined with ultra-cold temperatures of 0.4 $\,\rm mK$

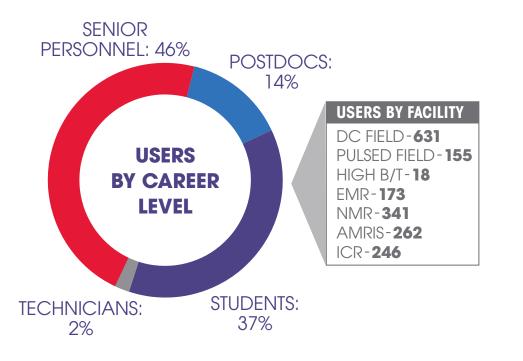
• Electron Magnetic Resonance (EMR)

Magnetic resonance techniques associated with the electron

2023 USERS BY DISCIPLINE

- Nuclear Magnetic Resonance (NMR) Solid & solution state NMR & animal imaging
- Advanced Magnetic Resonance Imaging & Spectroscopy (AMRIS) High-resolution solution and solid-state, NMR, animal imaging & human imaging
- Ion Cyclotron Resonance (ICR) Ultra-high resolution and high mass accuracy Fourier transform ion cyclotron resonance (FT-ICR) mass spectrometry





Advancing research by expanding accessibility:

110 users from 28 different institutes located in 16 EPSCoR states

89 users from 22 historically black colleges and universities, high Hispanic serving institutes, and/or women's colleges and universities.

WHAT OUR USERS SAY

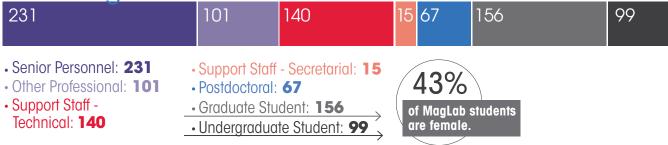
% of users were of users were of users were of users were satisfied with satisfied with the satisfied with satisfied or performance of assistance prothe proposal with the overall the facilities and vided by MaaLab safety at the process. equipment. technical staff. MagLab.

Data reflects external users only.

MAGLAB STAFF

The MagLab employs a diverse workforce that includes scientists, machinists, engineers, administrators, writers and even artists.

Total MagLab Staff: 809



SPARKING CURIOSITY

Whether in a traditional classroom setting or on our website, within the walls of our lab or in universities around the globe, the National MagLab is committed to sharing our passion for science. We are growing the next generation of scientists and inspiring all individuals about the magic of discovery in high magnetic fields.

7,400+

K-12 students participated in Classroom Outreach or a field trip. **58%** of the students reached are from Title I schools. visitors of all ages during our annual **5-hour** Open House event

Students in long-term mentorship or camp programs





hours of MagLab video content watched on YouTube.

The Veritasium Channel featured the MagLab in a video that garnered **<u>12 Million</u>**⁺ views.

1 LABORATORY MANAGEMENT

1.1 ORGANIZATION

Florida State University (FSU), the University of Florida (UF), and Los Alamos National Laboratory (LANL) jointly operate the National High Magnetic Field Laboratory (NHMFL or MagLab) for the National Science Foundation (NSF) under a cooperative agreement that establishes the MagLab's goals and objectives. As the signatory of the agreement, FSU is responsible for establishing and maintaining administrative and financial oversight of the MagLab and ensuring that the operations are in line with the objectives outlined in the cooperative agreement.

The structure of the MagLab is shown in the three figures below. **Figure 1.1.1** illustrates the external oversight and advisory committees, as well as the three internal committees that guide MagLab leadership.

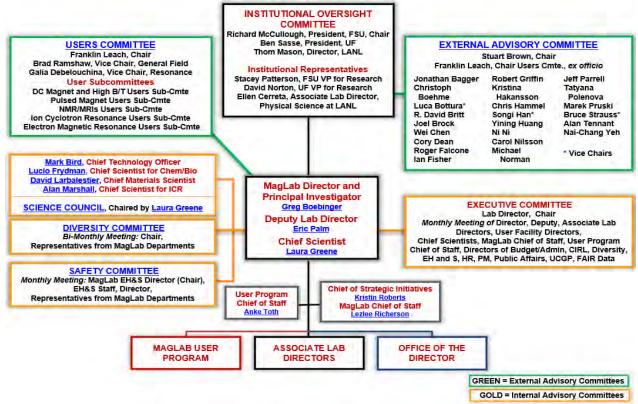


Figure 1.1.1. Advisory Committees of the MagLab, showing internal and external advisory committees (as of January 2024).

Greg Boebinger is the Director of the MagLab and PI of the cooperative agreement. Together, the Director, Deputy Laboratory Director, **Eric Palm**, and Chief Scientist, **Laura Greene**, function as a team to provide management oversight. **Lab Leadership** consists of the MagLab Director, Deputy Lab Director, Chief Scientists, Associate Lab Directors, and MagLab Facility Directors.

After nearly 20 years as the head of the Florida State University-headquartered National High Magnetic Field Laboratory, Greg Boebinger is stepping down from his post to return to the faculty. FSU has launched a national search to select his replacement in 2024. More information can be found on the <u>MagLab Director</u> <u>Search Website</u>.

Tom Painter has been appointed as the interim Director of MS&T since Mark Bird, former MS&T Director, has been named the MagLab's Chief of Technology to focus on magnet technology leadership.

The **Executive Committee** meets monthly to discuss Lab-wide as well as program–specific issues. The Lab's scientific direction is overseen by the **Science Council**, a multidisciplinary "think tank" group of distinguished faculties from all three sites. Two external committees meet regularly to provide critical advice on important issues. The **External Advisory Committee** made up of representatives from academia, government, and industry, offers advice on matters critical to the successful management of the Lab. The **User Committee**, which reflects the broad range of scientists who conduct research at the Lab, guides the development and use of facilities and services in support of the work of those scientists. These committees are further described below.

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Figure 1.1.2 shows the structure of the user program with its seven user facilities – DC Field Facility, Pulsed Field Facility, High B/T Facility, Electron Magnetic Resonance Facility, Nuclear Magnetic Resonance, and Magnetic Resonance Imaging at both FSU and UF and Ion Cyclotron Resonance.

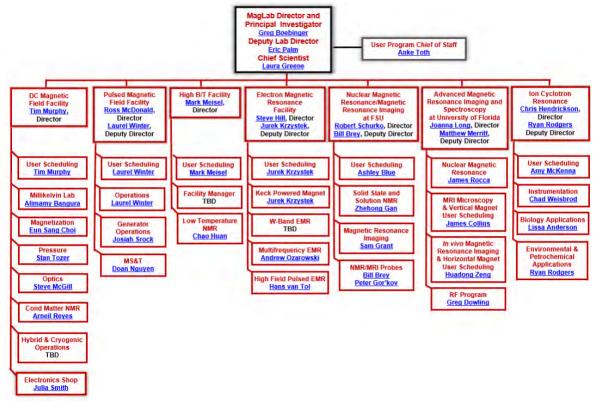


Figure 1.1.2. MagLab User Program (as of January 2024).

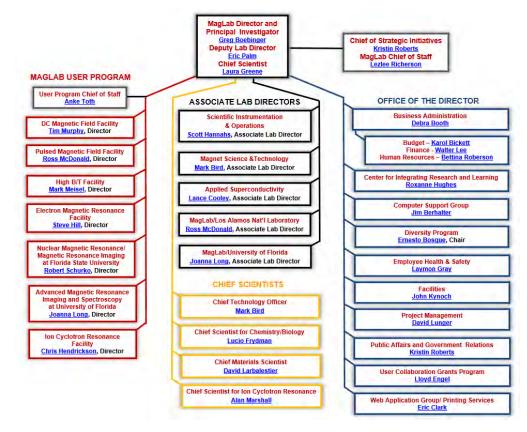


Figure 1.1.3. MagLab Organizational Chart (as of January 2024).

Figure 1.1.3 displays the internal operational organization of the MagLab with its seven user facilities, all Associate Lab Directors, Chief Scientists, and the Office of the Director.

1.2 External Advisory Committee

The External Advisory Committee (EAC) is made up of representatives from academia, government, and industry. This committee offers advice on matters critical to the successful management of the lab.

External Advisory Committee Chair

• Stuart Brown—UC-Los Angeles (Chair)

User Committee Chair (ex officio member of EAC)

• Nick Butch— NIST Center for Neutron Research

Biology and Chemistry Subcommittee

- R. David Britt—UC-Davis
- Wei Chen—University of Minnesota
- Robert Griffin—MIT
- Kristina Hakansson—University of Michigan
- Songi Han—UC-Santa Barbara (Vice Chair)
- Yining Huang—Western University
- Carol Nilsson—Swedish National Infrastructure for Biological Mass Spectrometry
- Tatyana Polenova—University of Delaware
- Marek Pruski—Ames Lab

Condensed Matter Subcommittee

- Christoph Boehme—University of Utah
- Cory Dean—City College of New York
- Ian Fisher—Stanford University
- Chris Hammel—The Ohio State University
- Ni Ni—University of California, Los Angeles
- Nai-Chang Yeh—California Institute of Technology

Magnet Technology and Materials Subcommittee

- Luca Bottura—Magnets, Superconductors and Cryostats (Vice Chair)
- Jeff Parrell—Bruker OST LLC

Science Management

- Jonathan Bagger—American Physical Society
- Joel Brock—Cornell University
- Roger Falcone—University of California, Berkeley
- Michael Norman—Argonne National Laboratory
- Bruce P. Strauss—U.S. Department of Energy (Vice Chair)
- Alan Tennant—University of Tennessee Knoxville

1.3 USER COMMITTEE

The MagLab's User Committee represents the MagLab's broad, multidisciplinary user community and advises the Lab's leadership on all issues affecting users of our facilities. The User Committee is elected from the user base of the MagLab, and each facility has a subcommittee elected by its users to represent their interests. DC Field and High B/T facilities have a single, combined subcommittee representing the two user facilities. Likewise, the NMR facilities at UF and FSU have a single, combined subcommittee. Pulsed Field, ICR, and EMR facilities have their subcommittees. Each subcommittee then elects members to represent it on the User Executive Committee. This User Executive Committee elects a chair and two vice chairs. The DC Field/High B/T Advisory Committee, the Pulsed Field Advisory Subcommittee, the EMR Advisory Subcommittee, the NMR/MRI Advisory Committee, and the representative from the ICR Advisory Committee met in Tallahassee, FL from September 18th to 20th, 2023, to discuss the state of the MagLab and provide feedback to the NSF and MagLab management. The 2023 User Advisory Committee Report has been made available on our website.

DC Field/High B/T Advisory Subcommittee

- Nat Fortune—Smith College*
- Jia (Leo) Li-Brown University
- Johannes Pollanen—Michigan State University
- Daniel Rhodes—University of Wisconsin Madison
- Sufei Shi—Rensselaer Polytechnic Institute
- Raivo Stern—National Institute of Chemical Physics & Biophysics*
- Fazel Tafti—Boston College
- Sanfeng Wu—Princeton University
- Sergei Zvyagin— Dresden High Magnetic Field Laboratory

EMR Advisory Subcommittee

- Alina Bienko—University of Wrocław, Poland
- Selvan Demir—Michigan State University*
- Carole Duboc—Université Grenoble Alpes
- Sandrine Heutz—Imperial College London
- Muralee Murugesu—University of Ottawa, Canada
- Joshua Telser—Roosevelt University

ICR Advisory Subcommittee

- Nathalie Agar—Harvard University*
- Facundo Fernández—Georgia Institute of Technology
- Franklin Leach—University of Georgia*
- Patricia Medeiros—University of Georgia
- Mike Senko—Thermo Fisher Scientific
- Caitlin Tressler—Johns Hopkins University School of Medicine
- Robert Young—New Mexico State University

NMR/MRI Advisory Subcommittee

- Vipin Agarwal—Tata Institute of Fundamental Research
- Claudia Avalos—New York University
- Galia Debelouchina—University of California San Diego*
- Brian Hansen—Aarhus University
- Shella Keilholz—Emory University/Georgia Tech*
- Danielle Laurencin—CNRS
- Lotjar Schad—University Heidelberg
- Sonia Waiczies—Max Delbrück Center for Molecular Medicine in the Helmholtz Association
- Tuo Wang—Louisiana State University
- Jun Xu—National Centre for Magnetic Resonance in Wuhan

Pulsed Field Advisory Subcommittee

- Nicholas P. Butch—University of Maryland (Chair)*
- Joseph G. Checkelsky—Massachusetts Institute of Technology
- Paul Goddard—University of Warwick
- Michihiro Hirata—Los Alamos National Laboratory
- Minhyea Lee—University of Colorado Boulder
- Lu Li—University of Michigan
- Brad Ramshaw—Cornell University (Vice Chair) *

Note: * Are members of the User Executive Committee

1.4 PERSONNEL

As of January 8, 2024, the MagLab employs **809** individuals across its three sites. These personnel are funded by the NSF core grant, State of Florida funding, and individual investigator awards, as well as a variety of home institutions and other sources. A list of MagLab personnel by department is presented in **Appendix I**.

Principal Investigators

- Gregory Boebinger (PI)—Director/Professor
- Joanna Long (Co-PI)—Program Director, AMRIS, UF
- Alan Marshall (Co-PI)—Chief Scientist for Ion Cyclotron Resonance
- Eric Palm (Co-PI)—Deputy Lab Director
- Ross McDonald (Co-PI)—Program Director, LANL

User Facility Directors

- Advanced Magnetic Resonance Imaging and Spectroscopy Facility (UF) Joanna Long
- DC Field Facility (FSU)—Tim Murphy
- Electron Magnetic Resonance Facility (FSU)— Stephen Hill
- High B/T Facility (UF)—Mark Meisel
- Ion Cyclotron Resonance Facility (FSU)—Chris Hendrickson
- Nuclear Magnetic Resonance (FSU)—Robert Schurko
- Pulsed Field Facility (LANL)—Ross McDonald

Of our **809** employees, senior personnel represents the largest group at 28.6%, followed by graduate students at 19.3%, technical support staff at 17.3%, undergraduate students at 12.2%, postdocs at 8.3% and administrative support staff at 1.9%; other professionals encompass 12.5%. The total distribution appears in **Figure 1.4.1**. The overall distribution of diversity for all three sites of the MagLab includes 43% white males, 22% Asian males and females, 15% white females, 8% black or African American males and females, and 0.2% American Indian or Alaska Native males and females. The distribution by diversity appears in **Figures 1.4.2 and 1.4.3** on the following page.

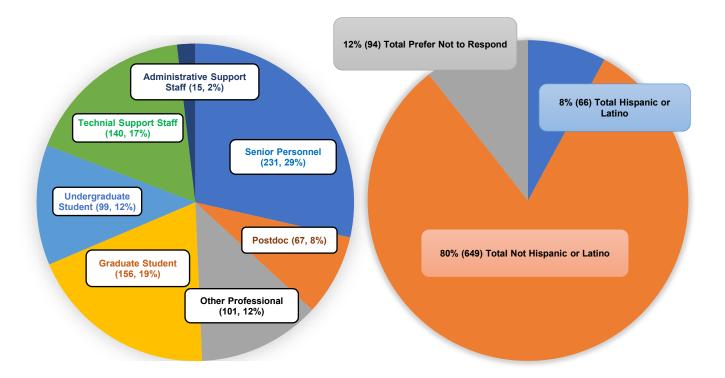


Figure 1.4.1 (left). MagLab Position Distribution (as of January 8, 2024). *Figure 1.4.2 (right).* MagLab Distribution by Ethnicity (as of January 8, 2024).

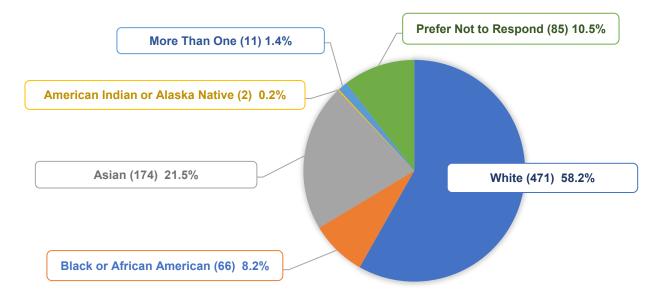


Figure 1.4.3. MagLab Distribution by Race (as of January 8, 2024).

1.5 DIVERSITY

1.5.1 DIVERSITY ACTION PLAN

Diversity and inclusion in the STEM workforce within the lab as well as throughout the nation continues to be a core mission of the MagLab. To make progress towards this goal, our efforts are focused on a) utilizing best practices in our hiring strategies to improve the representation of underrepresented minority groups (including women) at the lab and in the STEM workforce; b) constantly improving a work climate wherein personnel feel they have equal opportunities to career development; and c) retaining and supporting our early career team members with professional development opportunities.

The diversity committee has a structured budget with subcommittees that align with these efforts. The MagLab Diversity Committee meets periodically to discuss issues facing the lab.

Our Compliance Subcommittee is assisting in coordinating and ensuring that faculty hiring committees make an effort to search for diverse candidates, emphasizing groups underrepresented in STEM. The chair of every new faculty hiring committee must meet with MagLab HR and the Compliance Subcommittee at the outset of a position search. The position advertisement is screened to ensure the verbiage is inclusive and the search committee chair is informed of a wide array of networks that include underrepresented groups. Additionally, the meeting provides a chance to ensure that all members of a hiring committee have been trained in best practices for successfully staging diversity-promoting candidate searches. Before hiring committees make a final offer to a candidate, the Compliance Subcommittee is expected to review a summary of the candidate interviewing and selection process.

Within the committee, the draft directives document has been circulated. It provides more structure to the committee, detailing the basic requirements of the composition of committee members as well as a process of election and rotation of leadership within the committee. The responsibilities and expectations of the committee have also thoughtfully been laid out. The drafted bylaws have been introduced to the full committee for adoption. Adoption of the new structure and/or a revamping of the committee is expected in 2024, in line with the new MagLab director.

External involvement of the committee includes participation with the APS IDEA Network (American Physical Society Inclusion, Diversity, Equity, and Access Network). Though somewhat sparsely participated in this year due to individuals' concern about state laws, the MagLab remains a member of the national network and participated in a few meetings, in the "Building Safe Spaces" topical cohort.

etwork and participated in a few meetings, in the "Building Safe Spaces" topical cohort.	
The results of the 2022/2023 Climate Survey have been summarized in Table 1.5.2.	

Field	Very Strongly Disagree	Strongly Disagree	Disagree	Agree	Strongly Agree	Very Strongly Agree
l am a valued employee at the MagLab	5.4%	6.1%	10.1%	41.9%	25.0%	11.5%
I have access to everything that I need to perform my job at a high level	5.4%	8.7%	15.4%	31.5%	20.8%	18.1%
I feel motivated to do my best work	5.4%	4.7%	16.2%	28.4%	27.7%	17.6%
I feel respected by my team.	6.8%	3.4%	6.8%	27.0%	28.4%	27.7%
I feel respected by other employees at the lab outside of my team.	2.7%	5.5%	10.3%	43.2%	24.7%	13.7%
l accomplish meaningful things through my work	2.0%	2.0%	2.0%	28.4%	41.2%	24.3%
l understand how my work benefits the lab's overall mission	2.7%	2.7%	4.1%	25.7%	29.7%	35.1%
My workload is too high to perform my job to the best of my abilities	6.8%	14.3%	37.4%	25.2%	10.2%	6.1%
I feel burned out from my work	12.1%	12.8%	32.2%	22.1%	11.4%	9.4%
l intend to stay at the MagLab for the next five years	14.2%	5.4%	17.6%	38.5%	10.8%	13.5%

Table 1.5.2. Climate survey results

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Field	Very Strongly Disagree	Strongly Disagree	Disagree	Agree	Strongly Agree	Very Strongly Agree
There is a culture of cooperation and teamwork within the lab	9.5%	8.8%	17.7%	31.3%	23.8%	8.8%
<i>My compensation is commensurate with my experience and the work I provide for the lab.</i>	20.4%	14.3%	28.6%	27.2%	6.1%	3.4%

The responses from the survey show favorable trends concerning the work climate at the MagLab. Some question responses, however, may hint at some undesired trends. For example, for the question about whether worker workloads are too high and the question about feeling burned out, the results are only slightly weighted toward the more desired answers (e.g., not having too high a workload and not being burned out). However, the response rates are fairly balanced, whereas the goal might be to have survey responses that reflect a larger distinction away from feelings that workloads are too high or feelings of burnout. When asked if compensation is commensurate with experience and work provided, staff's responses tend to disagree that their compensation is sufficient.

In 2023, four research faculty searches were successful in placing new hires into DC Fields, EMR, NMR, and MS&T. Another MS&T search ended with a successful underrepresented minority hire into an assistant in a research position.

1.5.2 BROADENING PARTICIPATION

Over the year, the Diversity Committee worked steadily to broaden participation in MagLab activities to all scientists, students, and staff members including those from underrepresented groups. To help retain staff, a postdoc role was placed into a visiting research faculty role in CMS.

The Diversity Committee granted 21 travel fund requests to six undergraduates, nine graduate students, two post-docs, three research faculty, and one assistant professor to attend various conferences (see **Table 1.5.3**).

Start Date of Event in 2023	Conference / Meeting	Travel Grant Recipients
March 05	APS March Meeting	6 Graduate Students 1 Postdoc
June 03	International Society of Magnetic Resonance Spectroscopy Conference	2 Graduate Students 1 Undergraduate
June 04	Association for the Sciences of Limnology and Oceanography (ASLO) Aquatic Sciences Meeting	1 Research Faculty 1 Postdoc
June 20	Low Energy Electrodynamics of Solids Conference	1 Assistant Professor
August 14	Southern Ocean Observing System Symposium	1 Graduate Student
September 3	European Conference on Applied Superconductivity	1 Research Faculty
September 4	30 th Conference Condensed Matter Division of the European Physical Society	1 Research Faculty
October 11	Biomedical Engineering Society Annual Meeting	4 Undergraduates
October 25	Southeastern Magnetic Resonance Conference	1 Undergraduate

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1.6 SAFETY

A central focus of all activities conducted at the MagLab is to ensure that employees, users, visitors, and contractors are provided with a safe and educational environment. The Mag-Lab's Environmental, Health, and Safety team works collaboratively with management, researchers, staff, and users, as well as with other public and private entities, to proactively mitigate hazards in our industrial, laboratory, and office settings. The MagLab Safety Department is integrated with Florida State University's Central Environmental Health and Safety Department. This integration provides substantial support to existing safety programs at the MagLab. Areas of integration and support include Chemical Safety, Laboratory Safety, Biological Safety, Radiation Safety, Industrial Hygiene and occupational Safety, Fire Safety, Environmental Compliance, and Building Code Compliance (**Figure 1.6.1**).



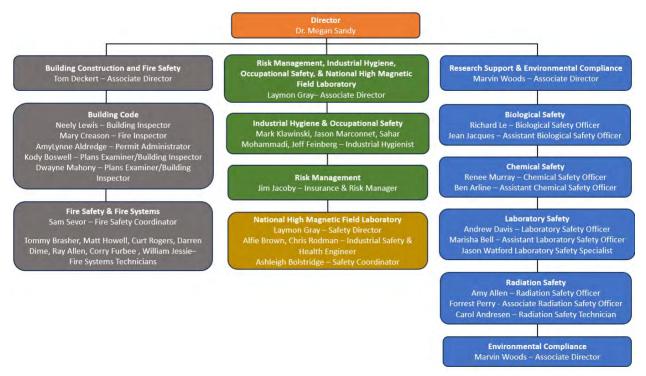


Figure 1.6.1. Environmental health & safety organizational chart

The MagLab uses its Integrated Safety Management Program (ISM) to integrate safety, health requirements, and controls into daily work activities to ensure the protection of the MagLab Community. The MagLab continues to foster a strong and sustainable Safety Culture. Examples of the activities that contribute to our commitment to a strong Safety Culture at the MagLab are listed below:

- a. Safety is a core value and is viewed as an investment, not a cost.
- b. Management drives and is actively involved in promoting our Safety Culture.
- c. Quarterly Safety Meetings are conducted by the Director of the MagLab to address lab-wide safety issues and initiatives.
- d. The Director of the MagLab and Director of Safety routinely walk through lab areas to engage researchers, staff, and users, and to observe ongoing work.
- e. New Employee safety training is provided to all incoming employees with their supervisor, with specific emphasis on our ISM. During new employee orientation, employees learn that safety is a value at the MagLab, and they are encouraged to have a questioning attitude about their safety. They also learn about our stop work, near-miss/no-fault self-reporting, and accident policies.

1.6.1 INVESTMENTS IN SAFETY

Our investments in safety equipment and materials along with management support and employee involvement demonstrate our strong commitment to sensibly utilize resources in a manner that protects all MagLab personnel, property, and the environment. In 2023, the MagLab strategically invested \$60,000 for safety-related equipment, supplies, security, training, and continuing education. Some of the key investments included personal protective equipment, lockout/tagout supplies and equipment used to verify hazardous energy sources, security enhancements, and monitoring devices.

1.6.2 SAFETY SUPPORT AND COORDINATION WITH FSU MAIN CAMPUS SAFETY TEAM

Safety at the MagLab is supported by a dedicated on-site team as well as the Florida State University (FSU) Environmental, Health, and Safety Department team. The two teams work together to provide comprehensive integrated safety support to all activities at the MagLab. Machine Shop, Biosafety, Laboratory, Laser, and Radiation inspections were completed with team members from both groups. The two teams also worked together to provide safety training.

1.6.3 COMMITTEES

Safety committees are an integral part of the MagLab's ISM. Committees meet to discuss and address safety concerns and provide program reviews.

The following is a list of committees.

- Directors Monthly Safety Committee (includes representatives from UF and LANL Facilities)
- Safety Concerns Committee
- Lock/Tag Verification Committee
- Cryogen Safety Committee
- Laser Safety Committee
- Electrical Safety Committee

Members of these committees also form subcommittees as needed based on the need to address specific safety issues.

1.6.4 SAFETY HIGHLIGHTS 1.6.4.1 ANNUAL MAINTENANCE SHUTDOWN



The use of daily work briefings and encouraging the use of human behavior-based safety tools have continually allowed the MagLab to build upon having a strong and resilient safety culture. During the MagLab annual shutdown, it is important for all employees and contractors to have knowledge, understanding, and encouragement in the use of human behaviorbased safety tools. By empowering each employee regardless of position and rank it has allowed for a more open atmosphere when

discussing safety and concerns. Operations, Maintenance, Safety, and Contractors communicated and worked closely to develop safe work plans to mitigate hazards and ensure no incidents occur.

A major project which took place for our annual shutdown this year was the installation of a second LN_2 tank. Having an uninterrupted supply of LN_2 is critical for magnet operations, liquid helium production, and research at the MagLab. The installation of the new tank doubles the capacity of LN_2 storage, provides redundancy should a failure occur with one of the tanks, and prevents interruption of Hybrid Magnet Operations, liquid helium production, and DC User Programs when routine servicing is required.

The MagLab's Safety Department teamed with Operations, Maintenance, and the Contractor to develop a safe work plan to mitigate hazards and ensure no incidents occurred. Through careful planning and the use of integrated safety management, the scope of work was defined, hazards were identified, controls were implemented, and the work was safely performed.



1.6.4.2 EMERGENCY MANAGEMENT – PREPARING FOR AND RECOVERING FROM HURRICANE IDALIA

Every May, the MagLab's Emergency Management Team (EMT) meets to review the MagLab's Emergency Management Plan (EAP). During the annual meeting roles and responsibilities are discussed, any changes, and scenarios that would require activation of the plan. This annual planning meeting ensures that the MagLab is prepared for emergencies, has taken appropriate mitigation measures to minimize impacts, and is positioned to recover as quickly as possible if an emergency occurs.

In August 2023, Hurricane Idalia made landfall just east of Tallahassee. Leading up to landfall, models predicted that Tallahassee would be in its direct path. The MagLab activated its EAP and initiated planning

activities several days before landfall. The MagLab's EMT met daily to discuss weather updates, and preparedness, and to coordinate with FSU leadership. Departments were directed to review their specific preparedness and recovery plans for shutdown and initiate actions to secure areas and equipment as Idalia approached. Critical areas of concern such as cryogen supplies, fuel for backup generators, computer support, communications, and overall security and safety at the MagLab were addressed. Post landfall, the MagLab's recovery team was able to assess the facility for damage and safety hazards. Fortunately, there was no damage to the MagLab, and personnel were able to return to the MagLab within 24 hours.

1.6.4.3 OPEN HOUSE

During February 2023, the MagLab hosted its first in-person Open House since COVID-19. In planning for Open House, the MagLab community developed ideas to support the theme, "It's Game On For Hands-On Science". The Safety Team worked alongside the MagLab community to ensure that all activities were safe for the public to participate in. Using Integrated Safety Management, activities were reviewed using a Task Hazard Analysis to identify and analyze hazards and implement controls (i.e., required PPE, boundaries/barriers, and clear communication). The results of careful planning ensured no incidents occurred and the event was a memorable experience.

1.6.4.4 STATISTICS

In 2023, there were 104 safety concerns entered into the SafeMag system. These entries included near misses, safety concerns, good catches/practices, and suggestions. Five incidents occurred in 2023 and none resulted in lost time/days away from work or restricted work. Three resulted in first aid, one incident was presumptive (determined to be a personal condition of an employee), and one required no treatment but was reported to follow protocol. None of the incidents required NSF notification.

1.6.5 USER FACILITY SAFETY

The MagLab's User facilities (DC Field, Pulsed Field, High B/T, NMR, AMRIS, EMR, and ICR) provide support to internal and external users. To facilitate their visits, users are assigned a combination of online and in-person training modules that are specific to the experiment they are conducting, and the hazards associated with each facility they will be working in. These are generally coordinated several weeks before the visitors' arrival if they are external users. Users must complete the required training before receiving authorization to start work. When users arrive at the facility, they receive hands-on training that is specific to each location and discuss any potential safety concerns with user support. While at each facility, users are assigned or receive support from in-house scientists and/or technicians to ensure both technical and safety needs are met. Non-routine and any particularly hazardous activities are completed by trained and experienced facility personnel to minimize risks to users.

1.7 BUDGET

The MagLab with its seven user programs is primarily funded by the National Science Foundation (NSF). Other operating funds are provided through the participating institutions: Florida State University, the University of Florida, and Los Alamos National Laboratory. Additionally, faculty and staff have been very successful in securing individual research funding for specific areas of research from a wide variety of sources, including federal, state, and private sectors.

The NSF Division/Directorate approved the MagLab's facilities award for 2023-2027 on December 12, 2022. For the Calendar Year 2023, NSF provided an operating budget of \$38,276,435.

In 2023, the MagLab also received two supplemental awards:

- \$99,869 Funding for the procurement of a Zero Emissions Vehicle (ZEV) and associated charging infrastructure.
- \$2,871,458 Funding for maintenance, repair, and replacement of equipment.

Table 1.7.1 represents the budget allocation and percentage of the total budget for each division/program of the MagLab. **Table 1.7.2** summarizes the MagLab's budget position as of December 31, 2023. The report includes annual funding per our Cooperative Agreement plus the two supplemental awards.

Division/Program	CY 2023 Total Funding (\$)	Budget (%)
Operations/Safety	2,222,249	5.39%
DC Field Facility/Facilities	8,350,788	20.25%
Magnet Science & Technology	5,036,770	12.21%
NMR	1,182,785	2.87%
ICR	2,386,223	5.79%
EMR	884,608	2.14%
CIRL and REU	562,429	1.36%
ASC	1,855,150	4.50%
Electricity & Gases	4,607,471	11.17%
LANL	8,660,115	21.00%
UF High B/T	451,887	1.10%
UF - AMRIS	799,411	1.94%
Diversity	5,868	0.01%
User Collaboration Grants Program	960,000	2.33%
FAIR Data	310,682	0.75%
Supplements	2,971,327	7.20%
Total Operations	41,247,762	100.0%

Table 1.7.1. NSF Budget by MagLab Division/Program

Table 1.7.2. NSF Budget & Expenses - Calendar Year 2023

Expense Classification	Budget (\$)	Expenses and Encumbered (\$)	Balance (\$)
Salaries and Fringe	12,233,654	11,245,660	987,994
Equipment	2,458,820	1,943,550	515,270
Travel	154,691	133,306	21,385
Participant Support	153,112	140,124	12,988
Direct Expense	3,735,580	4,264,123	(528,543)
Subawards	9,966,963	10,332,575	(365,612)
Other Direct Costs	3,068,570	2,164,521	904,049
Subtotal	31,771,390	30,223,859	1,547,531
Indirect Cost	9,476,372	7,957,909	1,518,463
Total Direct and Indirect Cost	41,247,762	38,181,768	3,065,994

Notes:

Per the Cooperative Agreement, DMR 2128556, the CY 2023 budget is \$38,276,435, plus two supplements in the total amount of \$2,971,327.

Negative values are attributed to the following:

- Materials and Supplies have a negative balance due to incorrect billing of helium that was corrected in January 2024.
- Subawards have a negative balance due to Increment 1 of 2024 being partially encumbered in December 2023.
- Travel and indirect costs are not encumbered.

1.8 MAGLAB COST RECOVERY REPORT

Seldom does the MagLab incur costs due to resources used for companies doing proprietary research. On occasion, companies will need access to the unique equipment at the MagLab, and they will contract for the use of said equipment. The MagLab has established procedures to accumulate and report costs continuously and consistently for all such contracts based upon an agreed-upon schedule of fees and costs to cover the use of such equipment that involves proprietary research.

In 2023, MagLab received income for the use of NSF-funded equipment during the period of performance of our federal award in the total amount of \$1,890.

1.9 INDUSTRIAL PARTNERSHIPS AND COLLABORATION

The MagLab collaborated with dozens of companies, national/international labs, universities, and community groups in 2023.

1.9.1 INDUSTRY

Advanced Conductor Technologies, Boulder, CO: The Applied Superconductivity Center and the Magnet Science and Technology Division of the MagLab are collaborating with Advanced Conductor Technologies on the development and testing of Conductor on Round Core (CORC®) cables, using multi-layer spiraling tapes around a core, for magnet applications. Danko van der Laan, Director of the company and associated with NIST/University of Colorado Boulder, is developing compact cables based on REBCO-coated conductors, a high-temperature superconductor. The ongoing collaboration on measurements of HTS cables at low temperatures and high magnetic fields (4K and 20T in Cell 4) continues to set new benchmarks for peak current, current density, bend radius, and ramp rates. (MagLab contact: Ulf Trociewitz, ASC)

Advanced Superconducting Materials (ASM), Lexington, KY: The Applied Superconductivity Center is collaborating with ASM under a Phase-I Small Business Technology Transfer award on the development of a photo-acoustic measurement device. (*MagLab contacts: Daniel Davis, Ulf Trociewitz, ASC*)

ATI Specialty Metals and Products, Albany, OR: The Applied Superconductivity Center is collaborating with ATI metals in the development of new Nb alloys for Nb₃Sn superconducting wire fabrication. The new alloys exhibit improved properties at high fields and could be used for accelerator magnets in facilities like the Future Circular Collider (FCC) under consideration by CERN. (*MagLab contacts: David C. Larbalestier, Chiara Tarantini, Peter Lee, ASC*)

Bridge12 Technologies Inc., Framingham, MA: Bridge12 is a small business specializing in the design and manufacturing of active and passive high-frequency microwave components. The EMR division is collaborating with Bridge12 on novel designs of high-field in-situ EPR spectrometers, as well as working together on the future development of high-frequency gyrotrons for DNP. (*MagLab contacts: Stephen Hill, Thierry Dubroca, EMR*)

Bruker Biospin Corp., Billerica, MA: The EMR and NMR groups have entered into a collaborative effort with Bruker Biospin regarding the Dynamic Nuclear Polarization (DNP) program. In particular, the effort aims at improving Bruker's recently acquired products (395GHz gyrotron, 600MHz/14.1T DNP probe) beyond their normal commercial uses by making technical modifications as well as developing new instrumentation. The modifications allow the DNP instruments to be more user program friendly without voiding the warranty. (*MagLab contacts: Stephen Hill, EMR, Frederic Mentink, NMR, Peter Gork'ov, NMR, Thierry Dubroca EMR*)

Bruker Biospin Corp., Billerica, MA: Investigators from MagLab facilities at UF and FSU collaborate with technical staff at Bruker on NIH-funded projects to develop improved superconductive cryogenic probes for solution NMR. (*MagLab contacts: William Brey, NMR; Matthew Merritt, AMRIS*)

Bruker OST, Carteret, NJ: Bruker OST is manufacturing accelerator quality Nb₃Sn strands based on the restacked-rod process that provides the production conductor for the High-Luminosity Upgrade of the Large Hadron Collider at CERN. The Applied Superconductivity Center oversees conductor production on behalf of the upgrade project, and ASC and the Magnet Science and Technology divisions perform quality verification utilizing the electromagnetic testing facilities at the MagLab. (*MagLab contacts: Lance Cooley, ASC; Jun Lu, MS&T*)

Bruker-OST, Carteret, NJ: Extensive collaborations exist between ASC and BOST on both Nb₃Sn and Bi-2212 conductor development, aided by direct support of R&D on these materials from DOE-High Energy Physics to ASC PIs and to BOST through the Conductor Development Program (now called Conductor Procurement and R&D Program) managed by ASC in partnership with Lawrence Berkeley National Laboratory. Through these collaborations, BOST has been able to develop the most advanced Nb₃Sn and Bi-2212 conductors produced. (*MagLab contacts: Lance Cooley, David C. Larbalestier, Eric Hellstrom, Peter J. Lee, Chiara Tarantini, Jianyi Jiang, ASC*)

Commonwealth Fusion Systems (CFS) Devens, MA. DC Field Facility collaborates with CFS in the characterization of REBCO superconducting tapes. CFS is an American fusion power company founded in 2018 in Cambridge, Massachusetts after a spin-out from the Massachusetts Institute of Technology (MIT).

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Its stated goal is to build a small fusion power plant based on the tokamak design. (MagLab contacts: Jan Jaroszynski, CMS, DCFF user support)

Cryomagnetics Inc.: Extensive collaboration with Cryomagnetics in the area of all superconducting high-field hybrid magnets that make use of HTS coils made with Bi-2212 nested in the high-field area of the magnet. Cryomagnetics is collaborating with the MagLab under a phase-IIa Small Business Technology Transfer award from the Department of Energy. Cryomagnetics has also obtained a license to use magnet technology based on Bi₂Sr₂CaCu₂O_{8-x} superconductors developed at the MagLab. Magnets will use unique high-pressure high-temperature reaction furnaces and other techniques developed in the ASC to reach 25T in magnet systems. ASC's involvement focuses on the design, construction, and heat treatment of Bi-2212 coils to be supplied to Cryomagnetics and embedded into their LTS magnet systems. *(MagLab contact: Ulf Trociewitz, ASC)*

Cryomagnetics Inc.: Cryomagnetics is collaborating with the MagLab on the development of REBCObased magnets for commercial production under a phase-II Small Business Innovative Research award from the Department of Energy. The MagLab previously developed a 32T all-superconducting magnet using REBCO conductor which we refer to as generation 1 REBCO magnet technology. The MagLab is now working on a second generation of REBCO magnet technology that will employ better stress management and operate at higher current density. For magnets to be built commercially in significant volume, further improvements are required. The collaboration with Cryomagnetics is intended to produce a third generation of technology that has a simpler design and protection process than generations 1 and 2. (*MagLab contacts: Hongyu Bai, MS&T, Mark Bird*)

Cryomagnetics Inc.: MS&T is collaborating with Cryomagnetics to develop a very high-field superconducting magnet using REBCO in the DOE STTR program. The goal is to develop a 30T full superconducting magnet with 18T contributed by a REBCO coil in a 12T LTS magnet. The MagLab is responsible for developing the HTS magnet. Phase I focused on the epoxy impregnation subscale HTS coil testing and promising results were achieved by using mold release on the conductor to reduce the delamination risk caused by cooldown and magnetic force. The Phase I ended in the middle of 2022. Then Phase II was funded and started in August 2022. In phase II, the technology of epoxy-impregnated REBCO coil will be explored in a relatively large-scale coil. If successful, a prototype HTS coil will be designed and fabricated at the MagLab and tested at Cryomagnetics. This project is planned to demonstrate the HTS magnet technology, power supply, and manufacturing processes needed for a 30T class commercial REBCO magnets in high energy physics and condensed matter physics research. *(MagLab contacts: Hongyu Bai, MS&T, Mark Bird)*

Danfoss Turbocor, Tallahassee, FL: Danfoss Turbocor Inc. is a company specializing in compressors, particularly the oil-free compressors. The compressors are specifically designed for the heating, ventilation, air conditioning, and refrigeration (HVACR) industry and need high-performance soft and hard magnet materials. The company and the laboratory have a joint research project on the selection, characterization, and development of permanent magnet materials and structural materials for high-performance and environmentally friendly compressors. (*MagLab contact: Ke Han, MS&T*)

Engi-Mat Co., Lexington, KY: Engi-Mat is a small business specializing in manufacturing advanced nanomaterials. MagLab collaborates with Engi-Mat Co on a small business innovation research grant funded by the US Department of Energy. The goal of this research is to improve the quality of Bi₂Sr₂CaCu₂O_{8-x} powder for superconducting wires. *(MagLab contact: Jianyi Jiang, ASC)*

Materion, Newton, MA: The Applied Superconductivity Center is collaborating with Materion in the development of new Nb alloys for the Nb₃Sn superconducting wire fabrication to be used for accelerator magnets like the Future Circular Collider (FCC) to be built at CERN. (*MagLab contacts: David C. Larbalestier, Chiara Tarantini, Peter Lee, ASC*)

Mevion Medical Systems, Littleton, MA: Mevion is a pioneer in the development of proton radiation therapy systems for the non-invasive treatment of cancer. The center of the system is the proton accelerator that utilizes low-temperature superconductors. The MagLab provides engineering support to Mevion by assisting in the qualification testing of full-scale high-current superconductors in background fields at low temperatures. The tests require the MagLab's unique test facility designed for tests of large conductors in a 12T split solenoid superconducting magnet system and the unique variable temperature – variable strain apparatus in ASC. (MagLab contacts: Todd Adkins, MS&T, Najib Cheggour, ASC)

Nikon, Melville, NY: The MagLab maintains close ties with Nikon on the development of an educational and technical support microscopy website, including the latest innovations in digital-imaging technology. As part of the collaboration, the MagLab is field-testing new Nikon equipment and developing new methods of fluorescence microscopy. (*MagLab contact: Eric Clark, Optical Microscopy*)

Noveon Magnetics, San Marcos, TX: Scientists and engineers from Urban Mining Company came to the MagLab to study the complete magnetization loop of the rare-earth permanent magnet alloys that they are developing. Urban mining specializes in recovering rare-earth magnetic material from recycled electronics and processing that material into new magnets for use in industry. (*MagLab contact: Tim Murphy, DC Field*)

Olympus Corp., Tokyo, Japan: Investigators at the MagLab have been involved in collaboration with engineers at Olympus to develop and test new optical microscopy systems for education and research. In addition to pacing the microscope prototypes through basic protocols, the Optical Microscopy group is developing technical support and educational websites as part of the partnership. (*MagLab contact: Eric Clark, Optical Microscopy*)

Oxford Instruments NanoScience (OINS), UK: The ASC has a collaboration with OINS on the development of high-field insert magnets made with Bi-2212 wire for use in 30+T NMR as well as 25T class compact research magnet systems. Particularly for NMR magnets, Bi-2212 conductor promises several significant advantages that will be exploited here. *(MagLab contact: David Larbalestier, ASC)*

Oxford Instruments NanoScience (OINS), UK has obtained a license to use magnet technology based on Bi₂Sr₂CaCu₂O_{8-x} superconductors developed at the MagLab. Magnets will use unique high-pressure high-temperature reaction furnaces and other techniques developed in the ASC. OINS aims to produce advanced magnets for laboratory research and NMR systems. *(MagLab contacts: David Larbalestier, Ulf Trociewitz, Lance Cooley, ASC)*

Phoenix NMR, LLC, Loveland, CO: Phoenix NMR used the NMR Dynamic Nuclear Resonance facility to test a commercial DNP probe. Additionally, the MagLab's NMR instrumentation program and Phoenix NMR collaborate on the development of stators for magic angle spinning NMR. *(MagLab contacts: Fred Mentink, Peter Gor'kov, NMR)*

SuperPower Inc., Schenectady, NY: The Applied Superconductivity Center and the Magnet Science and Technology division of the MagLab are collaborating with SuperPower Inc. on the characterization of YBCO-coated conductors. This material has the potential to transform the field of high-field superconducting magnet technology and is in an early stage of commercialization. The MagLab will work to improve our understanding of this product and provide guidance to SuperPower on enhancing the quality of its product. The MagLab has also taken the lead in encouraging a Coated Conductor Round Table of users of coated conductors at which much information about the long-length performance of coated conductors has been shared. (*MagLab contacts: David C. Larbalestier, Dmytro Abraimov, Jan Jaroszynski, ASC*)

Thomas Keating LtD, UK: The EMR group has entered into a partnership with Thomas Keating (TK) LtD in the UK as part of its program aimed at developing a new characterization tool, Dynamic Nuclear Polarization Nuclear Magnetic Resonance (DNP - NMR) at high fields (14.1T / 600MHz). TK draws on tool-making skills to design and develop quasi-optical Terahertz systems and subsystems. *(MagLab contact: Stephen Hill, EMR)*

ThermoFisher Scientific, Waltham, MA: The ICR Facility is collaborating with ThermoFisher Scientific and the University of Virginia (Charlottesville, VA) to use advanced control of proton transfer reactions to manipulate ion charge states for improved sensitivity (e.g., for proteomics and other biological applications). Further, this collaboration seeks to couple the latest Thermofisher Scientific mass spectrometry platforms with the Maglab's high field Fourier Transform ion cyclotron resonance (FT-ICR) instruments. (*MagLab contact: Chris Hendrickson, ICR*)

Virginia Diodes Inc., Charlottesville, VA: VDI is a technology company specializing in high-frequency microwave sources and detectors. The EMR division collaborates with VDI on the development of microwave sources for high-sensitivity high-field EPR spectroscopy. These new sources allow the MagLab to stay at the forefront of high-field EPR instrumentation. The development of high-power solid-state sources for DNP at very high magnetic fields (>30T) is also being planned. *(MagLab contacts: Stephen Hill, Thierry Dubroca, EMR)*

Waters Corporation, Miford, MA: The ICR and Future Fuels Institute are a Waters Corporation, Center of Innovation, and collaborate on advances in instrumentation for biological and petroleum applications. Instrument and ion source advances are provided to both facilities before their commercial release and allow for application development well before mainstream introduction. *(MagLab Contact: Ryan Rodgers, ICR)*

1.9.2 NATIONAL OR INTERNATIONAL LABORATORIES AND INSTITUTES

CHESS (Cornell High Energy Synchrotron Source), Cornell University, Ithaca, NY: MagLab scientists and engineers are collaborating with their counterparts at CHESS to support the establishment of the High Magnetic Field (HMF) X-ray beamline that is being constructed at CHESS. In 2023, potential detectors for the HMF beamline underwent fringe magnetic field testing at the MagLab to ensure functionality. Once completed the HMF will greatly increase the range of DC magnetic fields available in the US for several key synchrotron techniques. (*MagLab contact: Tim Murphy, DC Field*)

EUCARD2 (European Collaboration for Accelerator R&D), Geneva, Switzerland: EUCARD2 is a European Framework collaboration of about 10 European labs aimed at developing kiloamp high-temperature superconductor cables for future application to a high energy LHC. The European emphasis is on Roebel cables of REBCO-coated conductors, but an equally attractive cable for accelerator purposes is a round wire cable made in the Rutherford style out of Bi-2212 (Bi₂Sr₂CaCu₂O_{8-x}). This conductor has been developed at the MagLab under DOE-HEP support in the context of the Bismuth Strand and Cable Collaboration (BSCCo) that unites the MagLab, BNL, FNAL, LBNL, and OST in a team developing this material for accelerator use. The MagLab is now the US point of contact for collaborations between EUCARD2 and the US program. (*MagLab contact: David C. Larbalestier, ASC*)

Fermi National Accelerator Laboratory (FNAL), Batavia, IL: Applied Physics and Superconducting Technology Division, Magnet Systems Department of FNAL manages Nb₃Sn wire procurement for LHC high luminosity upgrade, MS&T physical property measurement lab is contracted by FNAL to measure critical current and residual-resistance-ratio of Nb₃Sn wires as a part of the quality verification program. This collaboration started in 2015 and will continue through the fall of 2023. *(MagLab contact: Jun Lu, MS&T)*

HL-LHC Accelerator Upgrade Project (AUP), Geneva, Switzerland: The AUP is the US contribution to the High-Luminosity Upgrade of the Large Hadron Collider. All the magnets are Nb₃Sn; there is no HTS. AUP will deliver new quadrupole magnets, 20 magnets x 4 coils = 80 coils measuring 4.2m long at 11.4T field and 1.9K, that intensify the focus of the CERN proton beams at the ATLAS and CMS intersection regions, and new crab cavities that rotate the beam slightly and ensure that collisions are head-on even when the focusing magnets are highly converging. These new elements will make physics happen 10 times faster than before (new physics being proportional to luminosity). The Hi-Lumi project in European accounting is around CHF 2.2 billion, AUP cost is \$225 million, and MagLab oversees a \$25 million component to procure 10 tons (7 tons have been delivered as of Feb 2021) of the highest-performing Nb₃Sn conductor ever made and verify its quality by testing critical current and other properties. The AUP is supported by the DOE Office of Science. The AUP team consists of six US laboratories and two universities: Fermilab, Brookhaven National Laboratory, Lawrence Berkeley National Laboratory, SLAC National Accelerator Laboratory, Thomas Jefferson National Accelerator Facility (all DOE national laboratories), the National High Magnetic Field Laboratory, Old Dominion University and the University of Florida. *(MagLab contacts: Lance Cooley, David C. Larbalestier, ASC)*

International Electrotechnical Commission (IEC)/ Versailles Project on Advanced Materials and Standards (VAMAS), Japan: This collaboration is a worldwide round-robin measurement of the critical current of superconducting BSCCO-2223 cable. The participants are a testing lab in Japan, Korea, the US, the UK, France, and China. The materials group in the MagLab's magnet science and technology division is the US participant. The measurement at the MagLab was completed in 2022. The outcome and the final report of the worldwide round-robin effort by VAMAS is expected in 2023. (*MagLab contact: Jun Lu, MS&T*)

International Thermonuclear Experimental Reactor (ITER), US-ITER Project Office, Oak Ridge National Laboratory (ORNL), Oak Ridge, TN: The United States is part of an exciting international collaboration to demonstrate the feasibility of an experimental fusion reactor that is under construction in France. MS&T's physical property measurement lab has been preparing Nb₃Sn wire samples as a witness for heat treatment ITER central solenoid modules, coax joints, and bus bars. The MagLab subsequently measures the critical current of these heat treatment witness samples. (*MagLab contact: Jun Lu, MS&T*)

Japan Proton Accelerator Research Complex (J-PARC), Japan: The Applied Superconductivity Center ASC is collaborating with the Japan Proton Accelerator Research Complex J-PARC to perform neutrondiffraction experiments on RRP[®] Nb₃Sn wires to find the origin of the strain irreversibility cliff in these conductors and to identify the different phases present in the conductor after heat-treatments. This collaboration also includes Kozo Osamura from the Research Institute for Applied Sciences RIAS (Kyoto, Japan) and Shutaro Machiya from Daido University (Nagoya, Japan). Work from this collaboration will expand to also include other conductors currently being developed such as Nb₃Sn containing additional pinning centers. (*MagLab contacts: Najib Cheggour, Peter J. Lee, ASC*)

Jefferson Lab, Newport News, VA: Recently, Nitrogen and Titanium doping have emerged as highly effective methods of improving the quality factor on Nb SRF cavities; the Applied Superconductivity Center is working with scientists at Jefferson Lab to evaluate the interaction between prior cold work and doping treatment of Nb samples and their influence on the superconducting properties. Doping is carried out at Jefferson Lab and superconducting property measurements, including magneto-optical imaging area carried out at the MagLab. (*MagLab contacts: Peter J. Lee, Lance Cooley, ASC*)

Key Laboratory of Electromagnetic Processing of Materials, Northeastern University, Shenyang, China: The collaboration between Northeastern University and the MagLab is related to the magnetic field impact on the fabrication of high-strength conductors and magnetic materials. Two joint papers have been published between 2019 and 2021. (*MagLab contact: Ke Han, MS&T*)

Korea Advanced Institute of Science and Technology (KAIST), Daejeon, South Korea: Professor Hyoungsoon Choi's group at the Korea Institute of Science and Technology (KAIST) has developed a cooperative agreement with Professor Yoonseok Lee and the MagLab's High B/T Facility for the study and development of the design of coolant materials used in nuclear demagnetization refrigerators. The collaboration focuses on the techniques and expertise required to produce high residual resistant ratios for the metallic materials used for the coolants and the associated components. KAIST is a leading center for ultra-low temperature research in Korea. (*MagLab contact: Yoonseok Lee, High B/T*)

Lawrence Berkeley Laboratory, Accelerator, Berkeley, CA: The Applied Superconductivity Center is collaborating with the Lawrence Berkeley National Laboratory (LBNL) to test strain properties of high-performance RRP[®] Nb₃Sn wires to be used in the LBNL Test Facility Dipole Project (TFD). This collaboration will explore the strain sensitivity of a specific Nb₃Sn conductor to help LBNL researchers decide early in the project whether this conductor is suitable for TFD. *(MagLab contact: Najib Cheggour, ASC)*

Lawrence Berkeley National Laboratory (LBNL), Berkeley, CA: Division of Accelerator Technology and Applied Physics collaborated with MS&T physical property measurement lab in critical current measurement of Nb₃Sn superconducting wires that are used in the development of the accelerator magnets and the test facility dipole (TFD) magnet, which will be installed at the Fermi National Accelerator Laboratory. This Nb₃Sn wire testing collaboration consists of three projects: A) wire for canted cosine theta (CCT) dipole magnet development; B) wire for electron cyclotron resonance (ECR) source magnet at the facility for rare isotope beam (FRIB) at Michigan State University, and C) the above mentioned TFD magnet (MagLab contact: Jun Lu, MS&T)

Lawrence Berkeley Laboratory, Accelerator, Berkeley, CA: The Applied Superconductivity Center is collaborating with the Lawrence Berkeley National Laboratory (LBNL) to heat-treat and test accelerator-type model coils (racetrack and CCT) based on Bi-2212 Rutherford cable conductor. (MagLab contact: Daniel Davis, ASC)

Lawrence Livermore National Laboratory, Livermore, CA: The Applied Superconductivity Center and the Magnet Science and Technology division of the MagLab are collaborating with researchers at Lawrence Livermore National Laboratory to develop cavity resonators and magnets for the Advanced Dark Matter Experiment. Fabrication and microstructural characterization facilities in the ASC are used to investigate Nb₃Sn and other superconducting coatings for use in cavities. Magnet Science and Technology consultation related to very large and high-field detector magnets is ongoing. (*MagLab contact: Lance Cooley, ASC*)

Los Alamos National Laboratory Community Programs Office, Los Alamos, NM: CIRL works closely with our counterpart, the Los Alamos National Laboratory Community Programs Office. Over the last year, the MagLab has developed a partnership to share information and resources on our educational activities.

The community programs office has a large staff that oversees more than 15 different educational/ community outreach programs including the Bradbury Museum. (*MagLab contact: Carlos R. Villa, CIRL*)

Los Angeles County Museum of Natural History, Los Angeles, CA: The collaboration between the IVPP and the MagLab is related to the investigation of Late Cenozoic Vertebrate Paleontology and Paleoenvironments of the Tibetan Plateau (China). Stable isotopic compositions of the samples collected in this project are analyzed in the Geochemistry Laboratories in the MagLab. (*MagLab contact: Yang Wang, Geochemistry Program*)

National Aeronautic and Space Administration, Washington DC: The MagLab is collaborating with a multi-university NASA University Leadership Institute to research zero-emission aviation. Collaboration members include Florida State University, Georgia Tech, University of Buffalo, University of Kentucky and industrial partners Boeing, Raytheon, and Advanced Magnet Lab. (*MagLab contacts: Wei Guo, MS&T and Lance Cooley, ASC*)

Princeton Plasma Physics Laboratory (PPPL): The Applied Superconductivity Center and PPPL are collaborating on the R&D of high-field superconducting cable coil for use in nuclear fusion systems. In this context, a particular interest exists for CORCTM-type cables made with ReBCO conductors as well as Rutherford-type cables made with Bi-2212 wire. (*MagLab contact: Daniel Davis, ASC*)

South Florida Water Management District (SFWMD), West Palm Beach, FL: The collaboration between the SFWMD and the MagLab is related to the investigation of land use and change on food web structure and mercury cycling in the Everglades. Isotopic compositions of the samples collected in this project were analyzed in the Geochemistry Laboratories in the MagLab. (*MagLab contact: Yang Wang, Geochemistry Program*)

US Magnet Development Program (*MDP***), Berkeley, CA:** The US Magnet Development Program aggressively pursues the development of superconducting accelerator magnets that operate as closely as possible to the fundamental limits of superconducting materials and at the same time minimize or eliminate the need to break in a magnet in a series of steps to achieve its design field strength. MDP looks forward to 15-30 years at accelerators that might be built. CERN is already thinking about a Future Circular Collider at 10x the energy of the present LHC, i.e. > 100TeV, in the 2050 timeframe. An important thing about the FCC is that it is constrained by mountains, and to get to 100TeV, the envisioned Nb₃Sn technology, which has a limit at ~16T, must be replaced by or combined with HTS to get to 20T. However, while MDP partners closely with CERN, the technology being developed is generic, and it is important to note that the physics reach of an accelerator scales with the ring diameter and the field strength. MagLab's major developments to date include pioneering Bi-2212 magnet technology and its high-pressure, high-temperature reaction demonstrating several Bi-2212 coils, demonstrating REBCO cables, and leading the national conductor development effort. LBNL serves as the host institution for the MDP organization. *(MagLab contacts: Lance Cooley, David C. Larbalestier, ASC)*

Woods Hole Oceanographic Institution (WHOI), Falmouth, MA: The collaboration between WHOI and the MagLab is related to ocean crust formation. WHOI is providing samples and analyses of abyssal peridotites, which are analyzed for Hf, Nd and Osisotopic composition. The MagLab also participates in seagoing expeditions. One has been to the mid-Atlantic Ridge; another is planned to the Marion Rise on the southwest Indian Ridge. Samples collected from these expeditions will be analyzed at both the MagLab and WHOI. (*MagLab contact: Vincent Salters, Geochemistry Program*)

Woods Hole Oceanographic Institution (WHOI), Falmouth, MA: The MagLab collaborates with Christopher Reddy and Robert Nelson at WHOI in the characterization of petroleum oil spills at the molecular level, by gas chromatography x gas chromatography and FT-ICR mass spectrometry. Although characterization of the 2010 Macondo wellhead oil has been completed, ongoing research focuses on subsequent physical, chemical, and biological changes of the spillages in the environment, and analysis of future spills. (*MagLab contact: Ryan Rodgers, ICR*)

1.9.3 UNIVERSITIES

Cornell University, Ithaca, New York: The Cornell High Energy Synchrotron Source (CHESS) is building a new beamline for x-ray scattering at high magnetic fields. The MagLab is a partner in this project providing advice on the design of the beamline to accommodate a future magnet using the high-temperature superconductors. (*MagLab contact: Mark Bird*)

Florida State University, College of Education, Tallahassee, FL: The Center for Integrating Research & Learning works closely with faculty from the FSU College of Education to network and strengthen programs on campus and at the lab. The MagLab utilizes the expertise of FSU faculty for research projects and recruits graduate students from FSU departments to conduct research on CIRL programs. (*MagLab contact: Roxanne Hughes, CIRL*)

Michigan State University, Lansing, MI: The Applied Superconductivity Center is collaborating with Michigan State University on a DOE-funded project to study the impact of grain boundaries and associated microstructural defects on the performance of superconducting cavities using the advanced microstructural, microchemical, and electromagnetic characterization techniques and expertise available in the MagLab. (*MagLab contact: Peter J. Lee, ASC*)

Nagoya University, Nagoya, Japan: The Applied Superconductivity Center is collaborating with Nagoya University in the investigation of iron-based superconducting thin films to establish their intrinsic properties and determine their potential for applications using electromagnetic characterization techniques also in the high field and expertise available in the MagLab. (*MagLab contact: Chiara Tarantini, ASC*)

Northwestern University, Evanston, IL: The Applied Superconductivity Center is collaborating with Prof. Halperin at Northwestern University on the investigation by NMR of Nb₃Sn bulk samples produced at the MagLab. (*MagLab contacts: Chiara Tarantini, David C. Larbalestier, ASC*)

Osaka City University, Japan: The EMR group received joint funding with the University of Modena in Italy and Osaka City University in Japan through an International Program sponsored by the Air Force's Asian Office of Aerospace Research and Development (AOARD). This joint program focuses on the quantum properties of molecular magnets. A cooperative agreement between Osaka City University and Florida State University has been established to formalize this collaboration. *(MagLab contact: Stephen Hill, EMR)*

Radboud University, Nijmegen, The Netherlands: The MagLab has partnered with the High Magnetic Field Lab in The Netherlands to develop a 45T hybrid magnet using only 24MW of power. The project was funded by the Dutch government in 2006, and in 2012 an agreement was signed for the MagLab to play a leading role in the development of the Nb₃Sn cable-in-conduit superconducting coil for this magnet system. This will be the fourth hybrid outsert to be developed at the MagLab (MagLab 45T, HZB, FSU SCH, Nijmegen), and the Dutch lab will benefit from our extensive experience. When complete, it is expected to be one of three 45T systems worldwide. The MagLab has delivered the CICC coil to Nijmegen. The Nijmegen lab is building the cryostat and resistive coils. (*MagLab contact: Mark D. Bird*)

Shanghai University, Shanghai, China: The collaboration between Shanghai University and the MagLab is related to the solidification of metallic materials and the application of machine learning to solidification. They have published two joint papers in 2022. (*MagLab contact: Ke Han, MS&T*)

St. Andrews University, UK: The EMR group has an ongoing partnership with St. Andrews University in the UK, involving the development of a high-power (1kW) high-frequency (94GHz) pulsed EPR spectrometer (HiPER) for its user program. *(MagLab contact: Stephen Hill, EMR)*

Tokyo University of Agriculture and Technology, Japan: The Applied Superconductivity Center is collaborating with TUAT in the investigation of iron-based superconducting bulks and films to establish their intrinsic properties and determine their potential for applications using electromagnetic characterization techniques also in the high field and expertise available in the MagLab. (*MagLab contact: Chiara Tarantini, ASC*)

University of Colorado Boulder, Boulder, CO: The NIST-Boulder electromechanical testing facilities were the primary location for the determination of the strain sensitivity of a wide range of superconducting wires, and these important instruments have been transferred to the Applied Superconductivity Center so that this critical work can be continued. (*MagLab contact: Najib Cheggour, ASC*)

University of Edinburgh, UK: The EMR group received funding through a joint program between the National Science Foundation and the Engineering and Physical Sciences Research Council in the UK, enabling an International Collaboration with the Chemistry Department at the University of Edinburgh, Scotland. This joint program involved the development of high-pressure/High-field EPR techniques. *(MagLab contact: Stephen Hill, EMR)*

University of Modena, Italy: The EMR group received joint funding with the University of Modena in Italy and Osaka City University in Japan through an International Program sponsored by the Air Force's Asian Office of Aerospace Research and Development (AOARD). This joint program focuses on the quantum properties of molecular magnets. *(MagLab contact: Stephen Hill, EMR)*

University of Oxford, UK: The Applied Superconductivity Center is collaborating with the University of Oxford in the investigation of doped Nb₃Sn superconducting wires and Fe-based superconductors (FBS) to determine by atom probe tomography the elemental distribution and possible contaminants (in the FBS) and their effect on the superconducting properties. (*MagLab contact: Chiara Tarantini, ASC*)

University of Texas, Arlington, TX: The Applied Superconductivity Center is working with Choong-Un Kim and his research group to understand electrochemical methods to apply refractory metals to copper and copper alloys. Kim's team has unique expertise in preparing non-aqueous methods that ensure very little oxygen is incorporated into the refractory metals, using expertise developed for semiconductor interconnections. The MagLab's microstructural and electromagnetic characterization facilities are used to evaluate the quality of coatings and their properties, including potential use as a superconducting material in a cavity resonator. (*MagLab contact: Lance Cooley, ASC*)

University of Texas, Austin, TX: The Applied Superconductivity Center is collaborating with Prof. Eric Taleff in developing novel heat treatment strategies to improve the performance of superconducting RF cavities. (*MagLab contact: Peter J. Lee, Lance Cooley, ASC*)

1.9.4 COMMUNITY GROUPS AND EDUCATIONAL GROUPS

American Physical Society - Forum on Outreach and Engaging the Public, College Park, MD: The Forum's goal is to increase the public's awareness of physics. CIRL works with this group to utilize best practices and engage in international discussions around physics outreach. *(MagLab contact: Roxanne Hughes, CIRL)*

Applied Superconductivity Educational Foundation (ASEF), Potomac, MD: The mission of the Applied Superconductivity Educational Foundation (ASEF) is to promote exploration, learning, and the exchange of scientific and technical ideas, breakthroughs and accomplishments, and to provide an array of educational and interactive experiences and events. The Applied Superconductivity Educational Foundation (ASEF) engages this vision on a variety of fronts, including the Applied Superconductivity Conference (ASC), the flagship, international conference on applied superconductivity, and ELEVATE, our integrated thrust to promote educational opportunities, professional & leadership development, and outreach between our scientific community and society. Prof. Cooley and Prof. Hellstrom are Board Officers (MagLab contacts: Lance Cooley, Eric Hellstrom, ASC)

Big Bend/Leon Association of Science Teachers (BLAST), Tallahassee, FL: The Big Bend/Leon Association of Science Teachers (BLAST) is a group that brings together formal and informal science educators to establish lines of communication among all persons involved in science education in the North Florida community and foster a life-long interest in the sciences. They do this by coordinating services most conducive to outstanding science educators, including hosting workshops and presentations that aim to increase the knowledge and skills of science teachers. Additionally, they recognize outstanding achievements in science instruction and provide monetary support for science teacher and student projects. (MagLab contact: Carlos R. Villa, CIRL)

Florida Afterschool Network, Tallahassee, FL: The Florida Afterschool Network (FAN) is an organization that is working toward creating and sustaining a statewide infrastructure to establish collaborative public and private partnerships that connect local, state, and national resources supporting afterschool programs that are endorsed or school-linked; develop quality afterschool standards that are endorsed and promoted by statewide stakeholders and through Florida Afterschool Network; and promote public awareness and advocate for policy that expands funding, quality improvement initiatives and accessibility of afterschool programs. The Center for Integrating Research & Learning is a member of the advisory council for this organization. *(MagLab contact: Carlos R. Villa, CIRL)*

Florida A&M University Developmental Research School (FAMU DRS), Tallahassee, FL: FAMU DRS is the lab school of FAMU, a historically black college and university. The mission of FAMU DRS is to conduct research, demonstrations, and evaluations of the management of teaching and learning. FAMU DRS emphasizes mathematics, science, technology, and foreign languages. The MagLab partnered with FAMU DRS to provide a SciGirls Coding Summer Camp to their students to increase the representation of African American women in computer science. *(MagLab contact: Carlos R. Villa, CIRL)*

Florida Association of Science Teachers (FAST), Tallahassee, FL: FAST is a diverse group of teachers, scientists, science educators, science supervisors, curriculum designers, administrators, and educational business partners who have a common goal of improving education for students in the state of Florida. FAST provides a way for all members to keep up with what is happening in education in Florida and across the United States. *(MagLab contact: Carlos R. Villa, CIRL)*

Future Physicists of Florida, Tallahassee, FL: Future Physicists of Florida is an organization dedicated to recognizing talented middle school math and science students and providing educational guidance to these students to prepare them for careers in physics and engineering. CIRL is a partner in the organization. *(MagLab contact: Carlos R. Villa, CIRL)*

Inclusive Graduate Education Network (IGEN), College Park, MD: The MagLab has worked with IGEN to beta test mentor training for mentors at national labs. MagLab staff will be able to participate in the final curriculum to strengthen the quality of mentorship at the MagLab. (*MagLab contact: Kawana Johnson, CIRL*)

Institute of Electrical and Electronic Engineers (IEEE), Piscataway, NJ: The MagLab works with the IEEE Council on Superconductivity to award student fellowships for research and travel. The awards are solicited and reviewed through the council for students nearing the Ph.D. degree. (*MagLab contacts: Eric Hellstrom, Lance Cooley, ASC*)

International Mentoring Association (IMA), Newberry, FL: This organization is a leading source for best practice solutions and support of mentoring and coaching professionals and their programs. The IMA advances individual and organizational development by promoting the use of mentoring best practices in every organizational setting. CIRL staff benefit from the professional development that this organization provides. (*MagLab contact: Kawana Johnson, CIRL*)

Leon County Schools, Tallahassee, FL: CIRL works closely with Leon County Schools (LCS) through our K-12 outreach and our middle school mentorship program. In 2014, CIRL staff worked with Title I elementary school teachers from LCS to develop and facilitate a year-long teacher professional development that culminated in a STEM challenge for students. (*MagLab contact: Carlos R. Villa, CIRL*)

Los Angeles County Museum of Natural History, Los Angeles, CA: The collaboration between the IVPP and the MagLab is related to the investigation of Late Cenozoic Vertebrate Paleontology and Paleoenvironments of the Tibetan Plateau (China). Stable isotopic compositions of the samples collected in this project are analyzed in the Geochemistry Laboratories in the MagLab. (*MagLab contact: Yang Wang, Geochemistry Program*)

National Girls Collaborative Project, Seattle, WA: This is a national nonprofit organization that works to improve girls' interest in and access to STEM programs and careers. CIRL has utilized its publications and webinars for best practices in STEM education. CIRL's research has also informed their work. (*MagLab contact: Roxanne Hughes, CIRL*)

National Postdoc Association, Washington, DC: The National Postdoc Association (NPA) advocates for postdoctoral scholars at a national level and coordinates an annual meeting of postdoctoral scholars, their mentors, and postdoctoral affairs staff. Florida State University is an affiliate member, so all postdocs at the FSU branch receive complimentary membership to the NPA. Additionally, representatives from the lab attend the annual meeting regularly to stay up-to-date on the latest issues and initiatives related to postdoctoral affairs. The NPA provides direct support to postdocs through professional development and a virtual career center. (*MagLab contact: Kawana Johnson, CIRL*)

Supporting Teachers to Encourage the Pursuit of Undergraduate Physics (STEP UP), Miami, FL: STEP UP is a national community of physics teachers, researchers, and professional societies. They have designed high school physics lessons to empower teachers, create cultural change, and inspire young women to pursue physics in college. It is supported by NSF, APS Physics, AAPT, and FIU. (*MagLab contact: Carlos R. Villa, CIRL*)

WFSU-TV, Tallahassee, FL: The Center for Integrating Research & Learning partners with WFSU-TV, the area's public television station, to administer SciGirls. The program includes two summer camps for middle school girls with an interest in science. The collaboration between the MagLab and WFSU-TV has resulted in a successful partnership that has lasted over a decade. (*MagLab contact: Carlos R. Villa, CIRL*)

1.9.5 SPIN-OFFS OR RESEARCH LABORATORIES AND CORPORATIONS

Black Fox LLC, Tallahassee, FL: Black Fox LLC is a spinoff company that builds custom magnetic resonance probes for research institutions. It was formed in 2016. *(MagLab contact: Peter Gor'kov, NMR)*

Center for Advanced Power Systems (CAPS), Tallahassee, FL: The Center for Advanced Power Systems (CAPS) is a multidisciplinary research center organized to perform basic and applied research to advance the field of power systems technology. CAPS's emphasis is on application to electric utility, defense, and transportation, as well as developing an education program to train the next generation of power systems engineers. The research focuses on electric power systems modeling and simulation, power electronics and machines, control systems, thermal management, cyber-security for power systems, high-temperature superconductor characterization, and electrical insulation research. *(MagLab contact: Greg Boebinger)*

Future Fuels Institute, Tallahassee, FL: The Future Fuels Institute (FFI) was established to enhance the existing Ion Cyclotron Resonance (ICR) Program at the MagLab to deal specifically with bio- and fossil fuels, particularly for heavy oils and synthetic crudes. Supported by sponsoring companies and collaborative entities (instrument companies, universities, and research institutes), the FFI works to develop and advance novel techniques for research applications and industrial problem-solving. Recent research has focused on biofuels and recycling efforts for petroleum-based materials (plastics). The institute also serves as a training center for fuel-related science and technology. It is currently part of an international joint laboratory (iC2MC), funded by TotalEnergies. (*MagLab contact/ Director: Ryan Rodgers, ICR*)

High-Performance Materials Institute (HPMI), Tallahassee, FL: The High-Performance Materials Institute (HPMI) is a multidisciplinary research institute for research and education in the field of advanced materials. Currently, HPMI is involved in four primary technology areas: High-Performance Composite and Nanomaterials, Structural Health Monitoring, Multifunctional Nanomaterials Advanced Manufacturing, and Process Modeling. Over the last several years, HPMI has proven a number of technology concepts that have the potential to narrow the gap between research and practical applications of nanotube-based materials. These technologies include magnetic alignment of nanotubes, fabrication of nanotube membranes or bucky papers, production of nanotube composites, modeling of nanotube-epoxy interaction at the molecular level, and characterization of SWNT nanocomposites for mechanical properties, electrical conductivity, thermal management, radiation shielding and EMI attenuation. *(MagLab contact: Greg Boebinger)*

2 USER FACILITIES

2.1 USER PROGRAM

2.1.1 PROPOSAL REVIEW PROCESS

Across all seven facilities, proposals for magnet time are submitted online via <u>https://users.magnet.fsu.edu</u> and reviewed in accordance with the MagLab User Proposal Policy. In brief, each user facility has a User Proposal Review Committee (UPRC) comprised of at least seven members, with more external members than internal. UPRC memberships are treated confidentially by the laboratory but are available for review by NSF and MagLab advisory committees. Proposal reviews are conducted in strict confidence and are based on two criteria: (1) the scientific and/or technological merit of the proposed research and (2) the "broader impacts" of the proposed work. They are graded online according to a scale, ranging from "A" (Proposal is high quality and magnet time must be given a high priority) to "C" (Proposal is acceptable and magnet time should be granted at MagLab discretion) to "F" (Proposal has little/no merit and magnet time should not be granted). The Facility Directors merge the UPRC recommendations with the availability and scheduling of specific magnets, experimental instrumentation, and user support scientists and make recommendations for magnet time assignments to the MagLab Director. The MagLab Director is responsible for final decisions on scheduling of magnet time based on these recommendations. All 2023 User Proposals can be found in **Appendix 5**.

2.1.2 FUNDING OPPORTUNITIES

2.1.2.1 DEPENDENT CARE TRAVEL GRANT

The MagLab recognizes that caregivers of children and other dependents often shoulder these demands in addition to the challenges of their research careers. For caregivers, travel to the MagLab to conduct experiments or to conferences to disseminate research findings often incurs extra costs for dependent care. Since 2011, the MagLab's Dependent Care Travel Grant (DCTG) program has offered up to \$800 per year for travel expenses for MagLab scientists traveling to conferences or MagLab users traveling to any of the three MagLab facilities. Beginning in 2023, the MagLab is proud that the DCTG Program is endowed at a level enabling \$1,200 in annual grants.

2.1.2.2 FIRST-TIME USER SUPPORT

The NHMFL is charged by the National Science Foundation with developing and maintaining facilities for magnet-related research that are open to all qualified scientists and engineers through a peer-reviewed proposal process. Facilities are generally available to users without cost. To encourage new research activities, first-time users are provided financial support for travel expenses. International users are provided \$1,000 of support and domestic users are provided \$500 of support for their travel costs. This funding is provided by the State of Florida and is available for Tallahassee user facilities only.

2.1.2.3 VISITING SCIENTIST PROGRAM (VSP)

The National High Magnetic Field Laboratory provides researchers from academia, industry, and national laboratories the opportunity to utilize the unique, world-class facilities of the laboratory to conduct magnet-related research. In 2023, the Visiting Scientist Program provided financial support of \$24,250 for four research projects on a competitive basis. To apply for support from the Visiting Scientist Program, interested researchers are required to submit an application and a proposal that will be reviewed by appropriate facility directors and scientists at the MagLab. All requests for support must be submitted online at https://vsp.magnet.fsu.edu/.

2.1.2.4 USER COLLABORATION GRANTS PROGRAM (UCGP)

The National Science Foundation charged the National High Magnetic Field Laboratory with developing an internal grants program that utilizes the MagLab facilities to carry out high-quality research at the forefront of science and engineering and advances the facilities and their scientific and technical capabilities. User Collaboration Grants Program, established in 1996, stimulates magnet and facility development and provides intellectual leadership for research in magnetic materials and phenomena.

The Program strongly encourages collaboration between MagLab scientists and external users of MagLab facilities. Projects are also encouraged to drive new or unique research, i.e., serve as seed money to develop initial data leading to external funding of a larger program. Per NSF policies, the MagLab cannot fund clinical studies.

Twenty-two (22) UCGP solicitations have now been completed with a total of 624 pre-proposals being submitted for review. Of the 624 proposals, 333 were selected to advance to the second phase of review and 152 were funded (24% of the total number of submissions).

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2.1.2.4.1. 2023 SOLICITATION AND AWARDS

The MagLab UCGP has been highly successful as a mechanism for supporting outstanding projects in the various areas of research pursued at the laboratory. It uses a two-stage proposal review process that is handled using a web-based system. The proposal review is done by a combination of internal and external reviewers. Details of the process and review criteria are available on the website <u>https://ucgp.magnet.fsu.edu/Guidance/ReviewCriteriaAndProcess</u>. The most recent solicitation is complete, and its awards will be issued approximately in March 2024.

Of the 8 pre-proposals received, 7 advanced to the full proposal stage. Of the 7 full proposals, 4 were awarded. A breakdown of the review results is presented in **Tables 2.1.1 and 2.1.2**.

Research Area	Pre-Proposals Submitted	Pre-Proposals Proceeding to Full Proposal	Projects Funded
Condensed Matter Science	5	5	2
Biological & Chemical Sciences	2	1	1
Magnet & Magnet Materials Technology	1	1	1
Total	8	7	4

Table 2.1.2. UCGP Funded Projects from 2023 Solicitation.

Principal Investigator	MagLab Institution	PROJECT TITLE	FUNDING
Alexey Suslov	FSU	Cryogenic Preamplifiers: Enhancing NHMFL DC Field Facility	\$234k
Rasul Gazizulin	UF	Routine High Magnetic Field Study of two-dimensional electron systems below 10mK	\$228k
Jan Jaroszynski	FSU	Advancing lengthwise assessment of REBCO tapes using force magnetometry	\$210k
Tomas Orlando	FSU	High power and phase control of Electron Paramagnetic Resonance (EPR) at 240GHz	\$228k

2.1.2.4.2. FUTURE SOLICITATIONS

The next solicitation announcement is planned to occur around April 2024.

2.1.2.4.3. RESULTS REPORTING

To assess the success of the UCGP, reports were requested in January 2023, on 22 grants issued from the five solicitations which had start dates from 2018 through 2023. At the time of the reporting, some of these grants were in progress, and some had been completed. For this "retrospective" reporting, PIs were asked to include external grants, MagLab facilities enhancements, and publications that were generated by the UCGP. Since UCGP grants are intended to seed new research through high-risk initial study or facility enhancements, principal investigators (PIs) were allowed and encouraged to report results that their UCGP grant had made possible, even if these were obtained after the term of the UCGP grant was complete.

The PIs reported:

- Lab enhancements, which are listed in Table 2.1.3.
- At least partial support for 16 undergraduate researchers, 23 grad students, and 12 postdocs.
- 11 funded external grants, which were seeded by results from UCGP awards. The total dollar value of the external grants was \$3.7M.
- 52 publications, many in high profile journals, including 1 in JACS, 1 in Nature Communications, 1 in Nature Catalysis, 11 in Physical Review Letters, 1 in PNAS, and 1 in Science.

Enhancement	Date Available	Users Groups*
Rapid high-resolution temperature dependence of heat capacity	06/01/2020	8
ARS Cryocooler System for Parahydrogen Enrichment to 99%	06/01/2021	8
High-resolution angle-dependent heat capacity	12/01/2020	8
Lowered electron temperature in dilution fridge > 300mK < 30mK	06/01/2021	7
High-resolution heat capacity < 0.01pJ/K^206/01/202		6
Magnetometer for Large Magnet Moments with Strong Magnetic Anisotropy	06/01/2021	6

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Enhancement	Date Available	Users Groups*
Rapid field sweeping measurement of heat capacity, up to 5T/min	01/01/2020	5
Packed Bed Heterogeneous Catalytic Reactor for Continuous-Flow Hyperpolarization	05/01/2022	5
Batch Catalytic Reactor System with Automated NMR Acquisition	02/01/2023	4
Ultrasonic Spray Injection Reactor System	06/01/2022	4
Online liquid chromatography for environmental applications (metal and organic speciation	09/01/2022	3
Radio Frequency pulse control within HiPER	02/01/2023	2
Razorbill piezoelectric uniaxial strain/stress	05/31/2019	2
Low-pass filters for ultra-low electron temperatures	11/29/2021	2
Tuning fork thermometer software	12/01/2021	2
Diamond anvil cell for pulsed fields	01/01/2022	1
Ability to measure and separate different components of heat capacity using frequency dependence	01/01/2023	1
Ability to measure spin-lattice relaxation rate using heat capacity	01/01/2023	1
Ultra-low-temperature NMR spectrometers at Bay 2 of High B/T facilities	01/31/2020	1
Magneto-Raman spectroscopy at temperatures down to 2K and high pressures up to 20GPa	03/01/2022	1
PEPPI-MS fractionation	06/06/2020	1
in-house designed and built piezoelectric strain device for pulsed fields	08/01/2021	1
Superconducting cable critical current measurement by using a superconducting transformer	08/01/2021	1
Trace-metal free LC system that can operate at low flow rates	09/01/2022	1
Ultimate3000 LC system, with low flow rate capability	09/01/2022	1
Measurement of dilation with 10x improved sensitivity	10/31/2022	1

* Number of external users (PIs or private companies only) reported to have used the enhancement.

2.1.3 ANNUAL USER PROGRAM SURVEY

The MagLab conducted its thirteenth annual user survey between June 1, 2023, and June 30, 2023. This annual survey guides the MagLab in setting priorities and planning for the future by assisting all seven facilities in responding to user needs and improving the facilities and services. The survey was sent to all MagLab User Principal Investigators (PI) and to their collaborators who received magnet time between June 1, 2022, and May 31, 2023, including PIs who sent samples for experiments performed by laboratory staff scientists. Out of 1,105 eligible users, we received feedback from 256 (23%) users. 21.5% of all external users responded to the survey. All user responses were treated as confidential. **Figures 2.1.3.1**-2.1.3.7 exclude internal responses.

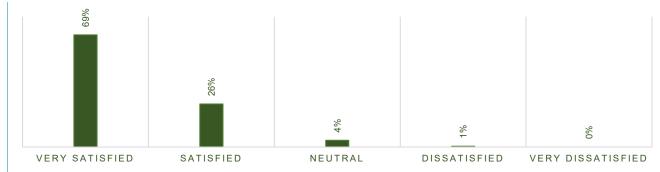


Figure 2.1.3.1. 95% of external users were satisfied or very satisfied with the proposal process (e.g., submission, review).

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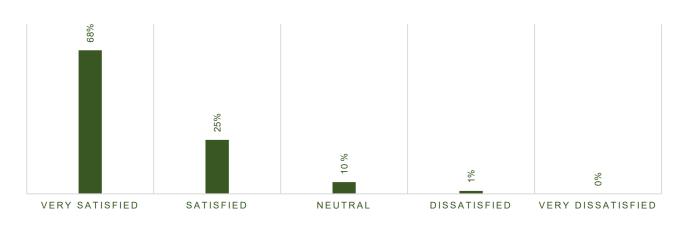


Figure 2.1.3.2. 93% of external users were satisfied or very satisfied with the availability of the facilities and equipment.

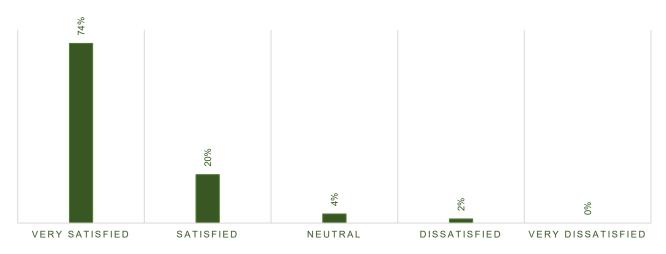


Figure 2.1.3.3. 94% of external users were satisfied or very satisfied with the performance of the facilities and equipment.

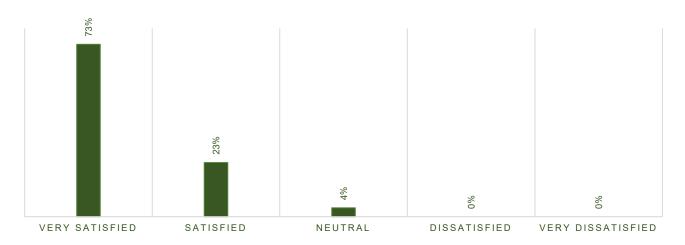


Figure 2.1.3.4. 96% of external users were satisfied or very satisfied with user-friendliness of training and safety procedures.

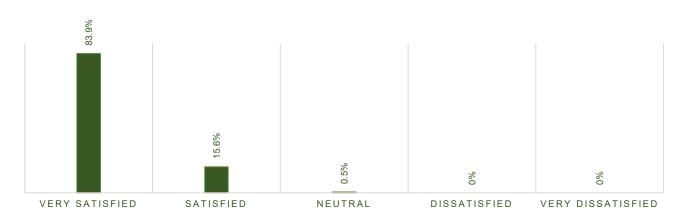


Figure 2.1.3.5. 99.5% of external users were satisfied or very satisfied with the overall safety at the MagLab.

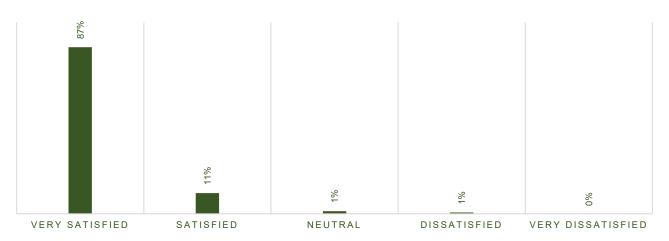


Figure 2.1.3.6. 98% of external users were satisfied or very satisfied with the assistance provided by MagLab facilities technical staff.

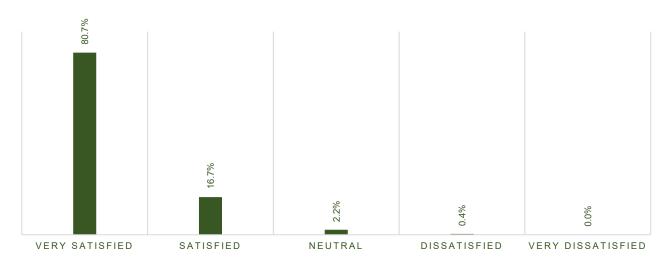


Figure 2.1.3.7. 97.4% of external users were satisfied or very satisfied with the assistance provided by MagLab facilities administrative staff.

2.2 SEVEN USER FACILITIES

2.2.1 AMRIS FACILITY

The AMRIS Facility at the University of Florida supports nuclear magnetic resonance spectroscopy (NMR) and magnetic resonance imaging (MRI) studies of chemical compounds – including micro-samples, biomolecular systems, tissues, small animals, large animals, and humans, as well as functional imaging. We also support studies in materials research, which depend upon ultra-high spatial resolution MRI. AMRIS supports fourteen systems with different magnetic fields and configurations for users for magnetic resonance experiments. The AMRIS staff includes fifteen professional staff members to assist users, maintain instrumentation, build new coils and probes, and help with administration.

2.2.1.1 OPERATION OF A WORLD-LEADING HIGH-MAGNETIC-FIELD USER PROGRAM

2.2.1.1.1 UNIQUE ASPECTS OF INSTRUMENTATION CAPABILITY

AMRIS Magnetic Resonance instruments (Table 2.2.1.1) offer users unique capabilities particularly focused on applications in chemistry and biology: the 750MHz wide bore provides outstanding high-field imaging for excised tissues and small animals as well as diffusion measurements with gradient strengths up to 30T/m; the 11.1T horizontal MRI has a large 400mm bore size and gradient strengths up to 1T/m; our solution NMR instruments have state-of-the-art cryoprobes for natural products, structural biology, metabolomics, and metabolic flux measurements in perfused organs; two dissolution DNP polarizers are available for in vivo measurements of metabolic flux, with a third to be installed in spring 2024. Four spectrometers are now equipped with state-of-the-art Bruker NEO hardware, which support multichannel transmit and receive experiments. These systems support a broad range of science, including natural product identification, membrane protein structure determination, cardiac studies in animals and humans, and the correlation of neural structures with brain function and chemistry. We note that due to decreased funding from the NSF for NMR/MRI user support, our 3.0T MRI/S scanners, 7.0T 200mm MRI/S scanner purchased with an NIH grant in 2022, one 600MHz NMR system, and 500MHz NMR system no longer receive support from the MagLab user program and will no longer be included in annual reporting. These instruments are available on fee-for-service and will continue to be independently administered by the AMRIS Facility. Despite this, the AMRIS user facility offers a world-unique combination of ultra-high field MRI and NMR magnets for a wide range of applications as seen in the below table.

¹ H Frequency	Field (T), Bore (mm)	Homogeneity	Measurements
800MHz	18.8, 63	1ppb	Solution/solid-state NMR and HR-MAS
800MHz	18.8, 54	1ppb	Solution NMR (Cryoprobe)
750MHz	17.6, 89	1ppb	Solution/solid-state NMR and MRI/S
600MHz	14.1, 51	1ppb	NMR, micro imaging, hyperpolarization (10mm Cryoprobe)
600MHz	14.1, 89	1ppb	Solution/ solid-state NMR and hyperpolarization
600MHz	14.1, 51	1ppb	Solution NMR (Micro Cryoprobe)
470MHz	11.1, 400	0.1ppm	DNP, MRI, and NMR of animals
212MHz	5.0, 89	1ppm	DNP polarization
143MHz	3.35, 52	1ppm	DNP polarization

Table 2.2.1.1. NMR and MRI Systems in the AMRIS Facility at UF in Gainesville are available through the MagLab User Program

2.2.1.2 CARRYING OUT IN-HOUSE RESEARCH AND SCIENTIFIC INSTRUMENTATION DEVELOPMENT IN SUPPORT OF THE USER PROGRAM

2.2.1.2.1 FACILITY DEVELOPMENTS AND ENHANCEMENTS

A ²H cryocoil (and related room-temperature coils) are being developed to enable metabolic flux measurements in tandem with proton MRI/S measurements on the 11.1T instrument through funding from a UCGP grant. All of our vertical bore systems can now be operated remotely with users sending samples to AMRIS staff. A new NEO console was installed on the 750MHz/ 89mm wide bore system, providing significantly improved SNR over the prior hardware. The 600MHz wide bore/89mm was upgraded with a 1.9mm HFXY 1.9mm MAS probe, further extending its ¹⁹F NMR capabilities to solid samples. A 5mm diffBB solution probe was added to the available 600MHz probes and allows for high-temperature diffusion NMR with the ease of use and high SNR of a modern solution NMR probe. A new NEO 7T/ 200 mm MRI system with mouse cryocoil was installed and is now available for users on a fee-for-service basis, allowing state-of-the-art rodent MR imaging. An associated HyperSense DNP will be available in spring 2024.

2.2.2.2.2 MAJOR RESEARCH ACTIVITIES AND DISCOVERIES

Our facility is back to full operations for all users after COVID-19 closures and restrictions. However, many of our users continue to collect data remotely. Our staff provides on-site support for users who choose to send samples and remotely control the spectrometers to collect data. This is working well for structural biology experiments, high-resolution *ex vivo* MRI measurements, and diffusion studies of materials. The majority of users on site are conducting *in vivo* studies that require their presence. Local graduate students and postdoctoral fellows continue to develop DNP hyperpolarization and *in vivo* spectroscopy techniques for metabolic studies. AMRIS facility users reported 26 peer-reviewed publications and 7 theses and dissertations during 2023 from magnet time provided through the NSF user program. Three highlights from the publications and graduate research projects are listed below. We note that beginning in 2023 these publications are only for instruments that receive some of their support from the NSF user program; an additional 39 publications were reported from our magnet systems available on a fee-for-service basis.

Different Protein Receptor Responses Resulting from Different Membrane Environments

N. Thakur¹, A.P. Ray¹, L. Sharp², B. Jin¹, A. Duong1, N. Gopal Pour¹, S. Obeng³, A.V. Wijesekara1, Z.-G. Gao⁴, C.R. McCurdy³, K.A. Jacobson⁴, E. Lyman², M.T. Eddy¹

1. University of Florida, Dept. of Chemistry; 2. University of Delaware, Dept. of Physics and Astronomy; 3. University of Florida, Dept. of Medicinal Chemistry; 4. Laboratory of Bioorganic Chemistry, NIDDK, National Institutes of Health **Funding:** Boebinger (NSF DMR-2128556); Eddy (NIH R35GM138291), Lyman (R01GM120351), Gao and Jin (ZIA DK031117)

Citation: Thakur, N.; Ray, A.; Sharp, L.; Jin, B.; Duong, A.; Gopal Pour, N.; Obeng, S.; Wijesekara, A.; Gao, Z.; McCurdy, C.; Jacobson, K.; Lyman, E.; Eddy, M.T., Anionic Phospholipids Control Mechanisms of GPCR-G Protein Recognition, Nature Communications, 14, 794 (2023) <u>doi.org/10.1038/s41467-023-36425-z</u> - <u>Data Set 1</u>, <u>Data Set 2</u>

G-protein-coupled receptors (GPCRs) play a crucial role in many physiological processes, first by detecting signals from external stimuli, such as hormones, neurotransmitters, and drugs, and then by transmitting those signals to the inside of the cell. Despite their significance as drug targets, the impact of the cellular membrane environment on the function of GPCRs is still largely unknown.

In this interdisciplinary collaborative study, MagLab users investigated how phospholipids within the cellular environment strongly influence the response of GPCRs to stimulating drugs. NMR spectroscopy played a central role in this study, allowing researchers to carefully observe receptors and their responses to drugs in different membrane environments (**Figure 2.2.1.1**). State-of-the-art NMR instrumentation at the MagLab is uniquely suited for precise measurements of lipid compositions and simultaneous investigation of receptor proteins on the same instrument through visualization of multiple nuclei, in particular 1H, 19F,

and 31P. By combining NMR data with computational modeling and in vitro experiments, the team research obtained new insights into the molecular mechanisms receptorunderlying lipid interactions.

The specific focus of this work was an adenosine receptor. the target for caffeine, and a validated drug target for Parkinson's disease and several cancers. The success of this study has broad implications for many other receptors, including human receptors for opioids, hormones, and neurotransmitters.

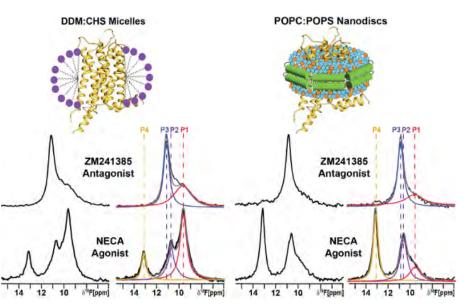


Figure 2.2.1.1: Receptor proteins respond differently to drugs depending on the environment in which they are studied. NMR spectroscopy at the MagLab's AMRIS facility enabled the investigation of the synergistic response between drug efficacy and the membrane environment, demonstrated above by different responses of the same receptor protein in (left) detergents and (right) lipid nanodiscs.

Disentangling Kinetics of CO Oxidation and Mass Transport in Nanoporous Gold using Pulsed Field Gradient NMR

Marcus Bäumer¹, Stefan Wild¹, Amineh Baniani³, Thomas Risse², Evan M. Forman³, Sergey Vasenkov³

1. University of Bremen; 2. Freie Universität Berlin; 3. University of Florida

Funding: G.S. Boebinger (NSF DMR-2128556, DMR-1157490); M. Bäumer and T. Risse (German Research Foundation, BA 1710/29-2 and RI 1025/3-2)

Citation: Baniani, A.; Wild, S.; Forman, E.; Risse, T.; Vasenkov, S.; Baumer, M., Disentangling catalysis and mass transport: Using diffusion measurements by pulsed field gradient NMR to reveal the microkinetics of CO oxidation over nanoporous gold, Journal of Catalysis, 413, 1123--1131 (2022) <u>doi.org/10.1016/j.jcat.2022.08.020</u>

Nanoporous gold, which has pores in the mesopore size range, is a promising candidate for catalytic oxidation of carbon monoxide (CO) to carbon dioxide (CO₂). A fundamental understanding of molecular diffusion in nanoporous gold is of crucial importance to assess its potential applications for catalysis.

In this experiment, MagLab users employed pulsed field (PFG) gradient NMR spectroscopy at a high magnetic field (17.6T) to quantify selfdiffusion of carbon monoxide and carbon dioxide in beds of nanoporous gold particles. Diffusion measurements were performed via ¹³C detection over a broad range of diffusion times to measure displacements both smaller and larger than the dimension relevant of the nanoporous gold particles (Figures 2.2.1.2, 2.2.1.3). The high magnetic field was needed to achieve sufficiently large determine signal-to-noise to diffusion rates. For displacements smaller than the particle size (short diffusion times), two populations are resolved for each studied (1) molecules that sorbate: diffuse inside the particles, and (2) molecules that diffuse in the gas phase outside the particles. These observed species have two different diffusivities, and the ratio between these diffusivities is defined as the tortuosity factor.

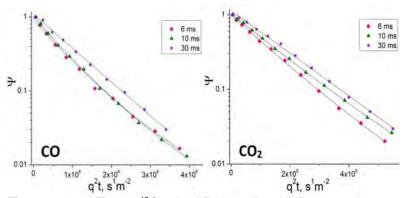


Figure 2.2.2.1. Figure: ¹³C pulsed-field gradient NMR attenuation curves, measured for gas diffusion inside a bed of nanoporous gold particles that are equilibrated with 15 bar of carbon monoxide (CO, at **left**) or carbon dioxide (CO₂ at **right**). The measurements were performed at 296K for the different diffusion times indicated and at the high magnetic field of 17.6T, which realized the higher signal-to-noise necessary to unambiguously identify the optimum particle size for nanoporous gold to catalytically oxidize carbon monoxide to carbon dioxide.

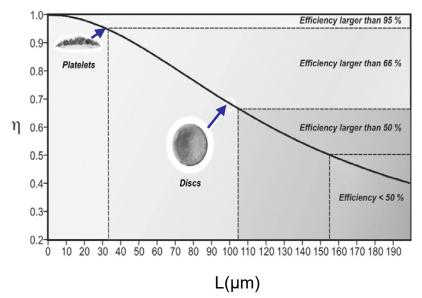


Figure 2.2.1.3. Effectiveness factor (η) of nanoporous gold catalysts exhibiting different shapes and characteristic lengths (L).

The tortuosity factor quantifies how much harder it is for gas to diffuse inside the particles compared to outside the particles. Measuring tortuosity factors enables contributions from mass transport to be disentangled from the kinetics of surface reactions (i.e., microkinetics). This high-magnetic-field technique was able to determine the rate constant and turnover frequency for low-temperature CO oxidation without the ambiguities arising in prior measurements from potential transport limitations. Based on these results, it was possible to predict the optimum catalyst particle size, the size that minimizes the diffusion limitations on the desired reactions, answering the question: which size of nanoporous gold particles is best for use as a catalyst?

A consensus protocol for functional connectivity analysis in the rat brain (Figure 2.2.1.4)

Joanes Grandjean^{1,2}, et al. (including more than 200 researchers in the collaboration) 1. Donders Institute for Brain, Behaviour, and Cognition, Radboud University, Nijmegen, The Netherlands; 2. Department for Medical Imaging, Radboud University Medical Center, Nijmegen, The Netherlands **Funding:** G.S. Boebinger (NSF DMR-1644779)

Citation: Grandjean, J. et al. A consensus protocol for functional connectivity analysis in the rat brain. Nat Neurosci 26, 673–681 (2023). (<u>https://doi.org/10.1038/s41593-023-01286-8</u>) – <u>MultiRat Dataset, StandardRat Dataset 2</u>

Rats are commonly used in pharmacological studies due to their similarities with humans in terms of drug metabolism, brain structure, and ability to learn complex tasks. However, combining and comparing datasets from different experiments has historically been made very difficult because brain imaging data is typically collected under a variety of different conditions (for example, different rat strains, anesthesia, or imaging instrumentation). Researchers at the AMRIS Facility participated in a multi-institution study that developed methods to make rat brain imaging datasets more Findable, Accessible, Interoperable, and Reusable. In this study, the authors aggregated 65 rat brain functional magnetic resonance imaging (fMRI) datasets from 45 institutions collected under a broad variety of conditions. These data were designated as the MultiRat collection and used to develop an optimized consensus protocol and reproducible data analysis pipeline to be used by researchers for rat brain fMRI experiments. A StandardRat collection of 21 datasets taken from the MultiRat collection was prepared based on this protocol. The AMRIS Facility contributed a portion of the data in the MultiRat dataset that was used to develop the standardized protocol. The authors needed to ensure that their protocol would be valid across a wide range of different magnetic resonance imaging instruments, including those with both low and high magnetic field strengths. The MagLab's high magnetic field strength magnets were essential for this purpose.

By using the optimized StandardRat protocol created by the authors, researchers can ensure their datasets can be effectively reused by others. This advancement will facilitate large-scale rat neuroimaging studies across multiple institutions, greatly increasing the current and future availability of high-quality rat brain fMRI data. The adoption of these FAIR data protocols will improve researchers' ability to study rat brain functional connectivity and make discoveries using datasets from a variety of prior experiments. The

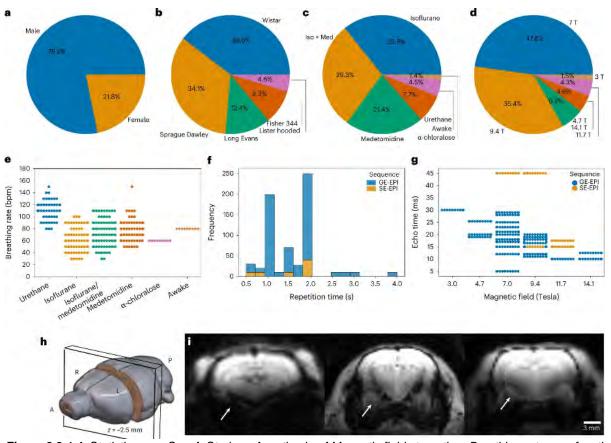


Figure 2.2.1.4. Statistics on **a** Sex, **b** Strain, **c** Anesthesia, **d** Magnetic field strength, **e** Breathing rate as a function of anesthesia, **f** Repetition time, and **g** Echo time as a function of magnetic field strength for the rats and data in MultiRat. **h** Slice position for fMRI examples. **i** Example of representative raw functional images. Arrows indicate different susceptibility artifact-related geometric distortions in the amygdala. **j** Successful anatomical (top) to standard (bottom) space registration. Red lines indicate the outlines of the standard image (top) and the anatomical (bottom). **k** Successful functional (bottom). Image reprinted from the original citation.

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authors have openly shared the datasets, consensus protocol, and reproducible data analysis pipeline in the OpenNeuro database and GitHub to maximize their value for the neuroscience community.

2.2.1.3 MAINTAINING FACILITY AND DEVELOPMENT OF NEW MAGNET SYSTEM INCLUDING OPERATION SCHEDULE AND SHUTDOWNS

2.2.1.3.1 FACILITY PLANS AND DIRECTIONS

Despite the ongoing challenging budgetary climate, our users have consistently and successfully pursued federal funding to support their research programs. This support extends to assisting the AMRIS facility in writing proposals to upgrade instrumentation. The successful partnership between the MagLab user program and individual investigator research grants provides constant scientific motivation for our technology development. One capability of particular focus is enhancing our cryocooled NMR probes and MRI coils to greatly increase sensitivity. To this end, we are supporting the maintenance of conventional NMR cryoprobes as well as HTS NMR cryoprobes developed through our NIH-funded technology center for NMR probe development, the development of an ²H MRI/S cryocoil for our 11.1T MRI/S scanner through a UCGP, and the initiation of a construction project for a new 3mm HTS cryoprobe. The new 3mm HTS cryoprobe, along with our commercial 1.7mm Micro-Cryoprobe, will cover a large range of solution volumes from 30 to 180 microliters for natural product and metabolomic-type samples. We are also boosting Low-E MAS probe capabilities at 800MHz with the construction of 1.6- and 3.2-mm probes for recently added NMR systems. The latest generation Bruker HRMAS iProbe is on order and planned for installation in late 2024 on the 800MHz/63mm system. It will have greatly improved usability for faster sample changing with automated magic-angle adjustment and upgraded gradient and RF coil design for better signal-to-noise and pulse sequence performance to further improve fresh tissue NMR; microwave tissue preservation capabilities were also added at UF. A third dissolution DNP will be installed in spring 2024, providing access for DNP experiments on the new 7T MRI system. As we recover helium, costs for using these systems remain low, allowing us to continue to support technological developments. An NSF MRI proposal was submitted this year to upgrade our aging helium recovery capabilities. A (new to this facility) 800MHz is planned for installation in the location of the retired 4.7T MR system. It will support MAS experiments using specially constructed Low-E MAS probes, and reuse much of the retired 750MHz console.

2.2.2.3.2 FACILITY OPERATION SCHEDULE

The AMRIS facility operates all year, except during the last week of December when the University of Florida is open only for essential operations. Vertical instruments for ex vivo samples are scheduled 24/7, including holidays and weekends. Horizontal instruments operate primarily 8-10 hours/day, 5 days/week due to the difficulty in running animal or human studies overnight, except the 11.1T scanner which operates 7 days a week due to oversubscription. During 2023, the AMRIS Facility was in full operation, with demand continuing to increase post-Covid.

2.2.1.4 CONDUCTING EDUCATION AND OUTREACH ACTIVITIES

During the first six months of the calendar year, former employee Amy Howe coordinated the outreach efforts on behalf of both the AMRIS and High B/T MagLab Facilities at the University of Florida, in Gainesville, FL. Although local K-12 schools were provided with several opportunities to receive either live or virtual sessions and the usage of kits containing interactive magnet activities, requests from local schools remained suppressed during 2023 relative to their pre-pandemic levels. We continued with our promotion of these types of educational outreach through online request forms and links to virtual content on both the main MagLab and UF websites. We also hosted several facility tours and the annual RF Coil Workshop to interact with undergraduate and graduate scientists, whom we encourage to submit their proposals for system usage as needed to achieve their research goals.

For much of the third quarter, the position was vacant, as the hiring process was ongoing. Just before the beginning of the fourth quarter, Eli Wolf became the new Research and Outreach Coordinator. Although primarily occupied with duties related to his facility and university onboarding, he was able to coordinate several tours of the AMRIS facility. He also began to work with UF's Center for Precollegiate Education (CPET) to arrange local K-12 outreach activities, which have been very successful thus far.

The total number of people directly contacted through in-person outreach efforts by the AMRIS and HBT Facility personnel: 74 students and teachers in grades K-12; 131 college undergrad and graduate students and postdocs visiting the Gainesville facilities for a seminar, tour, or workshop; and approximately 145 scientists of various levels either visiting the AMRIS facility or attending professional conferences where the MagLab was promoted by AMRIS or HBT staff.

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2.2.2 DC FIELD FACILITY

The DC Field Facility in Tallahassee serves a large and diverse user community by providing continuously variable magnetic fields in a range and quality unmatched anywhere in the world. The DC Field user community is made up of undergraduate students, graduate students, post-docs, and senior investigators from around the country and the world. State-of-the-art instrumentation is developed and coupled to these magnets through the efforts of our expert scientific and technical staff. The users of the DC Field Facility are supported throughout their visit by the scientific, technical, and administrative staff to ensure that their visit is as productive as possible. The interaction between the NHMFL scientific and technical staff with the students, post-docs, and senior investigators who come to the DC Field Facility to perform their research results in a continuous mix of scientific ideas and advanced techniques that are passed both to and from users.

2.2.2.1 OPERATION OF A WORLD-LEADING HIGH-MAGNETIC-FIELD USER PROGRAM

2.2.2.1.1 UNIQUE ASPECTS OF INSTRUMENTATION CAPABILITY

Table 2.2.2.1. DC Field Magnets

FLORIDA-BITTER and HYBRID MAGNETS			
Field, Bore, (Homogeneity)	Power (MW)	Supported Research	
45T, 32mm, (25ppm/mm) 41.5T, 32mm, (25ppm/mm) 36T, 40mm, (1ppm/mm) ² 35T, 32mm (x2) 31T, 32mm to 50mm ¹ (x2) 25T, 32mm bore (with optical access ports) ³	30.4 32 14 19.2 18.4 27	Magneto-optics – ultra-violet through far infrared; Magnetization; Specific heat; Transport – DC to microwaves; Magnetostriction; High Pressure; Temperatures from 30mK to 1500K; Dependence of optical and transport properties on field, orientation, etc.; Materials processing; Wire, cable, and coil testing. NMR, EMR, and sub/millimeter wave spectroscopy.	
SUPERCONDUCTING MAGNETS			

Field (T), Bore (mm) Sa	mple Temperature	Supported Research
32T, 34mm 18/20T, 52mm 18/20T, 52mm 17.5T, 47mm 10T, 34mm ³ 9T, 25mm ⁴ 7T, 7mm ⁴	14mK – 300K 20mK – 1K 0.3K – 300K 4K – 300K 0.3K – 300K 2.0K – 325K 2.0K – 325K	Magneto-optics – ultra-violet through far infrared, Magnetization, Specific heat, Transport – DC to microwaves, Magnetostriction; High pressure, Temperatures from 20mK to 300K, Dependence of optical and transport properties on field, orientation, etc. Low to medium resolution NMR, EMR, and sub/millimeter wave spectroscopy.

1. A coil for modulating the magnetic field and a coil for superimposing a gradient on the center portion of the main field are wound on 32mm bore tubes.

2. Higher homogeneity magnet for magnetic resonance measurements.

3. Optical ports at the field center with 4 ports each 11.4° vertical x 45° horizontal taken off of a 5mm sample space.

4. Quantum Design PPMS and MPMS user "on-ramp" magnet systems.

Table 2.2.2.1 lists the magnets in the DC Field Facility. The MagLab leads the world in available continuous magnetic field strength, the number of high-field DC magnets available to users, and accessibility for scientific research. The 45T hybrid magnet is one of two 45T magnets, which is reflected in the number of proposals from PIs located overseas. The 41.5T resistive magnet is the highest field resistive magnet in the world. The 36T Series Connected hybrid magnet features two configurations: 40mm bore, with 1ppm homogeneity for chem/bio NMR experiments, and a 48mm bore with 20ppm homogeneity for condensed matter physics experiments in a top-loading cryogenic system. The 35T, 32mm bore and 31T, 50mm bore resistive magnets are coupled to top-loading cryogenic systems that have impressive performance, flexibility, and ease of use. The 25 T Split-Helix magnet is the highest field direct optical access / scattering magnet in the world. With four optical ports located at the field center each having an 11.4° vertical x 45°

horizontal taken off of a 5mm opening, the ability to perform ultrafast, time-resolved, and x-ray scattering experiments are now a reality at high magnetic fields. The 32T all-superconducting magnet is the highest field superconducting magnet available for users anywhere in the world.

2.2.2.2 CARRYING OUT IN-HOUSE RESEARCH AND SCIENTIFIC INSTRUMENTATION DEVELOPMENT IN SUPPORT OF THE USER PROGRAM

2.2.2.2.1 FACILITY DEVELOPMENTS AND ENHANCEMENTS 2.2.2.2.1.1 INSTALLATION OF A SECOND LN2 TANK

An additional LN_2 storage tank was installed at the DCFF in 2023 to increase supply reliability and facility resilience. The new tank has a capacity of 49,000L, which roughly doubles the storage capacity for the DCFF (**Figure 2.2.2.1**). The plumbing for the combined tank system allows for either simultaneous and individual operation increasing the resilience of our helium cryogenic facilities against equipment failure, supply interruptions, and maintenance periods.

2.2.2.2.1.2 NEW FACILITY AIR COMPRESSORS AND DRYERS INSTALLED

Two new industrial air compressors were installed in 2023, replacing the two existing air compressors which had reached the end of their service lives (**Figure 2.2.2.2**). These compressors serve not only the extensive needs of the DCFF but supply compressed air to the entire Tallahassee site as well. The compressors and air dryers are operated in a redundant spare configuration so that in the event of a malfunction in the running compressor the other compressor automatically comes online to take its place. The compressors each have the capacity to supply 5.7m³/min. flow at 6.9 bar of supply pressure. The DCFF uses compressed air to operate hundreds of valves (water, helium, vacuum) across the facility as well as operating the water-cooled magnet disconnects and reversing switches for the 14MW DC power supplies.

2.2.2.2.1.3 INSTALLATION OF 6TH MAGNET COOLING WATER PUMP

During our Fall 2023 annual maintenance shutdown period we began the installation process for our sixth magnet cooling water pump (MCP1F). This pump has a 670kW motor and can output 7,570L/min at 33Bar. The addition of this pump to our lineup makes our two magnet cooling water loops equivalent in terms of flow rate, pressure and cooling power capabilities. Each cooling loop now features two 370kW pumps plus either the older 630kW or the new 670kW pump. It also provides redundancy for the operation of our 30MW and 32MW magnets if the other 630kW magnet cooling water pump needs to be taken offline for service. We will complete installation and testing in the summer of 2024 when we install new variable-speed drives for the four 370kW magnet cooling water pumps. The installation of these drives was originally scheduled for 2023 but contractor and material availability constraints forced us to push back the installation until the summer of 2024.

2.2.2.2.2 MAJOR RESEARCH ACTIVITIES AND DISCOVERIES

MagLab users from Princeton University *discovered an unprecedentedly high superconducting critical current density (17MA/cm2 at 0T) in atomically thin 1T'-WS*₂, exceeding those of all two-dimensional superconductors reported to date. It was also discovered that 1T'-WS₂ features a strongly anisotropic superconducting state that is not only anisotropic with regard to in-plane and out-of-plane orientation of the magnetic field but also within the two-dimensional plane. To measure these anisotropies, the sample was rotated around two different axes with respect to the applied field direction (Figure 2.2.2.4). The maximum in-plane critical field was found to approach 30T, which violates the Pauli paramagnetic limit by a factor of two, signaling the presence of unconventional superconductivity.



Figure 2.2.2.1. The new LN2 tank (right-hand side) is shown installed alongside the existing LN2 tank (left-hand side).



Figure 2.2.2.2. Air compressors, receiver tanks, and dryers are located in the DCFF plant.



Figure 2.2.2.3. Magnet cooling water pump MCP1F and motor shown after being positioned and set on pad.

The discovery of properties such as high supercurrent densities in materials like $1T'-WS_2$ could lead to materials that result in machines and devices that are more efficient and much smaller, such as high-field magnets and high-performance superconducting spintronics. Furthermore, the simultaneous presence of topology and superconductivity in $1T'-WS_2$ establishes it as a topological superconductor candidate which

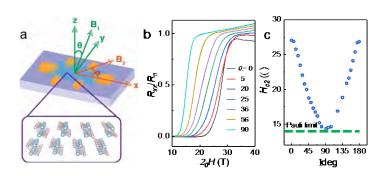


Figure 2.2.2.4 a) Schematic illustration of a 1T'-WS2 device and the rotation experiment setup. **b)** Magnetic field dependence of the normalized resistance of the 1T'-WS2 device at T = 0.33K with different in-plane rotation angles φ . c) The φ -dependence of the upper critical field. The green dashed line indicates the Pauli limit.

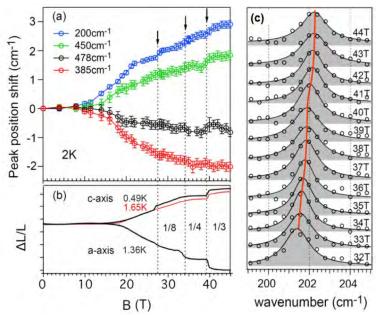


Figure 2.2.2.5. a) Evolution of the energy of four Raman modes of $SrCu_2(BO_3)_2$ with applied magnetic fields up to 45T. The arrows point to the anomalies detected in $200cm^{-1}$ mode coinciding with M/Ms = 1/8, 1/4, and 1/3 phases. b) Magnetostriction of $SrCu_2(BO_3)_2$ along a and c axes measured at magnetic fields up to 45T. c) Evolution of the 200cm-1 pantograph phonon mode with respect to increasing magnetic fields in the range 32-44T. The data points are shown as open circles and the solid lines are the Lorentzian fit of the data.

is a favorable environment for non-Abelian anyons that could enable the construction of a fault-tolerant topological quantum computer. This work was published in *Physical Review Materials.*

Researchers from Florida A&M University. Sorbonne University, NHMFL, HFML (Nijmegen), McMaster University, LANL, and Aix-Marseille conducted University Magneto-Raman scattering experiments and first-principles calculations on $SrCu_2(BO_3)_2$ showing four phonon modes that exhibit a strong magnetic field response that mimics the static magnetic properties observed in magnetic fields up to 45T in magnetization and magnetostriction. The observed Raman mode anomalies provide а direct correlation between the magnetic interaction and the Cu-O-Cu angle and identify which particular phonons facilitate this interaction between the Cu ions (Figure 2.2.2.5).

Understanding the nature and origin of magnetic interactions at the microscopic level is extremely important to realize controllable properties in materials for future applications. Magnetic interactions in novel quantum materials involve correlations between electron spins and the crystal lattice. Raman investigations that can reveal the nature of cooperation between the spins and lattice - known as magnetoelastic coupling - are crucial. A thorough understanding of the quantum phenomena that can be stabilized using external agents such as temperature, pressure, electric field, and magnetic field will facilitate the development of new technologies and applications in the future. This work was published in Physical Review B.

2.2.2.3 MAINTAINING FACILITY AND DEVELOPMENT OF NEW MAGNET SYSTEM INCLUDING OPERATION SCHEDULE AND SHUTDOWNS

2.2.2.3.1 FACILITY PLANS AND DIRECTIONS

2.2.2.3.1.1 INSTALLATION OF SECOND-GENERATION RESISTIVE MAGNET PROTECTION SYSTEMS

The DCFF Electronics Shop has completed the construction, benchtop testing, and validation tests of the first-of-the-line, second-generation resistive magnet protection systems (RMPS II). These systems continuously monitor several water-cooled magnet characteristics (voltage, current, water temperature, coil

temperature, water pressure, etc.), and if any of the monitored quantities exceed the predetermined limits the computer sends a signal to the power supplies to shut down, protecting the magnet and ancillary equipment. The RMPS II software runs on a field programmable gate array (FPGA) computer which allows it to acquire data and take action at high speeds. The deployment plan is to install the first system in the Cell 8 35T magnet and test the system for several weeks to fully validate the design and solve any implementation bugs that arise. Following successful installation in Cell 8 we will move to other magnet cells based on cell availability and other factors.

2.2.2.3.1.2 UPGRADE COMPUTER SYSTEMS FOR THE DISTRIBUTED CONTROL SYSTEM (DCS)

The DCS monitors and controls all the equipment in the DCFF plant (helium, water, electrical) that is used to power, cool, and carry out experiments in the water-cooled magnets. This system is the "brain" of the large-scale DCFF scientific infrastructure and doing this upgrade is the equivalent of performing a brain transplant, thus significant planning and preparation must go into this project. By updating and upgrading the DCS computers, the performance and security of the system are improved.

2.2.2.3.2 FACILITY OPERATION SCHEDULE

At the heart of the DC Field Facility are the four 14MW, low-noise, DC power supplies. Each 20MW or 28MW resistive magnet requires two power supplies to run, the 45T hybrid and the 41.5T resistive magnets each require three power supplies and the 36 T Series Connected Hybrid requires one power supply. Thus, the DC Field Facility operates in the following manner: in a given week there can be four resistive magnets and six superconducting magnets operating or the 45T hybrid/41.5T resistive, series connected hybrid, two resistive magnets and five superconducting magnets. The water-cooled DC resistive and hybrid magnets operated for 39 weeks in 2023 with 11 weeks of shutdown to allow for the installation of new secondary chilled water pumps and facility maintenance and a two-week shutdown period for the university-mandated holiday break from December 18, 2023, to January 3, 2024. The six superconducting magnets operated for 48 weeks out of the year with staggered maintenance periods as required. The daily operation schedule for the resistive and hybrid magnets is as follows: 7 hours/day on Monday and 21 hours/day Tuesday-Friday. The superconducting magnets operate 24 hours/day, 7 days/week.

2.2.2.4 CONDUCTING EDUCATION AND OUTREACH ACTIVITIES

The DC Field Facility operated in a normal (pre-Covid) manner in 2023 as evidenced by the number of users who came to the facility for magnet time. We hosted a booth at the 2023 Las Vegas March Meeting trade show where we introduced the MagLab to potential new users as well as communicated with a large number of current MagLab users.

Appendix 2, Table 9, shows the DC Field Facility attracted **35 new PIs in 2023**. This is in addition to the 24 new PIs reported last year (2022) and 19 reported in 2021.

The Annual DC Field Facility MagLab User Summer School was held on May 15-19 (**Figure 2.2.2.6**) This marked the 16th year of the summer school and we hosted 24 students. It is a five-day series of lectures and practical exercises in experimental condensed matter physics techniques developed and taught by members of the

taught by members of the MagLab scientific staff as well as experts from the industry. It has proven to be an excellent vehicle for communicating valuable experimental knowledge to the next generation of scientists from the enormous trove of knowledge and experience encompassed by the MagLab scientific staff. The feedback from both the students. Users Committee and industry participants was extremely positive.



Figure 2.2.2.6. 2023 MagLab User Summer School students.

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2.2.3 EMR FACILITY

Electron Magnetic Resonance (EMR) covers a variety of magnetic resonance techniques associated with the electron. The most widely employed is Electron Paramagnetic/Spin Resonance (EPR/ESR), which can be performed on anything that contains unpaired electron spins. EPR/ESR has thus proven to be an indispensable tool in a large range of applications in physics, materials science, chemistry, and biology, including studies of impurity states, molecular clusters, molecular magnets; antiferromagnetic/ ferromagnetic compounds in bulk, as well as thin films and nanoparticles; natural or induced radicals, optically excited paramagnetic states, electron spin-based quantum information devices; transition-metal based catalysts; and for structural and dynamical studies of metalloproteins, spin-labeled proteins, and other complex bio-molecules and their synthetic models.

2.2.3.1 OPERATION OF A WORLD-LEADING HIGH-MAGNETIC-FIELD USER PROGRAM

2.2.3.1.1 UNIQUE ASPECTS OF INSTRUMENTATION CAPABILITY

The EMR facility at the MagLab offers users several in-house built, high-field, and multi-high-frequency instruments covering the continuous frequency range from 9GHz to ~1THz. Several transmission probes are available for continuous-wave (CW) measurements, which are compatible with a range of magnets at the Lab, including the highest field 45T hybrid. Some of the probes can be configured with resonant cavities, providing enhanced sensitivity as well as options for in-situ rotation of single-crystal samples in the magnetic field, and the simultaneous application of pressure (up to ~3GPa). Quasi-optical (QO) reflection spectrometers are available in combination with high-resolution 12.5 and 16T superconducting magnet systems; a simple QO spectrometer has also been developed for use in the resistive and hybrid magnets (up to 45T). EMR staff members can assist users in the DC field facility using broadband tunable homodyne and heterodyne spectrometers as well. Moreover, frequency coverage up to ~180THz (6,000cm¹) is now possible through collaboration with staff in the DC field facility using broadband Fourier transform infrared spectroscopy (FIRMS). Also new in 2023 is the operation of an EMR user program in the high-resolution 36T Series Connected Hybrid (SCH) magnet (see highlight below).

In addition to CW capabilities, the MagLab EMR group boasts the highest frequency pulsed EPR spectrometer in the world, operating at 120, 240, 336GHz, and now 316 and 395GHz with < 100ns time resolution. A high-power (1kW) quasi-optical 94GHz spectrometer (HiPER) with 1ns time resolution (1GHz instantaneous bandwidth) is also available. Meanwhile, a commercial Bruker Elexsys 680 operating at 9GHz (X-band) is available upon request. This unique combination of CW and pulsed instruments may be used for a large range of applications in addition to EPR, including the study of optical conductivity, electron cyclotron resonance, and Dynamic Nuclear Polarization (DNP).

Finally, the EMR group collaborates with the NMR program in developing instrumentation for high-field DNP-enhanced NMR studies of solids and solution samples at fields up to 14.1T. The centerpiece of this installation is a quasioptical EPR spectrometer based on a 395GHz high-power CW gyrotron source.

2.2.3.1.2 MAJOR RESEARCH ACTIVITIES AND DISCOVERIES

20 peer-reviewed journal articles were reported by EMR users during the past year, as well as three PhD theses. The quality of publications was again high, including articles in the following journals: Nature publishing group (2); Phys. Rev. Lett. (1); Angew. Chem. (1); Chem. Sci. (1); Chem. Comm. (1); Phys. Rev. (2); Inorg. Chem. and Dalton Trans. (5); J. Mag. Res. and Appl. Mag. Res. (3). Projects in the facility spanned a range of disciplines, from fundamental physics studies of Haldane spin chains (Nat. Comms.) and spin liquids (Phys. Rev. Lett.), to research on molecular magnets and spin qubits (Comms. Phys. and Chem. Sci.), to biochemical investigations of water-soluble endohedral fullerenes (Angew. Chem.). The total number (20) is down slightly from recent years (25 in 2022 and 26 in 2021), which likely reflects the retirement of HiPER support scientist, Likai Song, in 2022.

The EMR Program continued major efforts in support of major center-type research initiatives and international collaborations involving multiple universities. These include the four-year, \$12M DOE-funded Energy Frontier Research Center for Molecular Magnetic Quantum Materials (M²QM) based at the University of Florida (PI and Director – Hai-Ping Cheng; Associate Director – Stephen Hill), with partners at the University of Central Florida, Florida State University, UTEP, Caltech and Los Alamos National Laboratory; an NSF-funded trilateral international collaboration entitled "Molecular Magnetoelectric Materials" involving FSU (Stephen Hill, funded by the US NSF), University College Dublin in Ireland (Professor Grace Morgan, an EMR user, funded by the Science Foundation Ireland), and Queens University Belfast in Northern Ireland (Professor Steven Bell, funded by the Department of the Economy in Northern Ireland); and a collaborative project together with researchers at Lawrence Berkeley National Lab and UC Berkeley, which focuses on "Molecular f-Element Qubits with Controllable Quantum Coherence and Entanglement". In addition to these ongoing projects, a new international collaboration was funded by the Office of Naval Research—Global, linking the MagLab with Osaka Metropolitan University in Japan and the

University of Modena and Reggio Emilia in Italy. This project totals \$900,000 for three years, with \$300,000 supporting international activities within the MagLab EMR program.

We report two 2023 scientific highlights in the next section of this report. The highlighted work, published in the Journal of Magnetic Resonance and Physical Review Letters, involves users from the following institutions: Cal State University – East Bay (a Hispanic serving institution), the University of Durham, UK, UC Santa Barbara, Wake Forest University, Anhui University in China, The University of Tennessee and Georgia Tech.

Terahertz EPR Spectroscopy in the High-Homogeneity 36T Series-Connected Hybrid Magnet:

MagLab scientists have developed instrumentation for performing high-resolution EPR in the high-homogeneity 36T seriesconnected hybrid (SCH) magnet. Τo demonstrate this truly unique new capability, experiments were carried out in collaboration with an external user on a series of Gd^{III} molecular compounds that are of interest as socalled "spin-labels". Such labels can be attached to large biomolecules so that EPR can then be used to report on structural and dynamical properties that cannot be determined by other methods. For example, the larger magnetic moments of electrons compared to nuclei enable distances between spin labels to be determined that exceed those in NMR by an order of magnitude, providing access to structural details of intrinsically disordered proteins that are unobtainable using X-ray techniques. Meanwhile, the higher Larmor frequencies of electrons provide sensitivity to much faster dynamics compared to NMR.

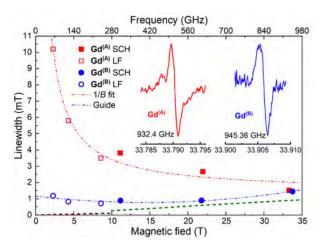


Figure 2.2.3.1. High field EPR spectra of two Gd^{III} spinlabels (Gd^(A) = Gd[DTPA], Gd^(B) = Gd[sTPATCN]-SL, see citation) and linewidth variation with field/frequency, measured in the SCH and a lower-field (LF) spectrometer. Dashed lines at the bottom represent the respective spectrometer resolutions.

In analogy to NMR of certain quadrupolar nuclei (with half-integer nuclear spin, $I > \frac{1}{2}$), the EPR spectrum of Gd^{III} (with electronic spin, $S = \frac{7}{2}$) exhibits a sharp central component with a linewidth that decreases ($\propto 1/B$) with increasing magnetic field, *B*. It is this property that makes Gd^{III} labels ideal for high-resolution biological EPR studies at very high magnetic fields. However, this also requires a magnet with comparable resolution, i.e., the magnetic field variation across the sample must be less than the EPR linewidth. For this reason, experiments must be performed in the SCH magnet.

Figure 2.2.3.1 shows results for two Gd^{III} spin labels. The expected 1/*B* narrowing of the linewidth is found in one case, whereas a weak increase is seen above ~15T for the other sample. In both cases, the SCH spectrometer enables resolution of the exceptionally narrow EPR lines (~1mT width) at the highest magnetic fields, paving the way towards the use of Gd^{III} spin-labels in ultra-high resolution biostructural studies.

Citation: T. Dubroca, X. Wang, F. Mentink-Vigier, B. Trociewitz, M. Starck, D. Parker, M.S. Sherwin, S. Hill, J. Krzystek, *Terahertz EPR spectroscopy using a 36-tesla high-homogeneity series-connected hybrid magnet*, Journal of Magnetic Resonance (accepted, May 2023); <u>https://doi.org/10.1016/j.jmr.2023.107480</u>

Disorder-Enriched Magnetic Excitations in a Heisenberg-Kitaev Quantum Magnet Na₂Co₂TeO₆: Quantum spin liquids represent an intriguing phase of matter that can arise in magnetic materials with certain structures, where quantum fluctuations impede the formation of long-range magnetic order, even at the lowest temperatures. Kitaev's spin- $\frac{1}{2}$ honeycomb model has attracted a lot of interest as it predicts exotic features that could be utilized in future quantum computing schemes. The compound Na₂Co₂TeO₆ has emerged as a potential Kitaev spin-liquid candidate in which the magnetic interactions between the low-energy effective spin- $\frac{1}{2}$ degrees of freedom associated with the cobalt (Co) atoms are highly directional. It is this property and the trigonal symmetry of the lattice that is central to the Kitaev physics.

In this highly collaborative experimental and theoretical study, involving researchers from China and multiple US universities, a combination of far-infrared transmission and high-field electron paramagnetic resonance (EPR) spectroscopy has been employed to investigate the low-temperature magnetic excitations of Na₂Co₂TeO₆ across a wide range of energies (0.2–15meV) and magnetic fields (\leq 17.5T); the work combines capabilities from two MagLab facilities. The measurements reveal extremely rich spectra with a

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surprisingly large number of modes. Theoretical calculations find that disorder associated with the partial occupancy of sodium (Na) sites within the lattice plays a crucial role in generating these modes.

This comprehensive study has resulted in a detailed understanding of the magnetic excitations in Na₂Co₂TeO₆, revealing the key role of disorder associated with the sodium atoms immediately surrounding the cobalt spins. More generally, the work emphasizes the importance of understanding (and possibly controlling) disorder in the spin environment in the search for materials hosting Kitaev physics with potential for future practical applications.

Citation: L. Xiang, R. Dhakal, M. Ozerov, Y. Jiang, B. S. Mou, A. Ozarowski, Q. Huang, H. Zhou, J. Fang, S. M. Winter, Z. Jiang, D. Smirnov, *Disorder-Enriched Magnetic Excitations in a Heisenberg-Kitaev Quantum Magnet Na*₂Co₂TeO₆, Physical Review Letters **131**, 076701 (2023); https://doi.org/10.1103/PhysRevLett.131.076701

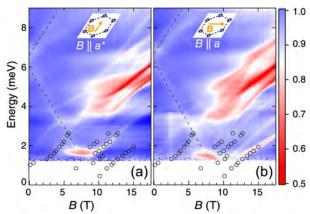


Figure 2.2.3.2. Normalized far-infrared transmission (see color legend) measured on a single-crystal of $Na_2Co_2TeO_6$ at T = 5K, with the applied magnetic field **B**//a^{*} (a) and **B**//a (b) (see insets). Black circles are excitation modes extracted from the EPR spectra measured on powdered samples at T = 5K. Dashed lines are guides to some of the weaker excitation modes.

2.2.3.2 CARRYING OUT IN-HOUSE RESEARCH AND SCIENTIFIC INSTRUMENTATION DEVELOPMENT IN SUPPORT OF THE USER PROGRAM 2.2.3.2.1 FACILITY DEVELOPMENTS AND ENHANCEMENTS

EMR staffing continued to evolve in 2023. As noted in last year's report, after an exhaustive international search, an offer was made to Tomas Orlando to join the group as a permanent staff member (rank of Research Faculty I). He subsequently joined the EMR group in January 2023. Orlando previously held the position of Project Leader at the Max Planck Institute for Multidisciplinary Sciences in Göttingen, Germany, where he built an international reputation in both high-field DNP and EPR. Since arriving, he has taken over the management of the Bruker spectrometer and helped write the proposal that will fund its replacement (see below). At the postdoctoral level, Elvin Salerno moved on to a position funded by the Energy Frontier Research Center for Molecular Magnetic Quantum Materials. Ara received her Ph.D. from Tohoku University in Japan and came to the MagLab via a short postdoctoral stint at Ohio State University. Finally, a wide search was launched to find a replacement for Krish Kundu, who served for several years as the MagLab-funded HiPER postdoctoral fellow. An offer was made to Kavipriya Thangavel who joined the group in January 2024, having recently completed a Ph.D. in the joint doctoral program between the University of Cardiff in the UK and the University of Leipzig in Germany.

A major infrastructure upgrade in 2023 was the ordering of two new superconducting magnets to replace the aging ones associated with the 15/17T Transmission Spectrometer and the high-power pulsed W-band spectrometer, HiPER. These have been the top requests by the EMR User Sub-Committee for the past several years. The replacement magnet for the Transmission Spectrometer was delivered in August 2023. It is rated at 16T at 4.2K, with a sweep rate that is twice that of the old magnet. Since this sweep rate is the main factor limiting data acquisition times, we are hopeful that this will increase future productivity on this spectrometer, which is the most heavily used in the facility. A minor issue related to helium consumption was noted upon testing, requiring a second visit by Oxford Instruments technical staff. At the time of writing of this report, this issue has been resolved and the new magnet will be integrated into the Transmission Spectrometer within the next few weeks. Meanwhile, the HiPER magnet was delivered in December 2023. This is more-or-less a like-for-like replacement, with a 9T maximum field and a 0.1T sweep coil. As with the 16T magnet, a problem was noted upon installation. In this case, the magnet power supply was not functional. At the time of writing of this report, a new power supply is being shipped from Oxford Instruments; testing will take place in the next weeks, and final integration with the HiPER spectrometer is scheduled for May 2024.

In addition to the magnet upgrades, the CW 395GHz gyrotron source that is associated with the joint EMR-NMR DNP facility was replaced in December of last year. The original gyrotron that was delivered to the MagLab in 2013 was still functioning well. However, it had reached end-of-life, meaning that there was a high probability of failure which would have resulted in very significant downtime for the highly successful solid-state DNP-NMR user program, as well as the developmental liquids DNP research effort. The replacement gyrotron outperforms the older one, generating up to 50W of CW power, as opposed to just 30W.

As highlighted elsewhere in this report, EMR operations in the 36T SCH produced the first publication

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in the Journal of Magnetic Resonance in 2023. The work involved a collaboration with researchers from the University of California at Santa Barbara, Cal State East Bay (a Hispanic Serving Institution), and the University of Durham in the UK. As such, this new capability is now available to external users. The 2023 publication focused on some EPR benchmark samples, as well as some Gd(III) complexes that are of potential interest for high-field DNP applications. The importance of the SCH is its high homogeneity, which permits high-resolution studies of very narrow-line EPR spectra, such as carbon-centered radicals and metals with d⁵ or f⁷ configurations that have very weak 2nd-order spin-orbit coupling contributions to their magnetic anisotropy. EMR Research Faculty continues to make improvements to the SCH setup.

2.2.3.3 MAINTAINING FACILITY AND DEVELOPMENT OF NEW MAGNET SYSTEM INCLUDING OPERATION SCHEDULE AND SHUTDOWNS

2.2.3.3.1 FACILITY PLANS AND DIRECTIONS

The most exciting new development in 2023 has been the successful submission and subsequent funding (@ \$2.14M) of a Major Research Instrumentation Program proposal (Track II) to the NSF, targeted at upgrading the aging Bruker E680 spectrometer. Although this instrument operates at low magnetic fields, it is a workhorse of our facility, with many users requesting access for various reasons. In many cases, users simply do not have access to state-of-the-art pulsed EPR spectrometers; so, there is a definite need in the national and international EPR user community. However, there are also many cases where users require low-field spectra to validate high-field results obtained within the facility, often on the exact samples they bring here for investigation. Nevertheless, because of its low operation field, it was clearly necessary to fund this acquisition separately from the MagLab core funding. The proposal submission was driven by six local investigators [Stephen Hill (EMR and Physics); Geoffrey Strouse and Wen Zhu (Chemistry); Hans van Tol, Thierry Dubroca and Tomas Orlando (EMR)], and was supported by 44 local, national and international users. The proposal was submitted in February 2023, funded in August, and orders were placed in October. Delivery of the Bruker system is estimated to occur in August of this year, with delivery of the laser in April.

The E680 was originally configured as a dual X-/W-band (9/94GHz) system. Given the addition of the HiPER W-band spectrometer in 2012, which significantly outperforms the E680 94GHz system in every measure, we opted to upgrade to X-/Q-band configuration. There is a clear demand for Q-band pulsed EPR for many key applications of interest to our users, so this already provides a completely new experimental capability. The upgrade converts the spectrometer to a modern digital console, including integration of a SpinJet Arbitrary Waveform Generator. As well as the addition of the Q-band capability, the new system will include pulsed ENDOR capabilities and high-power amplifiers at X- (600W solid state), Q-band (TWT 300W), and for ENDOR (500W). Furthermore, the probes and cryostat are configured for optical access and a separate tunable laser system is included with the acquisition: 410 – 2500nm, 40mJ at 10Hz repetition rate. This optical excitation capability is also compatible with many of the high-field instruments within the EMR program, thus opening up a completely new experimental dimension to our users, for photophysical, photochemical, energy and quantum science applications. The EMR Users Sub-Committee have been asking for such a capability for several years.

Another major development at FSU, which will also impact the MagLab EMR program over time, is the funding of the FSU Quantum Initiative, including hiring of faculty and postdocs in the areas of Quantum Science and Engineering. At the time of writing of this report, we are interviewing ~20 candidates for up to 8 faculty positions. In addition, the inaugural FSU Quantum Postdoctoral Scholar, Sabastian Atwood (from the group of Christoph Boehme at the University of Utah), will be hired into the EMR group in June. We hope to provide further updates about this initiative in future years.

Two other areas of development include internal funding awarded to the two junior EMR faculty, Dubroca and Orlando. Thierry Dubroca successfully submitted a proposal to the MagLab User Collaboration Grants Program (UCGP) in 2022, with an award made in 2023. His project involves extending hardware capabilities on the W-band pulsed spectrometer, HiPER. These developments include integration of an ENDOR capability, which will also improve NMR acquisition capabilities for pulsed DNP applications. The funding has also enabled us to purchase a 94GHz 10 W solid-state amplifier that, together with the development of a resonator, will allow for generation of longer pulses (currently limited by the duty cycle of the 1kW EIK amplifier), enabling more advanced pulse sequences of importance to the applications of many of our users. Moreover, this capability will provide some needed redundancy in the sense that we currently do not have a backup to the EIK amplifier, i.e., the HiPER program will be able to continue in the event that there is a major failure of the EIK. The solid-state amplifier was delivered in December 2023, and will undergo integration within the next two months. Meanwhile, Orlando's project (funded in January of this year) focuses on upgrading the capabilities of our very high field 240GHz pulsed spectrometer. Although currently an extremely productive instrument within the program, state-of-the-art microwave components have matured at a rapid pace, meaning that there are a handful of instruments around the world with superior performance (many of which were inspired by the MagLab instrument). The key upgrades include boosting the source power by almost an order of magnitude, from 30 to 250mW, integration of an Arbitrary

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Waveform Generator, and an upgraded user interface based on the popular SpecMan4EPR software suite. These improvements will significantly enhance sensitivity, time resolution and the overall user experience. An added benefit of these developments is that Tomas will be able to serve users on what is a very sophisticated instrument. Up to now, Hans van Tol has been the only person qualified to provide user support on the instrument, which is one of the reasons that its overall usage is somewhat lower than the high-frequency CW instrument. These efforts respond to recommendations of the EMR Users Sub-Committee.

2.2.3.3.2 FACILITY OPERATION SCHEDULE

Similar to 2022, operations and activities in the EMR program remained at pre-pandemic levels in 2023, i.e., with the exception of the commercial Bruker spectrometer (see below), the numbers of users, PIs, onsite participation, and proposals were all comparable to rates in 2018 and 2019. The workhorse 15/17T Transmission Spectrometer operated for a total of 261 days during 2023, which is up slightly from 2022 (237 days). One has to go back to 2018 (255 days) to compare to pre-pandemic levels due to the construction that took place in the lab in 2019. Thus, one can see that, within year-to-year fluctuations, this workhorse magnet is back to normal operation. Meanwhile, the 12.5T heterodyne spectrometer logged 198 days of usage, down slightly from 208 days in 2022, but up from the average of ~180 days in recent prepandemic years. This instrument requires more intensive staff support, which is the reason the numbers are consistently lower than the 15/17T system, which can be operated by local students and users without supervision.

A total of 222 days were logged in 2023 on the high-power pulsed 94GHz EPR spectrometer, HiPER, just a small decrease from the 232 days reported in 2019; the slight drop is likely attributable to the retirement of the HiPER support scientist, Likai Song, in 2022. It should be noted that 81 days were devoted to testing, maintenance, and methods development. However, this is quite typical of a normal year due to the significant methods development associated with this unique, cutting-edge spectrometer. Significant inhouse methods development was included in the plan when integrating HiPER into user operations, as much of the cost of the instrument was covered by funding sources separate from the MagLab core. Therefore, HiPER operated at normal capacity during 2023.

The one exception to the return to normal operations in 2023 was the commercial Bruker E680 spectrometer, which logged only 62 days. This is because the pulsed capability failed in late 2021. The instrument continued to operate in CW mode for a short time but was packed up and shipped to Bruker at the end of January 2022. It was eventually shipped back to Tallahassee in early 2023. However, Bruker was unable to fix the problem – hence, it operated only in CW mode for the remainder of 2023. It should be noted that, according to Bruker, this instrument has surpassed its serviceable lifetime of 25 years. Hence, the 62 days in 2023 reflect mostly local user operations (38 days). As noted elsewhere in this report, a successful proposal was submitted to the NSF in 2023 to upgrade this instrument. The new \$2.14M X-/Q-band spectrometer is expected to come online at the end of 2024.

As a whole, the four instruments offered by the EMR User Program were oversubscribed by 84% in 2023, i.e., 1,376 days were requested and 743 total days allocated. Note that the 743 days is up slightly from 699 in 2022, due almost entirely to the Bruker spectrometer coming partially back online in CW mode (it was operated only 22 days in 2022). The 84% oversubscription rate is up dramatically from recent years (20% in 2022), reflecting significantly increased demand for the EMR facility. We are now back to a situation where user activity is limited primarily by available staff time. The number of proposals on file in 2023 was 57, the same number as in 2022. Meanwhile, the oversubscription rate in terms of experiment submissions was 8.1%. Therefore, one sees that the facility continues to provide access to most users who apply for time. However, the number of magnet days that we can offer is severely limited by staff availability.

2.2.3.4 CONDUCTING EDUCATION AND OUTREACH ACTIVITIES

The total number of proposals that received magnet time during 2023 was 57, the same number as 2022, and just below pre-pandemic levels (~60). The number of PIs receiving magnet time was 54 (again, the same as 2022), of which 18 PIs were first-time users, meaning that one-third of our users were new to the program in 2023. Meanwhile, the EMR program assisted 172 individual researchers in 2023, up from 165 in 2022, and also up from 161 before the pandemic in 2019. Of these, 57 were first-time users in 2023, a record for the facility. 70 users were present on-site, a little below the 88 who were on-site before the pandemic in 2019. This is the second year in a row where these numbers are down, perhaps reflecting a trend in more users sending samples, as opposed to traveling to Tallahassee to participate in on-site measurements; as a percentage, 55% of users were on-site in 2019, compared to just 41% in 2023. Such a trend places an additional burden on the already stretched EMR Research Faculty. In terms of diversity, 24% of EMR users were female, and 7% were minority. These numbers are about the same as the previous year (23% and 8%, respectively).

Members of the EMR group continued to ramp up their aggressive efforts to advertise the facility and recruit new users at regional, national, and international conferences and workshops around the globe. As

an example, the EMR Director gave nine invited presentations at conferences during 2023. The EMR group also had a strong presence at the Rocky Mountain Conference (RMC) on Magnetic Resonance and the Southeastern Magnetic Resonance Conference (SEMRC) where we were able to interact with many of our existing users, and also recruit several new ones.

Members of the EMR group served on the organizing committees for the following events in 2023: the International Conference on Molecule-based Magnets (ICMM), organized by Nanjing University in China; the RMC EPR Symposium, which was held in July in Denver; the 3rd Magnetism in North America (MAGNA) conference that was held at Granlibakken Resort at Lake Tahoe, CA, in December. The EMR Director also submitted a successful proposal to the American Physical Society to host an Invited Symposium on "Molecular Spins for Next Generation Quantum Technologies", which was held at the 2023 March Meeting in Las Vegas. Finally, together with chemistry professor Mike Shatruk, the EMR Director organized the 2nd annual two-day Symposium focused on Quantum Science and Engineering at Florida State University in April 2023. This event will be repeated once again in April 2024, also featuring several outside speakers. Together with former EMR graduate student, Sam Greer, the EMR Director has organized a full-day Symposium at the 2024 International Conference on Coordination Chemistry entitled "Electron Paramagnetic Resonance: A Powerful Tool for Studies of Metal Coordination". Several EMR users have been invited to present at this Symposium, and several more EMR Users are expected to attend given that the event takes place in Colorado immediately prior to the RMC. Finally, the EMR Director will serve as the Vice-Chair of the RMC EPR Symposium this coming year, and then as the Chair in 2025.

Lastly, the EMR Director devoted considerable time and effort to a National Academies of Science, Engineering, and Medicine (NASEM) consensus study on *Opportunities at the Interface between Chemistry and Quantum Information Science*, including making presentations of the committee's findings to the sponsors, NSF and DOE, and to congressional staffers. He also presented these findings at the MagLab Users' Workshop in Tallahassee, in September 2023, and at the MAGNA conference in December 2023. The report, which was published in May 2023 (<u>https://doi.org/10.17226/26850</u>), contains multiple recommendations that are of relevance of the MagLab EMR program.

2.2.4 HIGH B/T FACILITY

2.2.4.1 OPERATION OF A WORLD-LEADING HIGH-MAGNETIC-FIELD USER PROGRAM

2.2.4.1.1 UNIQUE ASPECTS OF INSTRUMENTATION CAPABILITY

The High B/T Facility, located on the University of Florida campus, offers users a safe and comfortable atmosphere for performing research in high magnetic fields (up to 16T) and at ultralow temperatures (down to 0.5mK) with an ultra-quiet electromagnetic interference (EMI) environment. The Microkelvin Laboratory, the core of the High B/T Facility, is a separate, specially designed and built building with Tempest-guality shielded rooms to specifically afford access to the extremes of ultralow temperatures and high magnetic fields. Two demagnetization cryostats, one employing a PrN_5 + Cu refrigeration stage, known as Bay 3, the other equipped with a pure Cu stage, known as Bay 2, provide access to the ultralow temperature environments by using high magnetic fields of 8T to adiabatically cool the experimental regions. In other words, the high magnetic fields provide the means of refrigeration for cooling quantum materials in a steady high magnetic field applied to the sample region. In 2023, a Bluefors automated "dry" dilution refrigeration system operating at temperatures below 10mK was opened for user science with no externally applied magnetic field because the delivery of the 14T superconducting magnet was delayed until late November. By mid-December, the third bay, historically known as Bay 1, was fully operational and tested just before the winter holidays, so user access to this instrument will begin in January 2024. The introduction of a "dry" system to the inventory of unique instruments is a step in providing users with sustainable access to extreme environments needed to probe quantum materials while also equipping junior researchers with technical skills that are important for workforces in Florida and the nation. The combination of high magnetic fields with samples cooled to ultralow temperatures in an electromagnetically quiet environment provides users with access to parameter space that they cannot achieve in their home institutions and is also not available in other MagLab facilities. Briefly stated, the High B/T Facility provides users with opportunities to explore quantum matter, devices, and phenomena with unique, specialized probes, cells, and cryostats made inhouse by staff in our facility and in our cryogenics, instrument design-fabrication, and electronics shops. The resulting enhanced understanding of quantum materials will guide the development of devices operating near ambient conditions.

2.2.4.2 CARRYING OUT IN-HOUSE RESEARCH AND SCIENTIFIC INSTRUMENTATION DEVELOPMENT IN SUPPORT OF THE USER PROGRAM

2.2.4.2.1 FACILITY DEVELOPMENTS AND ENHANCEMENTS

Mentioned previously, a Bluefors automated "dry" dilution refrigeration system was installed in 2023. Originally, it was operating at temperatures below 10mK and had no external magnetic field because of a delayed delivery of the 14T superconducting magnet. Once the magnet arrived, it was installed and tested by mid-December so user access to this instrument could begin in January 2024. An important aspect of this instrument is the use of experimental cells that employ pure 3He for cooling the sample and the leads

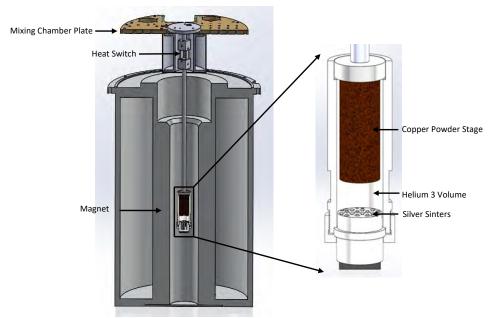


Figure 2.2.4.1. The lowest temperature regions of the planned low-temperature stage for Bay 1 is shown in a threedimensional rendering below the mixing chamber plate. The main experimental cell containing the copper powder demagnetization refrigerant bathed in pure 3He is expected to lower the minimum operating temperature from 10mK to 1mK.

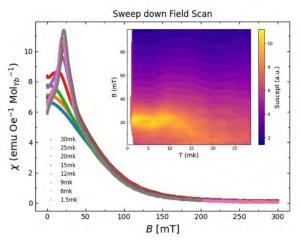
attached to the experimental platform. This approach and the presence of steel shielded rooms facilitate our ability to achieve electron temperatures that are dramatically lower than can be achieved elsewhere. In parallel with the operation of the instrument, MagLab faculty scientist Rasul Gazizulin and MagLab postdoctoral associate Nicolas Silva have been designing a copper powder demagnetization stage in collaboration with international colleagues Richard Haley and George Picket at Lancaster University, UK. **Figure 2.2.4.1.** The objective for this copper powder demagnetization stage is to provide users with a platform operating down to 1mK.

In 2023, the uninterruptible and clean power infrastructure remained in its inoperative state, which has been in its condition since 2020, but its status and critical importance to the MagLab HBT mission were externally reviewed by a team commissioned by the NSF. A report from the recent review team is expected in early 2024, and the findings and recommendation by a UF-commissioned review in 2022 provided important, definitive data used by the 2023 review team. Ultimately, a modern system is needed for robust uninterruptible and clean power to be available so routine electron temperatures below 10mK can be provided in the quantum materials being studied by users.

During the middle of the year, a faculty scientist of the team announced an intention to leave the group, so one of the instruments, Bay 3, could not be efficiently operated. This non-tenure accruing faculty position is funded by the College of Liberal Arts and Sciences and provided to the Department of Physics. An international search was initiated during the Fall 2023 semester, and the visits of candidates were arranged for early January 2024. The High B/T Facility is the smallest operation in the MagLab family, and its user science is facilitated and guided by three full-time faculty scientists. Consequently, the unexpected departure of a member of the group has a major impact on the facility.

2.2.4.2.2 MAJOR RESEARCH ACTIVITIES AND DISCOVERIES

The ultralow temperature magnetism of an ideal triangular lattice system (Alireza Ghasemi^{*}, Collin Broholm, Johns Hopkins University; Chao Huan, Rasul Gazizulin, Lucia Steinke, MagLab HBT and UF Physics, *graduate student). A common request from an external user is to extend existing data to even lower temperatures to facilitate a better understanding of the quantum magnetism in a specific system. In this case, NaBaYb(BO₃)₂ was identified as a striking triangular lattice system that lacked long-range ordering down to 150 mK.[‡] The High B/T team constructed a special cell to study the magnetic susceptibility down to 1.5mK, thereby extending the thermal parameter range by two orders of magnitude, **Figure 2.2.4.2**. MagLab faculty scientist Chao Huan performed a crucial role of running the experiment and suggesting protocols when a significant fraction of work was performed during the pandemic era. Reference: S. Guo, A. Ghasemi, C.L. Broholm, R.J. Cava, *Phys. Rev. Mater.* 3, 094404 (2019).



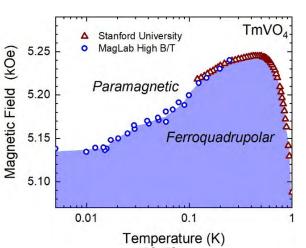


Figure 2.2.4.2. The ac magnetic susceptibility of Na temperatures down 1.5mK. The magnetic response pos field direction down (left) and up (right). These data inc lowest temperatures, and a description of their origin is b

 $T \rightarrow 0$ ferroquadrupolar phase diagram (Mark Zic*, Ian Fisher, Stanford University; Chao Huan and Nicolas Silva†, MagLab HBT and UF

Figure 2.2.4.3. Phase diagram of TmVO4. The data acquired at the High B/T facility (empty circles) agree with the users' high temperature results obtained with an instrument in their home institute. These data extend the range of the phase boundary down to 5mK, thereby placing important constraints on possible theoretical descriptions in the T \rightarrow 0 limit. From M.P. Zic et al., in preparation (2024).

Physics, *graduate student, †postdoc). The increasing synthesis of *f*-electron materials has provided an opportunity to explore magneto-structural dynamics, and TmVO₄ is a fascinating example. Having been characterized over a wide range of parameter space, the behavior in the zero-temperature limit ($T \rightarrow 0$) provides data to discriminate between models and/or parameter values. The MagLab High B/T facility is

uniquely positioned and experienced to perform these studies, extending the low temperature limit of 120mK down to 5mK for this material, **Figure 2.2.4.3**. Reference: M.P Zic *et al.*, arXiv:2308.15577 (2023).

2.2.4.3 MAINTAINING FACILITY AND DEVELOPMENT OF NEW MAGNET SYSTEM INCLUDING OPERATION SCHEDULE AND SHUTDOWNS

2.2.4.3.1 FACILITY PLANS AND ACCESS

Table 2.2.4.1 summarizes the present and future capabilities of the High B/T facilities at the University of Florida, which are described in this section. Proposals for magnet time may be submitted at any time, and contact/discussions with staff is recommended prior to submission. Users work with the faculty scientists to mount and tune the experiments on site. When the experiments begin, a member of the user team remains to assist the staff to perform the instant-to-instant steps, or in some instances, the users consult from off-site locations when the experiments span long periods of time due to the nature of significant relaxation times at the extremes of parameter space.

Table 2.2.4.1. The instrumentation available in the MagLab High B/T Facility tabulated, and their unique combination of temperature, magnetic field, and techniques are highlighted. Specialty shielding and filtering of the equipment provides the ultraquiet electromagnetic interference environment.

Equipment	Features	Supported Research
Bay 3: 16T superconducting magnet, 20mm dia. sample space	Temperatures ≥ 1mK, by 8T demag of PrNi ₅ + Cu stage.	Magnetization, quantum transport, torsional oscillator, viscosity, specific heat, dielectric, MEMS
Bay 2: 8T superconducting magnet, 32mm dia. sample space	Temperatures ≥ 0.5mK, by 8T demag of Copper stage.	NMR, quantum transport, magnetization, heat capacity, pressure cell, thermal transport
Bay 1: 14T superconducting magnet, 32mm dia. sample space	Temperatures ≥ 7mk, fully open for users in January 2024, demag cell in development.	quantum transport, with rotation optical access planned, novel magnetometry, scanning probes
NPB B135 FTA : fast turnaround, 10T superconducting magnet, 52mm dia. sample space	Being relocated/revitalized to NPB B135, ≥ 20mK in 10T / 16T for efficient and fast sample/cell transfer to Bays 1-3, ready in 2024.	Exploratory, novel technique development, sample/cell verification prior to use on Bays 1-3

2.2.4.3.2 FACILITY OPERATION SCHEDULE

Bays 1, 2, and 3 in the Microkelvin Facility are operational and open for new proposals from users. The High B/T Facility is operational year-round, including during University of Florida holidays and campus closure during the final week of December. Experiments can continue overnight and through closures when direct supervision of the experiment is not required. Visiting scientists from outside of Florida typically find short-term housing via online agencies when hotel options become prohibitively expensive. There are several times a year when local housing rates are at maximum levels due to sporting events, graduation weekends, and other special events. Users may contact staff to obtain advice on housing and visiting options.

2.2.4.4 CONDUCTING EDUCATION AND OUTREACH ACTIVITIES

During the first six months of the calendar year, former employee Amy Howe coordinated the outreach efforts on behalf of both the AMRIS and High B/T Facilities at the University of Florida in Gainesville, FL. After an approximately three-month vacancy in the position, Eli Wolf assumed that role for the fourth quarter of 2023. The total number of people directly contacted through in-person outreach efforts by UF MagLab personnel: 74 students and teachers in grades K-12; 131 college undergrad and graduate students and postdocs visiting the Gainesville facilities for a seminar, tour, or workshop; and approximately 145 scientists of various levels either visiting the AMRIS facility or attending professional conferences where MagLab was promoted by AMRIS or HBT staff. Complete details are available in the AMRIS Facility and Outreach sections of this annual report.

2.2.5 ICR FACILITY

During 2022 the Fourier Transform Ion Cyclotron Resonance (ICR) Mass Spectrometry program continued instrument and technique development as well as pursuing novel applications of FT-ICR mass spectrometry. These methods are made available to external users through the NSF National High-Field FT-ICR Mass Spectrometry Facility. The facility features nine staff scientists who support instrumentation, software, biological, petrochemical, and environmental applications, as well as a machinist, technician, and several rotating postdocs who are available to collaborate and/or assist with projects.

2.2.5.1 OPERATION OF A WORLD-LEADING HIGH-MAGNETIC-FIELD USER PROGRAM

The Ion Cyclotron Resonance facility provides sample analysis that requires the ultrahigh resolution $(m/\Delta m_{50\%} > 1,000,000 \text{ at } m/z 500)$, where $\Delta m_{50\%}$ is the full mass spectral peak width at half-maximum peak height) and sub-ppm mass accuracy only achievable by high-field FT-ICR MS. The facility's three FT-ICR mass spectrometers feature high magnetic fields (as high as 21T) and are compatible with multiple ionization and fragmentation techniques.

Field (T), Bore (mm)	Homogeneity	Ionization Techniques
21, 123	< 1ppm	ESI, APPI, APCI, MALDI
14.5, 104	1ppm	ESI, APPI, APCI, MALDI
9.4, 220	1ppm	ESI, APPI

Table 2.2.5.1. ICR systems at the MagLab in Tallahassee

2.2.5.1.1 UNIQUE ASPECTS OF INSTRUMENTATION CAPABILITY

Tesla hybrid linear ion trap-FT-ICR MS. In 2015, the ICR facility commissioned the **first 21T Fourier transform ion cyclotron resonance mass spectrometer**. The 21T magnet is the highest field superconducting magnet ever used for FT-ICR and features high spatial homogeneity, high temporal stability, and negligible liquid helium consumption (**Figure 2.2.5.1**) (*J. Am. Soc. Mass Spectrum.,* **26**, 1626-1632 (2015)).

Mass resolving power of 150,000 (m/ Δ m50%) is achieved for bovine serum albumin (66kDa) for a 0.38second detection period (Figure 2.2.5.2), and greater than 2,000,000 resolving power is achieved for a 12 second detection period. Externally calibrated broadband mass measurement accuracy is typically less than 150ppb rms, with resolving power greater than 300,000 at m/z 400 for a 0.76-second detection period. Combined analysis of electron transfer and collisional dissociation spectra results in 68% sequence coverage for carbonic anhydrase. The instrument is part of the NSF High-Field FT-ICR User Facility and is available free of charge to qualified users, with optimized experimental conditions, including top-down proteomics (J. Amer. Soc. Mass Spectrom., 33, 123-130 (2022)), ultrahigh-resolution ion isolation via SWIFT Fourier Transform mass spectrometry (Anal. Chem., 92, 3213-3219 (2020)), MALDI imaging (Anal. Chem. 92, 3133-3142 (2020)), and natural organic mixture analysis (Commun. Earth Environ., 3, 1-14 (2022)).

The instrument includes a commercial dual linear quadrupole trap front end that features high sensitivity, precise control of trapped ion number, and collisional and electron transfer dissociation. A third linear quadrupole trap offers high ion capacity and ejection efficiency, and rf quadrupole ion injection optics deliver ions to a novel dynamically harmonized ICR cell.



Figure 2.2.5.1. Picture of the 21T FT-ICR mass spectrometer.

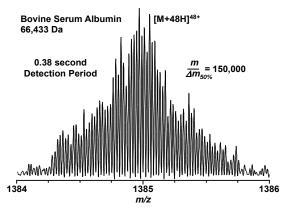


Figure 2.2.5.2. Single-scan electrospray FT-ICR mass spectrum of the isolated 48+ charge state of bovine serum albumin following a 12s detection period. Mass resolving power is approximately 2,000,000, and the signal-to-noise ratio of the most abundant peak is greater than 500:1. The ion accumulation period was 250ms and the ion target was 5,000,000.

14.5 Tesla hybrid linear ion trap-FT-ICR MS. An actively-shielded 14.5T, 104mm bore system offers the highest mass measurement accuracy (<300 parts-per-billion rms error) and highest combination of scan rate and mass resolving power available in the world. The spectrometer features electrospray, atmospheric pressure photoionization (APPI), atmospheric pressure chemical ionization sources (APCI); linear

quadrupole trap for external ion storage, mass selection, and collisional dissociation (CAD); and automatic gain control (AGC) for accurate and precise control of charge delivered to the ICR cell. The combination of AGC and high magnetic field make sub-ppm mass accuracy routine without the need for an internal calibrant. Mass resolving power > 200,000 at m/z 400 is achieved at one scan per second. An additional pumping stage has been added to improve resolution of small molecules.

The 9.4T, passively-shielded, 220mm bore system offers a unique combination of mass resolving power (m/ Δ m = 8.000.000 at mass 9.000 Da) and dynamic range (>10.000:1), as well as high mass range, mass accuracy, dual-electrospray source for accurate internal mass calibration, efficient tandem mass spectrometry (as high as MS⁸), and long ion storage period (J. Am. Soc. Mass Spectrom., **31**, 1783-1802 (2020); Anal. Chem., 92, 12193-12200 (2020)). A redesign to the custom-built mass spectrometer coupled to the 9.4T, 200mm bore superconducting magnet designed around custom vacuum chambers has improved ion optical alignment, minimized distance from the external ion trap to the magnetic field center and facilitated high conductance for effective differential pumping (J. Am. Soc. Mass Spectrom. 22, 1343-1351, (2011)). The length of the transfer optics is 30% shorter than the prior system, for reduced time-offlight mass discrimination and increased ion transmission and trapping efficiency at the ICR cell (J. Am. Soc. Mass Spectrom. 25, 943-949 (2014)). The ICR cell, electrical vacuum feed through, and cabling have been improved to reduce the detection circuit capacitance (and improve detection sensitivity) 2-fold (Rev. Sci. Instrum., 85, 066107 (2014)). When applied to compositionally complex organic mixtures such as dissolved organic matter (Glob. Biogeochem. Cyc., 37, e2022GB007495 (2023), emerging contaminants (Environ. Sci. Tech., 57, 18788-18800 (2023), microplastics (Environ. Sci. Technol., 57, 20097-20106 (2023) biofuels (Energy Fuels, 37, 16612-16628 (2023); Energy Fuels., 37, 11608-11621 (2023) and petroleum fractions (Energy Fuels 37, 8867-8882 (2022). The 21T mass spectrometer performance improves significantly because those mixtures are replete with mass "splits" that are readily separated and identified by FT-ICR MS (Soil Environ. Health, 1, 100023 (2023)). The magnet is passively shielded to allow proper function of all equipment and safety for users. The system features external mass selection prior to ion injection for further increase in dynamic range and rapid (~100ms time scale) MS/MS (Anal. Chem., 75, 3256-3262 (2003)), with ultrahigh-resolution ion isolation via stored waveform inverse Fourier transform (SWIFT) followed by infrared multiphoton (IRMPD) dissociation.

2.2.5.1.2 MAJOR RESEARCH ACTIVITIES AND DISCOVERIES

Complex mixture analysis benefits from the 21T FT-ICR system through high mass-resolving power, mass accuracy, dynamic range, and fast scan speed that enables resolution and confident elemental formula assignment for tens of thousands of unique species in complex organic mixtures (Anal. Chem., 94, 11382-11389 (2022)). We report enhanced speciation of organic N by positive-ion electrospray ionization (ESI) that leverages ultrahigh resolving power (m/ Δ_{m50} % = 1,800,000 at m/z 400) and mass accuracy (<10-100ppb) achieved by FT-ICR MS at 21T. Isobaric overlaps, roughly the mass of an electron ($M_{e^-} = 548 \mu Da$), are resolved across a wide molecular weight range and are more prevalent in positive ESI than negative ESI. The custom-built 21T FT-ICR MS instrument identifies previously unresolved mass differences in CcHhNnOoSs formulas in soil organic matter. Over a billion tons of terrestrial carbon (C) is stored in deep soils from the Southeastern Coastal Plain of the United States, and the stabilization mechanism elucidation requires ultrahigh resolution negative-ion ESI 21T FT-ICR MS and provides the first molecular-level insight into dynamics in the podzolized carbon pool. (Sci. Total. Environ., 906, 167382 (2023). Figure 2.2.5.3 shows the broadband +ESI FTICR mass spectrum for a pyOM extract with more

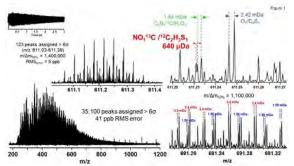


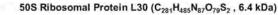
Figure 2.2.5.3. Positive-ion ESI 21T FT-ICR mass spectrum of a pyOM extract. Bottom left: Broadband FT-ICR mass spectrum containing more than 35 000 assigned mass spectral peaks (m/z 200-1200) with a root-mean-square mass error of 41ppb, with $m/\Delta m50\% = 1\ 800\ 000\ at\ m/z\ 400$. Top left: 350mDa mass scale-expanded segment, showing resolution of more than 120 mass spectral peaks at $m/z\ 611$. Bottom right: mass scale-expanded segment across $m/z\ 691.1-691.4$, showing the increase in the number of isobaric overlaps at higher m/z. Top right: ~60mDa mass scale-expanded segment, showing resolution of three isobaric overlaps: 2.42mDa, 1.80mDa, and 640μ Da (mass of an electron is 548 μ Da).

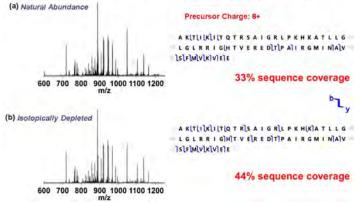
than 35,000 assigned mass spectral peaks between m/z 200 and 1300, centered at m/z 480. The mass scale-expanded segment at m/z 611 highlights the immense spectral density with ~123 peaks within a 0.3mDa window assigned with a RMS error of 5ppb (**Figure 2.2.5.3** (top left)). The theoretical resolving power required to separate equally abundant species that differ in mass by ~640µDa at m/z 600 is 950, 000.

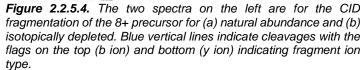
Biological applications of FT-ICR MS

proteomics culminate in "top-down" (Science, 375, 411-418 (2022)), which proteoform-specific structural provides information that is otherwise unobtainable. Human biology is tightly linked to proteins, vet most measurements do not precisely posttranscriptional capture and posttranslational processing. These dictate the distinct molecular proteoforms active in cells. Protein mass measurement by mass spectrometry is complicated by wide isotopic distributions that result from incorporation of heavy isotopes of C, H, N, O, and S, thereby limiting signal-to-noise ratio (SNR) and accurate intact mass determination, particularly for larger proteins.

Observation of the monoisotopic mass-







to-charge ratio (*m*/*z*) is the simplest and most accurate way to determine intact protein mass, but as mass increases, the relative abundance of the monoisotopic peak becomes so low that it is often undetectable. Recently, we used an isotopically depleted growth medium to culture bacterial cells (*Escherichia coli*), resulting in isotopically depleted proteins (*J. Am. Soc. Mass Spectrom.*, **34**, 137-144 (2023). Isotopically depleted proteins show increased sequence coverage, mass measurement accuracy, and increased S/N of the monoisotopic peak by Fourier transform ion cyclotron resonance mass spectrometry analysis, shown in **Figure 2.2.5.4**. We then grew *Caenorhabditis elegans* cells in a medium containing living isotopically depleted *E. coli* cells, thereby producing the first isotopically depleted eukaryotic proteins. This is the first-time isotopic depletion has been implemented for four isotopes (¹H, ¹²C, ¹⁴N, and ¹⁶O), resulting in the highest degree of depletion ever used for protein analysis and further improving MS analysis.

2.2.5.2 CARRYING OUT IN-HOUSE RESEARCH AND SCIENTIFIC INSTRUMENTATION DEVELOPMENT IN SUPPORT OF THE USER PROGRAM

Environmental analysis. The 9.4T and 21T instruments are primed for immediate impact in environmental and petrochemical analysis, where previously intractably complex mixtures are common. The field of "petroleomics" has been developed largely due to the unique ability of high-field FT-ICR mass spectrometry to resolve and identify all of the components in complex environmental, petrochemical, and biofuels samples (*Energy Fuels*, **37**, 16612-16628 (2023); *Energy Fuels*, **37**, 11608-11621 (2023); *iScience*, **25**, 104916 (2022).

Natural Organic Matter (dissolved organic matter) consists of soluble organic materials derived from the partial decomposition of organic materials (*Nat. Commun.*, **13**, 2153 (2022); *Sci. Adv.*, **8**, 27 (2022); *J. Geophys. Res.-Biogeosci.*, **127**, e2022JG006852 (2022); *Anal. Chem.*, **94**, 2973-2980 (2022); *Environ. Sci. Proc.*

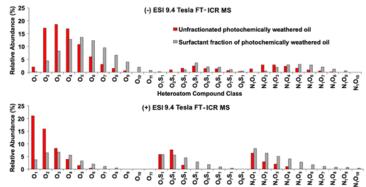


Figure 2.2.5.5. Heteroatom compound class distributions for unfractionated photochemically weathered oil (red) and the interfacial active (surfactant) fraction of photochemically weathered oil (gray) as determined by FT-ICR MS. The oil was introduced to the ion cell using electrospray ionization in negative-ion mode (top) and positive-ion mode (bottom), thereby targeting the acid- and ketone-containing photo-products, respectively. (Environ. Sci. Technol., **57**, 11988-11998 (2023)).

Impacts., **24**, 1661-1677 (2022); *Anal. Chem.*, **94**, 11382-11389 (2022); *Commun. Earth Environ.*, **3**, 1-14 (2022). Figure 2.2.5.5 investigates the microbial carbon pump (MCP) hypothesis suggesting that successive transformation of labile dissolved organic carbon (DOC) by prokaryotes produces refractory DOC (RDOC) and contributes to the long-term stability of the deep ocean DOC reservoir. We tested the MCP by exposing surface water from a deep convective region of the ocean to epipelagic, mesopelagic, and bathypelagic prokaryotic communities and tracked changes in dissolved organic matter concentration, composition, and prokaryotic taxa over time. Prokaryotic taxa from the deep ocean were more efficient at consuming DOC and producing RDOC as evidenced by a greater abundance of highly oxygenated molecules and fluorescent components associated with recalcitrant molecules. This first empirical evidence

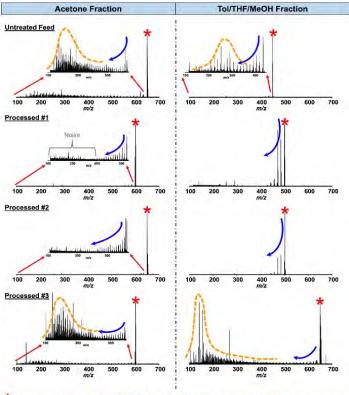
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of the MCP in natural waters shows that carbon sequestration is more efficient in deeper waters and suggests that the higher diversity of prokaryotes from the rare biosphere holds a greater metabolic potential in creating these stable dissolved organic

compounds. Carbon Fiber from Heavy Oil. Carbon paramount materials of fibers are importance for composites applied in fields such as aerospace engineering, medicine, and renewable energy. Currently, most of the production of carbon fibers uses polyacrylonitrile, which incurs significant greenhouse gas emissions and high production costs. Therefore, carbon fiber manufacturing from asphaltene-enriched feedstocks is attractive as it could add value to extra-heavy fossil fuels and cut down precursor costs by ~90%. Figure 2.2.5.6 presents the fragmentation of precursor ions for the acetone (most "island") and Tol/THF/MeOH (most "archipelago") extrography fractions isolated from the C7 asphaltenes. Precursors were isolated at m/z ~450, 500, 600, and 650, which was dependent on the sample mass range and the presence of dominant contaminant peaks at certain m/z ranges. (Energy Fuels 37, 5341-5360 (2023). The results indicate that upon thermal processing, asphaltenerich feedstocks produced a mixture with solubility, diverse i.e., maltenes. asphaltenes, and toluene-insoluble material.

Microplastics in the Ocean. Plastics are accumulating on Earth, including at sea.



* Precursor lons ---- Single-core Derived Fragments ----- Multicore Derived Fragments Figure 2.2.5.6. Infrared multiphoton dissociation, or IRMPD, for selected precursor ions for asphaltene extrography fractions, acetone and ToI/THF/MeOH, for the untreated feed and processed #1, #2, and #2 samples.

The photodegradation of microplastics floating in seawater produces dissolved organic matter (DOM), indicating that sunlight can photodissolve microplastics at the sea surface. To characterize the chemistry of DOM produced as microplastics photodissolve, three microplastics that occur in surface waters, polyethylene (PE), polypropylene (PP), and expanded polystyrene (EPS), were incubated floating on seawater in both the light and the dark (**Figure 2.2.5.7**). Photoproduced DOM included oxygen atoms, indicating that soluble, oxygen-containing organics were formed as plastics photodegrade. The photodissolution of plastics produced hundreds of photoproducts with varying elemental stoichiometries, indicating that a single abiotic process (photochemistry) can generate hundreds of different chemicals from

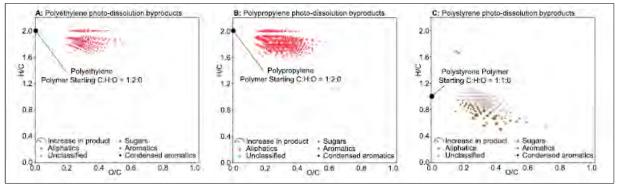


Figure 2.2.5.7. van Krevelen diagrams for CHO-only molecular formulas produced during the photodissolution of the following polymers in seawater: (A) polyethylene; (B) polypropylene; and (C) polystyrene. Color indicates the compound classes assigned to formulas, and the size of the markers indicates the relative production of the formula (i.e., a bigger marker indicates greater production). Marker in black on the y-axis (i.e., O/C = 0) indicates the C/H/O of the polymers. (Environ. Sci. Technol., 57, 20097-20106 (2023).

stoichiometrically monotonous polymers.

Biofuels. In 2022, several studies investigated the quantity of species that are produced when asphalt byproducts were subjected to sunlight over time (*Energy Fuels*, **36**, 13060-13070 (2022); *J. Haz. Mat.*, **424**, 127598 (2022); *Environ. Sci. Technol.*, **56**, 12988-12998 (2022). There is a general paucity of laboratory

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studies surrounding the characterization, transformation, and toxicity of DOMHC produced from the photodissolution of petroleum. Identifying the molecular composition of DOMHC and how it changes over time can lead to important inferences about how it influences bioavailability, dissolution, and toxicity in the environment. (*STOTEN*, **813**, 151884 (2022).

Per-and polyfluoroalkyl substances (PFASs) are a large family of thousands of chemicals, many of which have been identified using nontargeted time-of-flight and Orbitrap mass spectrometry methods. Comprehensive characterization of complex PFAS mixtures is critical to assess their environmental transport, transformation, exposure, and uptake. Because 21 tesla (T) Fourier-transform ion cyclotron resonance mass spectrometry (FT-ICR MS) offers the highest available mass resolving power and sub-ppm mass errors across a wide molecular weight range, we developed a nontargeted 21T FT-ICR MS method to screen for PFASs in an aqueous film-forming foam (AFFF) using suspect screening, a targeted formula database (C, H, Cl, F, N, O, P, S; \leq 865 Da), isotopologues, and Kendrick-analogous mass difference networks (KAMDNs).

2.2.5.3 MAINTAINING FACILITY AND DEVELOPMENT OF NEW MAGNET SYSTEM INCLUDING OPERATION SCHEDULE AND SHUTDOWNS

2.2.5.3.1 FACILITY PLANS AND DIRECTIONS

The ICR facility will continue to expand its user facility using the world's first 21 tesla FT-ICR mass spectrometer, including expansion of the MALDI imaging sampling and acquisition capabilities, LC FT-ICR MS for complex organic mixtures, and upgrade of the front-end of the 21T.

2.2.4.3.2 FACILITY OPERATION SCHEDULE

The ICR facility operates year-round, with weekend instruments scheduled. Throughout 2023, the ICR facility operated with on-site users and users sending samples for data acquisition by internal ICR support staff to maintain an active user program with minimal downtime.

2.2.5.4 CONDUCTING EDUCATION AND OUTREACH ACTIVITIES

2.2.5.4.1 OUTREACH TO GENERATE NEW PROPOSALS-PROGRESS ON STEM AND BUILDING USER COMMUNITY

The ICR program provided magnet time to **23** new principal investigators in 2023. The ICR program also enhanced its undergraduate research and outreach program for several undergraduate scientists through the REU program, in addition to co-supervising and committee service for more than nine graduate students from FAMU-FSU (Huan Chen, 4), Colorado State University (Amy McKenna, 4), University of Delaware (Amy McKenna) and University of Santander, Colombia (Martha L. Chaćon-Patiño, 1). The ICR program in 2023 supported the attendance of research faculty; postdoctoral associates; and graduate, and undergraduate students at numerous in-person, virtual, and hybrid national and international conferences.

In 2023, the ICR facility hosted the 13th North American FTMS Conference in Key West from April 30, 2023-May 3, 2023, with over 80 researchers from all over the world uniting to discuss applications of FTMS to geochemical, biological, environmental, and instrumentation applications.

The ICR facility also co-chaired (Amy McKenna) the 34th American Society of Mass Spectrometry Sanibel Conference on Mass Spectrometry in Energy and the Environment, with five invited talks, including an invited keynote (Ryan Rodgers) and three invited talks (Chad Weisbrod, Martha L. Chaćon-Patiño, Lydia Babcock-Adams).

2.2.5.4.2 EDUCATION AND TRAINING

The ICR program provides education and training to students, postdoctoral associates, faculty, and technical staff at the Cold Springs Harbor (Alberta, Canada), which is a ten-day training intensive workshop on mass spectrometry where ICR staff serve as instructors on various topics. ICR personnel provide handson, individualized training for software and data processing for all users, and also provide tutorial workshopstyle lectures throughout 2023. Several ICR faculty members have served as guest lecturers for both undergraduate and graduate courses at FSU in 2023.

2.2.5.4.3 STEM OUTREACH

The ICR facility actively participates in STEM outreach in local K-12 schools in Leon, Gadsden, Franklin, Jefferson, and Wakulla counties, with demonstrations designed to highlight fundamental principles of ICR.

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2.2.6 NMR FACILITY

The NMR/MRI User Program at the MagLab in Tallahassee (FSU) is partnered with the AMRIS User Program in Gainesville (UF). The research foci in Tallahassee include solid-state NMR (SSNMR) applications to materials science, chemistry, biology, and biochemistry and in vivo magnetic resonance imaging (MRI) of small animals and tissues. There are thirteen active NMR platforms on site, including three flagship instruments supported by the NSF core grant, including (i) the 36T Series Connected Hybrid (36T-SCH) platform, which operates at 35.2T/1.5GHz for ¹H NMR, making it the highest-field magnet for NMR in the world; (ii) the 14.1T/600MHz/395 GHz dynamic nuclear polarization (600-DNP) NMR platform (which also includes an Overhauser DNP setup for liquid-state NMR, 600-ODNP); (iii) the 21.1T/900MHz (900-MRI) ultrawide bore (105mm) MRI platform, which is currently the highest-field MRI/S instrument in existence; as well as (iv) one 20.0T/850MHz (850, new in 2023-2024) and two 18.8T/800 MHz platforms (800#1, 800#2), which are configured for biosolids and materials SSNMR, as well as for methods development and staging of UHF NMR experiments on the flagship platforms. These instruments are unique, in part, due to their coupling with unparalleled staff expertise and some of the world's best NMR probes, which are designed and constructed by our NMR Technology Group. In addition, there are a series of moderate-field instruments (600#1, 600#2, 500, 600-SOL), which are essential for triaging experiments for the high-field instruments, running unique high-temperature and/or ¹H/¹⁹F/X (HFX) experiments, testing new HTS solution NMR probes, and supporting the research of numerous users from around the U.S. and the world, including those from HBCUs, HSIs, WCUs, and PUIs.

The NMR/MRI User Program, which is run by our Research Faculty and staff scientists, and directed by Dr. Robert Schurko, annually serves *ca.* 250-375 users from around the world, including PIs, students, postdocs, and technicians. In 2023, our number of users was **341**, still higher than the pre-pandemic and COVID-pandemic years (2022: **352**, 2021: **311**, 2020: **234**, 2019: **286**). The magnet times for most instruments continue to run at near full capacity; however, this year has seen a number of difficulties with aging instrumentation, with two magnet quenches (**830** and **800-SOL**) and major downtime on the **36T-SCH**. Finally, the number of peer-reviewed publications from the NMR/MRI User Program for 2023 was **45**, significantly lower than in 2022 (**66**), and below the ten-year average (**56.2**). Much of this decline is connected to the aforementioned equipment failures, which are outlined in the sections below; fortunately, most of these issues will be resolved during 2024.

The most exciting event in 2023 was the award of an NIH RM1 grant (GM148766) to PIs Rob Schurko (FSU/NHMFL), Bill Brey (FSU/NHMFL), and Joanna Long (UF/AMRIS) for the support of the *National Resource for Advanced NMR Technology*. This project supports three Technology Development Projects (TDPs), including **TDP1** - *High Sensitivity NMR of Mass Limited Samples, Complex Mixtures, and Structural Biology*, **TDP2** - *Dynamic Nuclear Polarization NMR*, and **TDP3** - *Biomedical NMR Research Beyond the Reach of Conventional NMR Magnets*. These have fostered a number of Driving Biomedical Projects (DBPs) and Technology Partnership Projects (TPPs) with researchers from all over the world.

2.2.6.1 OPERATION OF A WORLD-LEADING HIGH-MAGNETIC-FIELD USER PROGRAM 2.2.6.1.1 UNIQUE ASPECTS OF INSTRUMENTATION CAPABILITY

Ultra-High Field (UHF) NMR: 36T-SCH: The 36T-SCH was in its fifth year of user service in 2023. This platform has resulted in 50 peer-reviewed publications since its commissioning in November 2018 (including **10** in 2023, **11** in 2022, **9** in 2021, and **14** in 2020).

Unfortunately, experiment time was greatly reduced in 2023 (**60** days, ~**90-100** initially allotted, down from **93** days in 2022). The magnet has not been operational since September 2023 (much NMR time was allocated during the end of 2023), because one of the six room-temperature circuit breakers overheated during normal operations (fortunately, there was no magnet damage). The vendor of the breaker (ABB Ltd.) is experiencing personnel shortages and supply chain issues; as a result, the evaluation and repair of the breaker are taking an extremely long time. Once the breaker is returned from ABB, the *DC Field operation* will reinstall it, test, and return the magnet into user service – unfortunately, the earliest projections for this are for August 2024. As a result, the NMR time allocation will again be low in 2024 (the number of days is uncertain, but it will not be near ~**90-100**).

On the bright side, some major positive modifications were made to the 36T-SCH for NMR operations. First, ferroshims were successfully implemented after the replacement of the A-coil (May 2023), giving the magnet new life and resulting in a stable magnetic field. Second, work continues on the cascade field regulation system (CFRS), which suppresses fluctuations and drift of the magnetic field from about 100ppm over 7 hours to an RMS average of 0.3ppm. Although the performance of this system is outstanding, it is not presently sufficient for some SSNMR studies, especially the detection of spin-1/2 nuclides in biological systems. Drs. William Brey (NHMFL) and Jeffrey Schiano (Penn State) continue their work to further improve the suppression of residual fluctuations to 0.1ppm RMS. In 2023, they made modifications to the National Instrument modules that run the CFRS to improve operations; the code for this system is now in

testing of an updated CFRS system will commence in March 2024. In addition, we are currently applying for supplemental funding to support this work.

Despite the aforementioned challenges, the 36T-SCH continues to prove its unmatched value for the SSNMR of half-integer guadrupolar nuclei (i.e., nuclear spins of 3/2, 5/2, 7/2, and 9/2, which constitute 73% of NMR-active nuclides in the periodic table) in a wide range of materials. In 2023, a major focus continues to be ¹⁷O SSNMR of chemicals, materials, and biological systems, where the SCH affords enormous gains in signal (especially for natural abundance samples, n.a.(17O) =

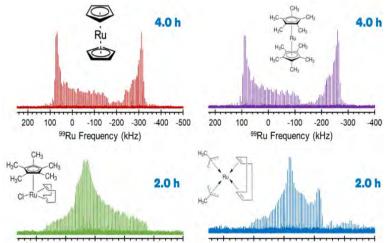


Figure 2.2.6.1. ⁹⁹*ru wurst-cpmg nmr spectra of organometallic compounds collected on at 35.2T on the Series Connected Hybrid.*

0.037%) and resolution (since the central transition patterns of half-integer quadrupolar nuclides narrow as the inverse of B_0).

A new triple-resonance 1.3mm HXY magic-angle spinning (MAS) NMR probe, dedicated for ¹Hdetection experiments and capable of spinning rates as high as 65kHz, was available to users in June 2023. This includes our design of a compact 1.3mm spinner, which will be implemented in all future fast MAS probes. To date, the probe has been tested and applied in HCN mode: fortunately, it is showing better linewidths and resolution (in ppm) than similar probes at 800MHz, since the ¹H peak widths at 35.2T are dominated by the ¹H-¹H dipolar coupling – the homogeneous broadening is largely constant and becomes smaller. New tuning cards were designed for SCH probes, providing access to different nuclides, including ¹⁷O, and low- γ nuclides: ³³S, ⁶⁷Zn, ⁹⁹Ru, and ¹⁰³Rh (**Figure 2.2.6.1**).

DNP NMR: 600-DNP/600-ODNP: The 600MHz DNP platform, a joint effort between NMR, AMRIS, and EMR, which opened for users in late 2018, has yielded **44** publications to date. It features the most efficient high field (*i.e.*, \geq 600MHz/395GHz) MAS DNP instrument in the world that is available to a large user base, due to the improved μ w delivery and unique on-site expertise – as such, it accounts for 40% of all publications from DNP platforms of 14.1T or higher worldwide. This unique DNP platform has both MAS DNP SSNMR (**600-DNP**) and Overhauser DNP (**600-ODNP**) instruments (solids and solutions platforms, respectively, on two separate magnets), which receive μ w irradiation via a quasi-optical table (built-inhouse) that splits the gyrotron μ w beam. Much of the developmental research takes advantage of the expertise across divisions, especially between NMR/MRI and EPR. The DNP system can be operated continuously (24/7) for up to three weeks at a time, unlike any other platform in the world. This enables extremely challenging DNP NMR experiments and support of users across the career spectrum, including early-career professors without routine access to DNP NMR. A benchtop EPR spectrometer and spinner are available for sample screening: these improve sample preparation and minimize probe damage.

Due to the expertise and diligence of Drs. Fred Mentink-Vigier and Thierry Dubroca, the 600-DNP had **227** magnet days in 2023 (out of a maximum of 240, with *ca.* 30 days for service and downtimes, and almost two months for upgrades, *vide infra*), and several new research groups were recruited. In 2023, a 395GHz gyrotron was purchased from Bruker to replace the previous one, which was 10 years old. Installation commenced in late 2023 and was completed in February 2024. There is also a brand-new Bruker NEO console; we repurposed the old console (AVIII) to replace an ancient console (AVI) on the 600#2.

In-house development of MAS DNP NMR probes continued in 2023. The 3.2mm HXY low-temperature (100K) DNP MAS probe, which was commissioned in late 2022, has been heavily utilized over the past year by our users. The team of P. Gor'kov, F. Scott, F. Mentink, and J. Long are pushing forward the construction of new 1.3mm and 1.9mm HXY 100K DNP MAS probes that were under development in 2023, one of which should be available starting in July 2024, and the second later in the year (these were pushed back on our schedule in 2023 due to the urgent need for probes for the 850). In 2023, Drs. Schurko, Mentink, Hu, and Frydman submitted a proposal for an NSF Mid-scale RI-1 (M1:IP), entitled: "*National Facility for High Field Dynamic Nuclear Polarization NMR*", which would bring the first 800MHz DNP NMR platform that would be available to both U.S. and international users at no cost. Despite excellent reviews and a successful reverse site visit with the NSF, the project was not funded.

Other High-Field Platforms (800#1, 800#2, 830, 850, 900-MRI, 800-SOL)

900-MRI. The 900MHz/21.1T ultra-wide bore (105mm) magnet, which was built in-house at MagLab, has been in operation since 2005, yielding **123** publications over its lifetime and **50** since 2017. It is largely used for MRI of small animals and *in vivo* MRI studies, which are made possible by the 105mm bore; however, it is also used for ultra-wideline NMR of unreceptive nuclei. Installation and software upgrades were completed on the 900UWB, with imaging and diffusion gradient capabilities now available over a range of sizes (18-64mm gradient bore diameters, with peak gradient strengths from 60 to 300G/cm), and various nuclides (*e.g.*, ²³Na, ³¹P, ⁷Li, ¹³C). An issue of concern is the 900-MRI control room, which has cryogenics controls and electronic safety equipment that is approaching the end of life (it is over 20 years old). Work is underway to replace this equipment to safeguard MagLab's flagship instruments. We note that the **500** platform augments MRI capabilities and provides a staging ground for experiments at 900MHz. It is equipped with *in vivo* MRI, microimaging, diffusion, and MR rheology instrumentation from previous systems or built in-house.

SSNMR from 800-850MHz. For over 10 years, the **800#1**, **800#2**, and **830** have been our central user platforms, serving a large community of users who require access to SSNMR experimentation at high magnetic fields, and contributing to hundreds of publications over this time period. What makes these platforms unique is the (i) wide array of probes that are available with virtually any tuning configurations that our users need (currently 14 different probes in service from 800-850MHz) and (ii) unmatched expertise in the development of NMR methods and applications of complex experiments to solve challenging problems in chemistry, materials science, and biology.

Sadly, the 830 magnet quenched in November 2022 after 31 years of service. This caused great complications in scheduling in 2023, with 800#1 and 800#2 running 361 and 365 days in 2023 and bearing the additional load from the former 830. The absence of the 830 workhorse is the main factor in our reduced publication rate in 2023. However, the NMR team tracked down a used 850MHz platform (from the Medical University of South Carolina), and installation took place in December 2023. The **850**, which also has a 2018-vintage NEO console, is now up and running – in part thanks to the rapid construction of a new 2.5mm MAS probe.

800MHz solution NMR magnet. The 800MHz solutions NMR magnet (**800-SOL**), which was the only instrument used to solve biological solutions NMR users, quenched in April 2022 (it was a used, pumped magnet resurrected in 2005 for bio-solutions NMR). We were in the process of reconfiguring it for use as a dedicated instrument for indirectly ¹H-detected NMR experiments on biosolids. In 2023, we continued the search for a used magnet but did not find one that was suitable (and in particular, actively shielded). Since late 2023, we have been in discussions with a northeastern U.S. university regarding an 850MHz magnet and making plans to apply for federal funding for a new console and two cryoprobes – these efforts are in part due to the arrival of Prof. A. Ramamoorthy in the Department of Chemical and Biomedical Engineering at FSU, who is working on these plans with Rob Schurko.

2.2.6.1.2 MAJOR RESEARCH ACTIVITIES AND DISCOVERIES

36T-SCH: The 36T-SCH continues to be our go-to instrument for applications of SSNMR to half-integer guadrupolar nuclei: this is because the central transition $(+\frac{1}{2} \leftrightarrow -\frac{1}{2})$ pattern breadths scale as B_0^{-1} , which provides significant enhancements in both signal and resolution. As discussed earlier, ¹⁷O SSNMR continues to be of great interest Efforts continue our users. at to 17O mechanochemical methods for enrichment, with ¹⁷O SSNMR studies of H₂O molecules hydrated in calcium pyrophosphate biominerals [Faraday Disc. 2023, 241, 250; DOI] and speciation of bridging and non-bridging oxygen atoms in alkali germanate glasses [JNCS 2023, 18, 100175; DOI] – both studies rely upon the incredible resolving power of the 36T-SCH.

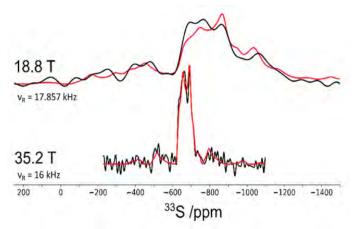


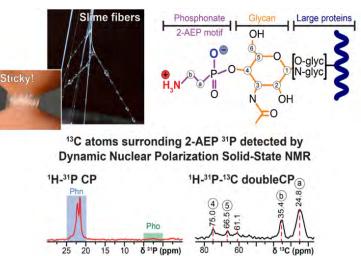
Figure 2.2.6.2. Experimental (black) and simulated (red) ³³S SSNMR spectra of zns·DDA npls acquired at 18.8T (top) and 35.2T (bottom).

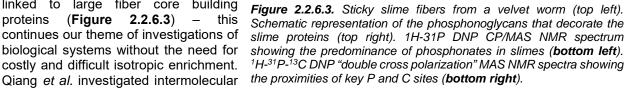
Wide swaths of the periodic table were explored in a number of materials science and biomaterials projects, including ³⁵Cl NMR of pharmaceuticals [*J. Magn. Reson.* **2023**, *350*, 107423; DOI], ⁶⁷Zn NMR of soaps [*Dalt. Trans.* **2023**, *52*, 6152; DOI], ⁶⁷Zn and ³³S NMR of nanoplatelets [*J. Phys. Chem. C* **2023**, *127*, 17809; DOI], ^{185/187}Re NMR of perrhenates [*Chem. Commun.* **2023**, *59*, 12609; DOI], and ⁶⁷Zn NMR of MOFs [*Chem. Commun.* **2023**, *59*, 5205; DOI]. In all of these cases, the nuclides are very unreceptive to the NMR experiment, due to low γ, low natural abundance, large quadrupole moments, or combinations of these

factors. For instance, ³³S, one of the most unreceptive NMR nuclides, was used to probe the sulfur environments in ZnS nanoplatelets via ³³S MAS NMR experiments at 18.8 and 35.2 T (**Figure 2.2.6.2**); clearly, the SCH provides the boost in signal and resolution to enable measurement of the chemical shift and quadrupolar parameters of the sulfur sites.

600-DNP: In 2023, the 600-DNP platform continued produce to groundbreaking science in areas of applications and methods development. Marcotte, Harrington, and a team of international researchers utilized ¹H-¹³C, ¹H-³¹P, and ¹H-³¹P-¹³C DNP CP/MAS NMR to investigate the natural phenomenon of fiber formation, by studying post-translational modifications in large proteins responsible for the assembly of slime from velvet worms into a fibrous material [J. Am. Chem. Soc. 2023, 145, 20749; DOI]. They identified the precise structure of a rare phosphonoglycan moiety, which is linked to large fiber core building proteins (Figure 2.2.6.3) _ this continues our theme of investigations of biological systems without the need for costly and difficult isotropic enrichment.

NMR





interactions between two pathological β-amyloid sequences, Aβ40 and Aβ42, that coaggregate and are thought to impact the function of anti-β-amyloid (Aβ) drugs. [ACS Chem. Neurosci. **2023**, 14, 4153; DOI]. In this work, 2D DNP DQ-SQ ¹³C/¹³C and ¹³C/¹³C dipolar-assisted rotational resonance (DARR) experiments were used to identify the molecular interactions of Aβ40, Aβ42, and lipids at the membrane-associated nucleation stage of their cofibrillation. Work continues on the development of new biradical polarizing agents for DNP NMR, including the PyrroTriPol family (trityl-nitroxides with piperazine linkers), which provide high quality ¹H-²⁷Al DNP CP/MAS NMR spectra of surface sites in γ-alumina, [*Chem. Sci.* **2023**, *14*, 3852; DOI] and the AsymPol family (including) AsymPol-TEK and cAsymPol-TEK, a methyl-free version), which were investigated using a combination of EPR spectroscopy, DFT and MD calculations, and numerical MAS DNP NMR spin dynamics simulations and found to outperform standard PAs like TekPol [*PCCP* **2024**, 26, 5669; DOI]. This work from our users and DNP experts at MagLab aims to push DNP for use in high fields, where currently, its efficiency is reduced compared to lower field experiments.

900-MRI: The flagship 900-UWB platform, the highest-field MRI system in the world, yielded several MRI publications. ²³Na and ¹H MRI/S have been shown to be sufficient at distinguishing effective therapeutics between stem cell therapies, and argue for clinical implementation for assessing efficacies and outcomes at early courses of treatment in ischemic stroke [*Transl. Stroke Res.* **2023**, *14*, 545; DOI]. Non-invasive ¹H diffusometry was used to monitor the self-diffusion dynamics of individual surfactants in micelles, overcoming challenges associated with traditional microstructural probing techniques [*J. Coll. Interf. Sci.* **2023**, *642*, 565; DOI]. Development of new NMR instrumentation was also undertaken, where Breynaert *et al.* reported a low-cost sample cell and HPLC column suited for high-pressure NMR experimentation at 21.1T, which can be used to study the occlusion of ethane molecules in the cages of the clathrate hydrate phase of ice [*Anal. Chem.* **2023**, *95*, 16936; DOI]. Finally, with new probe modifications and pulse sequence designs, the first ever comprehensive ¹⁰³Rh SSNMR study of inorganic and organometallic compounds was undertaken [*Chem. Sci.* **2024**, *15*, 2181; DOI]; this work will allow increasingly routine access to unreceptive nuclides and explorations of Rh chemistry – a rare and costly platinum group element.

Other Major SSNMR Instruments: Our 850, 800(×2), 600(×2), and 500MHz platforms, are the workhorses for the majority of high- and moderate-field SSNMR experimentation, as well as serving as screening platforms for flagship instruments. The 800#1, 800#2, and 850 NMR spectrometers are of importance for SSNMR of biosolids (due to high sensitivity and large chemical shift dispersions) and for half-integer quadrupolar nuclides in chemicals, pharmaceuticals, and a wide range of materials (again, due to narrowing of CT powder patterns proportional to B_0^{-1}). 600#1 and 600#2 act in support of these instruments, providing unique opportunities like ¹H-¹⁹F-X SSNMR, variable-temperature NMR, and MRI and diffusion

measurements. The 500 platform is heavily utilized for research on energy materials (*e.g.*, ⁷Li NMR and MRI of energy materials) and is equipped with a laser for heating to temperatures of *ca*. 700°C.

Some research highlights include: (i) biosolids and biomaterials: using SSNMR to elucidate synergistic antimicrobial effects of combining sophorolipid esters and piscidins against drug-resistant bacteria [J. Am. Chem. Soc. Au 2023, 3, 3345; DOI]; 2D ¹³C-¹³ C correlation SSNMR that reveals that halophilic fungus A. sydowii adapts to hypersaline environments by modifying its cell wall architecture, offering insights for biotechnological applications [Nat. Commun. 2023, 14, 7082; DOI]; and ¹³C and ¹⁵N SSNMR of the SARS-CoV-2 E protein, which forms a dimeric structure in lipid bilayers, suggesting a potential drug-binding site within a water-filled pocket [Commun. Biol. 2023, 6, 1109; DOI]. (ii) methods and applications: the design of efficient ¹⁷O-enrichment strategies for amino acids and peptides using mechanochemistry, enabling high-enrichment levels and site-selective labeling [Chem. - A Eur. J. 2023, 29, Early Access; DOI]; the creation of high sensitivity and resolution SSNMR techniques that selectively identify hydrogen-bonded ¹⁵N-¹⁷O pairs in peptides, enhancing protein structure determination through indirect ¹H detection and fast MAS [Chem. Commun. 2023, 59, 3111; DOI]; and experimental and theoretical demonstrations of broadband cross-polarization experiments for quadrupolar nuclei like ³⁵Cl, ⁵⁵Mn, ⁵⁹Co, ⁹³Nb, and others [*J. Phys. Chem. A* **2023**, *127*, 9621; DOI]. (c) materials science: ²⁷AI SSNMR of y-Al₂O₃ nanocrystals synthesized via a single-step ICP process to determine surface populations of AlO₆, AlO₅, and AlO₄ units, which enables size control and phase purity [Nanomater. 2023, 13, 1627; DOI]; multinuclear ⁷Li, ¹⁹F, and ⁷¹Ga SSNMR and DFT investigation of 2LiX-GaF₃ (X = Cl, Br, I) electrolytes reveal that Ga(F,X)_n polyanions facilitate Li⁺ ion transport by weakening Li⁺···X⁻ interactions via charge clustering, offering insights for designing high-conductivity solid-state batteries [Sci. Adv. 2023, 9, 47; DOI]; and a ³⁵CI SSNMR-guided NMR crystallographic study of polymorphs and cocrystals of Xylazine HCl, a veterinary analgesic with many known solid forms [Cryst. Growth Des. 2023, 23, 3412; DOI].

2.2.6.2 CARRYING OUT IN-HOUSE RESEARCH AND SCIENTIFIC INSTRUMENTATION DEVELOPMENT IN SUPPORT OF THE USER PROGRAM

2.2.6.2.1 PROBES

The probes designed by the NMR Technology Group are a major factor in setting the MagLab apart from other facilities around the world and keeping our user program on the cutting edge. This team, led by Dr. W. Brey and P. Gor'kov, designs, manufactures, and implements probes of very high quality. They provide versatile tuning configurations for multinuclear SSNMR, low-*E* coils for lossy biosolids samples, and some of the best rf circuits and coils for the detection of weak NMR signals.

Many of the new probe developments are described in the relevant instrument sections above, so here is presented a summary of new probes, capabilities, and tuning configurations that arose in 2023:

2.2.6.2.1.1 NEW PROBES AND RELATED HARDWARE

- 36T-SCH: 1.3 mm HXY (HCN) ¹H-detected probe; operations successfully tested in HCN mode; first experiments run in HXY mode
 - **N.B.**: Our own compact design of the 1.3mm spinner was completed in the process of building this probe; this new spinner design will be used in many future probes.
- 800#1/800#2: 2.5mm HX MAS probe this new probe covers 80% of NMR-active nuclides in the Periodic Table (*i.e.*, ¹H/¹⁹F and ¹⁰⁵Pd to ³¹P)
- **800#1/800#2**: 1.3mm HX(Y) probe design modification to account for minor mistakes and improve performance. Parts orders will start in March 2024.
- 800#1/800#2: 5.0mm HX low-temperature static HX SSNMR probe on order from Phoenix NMR
- 800#1/800#2: Planning: 1.3mm HFX MAS NMR probe collaboration with Phoenix NMR for late 2024 arrival.
- 850: 2.5mm HX MAS probe the tuning range of this probe is being expanded to cover a similar 80% isotope coverage to the 800#1/800#2 probes; tuning range started from ¹³C and ¹⁷O
- 600 DNP: 3.2mm HXY low-E MAS probe first year of operation for users
- **600 DNP**: 1.3mm HXY MAS probe, design finished, being assembled, testing/commissioning in July 2024
- 600 DNP: 1.9mm HXY MAS probe, design finished, assembly to start March/April 2024
 - N.B.: Both DNP probes have newly designed internal cold transmission lines (ITL), which were designed, machined, fully assembled, and tested for both probes. Ordering and inspection of machined parts for these probe frames are currently underway.
- o 600#1: Older static HX probe was fitted with a goniometer for single crystal NMR studies

2.2.6.2.1.2 NEW TUNING CONFIGURATIONS

- 36T-SCH: 3.2 mm HX MAS ¹H-⁹⁹Ru; ¹H-¹⁰³Rh
- 800#2: 1.3 mm HXY ¹H-³¹P-¹⁷O, ¹H-¹³C-¹⁷O, ¹H-X (X = ⁴⁷Ti, ⁴⁹Ti, ⁵³Cr, ⁴⁰K, ²⁵Mg, ⁶⁷Zn, ⁹⁵Mo, ²⁰¹Hg, ⁹⁷Mo, ⁴³Ca, ³¹P)
- 800#1/800#2: 3.2 mm HX MAS ¹H-¹⁸³W, ¹H-¹⁰⁹Ag, ¹H-³⁹K, ¹H-⁸⁹Y, ¹H-⁴³Ca, ¹H-¹²⁷I, ¹H-⁷¹Ga, ¹H-⁸⁷Rb, and ¹H-⁷Li
- **800#1/800#2**: 5.0 mm HX static ¹H-¹⁰³Rh, ¹H-⁶⁷Zn, ¹H-⁷³Ge, ¹H-⁸⁷Rb, new coil platform with silver wire, solder, and circuit elements for ¹H-⁶³Cu and ¹H-⁶⁵Cu tuning modes.
- 600#1/600#2: 3.2 mm HX MAS ¹H-⁶⁷Zn, ¹H-⁶⁵Cu, ¹H-⁶³Cu, ¹H-⁷¹Ga
- **600#1/600#2**: 5.0 mm goniometer inserts for ¹H-¹⁴N, ¹H-¹⁷O, and ¹H-¹¹B

Additionally, Bill Brey and the *NMR Technology Group* continue to work on the incorporation of HTS coils in solution NMR probes for optimized efficiency and sensitivity. At the beginning of 2022, the 1.5mm ¹³C-optimized HTS NMR probe was completed, and in 2023, it is operating routinely at NHMFL/FSU on the 600-SOL platform. A high-sensitivity ¹³C-optimized probe for 900MHz with an innovative sample cell developed in collaboration with Bruker and the University of Georgia is now operating full-time at the University of Georgia.

2.2.3.2.1.3 PROBES UNDER PLANNING

- 0.7mm HCNO MAS probe the ultimate probe for ¹³C/¹⁵N/¹⁷O SSNMR of labelled proteins and peptides for 800#1, 800#2
- 5.0mm HX static probe for the 32T-SCM
- 1.3mm HFX fast MAS probe for 800#1, 800#1

2.2.6.2.2 PLATFORM UPGRADES AND CONCERNS

Most of the information on platform upgrades and in-house research is described above, due to the quenched magnets, equipment downtimes, and arrival of new magnets and hardware over the course of 2023. Therefore, a bulleted summary of upgrades is provided, along with issues and concerns:

Platform upgrades

- 36T-SCH: ferroshims working, installation of A-coil
- 36T-SCH: improvements of cascade field regulation system (CFRS)
- 900-MRI: completion of installation of gradients and transceivers
- 850: installation of new magnet and console to replace quenched 830
- 600-DNP/600-ODNP: installation of new 395GHz gyrotron and console
- 600#2: adoption of AVIII console from the 600-DNP

Issues and Concerns

- 36T-SCH: offline from October 2023-August 2024 (at the earliest) due to a faulty breaker
- 900-MRI: Replacement of control room electronics (cryogenics controls and safeties)
- 830: Quenched (31 years old), November 2022 (replaced with 850) serious impact on User Program
- 800SOL: Quenched (20+ years old), April 2022 (no replacement found yet)
- 850: installation of new magnet and console to replace quenched 830
- 600-DNP/600-ODNP: installation of new 395GHz gyrotron

We note that the current state of most of our NMR consoles and magnets is very good, with most operating near 100% of the allotted user days. We stress that the presence of the new **850** is making possible the scheduling of high-field SSNMR time for more users.

2.2.6.3 MAINTAINING FACILITY AND DEVELOPMENT OF NEW MAGNET SYSTEM INCLUDING OPERATION SCHEDULE AND SHUTDOWNS

2.2.6.3.1 FACILITY PLANS AND DIRECTIONS

In 2023, we had three new members join the NMR/MRI Team: (i) **Dr. Amrit Venkatesh** (previous position: postdoc at École Polytechnique Fédérale de Lausanne, Switzerland) started as a Research Faculty I in May 2023, will be overseeing the 36T-SCH User Program, and working in the DNP NMR User Program as well; (ii) **Dr. Shinho Cho** (previous position: Researcher, Center for Magnetic Resonance Research, University of Minnesota) started as a Research Faculty I in December 2023, and will be working in the small animals/*in vivo* NMR User Program; and (iii) **Prof. Ayyalusamy Ramamoorthy** (previous position: Professor, Department of Chemistry, University of Michigan) was hired in the Department of Chemical and Biomedical Engineering in August 2023 and is an Affiliate Member at the MagLab. In 2024, we hope to hire a Postdoctoral Research Associate (SCH and DNP systems) and an MRI Animal Technician.

Despite significant cuts to the NSF core funding (2023-2028) to the NMR/MRI User Program, the state of the program is strong and dynamic. We are continuing to pursue initiatives that were planned/started in 2023 and continue into 2024; many of these involve the pursuit of external funding and include: (i)

Expanding the scope of our activities and user collaborations on the 36T-SCH, 600-DNP, and other high-field instruments, due to funding of the *National Resource for Advanced NMR Technology* (RM1-GM148766) [R. Schurko, B. Brey, J. Long, Z. Gan, F. Mentink, M. Merritt]; (ii) Submission of an NSF Mid-scale (800MHz/524 GHz DNP) or Major Research Instrumentation (400MHz/ 263GHz DNP) proposals to expand our DNP NMR capabilities [Mentink, Schurko, Frydman]; (iii) submission of an NIH S10 grant for the acquisition of an 800MHz console and two HXY MAS cryoprobes (one for materials, one for biosolids) [Ramamoorthy, Schurko, Gan]; (iv) design, construction, and commissioning of new NMR probes, including those for DNP as well as the 32T-SCM static HX dipping probe [Gor'kov, Brey, Mao, Kitchen, Scott]; (v) purchase and launch of an "HFX" (¹H-¹⁹F-X) 1.3mm fast MAS probe for 600#2, to enable studies on pharmaceuticals and other fluorine containing samples; (vi) continued search for a used NMR magnet (shielded, 800MHz or higher, standard or wide bore) to complete the set- up of a fourth high-field instrument for users [Gan, Venkatesh, Ramamoorthy]; and (vii) applying for NIH Supplemental Funding for new National Instruments hardware, which has increased FPGA fabric and backplane data transfer capability and is compliant with modern LAN and internet security requirements.

2.2.6.3.2 NMR/MRI FACILITY OPERATIONS SCHEDULE

The majority of our instruments operated at near 100% capacity (*i.e.*, **365** user days), including 800#1, 800#2, 600#1, and 600#2. The 830 that quenched in Nov. 2022 resulted in a major reduction of total User days; fortunately, this has been replaced by a new 850 MHz magnet and console, which is up and running as of Jan. 2024. The 900-MRI is back to full service for MRI and low-γ NMR, running **343** days in 2023 (with downtimes for helium fills and general maintenance, a great improvement over previous years due to the completed installation of gradients and console). The 600-DNP platform continued its outstanding performance, operating for **207** magnet days in 2023 (down from **235** in 202, due to the gyrotron replacement). Drs. Z. Gan, I. Hung, R. Fu, S. Wi, F. Mentink, T. Dubroca, A. Venkatesh, S. Grant, and A. Blue continue to be responsible for the great success on these instruments, in terms of doing great science and keeping the instruments and probes in top condition. Furthermore, our robust remote operation routines developed during the COVID pandemic continue to assist users with remote access to our spectrometers.

2.2.6.4 CONDUCTING EDUCATION AND OUTREACH ACTIVITIES

2.2.6.4.1 USER COMMUNITY AND RECRUITING

Our user numbers were very good this year (**341**), with a ratio of **72:28** for U.S. to international users. Students and postdocs comprised **47%** of our users. The remarkable change this year is the large number (**22**) of new PIs and new projects that commenced in 2023, which far surpasses any of the other past 10 years of the User Program. Our recruitment during the abatement of the pandemic has been very successful, and our User operations, both on-site and remotely, continue at the highest levels. Our affiliated faculty members, research faculty, and staff scientists have attended major international conferences to support the research efforts of our users, as well as recruiting, including the Experimental NMR Conference, EuroMAR, International Society for Magnetic Resonance, International Society for Magnetic Resonance in Medicine, Rocky Mountain Conference for Magnetic Resonance, Alpine NMR Conference, American Chemical Society conferences (regional and international), among others. We have also increased our advertising and sponsorships at several of these meetings.

To make it easier for our Users and Staff to track the conditions and activities of magnets and probes, we have updated our web pages, and continue to organize and update our lists of spectrometers and probes with several interactive databases, that can be used to check on the status of probes for each instrument, bore sizes, general use and maintenance, and other capabilities. This greatly aids us in presenting immediate information to users, as well as keeping the newly revised MagLab website updated.

During the Fall of 2023, we hosted six virtual NIH RM1 meetings, which involved the attendance of over 25 PIs with stakes in biological and medical NMR projects at MagLab. In the coming year, we will be hosting these again, along with our usual User Committee and External Advisory Committee meetings. Schurko and Grant also made presentations at the National Academy of Science Panel on the Future of Directions for High Magnetic Field Science in the U.S. on "*The Need for High-Field NMR*" and "*The State of Preclinical MRI and Prospects for the Future*" [Web Link].

2.2.6.4.2 EDUCATION AND TRAINING

The NMR/MRI team was involved in numerous research activities during 2023. (a) Workshops. M. Elumalai hosted the 2023 MRI RF coil workshop (May 28-31), which featured morning lectures and an afternoon workshop where quadrature coils for rat MRI were built, and with Dr. S. Grant, organized and conducted an advanced RF workshop (October 16-19) where 33mm coils were built for microimaging applications. We hope to conduct a UHF NMR/36T-SCH workshop for our *Users Committee Meeting* in Fall 2024. (b) NMR Winter and Summer Schools. A pilot test of an NMR School was conducted in January 2023, which aimed at senior undergraduates from a PUI. The students attended lectures and tours, and participated in NMR experiments for four days, to organize and present data, and the eventual goal of

publishing in a peer-reviewed journal - in fact, this article was published in 2023 [Magn. Reson. Chem. 2024, In Press; DOI]. A summer school on SSNMR will be offered May 13-17, 2024. These events are organized by R. Schurko and Prof. R. Iuliucci (Washington & Jefferson College), and participants included Mentink, Gor'kov, Scott, Grant, and students from Schurko's group. (c) Student supervision and training. Members of our team participated in the supervision of graduate (GR), undergraduate (UG), and high school (HS) students through 2023. M. Elumalai supervised two UG in the Magnetic Momentum Scholars Program, building MRI coils. J. Collins offered two days of machining and manufacturing lessons to two UG from Chemical & Biomedical Engineering. Dr. Fu mentored a summer UG research student at MagLab with NMR activities. Dr. Schurko and two of his GS, Zach Dowdell and Jazmine Sanchez, supervised one UG summer research project on cyclodextrin MOFs, and in the Fall, supervised UG research projects for two UG. They also had two HS students from the Young Scientists Program (YSP) work in the labs at FSU and on NMR projects at MagLab. Dr. Grant supervised summer research projects for four UG, covering topics like coil fabrication and quality assessment, post-stroke animal behavioral assessment, and adiposederived mesenchymal stem cells. Finally, one of our newest Research Faculty, Dr. Venkatesh, supervised fall (3 UG), and spring (2 UG) research projects on high-field SSNMR and ¹H-¹⁴N indirect detection NMR via the Undergraduate Research Opportunity Program.

2.2.6.4.3 STEM OUTREACH

STEM outreach was exceptional in 2023, outpacing all volunteer activities for the past five years. Drs. I. Litvak and F. Scott, along with M. Elumalai, conducted the annual "Neighborhood Camp Fair" activities, which had 108 attendees (63 MS/HS students, 45 adults, and the majority of attendees were from URM areas). Dr. Litvak and M. Elumalai also organized and ran a "Teen Summer Program Fair" aimed at Tallahassee South Side residents (28 middle- and high-school students, 21 adults, predominantly URM area). Dr. S. Grant made STEM presentations to hundreds of children in middle schools and Cub Scout day camps, worked with one elementary school teacher, and made presentations for visitors from the Mayo Clinic. He also appeared in a video on the Veritasium YouTube Channel about the MagLab, where he discussed MRI and the 900MHz platform. Drs. Scott and Schurko conducted tours for the Women in Math, Science, and Engineering (WIMSE) program at FSU, with 5-6 female undergraduates from across a wide swath of degree programs. Dr. Scott also managed the MagLab booth for the Tallahassee Science Festival and met weekly as a mentor for a middle-school science teacher to aid in lesson planning and gave a MagLab tour to groups of 10 teachers. Drs. Litvak, Elumalai, and Grant participated in organizing and judging local science fairs. Most of our personnel conducted in-person tours of the MagLab facilities, for K-12 students, undergraduates, graduate students, the general public, and numerous other visitors and scientists. Finally, the majority of our staff and almost all of the graduate students in the various MagLab affiliate groups participated in the 2023 MagLab Open House on February 25, 2023, which saw over 11,000 people visit the MagLab in a five-hour period!

The Pulsed Field Facility (PFF), located within Los Alamos National Laboratory (LANL) in Los Alamos, NM, utilizes both LANL and U.S. Department of Energy assets to provide pulsed magnetic fields to our international community of users – from undergraduate students to senior investigators. Along with our magnets, we provide users with both robust scientific instrumentations engineered to operate in the transient pulsed magnetic field environment, along with the support of scientists who are active researchers with expertise in high magnetic field-driven science.

2.2.7.1 OPERATION OF A WORLD-LEADING HIGH-MAGNETIC-FIELD USER PROGRAM 2.2.7.1.1 CAPABILITIES

The suite of magnets and associated techniques supported at the PFF are listed in **Table 2.2.7.1**. At the heart of our magnet operations is a fully multiplexed (8 output) computer-controlled 4MJ, 16kV capacitor bank. Currently, this capacitor bank is responsible for providing power to all operational pulsed magnet systems, including our workhorse 65T Short-pulse magnets and the higher energy 60T Mid-pulse and 75T Duplex magnets. LANL is uniquely home to a 1.4GVA generator, which the PFF utilizes as a pulsed-power system to provide the hundreds of megajoules required to run our 100T Multi-shot and 60T Controlled Waveform ("Long-pulse") magnets; the former is the first and only magnet in the world to provide repeatable, non-destructive magnet fields for science experiments at 100T. Furthermore, the rectification of the generator output enables the control of the pulsed power waveform, allowing for the optimization of both the 100T and 60T Long-pulse for existing experimental research techniques. Currently, these two magnets are unavailable to users while the generator is under repair.

Capacitor Driven Pulsed Magnets						
Magnet System	Bore, ³ He Sample Space	Rise Time, Max dB/dt	Pulse Duration	Supported Research*		
65T Short-pulse (x4)		8ms, 8.1T/ms	80ms	Magneto-optics – IR through UV Magnetization – Extraction, Torque Magnetic Susceptibility		
75T Duplex	15mm, 9mm	1.8ms, 25T/ms (30 - 75T)	80ms	Magnetotransport – DC through MHz; incl. Critical Current Measurements Pulse Echo Ultrasound Spectroscopy Fiber Bragg Grating Dilatometry Polarization Magnetocaloric		
60T Mid-pulse		32 ms, 1.8 T/ms	300ms	Sample Temperatures: 400mK to 300K For compatible techniques: Pressures up to 5GPa and in-situ sample rotation		
		Generato	or Driven Pulsed	Magnets**		
Magnet System	Bore, ³ He Sample Space	Rise Time, Max dB/dt	Pulse Duration	Supported Research*		
100T Multi-shot	10mm, 5mm	8ms, 7.5T/msec (40 – 100T)	3s	All techniques listed above		
60T Controlled Waveform ("Long-pulse")	25mm, 18mm	Adjustable	3s, Up to 100ms full field flat top	All techniques listed above, plus: Magnetothermal studies (Heat Capacity and Magnetocaloric) FIR and THz optics Larger Sample Volumes		

Resources available to work with users to develop and field new and novel techniques as needed in our magnet systems.

**Offline while LANL's 1.4 GVA generator is being repaired.

2.2.7.1.2 FAIR DATA

Staff scientist Fedor Balakirev continues to lead the PFF's effort to incorporate FAIR data principles into the research performed by our staff and users. His efforts thus far have primarily focused on integrating the pulsed magnet data acquisition program into OSF (Open Science Framework), which not only stores all the experimental data in an easily accessible location that can eventually be openly shared but allows for the

recording of some meta-data and a real time logbook. An added benefit of using OSF for storing pulsed field data is that not only can remote users retrieve data in real time, but they can obtain all of the relevant experimental parameters for data analysis using the built-in "wiki" pages without asking for copies of scanned notebooks or sending emails back and forth with the user support. In addition to continuously improving and modifying the integration and use of OSF with the pulsed magnet data acquisition, Balakirev participated in several conferences this year including the 26th International Conference on Theory and Practice of Digital Libraries in Italy where he and his team presented their efforts on making FAIR data practices accessible and attractive for scientists to adopt.

2.2.7.1.3 RESEARCH HIGHLIGHTS

When doped with a high density of mobile charge monolayer carriers. transition-metal dichalcogenide (TMD) semiconductors such as WSe₂ can host new types of composite manyparticle exciton states that do not exist in conventional semiconductors. Such multi-particle bound states arise when a photoexcited electronhole pair couples not to just a single Fermi sea that is quantum-mechanically distinguishable (as for the case of conventional charged excitons or trions that have been studied in semiconductors for decades), but rather couples simultaneously to *multiple* Fermi seas, each having *distinct* spin and valley quantum numbers (a schematic of which is shown in Figure 2.2.7.1). Coupling to multiple Fermi seas of distinguishable carriers can occur in the monolayer TMD semiconductors due to the presence of both spin and valley of quantum-mechanical freedom. degrees Composite six-particle "hexciton" states were recently identified in electron-doped WSe₂

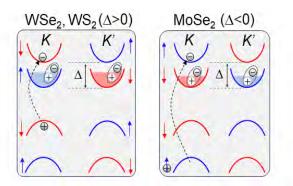


Figure 2.2.7.1: Schematics of the conduction and valence bands in monolayer WS_2 and $MoSe_2$, showing how a photoexcited electron-hole pair (ie, an exciton) can couple to multiple Fermi seas of electrons that have distinguishable spin and valley quantum numbers. Such interactions lead to entirely new composite many-body excitons: here we show the 6-particle "hexcitons" that arise from photoexcitation at the low-energy A-exciton (in WS_2) and at the higher-energy B-exciton (in $MoSe_2$). The difference arises from the particular ordering of their spinpolarized bands.

monolayers, but under suitable conditions they should also form in *all* other members of the monolayer TMD family. To investigate the existence of such hexciton states in other TMDs, polarized magneto-optical spectroscopic measurements up to 60T were performed. The results provide spectroscopic evidence demonstrating the emergence of many-body hexcitons in charge-tunable WS₂ monolayers (at the A-exciton) and in MoSe₂ monolayers (at the B-exciton). For more detail see: Phys. Rev. B **109**, L041304 (2024) (DOI).

CsV₃Sb₅ is a Kagome metal that has recently garnered significant attention as it is proposed to host small Chern Fermi pockets (CFPs) that could explain the observation of giant anomalous Hall and anomalous Nernst effects in the material. CFPs should give rise to large orbital magnetic moments which

observable would then be through magnetization measurements. However, in CsV₃Sb₅ the crystal lattice is such that the orbital moments antiferromagnetically align, thus rendering the technique insufficient for definitively detecting the presence of these proposed pockets. To overcome this challenge users from the University of Michigan leveraged the high fields produced by the 75 T Duplex magnet to induce magnetic breakdown - an effect whereby the large fields cause the guasiparticles to tunnel between different Fermi surface sections - between the CFPs and conventional Fermi-surface sections in CsV₃Sb₅, giving rise to Shubnikov-de Haas (SdH) oscillations as shown in Figure 2.2.7.2. From studying these oscillations as a function of angle the team was able to determine that the apparent g-factor - a quantity that characterizes the magnetic moment of the system - was greatly enhanced, a strong indication that one of the Fermi surface sections involved in the breakdown orbits possesses a greatly enhanced orbital moment and therefore could be a CFP. For more detail see: Commun Mater 4, 96 (2023) (DOI).

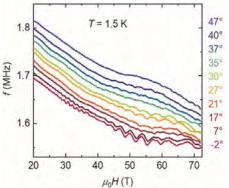


Figure 2.2.7.2: SdH oscillations of CsV_3Sb_5 as a function of angle provides information regarding the magnetic character of the Fermi surface sections that give rise to this behavior. Further analysis suggests that one of the orbits being measured could be a Chern Fermi pocket.

2.2.7.2 CARRYING OUT IN-HOUSE RESEARCH AND SCIENTIFIC INSTRUMENTATION DEVELOPMENT IN SUPPORT OF THE USER PROGRAM

2.2.7.2.1 RESEARCH HIGHLIGHT

PFF

UTe₂ has been a hot topic of research for several years now due to the existence of various high magnetic field-induced states, including superconductivity. Previous studies have focused on electrical and magnetic properties of this proposed high field-induced superconducting state, but there was a lack of thermodynamic measurements to support the claim. To this end a team of LANL scientists, including those working at the PFF, performed complementary proximity detector oscillator (PDO), magnetocaloric effect (MCE), and angular dependent torque magnetometry measurements up to 55T in the Midpulse magnet to provide thermodynamic evidence of the phase transitions at high fields. In particular, the MCE measurements (which are summarized by the sample temperature in the (H, Θ)) phase diagram shown in Figure 2.2.7.3) indicate that the proposed field-induced superconducting state is characterized by energy-gapped excitations that carry charge but no heat. Taken together with the high electrical conductivity measured in the high field state, these characteristics point to the existence of superconducting pairs carrying no entropy in this state. These results advance the understanding of this field-

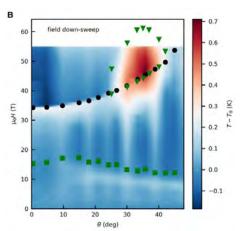


Figure 2.2.7.3 Sample temperature in the (H,Θ) phase diagram, showing enhanced temperature and adiabaticity in the field-induced state.

induced state and put constraints on the theoretical models used to explain it. For more detail see: *PNAS Nexus* **3**, 1-10 (2024) (<u>DOI</u>).

2.2.7.2.2 MAGNET DEVELOPMENT

In 2023, several important changes and improvements have been made and implemented in the design and fabrication of our 65T Short-pulse magnets. First, because of the difficulty in producing the high quality AL60 necessary for these magnets, a new conductor made of a CuCrZr alloy was used to fabricate the internal A coil of the 65T magnets. Not only have the magnet coils made with the new CuCrZr performed well – thus far none of these 65T A coils have failed after 4 to 8 months of operation – the material itself is cheaper and easier to draw than the previously used AL60. Another new advancement is the replacement of significant amounts of expensive G10 parts with glass-filled Nylon parts that are designed and manufactured in-house via 3D printing techniques. This work was directly the result of research performed by PFF staff in collaboration with MS+T on the mechanical and thermal properties of glass-reinforced composite materials published in *IEEE Transactions on Applied Superconductivity* **32**, 7700805 (2022) (DOI). The use of these homemade parts has significantly reduced both the lead time and the cost of structural parts used in the design of the 65T magnets when compared to the prior use of G10 parts.

Another major change occurred in the second half of the year with the development of new tooling and fabrication techniques for the manufacturing of a newly redesigned 65T magnet. This new design, which involves the use of two independent coils separated by a cooling gap for faster cooling time, reduces the time between full-field pulses from approximately 50 minutes to about 30 minutes (a nearly 70% improvement). Another advantage of this new design is the use of two independent coils enabling the reuse of one of the coils in the case of a single coil failure, thus cutting the cost and lead time to manufacture an entire 65T magnet. Although this new design has resulted in several improvements, it has also introduced some challenges that now need to be addressed. The previous magnet design had a support structure that was developed to minimize the vibrations caused by the electromagnetic forces interacting between the two coils. By introducing a cooling gap the addition of space between the coils has resulted in the innermost winding layer of the outer coil (B-coil) becoming less stable to the compressive force and thermal expansion that results with the heating of the coil during the pulse. Consequently, the lifetime of the outer B coil has decreased, and this has led to all magnet failures of this design. Currently, tests to improve the lifetime of the outer coil, including thicker conductors, are planned.

2.2.7.3 MAINTAINING FACILITY AND DEVELOPMENT OF NEW MAGNET SYSTEM INCLUDING OPERATION SCHEDULE AND SHUTDOWNS

2.2.7.3.1.85T DUPLEX MAGNET

Efforts have continued to deliver an 85T all-capacitor bank-driven duplex magnet, a unique magnet that requires the tandem operation of both the 16kV, 4MJ Short-pulse and 18kV, 2MJ 100T capacitor banks. While the initial plan to test this new magnet system required taking the 75T Duplex magnet offline to utilize the existing magnet cell infrastructure, this plan was ultimately revised due to the high user demand for the

75T. As a result, a new cell was built along with the necessary safety and power infrastructure that would allow for the commission of the 85T without interfering with the regular user operations of another magnet.

2.2.7.3.2 HIGH VOLTAGE CAPACITOR BANK

After multiple delays the fabrication and assembly of a custom designed and order 1.2MJ, 30kV capacitor bank neared completion toward the end of 2023 (Figure 2.2.7.4). Early in 2024, the capacitor bank will be tested at low voltages – less than 5kV – via use of a test load provided by the PFF. This initial test will confirm that the electronic hardware and control software are operating as designed. Once tests are completed at the assembly location and the bank is confirmed to be working as required it will be shipped to the PFF where it will eventually be installed and commissioned in a new capacitor bank enclosure separate from the already existing capacitor banks.



Figure 2.2.7.4. Two modules of the 1.2MJ, 30kV capacitor bank assembled in Alpha Omega Power Technology LLC at the end of 2023.

2.2.7.3.3 MODE OF OPERATION

Jointly with the DC Facility, the PFF solicits proposals through a common call three times a year to streamline the application process and ensure the availability of personnel and magnet resources. The capacitor bank-driven magnets operate Monday through Friday from 8 am to 7 pm, with a later start of 10 am on Mondays due to weekly maintenance. Generally, no more than three pulsed magnets – either three 65T magnets or two 65T magnets and either the 75T Duplex or 60T Mid-pulse – are scheduled for users each week to enable turnaround and continuation of an experiment following a magnet failure. The generator-driven magnets – the 100T and 60T Long-pulse continue to be offline while we await the new rotor for the motor generator.

2.2.7.4 CONDUCTING EDUCATION AND OUTREACH ACTIVITIES

As in past years, PFF members widely participated in the 7th Annual Los Alamos National Laboratory Summer Physics Camp for Young Women, a free camp for about 40 students primarily in New Mexico that focuses on inspiring interest in STEM through inquiry-based labs and is led almost entirely by women currently working in STEM. Especially exciting this year was the events returned to in-person. Three of our early career scientists — Johanna Palmstrom, Minseong Lee, and Chris Mizzi — were instrumental in developing and showcasing hands-on magnet-related demonstrations, while the PFF's Director, Ross McDonald, and Deputy Director, Laurel Winter, gave onsite tours of the facility. In addition, many of our staff gave talks at universities and conferences throughout the year to encourage new collaborations and users to the facility.

EDUCATION AND OUTREACH

3.1 EDUCATION

The Center for Integrating Research and Learning (CIRL) guides the K-12 educational and broader mentoring efforts of the MagLab's education and outreach mission. Our programs are designed to include research-based best practices in science and engineering education for K-12 students and in mentoring for students, teachers, postdocs, and faculty in STEM. Our staff participate in and facilitate professional development in their specific disciplines so that we can ensure the MagLab is aware of best practices for building a more diverse STEM workforce.

The K-12 education and broader mentoring efforts would not be possible without the CIRL team. Below are some examples of the leadership and relative professional development initiatives that CIRL staff have engaged in over the last year.

CIRL Personnel Highlights in 2023:

- CIRL's K-12 Education Director Carlos R. Villa was reelected to be Area 2 Director of the Florida Association of Science Teachers, a position he has held since 2019. In addition to presentations at the Florida Association of Science Teachers Annual Conference in St. Augustine, FL, the National Science Teaching Association Annual Conference in Atlanta, GA, and the Associated Universities Inc. Conference, Villa also served on the planning committee for the American Association of Physics Teachers Florida Chapter meeting in Tallahassee in November of 2023.
- CIRL's Mentoring Director Dr. Kawana Johnson was awarded a \$5,000 mini-grant from the ECMC Foundation, a national foundation working to improve postsecondary outcomes for underrepresented minority students and students from underserved backgrounds, to develop a CTE (Career & Technical Education) program at the MagLab. In addition to mentoring presentations at the American Physical Society (APS) March Meeting and the Mentoring Institute Conference in October, she was also invited to serve as a facilitator for the 2023 Aspire Summer Institute.
- CIRL's Director Dr. Roxanne Hughes served her third of a 4-year term as the Chair of the American Physical Society's Forum on Outreach and Engaging the Public, wherein she organized an Invited Speaker session at the APS March meeting, Countering Misinformation in Physics Outreach and Public Engagement, that built on lessons learned through her work at the MagLab. She served on the Florida State University (FSU) Office of Research's Strategic Planning Committee wherein she represented the MagLab to ensure it continues to be an important part of FSU's research future.

Diversity And Inclusion In CIRL Education Programs

Diversity and inclusion are focal points of all MagLab's educational and outreach activities. **Table 3.1.1** highlights the demographics for CIRL's in-depth programs (i.e., one week or longer).

2023	Total	% Women	%African American	% Hispanic	%American Indian/Native Hawaiian
Research Experiences for Undergraduates (REU) summer	12 undergraduates	75%	25%	25%	NA
Magnetic Momentum Scholars Program	9 undergraduates	78%	100%	NA	NA
Research Experiences for Teachers (RET) summer	10 K-12 teachers	80%	50%	10%	0%
High School Externship (2022- 2023 Academic Year)	19 high school students	58%	11%	11%	0%
MagLab Godby Summer Scholars Program	6 high school students	50%	50%	33%	0%
Camp TESLA (1- week camp)	20 middle school students	35%	25%	0%	15%
SciGirls Summer camp (1-week camp)	22 middle school students	100%	36%	9%	0%

Table 3.1.1. Diversity of Education Programs

3.1.1 WEB-BASED OUTREACH

3.1.1.1 MAGNET ACADEMY

The Magnet Academy is MagLab's web-based home for free resources on magnetism and electricity for educators and learners of all ages. Magnet Academy resources include lesson plans, recorded science demonstrations, and interactive activities for teachers, students, and parents. **Table 3.1.2** shows the Google analytics for 2023.

Page Title	Page Views ¹	Active Users ²	Avg Number of Views per User	Avg. Engagement Time	Event Count ³
Total Magnet Academy Views	484,565	248,478	1.73	40s	1,904,173
Watch & Play	185,076	81,506	2.07	48s	693,150
Read Science Stories (Learn the Basics)	11,198	6,778	1.65	1m 43s	45,543
Explore History	207,739	133,397	1.38	39s	853,802
Try This at Home	18,682	12,165	1.48	1m 05s	80,535
Plan a Lesson	10,968	7,692	1.37	26s	45,415

3.1.2 K-12 EDUCATION PROGRAMS

3.1.2.1 MAGLAB FIELD TRIPS

CIRL provides educational field trips to 5th-12th grade school groups at the MagLab's Tallahassee location (**Figure 3.1.1**). The goal of the MagLab field trips is to expose students to MagLab-related science and engineering activities. Field trips include a hands-on activity facilitated by Villa and requested by the teacher from a list of options available on the MagLab website. In addition, student groups also participate in a tour of the Tallahassee facility led by a MagLab scientist. For the 2022-2023 school year, the field trips were advertised directly to local school administrators, the MagLab Educators Club (a mailing list with over 550 subscribers that include educators and parents), as well as through local and national educational organizations such as the Big Bend/Leon Association for Science Teaching, the



Figure 3.1.1. Students learn about circuits during a field trip to the MagLab.

Florida Association of Science Teachers, and the National Science Teaching Association. One of CIRL's broadening participation goals is to ensure at least 50% of our outreach includes Title I schools (i.e., schools in which children from low-income families make up at least 40% of enrollment who might not have access to innovative scientific resources like the MagLab).For this last school year, 58% of the school groups came from Title I schools. During the 2022-23 school year, Villa provided outreach to 1,214 students from 24 schools. Most participating students were 5th graders (36%), with 7th graders making up 25% of outreach and 10th graders being the third largest group, making up 23%. Requests for field trips in 2022-23 came from Florida and Georgia. The two most popular activities requested were: (1) Electricity, Static & Currents: The Power All Around Us, and (2) Superconductivity: A Matter of Temperature. Each represents 39% of field trip requests. (The full description of the hands-on activities offered can be found on the MagLab's website:

https://nationalmaglab.org/education/teachers/).

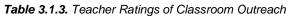
Metrics for Success. After each field trip, teachers were sent a short online survey asking them about their experience. Overall, the teachers were very satisfied with their experience. 100% of teachers rated their experience as very good or excellent and said that the website provided them with enough information to

¹ Views of web pages including repeat views by the same user.

² Unique users who engaged with the site.

³ The event count shows a specific interaction or occurrence on the website (e.g., views, clicks, downloads), highlighting how often a user interacts with specific elements on the website within a given time span.

appropriately select an activity and incorporate it into their class. **Table 3.1.3** presents average satisfaction scores (i.e., 5 rating = the highest) for the quality of the instruction that Villa provided. The high ratings show that the outreach experiences were well received by the educators.



Question (n=23)	Mean Response
The outreach educator employed instructional strategies that made the content/concept(s) understandable to my students	4.8
The outreach educator used strategies to appeal to different types of students	4.7
There were connections made between the content/concepts presented and the real-world	4.8
Students were encouraged to ask scientific questions to shape their understanding	4.9
The content was relevant to my instructional needs	4.7
The content was developmentally appropriate for my students	4.7

(5 pt. Likert scale 5=Strongly Agree, 1=Strongly Disagree)

Lessons Learned. Based on the survey feedback, we plan to make the following changes to the field trip program for the 2023-24 academic year. The confirmation emails will include more details including letting teachers know that their activity can be adapted based on their group and their needs. We will add a text box to the application to encourage teachers to provide more information on their class needs so that their field trips can be tailored specifically to their requests. We will also be giving the link to the evaluation survey as the field trip ends so teachers can provide feedback immediately.

3.1.2.1.1 GAINESVILLE

The MagLab facilities at the University of Florida conduct their own educational programs that are currently facilitated by Eli Wolfe. During the 2022-2023 school year, staff from the AMRIS and High B/T MagLab facilities gave 21 tours of the facility to 190 people. These tours included K-12 students, undergraduate students, and graduate students. Additionally, five presentations on AMRIS and High B/T research were given to 56 graduate students.

3.1.2.1.2 LOS ALAMOS

In 2023 the LANL Pulsed Field Facility members once again widely participated in the now 7th annual Los Alamos National Laboratory Summer Physics Camp for Young Women, a free camp for ~40 students that focused on inspiring interest in STEM through inquiry-based labs. The camp is led almost entirely by women currently working in STEM. Three of our early career scientists - Johanna Palmstrom, Minseong Lee, and Chris Mizzi - were instrumental in developing and showcasing hands-on magnet-related demonstrations, while the PFF's Director, Ross McDonald, and Deputy Director, Laurel Winter, gave onsite tours of the facility.

3.1.2.2 MAGLAB SUMMER CAMPS

The MagLab hosted two in-person summer camps in the summer of 2023: SciGirls and Camp TESLA. The goal of these MagLab summer camps is to provide a space for participants to do MagLab-related science and to introduce participants to relevant MagLab careers and role models in STEM. This year's camps were able to achieve both goals by creating programs that included presentations and activities with relevant MagLab STEM professionals (i.e., 8 faculty/postdocs, 2 staff, and 2 grad/undergrad students) as well as activities that were connected to that role model's area of study. During the week of camp, participants came to the MagLab Monday-Friday from 9 am - 4 pm. During the program, campers were able to meet STEM professionals from around the lab and ask questions about their research, career, and educational path in addition to their hobbies and interests. Each camp culminates with a reception wherein the campers showcase the projects they completed during the week and compete in an engineering challenge with their families.

3.1.2.2.1 CAMP TESLA (TECHNOLOGY, ENGINEERING, AND SCIENCE IN A LABORATORY ATMOSPHERE)

In 2023, 20 students participated in Camp TESLA (Figure 3.1.2). The three highestrated activities were: (1) making cell phone holograms which is an optics project that uses technology and physics to connect to students' lives using their cell phones; (2) building spaghetti bridges, which is an materials engineering project where campers used spaghetti and hot glue to create the strongest possible bridge with the lightest materials; and (3) the liquid nitrogen demo showing the impacts of low temperatures that also serves introduction an to as superconductors. During the reception, the campers tested their spaghetti bridges.



Figure 3.1.2. The 2023 Summer Camp TESLA group.

3.1.2.2.2 SCIGIRLS SUMMER CAMP

In 2023, 22 girls participated in the SciGirls one-week camp (Figure 3.1.3). SciGirls is a partnership with MagLab's local PBS affiliate, WFSU, that introduces participating girls to relevant hands-on MagLab science and female STEM role models. The role models describe their paths to their STEM careers and answer questions from the campers. The top three highest-rated activities were (1) the liquid nitrogen demo showing the impacts of low temperatures that also serves as an introduction to superconductors; (2) building a working speaker that connects the properties of electricity and magnetism to relevant concepts like music and sound; (3) An interview with MagLab graduate student Sophie Jermyn about her work in nanorobotics and her career trajectory in STEM. Figures 3.1.4 and 3.1.5 show some of the activities. Like Camp TESLA, the SciGirls camp ended with a reception wherein the girls tested their spaghetti bridges. In addition, the SciGirls reception includes a panel with female scientists and engineers. The 2023 panel included two female MagLab scientists and two former SciGirls campers who are now pursuing degrees in STEM majors, both of whom have participated in the MagLab's REU program.



Figure 3.1.3. A TESLA Camper shows off the electric motor they built.



Figure 3.1.4. The 2023 SciGirls Summer Camp.



Figure 3.1.5. SciGirls listening to Dr. Julia Smith describing the electromagnets at the MagLab during a tour.

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Metrics for Success: To assess how successful the camps were at achieving the goals, we gave each participant a pre- and post-program survey measuring their changes in knowledge of STEM careers and role models as well as their sense of belonging in the camp. Tables 3.1.4-3.1.6 show that both camps achieved their goals by giving campers a space to do science and introducing them to role models who were working in STEM. The tables highlight that 98% of all campers learned about new STEM disciplines and fields and 93% learned about how to achieve a career in STEM. Furthermore, 98% of the campers said that they felt they were a part of the camp and 98% of all campers said they felt accepted by their peers at camp, thereby demonstrating that the camps are creating a safe space for participants to practice their science skills and learn about STEM careers.

TESLA Percent (n=18)	SciGirls Percent (n=22)
94%	100%
94%	86%*
100%	100%
	Percent (n=18) 94% 94%

Table 3.1.4. Participants self-reported learning about careers.

*For this item, n=21.

Table 3.1.5. Participant connections to STEM role models.

During Camp	TESLA Percent (n=18)	SciGirls Percent (n=22)
Did you meet any STEM role models?	89%	100%
Did you meet someone who taught you more about what it is like to work in science?	89%	96%

Table 3.1.6. Sense of Belonging in Camp

During Camp	TESLA Percent (n=18)	SciGirls Percent Agree (n=22)
I was a part of the camp	100%	100%
I was accepted by my peers at camp.	89%	100%

Lessons Learned. Based on the survey feedback and data collected, we realized some of the activities need to be adjusted for 2024 due to low scores by the campers. Villa will work with the teachers to determine ways to make this activity more relevant to the campers and connect it more to MagLab engineering and science aspects they learned during the camp. Additionally, feedback from the teachers shows that some

of the higher-scoring activities as well as the MagLab tours can benefit from stronger introductions that show students how the science at the MagLab is relevant to their lives.

3.1.2.3 HIGH SCHOOL EXTERNSHIP

The goal of CIRL's High School Externship program is to give students real-world experience in their interested STEM career path, by pairing them with a MagLab scientist to learn more about research careers in STEM. Villa worked with local Tallahassee high schools to recruit students. Nineteen students were accepted and paired with a mentor at the MagLab to work on a STEM project for an entire school year. During their time at the MagLab, the participants were able to meet their mentor's research team and interact with other STEM professionals (e.g., postdocs, graduate students, and technicians at the MagLab). At the end of the school year, the MagLab hosted an in-person

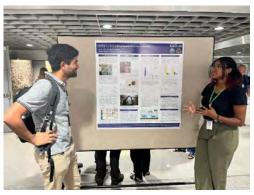


Figure 3.1.6. A MagLab Extern explains her work during the High School Externship poster session.

poster session to provide the participants an opportunity to showcase the work they accomplished during the externship program to their friends, family, and MagLab staff (Figure 3.1.6). A full list of students, their mentors, and their research topics are presented in Table 3.1.7.

Student (URM in italics)	Mentors (MagLab Department)	Research Subject
Jiayi Bai	Kwangmin Kim (MST)	Test of Multi-Width No-Insulation Magnet at 77K
Raiona Collins	Steffanie Sillitoe-Kukas (Geochem)	Investigating Platinum-Group Element Abundances in Red Clays
Brody Craig	Ryan Rodgers (ICR) & Joseph Frye-Jones (ICR)	Characterization of Water-Soluble Photoproducts from HVGO and Coal-derived Fossil Materials
Siri Davidi	William Oates (CMS) & Basanta Pahari (CMS)	Exploring Superposition States Within Quantum Computing
Kavyashree Kadhirvelu	Martha Chacon Patino (ICR)	A Python Tool to Predict Bio-Oil Quality Based on Molecular Composition Derived from FT-ICR MS
Will Kynoch	Eric Clark (Director's Office)	Coding, Photoshop, and AI Image Generation
Annika Lagy	Christianne Beekman (CMS) & Sangsoo Kim (CMS)	Effects of Annealing Spinel Cobalt Vanadate Thin Films
Sanjana Penmetcha	Theo Siegrist (CMS)	Arduino Microcontroller Programming to Control a Stepper Motor
Francesca Perfetto Alvarez	Komalavalli Thirunavukkuarasu (CMS)	Optical Spectroscopy for Materials Research
Sumana Posinasetty	Kari Roberts (Director's Office)	Programming in Python and Web Scraping
Noah Summerlin	Dmitry Smirnov (CMS)	Debunking So-Called "Giant Magneto-Optical Effect"
Vibav Tammisetti	Jamel Ali (CMS) & Prateek Benhal (CMS)	Tracking the Speed of Bacteria in Viscous Fluids Using Fiji ImageJ
Grace Tran	Samuel C. Grant (NMR) & Dayna L. Richter (NMR)	Choroid Plexus Perfusion for Migraine Study
Sarayu Vanga	Kaya Wei (CMS) & Jorge Galeano- Cabral (CMS)	Synthesis and Thermal Properties of XSn (X=Co, Rh)
Divya Vemireddy	Shalinee Chikara (CMS)	An Attempt to Synthesize Single Crystals of Honeycomb Materials Na ₃ Co ₂ SbO ₆

Table 3.1.7. High School Externship 2022-23

Metrics for Success. To assess how successful the High School Externship program was, we gave each participant a post-program survey. **Table 3.1.8** shows the means for participants' responses as evidence of students' increased interest in STEM careers after participating in the program, thereby demonstrating that the program reached its goal of giving students real-world experience in STEM careers. In addition,100% of the participants who completed the post-survey said they would recommend the program to a friend. All of these respondents also said that they found the instructions they received during the program to be helpful and believed that their goals were met.

My participation in externship	Mean N=11
Helped me understand science better.	3.7
Led me to a better understanding of my own career goals.	3.7
Increased my interest in studying science in college.	3.5
Made me think more about what I will do after graduating.	3.6
Made me more confident in my ability to succeed in science.	3.5
Increased my confidence in my ability to participate in science projects or activities.	3.6

(4 pt. Likert scale 4=Strongly Agree, 1=Strongly Disagree)

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Lessons Learned. The results of the surveys helped us to make adjustments for the 2023-2024 academic year program. Before the students arrived, mentors were sent information on mentoring best practices for high school students to provide them with concrete examples for strengthening their mentoring relationship (e.g., setting goals, and aligning expectations including frequency of communication and expectations for communication). Villa met with mentors early in the program to review the best practices for mentoring and answer any questions. Mentors have been encouraged to pick a project for their students that gives them a sense of how research is done (e.g., start to finish) both in the mentor's field as well as other facilities within the MagLab (e.g., conversations with other researchers to highlight). For students, Villa provided them with more details in their introductory email to the program, including the dates when specific programmatic elements will be due (e.g., the poster draft). Villa is also incorporating more email and inperson check-ins with students and mentors.

3.1.2.4 GODBY SCIENCE SCHOLARS PROGRAM

In the summer of 2023, the MagLab hosted six students in the Godby Science Scholars program, a 3-week program developed to broaden the participation of underrepresented students in STEM (**Figure 3.1.7**). Godby High School is a local Title I school (40% are eligible for free lunch), with a student population of 71% Black/African American, 11% White, 13% Hispanic, 5% two or more races, <1% Asian, <1% American Indian/Alaskan native. The program's goals are to introduce participants to MagLab research and careers and develop their scientific skills. The program culminates with a research proposal presentation by the students to MagLab scientists to initiate possible ongoing research opportunities.

Participants came to the MagLab Monday-Friday for 7 hours each day. The program schedule included hands-on activities, tours of MagLab facilities, and



Figure 3.1.7. Some of the 2023 Godby scholars listen to MagLab electrical engineer Yanique Lawrence describe her work while showing some circuitry.

presentations and interviews with MagLab scientists who could serve as potential STEM role models. The program culminated in the scholars developing a research proposal that was presented at the end of the program during a poster session. Participants received a \$300 stipend for participating in the program.

Metrics for Success. Data collection for the evaluation of the Godby Science Scholars was done through a pre- and post-program survey to participants. Before the program, 50% of participants said they were interested in pursuing a career in materials science. After the program, 83% of the participants said they were interested in pursuing a career in materials science. 100% of participants said that their participation in the program helped them understand materials science better and increased their interest in studying materials science in college. **Table 3.1.9** shows that the means for all of the measured STEM skills increased, providing evidence that the program increased the students' STEM skills, thereby meeting the goals of the program.

Statement (n=6)		
How would you rate your ability to…	Pre-survey Mean	Post-survey Mean
Figure out the next step in a research project	4.00	4.50
Prepare a scientific poster	4.20	4.83
Problem solving, in general	4.14	4.67
Feel a part of the scientific community	4.33	4.50
Identify limitations of research methods and designs	4.00	4.50
Feel like a scientist	4.17	4.67

Table 3.1.9. Godby Science Scholars STEM Skills.

(5 pt. Likert scale 5=Strongly Agree, 1=Strongly Disagree)

Lessons Learned. Based on the survey feedback and data collected during focus groups, we plan to make the following changes for the 2024 Godby Science Scholars: (1) We will move the MagLab scientist presentations to the first two weeks of the program to give students more time to prepare their research proposal; (2) Villa will work with the MagLab scientists before the program to help them develop interactive presentations that avoid lecturing. In addition, Villa will work with the Godby program teachers to develop activities and discussions to follow each scientist's talk that will allow participants a chance to clarify any questions they may have or to discuss ideas; (3) Villa and the teachers will check in more frequently to help students develop their poster.

3.1.2.5 TEACHERS AND INFORMAL STEM EDUCATORS

CIRL supports K-12 teachers and informal STEM educators through Educator workshops and the annual Research Experiences for Teachers (RET) program. The Educator workshops are designed by Villa to introduce educators to MagLab-specific STEM topics that can be incorporated into their science lessons. Villa ensures that these workshops conform to state and national education standards and engage students in MagLab-related, inquiry-based, hands-on science activities. **Table 3.1.10** highlights the workshops offered in 2023.

Date	Presentation Title	Conference/Organization	Attendance
3/2	Observations and Inferences Workshop	Leon County Schools	22 science teachers
3/23	The National Magnet Lab presents Tesla Tales	National Science Teaching Association	28 science educators
10/20	Florida's Tesla Tale	Florida Association for Science Teachers	30 science teachers
10/21	Magnets and the National Magnet Lab	Florida Association for Science Teachers	14 science teachers
11/4	Student Research Opportunities	American Association of Physics Teachers – Florida Chapter	14 science educators
11/9	Science Fair Workshop	Pineview Elementary	12 science teachers

Table 3.1.10. Educator Workshops offered by CIRL

3.1.2.6 RESEARCH EXPERIENCES FOR TEACHERS (RET) PROGRAM

The goal of the RET program is: (1) to help educators connect MagLab science to their lesson plans. After a nationwide application process, ten teachers were chosen to participate in the 2023 RET program, which consisted of a one-week in-person visit to the MagLab that included tours of multiple facilities, followed by monthly meetings with Villa to provide pedagogical support for the culmination of the program – a MagLabrelated science lesson plan to be posted on the MagLab's website. During the week at the MagLab, teachers participated in tours and presentations by scientists from the ICR, NMR, MST, CMS, and DC Field facilities. During the fall, in addition to the virtual sessions with Villa, each teacher was paired with a MagLab scientist who served as a science consultant for their lesson plan development. The teachers met virtually with their MagLab scientists to develop a STEM lesson plan that incorporated MagLab resources and/or content and included a culturally responsive component. This year's cohort consisted of four elementary teachers, three middle school and three high school teachers. They represent four different states (Alabama, Florida, Georgia, and North Carolina) and all teach at Title I schools. A list of the participants and their scientist mentors can be found in **Table 3.1.11**. The lesson plans are available to the public on the RET website:

https://nationalmaglab.org/education/teachers/professional-development/research-experiences-forteachers

RET Participant (School, State)	MagLab Mentor	Lesson Plan Title
Tiffany Cochran (Branford Elementary, FL)	Faith Scott (NMR)	Chocolate Conduction
April Crawford (Suwannee Pineview Elementary, FL)	Faith Scott (NMR)	Electricity & Magnetism
Ann Marie Dubick (Campbell Middle, GA)	Ernesto Bosque (ASC)	MagLev Trains
Michael Giddens (Hobbton Middle, NC)	Sam Grant (NMR)	Simple Machines Project
Shakilla Gordon (Oak Ridge Elementary, FL)	Scott Marshall (MST)	Science and the Arts: Ballet
Wanda Harding (Carver Early College High School, GA)	Malathy Elumalai (NMR)	The Big Reveal - Magnetic Resonance Imaging
Valerie Hucey (Whiddon Rogers Education Center, FL)	Lissa Henderson (ICR)	The Impact of Rising Carbon Dioxide Levels and Ocean Acidification
Brittany Tate (Pryor Middle, FL)	Martha Chacon (ICR)	Accidental Science
Mashika Tempero Culliver (Selma High, FL)	Huan Chen (ICR)	Supporting Environmental Justice
Sherrick Williams Sr. (Oak Ridge Elementary, FL)	Scott Marshall (MST)	Electric Motors

Table 3.1.11. 2023 RET Participants

Metrics for Success. Data collection for the evaluation of the RET program included a pre-survey before the program, a mid-point survey at the end of the first week, and a post-survey after the teachers had submitted their lesson plans in December. To measure the success of the program the mid- and post-surveys asked the teachers to rate the impact of the program on their interest in STEM research, improvements in understanding science research and incorporating it into their science teaching, and improvements in their confidence related to using culturally responsive pedagogy. On the mid- and post-surveys, 100% of the respondents (n=10) replied that they believed they would be more effective educators as a result of participating in the in-person and virtual sections



Figure 3.2.8. The 2023 RET Cohort

of the RET program **(Figure 3.2.8)**. Additionally, 100% of the participants indicated that they learned ways to improve the STEM content of their lessons. These results indicate that the program achieved its goals of helping educators connect MagLab STEM to their lesson plans (see **Table 3.1.12** for a summary of the means from both the mid- and post-surveys).

The RET Program	Mid-point Mean (N=10)	Post-survey Mean (N=10)
Increased my interest in research and the ways that current STEM research can be applied to my STEM teaching.	5.6	4.9
Stimulated me to think about ways I can improve my teaching.	5.7	5.2
Increased my motivation to seek out other culturally responsive professional development activities.	5.2	5.1
Increased my commitment to learning and seeking new ideas to implement into my teaching on my own.	5.9	5.4
Increased my confidence as a teacher.	5.2	5.3
Elevated my enthusiasm for teaching.	5.8	5.6
Increased my interest and ability to network with teachers and other professionals.	5.9	5.7
Increased my confidence to use culturally responsive pedagogy in my teaching.	5.4	5.

Table 3.1.12. Participant Reported Impacts of the RET Program

(6 pt. Likert scale 6=Strongly Agree, 1=Strongly Disagree)

Lessons Learned. Overall, the program was rated very highly. The participant feedback shows us that we are meeting the goals of the program. All of the participants reported learning about MagLab science and believed that their participation in the RET program would improve their ability to teach science. The teachers' suggestions for improvement as determined through their response to open-ended questions, will help us make necessary changes for the 2024 program. Based on these responses, for the in-person week at the MagLab, Villa will provide more opportunities for teachers (1) to engage in discussions and reflections with each other after each tour and (2) to meet with their scientist mentor in person. For the fall program, Villa will incorporate more opportunities for teachers to provide feedback on and discuss each other's lesson plans.

3.1.3 UNDERGRADUATE STUDENTS

Undergraduate students are at a crucial stage in the STEM workforce trajectory. It is at this stage that they develop research skills and can be introduced to specific STEM careers in more depth. The MagLab offers two undergraduate programs that are facilitated by CIRL's Mentoring Director, Kawana Johnson: (1) the Magnetic Momentum Scholars Program and (2) the Research Experiences for Undergraduates (REU) Program.

3.1.3.1 MAGNETIC MOMENTUM SCHOLARS

PROGRAM. The goal of the Magnetic Momentum scholars' program was to expose a diverse student population to STEM careers at the MagLab. During the Spring 2023 semester, the MagLab hosted a cohort class of nine undergraduate Magnetic Momentum Scholars. This seven-week program was developed as a partnership with Florida A&M University (FAMU) designed to expose a diverse student population to STEM careers at the MagLab. Johnson worked



Figure 3.1.8. Spring 2023 Momentum Scholars

with FAMU STEM faculty and administrators to promote the Momentum Scholars program to undergraduate STEM majors. 25 FAMU students applied and nine were accepted. The Magnetic Momentum Scholars program also provides MagLab scientists and engineers an opportunity to develop their mentoring skills. Students were paired with mentors based on their interests and the research areas of the individual mentors (**Figure 3.1.8**).

The nine student participants were divided across the following undergraduate stages: 22.2% sophomores, 44.4% juniors, and 33.3% seniors and represented the following majors: 55.6% biological sciences, 22.2% engineering disciplines, 11.1% Chemistry, and 11.1% information technology. Johnson planned professional development sessions that were held each week. These sessions included panels by STEM graduate students and postdocs, MagLab faculty, and STEM industry professionals. These sessions allowed the students to gain professional advice and learn about various career paths in STEM. In addition, a group of MagLab faculty provided the students with weekly tours of the various departments and research areas within the lab to inform them of potential research opportunities. The program culminated in a 3-minute pitch presentation wherein the students described their experience in three minutes or less. A list of the Magnetic Momentum Scholars, mentors, and departments can be found in **Table 3.1.13**.

First Name	Last Name	Mentor	Department
Chloe	Allen	Alyssa Atwood	Geochemistry
Nyah	Billups	Stephen McGill	CMS
Keirsi	Birch	Malathy Elumalai	CIMAR/NMR
Raygen	Bostick	David Graf	CMS/DC Field
Reayna	Edman	Sanjay Singh	CMS
Taalib	Ferguson	Daniel Davis	ASC
MaKayla	Jean-Baptiste	Komalavalli Thirunavukkuarasu	CMS/DC Field
Steven	Numa	Eun Sang Choi	CMS/DC Field
Yara	Steele	Daniel Hallinan	CIMAR/NMR

Table 3.1.13.	20231	Magnetic	Momentum	Scholars
1 4 6 1 6 1 1 1 6 1		nagnouo	monitoritarii	001101010

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Metrics for Success. To assess whether the program is meeting its goals, Johnson gives students a pre- and post-program survey and reaches out to mentors and tour guides through a post-program survey. For the students, the pre-/post-survey results indicated that all of the participants learned new skills and that those skills will help them to be successful in their future career path. 88% of participants said that the skills they learned will help them to be successful in their future career paths while 100% indicated that they worked well together with their mentor. In addition, participants indicated high levels of satisfaction with the Momentum Scholars program. 87.5% of participants said they were satisfied or very satisfied with their overall experience in the program.

In terms of mentor feedback, 100% said that they discussed how to work well together with their student early in the program. 86% said they were able to effectively communicate their expectations with their student. In addition, 86% of mentors said they enjoyed their experience as a mentor in the program. To further assess the quality of the mentoring, we asked students to tell us the effective strategies that their mentor used throughout the program. We also asked mentors to tell us what strategies they used to ensure the students understood their expectations. By asking both students



Figure 3.1.9. Momentum Scholar working in lab space

and mentors to describe quality mentoring strategies, we were able to determine: (1) what strategies were rated most impactful by Momentum Scholars and (2) whether mentors were using these best practices (Figure 3.1.9). Based on this comparison, the most cited strategy for a successful relationship occurs when the mentor and mentee engage in a discussion related to how they can best communicate early in the program. For students, the best strategy is to ask their mentor questions. The full list of strategies can be found in Table 3.1.14. We plan to continue presenting this information to mentors who volunteer for future programs so that they can see what types of strategies are most admired by undergraduates.

Momentum Scholars	Momentum Scholar Mentors
 Students were asked what strategies that their mentor(s) used to check for understanding. The strategies identified were: Asking questions (n=4) Giving good explanations (n=2) Allowing scholars to shadow lab meetings and group members (n=2) Providing background materials (n=2) Being patient (n=1) 	 Mentors were asked how they checked for understanding when communicating expectations to REU students. They indicated that they used the following strategies: Discussed how to work well together early in the program (n=9)
 Momentum Scholars were also asked what elements of the mentoring received during the program were particularly impactful. They fell into three categories: Professional development sessions (n=2) Networking (n=2) Skill development (n=3) 	 Mentors were asked what mentoring strategies they used that they thought were impactful. They provided the following strategies: Regular communication (n=3) Setting meeting times (n=3) Encouraging questions (n=1) Getting updates from the mentee (n=1) Picking an appropriate project (n=1) Including the mentee in a variety of work (n=1) Pairing with a near-peer mentor (n=1) Modifying work based on the student's major (n=1) Setting regular goals and checking progress towards those goals (n=1)

Only 2 tour guides responded to the program survey. We realize that this is too small of a sample to make decisions, so the program coordinator will make more of an effort to gather input from the tour guide coordinators in the future. 56% of mentors and tour coordinators who responded to the survey said they would be willing to participate in the program again in the future, 22% said they were not sure, and 22% said they were not interested in participating again.

Lessons Learned. Overall, the program was a success as 100% of the students said they were more interested in pursuing a STEM career after participating in the program. Feedback also indicated that tours, professional development sessions, and mentoring opportunities worked particularly well for the participants' experience. Based on open-ended response feedback, Johnson is working to update the program so that it focuses more on introducing FAMU students to potential research opportunities and mentors at the MagLab. The influence of this change will be measured through the survey instruments.

3.1.3.2 RESEARCH EXPERIENCES FOR UNDERGRADUATES (REU)

For the 2023 REU program, we continued the in-person research experience and virtual professional development sessions (Figure 3.1.10). The goals of the 10-week REU program are to provide undergraduate students with opportunities to learn research skills and explore MagLab-related research

career options. The REU program also allows MagLab scientists and engineers to develop their mentoring skills. To recruit students, Johnson posted the opportunity to job boards through multiple sites (e.g., Handshake, Simplicity, multi-school listings via job management boards, Pathways to Science); shared details with deans and department chairs at Historically Black Colleges and Universities (HBCUs) throughout the country; and solicited assistance from MagLab faculty and staff in promoting the opportunity to students and colleagues within their sphere of influence. The MagLab REU program had 52 applicants. Based on students' responses to the



Figure 3.1.10. Summer 2023 REU Participants

application, the majority of the applicants heard about the program from a MagLab employee (41.66%), a friend/professor/advisor (41.66%), or the MagLab website (16.66%). The selection process relies on mentors who send Johnson their top three choices based on students' experience and interest in the mentor's respective research area or discipline. Johnson then finalized this list, accepting 12 participants and ensuring all mentors get one of their top three choices.

The 12 REU participants were divided across all undergraduate stages: 8.3% freshmen, 16.6% sophomores, 41.6% juniors, and 33.3% seniors. The participants represented a variety of majors: 50% engineering, 41.6% physical science, and 8.3% computer science. Besides the demographic statistics provided in **Table 3.1.1**, 25% of our REUs came from Minority Serving Institutions or community colleges.

Johnson planned professional development sessions that were held once a week to help students gain a broader understanding of various types of STEM careers, including those at the MagLab (Figure 3.1.11).

These sessions included: panels by MagLab research faculty, tenure-track faculty, graduate students, as well as MagLab alumni who are STEM entrepreneurs or industry professionals. Sessions also included information on graduate school applications and developing an elevator pitch. Each week, beginning in week 6, REUs led tours of their labs for the rest of the group. The program culminated in a 3-minute pitch presentation wherein the students described their research project in three minutes or less. MagLab faculty and staff were invited to serve as judges to provide participants with feedback and recognize the top three presenters with prizes. They had opportunities to practice their pitch with mentors and during professional development sessions. A list of the REU participants, their respective universities/colleges, research topics, and mentors can be found in **Table 3.1.1.15**.



Figure 3.1.11. REU student during a lab tour

First Name	Last Name	School	Research Area	Mentor	Department
Makena	Andersen	Lewis & Clark College	Physicochemical Characterization of Magnetic Erythrocyte Based Micromotors	Jamel Ali	CMS
Bariana	Bowman	West Virginia University	Quantum Properties of SmB6	Laura Greene	CMS
Joshua	Davey	Tallahassee Community College	Rheological Examination of Edible Viscoelastic Material to Optimize Print Settings	Subramanian Ramakrishnan	MS&T
Frank	Genderson	Stevens Institute of Technology	Properties and Microstructure Analysis of Cu Composite Samples	Rongmei Niu	MS&T
Jonathan	Giraldo	Florida State University	Towards Nano-Optical Study of Phonon Polaritons in Van der Waals Material (WO3)	Guangxin Ni	CMS
Leilanis	Gonzalez	Florida State University	Soret Effect in Polymer Electrolytes Using Fourier Transform Infrared Spectroscopy	Daniel Hallinan	NMR
Katherine	Martinez	Florida State University	Behavioral Studies of Ischemic Female Rats Treated with Extracellular	Samuel Grant	NMR
			Vesicles Derived from Human Mesenchymal Stem Cells		
Chloe	Patterson	Florida State University	Protein Adsorption in Oil/Water Interfaces	Hadi Mohammadigoushki	NMR
Isabel	Ruby	California State East Bay	New Technique for Molecular Mapping	Riqiang Fu	NMR
Tyler	Walker	Oregon State University	Microwave Resonator Design for Improved Magnetic Resonance Sensitivity	Thierry Dubroca	EMR
Rachel	White	California State East Bay	Mass Spectrometry Used in Identifying PFAS and Micro Plastics	Martha Chacon	ICR

Table 3.1.15. 2023 REU Participants

Metrics for Success. Our pre-/post-survey of all participants helped us to assess the success of the program. In terms of research skill development, we used a modified version of the undergraduate research student's self-assessment (URSSA) survey instrument (Weston & Laursen, 2015⁴). Although this survey has historically been administered post-program by other REU programs, because the MagLab has an evaluator, we were able to incorporate a pre-survey to measure actual changes in skills rather than retrospective self-reported changes. **Table 3.1.16** highlights the mean changes from pre- to post-program related to skill development, demonstrating the success of the program. In addition, all participants indicated that the experience increased their positive perception of STEM careers or reaffirmed their already positive

⁴ Weston, T. J., & Laursen, S. L. (2015). The undergraduate research student self-assessment (URSSA): Validation for use in program evaluation. *CBE—Life Sciences Education*, *14*(3), ar33.

perception of STEM careers. Sixty-two percent of the REU students rated their mentor as above average or outstanding.

How would you rate your ability to…	Pre-Program Mean N=8	Post-Program Mean N=8
Analyze data for patterns	3.5	3.75
Figure out the next step in a research project	3.0	3.75
Problem-solving, in general	3.63	3.88
Formulate a research question that could be answered with data	3.14	3.5
Identify limitations of research methods and designs	2.88	4.0
Understand the theory and concepts guiding my research project	3.13	4.13
Understand the connections among scientific disciplines	3.50	4.0
Understand the relevance of research to my coursework.	3.63	4.0

To measure mentoring quality, we reviewed the categories of quality mentoring developed by the Center for the Improvement of Mentored Experiences in Research (CIMER) to determine which were most relevant to undergraduate mentees in the 10-week program. We focused on the following categories that were assessed through open-ended questions on the post-survey to REU participants and to REU mentors: aligning expectations, assessing understanding, and maintaining effective communication. We asked REUs to rate their mentors and to tell us the effective strategies that their mentors used throughout the program. We also asked mentors to tell us what strategies they used to ensure the REU understood their expectations and completed their projects. 100% of REU participants said they worked well together with their mentor and 100% said their mentor was available when they needed them during the program.

By asking both mentees and mentors to describe quality mentoring strategies we were able to determine: (1) what strategies were rated most impactful by REUs and (2) whether mentors were using these best practices. The most impactful mentoring strategies were having regular meetings and check-ins with REUs to ensure that they could receive ongoing coaching on their work and project as well as encouraging students to ask questions. The full list of strategies can be found in **Table 3.1.17**. We plan to present this information to mentors who volunteer for future programs so that they can see what types of strategies are most admired by undergraduates.

REU students	REU Mentors
 Students were asked what strategies that their mentor(s) used to check for understanding. The themes from their responses were: Being available (n=3) Having regular meetings (n=3) Asking questions to the REUs (n=1) 	 REU mentors were asked how they checked for understanding when communicating expectations to REU students. They indicated that they used the following strategies: Asking questions and assigning tasks (n=6) Weekly meetings (n=6)
 REU participants were also asked about the overall mentoring strategies that mentors used that they found particularly impactful. The strategies identified were: Having a previous work relationship with my mentor (n=1) Mentor's willingness to help (n=1) Being made to feel part of the team (n=1) Mentor helping them build their network by introducing them to others (n=1). 	 Mentors were asked what mentoring strategies they used that they thought were impactful. They provided the following strategies: Individual meetings (n =5) Having a group of REU students in the lab, in addition to graduate students and postdocs, helped with mentorship. (n=1) Defining what was important, and especially not important, for success. This includes defining what success was within the REU requirements, matching with the student's abilities. (n=1) Spend more time discussing with students, and introducing a project and its potential outcome, to make the project interesting to the student. (n=1)

Lessons Learned. Overall, the program was successful in meeting its goals as evidenced by the REU's self-reported improvements in: understanding research career options; skill development, and the overall rating of the mentor relationships. Because of the open-ended questions from the post-surveys, we were able to identify two areas that we plan to improve for next year: (1) more details provided by students on the application to help mentors make selections (e.g., previous lab experience, overall research interest, motivation, and summer class intentions). These have been added to the application so mentors can make more informed decisions. (2) more details provided by the mentor describing the research project so students can make more informed choices to participate in the program. Mentors have been provided a template to develop a detailed project description and this will be shared with the selected REUs so they can make more informed decisions related to their participation.

3.1.4 GRADUATE STUDENTS AND POSTDOCS

During the 2022-2023 academic year, Johnson held the inaugural Mentoring Incubator. The Incubator was designed to give graduate students, postdocs, and faculty the resources and structure to grow professionally and achieve their goals while effectively supporting others in doing the same. In the fall of 2022, five faculty, three postdocs, and five graduate students participated in the program. By introducing the Center for the Improvement of Mentored Experiences in Research (CIMER) mentorship education curriculum, the incubator supports mentor and mentee skill development while engaging participants in understanding their individual needs and interests. To achieve the program goals, nine sessions were held during the fall of 2022 and participants used funds from the program to travel and potentially build on their mentoring skills in the spring of 2023. Table 3.1.17 provides the list of sessions and their descriptions held during the 2022-2023 program. These sessions were facilitated by six MagLab employees who completed the CIMER training in 2021 (Kawana Johnson, Roxanne Hughes, Huan Chen, Kristin Roberts, Laurel Winter, and Kaya Wei). Participants who successfully completed the program received \$500 that could be used toward travel taking place during the Spring 2023 semester. Although all five of the faculty used their stipend, only three of the nine postdocs/grad students utilized their stipend. During the summer of 2023, Johnson conducted a follow-up survey with the program participants and interviewed mentoring experts to expand her knowledge and gain insight into the direction of the 2023 program. Feedback from the program participants included a desire for more discussions during the sessions and fewer individual sessions. The CIRL team decided the stipends were not enough of a motivator to maintain. As a result, Johnson decided to change the structure of the 2023-2024 Mentoring Incubator program to include four joint sessions with all participants conducted over two semesters.

Session topics	Dates/Times
Introductory Meeting (What to expect/Introductions of participants and facilitators)	All - Monday, Sept. 19th @ 4 p.m.
Meeting #1 (Aligning Expectations)	Postdocs/Grad Students - Monday, Sept. 26th @ 3:00 p.m. Faculty - Wednesday, Sept. 28th @ 3:30 p.m.
Meeting #2 (Addressing Equity & Inclusion)	Postdocs/Grad Students - Monday, Oct. 3rd @ 3:00 p.m. Faculty - Wednesday, Oct. 5th @ 3:30 p.m.
Meeting #3 (Maintaining Effective Communication)	Postdocs/Grad Students - Monday, Oct. 10th @ 3:00 p.m. Faculty - Wednesday, Oct. 12th @ 3:30 p.m.
Meeting #4 (Promoting Professional Development)	Postdocs/Grad Students - Monday, Oct. 17th @ 3.00 p.m. Faculty - Wednesday, Oct. 19th @ 3.30 p.m.
Meeting #5 (Assessing Understanding)	Postdocs/Grad Students - Monday, Oct. 24th @3:00 p.m. Faculty - Wednesday, Oct. 26th @3:30 p.m.
Meeting #6 (Fostering Independence)	Postdocs/Grad Students - Monday, Oct. 31st @ 3:00 p.m. Faculty - Wednesday, Nov. 2nd @ 3:30 p.m.
Meeting #7 (Articulating Your Mentoring Philosophy & Plan)	Postdocs/Grad Students - Monday, Nov. 7th @ 3:00 p.m. Faculty - Wednesday, Nov. 9th @ 3:30 p.m.
Meeting #8 (Closing Session/Recognition)	All - Monday, Nov. 14th @ 3:30 p.m.

Table 3.1.17. 2022-2023 Mentoring Incubator Session Topics and Schedule

3.1.5 EVALUATION AND RESEARCH

3.1.5.1 EVALUATION

In 2023, each program manager evaluated their respective programs. The results of these evaluation summaries are shared and discussed with the Director of CIRL to make decisions for the next year's programs. Primary metrics for each program are determined based on the program's goals and mission and measured using appropriate methodology. The forms of evaluation are listed in **Table 3.1.18**.

Table 3.1.18. Evaluation Description for 2023 MagLab Education and Outreach Programs

Program	Form of Evaluation
MagLab Field trips	Post-survey to teachers after field trip
Summer Camps	Pre-/Post-survey to students, post-survey to parents, and post-camp survey to teachers
REU	Pre-/Post-survey to REU participants, mid-program and post-program focus groups with REU participants, post-program survey and interview with mentors
Magnetic Momentum Scholars Program	Pre-/Post-survey to Magnetic Momentum Scholar participants, post- program focus group and individual interviews with participants, post- program survey to mentors
RET	Pre-/Mid-/Post-surveys to RET participants, post-program survey to mentors.
High School Externship	Post-program survey to externship participants, post-program survey to mentors
Godby High School Program	Pre-/Post-survey to participants, post-program focus groups, and post- survey to the program teachers

3.1.5.2 RESEARCH

A cornerstone of CIRL's programs is that they are developed based on research conducted by CIRL staff. Our research not only informs our MagLab programs but adds to scholarship for STEM education and mentoring programs nationally. Hughes continues to lead CIRL's research efforts, which are supported by a STEM identity lens (one's sense of belonging and future success in STEM). In 2023, CIRL staff had multiple publications that added to the national and international dialogue related to STEM education and mentoring.

- Hughes, R., Davidson, S., Johnson, K., (2023). Meta Mentoring: Mentors' Reflections on Mentoring, *Journal for STEM Education Research*. <u>https://doi.org/10.1007/s41979-023-00104-x</u>
- Hughes, R., & Schellinger, J., (2023). Gatekeepers to Science and Engineering: Informal Science and Engineering Educator's Role in Positioning and Recognizing Girls' Identity Performances. *International Journal of Informal Science and Environmental Education*, 3(1).
- Johnson, K. W. (2023). How program and evaluation can nurture mentoring relationships and program success in STEM. *The Chronicle of Mentoring & Coaching*, 7(16), p. 483-488.

Hughes continues to lead the research efforts of her NSF AISL grant (BRITE Girls Online STEM Practices: Building Relevance and Identity to Transform Experiences. NSF Advancing Informal Science Learning (AISL, #2215138), [8/15/22 – 7/31/25, \$1,902,274]) as the PI. The team completed their first summer, holding a virtual STEM program for 70 middle and high school girls to determine the impact of the program on the participating girls' STEM identity. The results of this study should inform MagLab programs as well as virtual programs across the country. In addition, Hughes is a co-PI on the NSF ADVANCE grant awarded to Florida State University: ADVANCE Adaptation: Institutionalizing Normative Changes for Recruitment, Empowerment, Advancement, and Systematic Equity for STEM Faculty (INCREASE). NSF ADVANCE: Organizational Change for Gender Equity in STEM Academic Professions (EES #2305516), [9/1/23 – 8/31/26, \$999,919]. This grant focuses on STEM faculty and can inform mentoring practices at the MagLab.

3.2 PUBLIC OUTREACH

Public outreach is run by the MagLab's Public Affairs team who use a comprehensive communications strategy to reach broad and diverse audiences with content designed for varying levels of scientific understanding. In 2023, the MagLab posted 18 news and feature stories. On top of that, the MagLab was discussed in about 800 news articles in outlets such as the Tallahassee Democrat, Forbes, Yahoo News, ScienceDirect, Los Alamos Reporter, Washington Daily News, and many others reaching more than 2.2 billion readers/viewers worldwide.

3.2.1 WEBSITE AND SOCIAL MEDIA

In 2023, the MagLab launched a new and improved website. The site includes a reorganized user resources section with new content, a **refreshed modern design**, **streamlined information for audiences**, **and a mega-menu to encourage easier navigation across the site**. In 2023, the website received nearly 3.4 million "events" (events are a measure of website interactions: view, watch, click, download, scroll, submit a form, etc.). Pageviews increased for the research and news/events sections of the website and website "events" were higher than 2022 pageviews across the website.

Worldwide social media users continued to grow in 2023, however, the amount of overall time users spent on networks decreased as the broader sector landscape continued to face significant changes across different networks and platforms. The MagLab's social media accounts continued to provide a connection point between the lab and our worldwide audiences. Our Facebook and Instagram accounts grew with

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posts reaching different ages, genders, and geographic locations including India, Brazil, Pakistan, Bangladesh, Mexico, Iran, and Egypt. The lab's audience includes a larger percentage of women on Facebook and Facebook is better at reaching 45-65+ year old audiences, but the lab's audience distribution is broad across the network. Instagram favors younger audiences with the peak of visitors between the 25-34 age group.

The MagLab's Twitter/X account reached nearly 240,000 people in 2023 and saw growth in tweet clicks, likes, replies, and engagement rates above 2022 levels. The MagLab's Twitter/X content experienced a much higher than average engagement rate of 2.4% (compared to the average overall median engagement rate on Twitter/X of 0.035% which means the lab's engagement rate is 6,757% higher than average). Top tweets of 2023 were focused on the director's search updates, events, research, recognitions/awards/accomplishments, and tweets that align with pop culture moments (**Figure 3.2.1**).

	Impressions	Click	Engagement Rate
National MagLab @NationalMagLab - Mar 24 Still thinking about that #LastOfUs finale? Read how real scientists are using powerful magnets to understand one of the most prevalent and deadly #fungi. buff.ly/3K1MEjV pic.twitter.com/qhpxXBtuwo	4,984	207	4.2%
National MagLab @NationalMagLab - Jun 5 This Monday, take a moment to meet a MagLab magnet probe - a fancy home-built sample-holder that helps our scientists make amazing discoveries. bit.ly/3WukiDN pic.twitter.com/8xfmm8u6uz	2,469	65	2.6%
National MagLab @NationalMagLab · May 22 A number of amazing postdoctoral opportunities are available at the National MagLab. Check them out and apply now - bit.ly/3HcK2xV	3,761	160	4.3%
National MagLab @NationalMagLab - Apr 17 FSU is lauching a search to find the next director of the National HIgh Magnetic Field Laboratory - bit.ly/3MMDXvR pic.twitter.com/1vRk0WxN5q	8,972	217	2.4%
National MagLab @NationalMagLab - Aug 24 Read how scientists trapped light inside a magnetic metamaterial and made the material itself 10 times more magnetic. bit.ly/3swjl2D pic.twitter.com/4kWgrDowv5	36,419	462	1.3%
National MagLab @NationalMagLab + Aug 5 Our own David Larbalestier is quoted in this new piece from @Verge about what experts think on the new LK-99 "superconductor" going viral: bit.ly/3Qr7CfK pic.twitter.com/47fyDzvz6U	2,417	137	5.7%
	Impressions	Click	Engagement Rate
National MagLab @NationalMagLab · Nov 13, 2023 CYMI: bit.ly/464Cirh	7,212	18	0.2%
MagLab is analyzing water & soil from the Maui			

Figure 3.2.1. Top tweets plus impressions, clicks, and engagement rate.

11 7.2K

03

wildfires

t11

0:34

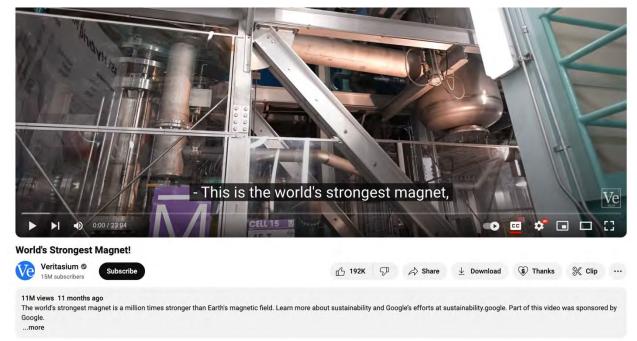
DI

MagLab videos received more than 10.1 million impressions on YouTube in 2023 and were viewed 865,000 times. The lab's YouTube channel added 4,500 subscribers and more than 26,000 hours of MagLab videos were watched in 2023. Peaks in views coincide with social media promotion and the release of new video content.

MagLab YouTube viewers come from all ages with more than 55% of viewers between 18 and 34. More than 21% of the MagLab's YouTube watchers are female and audiences come from around the globe including India, the Philippines, Pakistan, Bangladesh, Indonesia, the United Kingdom, Canada, South Africa, Sri Lanka, Australia, Malaysia, Ethiopia, Turkey, Brazil, Kenya, Vietnam, Myanmar, Egypt, Germany, Thailand, Iraq, and Nigeria. 2023 saw growth in viewers from Africa with more than 5.5% of the MagLab's total YouTube viewers from Africa.

The most popular videos on the MagLab's YouTube channel continue to be the See-Thru Science video series which shows viewers what electricity and magnetism might look like if they weren't invisible. In 2023, the See-Thru Science series earned another million views bringing the series to more than 11 million total views.

In March 2023, YouTube Science Influencers VERITASIUM released a video about the World's Strongest Magnet. As of this writing, it has 11 million views and nearly 7,000 comments on YouTube (**Figure 3.2.2**). (<u>https://youtu.be/g0amdlcZt5I?si=q2ORJxmwh3FwV8cX</u>)



6,964 Comments = Sort by

Figure 3.2.2. Veritasium Video on YouTube

3.2.2 EVENTS

The Public Affairs team engaged with excited and enthusiastic audiences throughout 2023. Events are an important way for people of all ages to connect with the MagLab by meeting our researchers, seeing our unique lab spaces, and enjoying the fun of hands-on science. Events excite and inspire young visitors and remind adults that science is important and worthy of continued support.

Our Open House returned on February 25, 2023, and hosted more than **11,700 visitors** from across the southeast to play with the nearly 100 hands-on games and demonstrations at Open House 2023. This event marked the first return to an in-person Open House experience since February 2020 and featured the largest Open House attendance in MagLab history.

The 2023 game-themed event included one-of-a-kind experiences based on classic board games, video games, carnival games, and even TV game shows including an **Operation** game that explained the kinds of special things that can be imaged with more powerful MRIs, an outdoor **CandyLab** experience with a colorful path through science-inspired magical lands teaching about colors on the visible light spectrum, a **Pokémon Go Scavenger Hunt** that took visitors around the lab to find Pokémon connected with MagLab spaces and activities, a **MagLab Game Show Network** where visitors could play MagLab versions of classic TV game shows including Jeopardy, Pictionary, Match Game and Two Truths & a Lie, **Super MagLab World** with activities themed around Super Mario, and more (**Figure 3.2.3**).

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Preliminary 2023 Open House survey data shows that about half of Open House visitors had never been to the lab before the event and that more than 75% agreed or strongly agreed that the event helped them better understand the science at the MagLab and how it benefits our community.



Figure 3.2.3. Open House 2023 photos.

Partnering with the Tallahassee Senior Center, Public Affairs hosted a series of lunch and learn sessions where dozens of seniors had the chance to tour the lab and have lunch with MagLab researchers to discuss their work. We also took part in community events across the region including the Tallahassee Science Festival in October 2023.

The Public Affairs Team completed the 2022-2023 Science Night series at Leon County Libraries and launched the 2023-2024 school year season as well (Table 3.2.1). Science Night is a public event targeting young children but also acts as a critical engagement point with parents of all ages. Each event features a science story read-along by a MagLab Scientist which is used to help the scientist explain their exciting research to the mostly elementary-aged students and their families. Following the story, students take part in hands-on science with brand-new dynamic activities designed to share the inspiration of science. Participants of all ages also get to engage with MagLab scientists and ask questions about all the things they've ever wondered about.



Figure 3.2.4. Select Photos of the 2023 Science Nights.

Science Night also continued to branch outside of the main library location to offer experiences at branch libraries across the community to reach new diverse audiences (**Figure 3.2.4**).

Table 3.2.1. 2023 Science Nights

Date	Scientist/Topic	Hands-On Activities	Location	Attendees
1/19/2023	Thierry Dubroca, EMR You are swimming in a sea of waves, and you didn't even have to go to the beach! From radio waves to rays of light, we will take a look at the invisible ocean of electromagnetic waves around us. Hangout with a scientist that is channeling powerful waves to make new scientific discoveries.	 Candy Wave Machine DIY kaleidoscopes Seeing Light waves Microwaves and Marshmallows 	Main Library	130
2/16/23	Ernesto Bosque, ASC Do you love puzzles and problem solving? Then you probably love math! Lucky for you, math is key to all kinds of research from physics to engineering. We'll learn how math saved the day in the past, and talk to an engineer that is using it to shape the future.	 Luck & Logic Game Mobius Strip Pattern Party Game Fractal Worksheet 	Eastside Branch Library	80
3/23/23	Kari Roberts, Statistician Sure, we're talking in code, but there won't be any secrets around here! Join us as we unlock the language of computers and learn how to control robots with special commands. We'll learn about the many ways code helps science happen, at the MagLab and beyond.	 OzoBot If/Then Board Game Binary Bracelets Decoder Wheel 	Main Library	75
4/20/23	Lydia Babcock, ICR As the weather warms up, beaches are the place to be, but healthy oceans are important to everyday life, not just vacation days. Together we'll learn what makes oceans special and how we can protect them. We'll even meet a MagLab scientist that travels the world studying the chemistry of ocean water.	 Depths of the Ocean Sticker Food Chain craft Ocean Acidity Chemistry Test 	Main Library	60
9/21/23 10/19/23	CANCELLED FOR HURRICANE IDALIA Yanique Lawrence, DC Instrumentation/ Electronics Shop Shock and AHHH! Zap! Buzz! Boo! Electricity can be mysterious. It can even seem supernatural. Join us for a hair-raising night as we untangle the mystery and channel the electrons that power our lives.	 Groovin Ghosts (static electricity activity) Pumpkin power (pumpkin batteries) Van de Graff Generator + Bubbles Electric Eels 	Main	50
11/16/23	Emma Martin, ASC Taking Flight Ready for liftoff? We're headed toward the clouds to learn how people harnessed math and science to take flight. We'll make some flying crafts of our own and see who can soar the highest.	Paper airplanes Making different designs & testing them on the Runway	Main	50
TOTAL AT	TENDEES			445

3.3 CONFERENCES AND WORKSHOPS

Each year, the MagLab hosts or sponsors a variety of workshops and conferences related to high magnetic field research (**Table 3.3.1**) In 2023, seven conferences/workshops were offered in person across scientific disciplines.

Event	Date	Location/ Type	Description	Attendees
Theory Winter School	January 9-13	In-Person Tallahassee, FL	The 2023 School focused on "electron correlations in fractional quantum Hall effects and moiré materials." It provided an introductory overview of key results and unanswered questions in both fields, theoretical and experimental, and points towards possible connections or analogies between these two correlated systems.	
13 th North American FT MS Conference	April 30 – May 3	In-Person Key West, FL	The FT MS Conference is held every two years and is the premier of its kind in the field of Fourier Transform Mass Spectrometry and its applications. Presentations ranged from instrumentation to technique development in the biological/biomedical sciences ranging from pharmaceutical metabolism to proteomics, environmental analysis and petroleomics, with special emphasis on new developments.	
User Summer School	May 15-19	In Person Tallahassee, FL	 A weeklong workshop with talks from experts in the field of condensed matter physics on: Noise types and theory; noise suppression techniques Transport techniques Magneto-optics Infrared and terahertz spectroscopy NMR techniques for condensed matter Cryogenic techniques Heat capacity Measuring fermi surfaces The nuts and bolts of data acquisition 	
Low-Temperature Superconductor Workshop	May 23-25	In Person Tallahassee, FL	 This invitation-only event brought together magnet builders, conductor manufacturers, and university and lab groups seeking a fundamental understanding of superconductors. Participants discussed the latest successes and challenges in implementing conductors into magnets and developing the next generation of magnet technologies. Topics included: High energy physics Commercializing superconducting magnets for fusion and research Wire Manufacturing A look back at 40 years of the workshop 	
External Advisory Committee Meeting	August 18-20	In Person Tallahassee, FL	The EAC is charged with reporting on the State of the MagLab to the leadership of its three partner institutions: Florida State University, the University of Florida, and Los Alamos National Laboratory.	
User Committee Meeting	September 18-20	In Person Tallahassee, FL	An annual meeting of users who represent the	
RF Coil Workshop (Phase 2)	October 16-19	In Person Tallahassee, FL	A 4-day advance coil workshop to learn how to build radio frequency MRI (Magnetic Resonance Imaging) volume coils. The workshop is focused on constructing a birdcage volume coil for 500 MHz MRI micro imaging system. Participants are able to learn theory and get hands-on experience in coil construction, tuning and impedance matching.	

3.4 BROADENING OUTREACH

In addition to the Diversity and Education sections of this report which speak to the MagLab's work to broaden participation through education and outreach, MagLab staff regularly take advantage of conferences and workshops to share information about the lab's user program with diverse researchers

from around the globe. Each talk, presentation, poster, or abstract opportunity provides the chance for scientists to learn more about the lab's research capabilities and broaden our user program to new scientists from across disciplines and career levels – from graduate students and postdocs to track faculty.

In 2023, MagLab staff gave **158** lectures, talks, and presentations to organizations around the country and the world (**Figures 3.4.1 and 3.4.2**). Compared to years that were more heavily impacted by COVID-19, nearly all national and international meetings occurred in person. As such, 99% of the presentations were in-person in 2023 (**Figure 3.4 3**).

During the year, the MagLab continued the important work to broaden participation through outreach and presentations at prominent meetings and conferences including the American Physical Society (APS) March Meeting, American Institute of Chemical Engineers (AIChE) Annual Meeting, MT-28 International Conference on Magnet Technology, Experimental Nuclear Magnetic Resonance Conference, 21st Symposium on Condensed Matter Physics; 16th European Conference on Applied Superconductivity (EUCAS); Quantum Phenomena in 2D Matter (QP2DM-2023), 21st International Conference on RF Superconductivity (SRF 2023), 71st ASMS Conference on Mass Spectrometry and Allied Topics, 8th International Conference on Smart Innovation & Sustainable Transportation; Science and Technology of Emergent Materials: International Neuropsychological Society Annual Meeting; 2023 Annual Meeting of the Biomedical Engineering Society; 2023 ISMRM Annual Meeting; Workshop on Strong Electron Correlations in Quantum Materials: Inhomogeneities, Frustration, and Topology; Lectures on Metal-Insulator Transitions; QCRYSTAL 23; AGU Fall

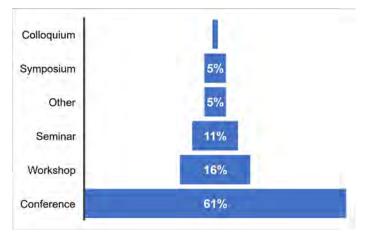


Figure 3.4.1. 2023 Presentation types

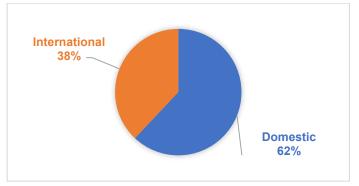


Figure 3.4.2. Breakdown of 2023 presentations by geographic distribution.

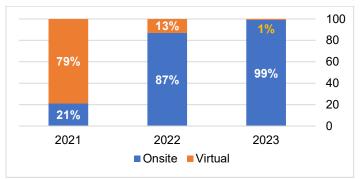


Figure 3.4.3. Comparison of presentations given virtually in 2021 and 2022 versus 2023

Meeting 2023; and the National Association of Research in Science Teaching.

4 IN-HOUSE RESEARCH IN SUPPORT OF THE USER PROGRAM

4.1 MAGNETS AND MATERIALS

4.1.1 INTRODUCTION

4.1.1.1 APPLIED SUPERCONDUCTIVITY CENTER

The Applied Superconductivity Center (ASC) supports the development of magnet technologies from materials up to important feasibility validations. Work at ASC defines the limits of conductor, magnet components, and magnets via tests and post-test analyses using extensive materials science and physics tools. There is a natural transition from ASC to the missions of MS&T, DOE labs, and magnet manufacturers. ASC also develops characterizations of structure and properties that definitively connect processing with performance, with characterization tools to find processing origins and material root causes of performance shortfalls. This provides a natural pathway for collaboration with conductor manufacturers. ASC extends the boundaries of knowledge in materials, conductors, and magnets via a portfolio of high-impact research grants including the NSF core grant to MagLab, via collaborations with other laboratories and institutions, and commercial partnerships. Faculties in ASC aim to propagate knowledge and training via support of MS, PhD, and post-doctoral staff, interactions with industry and federal agencies, participation in review panels and oversight committees, and support of publications, conferences, and learned societies.

4.1.1.2 MAGNET SCIENCE AND TECHNOLOGY

The Magnet Science and Technology (MS&T) division supports the MagLab's Mission to develop, operate, and maintain existing and new magnet systems that enable a world-leading high-magnetic-field user program. In 2023, MS&T made important progress on the all-superconducting 40T magnet design and developmental coil testing; a cryocooled test facility to evaluate the performance of REBCO high-temperature superconducting coil modules; fabrication of large, pulsed coils for the LANL 60T continuous wave and 100T multi-shot magnets; development of the high-strength, high-conductivity materials required for pulsed and DC resistive magnets and continuing to maintain the suite of resistive magnets in the DC Field Facility including the world-record high fields produced by the 45T Hybrid, the 36T, 1ppm Series-Connected Hybrid and the 41.5T all-resistive magnets. The following sections further describe the achievements in these areas.

4.1.2 PROGRESS DURING THIS REPORTING PERIOD

4.1.2.1 40T ALL-SUPERCONDUCTING MAGNET

A Mid-Scale RI-1 grant to for the Preliminary and Final Design of a 40T all-superconducting magnet was awarded to the MagLab in 2021 (Award number: NSF/DMR 2131790). This 5-year project will validate the HTS technologies needed for the 40T magnet and complete the final design required for the implementation. This all-superconducting magnet is expected to produce 40T in the center of a cold bore of 34mm diameter with homogeneity of less than 500ppm over a one-centimeter diameter spherical volume. When complete, the 40T magnet will be installed in the DC Field Facility. The 40T magnet will provide a very low noise environment for experiments lasting days at a time, surpassing the time available from present-day powered (resistive and hybrid) magnets. Upon its commissioning, the 40T magnet will become

a flagship in the MagLab's suite of high-field magnets that exist to serve the User Community. In 2023, the team continued to work on optimizing the 40T design and validate the technologies needed for the magnet. The section below highlights the achievements in 2023.

Several "mid-scale" coils were designed, built, and tested during 2021-2022. Some used traditional insulation between turns, while others used a "resistive insulation" approach. In late 2022, we decided to down-select to using exclusively traditional insulation instead of "resistive insulation".

4.1.2.1.1 40T MAGNET DESIGN

In the past year, an extensive design study was performed focusing on the insulated approach while including all the lessons learned from the various test coils as well as new insights that had emerged from more sophisticated numerical modeling of the behavior of the conductors during energization and quench. The design study is based on the two-in-

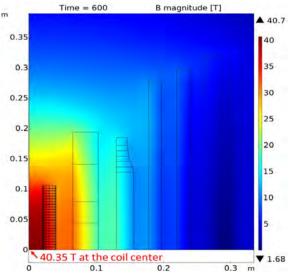


Figure 4.1.1. Field distribution of the 40T magnet design of 3 HTS coils.

hand insulation technology with the following features: an operating current to the critical current ratio (I_{op}/I_c) of less than 60%, radial compression on each turn, limited axial pressure and rotation angle, reduced cowind thickness and overband grading. Various options were studied including the use of standard I_c tapes vs graded I_c tapes, an 8T LTS magnet vs 12T LTS magnet, and 2 vs 3 nested HTS coils. Figure 4.1.1 shows the field distribution of the present 40T design with 3 HTS coils. The quench analysis of the design is progressing, and the design will be revised accordingly to limit the peak temperatures and ground voltages during quench in the coming year.

4.1.2.1.2 MAGNET TECHNOLOGY VALIDATION

The 40T project continued to validate the technologies required for the 40T magnet in two key areas: operation at a high fraction of critical current and crossover joints connecting individual modules at the outer diameter. To demonstrate the coils can reach a high critical current ratio (I_{op}/I_c) of more than 70%, a total of 8 modules were tested individually in the 6.5T Petten magnet. Figure 4.1.2 shows the critical current fraction at a charging current of 900A in both the positive and negative directions. The test results showed that most of the modules could be operated to greater than 90% of the coil I_c as predicted from short sample testing of the REBCO tape. The individual module test demonstrated the test process, and the predictability of I_c in the modules and verified the module fabrication process before subjecting them to an expensive full coil, multiple module test. The developed individual module testing is being evaluated for implementation as a standard verification test for modules to be used in the 40T magnet.

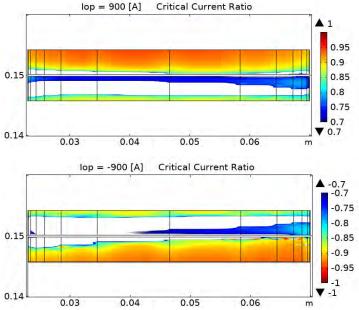


Figure 4.1.2. The critical current ratio in a module at a positive charging current of 900A to verify the top disk (top figure) and negative 900A to verify the l_c in the bottom disk (bottom figure).

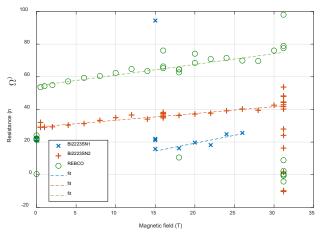


Figure 4.1.3. The electrical resistance of the new crossover design using Bi2223 tape. The new design is less than the 50nOhm resistance requirement for the 40T.

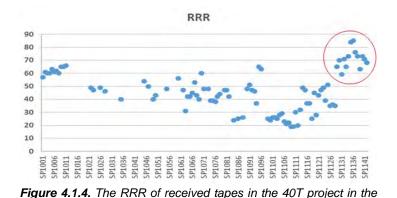
A new design of the crossover joints using Bi-2223 instead of REBCO HTS tape was tested. The resistance of the new design was tested up to 31T and was measured to be less than the target upper limit of 50nOhm as shown in **Figure 4.1.3**. Not only is the resistance lower than that of the older REBCO joints, but the screening current effects are much smaller in the new design as well. Fatigue testing on the new crossover was also performed at a high current of 500A in a mini-fatigue test coil. After 50,000 cycles no degradation occurred at high current and stress. This activity qualified the new design for the Large-Scale Test coil.

4.1.2.1.3 REBCO CONDUCTOR CHARACTERIZATION

A total of more than 8 km of REBCO HTS tapes were received from SuperPower. The tapes are being used for the Large-Scale Coil to be tested in the coming year. Extensive quality control tests were performed on the tapes including I_c measurements at fixed angles, angular and temperature dependence of I_c , residual resistivity ratio (RRR) of the copper matrix, determination of the *ab*-plane tilt angle, joint resistance, fatigue life, electro-mechanical properties, scanning electron microscope imaging of the defects in the REBCO tape, etc. The results guided the design of the Large-Scale Coil test and were provided to SuperPower as feedback for improving the performance of their production of the REBCO tape.

the 40T design.

One improvement made by Superpower is the RRR that compares the room temperature and 4K resistance of copper in the REBCO conductor. The tapes received at the end of 2023 showed a very good RRR of 60-80 which is much larger and more beneficial to the magnet design than values in the past few years as shown in **Figure 4.1.4.** In short, SuperPower is meeting the needs of the project.



past 5 years. The data in the circle on the right are for the tapes

received at the end of 2023 showing the improvements benefiting

4.1.2.1.4 LARGE-SCALE COIL

The Large-Scale Coil (LSC) will be built and tested to validate the integrated HTS technologies for the 40T for two purposes:

- a. Validate the technologies and
 - design needed for the final 40T SC magnet.
- b. Identify any unknowns that have not been revealed in the smaller mid-scale test coils.

The 40T preliminary design provides the basis for the LSC design which has a similar length as the innermost HTS coil and the same diameter as the outermost HTS coil. Great progress was made on the LSC design and a design review by the Technical Advisory Committee was held in December 2023 which approved proceeding to the LSC fabrication and testing. After the design review, the materials and instruments with the longest lead times were ordered. LSC fabrication started in January 2024 and the testing is planned to be finished by the end of 2024. **Figure 4.1.5** shows the mechanical model of the Large-Scale Coil design.

4.1.2.2 HTS MODULE PERFORMANCE TEST FACILITY

With funding from the MagLab's User Collaboration Grant Program (UCGP), an individual HTS module test facility has been designed to meet increased current capability in excess of 800A. This work builds on the success of the individual module testing for the 40T magnet performed in liquid helium by adding the convenience and reduced expense of cryocooler refrigeration. The cryocooler not only saves liquid



Figure 4.1.5. The Large Scale Coil design with a bore of 260mm diameter.

helium costs but will allow testing at various temperatures. A single and double current lead model has been designed as shown in **Figure 4.1.6.** The two designs will be reviewed and one design will be selected for commencement of fabrication in the coming year.

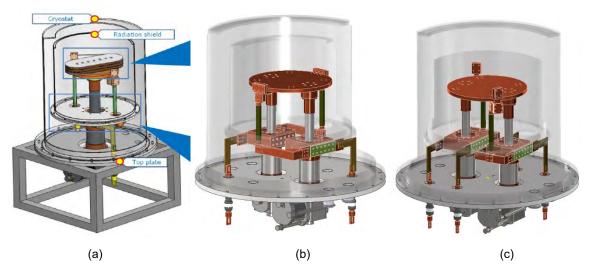


Figure 4.1.6. The 3D computer design drawings show (a) the initial concept, (b) the one current lead model, and (c) the two current lead models.

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4.1.2.3 LARGE PULSED COIL FABRICATION

Fabrication of Los Alamos National Lab's large outsert coils of the 60T controlled waveform (CW) and 100T multi-shot (MS) magnets are being performed at the MagLab in Tallahassee. One additional coil for the

60T and two coils for the 100T are required to complete the magnet sets. It is the objective of this activity to have the two magnet systems online by the time the repaired flywheel generator is installed and commissioned.

Winding of Coil 7 of the 60T CW coil commenced as shown in Figure 4.1.7 in late 2023. It is the first coil to use the new, improved insulation wrapping conductor equipment. The machine produces more consistent wrapping а pattern of Kapton and E-glass tapes and wraps faster than the older system. The coil consists of six total layers, four of which will be wound using AL-60, the material traditionally used in the 60T. However, due to material drawing difficulties, the supply chain for AL-60 no longer exists. Thus, two

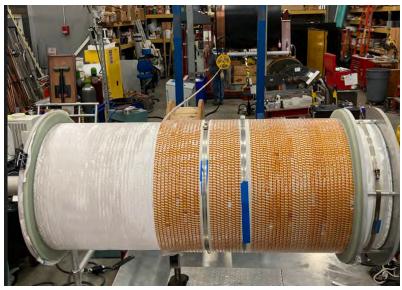


Figure 4.1.7. Coil 7 of the 60T CW magnet is being wound with AL-60 wire. Kapton-E-glass-wrapped insulation is applied by the yellow insulation machine in the background.

layers will be wound with a newly developed alternate conductor made from CuCrZr. The properties are similar but CuCrZr is easier to draw to its final dimensions allowing suppliers to process the conductor.

4.1.2.4 HIGH-STRENGTH, HIGH-CONDUCTIVITY MATERIALS

To maintain ultrahigh-magnetic fields, resistive and pulsed magnets require a constant supply of composite conductors with properties well above those usually provided in market-available materials. In 2023, MagLab faced several challenges in maintaining our supply chains for these conductors.

One of these challenges was the discontinuation of collaboration between the MagLab and Rusatom, a company in Russia with whom we had previously worked closely on the development and manufacture of the high-strength Cu-Nb required for our 101T pulsed magnet and our >75T duplex pulsed magnets. After the discontinuation, we explored two new alternatives. The first was to develop, no later than 2024, a replacement for the high-strength Cu-Nb composite that we are currently using with another high-strength Cu-Nb composite that has slightly lower strength but higher conductivity. About 20kg of this new material will arrive at the MagLab in 2024, at which time we plan to begin characterizing this new conductor and undertaking further R&D.

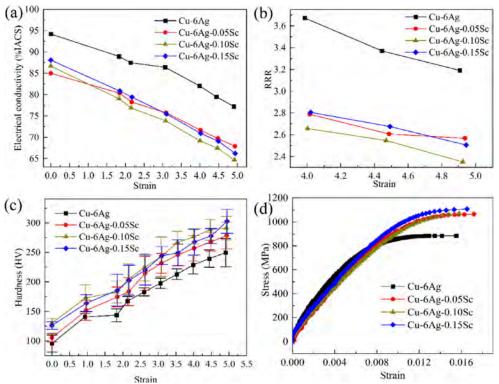
The second alternative that we are exploring is how to enhance our development of Cu-Ag-based composites. These composites are known for both high strength and high conductivity and are currently used at the MagLab as conductors in high-field DC magnets.

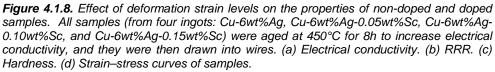
To maintain these magnets, we must have a constant supply of the necessary composites. Consequently, we must maintain consistent quality control. To this end, we tested more than 220 samples of Cu-Ag and Cu-Zr composites in 2023. Our tests revealed variations in the properties of conductors supplied by the same vendor. This experience led us to believe that more R&D is required before we fully commit to the application of Cu-Ag composites in pulsed magnets, even though we presently consider Cu-Ag a promising alternative for Cu-Nb.

The desirable properties of Cu-Ag are the result of a high density of Ag precipitates that lengthen into long fibers during deformation [1-3]. The resulting multiplicity of Cu/Ag interfaces prevents dislocation movement, thus increasing strength. The density of the precipitates can be increased by doping with other alloying elements. We demonstrated that the density of the precipitation was enhanced by the doping of Cu-6wt%Ag with Sc. We found that a high-volume fraction of precipitates, which had nucleated on {111} planes of Cu, subsequently led to a 55MPa increase in strength, with only a slight decrease in electrical conductivity.

The addition of Sc inhibited the nucleation of coarse precipitates by causing the Sc and the Ag to cosegregate onto grain boundaries, thus forming a thin intermetallic compound layer between grains, leading to the formation of fine precipitates. After deformation, precipitates were drawn into Ag fibers. The combination of doping and deformation strain caused an increase in density, a decrease in the diameter of Ag fibers, and a decrease in the distance between fibers. At a strain value of 4.9, we found that the mean edge-torandom edge distance of coarse precipitates (which appeared mainly in nondoped samples) and fine precipitates (which were found mainly in doped samples) were 43.3 ± 2.1nm and 25.9 ± 5.1nm, respectively.

The properties of conductors are also dependent on the presence of dislocations and twins. In both types of samples, we observed misfit dislocations on Cu/Ag interfaces even though the diameter of fibers





was only about 1.8nm. Some doped samples, however, did not show any misfit dislocations on Cu/Ag interfaces even when the fiber diameter was as high as 2.5nm. Some deformation twins (as thin as 2nm) appeared in the doped samples. In the non-doped samples, some recrystallized Cu grains and coarsened Ag particles appeared in local areas, but none at all appeared in the doped samples. Instead, there were many subgrains in the doped samples with numerous fine fibers diffused along their boundaries.

As strain increased during deformation, electrical conductivity and RRR decreased in both doped and non-doped samples because of the decrease in the distance between Ag fibers. When strain increased to 4.9, electrical conductivity decreased to around 66% IACS in doped samples and 77% IACS in non-doped samples. The RRR also decreased to around 2.5 in doped samples and 3.2 in non-doped samples as shown in **Figure 4.1.8 (a,b)**. For reference, 100% IACS (International Annealed Copper Standard) is equivalent to 1.7241µ Ω cm. The hardness of both doped and non-doped samples increased as the strain increased. At strain of 4.9, hardness values in doped and non-doped samples were around 290HV and 249HV respectively as shown in **Figure 4.1.8 (c)**. The hardening rate for doped samples was around 35HV per unit of strain, higher than the rate for non-doped samples (31HV per unit of strain). Our tensile testing showed that, after having been deformed to a strain of 4.9, all doped samples had UTS of around 1070MPa, about 205MPa higher than the average UTS of non-doped samples as shown in **Figure 4.1.8 (d)**. To increase the conductivity of doped samples, we also tested the properties of deformed samples (strain of 4.9) aged at 300°C for various time intervals. The UTS of samples aged for 1h was marginally lower than that of unaged samples, while conductivity was higher by about 6.3% IACS.

In such high-strength conductors, mechanical properties are sensitive to defects. This may cause premature failure of the magnet coils. Thus, analysis of the failures that occur in high-strength conductive composites with defects is critical for the development of reliable coils in the future. Using strain mapping, we studied the effect of notch geometry on mechanical properties and the mechanisms of notch-related plastic deformation [3]. Our study revealed notch-strengthening in Cu-Ag composites. In all notched samples, we found highly localized necking bands between pairs of notches. Under tension, these bands developed into ellipse loops. Within the bands, the deformation strain was much higher than the average strain over a large neighboring area. The plasticity of necking bands depended on notch tip radii. In samples whose notch tip radius was ~ 3.81mm, the localized strain within necking bands reached as high as 50%. In samples with sharper notches (~0.20mm), necking plasticity still attained 18% before failure as shown in **Figure 4.1.9**. The results of this study provide unique insights into the endurance and performance of high-strength composites.

To face the supply challenge of Cu+alumina conductors in 2023, we enhanced both hardness and electrical conductivity in solutiontreated Cu-0.66Cr-0.05Zr (at%) wires [4]. After cold deformation, hardness increased by ~100%, and electrical conductivity increased by 24%. We further demonstrated that postdeformation aging increased hardness by another 27%~38% and electrical conductivity by up to an additional 80%. In previous research on composite conductors, hardness increase caused by deformation was usually accompanied by a decrease in electrical conductivity. In our case, however, we were able to increase both hardness and conductivity simultaneously by controlling thermomechanical process parameters with the aim of engineering precipitate size and density. We attributed our simultaneous enhancement of hardness and conductivity to the generation of deformation-induced precipitates, each less than a nanometer thick. Aging, either before or after deformation, induced the creation of even more precipitates, thus strengthening the conductor We subjected solutionfurther. treated materials to either aging deformation followed by or deformation followed by aging. Our results were the same regardless of order. Based on this study, we made conductors for optical magnets and coil A of the 65T short-pulsed magnets. We found that Coil A, which was made from our new conductor. out-performed coil B in a 65T shortpulsed magnet.

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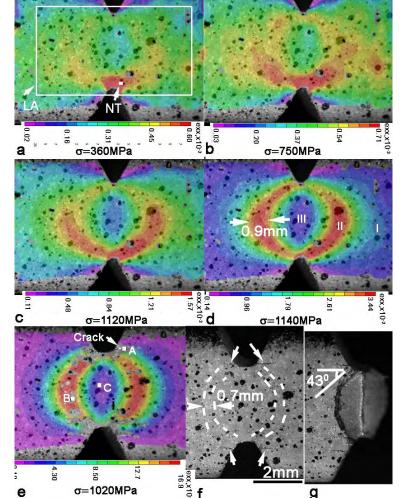


Figure 4.1.9. Strain (exx, parallel to loading direction) distribution across the CuAg sample surface at the notch tip (R=0.20mm) under various levels of tensile stress. The horizontal color bar represents local strains. a) exx of 360MPa: non-uniform strain distribution at early loading. The average strain value in a Large Area (LA) is measured within the rectangle enclosed by white lines. NT indicates the location of the Notch Tip for quantitative strain measurement. b) exx of 750MPa: Areas with higher e_{xx} are scattered in the vicinity of the notch. c) e_{xx} of 1120MPa: deformation starts localizing; by this time, the notch has widened by ~3.8%. d) exx of 1140MPa: necking bands developed in Zone II. By comparison, Zones I and III are less deformed. The inner radius of Zone II is ~ 1.8± 0.5mm. The notch has widened by ~9.3%. e) exx of 1020MPa: the inner radius of Zone II is ~ 2.0 ± 0.6 mm. The notch has widened by ~37.5%. The plastic deformation has blunted the notch tips. Long cracks parallel to the loading direction appear at the transition from Zone I to Zone II. f) An in-situ capture of the notched sample under tension before fracture, exhibiting microcracks developing and propagating within the necking bands in Zone II. The sharp notches have become blunted and stretched. (Necking width was estimated along the white dash lines that mark the boundary of the necking band area). g) A fracture appearing across the necking band and slipping off along the shear direction.

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4.1.2.5 DC RESISTIVE MAGNETS

2023 has been a very successful seventh year of operation of the MagLab's 36T, 1ppm Series-Connected Hybrid magnet, the world's highest field 1-ppm magnet. The resistive insert for this magnet provides 23T while operating in the background of 13T provided by the superconducting outsert. The insert had accumulated more than 4,240 hours of operation over six years before its first A-coil replacement at the end of 2022. Next, to ensure the re-delivery of overall 1ppm field uniformity after the most inner coil replacement, the A/B-coil assembly had to be re-calibrated, aligned, and re-tuned. This task has been delivered successfully in 2023 with only minimal downtime to the user program. The new A-coil has meanwhile also served another 517 hours of user experiment time at full field. The other three outer coils are still operating successfully without issues since the day of first commissioning.

Another resistive magnet milestone worthwhile to explicitly mention is the flawless six years of operation of the world record 41.5T all resistive magnet since the first charge to record field in August 2017. In June 2023, the windings of the A/B-coil assembly were eventually replaced after about 2,000 hours of operation at full field. This represents about double the typical lifetime of an equally highly stressed coil winding of the 45T Hybrid coils and is considered a significant success. The new coils have meanwhile served another 500 hours of user operation. The remaining outer four coils are also in successful operation since 2017 (unchanged as originally installed).

Furthermore, to support the smooth operation of the resistive user program, the MagLab has completed the fabrication and assembly of eight resistive spare coils as part of the routine 2023 maintenance program and performed over 24 maintenance actions (coil tightening, replacement, or other major scheduled tasks) in the resistive magnet cells. This includes the fabrication of a complete set of spare coils for the resistive insert of the 45T Hybrid system, which has been cleared for operation at full 45T field again since fall 2023. Overall, 2023 has been another very busy and productive year for the MagLab Resistive Magnet Program.

4.1.2.6 MECHANICALLY ROBUST CORC® CABLE SOLENOIDS

A solenoid parallel to our fusion activities funded by the DOE-FES, we have tested a magnet design in

which CORC®, an HTS-ReBCO cable, is wound into grooved metal mandrels with insulation but without epoxy or other filler. The coil was developed by Advanced Technologies Conductor (ACT), in collaboration with the Princeton Plasma Physics Laboratory (PPPL) and the Applied Superconductivity Center at the National High Magnetic Field Laboratory (ASC-NHMFL), as a potential route to manufacture high-field Ohmic Heating (OH) coils for compact fusion reactors. The 2-layer thick coil was about 60mm high and had a total of 12 turns with an ID of 119mm and an OD of 152mm. Initial stand-alone testing in liquid nitrogen and liquid helium at current ramp rates relevant for OH coils up to 5kA/s showed no limitations when applying high current ramp rates. Further testing at the ASC was carried

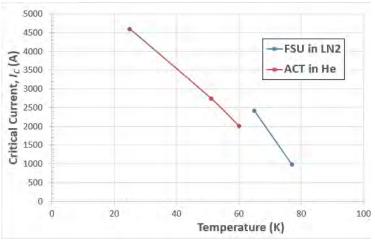


Figure 4.1.10. Performance of a CORC solenoid with designed defects cooled using re-circulated helium gas at ACT and sub-cooled liquid nitrogen at the NHMFL showing significant current sharing well above the limits of the defects with ultimate performance affected by the available cooling power.

out inside our 14T, 161mm cold bore LTS outsert magnet. At 12T, the coil had a critical current of about 4,500A as shown in **Figure 4.1.10**, corresponding to an engineering current density of 193 – 197A/mm² and a peak hoop stress of 173.5MPa. To understand the mechanical effects of winding, cryogenic cooldown, and stress-cycle operation on the novel dry-wound grooved-mandrel design on this coil and subsequent coils operated to significantly higher stresses, a postmortem investigation was undertaken. The goals of the investigation are to look for any hidden damage to the tapes within the cable, develop deconstruction and polishing techniques that preserve the mechanical state of the cables, and preserve long lengths of the cables for future reel-to-reel techniques like YateStar. At the ASC, methods have been developed for deconstructing a CORC® magnet, removing the CORC® cable coils without deformation or damage, segmenting the CORC® cables without unraveling and tampering with its inner structure, and preparing the CORC® cables in standard sample pucks for polishing and imaging of its cross-sections as shown in **Figure 4.1.11**. The development of these methods will act as standards for post-mortem analysis of CORC® magnets and inform new magnet designs.

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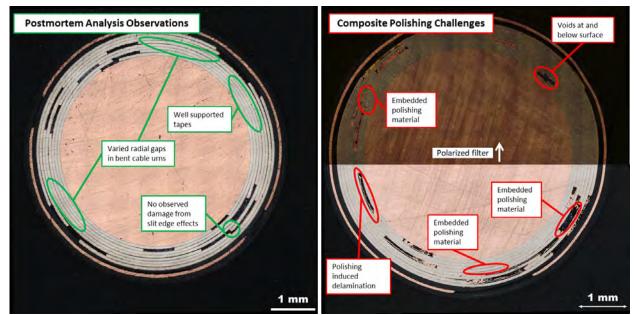


Figure 4.1.11. Results from postmortem analysis observations of CORC magnet cross sections and associated challenges of trying to preserve the mechanical information through a VPI epoxy process, composite polishing, and imaging technique.

A four-layer CORC cable solenoid was wound and tested for a DOE-EERE-AMO project. The CORC cable wound into the solenoid was designed to include well-understood performance dropouts in the REBCO tapes to validate the use of what some manufacturers term VIC conductor that has lower specs and is lower cost. Further testing at 65K using sub-cooled liquid nitrogen was carried out in synergy with the NSF goals of understanding cable solenoid operation. Testing in our liquid-helium-free 8T large-bore testbed was planned but could not be completed because of a long lead time on a replacement cold head after a very uncommon mechanical seizure of the piston before the normal maintenance cycle. The coil operated as if no VIC dropouts were producing more than 2T at 65K in sub-cooled liquid nitrogen, with better performance in liquid cryogens, presumably due to the improved cooling power of the current sharing around dropouts.

4.1.2.7 25T GENERAL SCIENCE MAGNET WITH BI-2212

There significant interest Bi-2212 is in (Bi2Sr2Ca1Cu2O8+x) conductor in the R&D community as well as industry and recently an additional manufacturer has joined the scene making Bi-2212 wire. Bi-2212 is commercial unique among high-temperature superconductors (HTS) as it is the only one available in multifilament, round wire, architecture and thus does not suffer from screening current effects. It behaves macroscopically isotropic (does not show a field field-angle dependence of the transport current), and can be internally twisted to reduce charging losses, just like Nb-Ti and Nb3Sn. Bi2212 can be cabled easily, and it is regularly produced on a 1+ km length scale with reproducible performance over long lengths.

2023 marked our first year collaborating with Oxford Instruments, a worldwide leader in high-field magnet manufacturing. The subject of our collaboration is the



Figure 4.1.12. Coil made by OI and heat treated at the ASC. Surprisingly, the coil showed significant leakage.

development of a hybrid 25T compact research magnet that will consist of a Bi-2212 insert inside a lowtemperature superconducting (LTS) outsert. In the current design generating 8T, the HTS section will provide a significant proportion of >30% of the total field. A coil, made by OI, was heat-treated in our new, large furnace at 10 bar due to limitations of the current heater insert. Unrelated to the reaction at lower pressures the coil showed significant leakage, which is very untypical for coated and braided Bi-2212 singlestrand conductor these days as shown in **Figure 4.1.12**. The conductor used in this coil was 0.8mm in diameter and twisted. Initial investigations identified an issue with the twisting process at the conductor manufacturer's level with inconsistent and partially approximately 3 times shorter pitch lengths compared with the nominal target value of 25.4mm as shown in **Figure 4.1.13**. Further investigations into this issue are ongoing and communicated with the manufacturer.

4.1.2.8 28T SUPERCONDUCTING MAGNET WITH HIGH HOMOGENEITY

A proposal for a 28T hybrid LTS/HTS demo NMR magnet system using Bi-2212 insert coil that we submitted to the NIH in 2022 was not funded and a new proposal was submitted to the NIH in 2023.

4.1.2.9 LOW INDUCTANCE HIGH-FIELD COILS WITH 2212 RUTHERFORD CABLE

The motivation for 2212 Rutherford cablerelated work is threefold:

> To explore a pathway towards low inductance (easier to protect) ultrahigh field magnets, like research magnets or advanced HEP accelerator concepts including muon

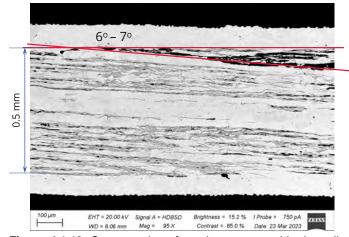


Figure 4.1.13. Cross section of conductor as used in the coil made by OI revealed inconsistent and partially significantly shorter twist pitches. In the example shown above, the twist pitch ion this conductor section is ~3 times shorter than the nominal twist pitch of 25.4mm.

collider cooling magnets, which fit within the framework of the DOE Magnet Development Program (MDP), where we collaborate with other leading national laboratories.

 Develop a deeper understanding of the role 2212 Rutherford cable can play within the framework of ASC's nuclear fusion efforts funded by DOE_FES.

• To develop a pathway towards a 50+T magnet system, which is a goal of the NHMFL.

A second Bi-2212 Rutherford cable solenoid "BR-2" has been designed based on the lessons learned from the first coil "BR-1" postmortem investigation as shown in **Figure 4.1.14**. The most important aspect is the

further optimization of our pure alumina insulation using the braiding machine for 9strand Bi-2212 Rutherford cables shown in Figure 4.1.15. With four times as much conductor at 24m, even with a decade-old Bi-2212 strand, BR-2 should produce up to 5T, supporting hoop stresses of order 230MPa with reinforcement. conservative Different а assumptions of the strength of the pure alumina braid epoxy composite from that of pure epoxy to that of pure alumina were run in finite-element simulations in parallel to the experimental studies described in the mechanical properties section.

An additional aspect of BR-2 is a 24mm inner diameter and 3D twist-bend supporting silver terminals. We used resin 3D-printed terminals to test wind these features, followed by plastic test articles from our new CNC machine before producing the silver articles. This coil will Cabled Strands Braid High Strength Bands

Figure 4.1.14. Solenoid "BR-2" schematic design used for finite-element modeling; indicates deformed strand shapes, cable geometry, braid insulation, and reinforcement structures. ID 24mm, H 55mm, 12.5 turns x 12 layers.

also include interface control with mica or alumina paper on all winding surfaces. These materials have been validated with our over-pressure reaction and VPI epoxy process. The results of this work are already having a significant impact on our ongoing and growing external collaborations. The University of Twente is performing transverse compression studies on over-pressure reacted cables provided by LBL. In the latest sample, we investigated the limits of our braiding machine to insulate a 17-strand ~8mm wide cable with pure alumina fibers so that there would be no leakage affecting the initial cable performance. It has been over-pressure reacted with no significant leakage visible on the exposed cable ends.

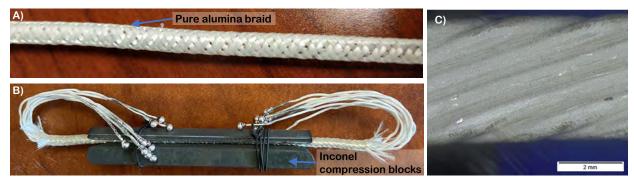


Figure 4.1.15. A) Bi-2212 Rutherford cable (9-strand, 0.8mm strand, 4.4×1.74 mm insulated) braided with 12-threads of 1500 denier pure alumina fiber at 16 picks per inch; B) cable sample with sealed ends after over-pressure heat treatment within Inconel-600 compression blocks; C) light microscope image of reacted cable after insulation was removed showing no signs of any reaction with the insulation.

4.1.2.10 BI-2212 STRAND-BASED COILS

Compact ultra-high-field (>25T) magnets will generate stresses of 200 - 500MPa, beyond the strength of any unreinforced superconductor. Also, fast current ramp rates enable rapid sample testing in research magnets and are a requirement for future higher-field accelerator magnets or compact fusion ohmic heating magnets. Three small-size coils were built and tested in background fields of up to 31T one of which is shown in Figure 4.1.16. With compact coil parameters [ID: 12mm; OD: < 38mm; H: 80mm; < 50m of Ø1mm wire; 7-9mT/A], these "Teo" dubbed test solenoids are a cost-efficient vehicle to test Bi-2212 conductor and magnet technology including reinforcement, insulation, and filler (epoxy) materials. In the 31T background field of the MagLab's 31T resistive magnet, these coils generated peak fields of 34T at a wire current density (Je) of 464 A/mm², a current density that is sufficient to produce 25T class compact research magnets. The coils supported a peak hoop stress ($J_e^*B^*R$) between 237 - 273MPa, well over the breaking stress of the bare wire, demonstrating our capability to reliably reinforce at the coil level. The coils were ramped at rates of up to 3200A/s, with full quench protection capability up to 1600A/s, and without degradation at the quench current after repeated high ramp rates as shown in Figure 4.1.16. This robust operation of multiple coils in fields >30T is an important demonstration to our collaborators including commercial partners, Cryomagnetics Inc., and Oxford Instruments (OI), which develop compact 25T class research magnets, the US-DOE Magnet Development Program develop hybrid HTS/LTS 16T dipoles, and Princeton Plasma Physics Laboratory (PPPL) who are pursuing the development of ohmic heating solenoids within their nuclear fusion program, as well as our efforts at ASC towards high field NMR and EMR magnets. This coil work was selected as a monthly highlight to the NSF in 2023.

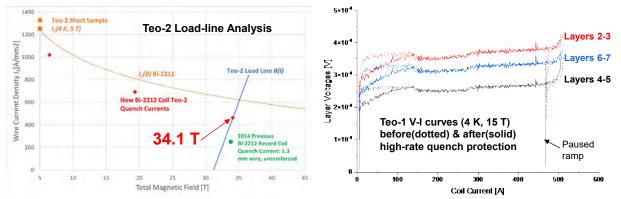


Figure 4.1.16. (Left) In-field performance of coil TEO-2 and comparison with the short sample performance of the same wire as used in the coil. Most of the discrepancy seen between short sample and coil performance is believed to be caused by the limited cooling available in the small space of the cryostat used. (Right) Coil voltages vs. transport currents before and after several high ramp rate runs of coil TEO-1. No sign of coil degradation is visible proving the robustness of the coil.

4.1.2.11 MECHANICAL PROPERTIES OF A BI-2212 WINDING PACK

Coil post-mortems are used to aid our understanding of magnet performance. Mechanically weak areas causing performance limitations are revealed through cross-sectional imaging and transport current characterizations of extracted samples from coil sections. Cross-sectional imaging of sections from a recent Bi-2212 coil revealed cracks running along the interfaces between winding layers and ceramic reinforcement layers. These cracks correlate with a reduction in the transport properties of conductor

extracted from these areas. The Bi-2212 winding pack is considered a complex composite consisting of superconducting wire. insulating material, ceramic reinforcement fiber, and epoxy. Its properties and the properties of some of the components are not well known. This has motivated a study to experimentally establish the mechanical properties of the Bi-2212 winding pack. To enable such a study, a cost-efficient method was devised to emulate a coil winding pack without building actual coils. Braidinsulated Bi-2212 wire was wound in several layers onto a racetrack-type mandrel made from Inconel-600 and annealed in flowing oxygen. This racetrack-type coil pack was then vacuum-impregnated with epoxy and

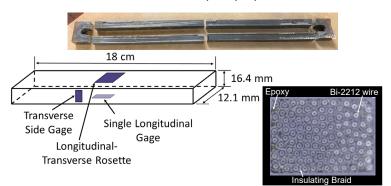


Figure 4.1.17. (Top) Racetrack-type coil assembly sectioned into four samples in preparation for mechanical testing. The end pieces are not used. (Bottom left) Characteristic dimensions of the samples and placement of the film strain gauges. (Bottom right) Transverse cross-section of a winding pack sample with components that are used in actual coils.

sectioned into several straight samples. These samples shown in **Figure 4.1.17** were then equipped with an array of film strain gauges and load-tested in an MTS machine in liquid nitrogen at 77K. To cover the region of interest for actual magnet operation, these samples were axially loaded and cycled from 0.0 to 0.7% strain in increments of 0.1%. The measurements showed that a significant contribution to the strain in the transverse direction was made by the thermal contraction the samples experienced during cool-down. This can affect coil integrity in the radial direction and thus limit its performance. While FEA modeling is already used in magnet design to predict the mechanical stresses and strains experienced by coils, a focus will have to be put on incorporating the effects of thermal stresses on cool-down to educate our coil reinforcement strategies.

4.1.2.12 QUENCH PROTECTION

While Bi-2212 magnets can be considered comparatively easier to protect than ReBCO coils due to Bi-2212's more moderate temperature margin and high silver stabilizer fraction, quench management is still critical when moving towards larger volume magnets with higher stored energies. Additionally, the lower



Figure 4.1.18. High current magnet test facility with upgrade to 10kA capability including IGBT solid-state switching for faster active quench protection.

inductance and higher current of cable magnets come with higher power and faster time scales to the quench protection systems. Besides fast quench detection, fast quench protection is essential to quickly extract the energy from a quenching magnet system. Currently, we are using a passive parallel dump resistor along with electro-mechanical contactors to disconnect the power source from the quenching magnet. We have a customizable suite of extraction systems including a 4-resistor, multi-configuration rheostat, nonlinear varistors for 20kJ and 1MJ stored energy single-strand (~500A) inserts, and a milliohm steel-ribbon resistor for cable magnets. However, we have realized that slow opening times exacerbated by prolonged arcing of the contacts limit the effectivity of our quench protection circuitry. An upgrade to this circuitry with insulated-gate bipolar transistors (IGBT) with switching times on the order of 1 µs for the full 10kA capabilities of our large bore test magnet has been finished as shown in **Figure 4.1.18**, and we are ready for the first high current implementation of this facility.

4.1.2.13 OVER-PRESSURE HEAT TREATMENT (OPHT) PROCESS AND FURNACE DEVELOPMENT AND IMPLEMENTATION

Bi-2212 coil technology requires heat treatments at high pressures (typically 50 bar) and temperatures (up to 890°C). For our and our collaborators' Bi-2212 coil and sample reactions, we are operating two large furnaces of which the larger one was put into commission during the past year. Both systems are cold-wall designs, which means that the furnace wall temperatures are kept low employing sufficiently thick thermal insulation between the heater elements and the internal furnace wall. During the commissioning runs it became clear that the insulation thickness used was insufficient and that the experienced heat losses through the furnace wall would limit the operational envelope to 10 bar at a temperature of 890°C. Within these limited performance parameters, a coil was heat-treated for our commercial collaborator Oxford Instruments (OI). A FEA model was created to help understand and remedy the issue. The results of the calculations are shown in **Figure 4.1.19**. While the modified heater shows significantly lower thermal losses due to a significant increase in wall insulation thickness it comes at the cost of a reduced furnace inner diameter of 153mm. This diameter, however, is still sufficiently large to heat-treat the next generations of high-field solenoids as well as heat-treating coils for our collaborators. The new insert has been ordered from the manufacturer at the end of 2023.

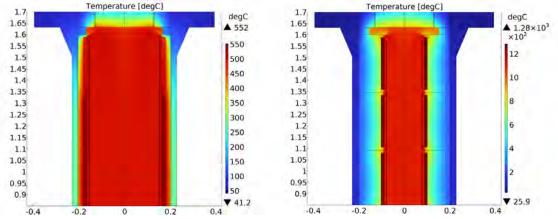


Figure 4.1.19. A comparison of two FEA models of the furnace with the existing heater assembly (left) and with a modified heater assembly (right). The elevated heat loss of the existing heater is clearly visible (ellipses).

4.1.2.14 "LITTLE BIG COIL" INVESTIGATIONS OF THE LIMITS OF REBCO

'Little Big Coil (LBC)' is a high magnetic field realm exploration framework using REBCO-coated conductors. Earlier, we made the record-high magnetic field of 45.5T with the third coil (LBC3) operating in the bore of a 31.1T resistive magnet, though a quench happened right on reaching this peak field. LBC3 post-mortem showed plastic damage in 10 out of 12 coils, where the undamaged coils had their slit edges pointing inward toward the coil center, leading to a correlation between the safe and unsafe orientation. In 2023, we, therefore, substantiated the correlation through the fourth coil (LBC4) by replicating LBC3 but arranging every slit edge to the safe orientation. As shown in **Figure 4.1.20**, LBC4 attained a peak field of 44.0T but did quench at 43.5T on a re-ramp of the magnet. Nevertheless, a post-mortem showed far less damage than LBC3, and in-silico research validates the effect of the pointing inward slit edge orientation on damage mitigation.

LBC4 challenged exploring higher fields beyond the current record-high direct current magnetic field of 45.5T in the 31.1T environment, but it experienced a quench at 44T and damage, which prevented higher field tests. However, the test results suggest an optimistic conclusion based on the following observations. First, the slit edge orientation facing inward toward the magnetic field center indeed mitigated the mechanical deformation and the corresponding critical current degradation. Second, there is minor mechanical damage at the top and bottom coils where excessive magnetic stress by screening current-induced stress is expected from numerical simulation. Next, there are kinks in the central single pancakes, SP6 and 7, but they are mainly attributed to incomplete inner joint fabrication, not electromechanical failure. Lastly, the 44T quench happened by electrical failure where the inner joint resistance is comparably higher than other module coils, and the outer joint resistance increased during the operation. It is presumed that the resistance component would have generated Joule heat dissipation, provoked a local hot spot, and eventually led to the quench. Now, we are aiming to 50T with the next mini magnets, LBCx, by addressing the mentioned issues. This LBC framework will continue investigating the REBCO conductor's performance limit by pushing it to an extremely high-field and high-stress condition.

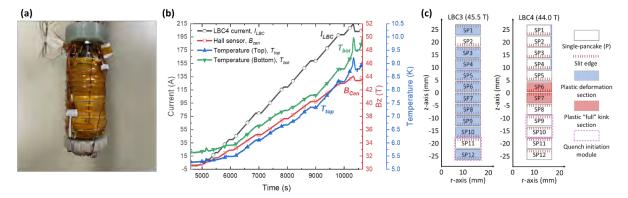


Figure 4.1.20. Design, construction, test, and post-mortem results. (a) a photo of LBC4 comprising twelve singlepancake coils. (b) the 31.1T in-field test results: 44T exploration but a coil quench occurred on the re-ramp operation. (c) post-mortem result of much less damage than the world-record high field 45.5T magnet LB3. It substantiates the effect of the component technology, the slit-edge arrangement facing inward toward the coil center, thus partially validating the possibility of 50T exploration.

Center for FAIR Open Science

4.2 CENTER FOR FAIR AND OPEN SCIENCE

4.2.1 INTRODUCTION

The MagLab's Center for FAIR and Open Science (CFOS) aims to ensure that all products of research generated at the MagLab are shared according to the principles of FAIR data¹ and open science (FAIROS). The FAIR principles provide guidance for ensuring that data are findable, accessible, interoperable, and reusable by both humans and machines, enabling reproducibility and advanced applications that utilize machine learning and artificial intelligence. These goals closely align with those of open science, which is defined by the White House Office of Science and Technology Policy as "the principle and practice of making research products and processes available to all, while respecting diverse cultures, maintaining security and privacy, and fostering collaborations, reproducibility, and equity".²

Making data FAIR and open is recognized by both the United States federal government and a broad array of intergovernmental organizations as being essential to accelerating the pace of innovation and making the social and economic benefits of science available to all. To do this CFOS develops regulations, policies, and recommendations on FAIR and open science for all users, including both instrument users who directly utilize magnet systems and data users who access MagLab datasets through open access repositories. The National Science Foundation's (NSF) Public Access Plan 2.0³ and related provisions in the current Proposal & Award Policies & Procedures Guide⁴ are the primary guiding documents used in this process, but documentation and best practices from across the fields of science and engineering are also considered.

CFOS recognizes technical and cultural challenges within the disciplines of research practiced at the MagLab that complicate the adoption of FAIR and open data sharing practices. CFOS addresses these challenges by providing knowledge and tools that simplify the process of implementing FAIROS, working towards making it an integral and seamless part of the research experience. CFOS staff also participate in research community organizations to help drive the development of solutions to the implementation challenges that MagLab users face.

4.2.2 USER SUPPORT

MagLab users face a growing complexity in applying FAIROS to their work. For example, data sharing policies from funders, publishers, and institutions increasingly require that products of research, including the raw data underlying the research findings, be made immediately and publicly available upon publication (or other dissemination). CFOS aims to ensure that users have access to tools and knowledge that minimize the time investment required to meet these requirements and maximize the value derived from applying FAIROS principles such as increased citation of the work.

In 2023, CFOS provided support to MagLab users in a variety of ways. Data management and sharing plans (DMSPs), primarily based on guidance from the NSF Division of Materials Research, were made available in a centralized location on the MagLab website to ensure their accessibility for users. DMSPs are available for the MagLab as a whole and for each user facility, providing users with details specific to their discipline of research. The MagLab also continued its membership to Open Science Framework (OSF), a generalist open access repository that allows users to upload and share their work. Research products can be associated with metadata and assigned persistent identifiers to enable their findability and meet sharing requirements for their work.

MagLab users also received direct support from CFOS and affiliated MagLab staff in meeting sharing requirements for data, publication, software, and other products derived from their use of MagLab resources. In the MagLab's Pulsed Field Facility (PFF), CFOS-affiliated staff Lyudmila Balakireva and Fedor Balakirev provided specialized tools that allow PFF users to automatically upload data and metadata collected at the facility to OSF, providing a convenient means of access to user-acquired data and simplifying the process of data sharing.⁵

In the future, CFOS will continue to provide up-to-date guidance and on-demand support for MagLab users. We anticipate that the release of a supplement to NSF's Public Access Plan 2.0 will mandate the use of persistent identifiers for researchers, infrastructure, and research outputs and will necessitate changes to user practice, and CFOS is preparing to address them well in advance of their required implementation.

4.2.3 COMMUNITY OUTREACH AND EDUCATION

One of the major challenges that researchers face in the application of FAIROS practices is a lack of appropriate solutions, e.g., lack of necessary cyberinfrastructure (CI) and widely recognized community standards for representation of data and metadata. It is well understood among researchers, policymakers, funders, and other stakeholders that the advancement of FAIROS across the fields of science and engineering will require widespread research community coordination and participation. In recent years there have been a broad variety of initiatives to foster coordination within and between disciplines of research. CFOS participates in these activities to keep the MagLab up to date with current best practices and advocate on behalf of MagLab users.

4.2.3.1 FSU OPEN SCHOLAR

CFOS participates in the activities of FSU's Open Scholarship Taskforce (OST), a group open to all graduate students, postdocs, faculty, and other academic staff at FSU. The Taskforce discusses subjects such as open access, open publishing, and FAIR data. It provides an excellent opportunity for discussion among researchers and librarians on what can be done to promote FAIROS at Florida State University and elsewhere. OST has also hosted discussions with senior university leadership, including President Richard McCullough, and hosted its first annual Open Scholarship Symposium in September 2023, bringing together researchers from multiple career levels and departments at FSU.

4.2.3.2 MAGLAB OPEN HOUSE

The MagLab's 2023 Open House, the first in the post-COVID era, was held in February and achieved historic attendance. To line up with the event's theme of "Games", CFOS held its own demonstration where MagLab visitors were introduced to games designed with the common goal of succeeding together through cooperation. Several card and board games were available, most utilizing simple components such as playing cards, dice, and tokens to make them accessible to children visiting the MagLab. The demonstration highlighted the ways that cooperation and knowledge sharing can advance common goals, offering an analogy to the behaviors that FAIROS aims to facilitate among researchers.

4.2.3.3 CI COMPASS COLLABORATIONS

Throughout 2023, CFOS worked with CI Compass, the NSF Cyberinfrastructure Center of Excellence, on a several initiatives related to FAIROS. The mission of CI Compass is to "provide expertise and active support to CI practitioners at NSF Major Facilities in order to accelerate the data lifecycle and ensure the integrity and effectiveness of the CI upon which research and discovery depend". This support has been critical to helping the MagLab advance its plans for implementing FAIROS practices.

4.2.3.4 CI COMPASS FAIR WG

In addition to supporting major facilities, CI Compass maintains a FAIR Working Group that brings together CI professionals and major facility staff to discuss FAIR data implementation at major facilities. Several guest speakers presented in 2023, including NSF Cybersecurity Advisor For Research Michael Corn discussing major facility cybersecurity, Bart Trawick from the National Institutes of Health discussing SciENcv and researcher profiles, and Matt Mayernik, co-principal investigator (PI) of the FAIROS Research Coordination Network on FAIR Facilities and Instruments. CI Compass FAIR Working Group members also coordinated on a variety of outreach activities, which will continue in 2024.

4.2.3.5 CI COMPASS FELLOWS PRESENTATION

CI Compass maintains a fellowship program which works with major facilities to host undergraduate students for hands-on learning with facility CI. Programs of this kind will be essential for training and recruiting future generations of CI professionals who will be needed to ensure that major facilities can keep pace with the evolving data management landscape. CFOS staff member David Butcher spoke to the 2023 cohort about the MagLab and the challenges it faces in providing appropriate CI for users. In 2024, the MagLab will be a full major facility partner and bring undergraduate students into the lab to assist with ongoing research and development of CI to enable FAIR data.

4.2.3.6 ENGAGEMENT WITH CI COMPASS

In the latter half of the year, CI Compass and the MagLab held a formal engagement with the goal of advising the MagLab on best practices for FAIR data management, in particular describing the data and metadata for the most commonly-used instruments in the DC Field facility (DCFF) and exploring the use of persistent identifiers for instruments and instrumental configurations. The engagement will form the basis of the MagLab's plans to transition to new CI in the DCFF that will enable automated capture of FAIR data and metadata. Newly developed CI will improve users' ability to share, reuse, and reproduce data collected at the DCFF.

4.2.3.7 ACM/IEEE JOINT CONFERENCE ON DIGITAL LIBRARIES

CFOS collaborated with CI Compass to host a panel discussion titled "FAIR Data for Large Research Facilities" at the 2023 ACM/IEEE Joint Conference on Digital Libraries, held in Santa Fe, New Mexico from June 26 – 30. Panelists included Brian Minihan from ORCID, Christine Laney from the National Ecological Observatory Network, and Laurel Winter, Deputy Director of the MagLab's Pulsed Field Facility hosted at Los Alamos National Laboratory. Subjects discussed included strategies for addressing federal open access mandates, cybersecurity, and developing unified cyberinfrastructure to serve the general needs of large research facilities.

4.2.3.8 ASMS INTEREST GROUP

CFOS staff member David Butcher collaborated with Yuri Corilo, computational scientist at Pacific Northwest National Laboratory, to organize this year's Fourier transform mass spectrometry (FTMS) interest group meeting at the 71st Conference on Mass Spectrometry and Allied Topics in Houston, Texas. The interest group meeting took the form of a workshop and group discussion on open and reproducible data analysis for FTMS with the goal of promoting these practices in the FTMS community. Researchers in attendance were given practical advice on applying open and reproducible data analysis workflows. Invited speakers also showcased software for FTMS data analysis developed with the design goals of ensuring reproducibility of analyses and demonstrated their use.

4.2.3.9 FAIROS RCN: FAIR FACILITIES AND INSTRUMENTS

The NSF's Findable Accessible Interoperable Reusable Open Science Research Coordination Networks (RCN) program was granted in 2022 with the goal of fostering catalytic improvements in scientific communities focusing on the FAIR principles. This year, the first annual meeting of the FAIROS RCN for FAIR Facilities and Instruments was held at University of Colorado, Boulder from September 13 – 15. Participants were invited from a variety of disciplines and organizations and included MagLab CFOS staff. Extensive presentations and roundtable discussions were held focusing on the use of persistent identifiers for major facilities, core facilities, and their instrumentation. The co-PIs of the RCN compiled the findings of the workshop into a comprehensive report⁶ which summarizes observations and recommended next steps for research communities and RCN participants. In 2024 the MagLab will strengthen our participation in this effort by hosting the RCN's annual meeting and inviting MagLab researchers to participate in pilot implementations of PIDs throughout the first half of the year.



Figure 4.2.1.1. Participants in the 2023 FAIR Facilities and Instruments Workshop in Boulder, CO.

4.2.4 USER SURVEY

This year, questions related to users' knowledge and implementation of FAIROS practices were added to the annual user survey for the first time. By tracking answers to these questions, CFOS will be able to monitor progress on user adoption and implementation of FAIROS practices over time, providing valuable metrics. We intend to modify or add questions over time as appropriate. A separate, more comprehensive survey of internal researchers was conducted in 2022 and will be repeated in 2024 to ensure that the unique needs of MagLab staff are addressed.

4.2.5 PUBLICATION

MagLab personnel from CFOS, the Computer Support Group, and Condensed Matter Sciences collaborated with the cybersecurity professionals from Florida State University to write a publication on the institutions' combined approach to addressing cybersecurity at the MagLab⁷ which was published in May 2023. Cybersecurity has become a critical concern in an era where cyberattacks on research universities and critical infrastructure have become common and increasingly inevitable. The paper describes how cybersecurity of key research technology is maintained at the MagLab using private networks with controlled access, among other measures. It also describes novel risks created by the implementation of FAIROS principles for major facilities that are responsible for ensuring the confidentiality of user data prior to its public dissemination.

4.2.6 SCIENCE HIGHLIGHTS

A MagLab science highlight contributed by CFOS and published in June 2023 described a study which utilized data collected in the MagLab's Advanced Magnetic Resonance Imaging and Spectroscopy (AMRIS) facility. Researchers at the University of Florida's McKnight Brain Institute conducted a multiinstitution study that aggregated and analyzed 65 rat brain functional magnetic resonance imaging (fMRI) datasets from 45 institutions, including the MagLab, covering a wide variety of different experimental conditions including rat strains, anesthesia, and imaging instrumentation. The data were compiled into a dataset that was used to develop an optimized, standardized protocol for the acquisition of rat brain fMRI data with the goal of ensuring that future datasets are interoperable and can be reused effectively. The authors made all the datasets and protocols from the study openly available to maximize the potential for widespread use among the rat brain fMRI community. In the future, CFOS will continue to publish FAIR data science highlights to show the value to be gained from making research FAIR and open and encourage an increase in the population of data users.

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- 7. Butcher, D. S. *et al.* Cybersecurity in a Large-Scale Research Facility—One Institution's Approach. *J. Cybersecurity Priv.* **3**, 191–208 (2023).

5 PUBLICATIONS

5.1 PEER-REVIEWED PUBLICATIONS

The Laboratory continued its strong record of publishing, with **298** articles appearing in peer-reviewed scientific and engineering journals in 2023. Among these, **257** acknowledge NSF support for the operation of the NHMFL, and **122** (41 percent) appeared in significant journals. **Table 5.1.1** provides an overview of NSF-acknowledged peer-reviewed and significant peer-reviewed publications by division then non-NSF-funded units.

Table 5.1.1. Submitted peer-reviewed publications from the OPMS live database. The point-in-time snapshot was on March 5, 2024. A total number of publications per year should NOT be drawn from this report because a submitter may, as appropriate, link a publication to two or more facilities. We note that the State of Florida contributes significantly to NHMFL and hired faculty at UF and FSU to enhance NHMFL programs. Publications from these professors are included as they significantly enhance the NHMFL research effort and are listed here in the UF physics and CMT/E categories.

Facility	Peer Reviewed	Significant Peer Reviewed	Acknowledges Core Grant
AMRIS Facility at UF	26	5	20
DC Field Facility at FSU	68	38	67
EMR Facility at FSU	20	7	20
High B/T Facility at UF	1	1	1
ICR Facility at FSU	32	12	31
NMR Facility at FSU	47	18	46
Pulsed Field Facility at LANL	33	20	33
ASC	8	6	8
MS & T	15	7	15
Education at FSU	1	-	1
CMT/E	46	30	NA ¹
Geochemistry Facility	4	-	NA ¹
MBI at UF	39	2	NA ¹
UF Physics	2	1	NA ¹

¹Research not funded by NSF.

Table 5.1.2 summarizes the publications generated by external users and in-house research activities. A detailed list of these publications can be found in Table 5.1.2.

Table 5.1.2. Overview of publications generated by external users and in-house research activities. A total number of publications per year should NOT be drawn from this report because a submitter may, as appropriate, link a publication to two or more facilities.

Facility	All Internal Correspon Authors Extern Co-Auth		ponding r(s) with ernal			All External Authors		Totals			
	NSF Core Grant Cited	NSF Core Grant Not Cited	NSF Core Grant Cited	NSF Core Grant Not Cited	NSF Core Grant Cited	NSF Core Grant Not Cited	NSF Core Grant Cited	NSF Core Grant Not Cited	NSF Core Grant Cited	NSF Core Grant Not Cited	Pubs for (selected period)
AMRIS Facility at UF	-	-	9	3	9	3	2	I	20	6	26
DC Field Facility at FSU	2	-	7	-	58	1	-	-	67	1	68
EMR Facility at FSU	1	-	4	-	15	-	-	-	20	-	20
High B/T Facility at UF	-	-	1	-	-	-	-	-	1	-	1

Facility	All Internal Authors		Internal Corresponding Author(s) with External Co-Authors		External Corresponding Author(s) with Internal Co-Authors		All External Authors		Totals		
	NSF Core Grant Cited	NSF Core Grant Not Cited	NSF Core Grant Cited	NSF Core Grant Not Cited	NSF Core Grant Cited	NSF Core Grant Not Cited	NSF Core Grant Cited	NSF Core Grant Not Cited	NSF Core Grant Cited	NSF Core Grant Not Cited	Pubs for (selected period)
ICR Facility at FSU	-	-	8	-	23	1	-	-	31	1	32
NMR Facility at FSU	5	-	15	1	23	-	3	-	46	1	47
Pulsed Field Facility at LANL	-	-	19	-	14	-	-	-	33	-	33
ASC	1	-	5	-	2	-	-	-	8	-	8
MS & T	3	-	4	-	8	-	-	-	15	-	15
Education at FSU	I	-	1	-	-	-	-	-	1	-	1
CMT/E ¹	11	-	13	1	21	-	-	-	45	1	46
Geochemistry Facility ¹	-	-	2	-	1	-	-	1	3	1	4
MBI at UF ¹	-	-	-	3	2	10	7	17	9	30	39
UF Physics ¹	-	-	2	-	-	-	-	-	2	-	2

¹Research not funded by NSF.

Besides 298 peer-reviewed publications, the following other products have also been published at the MagLab in 2023:

•	Books:	6
•	Disseminations:	9
•	Products:	3

Products:

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- M.S. Theses:
 - o Local:

8

4

4

19

- o External:
- Ph.D. Theses: 34
 - o Local:
 - o External: 15

5.1.1 PUBLICATIONS GENERATED BY AMRIS AT UF (26)

Authors	Title	Journal Name	Vol	Issue	Pages	DOI	Cites NSF Core Grant
Baniani, A.; Rivera, M.P.; Marreiros, J.; Lively, R.P.; Vasenkov, S.	Influence of polymer modification on intra-MOF self-diffusion in MOF-based mixed matrix membranes	Microporous and Mesoporous Materials	359		112648	10.1016/j.micromeso. 2023.112648	Yes
Cai, F.; Bezwada, D.; Cai, L.; Mahar, R.; Wu, Z.; Chang, M.C.; Pachnis, P.; Yang, C.; Kelekar, S.; Gu, W.; Brooks, B.; Ko, B.; Vu, H.S.; Mathews, T.P.; Zacharias, L.G.; Martin-Sandoval, M.; Do, D.; Celeste Oaxaca, K.; Jin, E.S.; Margulis, V.; Malloy, C.R.; Merritt, M.E.; DeBerardinis, R.J.	Comprehensive isotopomer analysis of glutamate and aspartate in small tissue samples	Cell Metabolism	35	10	1830- 1843.e 5	10.1016/j.cmet.2023.0 7.013	Yes
Chen, S.; Tennakoon, A.; You, K.; Paterson, A.L.; Yappert, R.; Alayoglu, S.; Fang, L.; Wu, X.; Zhao, T.; Lapak, M.P.; Saravanan, M.; Hackler, R.A.; Wang, Y.; Qi, L.; Delferro, M.; Liu, T.; Lee, B.; Peters, B.; Poeppelmeier, K.R.; Ammal, S.C.; Bowers, C.R.; Perras, F.A.; Heyden, A.; Sadow, A.D.; Huang, W.	Ultrasmall amorphous zirconia nanoparticles catalyse polyolefin hydrogenolysis	Nature Catalysis	-		113	10.1038/s41929-023- 00910-x	Yes
Dunleavy, K.M.; Li, T.; Milshteyn, E.; Jaufer, A.M.; Walker, S.A.; Fanucci, G.E.	Charge Distribution Patterns of IA3 Impact Conformational Expansion and Hydration Diffusivity of the Disordered Ensemble	Journal of Physical Chemistry B	127	45	9734- 9746	10.1021/acs.jpcb.3c0 6170	Yes
Dunleavy, K.M.; Oi, C.; Li, T.; Secunda, A.; Jaufer, A.M.; Zhu, Y.; Friedman, L.; Kim, A.; Fanucci, G.E.	Hydrogen Bonding Compensation on the Convex Solvent-Exposed Helical Face of IA3, an Intrinsically Disordered Protein	Biochemistry	62	11	1716- 1724	10.1021/acs.biochem. 3c00169	No
Gaynor, L.S.; Ravi, M.; Zequeira, S.; Hampton, A.M.; Pyon, W.S.; Smith, S.; Colon-Perez, L.M.; Pompilus, M.; Bizon, J.L.; Maurer, A.P.; Febo, M.; Burke, S.N.	Touchscreen-Based Cognitive Training Alters Functional Connectivity Patterns in Aged But Not Young Male Rats	eNeuro	10	2		10.1523/ENEURO.03 29-22.2023	Yes
Grandjean, J.; Desrosiers-Gregoire, G.; Anckaerts, C.; Angeles-Valdez, D.; Ayad, F.; Barriere, D.A.; Blockx, I.; Bortel, A.; Broadwater, M.; Cardoso, B.M.; Celestine, M.; Chavez-Negrete, J.E.; Choi, S.; Christiaen, E.; Clavijo, P.; Colon- Perez, L.; Cramer, S.; Daniele, T.; Dempsey, E.; Diao, Y.; Doelemeyer, A.; Dopfel, D.; Dvorakova, L.; Falfan-Melgoza, C.; Fernandes, F.F.; Fowler, C.F.; Fuentes-Ibanez, A.; Garin, C.M.; Gelderman, E.; Golden, C.; Guo, C.; Henckens, M.; Hennessy, L.A.; Herman, P.; Hofwijks, N.; Horien, C.; Ionescu, T.M.; Jones, J.A.; Kaesser, J.; Kim, E.; Lambers, H.; Lazari, A.; Lee, S.H.; Lillywhite, A.; Liu, Y.; Liu, Y.Y.; Lopez-Castro, A.; Lopez-Gil, X.; Ma, Z.; MacNicol, E.; Madularu, D.; Mandino, F.; Marciano, S.; McAuslan, M.J.; McCunn, P.; McIntosh, A.; Meng, X.; Meyer- Baese, L.; Missault, S.; Moro, F.; Naessens, D.; Nava-Gomez, L.J.; Nonaka, H.; Ortiz, J.J.; Paasonen, J.; Peeters, L.M.; Pereira, M.; Perez, P.D.; Pompilus, M.; Prior, M.; Rakhmatullin, R.; Reimann, H.M.; Reinwald, J.; Del Rio, R.T.; Rivera- Olvera, A.; Ruiz-Perez, D.; Russo, G.; Rutten, T.J.; Ryoke, R.; Sack, M.; Salvan, P.; Sanganahalli, B.G.; Schroeter, A.; Stenroos, P.J.; Straathof, M.; Strobelt, S.; Sumiyoshi, A.; Takahashi, K.; Torres-Garcia, M.E.; Tudela, R.; van den Berg, M.; van der Marel, K.	A consensus protocol for functional connectivity analysis in the rat brain	Nat Neurosci	26	4	673- 681	10.1038/s41593-023- 01286-8	Yes
Jagels, A.; Adressa, D.; Kaweesa, E.; McCauley, M.; Philmus, B.; Strother, J.; Loesgen, S.	Metabolomics-Guided Discovery, Isolation, Structure Elucidation,	Journal of Natural Products	86	7	1723- 1735	10.1021/acs.jnatprod. 3c00148	Yes

Authors	Title	Journal Name	Vol	Issue	Pages	DOI	Cites NSF Core Grant
	and Bioactivity of Myropeptins C-E from Myrothecium inundatum						
Jaiswal, M.; Tran, T.T.; Guo, J.T.; Zhou, M.W.; Kundu, S.; Guo, Z.W.; Fanucci, G.E.	Spin-Labeling Insights into How Chemical Fixation Impacts Glycan Organization on Cells	Applied Magnetic Resonance	55		317- 333	10.1007/s00723-023- 01624-w	No
Jaiswal, M.; Zhou, M.; Guo, J.; Tran, T.; Kundu, S.; Jaufer, A.; Fanucci, G.E.; Guo, Z.	Different Biophysical Properties of Cell Surface \$\alpha\$2, 3-and \$\alpha\$2, 6-Sialoglycans Revealed by Electron Paramagnetic Resonance Spectroscopic Studies	The Journal of Physical Chemistry B	127	8	1749 1757	10.1021/acs.jpcb.2c0 9048	No
Kem, W.; Rocca, J.R.; Johnson, J.; Junoy, J.	Discovery of the Nicotinic Receptor Toxin Anabaseine in a Polystiliferan Nemertean	Toxins	15	1	46	10.3390/toxins150100 46	Yes
Lei, J.; Mahar, R.; Chang, M.C.; Collins, J.H.; Merritt, M.E.; Garrett, T.J.; Yost, R.A.	Segmented Flow Strategies for Integrating Liquid Chromatography-Mass Spectrometry with Nuclear Magnetic Resonance for Lipidomics	Analytical Chemistry	95	3	1908□ 1915	10.1021/acs.analche m.2c03974	Yes
Li, Z.; Xu, B.; Kojasoy, V.; Ortega, T.; Adpressa, D.; Ning, W.; Wei, X.; Liu, J.; Tantillo, D.; Loesgen, S.; Rudolf, J.	First trans-eunicellane terpene synthase in bacteria	Chem	9	3	698 708	10.1016/j.chempr.202 2.12.006	Yes
Neyroud, D.; Laitano, O.; Dasgupta, A.; Lopez, C.; Schmitt, R.E.; Schneider, J.Z.; Hammers, D.W.; Sweeney, H.L.; Walter, G.A.; Doles, J.; Judge, S.M.; Judge, A.R.	Blocking muscle wasting via deletion of the muscle-specific E3 ligase MuRF1 impedes pancreatic tumor growth	Communication s Biology	6	1	519	10.1038/s42003-023- 04902-2	No
Orsini, C.A.; Pyon, W.S.; Dragone, R.J.; Faraji, M.; Wheeler, A.; Pompilus, M.; Febo, M.; Bizon, J.L.; Setlow, B.	Age-Related Changes in Risky Decision Making and Associated Neural Circuitry in a Rat Model	eNeuro	10	1		10.1523/ENEURO.03 85-22.2022	No
Peng, E.; Nogueira, M.; Rivière, G.; Brady, L.; Long, J.R.	Backbone NMR resonance assignments for the C terminal domain of the Streptococcus mutans adhesin P1	Biomolecular NMR Assignments	17		293□2 99	10.1007/s12104-023- 10158-y	Yes
Pritzlaff, A.; Ferre, G.; Dargassies, E.; Williams, C.; Gonzalez, D.; Eddy, M.T.	Conserved ProteinPolymer Interactions across Structurally Diverse Polymers Underlie Alterations to Protein Thermal Unfolding	American Chemical Society Central Science	9	4	685 695	10.1021/acscentsci.2c 01522	Yes
Ray, A.; Thakur, N.; Pour, N.; Eddy, M.T.	Dual mechanisms of cholesterol- GPCR interactions that depend on membrane phospholipid composition	Structure	31		112	10.1016/j.str.2023.05. 001	Yes
Rey, J.A.; Farid, U.M.; Najjoum, C.M.; Brown, A.; Magdoom, K.N.; Mareci, T.H.; Sarntinoranont, M.	Perivascular network segmentations derived from high- field MRI and their implications for perivascular and parenchymal mass transport in the rat brain	Scientific Reports	13	1	9205	10.1038/s41598-023- 34850-0	Yes
Rushin, A.C.; McLeod, M.A.; Ragavan, M.; Merritt, M.E.	Observing exocrine pancreas metabolism using a novel pancreas perfusion technique in combination with hyperpolarized [1-1 ³ C]pyruvate	Magnetic Resonance in Chemistry	61	12	748- 758	10.1002/mrc.5382	Yes
Sadaka, A.H.; Canuel, J.; Febo, M.; Johnson, C.T.; Bradshaw, H.B.; Ortiz, R.; Ciumo, F.; Kulkarni, P.; Gitcho, M.A.; Ferris, C.F.	Effects of inhaled cannabis high in Delta9-THC or CBD on the aging brain: A translational MRI and behavioral study	Front Aging Neurosci	15		105543 3	10.3389/fnagi.2023.10 55433	No
Sakthivel, RAVI.; Criado-Marrero, M.; Barroso, D.; Braga, I.; Bolen, M.; Rubinovich, U.; Hery, G.; Grudny, M.; Koren III, J.; Prokop, S.; Febo, M.; Abisambra, J.	Fixed time point analysis reveals repetitive mild traumatic brain injury effects on resting state fMRI connectivity and neuro-spatial protein profiles	Journal of Neurotrauma	early	ja	464	10.1089/neu.2022.04 64	Yes
Thakur, N.; Ray, A.; Sharp, L.; Jin, B.; Duong, A.; Gopal Pour, N.; Obeng, S.; Wijesekara, A.; Gao, Z.; McCurdy, C.; Jacobson, K.; Lyman, E.; Eddy, M.T.	Anionic Phospholipids Control Mechanisms of GPCR-G Protein Recognition	Nature Communica- tions	14		794	10.1038/s41467-023- 36425-z	Yes
Trusty, B.; Fang, J.; Angelopoulos, A.; Vasenkov, S.	Self-Diffusion of a Chemical Warfare Agent Simulant and Water in Nafion by Pulsed Field Gradient NMR	Chemie Ingenieur Technik	95	11	1741- 1747	10.1002/cite.2023000 10	Yes
Wild, S.; Mahr, C.; Rosenauer, A.; Risse, T.; Vasenkov, S.; Bäumer, M.	New Perspectives for Evaluating the Mass Transport in Porous Catalysts and Unfolding Macro- and Microkinetics	Catalysis Letters	153		3405- 3422	10.1007/s10562-022- 04218-6	Yes
Wilkes, B.J.; Adury, R.Z.; Berryman, D.; Concepcion, L.R.; Liu, Y.; Yokoi, F.; Maugee, C.; Li, Y.; Vaillancourt, D.E.	Cell-specific Dyt1 ∆GAG knock-in to basal ganglia and cerebellum reveal differential effects on motor	Exp Neurol	367		114471	10.1016/j.expneurol.2 023.114471	Yes

Authors	Title	Journal Name	Vol	Issue	Pages	DOI	Cites NSF Core Grant
	behavior and sensorimotor network function						

5.1.2 PUBLICATIONS GENERATED BY DC FIELD AT FSU (68)

Authors	Title	Journal Name	Vol	Issue	Pages	DOI	Cites NSF Core Grant
Al-Tawhid, A.H.; Poage, S.J.; Salmani-Rezaie, S.; Gonzalez, A.; Chikara, S.; Muller, D.A.; Kumah, D.P.; Gastiasoro, M.N.; Lorenzana, J.; Ahadi, K.	Enhanced Critical Field of Superconductivity at an Oxide Interface	Nano Energy	23		6944- 6950	10.1021/acs.nanolett. 3c01571	Yes
Bag, R.; Dissanayake, S.E.; Yan, H.; Shi, Z.; Graf, D.E.; Choi, E.; Marjerrison, C.; Lang, F.; Lancaster, T.; Qiu, Y.; Chen, W.; Blundell, S.J.; Nevidomskyy, A.H.; Haravifard, S.	Beyond single tetrahedron physics of the breathing pyrochlore compound Ba3Yb2Zn5O11	Physical Review B	107		L14040 8	10.1103/PhysRevB.10 7.L140408	Yes
Barman, B.; Linn, A.G.; O'Beirne, A.L.; Holleman, J.; Garcia, C.; Mapara, V.; Reno, J.L.; McGill, S.A.; Turkowski, V.; Karaiskaj, D.; Hilton, D.J.	Superradiant emission in a high- mobility two-dimensional electron gas	Journal of Physics- Condensed Matter	35	30	305302	10.1088/1361- 648X/acce8c	Yes
Bellan, E.; Maleki, F.; Jakoobi, M.; Fau, P.; Fajerwerg, K.; Lagarde, D.; Balocchi, A.; Lecante, P.; Trebosc, J.; Xu, Y.; Gan, Z.; PautrotdAlencon, L.; LeMercier, T.; Nagashima, H.; Pacchioni, G.; Lafon, O.; Coppel, Y.; Kahn, M.L.	Ultra-High-Field 67Zn and 33S NMR Studies Coupled with DFT Calculations Reveal the Structure of ZnS Nanoplatelets Prepared by an Organometallic Approach	Journal of Physical Chemistry C	127	36	17809- 17819	10.1021/acs.jpcc.3c02 754	Yes
Broyles, C.; Rehfuss, Z.; Siddiquee, H.; Zhu, J.; Zheng, K.; Nikolo, M.; Graf, D.E.; Singleton, J.; Ran, S.	Revealing a 3D Fermi Surface Pocket and Electron-Hole Tunneling in UTe2 with Quantum Oscillations	Physical Review Letters	131		36501	10.1103/PhysRevLett. 131.036501	Yes
Butcher, D.S.; Brigham, C.J.; Berhalter, J.B.; Centers, A.L.; Hunkapiller, W.M.; Murphy, T.P.; Palm, E.C.; Smith, J.H.	Cybersecurity in a Large-Scale Research Facility One Institution's Approach	Journal of Cybersecurity and Privacy	3		191- 208	10.3390/jcp3020011	Yes
Cabrera-Baez, M.; Silva, K.V.R.A.; Ribeiro, P.R.T.; Ratkovski, D.R.; França, E.L.T.; Flessa Savvidou, A.K.; Casas, B.W.; Siegrist, T.M.; Balicas, L.; Resende, S.M.; Machado, F.L.A.	Giant magnetoresistance in the crystalline YCd6 intermetallic compound	Physical Review B	107		144414	10.1103/PhysRevB.10 7.144414	Yes
Chapai, R.; Reddy, P.V.; Xing, L.; Graf, D.E.; Karki, A.B.; Chang, T.R.; Jin, R.	Evidence for unconventional superconductivity and nontrivial topology in PdTe	Scientific Reports	13	1	6824	10.1038/s41598-023- 33237-5	Yes
Chong, S.; Lei, C.; Lee, S.; Jaroszynski, J.J.; Mao, Z.; MacDonald, A.H.; Wang, K.L.	Anomalous Landau quantization in intrinsic magnetic topological insulators	Nature Communica- tions	14	1	4805	10.1038/s41467-023- 40383-x	Yes
Cong, R.; Garcia, E.; Forino, P. C.; Tassetti, A.; Allodi, G.; Reyes, A.P.; Tran, P. M.; Woodward, P.M.; Franchini, C.; Sanna, S.; Mitrovic, V.	Effects of charge doping on Mott insulator with strong spin-orbit coupling, Ba ₂ Na _{1-x} Ca _x OsO ₆	Physical Review Materials	7		84409	10.1103/PhysRevMat erials.7.084409	Yes
Cui, J.; Boström, EV.; Ozerov, M.; Wu, FL.; Jiang, QN.; Chu, JH.; Li, CC.; Liu, FC.; Xu, XD.; Rubio, A.; Zhang, Q.	hirality selective magnon-phonon hybridization and magnon-induced chiral phonons in a layered zigzag antiferromagnet	Nature Communica- tions	14		3396	10.1038/s41467-023- 39123-y	Yes
Devkota, L.; SantaLucia, D.J.; Wheaton, A.M.; Pienkos, A.J.; Lindeman, S.V.; Krzystek, J.; Ozerov, M.; Berry, J.F.; Telser, J.; Fiedler, A.T.	Spectroscopic and Magnetic Studies of Co(II) Scorpionate Complexes: Is There a Halide Effect on Magnetic Anisotropy?	Inorganic Chemistry	62		5984- 6002	10.1021/acs.inorgche m.2c04468	Yes
Dhital, C.; Dally, R.L.; Ruvalcaba, R.; Gonzalez-Hernandez, R.; Guerrero-Sanchez, J.; Cao, H.B.; Zhang, Q.; Tian, W.; Wu, Y.; Frontzek, M.D.; Karna, S.K.; Meads, A.; Wilson, B.; Chapai, R.; Graf, D.E.; Bacsa, J.; Jin, R.; DiTusa, J.F.	Multi-k magnetic structure and large anomalous Hall effect in candidate magnetic Weyl semimetal NdAlGe	Physical Review B	107		224414	10.1103/PhysRevB.10 7.224414	Yes

Authors	Title	Journal Name	Vol	Issue	Pages	DOI	Cites NSF Core Grant
Dissanayake, C.U.; Jacko, A.C.; Kumarasinghe, K.; Munir, R.; Siddiquee, H.; Newsome, W.J.; Uribe-Romo, F.J.; Choi, E.S.; Yadav, S.; Hu, X.Z.; Takano, Y.; Pakhira, S.; Johnston, D.C.; Ding, Q.P.; Furukawa, Y.; Powell, B.J.; Nakajima, Y.; Dissanayake, C.U.; Jacko, A.C.; Kumarasinghe, K.; Munir, R.; Siddiquee, H.; Newsome, W.J.; Uribe-Romo, F.J.; Choi, E.S.; Yadav, S.; Hu, X.Z.; Takano, Y.; Pakhira, S.; Johnston, D.C.; Ding, Q.P.; Furukawa, Y.; Powell, B.J.; Nakajima, Y.	Gapless spinons and a field- induced soliton gap in the hyperhoneycomb Cu oxalate framework compound [(C2H5)3NH]2Cu2(C2O4)3	Physical Review B	108		134418	10.1103/PhysRevB.10 8.134418	Yes
Drichko, I.L.; Smirnov, I. Y.; Suslov, A.V.; Baldwin, K.W.; Pfeiffer, L.N.; West, K.W.; Galperin, Y. M.	Coexistence of two hole phases in high-quality p- GaAs/AlGaAs in the vicinity of Landau-level filling factors v=1 and v=(1/3)	Physical Review B	107		85301	10.1103/PhysRevB.10 7.085301	Yes
Dubroca, T.; Wang, X.; Mentink- Vigier, F.; Trociewitz, B.; Starck, M.; Parker, D.; Sherwin, M.S.; Hill, S.; Krzystek, J.	Terahertz EPR spectroscopy using a 36-tesla high-homogeneity series-connected hybrid magnet	Journal of Magnetic Resonance	353		107480	10.1016/j.jmr.2023.10 7480	Yes
Feng, K.; Galeano Cabral, J.R.; Wei, K.; Baumbach, R.	Revealing complex spin states in GdNiAl₄Ge₂	Physical Review Materials	7		124409	10.1103/PhysRevMat erials.7.124409	Yes
Ferentinos, E.; Tzeli, D.; Sottini, S.; Groenen, E.J.J.; Ozerov, M.; Poneti, G.; Kaniewska-Laskowska, K.; Krzystek, J.; Kyritsis, P.	Magnetic anisotropy and structural flexibility in the field-induced single ion magnets [Co(OPPh2)(EPPh2)N2], E = S, Se, explored by experimental and computational methods	Dalton Transactions	52		2336- 2350	10.1039/d2dt03335f	Yes
Flessa Savvidou, A.K.; Ptok, A.; Sharma, G.; Casas, B.W.; Clark, J.K.; Li, V.M.; Shatruk, M.; Tewari, S.; Balicas, L.	Anisotropic positive linear and sub-linear magnetoresistivity in the cubic type-II Dirac metal Pd ₃ In ₇	Nature Partner Journals Quantum Materials (npj)	8		68	10.1038/s41535-023- 00601-7	Yes
Fortune, N.A.; Palmer-Fortune, J.E.; Trainer, A.; Bangura, A.; Kondedan, N.; Rydh, A.	Wide-range thin-film ceramic metal-alloy thermometers with low magnetoresistance	Physical Review Applied	20		54016	10.1103/PhysRevAppl ied.20.054016	Yes
Galeano-Cabral, J.R.; Karr, E.J.; Schundelmier, B.C.; Oladehin, O.; Choi, E.S.; Siegrist, T.M.; Ordonez, J.C.; Shastri, S.; Petkov, V.; Baumbach, R.; Wei, K.	Enhanced thermoelectric properties of heavy-fermion compounds YbxCeySmzlr2Zn20 (x+y+z=1)	Physical Review Materials	7	2	25406	10.1103/PhysRevMat erials.7.025406	Yes
Galstyan, E.; Kadiyala, J.; Paidpilli, M.; Goel, C.; Sai Sandra, J.; Yerraguravagari, V.; Majkic, G.; Jain, R.; Chen, S.; Li, Y.I.; Schmidt, R.; Jaroszynski, J.J.; Bradford, G.; Abraimov, D.V.; Chaud, X.; Song, J.; Selvamanickam, V.	High critical current STAR® wires with REBCO tapes by advanced MOCVD	Super- conductor Science and Technology	36	5	55007	10.1088/1361- 6668/acc4ed	Yes
Gupta, A.; Weiser, A.; Pressley, P.; Luo, Y.; Lygouras, C.; Trowbridge, J.; Phelan, W.A.; Broholm, C.L.; McQueen, T.M.; Park, W.K.	Topological surface states in the Kondo insulator YbB ₁₂ revealed via planar tunneling spectroscopy	Physical Review B	107		165132	10.1103/PhysRevB.10 7.165132	Yes
Hu, Z.; Deng, J.; Li, H.; Ogunbunmi, M.O.; Tong, X.; Wang, Q.; Graf, D.E.; Pudelko, W.; Liu, Y.; Lei, H.; Bobev, S.; Radovic, M.; Wang, Z.; Petrovic, C.	Robust three-dimensional type-II Dirac semimetal state in SrAgBi	Nature Partner Journals Quantum Materials (npj)	8	1	20	10.1038/s41535-023- 00549-8	Yes
Hu, Z.; Koo, J.; Hu, Y.; Wang, Q.; Abeykoon, M.; Graf, D.E.; Liu, Y.; Lei, H.; Ma, J.; Shi, M.; Yan, B.; Petrovic, C.	Topological Dirac semimetal BaAuSb	Physical Review Research	5		13079	10.1103/PhysRevRes earch.5.013079	Yes
Jiang, N.; Zhou, J.; Hao, X.; Li, J.; Zhang, D.; Bacsa, J.; Choi, E.; Ramanathan, A.; Baumbach, R.E.; Li, H.; Bredas, J.; Han, Y.; La Pierre, H.S.	Ground-State Spin Dynamics in d1 Kagome-Lattice Titanium Fluorides	Journal of the American Chemical Society	145	1	207- 215	10.1021/jacs.2c09633	Yes
Jiang, Y.; Ermolaev, M.; Moon, S.; Kipshidze, G.; Belenky, G.; Svensson, S.; Ozerov, M.; Smirnov, D.; Jiang, Z.; Suchalkin, S.	g-factor engineering with InAsSb alloys toward zero band gap limit	Physical Review B	108		L12120 1	10.1103/PhysRevB.10 8.L121201	Yes
Jiang, Y.; Zhao, T.; Zhang, L.; Chen, Q.; Zhou, H.; Ozerov, M.; Smirnov, D.; Jiang, Z.	Revealing temperature evolution of the Dirac band in ZrTe5 via magnetoinfrared spectroscopy	Physical Review B	108		L04120 2	10.1103/PhysRevB.10 8.L041202	Yes
Khansili, A.; Bangura, A.; McDonald, R.; Ramshaw, B.J.; Rydh, A.; Shehter, A.S.	Calorimetric measurement of nuclear spin-lattice relaxation rate in metals	Physical Review B	107		195145	10.1103/PhysRevB.10 7.195145	Yes

Authors	Title	Journal Name	Vol	Issue	Pages	DOI	Cites NSF Core Grant
Krstovska, D.; Choi, E.; Steven, E.	Giant Angular Nernst Effect in the Organic Metal alpha-(BEDT- TTF)2KHq(SCN)4	Magneto- chemistry	9	1	27	10.3390/magnetoche mistry9010027	Yes
Landart, A.; Quesada-Moreno, M.; Palacios, M.; Díaz Ortega, I.; Nojiri, H.; Ozerov, M.; Krzystek, J.; Colacio, E.	Pushing up the easy-axis magnetic anisotropy and relaxation times in trigonal prismatic Co(II) mononuclear SMMs by molecular structure design	Chemical Communica- tions	59		952- 955	10.1039/D2CC06012 D	Yes
Laramee, B.; Ghimire, R.; Graf, D.E.; Martin, L.; Blundell, T.J.; Agosta, C.C.	Superconductivity and Fermi Surface Studies of beta"-(BEDT- TTF)2[(H2O)(NH4)2Cr(C2O4)3]·1 8-Crown-6	Magnet- ochemistry	9	3	64	10.3390/magnetoche mistry9030064	Yes
Lee, S.; Graf, D.E.; Robinson, R.; Singleton, J.; Palmstrom, J.C.; Mao, Z.	Evidence of magnetic fluctuation induced Weyl semimetal state in the antiferromagnetic topological insulator Mn(Bi1-xSbx)2Te4	Physical Review B	107		205105	10.1103/PhysRevB.10 7.205105	Yes
Lei, S.; Allen, K.; Huang, J.; Moya, J.M.; Wu, T.C.; Casas, B.W.; Oh, J.S.; Hashimoto, M.; Lu, D.; Denlinger, J.; Jozwiak, C.; Bostwick, A.; Rotenberg, E.; Balicas, L.; Birgeneau, R.; Foster, M.S.; Yi, M.; Sun, Y.; Morosan, E.	Weyl nodal ring states and Landau quantization with very large magnetoresistance in square-net magnet EuGa4	Nature Communication s	14		5812	10.1038/s41467-023- 40767-z	Yes
Liu, Y.; Hu, Z.; Tong, X.; Graf, D.E.; Petrovic, C.	Electronic transport and thermoelectricity in the selenospinel Cu6- xFe4+xSn12Se32	Physical Review B	108		45135	10.1103/PhysRevB.10 8.045135	Yes
Maccari, I.; Pokharel, B.K.; Terzic, J.; Dutta, S.; Jesudasan, J.; Raychaudhuri, P.; Lorenzana, J.; De Michele, C.; Castellani, C.; Benfatto, L.; Popovic, D.	Transport signatures of fragile glass dynamics in the melting of the two-dimensional vortex lattice	Physical Review B	107		14509	10.1103/PhysRevB.10 7.014509	Yes
Martins, V.; Lucier, B.E.G.; Chen, K.; Hung, I.; Gan, Z.; Gervais, C.; Bonhomme, C.; Nie, H.; Zhang, W.; Huang, Y.	Molecular-Level Characterization of Oxygen Local Environments in a Pristine and Post-Synthetically Modified Metal-Organic Framework via 170 Nuclear Magnetic Resonance Spectroscopy	Chemistry of Materials	35	9	3555- 3569	10.1021/acs.chemmat er.3c00199	Yes
Mayo, A.H.; Takahashi, H.; Ishiwata, S.; Górnicka, K.; Winiarski, M.; Jaroszynski, J.J.; Cava, R.J.; Xie, W.; Klimczuk, T.	Enhancement of the Magnetoresistance in the Mobility- Engineered Compensated Metal Pt5P2	Advanced Electronic Materials	9	3	220112 0	10.1002/aelm.202201 120	Yes
Pradhan, N.R.; Garcia, C.; Chakrabarti, B.; Rosenmann, D.; Divan, R.; Sumant, A.V.; Miller, S.; Hilton, D.J.; Karaiskaj, D.; McGill, S.A.	Insulator-to-metal phase transition in a few-layered MoSe ₂ field effect transistor	Nanoscale	15		2667- 2673	10.1039/D2NR05019 F	Yes
Ramanathan, A.; Kaplan, J.; Sergentu, DC.; Branson, JA.; Ozerov, M.; Kolesnikov, AI.; Minasian, SG.; Autschbach, J.; Freeland, JW.; Jiang, ZG.; Mourigal, M.; La Pierre, HS.	Chemical design of electronic and magnetic energy scales of tetravalent praseodymium materials	Nature Communica- tions	14	1	3134	10.1038/s41467-023- 38431-7	Yes
Sakhratov, Y. A.; Svistov, L. E.; Reyes, A.P.	Anisotropy Stabilized Magnetic Phases of the Triangular Antiferromagnet RbFe(MoO ₄) ₂	Journal of Experimental and Theoretical Physics	137	4	526- 532	10.1134/S106377612 3100102	Yes
Semeniuk, K.; Chang, H.; Baglo, J.; Friedemann, S.; Tozer, S.W.; Coniglio, W.A.; Gamza, M.B.; Reiss, P.; Alireza, P.; Leermakers, I.; McCollam, A.; Grockowiak, A.D.; Malte Grosche, F.	Truncated mass divergence in a Mott metal	Proceedings of the National Academy of Sciences of the USA (PNAS)	120	38	e23014 56120	10.1073/pnas.230145 6120	Yes
Sen, S.; Stebbins, J.F.; Xu, Y.; Hung, I.; Gan, Z.	Germanate anomaly and its temperature dependence: An ultra-high field 170 NMR spectroscopic study of sodium germanate glasses	Journal of Non- Crystalline Solids: X	18		100175	10.1016/j.nocx.2023.1 00175	Yes
Sharma, S.; Mardani, M.; Feng, K.; Wei, K.; Baumbach, R.; Zhang, Q.; Singh, D.J.; Siegrist, T.M.	Crystal growth and magnetic structure of ternary silicide EuPd ₃ Si ₂	Physical Review Materials	7		23402	10.1103/PhysRevMat erials.7.023402	Yes
Shrestha, K.; Shi, M.; Nguyen, T.; Miertschin, D.; Fan, K.; Deng, L.; Graf, D.E.; Chen, X.; Chu, C.	Fermi surface mapping of the kagome superconductor RbV3Sb5 using de Haas-van Alphen oscillations	Physical Review B	107		75120	10.1103/PhysRevB.10 7.075120	Yes

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Authors	Title	Journal Name	Vol	Issue	Pages	DOI	Cites NSF Core Grant
Shrestha, K.; Shiddiq, M.; Regmi, B.; Nguyen, T.; Miertschin, D.; Fan, K.; Deng, L.Z.; Aryal, N.; Kim, S.G.; Graf, D.E.; Chen, X.; Chu, C.W.	High quantum oscillation frequencies and nontrivial topology in kagome superconductor KV3Sb5 probed by torque magnetometry up to 45 T	Physical Review B	107		155128	10.1103/PhysRevB.10 7.155128	Yes
Slade, T.J.; Mudiyanselage, R.S.D.; Furukawa, N.; Smith, T.R.; Schmidt, J.; Wang, L.; Kang, C.; Wei, K.; Shu, Z.; Kong, T.; Baumbach, R.; Kotliar, G.; Bud'ko, S.L.; Xie, W.; Canfield, P.C.	<i>Mn(Pt_{1-x}Pd_x)₅P: Isovalent tuning of Mn-sublattice magnetic order</i>	Physical Review B	107		134429	10.1103/PhysRevB.10 7.134429	Yes
Stensberg, J.; Han, X.; Lee, S.; McGill, S.A.; Paglione, J.; Takeuchi, I.; Kane, C.L.; Wu, L.	Observation of the Superconducting Proximity Effect from Surface States in SmB6/YB6 Thin Film Heterostructures via Terahertz Spectroscopy	Physical Review Letters	130		96901	10.1103/PhysRevLett. 130.096901	No
Swanson, R.K.; Stebbins, J.F.; Yeo, T.M.; Xu, Y.; Hung, I.; Gan, Z.; McCormack, S.J.; Sen, S.	Structure and fragility of normal and invert lanthanum borate glasses: Results from 11B and 170 NMR spectroscopy and calorimetry	Journal of Non- Crystalline Solids	603		122119	10.1016/j.jnoncrysol.2 022.122119	Yes
Terashima, T.; Hirose, H.T.; Kikugawa, N.; Uji, S.; Graf, D.E.; Sugawara, H.	CeFe2AI10: A correlated metal with a Fermi surface exhibiting nonmetallic conduction	Physical Review B	107		155118	10.1103/PhysRevB.10 7.155118	Yes
Thirunavukkuarasu, K.; Radtke, G.; Lu, Z.; Lazzeri, M.; Christianen, P.; Ballottin, M.V.; Dabkowska, H.A.; Gaulin, B.D.; Smirnov, D.; Jaime, M.; Saul, A.	Magnetoelastic interactions in SrCu2(BO3)2 studied by Raman scattering experiments and first principles calculations	Physical Review B	107		64410	10.1103/PhysRevB.10 7.064410	Yes
Troyan, I.A.; Semenok, D.V.; Ivanova, A.G.; Sadakov, A.V.; Zhou, D.; Kvashnin, A.G.; Kruglov, I.A.; Sobolevskiy, O.A.; Lyubutina, M.V.; Perekalin, D.S.; Helm, T.; Tozer, S.W.; Bykov, M.; Goncharov, A.F.; Pudalov, V.M.; Lyubutin, I.S.	Non-Fermi-Liquid Behavior of Superconducting SnH4	Advanced Science	10	30	230362 2	10.1002/advs.202303 622	Yes
Wagner, M.; Pigliapochi, R.; Di Tullio, V.; Catalano, J.; Zumbulyadis, N.; Centeno, S.A.; Wang, X.; Chen, K.; Hung, I.; Gan, Z.; Dworzak, M.R.; Yap, G.P.A.; Dybowski, C.	Multi-technique structural analysis of zinc carboxylates (soaps)	Dalton Transactions	52	18	6152- 6165	10.1039/d3dt00184a	Yes
Wang, JS.; Liu, XY.; Wang, TY.; Ozerov, M.; Assaf, B.	g factor of topological interface states in Pb1-xSnxSe quantum wells	Physical Review B	107		155307	10.1103/PhysRevB.10 7.155307	Yes
Wang, JS.; Wang, TY.; Ozerov, M.; Zhang, Z.; Bermejo-Ortiz, J.; Bac, SK.; Trinh, H.; Zhukovskyi, M.; Orlova, T.; Ambaye, H.; Keum, J.; de Vaulchier, LA.; Guldner, Y.; Smirnov, D.; Lauter, V.; Liu, XY.; Assaf, BA.	Energy gap of topological surface states in proximity to a magnetic insulator	Communica- tions Physics	6	1	200	10.1038/s42005-023- 01327-5	Yes
Wang, K.; Wang, L.; Liu, I.L.; Boschini, F.; Zonno, M.; Michiardi, M.; Rotenberg, E.; Bostwick, A.; Graf, D.E.; Ramshaw, B.J.; Damascelli, A.; Paglione, J.	Symmetry-enforced Fermi degeneracy in topological semimetal RhSb3	Physical Review Materials	7		74205	10.1103/PhysRevMat erials.7.074205	Yes
Wu, W.; Shi, Z.; Du, Y.; Wang, Y.; Qin, F.; Meng, X.; Liu, B.; Ma, Y.; Yan, Z.; Ozerov, M.; Zhang, C.; Lu, H.Z.; Chu, J.; Yuan, X.	Topological Lifshitz transition and one-dimensional Weyl mode in HfTe5	Nature Materials	22	1	8491	10.1038/s41563-022- 01364-5	Yes
Wu, Z.; Weinberger, T.I.; Chen, J.; Cabala, A.; Chichinadze, D.; Shaffer, D.; Pospisil, J.; Prokleska, J.; Haidamak, T.; Bastien, G.; Sechovsky, V.; Hickey, A.J.; Mancera-Ugarte, M.J.; Benjamin, S.M.; Graf, D.E.; Skourski, Y.; Lonzarich, G.G.; Valiska, M.; Grosche, F.M.; Eaton, A.G.	Enhanced triplet superconductivity in next generation ultraclean UTe2	arXiv	2305		19033	10.48550/arXiv.2305. 19033	Yes
Xiang, L.; Dhakal, R.; Ozerov, M.; Jiang, Y.; Mou, B.S.; Ozarowski, A.; Huang, Q.; Zhou, H.; Fang, J.; Winter, S.M.; Jiang, Z.; Smirnov, D.	Disorder-Enriched Magnetic Excitations in a Heisenberg-Kitaev Quantum Magnet Na2Co2TeO6	Physical Review Letters	131		76701	10.1103/PhysRevLett. 131.076701	Yes
Xu, X.; Peng, X.; Wan, F.; Rochester, J.; Bradford, G.; Jaroszynski, J.J.; Sumption, M.	APC Nb3Sn superconductors based on internal oxidation of NbTaHf alloys	Super- conductor Science and Technology	36	3	35012	10.1088/1361- 6668/acb17a	Yes

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Authors	Title	Journal Name	Vol	Issue	Pages	DOI	Cites NSF Core Grant
Xu, Y.; Calabrese, M.; Demitri, N.; Pizzi, A.; Nag, T.; Hung, I.; Gan, Z.; Resnati, G.; Bryce, D.L.	Non-covalent matere bonds in perrhenates probed via ultrahigh field rhenium-185/187 NMR and zero-field NQR spectroscopy	Chemical Communica- tions	59	84	12609- 12612	10.1039/d3cc04090a	Yes
Yang, Y.; Huang, Y.; Wei, K.; Yang, H.; Zheng, A.; Baumbach, R.; Jia, S.; Xie, W.	Crystal structure and magnetic properties of Gd ₈ Mn₃Sb₁9	Journal of Physics and Chemistry of Solids	183		111643	10.1016/j.jpcs.2023.1 11643	Yes
Yao, X.; Gaudet, J.; Verma, R.; Graf, D.E.; Yang, H.; Bahrami, F.; Zhang, R.; Aczel, A.A.; Subedi, S.; Torchinsky, D.H.; Sun, J.; Bansil, A.; Huang, S.; Singh, B.; Blaha, P.; Nikolic, P.; Tafti, F.	Large Topological Hall Effect and Spiral Magnetic Order in the Weyl Semimetal SmAlSi	Physical Review X	13		11035	10.1103/PhysRevX.13 .011035	Yes
Zhang, C.; Jiang, X.; Sercel, P.C.; Lu, H.; Beard, M.C.; McGill, S.A.; Semenov, D.; Vardeny, Z.V.	Dark Exciton in 2D Hybrid Halide Perovskite Films Revealed by Magneto-Photoluminescence at High Magnetic Field	Advanced Optical Materials	2023	n/a	230043 6	10.1002/adom.20230 0436	Yes
Zhang, H.; Xing, C.K.; Noordhoek, K.; Liu, Z.; Zhao, T.H.; Horák, L.; Huang, Q.; Hao, L.; Yang, J.; Pandey, S.; Dagotto, E.; Jiang, Z.; Chu, J.H.; Xin, Y.; Choi, E.S.; Zhou, H.D.; Liu, J.	Anomalous magnetoresistance by breaking ice rule in Bi2Ir2O7/Dy2Ti2O7 heterostructure	Nature Communica- tions	14		1404	10.1038/s41467-023- 36886-2	Yes
Zhang, Q.; Hossain, S.MD.; Casas, B.W.; Zheng, W.; Cheng, Z.J.; Lai, Z.; Tu, Y.H.; Chang, G.; Yao, Y.; Li, S.; Jiang, Y.X.; Mardanya, S.; Chang, T.R.; You, J.Y.; Feng, Y.P.; Cheng, G.; Yin, J.X.; Shumiya, N.; Cochran, T.A.; Yang, X.P.; Litskevich, M.; Yao, N.; Watanabe, K.; Taniguchi, T.; Zhang, H.; Balicas, L.; Hasan, M.Z.	Ultra high supercurrent density in a two-dimensional topological material	Physical Review Materials	7		L07180 1	10.1103/PhysRevMat erials.7.L071801	Yes
Zhang, W.; Hassan, A.; Struppe, J.; Monette, M.; Hung, I.; Gan, Z.; Martins, V.; Terskikh, V.; Huang, Y.	Overcoming challenges in 67Zn NMR: a new strategy of signal enhancement for MOF characterization	Chemical Communica- tions	59	35	5205- 5208	10.1039/d3cc00716b	Yes
Zhao, MH.; Yan, ZB.; Yang, YK.; Joseph, NB.; Leng, PL.; Ozerov, M.; Xu, ZC.; Shi, YG.; Narayan, A.; Xiu, FX.	Field-induced chiral transitions in the Weyl semimetal TaP	Physical Review B	107	19	195201	10.1103/PhysRevB.10 7.195201	Yes

5.1.3 PUBLICATIONS GENERATED BY EMR AT FSU (20)

Authors	Title	Journal Name	Vol	Issue	Pages	DOI	Cites NSF Core Grant
Devkota, L.; SantaLucia, D.J.; Wheaton, A.M.; Pienkos, A.J.; Lindeman, S.V.; Krzystek, J.; Ozerov, M.; Berry, J.F.; Telser, J.; Fiedler, A.T.	Spectroscopic and Magnetic Studies of Co(II) Scorpionate Complexes: Is There a Halide Effect on Magnetic Anisotropy?	Inorganic Chemistry	62		5984- 6002	10.1021/acs.inorgche m.2c04468	Yes
Dubroca, T.; Wang, X.; Mentink- Vigier, F.; Trociewitz, B.; Starck, M.; Parker, D.; Sherwin, M.S.; Hill, S.; Krzystek, J.	Terahertz EPR spectroscopy using a 36-tesla high-homogeneity series-connected hybrid magnet	Journal of Magnetic Resonance	353		107480	10.1016/j.jmr.2023.10 7480	Yes
Ferentinos, E.; Tzeli, D.; Sottini, S.; Groenen, E.J.J.; Ozerov, M.; Poneti, G.; Kaniewska-Laskowska, K.; Krzystek, J.; Kyritsis, P.	Magnetic anisotropy and structural flexibility in the field-induced single ion magnets [Co(OPPh2)(EPPh2)N2], $E = S$, Se, explored by experimental and computational methods	Dalton Transactions	52		2336- 2350	10.1039/d2dt03335f	Yes
Gimeno, I.; Zueco, D.; Duan, Y.; Sanchez-Azqueta, C.; Astner, T.; Gaita-Arino, A.; Hill, S.; Majer, J.; Coronado, E.; Luis, F.	Coupling spin 'clock states' to superconducting circuits	Physical Review Applied	20		44070	10.1103/PhysRevAppl ied.20.044070	Yes
Hanabe Subramanya, M.V.; Marbey, J.; Kundu, K.; McKay, J.E.; Hill, S.	Broadband Fourier-Transform Detected EPR at W-band	Applied Magnetic Resonance	54		165- 181	10.1007/s00723-022- 01499-3	Yes
Kundu, K.; Chen, J.; Hoffman, S.; Marbey, J.; Komijani, D.; Duan, Y.; Gaita-Ariño, A.; Stanton, J.; Zhang, X.; Cheng, H.P.; Hill, S.	Demonstration of electron-nuclear decoupling at a spin clock transition	Communica- tions Physics	6		38	10.1038/s42005-023- 01152-w	Yes
Landart, A.; Quesada-Moreno, M.; Palacios, M.; Díaz Ortega, I.; Nojiri, H.; Ozerov, M.; Krzystek, J.; Colacio, E.	Pushing up the easy-axis magnetic anisotropy and relaxation times in trigonal prismatic Co(II) mononuclear	Chemical Communica- tions	59		952- 955	10.1039/D2CC06012 D	Yes

HIGH B/T

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Authors	Title	Journal Name	Vol	Issue	Pages	DOI	Cites NSF Core Grant
	SMMs by molecular structure design						
Lee, C.; Lee, S.; Kim, H.; Kittaka, S.; Kohama, Y.; Sakakibara, T.; Lee, K.; van Tol, J.; Gorbunov, D.I.; Do, S.; Yoon, S.; Berlie, A.; Choi, K.Y.	Random singlets in the s=5/2 coupled frustrated cubic lattice Lu ₃ Sb ₃ Mn ₂ O ₁₄	Physical Review B	107		214404	10.1103/PhysRevB.10 7.214404	Yes
Li, Y.; Biswas, R.; Kopcha, W.P.; Dubroca, T.; Abella, L.; Sun, Y.; Crichton, R.A.; Rathnam, C.; Yang, L.; Yeh, Y.W.; Kundu, K.; Rodríguez-Fortea, A.; Poblet, J.M.; Lee, K.B.; Hill, S.; Zhang, J.	Structurally Defined Water-Soluble Metallofullerene Derivatives towards Biomedical Applications	Angewandte Chemie International Edition	135	3	1e2022 11704	10.1002/anie.2022117 04	Yes
Martinez, R.; Jackson, C.E.; Üngör, Ö.; van Tol, J.; Zadrozny, J.M.	Impact of ligand chlorination and counterion tuning on high-field spin relaxation in a series of V(IV) complexes	Dalton Transactions	52		10805- 10816	10.1039/D3DT01274 C	Yes
Mavragani, N.; Kitos, A.; Hrub, J.; Hill, S.; Mansikkamäki, A.; Moilanen, J.; Murugesu, M.	Strong magnetic exchange coupling in Ln ₂ metallocenes attained by the trans-coordination of a tetrazinyl radical ligand	Inorganic Chemistry Frontiers	1		1	10.1039/D3Q100290J	Yes
Ortiz, R.J.; Shepit, M.; van Lierop, J.; Krzystek, J.; Telser, J.; Herbert, D.E.	Characterization of the Ligand Field in Pseudo-Octahedral Ni(II) Complexes of Pincer-Type Amido Ligands: Magnetism, Redox Behavior, Electronic Absorption and High-Frequency and -Field EPR Spectroscopy	European Journal of Inorganic Chemistry	26		1-10	10.1002/ejic.2023004 46	Yes
Perras, F.A.; Matsuki, Y.; Southern, S.A.; Dubroca, T.; Flesariu, D.F.; van Tol, J.; Constantinides, C.P.; Koutentis, P.A.	Mechanistic origins of methyl- driven Overhauser DNP	Journal of Chemical Physics	158	15	154201	10.1063/5.0149664	Yes
Quan, Y.; Subramanya, M.; Ouyang, Y.; Mardini, M.; Dubroca, T.; Hill, S.; Griffin, R.G.	Coherent Dynamic Nuclear Polarization using Chirped Pulses	Journal of Physical Chemistry Letters	14	20	4748- 4753	10.1021/acs.jpclett.3c 00726	Yes
Thomas, B.; Jardón-Álvarez, D.; Carmieli, R.; van Tol, J.; Leskes, M.	The Effect of Disorder on Endogenous MAS-DNP: Study of Silicate Glasses and Crystals	Journal of Physical Chemistry C	127	9	4759- 4772	10.1021/acs.jpcc.2c08 849	Yes
Tin, P.; Jenkins, J.J.; Xing, J.; Caci, N.; Gai, Z.; Jin, R.; Wessel, S.; Krzystek, J.; Li, C.; Daemen, L.L.; Cheng, Y.; Xue, Z.L.	Haldane topological spin-1 chains in a planar metal-organic framework	Nature Communica- tions	14		5454	10.1038/s41467-023- 41014-1	Yes
Wang, X.; Hale, A.R.; Hill, S.; Christou, G.	High-Field EPR Investigation and Detailed Modeling of the Magnetoanisotropy Tensor of an Unusual Mixed-Valent Mn ^{IV} ₂ Mn ^{III} ₂ Mn ^{III} Cluster	Applied Magnetic Resonance	54		77-91	10.1007/s00723-022- 01517-4	Yes
Wojnar, M.K.; Kundu, K.; Kairalapova, A.; Wang, X.; Ozarowski, A.; Berkelbach, T.C.; Hill, S.; Freedman, D.E.	Ligand field design enables quantum manipulation of spins in Ni ²⁺ complexes	Chemical Science	1	1	1	10.1039/D3SC04919 A	Yes
Xiang, L.; Dhakal, R.; Ozerov, M.; Jiang, Y.; Mou, B.S.; Ozarowski, A.; Huang, Q.; Zhou, H.; Fang, J.; Winter, S.M.; Jiang, Z.; Smirnov, D.	Disorder-Enriched Magnetic Excitations in a Heisenberg-Kitaev Quantum Magnet Na2Co2TeO6	Physical Review Letters	131		76701	10.1103/PhysRevLett. 131.076701	Yes
Zabala-Leukona, A.; Landart- Gereka, A.; Quesada-Moreno, M.M.; Mota, A.J.; Diaz-Ortega, I.F.; Nojiri, H.; Krzystek, J.; Seco, J.M.; Colacio, E.	Zero-Field SMM Behavior Triggered by Magnetic Exchange Interactions and a Collinear Arrangement of Local Anisotropy Axes in a Linear Co3II Complex	Inorganic Chemistry	62		1-11	10.1021/acs.inorgche m.3c02817	Yes

5.1.4 PUBLICATIONS GENERATED BY HIGH B/T AT UF (1)

Authors	Title	Journal Name	Vol	Issue	Pages	DOI	Cites NSF Core Grant
Woods, A.J.; Donald, A.M.; Gazizulin, R.; Collin, E.; Steinke, L.	Developing compact tuning fork thermometers for sub-mK temperatures and high magnetic fields	Journal of Applied Physics	133	2	24501	10.1063/5.0132492	Yes

5.1.5 PUBLICATIONS GENERATED BY ICR AT FSU (32)

Authors	Title	Journal Name	Vol	lssue	Pages	DOI	Cites NSF Core Grant
Adams, L.M.; DeHart, C.J.; Drown, B.S.; Anderson, L.C.; Bocik, W.; Boja, E.S.; Hiltke, T.M.; Hendrickson, C.L.; Rodriguez, H.; Caldwell, M.; Vafabakhsh, R.; Kelleher, N.L.	Mapping the KRAS Proteoform Landscape in Colorectal Cancer Identifies Truncated KRAS4B that Decreases MAPK Signaling	Journal of Biological Chemistry	299	1	102768	10.1016/j.jbc.2022.10 2768	Yes
Bare, W.F.R.; Struhs, E.; Mirkouei, A.; Overturf, K.; Chacon Patino, M.L.; McKenna, A.M.; Chen, H.; Raja, K.S.	Controlling Eutrophication of Aquaculture Production Water Using Biochar: Correlation of Molecular Composition with Adsorption Characteristics as Revealed by FT-ICR Mass Spectrometry	Processes	11	10	2883	10.3390/pr11102883	Yes
Behnke, M.I.; Fellman, J.B.; D'Amore, D.V.; Spencer, R.G.M.	Trees in the Stream: Determining Patterns of Terrestrial Dissolved Organic Matter Contributions to the Northeast Pacific Coastal Temperate Rainforest	Journal of Geophysical Research Biogeo- sciences	128	4	e2022J G0070 27	10.1029/2022JG0070 27	Yes
Butcher, D.S.; Brigham, C.J.; Berhalter, J.B.; Centers, A.L.; Hunkapiller, W.M.; Murphy, T.P.; Palm, E.C.; Smith, J.H.	Cybersecurity in a Large-Scale Research Facility One Institution's Approach	Journal of Cybersecurity and Privacy	3		191- 208	10.3390/jcp3020011	Yes
Castro, D.C.; Smith, K.W.; Norsworty, M.D.; Rubakhin, S.S.; Weisbrod, C.; Hendrickson, C.L.; Sweedler, J.V.	Single-Cell and Subcellular Analysis Using Ultrahigh Resolution 21 T MALDI FTICR Mass Spectrometry	Analytical Chemistry	95	17	6980- 6988	10.1021/acs.analche m.3c00393	Yes
Chacon Patino, M.L.; Mase, C.; Maillard, J.F.; Barrere-Mangote, C.; Dayton, D.C.; Afonso, C.; Giusti, P.; Rodgers, R.P.	Petroleomics Approach to Investigate the Composition of Upgrading Products from Pyrolysis Bio-Oils as Determined by High- Field FT-ICR MS	Energy Fuels	37	21	16612- 16628	10.1021/acs.energyfu els.3c02599	Yes
Chacon Patino, M.L.; Neumann, A.; Ruger, C.P.; Bomben, P.G.; Friederici, L.; Zimmerman, R.; Frank, E.; Kreis, P.; Buchmeiser, M.R.; Gray, M.R.	Chemistry and Properties of Carbon Fiber Feedstocks from Bitumen Asphaltenes	Energy Fuels	37	7	5341- 5360	10.1021/acs.energyfu els.2c04274	Yes
Counihan, K.L.; McKenna, A.M.; Hebert, D.; Tomco, P.; Zito, P.	Photo-Enhanced Oil Toxicity to Alcid Immune Function	Environmental Toxicol. Chemistry.	42	12	2701- 2711	10.1002/etc.5742	Yes
D'Andrilli, J.; Romero, C.M.; Zito, P.; Podgorski, D.C.; Payn, R.A.; Sebestyen, S.D.; Zimmerman, A.R.; Rosario-Ortiz, F.L.	Advancing Chemical Lability Assessments of Organic Matter Using a Synthesis of FT-ICR MS Data Across Diverse Environments and Experiments	Organic Geochemistry	184		104667	10.1016/j.orggeochem .2023.104667	Yes
Dong, H.; Cuthbertson, A.A.; Plewa, M.; Weisbrod, C.; McKenna, A.M.; Richardson, S.D.	Unravelling High-Molecular-Weight DBP Toxicity Drivers in Chlorinated and Chloraminated Drinking Water: Effect-Directed Analysis of Molecular Weight Fractions	Environmental Science and Technology	57	47	18788- 18800	10.1021/acs.est.3c00 771	Yes
Drake, T.W.; Barthel, M.; Mbongo, C.E.; Mpambi, D.M.; Baumgartner, S.; Botefa, C.I.; Bauters, M.; Kurek, M.R.; Spencer, R.G.M.; McKenna, A.M.; Haghipour, N.; Ekamba, G.L.; Wabakanghanzi, J.N.; Eglinton, T.I.; Oost, K.V.; Six, J.	Hydrology Drives Export and Composition of Carbon in a Pristine Tropical River	Limnology and Oceanography	68	11	2476- 2491	10.1002/ino.12436	Yes
Eeso, K.; Gallan, R.; Nouri Goukeh, M.; Tate, K.; Raja, R.K.B.; Popovic, Z.; Abichou, T.; Chen, H.; Locke, B.R.; Tang, Y.	Degradation of Per- and Polyfluoroalkyl Substances in Landfill ILachate by a Thin-water- film Nonthermal Plasma Reactor	Waste Management	161		104- 115	10.1016/j.wasman.20 23.02.030	Yes
Freeman, D.H.; Niles, S.; Rodgers, R.P.; French-McCay, D.P.; Longnecker, K.; Reddy, C.M.; Ward, C.P.	Hot and Cold: Photochemical Weathering Mediates Oil Properties and Fate Differently Depending on Seawater Temperature	Environmental Science and Technology	57	32	11988- 11998	10.1021/acs.est.3c02 962	Yes
Hermes, A.L.; Logan, M.N.; Poulin, B.A.; McKenna, A.M.; Dawson, T.E.; Borch, T.; Hinckley, E.S.	Agricultural Sulfur Applications Alter The Quantity And Composition Of Dissolved Organic Matter From Field-To-Watershed Scales	Environmental Science and Technology	57	27	10019- 10029	10.1021/acs.est.3c01 347	Yes
Holt, A.D.; Kellerman, A.M.; Battin, T.I.; McKenna, A.M.; Hood, E.; Andino, P.; Crespo-Pérez, V.; Peter, H.; Schön, M.; De Staercke, V.; Styllas, M.; Tolosano, M.; Spencer, R.G.M.	A Tropical Cocktail of Organic Matter Sources: Variability in Supraglacial and Glacier Outflow Dissolved Organic Matter Composition and Age Across the Ecuadorian Andes	Journal of Geophysical Research Biogeo- sciences	128	5	e2022J G0071 88	10.1029/2022JG0071 88	Yes

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Authors	Title	Journal Name	Vol	Issue	Pages	DOI	Cites NSF Core Grant
Kellerman, A.M.; Hernes, P.J.; McKenna, A.M.; Clarke, J.B.; Edmund, A.; Grunert, B.; Mann, P.J.; Mannino, A.; Novak, M.; Stubbins, A.; Tzortiziou, M.; Zimov, N.; Spencer, R.G.M.	Mixing Behavior of Dissolved Organic Matter at the Yukon and Kolyma Land Ocean Interface	Marine Chemistry	255		104281	10.1016/j.marchem.20 23.104281	Yes
Kurek, M.; Garcia-Tigreros, F.; Wickland, K.P.; Frey, K.E.; Dornblaser, M.M.; Striegl, R.G.; Niles, S.; McKenna, A.M.; Aukes, P.J.K.; Kyzivat, E.D.; Wang, C.; Pavelsky, T.M.; Smith, L.C.; Schiff, S.L.; Butman, D.; Spencer, R.G.M.	Hydrologic and Landscape Controls on Dissolved Organic Matter Composition Across Western North American Arctic Lakes	Global Biogeo- chemistry Cycles	37		e2022 GB007 495	10.1029/2022GB0074 95	Yes
Kurek, M.R.; Garcia-Tigreros, F.; Nichols, N.A.; Druschel, G.K.; Wickland, K.P.; Dornblaser, M.M.; Striegl, R.G.; Niles, S.; McKenna, A.M.; Aukes, P.J.K.; Kyzivat, E.D.; Wang, C.; Smith, L.C.; Schiff, S.L.; Butman, D.; Spencer, R.G.M.	High Voltage The Molecular Properties of Redox-Active Dissolved Organic Matter in Northern High-Latitude Lakes	Environmental Science and Technology	57	23	8617- 8627	10.1021/acs.est.3c01 782	Yes
Li, S.; Meng, L.; Zhao, C.; Gu, Y.; Spencer, R.G.M.; Álvarez-Salgado, X.A.; Kellerman, A.M.; McKenna, A.M.; Huang, T.; Yang, H.; Huang, C.	Spatiotemporal Response of Dissolved Organic Matter Diversity to Natural and Anthropogenic Forces Along the Whole Mainstream of the Yangtze River	Water Research	234		119812	10.1016/j.watres.2023 .119812	Yes
Lin, Y.; Agarwal, A.M.; Anderson, L.C.; Marshall, A.G.	Discovery of a biomarker for β- Thalassemia by HPLC-MS and improvement from Proton Transfer Reaction - Parallel Ion Parking	JMSACL	28		20-26	10.1016/j.jmsacl.2023. 01.004	Yes
Mailard, J.; Carrasco, N.; Ruger, C.P.; Chatain, A.; Schmitz-Afonso, I.; Weisbrod, C.R.; Baily, L.; Petit, E.; Gautier, T.; McKenna, A.M.; Afonso, C.	Humid Evolution of Haze in the Atmosphere of Super-Earths in the Habitable Zone	Astrobiology	23	6	723- 732	10.1089/ast.2022.002 1	Yes
Miranda, C.; Boiteau, R.M.; McKenna, A.M.; Knapp, A.N.	Quantitative and Qualitative Comparison of Marine Dissolved Organic Nitrogen Recovery Using Solid Phase Extraction	Limnology and Oceanography: Methods	21	8	467- 477	10.1002/lom3.10558	Yes
Moore, M.R.N.; Tank, S.E.; Kurek, M.; Taskovic, M.; McKenna, A.M.; Smith, J.L.J.; Koklej, S.V.; Spencer, R.G.M.	Ultrahigh Resolution Dissolved Organic Matter Characterization Reveals Distinct Permafrost Characteristics on the Peel Plateau, Canada	Biogeo- chemistry	166	3	1-19	10.1007/s10533-023- 01101-3	Yes
Muni-Morgan, A.; Lusk, M.G.; Heil, C.; Goeckner, A.H.; Chen, H.; McKenna, A.M.; Holland, P.S.	Molecular Characterization of Dissolved Organic Matter in Urban Stormwater Pond and Municipal Wastewater Discharges Transformed by the Florida Red Tide dinoflagellate Karenia brevis	Science of the Total Environment	904		166291	10.1016/j.scitotenv.20 23.166291	Yes
Popovic, Z.; Anderson, L.C.; Zhang, X.; Butcher, D.S.; Blakney, G.T.; Zubarev, R.A.; Marshall, A.G.	Analysis of Isotopically Depleted Proteins Derived from Escherichia coli and Caenorhabditis elegans Cell Lines by Liquid Chromatography 21 T Fourier Transform-Ion Cyclotron Resonance Mass Spectrometry	Journal of the American Society for Mass Spectrometry	34	2	137- 144	10.1021/jasms.2c002 42	Yes
Roth, H.K.; McKenna, A.M.; Simpson, M.J.; Chen, H.; Srikanthan, N.; Fegel, T.S.; Nelson, A.R.; Rhoades, C.C.; Wilkins, M.J.; Borch, T.	Effects of Burn Severity on Organic Nitrogen and Carbon Chemistry in High-elevation Forest Soils	Soil & Environmental Health	1	2	100023	10.1016/j.seh.2023.10 0023	Yes
Ruiz, W.; Guillemant, J.; Coniglio, L.; Rodgers, R.P.; Christensen, J.H.; Garcia-Montoto, V.; Verdier, S.; Giusti, P.; Barrere-Mangote, C.; Bouyssiere, B.	Bio-oil Inorganic Analysis: A Minireview of Current Trends, Challenges, and Future Perspectives	Energy Fuels	37	16	11608- 11621	10.1021/acs.energyfu els.3c01462	No
Ruiz, W.; Moulian, R.; Rodgers, R.P.; Giusti, P.; Bouyssiere, B.; Marshall, A.G.; Barrere-Mangote, C.; Guillemant, J.	Past to Future: Application of Gel Permeation Chromatography from Petroleomics and Metallopetroleomics to New Energies Applications: A Minireview	Energy Fuels	37	13	8867- 8882	10.1021/acs.energyfu els.3c00856	Yes
Starr, S.; Johnston, S.E.; Sobolev, N.; Perminova, I.; Kellerman, A.; Fiske, G.; Bulygina, E.; Shiklomanov, A.; McKenna, A.M.; Spencer, R.G.M.	Characterizing Uncertainty in Pan- Arctic Land-Ocean Dissolved Organic Carbon Flux: Insights From the Onega River, Russia	Journal of Geophysical Research Biogeo- sciences	128	5	e2022J G0070 73	10.1029/2022JG0070 73	Yes
Stubbins, A.; Zhu, L.; Zhao, S.; Spencer, R.G.M.; Podgorski, D.C.	Molecular Signatures of Dissolved Organic Matter Generated from the Photodissolution of Microplastics in Sunlit Seawater	Environmental Science and Technology	57	48	20097- 20106	10.1021/acs.est.1c03 592	Yes

Authors	Title	Journal Name	Vol	Issue	Pages	DOI	Cites NSF Core Grant
Vaughn, D.; Kellerman, A.M.; Wickland, K.P.; Striegl, R.G.; Podgorski, D.C.; Hawkings, J.R.; Nienhuis, J.H.; Dornblaser, M.M.; Stets, E.G.; Spencer, R.G.M.	Bioavailability of Dissolved Organic Matter Varies with Anthropogenic Landcover in the Upper Mississippi River Basin	Water Research	229		119357	10.1016/j.watres.2022 .119357	Yes
Yalcin, Y.S.; Aydin, B.; Chen, H.; Gichuki, S.; Sitther, V.	Lipid Production and Cellular Changes in Fremyella Diplosiphon Exposed to Nanoscale Zerovalent Iron Nanoparticles and Ampicillin	Microbial Cell Factories	22		108	10.1186/s12934-023- 02113-2	Yes

5.1.6 PUBLICATIONS GENERATED BY NMR AT FSU (47)

Authors	Title	Journal Name	Vol	Issue	Pages	DOI	Cites NSF Core Grant
Abdulla, L.M.; Peach, A.; Holmes, S.; Dowdell, Z.; Watanabe, L.K.; Iacobelli, E.M.; Hirsh, D.A.; Rawson, J.M.; Schurko, R.W.	Synthesis and Characterization of Xylazine Hydrochloride Polymorphs, Hydrates, and Cocrystals: A 35Cl Solid-State NMR and DFT Study	Crystal Growth and Design	23	5	3412 3426	10.1021/acs.cgd.2c01 539	Yes
Ball, H.L.; Said, H.; Chapman, K.; Fu, R.; Xiong, Y.W.; Burk, J.A.; Rosenbaum, D.; Veneziano, R.; Cotten, M.	Orexin A, an amphipathic α-helical neuropeptide involved in pleiotropic functions in the nervous and immune systems: Synthetic approach and biophysical studies of the membrane-bound state	Biophysical Chemistry	297		107007	10.1016/j.bpc.2023.10 7007	Yes
Bellan, E.; Maleki, F.; Jakoobi, M.; Fau, P.; Fajerwerg, K.; Lagarde, D.; Balocchi, A.; Lecante, P.; Trebosc, J.; Xu, Y.; Gan, Z.; PautrotdAlencon, L.; LeMercier, T.; Nagashima, H.; Pacchioni, G.; Lafon, O.; Coppel, Y.; Kahn, M.L.	Ultra-High-Field 67Zn and 33S NMR Studies Coupled with DFT Calculations Reveal the Structure of ZnS Nanoplatelets Prepared by an Organometallic Approach	Journal of Physical Chemistry C	127	36	17809- 17819	10.1021/acs.jpcc.3c02 754	Yes
Chen, S.; Tennakoon, A.; You, K.; Paterson, A.L.; Yappert, R.; Alayoglu, S.; Fang, L.; Wu, X.; Zhao, T.; Lapak, M.P.; Saravanan, M.; Hackler, R.A.; Wang, Y.; Qi, L.; Delferro, M.; Liu, T.; Lee, B.; Peters, B.; Poeppelmeier, K.R.; Ammal, S.C.; Bowers, C.R.; Perras, F.A.; Heyden, A.; Sadow, A.D.; Huang, W.	Ultrasmall amorphous zirconia nanoparticles catalyse polyolefin hydrogenolysis	Nature Catalysis	-		113	10.1038/s41929-023- 00910-x	Yes
Concilio, M.; Frydman, L.	Microwave-free-driven dynamic nuclear polarization: A proposal for enhancing the sensitivity of solution-state NMR	Physical Review E	107	3	35303	10.1103/PhysRevE.10 7.035303	Yes
Dubroca, T.; Wang, X.; Mentink- Vigier, F.; Trociewitz, B.; Starck, M.; Parker, D.; Sherwin, M.S.; Hill, S.; Krzystek, J.	Terahertz EPR spectroscopy using a 36-tesla high-homogeneity series-connected hybrid magnet	Journal of Magnetic Resonance	353		107480	10.1016/j.jmr.2023.10 7480	Yes
Fernando, L.D.; Perez-Llano, Y.; Dickwella Widanage, M.; Jacob, A.; Martinez-Avila, L.; Lipton, A.S.; Gunde-Cimerman, N.; Latge, J.P.; Batista-Garcia, R.A.; Wang, T.	Structural adaptation of fungal cell wall in hypersaline environment	Nature Communica- tions	14		7082	10.1038/s41467-023- 42693-6	Yes
Gan, Z.	An analytical treatment of electron spectral saturation for dynamic nuclear polarization NMR of rotating solids	The Journal of Chemical Physics	158	2	24114	/10.1063/5.0109077	Yes
Githongo, M.; Ngatia, L.; Kiboi, M.; Muriuki, A.; Fliessbach, A.; Musafiri, C.; Fu, R.; Ngetich, F.	The Structural Quality of Soil Organic Matter under Selected Soil Fertility Management Practices in the Central Highlands of Kenya	Sustainability	15		6500	10.3390/su15086500	Yes
Goldberga, I.; Jensen, N.D.; Combes, C.; Mentink-Vigier, F.; Wang, X.; Hung, I.; Gan, Z.; Trébosc, J.; Métro, T.; Bonhomme, C.; Gervais, C.; Laurencin, D.	170 solid state NMR as a valuable tool for deciphering reaction mechanisms in mechanochemistry: the case study on the 170-enrichment of hydrated Ca-pyrophosphate biominerals	Faraday Discussions	241		250- 265	10.1039/D2FD00127F	Yes
Grazia Concilio, M.; Frydman, L.	Steady state effects introduced by local relaxation modes on J-driven DNP-enhanced NMR	Journal of Magnetic Resonance	355		107542	10.1016/j.jmr.2023.10 7542	No
Halbritter, T.; Harrabi, R.; Paul, S.; van Tol, J.; Lee, D.; Hediger, S.; Sigurdsson, S.; Mentink-Vigier, F.; Paepe, G.	PyrroTriPol: A Semi-Rigid Trityl- Nitroxide for High Field Dynamic Nuclear Polarization	Chemical Science	14		3852- 3864	10.1039/D2SC05880 D	Yes

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Authors	Title	Journal Name	Vol	Issue	Pages	DOI	Cites NSF Core Grant
Helsper, S.; Yuan, X.; Bagdasarian, F.A.; Athey, J.D.; Li, Y.; Borlongan, C.V.; Grant, S.C.	Multinuclear MRI Reveals Early Efficacy of Stem Cell Therapy in Stroke	Translational Stroke Research	14	4	545- 561	10.1007/s12975-022- 01057-w	Yes
Holmes, S.; Schoenzart, J.; Philips, A.B.; Kimball, J.; Termos, S.; Altenhof, A.; Xu, Y.; O'Keefe, C.A.; Autschbach, J.; Schurko, R.W.	Structure and bonding in rhodium coordination compounds: a 103Rh solid-state NMR and relativistic DFT study	Chemical Science	In		Press	10.1039/d3sc06026h	Yes
Houlleberghs, M.; Helsper, S.; Dom, D.; Dubroca, T.; Trociewitz, B.; Schurko, R.W.; Radhakrishnan, S.; Breynaert, E.	Building a Cost-Efficient High- Pressure Cell for Online High-Field NMR and MRI Using Standard Static Probe Heads: An In Situ Demonstration on Clathrate Hydrate Formation	Analytical Chemistry	95	46	16936- 16942	10.1021/acs.analche m.3c03050	Yes
Hung, I.; Gan, Z.	Pushing the limit of MQMAS for low-y quadrupolar nuclei in pharmaceutical hydrochlorides	Journal of Magnetic Resonance	350		107423	10.1016/j.jmr.2023.10 7423	Yes
Hung, I.; Gan, Z.	Satellite-transition double cross- polarization HETCOR under fast MAS	Journal of Magnetic Resonance	348		107380	10.1016/j.jmr.2023.10 7380	Yes
Hung, I.; Mao, W.; Keeler, E.G.; Griffin, R.G.; Gor'kov, P.L.; Gan, Z.	Characterization of peptide O···N hydrogen bonds via 1H-detected 15N/17O solid-state NMR spectroscopy	Chemical Communica- tions	59	21	3111- 3113	10.1039/d2cc07004a	Yes
Jaroszewicz, M.J.; Altenhof, A.R.; Schurko, R.W.; Frydman, L.	An Automated Multi-Order Phase Correction Routine for Processing Ultra-Wideline NMR Spectra	Journal of Magnetic Resonance				10.1016/j.jmr.2023.10 7528	Yes
Kimball, J.; Altenhof, A.; Jaroszewicz, M.J.; Schurko, R.W.	Broadband Cross-Polarization to Half-Integer Quadrupolar Nuclei: Wideline Static NMR Spectroscopy	Journal of Physical Chemistry A	127	45	9621- 9634	10.1021/acs.jpca.3c0 5447	Yes
Liang, Z.T.; Xiang, Y.X.; Wang, K.J.; Zhu, J.P.; Jin, Y.T.; Wang, H.C.; Zheng, B.Z.; Chen, Z.R.; Tao, M.M.; Liu, X.S.; Wu, Y.Q.; Fu, R.; Wang, C.S.; Winter, M.; Yang, Y.	Understanding the failure process of sulfide-based all-solid-state lithium batteries via operando nuclear magnetic resonance spectroscopy	Nature Communica- tions	14		259	10.1038/s41467-023- 35920-7	Yes
Liu, F.; Greenwood, A.; Xiong, Y.; Miceli, R.; Fu, R.; Anderson, K.; McCallum, S.; Mihailescu, M.; Gross, R.; Cotten, M.	Host Defense Peptide Piscidin and Yeast derived Glycolipid Exhibit Synergistic Antimi-crobial Action through Concerted Interactions with Membranes	Journal of the American Chemical Society	3		3345- 3365	10.1021/jacsau.3c005 06	Yes
Martins, V.; Lucier, B.E.G.; Chen, K.; Hung, I.; Gan, Z.; Gervais, C.; Bonhomme, C.; Nie, H.; Zhang, W.; Huang, Y.	Molecular-Level Characterization of Oxygen Local Environments in a Pristine and Post-Synthetically Modified Metal-Organic Framework via 170 Nuclear Magnetic Resonance Spectroscopy	Chemistry of Materials	35	9	3555- 3569	10.1021/acs.chemmat er.3c00199	Yes
McCalpin, S.D.; Fu, R.; Ravula, T.; Wu, G.; Ramaoorthy, A.	Magnetically aligned nanodiscs enable direct measurement of 17O residual quadrupolar coupling for small molecules	Journal of Magnetic Resonance	346		107347	10.1016/j.jmr.2022.10 7341	Yes
McCalpin, S.D.; Widanage, M.C.D.; Fu, R.; Ramamoorthy, A.	On-Pathway Oligomer of Human Islet Amyloid Polypeptide Induced and Stabilized by Mechanical Rotation during Magic Angle Spinning Nuclear Magnetic Resonance	Journal of Physical Chemistry Letters	14		7644- 7649	10.1021/acs.jpclett.3c 02009	Yes
Patel, S.V.; Lacivita, V.; Liu, H.; Truong, E.; Jin, Y.; Wang, E.; Miara, L.; Kim, R.; Gwon, H.; Zhang, R.; Hung, I.; Gan, Z.; Jung, S.; Hu, Y.	Charge-clustering induced fast ion conduction in 2LiX-GaF3: A strategy for electrolyte design	Science Advances	9	47	eadj99 30	10.1126/sciadv.adj99 30	Yes
Peach, A.; Holmes, S.; MacGillivray, L.R.; Schurko, R.W.	The formation and stability of fluoxetine HCl cocrystals investigated by multicomponent milling	Cryst Eng Comm	25	2	213 224	10.1039/d2ce01341j	Yes
Poudel, T.P.; Deck, M.J.; Wang, P.; Hu, Y.	Transforming Li3PS4 Via Halide Incorporation: a Path to Improved Ionic Conductivity and Stability in All-Solid-State Batteries	Advanced Functional Materials	34	4	230965 6	10.1002/adfm.202309 656	Yes
Poulhazan, A.; Baer, A.; Daliaho, G.; Mentink-Vigier, F.; Arnold, A.A.; Browne, D.C.; Hering, L.; Archer- Hartmann, S.; Pepi, L.E.; Azadi, P.; Schmidt, S.; Mayer, G.; Marcotte, I.; Harrington, M.J.	Peculiar Phosphonate Modifications of Velvet Worm Slime Revealed by Advanced Nuclear Magnetic Resonance and Mass Spectrometry	Journal of the American Chemical Society	145	38	20749- 20754	10.1021/jacs.3c06798	Yes
Qiang, W.; Kengwerere, M.K.; Zhao, W.; Scott, F.; Wutoh-Hughes, X.; Wang, T.; Mentink-Vigier, F.	Heterotypic Interactions between the 40- and 42-Residue Isoforms of β-Amyloid Peptides on Lipid Bilayer Surfaces	American Chemical Society Chemical Neuroscience	14	23	4153- 4162	10.1021/acschemneur o.3c00523	Yes

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Authors	Title	Journal Name	Vol	Issue	Pages	DOI	Cites NSF Core Grant
Scigliani, A.; Grant, S.C.; Mohammadigoushki, H.	Probing Self-assembled Micellar Topologies via Micro-scale Diffusive Dynamics of Surfactants	Journal of Colloid and Interface Science	642		565- 573	10.1016/j.jcis.2023.03 .102	Yes
Sen, S.; Stebbins, J.F.; Xu, Y.; Hung, I.; Gan, Z.	Germanate anomaly and its temperature dependence: An ultra-high field 170 NMR spectroscopic study of sodium germanate glasses	Journal of Non- Crystalline Solids: X	18		100175	10.1016/j.nocx.2023.1 00175	Yes
Shan, P.Z.; Chen, J.N.; Tao, M.; Zhao, D.H.; Lin, H.X.; Fu, R.; Yang, Y.	The applications of solid-state NMR and MRI techniques in the study of rechargeable sodium-ion batteries	Journal of Magnetic Resonance	353		107516	10.1016/j.jmr.2023.10 7516	Yes
Smrt, S.T.; Escobar Bravo, C.A.; Dey, S.; Cross, T.A.; Zhou, H.	An Arg/Ala-rich helix in the N- terminal region of M. tuberculosis FtsQ is a potential membrane anchor of the Z-ring	Communica- tions Biology	6	1	311	10.1038/s42003-023- 04686-5	Yes
Spackova, J.; Goldberga, I.; Yadav, R.; Cazals, G.; Lebrun, A.; Verdie, P.; Metro, T.; Laurencin, D.	Fast and Cost-Efficient 170- Isotopic Labeling of Carboxylic Groups in Biomolecules: From Free Amino Acids to Peptide Chains	Chemistry A European Journal	29	10	in press	10.1002/chem.202203 014	Yes
Swanson, R.K.; Stebbins, J.F.; Yeo, T.M.; Xu, Y.; Hung, I.; Gan, Z.; McCormack, S.J.; Sen, S.	Structure and fragility of normal and invert lanthanum borate glasses: Results from 11B and 170 NMR spectroscopy and calorimetry	Journal of Non- Crystalline Solids	603		122119	10.1016/j.jnoncrysol.2 022.122119	Yes
Vugmeyster, L.; Rodgers, A.; Ostrovsky, D.; McKnight, C.J.; Fu, R.	Deuteron off-resonance rotating frame relaxation for the characterization of slow motions in rotating and static solid-state proteins	Journal of Magnetic Resonance	352		107493	10.1016/j.jmr.2023.10 7493	Yes
Wagner, M.; Pigliapochi, R.; Di Tullio, V.; Catalano, J.; Zumbulyadis, N.; Centeno, S.A.; Wang, X.; Chen, K.; Hung, I.; Gan, Z.; Dworzak, M.R.; Yap, G.P.A.; Dybowski, C.	Multi-technique structural analysis of zinc carboxylates (soaps)	Dalton Transactions	52	18	6152- 6165	10.1039/d3dt00184a	Yes
Wang, P.; Patel, S.; Liu, H.; Chien, P.; Feng, X.; Gao, L.; Chen, B.L.; Liu, J.; Hu, Y.	Configurational and Dynamical Heterogeneity in Superionic Li5.3PS4.3Cl1.7-xBrx	Advanced Functional Materials	33	51	230795 4	10.1002/adfm.202307 954	Yes
Wang, S.T.; Fu, R.; Li, J.	Pre-zeolite framework super-MIEC anodes for high-rate lithium-ion batteries	Energy and Environmental Science	16		241	10.1039/d2ee02918a	Yes
Wi, S.; Frydman, L.; Lee, W.; Pham, K.; Li, C.	Short and long range 2D 15N15N NMR correlations among peptide groups by novel solid state dipolar mixing schemes	Journal of Biomolecular NMR				10.1007/s10858-023- 00429-0	Yes
Wittmer, Y.; Jami, K.M.; Stowell, R.K.; Le, T.; Hung, I.; Murray, D.T.	Liquid Droplet Aging and Seeded Fibril Formation of the Cytotoxic Granule Associated RNA Binding Protein TIA1 Low Complexity Domain	Journal of the American Chemical Society	145	3	1580- 1592	10.1021/jacs.2c08596	Yes
Xiong, Z.; Andaraarachchi, H.P.; Held, J.T.; Dorn, R.W.; Jeong, Y.; Rossini, A.; Kortshagen, U.R.	Inductively Coupled Nonthermal Plasma Synthesis of Size- Controlled y-Al2O3 Nanocrystals	Nanomaterials	13	10	1627	10.3390/nano131016 27	Yes
Xu, Y.; Calabrese, M.; Demitri, N.; Pizzi, A.; Nag, T.; Hung, I.; Gan, Z.; Resnati, G.; Bryce, D.L.	Non-covalent matere bonds in perrhenates probed via ultrahigh field rhenium-185/187 NMR and zero-field NQR spectroscopy	Chemical Communica- tions	59	84	12609- 12612	10.1039/d3cc04090a	Yes
Zhang, R.; Qin, H.; Prasad, R.; Fu, R.; Zhou, H.; Cross, T.A.	Dimeric Transmembrane Structure of the SARS-CoV-2 E Protein	Communication s Biology	6		1109	10.1038/s42003-023- 05490-x	Yes
Zhang, W.; Hassan, A.; Struppe, J.; Monette, M.; Hung, I.; Gan, Z.; Martins, V.; Terskikh, V.; Huang, Y.	Overcoming challenges in 67Zn NMR: a new strategy of signal enhancement for MOF characterization	Chemical Communica- tions	59	35	5205- 5208	10.1039/d3cc00716b	Yes
Zhao, W.; Debnath, D.; Gautam, I.; Fernando, L.D.; Wang, T.	Charting the solid-state NMR signals of polysaccharides: A database-driven roadmap	Magnetic Resonance in Chemistry	in press		1-12	10.1002/mrc.5397	Yes

5.1.7 PUBLICATIONS GENERATED BY PULSED FIELD AT LANL (33)

Authors	Title	Journal Name	Vol	Issue	Pages	DOI	Cites NSF Core Grant
Bhardwaj, A.; Nguyen, L.N.; Schillig, J.; Cheetham, P.; Kim, C.H.; Nguyen, D.N.; Pamidi, S.	Superconducting Magnetic Energy Storage for Pulsed Power Magnet Applications	IEEE Transactions on Applied Super- conductivity	33	5	1-6	10.1109/TASC.2023.3 265620	Yes
Blawat, J.; Speer, S.; Singleton, J.; Xie, W.; Jin, R.	Quantum-limit phenomena and band structure in the magnetic topological semimetal EuZn2As2	Communica- tions Physics	6		255	10.1038/s42005-023- 01378-8	Yes
Breindel, A.J.; Deng, Y.; Moir, C.; Fang, Y.; Ran, S.; Lou, H.; Li, S.; Zeng, Q.; Shu, L.; Wolowic, C.T.; Schuller, I.K.; Rosa, P.F.; Fisk, Z.; Singleton, J.; Maple, M.B.	FeSi, a d-electron topological Kondo insulator candidate, with magnetic field, pressure, and microwaves	Proceedings of the National Academy of Sciences of the USA (PNAS)	120		221636 7120	10.1073/pnas.221636 7120	Yes
Broyles, C.; Rehfuss, Z.; Siddiquee, H.; Zhu, J.; Zheng, K.; Nikolo, M.; Graf, D.E.; Singleton, J.; Ran, S.	Revealing a 3D Fermi Surface Pocket and Electron-Hole Tunneling in UTe2 with Quantum Oscillations	Physical Review Letters	131		36501	10.1103/PhysRevLett. 131.036501	Yes
Chen, K.; Zheng, G.; Zhang, D.; Chan, A.; Zhu, Y.; Jenkins, K.; Yu, F.; Shi, M.; Ying, J.; Xiang, Z.; Chen, X.; Wang, Z.; Singleton, J.; Li, L.	Magnetic breakdown and spin- zero effect in quantum oscillations in kagome metal CsV3Sb5	Communica- tions Materials	4		96	10.1038/s43246-023- 00422-y	Yes
Choi, J.; Lane, C.; Zhu, J.X.; Crooker, S.	Asymmetric magnetic proximity interactions in MoSe2/CrBr3 van der Waals heterostructures	Nature Materials	22		305	10.1038/s41563-022- 01424-w	Yes
Du, K.; Xu, X.; Won, C.; Wang, K.; Crooker, S.; Rangan, S.; Bartynski, R.; Cheong, S. W.	Topological surface magnetism and Néel vector control in a magnetoelectric antiferromagnet	Nature Partner Journals Quantum Materials (npj)	8		17	10.1038/s41535-023- 00551-0	Yes
Goryca, M.M.; Zhang, X.; Ramberger, J.; Watts, J.; Nisoli, C.; Leighton, C.; Schiffer, P.; Crooker, S.	Deconstructing magnetization noise: Degeneracies, phases, and mobile fractionalized excitations in tetris artificial spin ice	Proceedings of the National Academy of Sciences of the USA (PNAS)	120		e23107 77120	10.1073/pnas.231077 7120	Yes
Junior, P.; Naimer, T.; McCreary, K.; Jonker, B.; Finley, J.; Crooker, S.; Fabian, J.; Stier, A.	Proximity-enhanced valley Zeeman splitting at the WS2/graphene interface	2D Materials	10		34002	10.1088/2053- 1583/acd5df	Yes
Khansili, A.; Bangura, A.; McDonald, R.; Ramshaw, B.J.; Rydh, A.; Shehter, A.S.	Calorimetric measurement of nuclear spin-lattice relaxation rate in metals	Physical Review B	107		195145	10.1103/PhysRevB.10 7.195145	Yes
Kopteva, N.; Yakovlev, D.; Kirstein, E.; Zhukov, E.; Kudlacik, D.; Sapega, V.; Dirin, D.; Kovalenko, M.; Baumann, A.; Hocker, J.; Dyakonov, V.; Crooker, S.; Bayer, M.	Weak Dispersion of Exciton Landé Factor with Band Gap Energy in Lead Halide Perovskites: Approximate Compensation of the Electron and Hole Dependences	Small	2023		230093 5	10.1002/smll.2023009 35	Yes
Lee, M.; Schoenemann, R.U.; Zhang, H.; Dahlbom, D.; Jang, T.; Do, S.; Christianson, A.D.; Cheong, S.; Park, J.; Brosha, E.; Jaime, M.; Barros, K.; Batista, C.D.; Zapf, V.	Field-induced spin level crossings within a quasi-XY antiferromagnetic state in Ba2FeSi2O7	Physical Review B	107		144427	10.1103/PhysRevB.10 7.144427	Yes
Lee, S.; Choi, Y. S.; Do, S.H.; Lee, W.; Lee, C.H.; Lee, M.; Vojta, M.; Wang, C.N.; Luetkens, H.; Guguchia, Z.; Choi, K.Y.	Kondo screening in a Majorana metal	Nature Communica- tions	14		7405	10.1038/s41467-023- 43185-3	Yes
Lee, S.; Graf, D.E.; Robinson, R.; Singleton, J.; Palmstrom, J.C.; Mao, Z.	Evidence of magnetic fluctuation induced Weyl semimetal state in the antiferromagnetic topological insulator Mn(Bi1-xSbx)2Te4	Physical Review B	107		205105	10.1103/PhysRevB.10 7.205105	Yes
Lewkowitz, M.; Adams, J.; Sullivan, N.S.; Wang, P.; Shatruk, M.; Zapf, V.; Arvij, A.S.	Direct observation of electric field- induced magnetism in a molecular magnet	Scientific Reports	13	1	2769- 2784	10.1038/s41598-023- 29840-1	Yes
Li, X.; Jones, A.; Choi, J.; Zhao, H.; Maletinsky, P.; Sinitsyn, N.; Crooker, S.; Htoon, H.; Pettes, M.	Proximity-induced chiral quantum light generation in strain- engineered WSe2/NiPS3 heterostructures	Nature Materials	22		1311	10.1038/s41563-023- 01645-7	Yes
Manson, J.L.; Pajerowski, D.M.; Donovan, J.M.; Twamley, B.; Goddard, P.A.; Johnson, R.; Bendix, J.; Singleton, J.; Lancaster, T.; Blundell, S.J.; Herbrych, J.; Baker, P.J.; Steele, A.J.; Pratt, F.L.; Franke-Chaudet, I.; McDonald, R.; Plonczak, A.; Manuel, P.	Spatially anisotropic S=1 square- lattice antiferromagnet with single- ion anisotropy realized in a Ni(II) pyrazine-n,n'-dioxide coordination polymer	Physical Review B	108		94425	10.1103/PhysRevB.10 8.094425	Yes
Mazza, A.R.; Skoropata, E.; Lapano, J.; Chilcote, M.A.; Jorgensen, C.; Tang, N.; Gai, Z.; Singleton, J.; Brahlek, M.J.; Gilbert, D.A.; Ward, T.Z.	Hole doping in compositionally complex correlated oxide enables tunable exchange biasing	APL Materials	11	3	31118	10.1063/5.0142224	Yes

Authors	Title	Journal Name	Vol	Issue	Pages	DOI	Cites NSF Core Grant
Nguyen, L.N.; Naud, M.; Weiss, J.D.; Pamidi, S.V.; Dönges, S.A.; van der Laan, D.; Nguyen, D.N.	Simulation for the Fault Current Limiting Operation of REBCO CORC Superconducting Cables With Different Core Materials	IEEE Transactions on Applied Super- conductivity	33	2	1-8	10.1109/TASC.2022.3 229656	Yes
Nguyen, L.N.; Shields, N.; Ashworth, S.; Nguyen, D.N.	Understanding ac losses in CORC cables of YBCO superconducting tapes by numerical simulations	Journal of Applied Physics	134	14	143903	10.1063/5.0162439	Yes
Nomoto, T.; Zhong, C.; Kageyama, H.; Suzuki, Y.; Jaime, M.; Matsuo, A.; Kindo, K.; Izawa, K.; Kohama, Y.	Simultaneous measurement of specific heat and thermal conductivity in pulsed magnetic field	Review of Scientific Instruments	94		54901	https://doi.org/10.1063 /5.0143875	Yes
Precker, C.E.; Barzola-Quiquia, J.; Chan, M.K.; Jaime, M.; Esquinazi, P.D.	High-field and high-temperature magnetoresistance reveals the superconducting behaviour of the stacking faults in multilayer graphene	Carbon	203		462	10.1016/j.carbon.2022 .11.072	Yes
Ramette, C.; Pressley, L.; Avdeev, M.; Lee, M.; Kushwaha, S.K.; Krogstad, M.; Sarker, S.; Cardon, P.; Ruff, J.; Khan, M.; Kataoka, K.; McQueen, T.; Ji, H.	Floating Zone Crystal Growth, Structure, and Properties of a Cubic Li5.5 La3Nb1.5Zr0.5O12 Garnet-Type Lithium-Ion Conductor	Journal of Materials Chemistry A	11		21754- 21766	10.1039/D3TA04606K	Yes
Shehter, A.S.; McDonald, R.; Ramshaw, B.J.; Modic, K.A.	Magnetotropic susceptibility	Physical Review B	108		35111	10.1103/PhysRevB.10 8.035111	Yes
Shitaokoshi, S.; Kawachi, T.; Nomura, T.; Balakirev, F.; Kohama, Y.	Radio frequency electrical resistance measurement under destructive pulsed magnetic fields	Review of Scientific Instruments	94		94706	10.1063/5.0165680	Yes
Wakefield, J. P.; Kang, M.; Neves, P. M.; Oh, D.; Fang, S.; McTigue, R.; Frank Zhao, S. Y.; Lamichhane, T. N.; Chen, A.; Lee, S.; Park, S.; Park, J.; Jozwiak, C.; Bostwick, A.; Rotenberg, E.; Rajapitamahuni, A.; Vescovo, E.; McChesney, J. L.; Graf, D.E.; Palmstrom, J.C.; Suzuki, T.; Li, M.; Comin, R.; Checkelsky, J. G.	Three-dimensional flat bands in pyrochlore metal CaNi2	Nature	623		301- 306	10.1038/s41586-023- 06640-1	Yes
Wang, K.; Wang, L.; Liu, I.L.; Boschini, F.; Zonno, M.; Michiardi, M.; Rotenberg, E.; Bostwick, A.; Graf, D.E.; Ramshaw, B.J.; Damascelli, A.; Paglione, J.	Symmetry-enforced Fermi degeneracy in topological semimetal RhSb3	Physical Review Materials	7		74205	10.1103/PhysRevMat erials.7.074205	Yes
Woods, A.J.; Donald, A.M.; Gazizulin, R.; Collin, E.; Steinke, L.	Developing compact tuning fork thermometers for sub-mK temperatures and high magnetic fields	Journal of Applied Physics	133	2	24501	10.1063/5.0132492	Yes
Yakovlev, D.; Crooker, S.; Semina, M.; Rautert, J.; Mund, J.; Dirin, D.; Kovalenko, M.; Bayer, M.	Exciton-Polaritons in CsPbBr3 Crystals Revealed by Optical Reflectivity in High Magnetic Fields and Two-Photon Spectroscopy	Physica Status Solidi RRL			230040 7	10.1002/pssr.2023004 07	Yes
Yao, W.; Huang, Q.; Xie, T.; Podlesnyak, A.; Brassington, A.; Xing, C.; Mudiyanselage, R.; Wang, H.; Xie, W.; Zhang, S.; Lee, M.; Zapf, V.; Bai, X.; Tennant, D.; Liu, J.; Zhou, H.	Continuous Spin Excitations in the Three-Dimensional Frustrated Magnet	Physical Review Letters	131		146701	10.1103/PhysRevLett. 131.146701	Yes
Yi, H.; Hu, L.; Zhao, Y.; Zhou, L.; Yan, Z.; Zhang, R.; Yuan, W.; Wang, Z.; Wang, K.; Hickey, D.R.; Richardella, A.R.; Singleton, J.; Winter, L.; Wu, X.; Chan, M.H.; Samarth, N.; Liu, C.	Dirac-fermion-assisted interfacial superconductivity in epitaxial topological-insulator/iron- chalcogenide heterostructures	Nature Communica- tions	14		7119	10.1038/s41467-023- 42902-2	Yes
Zhang, S.; Lee, S.; Woods, A.J.; Peria, W.K.; Thomas, S.M.; Movshovich, R.; Brosha, E.; Huang, Q.; Zhou, H.; Zapf, V.; Lee, M.	Electronic and magnetic phase diagrams of the Kitaev quantum spin liquid candidate Na ₂ Co ₂ TeO ₆	Physical Review B	108		64421	10.1103/PhysRevB.10 8.064421	Yes
Zhu, Y.; Huang, C.; Wang, Y.; Graf, D.E.; Lin, H.; Lee, S.H.; Singleton, J.; Min, L.; Palmstrom, J.C.; Bansil, A.; Singh, B.; Mao, Z.	Large anomalous Hall effect and negative magnetoresistance in half-topological semimetals	Communica- tions Physics	6		346	10.1038/s42005-023- 01469-6	Yes

5.1.8 PUBLICATIONS GENERATED BY ASC (8)

Authors	Title	Journal Name	Vol	Issue	Pages	DOI	Cites NSF Core Grant
Balachandran, S.; Bieler, T.; Chetri, S.; Dhakal, P.; Lee, P.J.; Thune, Z.; Valente-Feliciano, A.M.	Microstructure Development in a Cold Worked SRF Niobium Sheet After Heat Treatments	JACoW	SRF2 023		MOPM B041	10.18429/JACoW- SRF2023- MOPMB041	Yes
Balachandran, S.; Smathers, D.B.; Kim, J.; Sim, K.; Lee, P.J.	A Method for Measuring Interface Roughness from Cross-Sectional Micrographs	IEEE Transactions on Applied Super- conductivity	33	5	600020 5	10.1109/TASC.2023.3 250165	Yes
Balachandran, S.; Xu, P.; Dhakal, P.; Carl, M.; Walsh, R.P.; Lee, P.J.	Effect of strain on the resistivity and thermal conductivity of high purity niobium	IEEE Transactions on Applied Super- conductivity	33	5	350080 5	10.1109/TASC.2023.3 262218	Yes
Bang, J.; Park, J.; Choi, K.; Kim, G.; Hahn, S.	A numerical method to calculate screening current-dependent self and mutual inductances of REBCO coils	Super- conductor Science and Technology	36		85003	10.1088/1361- 6668/acdb9e	Yes
Galstyan, E.; Kadiyala, J.; Paidpilli, M.; Goel, C.; Sai Sandra, J.; Yerraguravagari, V.; Majkic, G.; Jain, R.; Chen, S.; Li, Y.I.; Schmidt, R.; Jaroszynski, J.J.; Bradford, G.; Abraimov, D.V.; Chaud, X.; Song, J.; Selvamanickam, V.	High critical current STAR® wires with REBCO tapes by advanced MOCVD	Super- conductor Science and Technology	36	5	55007	10.1088/1361- 6668/acc4ed	Yes
Jiang, J.; Hosssain, S.I.; Barua, S.; Oloye, A.; Kvitkovic, J.; Kametani, F.; Trociewitz, U.P.; Hellstrom, E.; Larbalestier, D.C.; Bugaris, D.E.; Goggin, C.; Huang, H.; Parrell, J.A.; Shen, T.	Performance and Microstructure Variation with Maximum Heat Treatment Temperature for Recent Bi-2212 Round Wires	IEEE Transactions on Applied Super- conductivity	33	5	640010 5	10.1109/TASC.2023.3 236870	Yes
Tarantini, C.; Oloye, A.; Hossain, S.I.; Kametani, F.; Jiang, J.; Hellstrom, E.; Larbalestier, D.C.	ac susceptibility studies of intra- and intergrain properties of high-Jc Bi-2212 wires	Physical Review Materials	7		14802	10.1103/PhysRevMat erials.7.014802	Yes
Xu, X.; Peng, X.; Wan, F.; Rochester, J.; Bradford, G.; Jaroszynski, J.J.; Sumption, M.	APC Nb3Sn superconductors based on internal oxidation of NbTaHf alloys	Super- conductor Science and Technology	36	3	35012	10.1088/1361- 6668/acb17a	Yes

5.1.9 PUBLICATIONS GENERATED BY MS&T (15)

Authors	Title	Journal Name	Vol	Issue	Pages	DOI	Cites NSF Core Grant
An, B.; Niu, R.; Xin, Y.; Starch, W.L.; Xiang, Z.L.; Su, Y.F.; Goddard, R.E.; Lu, J.; Siegrist, T.M.; Wang, E.G.; Han, K.	Suppression of discontinuous precipitation and strength improvement by Sc doping in Cu-6 wt% Ag alloys	Journal of Materials Science and Technology	135		80-96	10.1016/j.jmst.2022.0 6.043	Yes
Balachandran, S.; Xu, P.; Dhakal, P.; Carl, M.; Walsh, R.P.; Lee, P.J.	Effect of strain on the resistivity and thermal conductivity of high purity niobium	IEEE Transactions on Applied Super- conductivity	33	5	350080 5	10.1109/TASC.2023.3 262218	Yes
Biekert, A.; Chang, C.; Chaplinsky, L.; Fink, C.W.; Frey, W.D.; Garcia- Sciveres, M.; Guo, W.; Hertel, S.A.; Li, X.; Lin, J.; Lisovenko, M.; Mahapatra, R.; McKinsey, D.N.; Mehrotra, S.; Mirabolfathi, N.; Patel, P.K.; Penning, B.; Pinckney, H.D.; Reed, M.; Romani, R.K.; Sadoulet, B.; Smith, R.J.; Sorensen, P.; Suerfu, B.; Suzuki, A.; Velan, V.; Wang, G.; Wang, Y.; Watkins, S.L.; Williams, M.R.	A portable and monoenergetic 24 keV neutron source based on 124Sb-9Be photoneutrons and an iron filter	Journal of Instrumentation	18	7	P0701 8	10.1088/1748- 0221/18/07/P07018	Yes
Lu, J.; Xin, Y.; Zhang, Y.; Bai, H.	ab-Plane Tilt Angles in REBCO Conductors	IEEE Transactions on Applied Super- conductivity	33	5	1-4	10.1109/TASC.2023.3 236258	Yes
Niu, R.; Han, K.	Pockets of strain-softening and strain-hardening in high-strength Cu-24wt%Ag sheets	Journal of Materials Science	58	21	8981	10.1007/s10853-023- 08519-y	Yes
Niu, R.; Han, K.; Lu, J.; Levitan, J.W.; Toplosky, V.J.	Deformation induced precipitation in CuCrZr composites	Materials Science and Engineering A	875	6	145092	10.1016/j.msea.2023. 145092	Yes
Pathirage, V.; Khatun, S.; Lisenkov, S.; Lasek, K.; Li, J.F.; Kolekar, S.;	2D Materials by Design: Intercalation of Cr or Mn between two VSe2 van der Waals Layers	American Chemical	23	20	9579- 9586	10.1021/acs.nanolett. 3c03169	Yes

Publications

ED/CMT-E

Authors	Title	Journal Name	Vol	Issue	Pages	DOI	Cites NSF Core Grant
Valvidares, M.; Gargiani, P.; Xin, Y.; Ponomareva, I.; Batzill, M.		Society Macro Letters					
Saltini, C.; Mohammad, N.; Xin, Y.; Alvarado, R.; Ghio, A.J.; Moneypenny, C.G.; Riva, A.; Fu, D.; Flagg, T.; Saltini, G.F.A.; Arisi, I.; Fredenburg, K.M.; Zhang, Y.; Lascano, J.E.; Brantly, M.	Lung microhaemorrhage drives oxidative/inflammatory damage in α1-antitrypsin deficiency	ERJ Open Research	9	3		10.1183/23120541.00 662-2022	Yes
Shang, Z.; Lian, Z.; Li, M.; Han, K.; Zheng, H.X.	Machine-learning-assisted multi- objective optimization in vertical zone refining of ultra-high purity indium	Separation and Purification Technology	305		122430	10.1016/j.seppur.2022 .122430	Yes
Suetomi, Y.; Xu, P.; Bosque, E.; Gavrilin, A.V.; Markiewicz, W.D.; Bai, H.; Dixon, I.R.	Screening Current Induced Stress/Strain Analysis of High Field REBCO Coils With Co- Winding or Over-Banding Reinforcement	IEEE Transactions on Applied Super- conductivity	34	5	1-6	10.1109/TASC.2023.3 342762	Yes
Tang, Y.; Guo, W.; Kobayashi, H.; Yui, S.; Tsubota, M.; Kanai, T.	Imaging quantized vortex rings in superfluid helium to evaluate quantum dissipation	Nature Communica- tions	14		2941	10.1038/s41467-023- 38787-w	Yes
Wen, X.; Pierce, J.; Lavrik, N.; Randolph, S.J.; Guo, W.; Fitzsimmons, M.R.	Flow of the normal component of He-II about bluff objects observed with He [*] 2excimers	Physical Review B	107		174501	10.1103/PhysRevB.10 7.174501	Yes
Xiang, Z.; zhang, L.; An, B.; Lu, J.; Niu, R.; Xin, Y.; Mardani, M.; Siegrist, T.M.; Goddard, R.E.; Han, K.; wang, E.	Effect of evolution of spinodal decomposition on microstructure and properties in multi-step aged FeCrCo alloy	Materials Characteri- zation	199		112764	10.1016/j.matchar.202 3.112764	Yes
Xu, P.; Kolb-Bond, D.; Dixon, I.R.; Bai, H.	Stress Analysis of Terminals From the Distribution of Screening Currents for the 40 T All- Superconducting Magnet Project	IEEE Transactions on Applied Super- conductivity	23	5	430020 5	10.1109/TASC.2023.3 253460	Yes
Zhang, H.; Xing, C.K.; Noordhoek, K.; Liu, Z.; Zhao, T.H.; Horák, L.; Huang, Q.; Hao, L.; Yang, J.; Pandey, S.; Dagotto, E.; Jiang, Z.; Chu, J.H.; Xin, Y.; Choi, E.S.; Zhou, H.D.; Liu, J.	Anomalous magnetoresistance by breaking ice rule in Bi2lr2O7/Dy2Ti2O7 heterostructure	Nature Communica- tions	14		1404	10.1038/s41467-023- 36886-2	Yes

5.1.10 PUBLICATIONS GENERATED BY EDUCATION AT FSU (1)

Authors	Title	Journal Name	Vol	Issue	Pages	DOI	Cites NSF Core Grant
Hughes, R.; Davidson, S.; Johnson, K.W.	Meta Mentoring: Mentors' Reflections on Mentoring	Fortschritte der Physik				10.1007/s41979-023- 00104-x	Yes

5.1.11 PUBLICATIONS GENERATED BY CMT/E (46)

Authors	Title	Journal Name	Vol	lssue	Pages	DOI	Cites NSF Core Grant
Biekert, A.; Chang, C.; Chaplinsky, L.; Fink, C.W.; Frey, W.D.; Garcia- Sciveres, M.; Guo, W.; Hertel, S.A.; Li, X.; Lin, J.; Lisovenko, M.; Mahapatra, R.; McKinsey, D.N.; Mehrotra, S.; Mirabolfathi, N.; Patel, P.K.; Penning, B.; Pinckney, H.D.; Reed, M.; Romani, R.K.; Sadoulet, B.; Smith, R.J.; Sorensen, P.; Suerfu, B.; Suzuki, A.; Velan, V.; Wang, G.; Wang, Y.; Watkins, S.L.; Williams, M.R.	A portable and monoenergetic 24 keV neutron source based on 124Sb-9Be photoneutrons and an iron filter	Journal of Instrumentation	18	7	P0701 8	10.1088/1748- 0221/18/07/P07018	Yes
Casas, B.W.; Li, Y.; Moon, A.; Xin, Y.; McKeever, C.; Macy, J.J.; Petford-Long, A.K.; Phatak, C.M.; Santos, E.J.G.; Choi, E.S.; Balicas, L.	Coexistence of Merons with Skyrmions in the Centrosymmetric van der Waals Ferromagnet Fe5- xGeTe2	Advanced Materials	35		202212 087	10.1002/adma.20221 2087	Yes
Chong, S.; Lei, C.; Lee, S.; Jaroszynski, J.J.; Mao, Z.; MacDonald, A.H.; Wang, K.L.	Anomalous Landau quantization in intrinsic magnetic topological insulators	Nature Communica- tions	14	1	4805	10.1038/s41467-023- 40383-x	Yes
Datta, A.; Changlani, H.J.; Yang, K.; Ghosal, A.	Enigma of the vortex state in a strongly correlated d-wave superconductor	Physical Review B: Rapid Comm/Letters	107		L14050 5	10.1103/PhysRevB.10 7.L140505	Yes

Authors	Title	Journal Name	Vol	Issue	Pages	DOI	Cites NSF Core Grant
Djafari, J.; Duarte, F.; Fernández- Lodeiro,, J.; Fernández-Lodeiro, A.; Santos, H.; Bladt, E.; Bals, S.; Flessa Savvidou, A.K.; Balicas, L.; Rodríguez-González, B.; Dos Santos, A.A.; Capelo-Martínez, J.L.; Lodeiro, C.	Diphenyl ditelluride assisted synthesis of noble metal-based silver-telluride 2D organometallic nanofibers with enhanced aggregation-induced emission (AIE) after oleylamine treatment	Dyes and Pigments				10.1016/j.dyepig.2023 .111754	Yes
Flessa Savvidou, A.K.; Ptok, A.; Sharma, G.; Casas, B.W.; Clark, J.K.; Li, V.M.; Shatruk, M.; Tewari, S.; Balicas, L.	Anisotropic positive linear and sub-linear magnetoresistivity in the cubic type-II Dirac metal Pd ₃ In ₇	Nature Partner Journals Quantum Materials (npj)	8		68	10.1038/s41535-023- 00601-7	Yes
Franco-Rivera, G.; Cochran, J.R.; Miyashita, S.; Bertaina, S.U.; Chiorescu, I.	Strong Coupling of a Gd3+ Multilevel Spin System to an On- Chip Superconducting Resonator	Physical Review Applied	19		24067	10.1103/PhysRevAppl ied.19.024067	Yes
Fratini, S.; Ciuchi, S.; Dobrosavljevic, V.; Rademaker, L.	Universal Scaling near Band- Tuned Metal-Insulator Phase Transitions	Physical Review Letters	131		196303	10.1103/PhysRevLett. 131.196303	Yes
Galeano-Cabral, J.R.; Karr, E.J.; Schundelmier, B.C.; Oladehin, O.; Choi, E.S.; Siegrist, T.M.; Ordonez, J.C.; Shastri, S.; Petkov, V.; Baumbach, R.; Wei, K.	Enhanced thermoelectric properties of heavy-fermion compounds YbxCeySmzIr2Zn20 (x+y+z=1)	Physical Review Materials	7	2	25406	10.1103/PhysRevMat erials.7.025406	Yes
Galstyan, E.; Kadiyala, J.; Paidpilli, M.; Goel, C.; Sai Sandra, J.; Yerraguravagari, V.; Majkic, G.; Jain, R.; Chen, S.; Li, Y.I.; Schmidt, R.; Jaroszynski, J.J.; Bradford, G.; Abraimov, D.V.; Chaud, X.; Song, J.; Selvamanickam, V.	High critical current STAR® wires with REBCO tapes by advanced MOCVD	Super- conductor Science and Technology	36	5	55007	10.1088/1361- 6668/acc4ed	Yes
Garceau, N.; Bao, S.; Guo, W.	Vacuum Break in a Helium Cooled Tube with an Inserted Cavity	Proceedings of ICEC28-ICMC	70		413 419	10.1007/978-981-99- 6128-3_52	Yes
Guo, W.; Kanai, T.	Vinen's Latest Thoughts on the ``Bump" Puzzle in Decaying He II Counterflow Turbulence	Journal of Low Temperature Physics	212	5	351- 362	10.1007/s10909-023- 02961-7	Yes
Gupta, A.; Weiser, A.; Pressley, P.; Luo, Y.; Lygouras, C.; Trowbridge, J.; Phelan, W.A.; Broholm, C.L.; McQueen, T.M.; Park, W.K.	Topological surface states in the Kondo insulator YbB ₁₂ revealed via planar tunneling spectroscopy	Physical Review B	107		165132	10.1103/PhysRevB.10 7.165132	Yes
Inui, S.; Hulse, M.F.; Kanai, T.; Guo, W.	Boiling peak heat flux for steady inhomogeneous heat transfer in superfluid ⁴ He	Physical Review B	108		174509	10.1103/PhysRevB.10 8.174509	Yes
Kang, J.; Vafek, O.	Pseudomagnetic fields, particle- hole asymmetry, and microscopic effective continuum Hamiltonians of twisted bilayer graphene	Physical Review B	107		75408	10.1103/PhysRevB.10 7.075408	Yes
Kim, H.; Choi, Y.; Lantagne- Hurtubise, É.; Lewandowski, C.K.; Thomson, A.; Kong, L.; Zhou, H.; Baum, E.; Zhang, Y.; Holleis, L.; Watanabe, K.; Taniguchi, T.; Young, A.F.; Alicea, J.; Nadj-Perge, S.	Imaging inter-valley coherent order in magic-angle twisted trilayer graphene	Nature	623	7989	942- 948	10.1038/s41586-023- 06663-8	Yes
Kolar, K.; Zhang, Y.; Nadj-Perge, S.; von Oppen, F.; Lewandowski, C.K.	Electrostatic fate of N-layer moiré graphene	Physical Review B	108	19	0	10.1103/physrevb.108 .195148	Yes
Krstovska, D.; Choi, E.; Steven, E.	Giant Angular Nernst Effect in the Organic Metal alpha-(BEDT- TTF)2KHg(SCN)4	Magneto- chemistry	9	1	27	10.3390/magnetoche mistry9010027	Yes
Lee, K.; Sharma, P.; Vafek, O.; Changlani, H.J.	Triangular lattice Hubbard model physics at intermediate temperatures	Physical Review B	107		235105	10.1103/PhysRevB.10 7.235105	Yes
Lei, S.; Allen, K.; Huang, J.; Moya, J.M.; Wu, T.C.; Casas, B.W.; Oh, J.S.; Hashimoto, M.; Lu, D.; Denlinger, J.; Jozwiak, C.; Bostwick, A.; Rotenberg, E.; Balicas, L.; Birgeneau, R.; Foster, M.S.; Yi, M.; Sun, Y.; Morosan, E.	Weyl nodal ring states and Landau quantization with very large magnetoresistance in square-net magnet EuGa4	Nature Communica- tions	14		5812	10.1038/s41467-023- 40767-z	Yes
Li, H.; Shan, X.; Psulkowski, S.C.; Guo, W.; Dickens, T.; Yu, Z.	3D Printed Tandem X-Ray Detector with Halide Perovskite- Polymer Composite Semiconductor Absorber	Advanced Manufacturing	1	1	2	10.55092/am2023000 2	No
Ma, K.W.; Turker, O.; Seidel, A.; Yang, K.	Competing phases and intertwined orders in coupled wires near the self-dual point	Physical Review B	108		245138	10.1103/PhysRevB.10 8.245138	Yes
Maccari, I.; Pokharel, B.K.; Terzic, J.; Dutta, S.; Jesudasan, J.; Raychaudhuri, P.; Lorenzana, J.; De Michele, C.; Castellani, C.; Benfatto, L.; Popovic, D.	Transport signatures of fragile glass dynamics in the melting of the two-dimensional vortex lattice	Physical Review B	107		14509	10.1103/PhysRevB.10 7.014509	Yes

Authors	Title	Journal Name	Vol	Issue	Pages	DOI	Cites NSF Core Grant
Mayo, A.H.; Takahashi, H.; Ishiwata, S.; Górnicka, K.; Winiarski, M.; Jaroszynski, J.J.; Cava, R.J.; Xie, W.; Klimczuk, T.	Enhancement of the Magnetoresistance in the Mobility- Engineered Compensated Metal Pt5P2	Advanced Electronic Materials	9	3	220112 0	10.1002/aelm.202201 120	Yes
Papaj, M.; Lewandowski, C.K.	Probing correlated states with plasmons	Science Advances	9	17	0	10.1126/sciadv.adg32 62	Yes
Sakhratov, Y. A.; Svistov, L. E.; Reyes, A.P.	Anisotropy Stabilized Magnetic Phases of the Triangular Antiferromagnet RbFe(MoO ₄) ₂	Journal of Experimental and Theoretical Physics	137	4	526- 532	10.1134/S106377612 3100102	Yes
Setty, C.; Zhao, J.; Fanfarillo, L.; Huang, E.W.; Hirschfeld, P.J.; Phillips, P.W.; Yang, K.	Exact solution for finite center-of- mass momentum Cooper pairing	Physical Review B	108		174506	10.1103/PhysRevB.10 8.174506	Yes
Stanley, L.J.; Lin, P.; Jaroszynski, J.J.; Popovic, D.	Screening the Coulomb interaction leads to a prethermal regime in two-dimensional bad conductors	Nature Communica- tions	14		7004	10.1038/s41467-023- 42778-2	Yes
Tan, Y.; Tsang, P.H.; Dobrosavljevic, V.; Rademaker, L.	Doping a Wigner-Mott insulator: Exotic charge orders in transition metal dichalcogenide moir\'e heterobilayers	Physical Review Research	5		43190	10.1103/PhysRevRes earch.5.043190	Yes
Tang, Y.; Guo, W.; Kobayashi, H.; Yui, S.; Tsubota, M.; Kanai, T.	Imaging quantized vortex rings in superfluid helium to evaluate quantum dissipation	Nature Communica- tions	14		2941	10.1038/s41467-023- 38787-w	Yes
Thirunavukkuarasu, K.; Radtke, G.; Lu, Z.; Lazzeri, M.; Christianen, P.; Ballottin, M.V.; Dabkowska, H.A.; Gaulin, B.D.; Smirnov, D.; Jaime, M.; Saul, A.	Magnetoelastic interactions in SrCu2(BO3)2 studied by Raman scattering experiments and first principles calculations	Physical Review B	107		64410	10.1103/PhysRevB.10 7.064410	Yes
Vafek, O.	Anisotropic resistivity tensor from disk geometry magnetoconductance	Physical Review Applied	20		64008	10.1103/PhysRevAppl ied.20.064008	Yes
Vafek, O.; Kang, J.	Continuum effective Hamiltonian for graphene bilayers for an arbitrary smooth lattice deformation from microscopic theories	Physical Review B	107		75123	10.1103/PhysRevB.10 7.075123	Yes
Wang, R.; Yang, K.	Non-Fermi liquid behavior in a simple model of Fermi arcs and pseudogap	Modern Physics Letters B	37		235011 9	10.1142/S021798492 3501191	Yes
Wang, X.; Finney, J.; Sharpe, A.L.; Rodenbach, L.K.; Hsueh, C.L.; Watanabe, K.; Taniguchi, T.; Kastner, M.A.; Vafek, O.; Goldhaber-Gordon, D.	Unusual magnetotransport in twisted bilayer graphene from strain-induced open Fermi surfaces	Proceedings of the National Academy of Sciences of the USA (PNAS)	120	34	e23071 51120	10.1073/pnas.230715 1120	Yes
Wang, X.; Vafek, O.	Revisiting Bloch electrons in a magnetic field: Hofstadter physics via hybrid Wannier states	Physical Review B	108		245109	10.1103/PhysRevB.10 8.245109	Yes
Wen, X.; Pierce, J.; Lavrik, N.; Randolph, S.J.; Guo, W.; Fitzsimmons, M.R.	Flow of the normal component of He-II about bluff objects observed with He [*] 2excimers	Physical Review B	107		174501	10.1103/PhysRevB.10 7.174501	Yes
Wu, Z.; Weinberger, T.I.; Chen, J.; Cabala, A.; Chichinadze, D.; Shaffer, D.; Pospisil, J.; Prokleska, J.; Haidamak, T.; Bastien, G.; Sechovsky, V.; Hickey, A.J.; Mancera-Ugarte, M.J.; Benjamin, S.M.; Graf, D.E.; Skourski, Y.; Lonzarich, G.G.; Valiska, M.; Grosche, F.M.; Eaton, A.G.	Enhanced triplet superconductivity in next generation ultraclean UTe2	arXiv	2305		19033	10.48550/arXiv.2305. 19033	Yes
Xiang, L.; Dhakal, R.; Ozerov, M.; Jiang, Y.; Mou, B.S.; Ozarowski, A.; Huang, Q.; Zhou, H.; Fang, J.; Winter, S.M.; Jiang, Z.; Smirnov, D.	Disorder-Enriched Magnetic Excitations in a Heisenberg-Kitaev Quantum Magnet Na2Co2TeO6	Physical Review Letters	131		76701	10.1103/PhysRevLett. 131.076701	Yes
Xie, F.; Kang, J.; Bernevig, B.; Vafek, O.; Regnault, N.	Phase diagram of twisted bilayer graphene at filling factor v=±3	Physical Review B	107		75156	10.1103/PhysRevB.10 7.075156	Yes
Xu, X.; Peng, X.; Wan, F.; Rochester, J.; Bradford, G.; Jaroszynski, J.J.; Sumption, M.	APC Nb3Sn superconductors based on internal oxidation of NbTaHf alloys	Super- conductor Science and Technology	36	3	35012	10.1088/1361- 6668/acb17a	Yes
Yang, C.; Esin, I.; Lewandowski, C.K.; Refael, G.	Optical Control of Slow Topological Electrons in Moir\'e Systems	Physical Review Letters	131		26901	10.1103/PhysRevLett. 131.026901	Yes
Yue, L.; Li, J.; Qi, Y.; Chen, J.; Wang, X.; Cao, J.	Auger recombination and carrier- lattice thermalization in semiconductor quantum dots under intense excitation	American Chemical Society Nano Letters	23	7	2578	10.1021/acs.nanolett. 2c04804	Yes

Authors	Title	Journal Name	Vol	Issue	Pages	DOI	Cites NSF Core Grant
Zhang, H.; Xing, C.K.; Noordhoek, K.; Liu, Z.; Zhao, T.H.; Horák, L.; Huang, Q.; Hao, L.; Yang, J.; Pandey, S.; Dagotto, E.; Jiang, Z.; Chu, J.H.; Xin, Y.; Choi, E.S.; Zhou, H.D.; Liu, J.	Anomalous magnetoresistance by breaking ice rule in Bi2Ir2O7/Dy2Ti2O7 heterostructure	Nature Communica- tions	14		1404	10.1038/s41467-023- 36886-2	Yes
Zhang, Q.; Hossain, S.MD.; Casas, B.W.; Zheng, W.; Cheng, Z.J.; Lai, Z.; Tu, Y.H.; Chang, G.; Yao, Y.; Li, S.; Jiang, Y.X.; Mardanya, S.; Chang, T.R.; You, J.Y.; Feng, Y.P.; Cheng, G.; Yin, J.X.; Shumiya, N.; Cochran, T.A.; Yang, X.P.; Litskevich, M.; Yao, N.; Watanabe, K.; Taniguchi, T.; Zhang, H.; Balicas, L.; Hasan, M.Z.	Ultra-high supercurrent density in a two-dimensional topological material	Physical Review Materials	7		L07180 1	10.1103/PhysRevMat erials.7.L071801	Yes
Zhang, X.; Lee, Y.; Kakani, V.; Yang, K.; Cho, K.; Shi, X.	Two types of three-dimensional quantum Hall effects in multilayer W Te ₂	Physical Review B	107		245410	10.1103/PhysRevB.10 7.245410	Yes

5.1.12 PUBLICATIONS GENERATED BY GEOCHEMISTRY FACILITY (4)

Authors	Title	Journal Name	Vol	lssue	Pages	DOI	Cites NSF Core Grant
Salters, V.J.; Sachi-Kocher, A.; Downs, D.; Stelten, M.; Sisson, T.	Isotopic and Geochemical Evidence for the Source of Volcanism at Harrat Rahat, Kingdom of Saudi Arabia	USGS Professional paper	1862		J	10.3133/pp1862J	Yes
Sanfilippo, A.; Liu, C.; Salters, V.J.; Mosconi, A.; Zanetti, A.; Tribuzio, R.	Preserved Nd-Hf-Os isotope variability in replacive channels from the Lanzo ophiolite: Traces of incomplete melt aggregation in the shallow mantle	Chemical Geology	641		121779	10.1016/j.chemgeo.20 23.121779	Yes
Sissin, T.; Downs, D.; Calvert, A.; Dieterich, H.; Mahood, G.; Salters, V.; Stelten, M.; Shawali, J.	Mantle origin and crustal differentiation of basalts and hawaiites of northern Harrat Rahat, Kingdom of Saudi Arabia	USGS Professional Paper	1862		l	10.3133/pp1862I	No
Woelki, D.J.; Salters, V.J.; Beier, C.; Dick, H.; Koepke, J.; Romer, R.	Shallow recycling of lower continental crust: The Mahoney Seamount at the Southwest Indian Ridge	Earth and Planetary Science Letters	602		117698	10.1016/j.epsl.2022.1 17968	Yes

5.1.13 PUBLICATIONS GENERATED BY MBI AT UF (39)

Authors	Title	Journal Name	Vol	Issue	Pages	DOI	Cites NSF Core Grant
Antoine, L.H.; Tanner, J.J.; Mickle, A.M.; Gonzalez, C.E.; Kusko, D.A.; Watts, K.; Rumble, D.D.; Buchanan, T.L.; Sims, A.M.; Staud, R.; Lai, S.; Deshpande, H.; Phillips, B.; Buford, T.W.; Aroke, E.N.; Redden, D.T.; Fillingim, R.B.; Goodin, B.R.; Sibille, K.T.	Greater socioenvironmental risk factors and higher chronic pain stage are associated with thinner bilateral temporal lobes	Brain and Behavior	13	12	e3330	10.1002/brb3.3330	Yes
Bottari, S.; Cohen, R.; Friedman, J.; Porges, E.; Chen, A.; Britton, M.; Gunstad, J.; Woods, A.; Williamson, J.	Change in medial frontal cerebral metabolite concentrations following bariatric surgery	NMR in Biomedicine	ePub		e4897	10.1002/nbm.4897	No
Boylan, M.R.; Panitz, C.; Tebbe, A.; Vieweg, P.; Forschack, N.; Müller, M.M.; Keil, A.	Feature-based Attentional Amplitude Modulations of the Steady-state Visual Evoked Potentials Reflect Blood Oxygen Level Dependent Changes in Feature-sensitive Visual Areas	Journal of Cognitive Neuroscience	35	9	1493- 1507	10.1162/jocn_a_0203 0	No
Bush, N.J.; Boissoneault, J.; Letzen, J.; Staud, R.; Robinson, M.E.	Task-dependent functional connectivity of pain is associated with the magnitude of placebo analgesia in pain-free individuals	European Journal of Pain	27	8	1023- 1035	10.1002/ejp.2145	Yes
Chen, A.K.; Gullett, J.M.; Williamson, J.B.; Cohen, R.A.	Presurgical microstructural coherence predicts cognitive change for bariatric surgery patients	Obesity	31	9	2325- 2334	10.1002/oby.23837	No

Publications

MBI

Authors	Title	Journal Name	Vol	Issue	Pages	DOI	Cites NSF Core Grant
Chiasson, P.; Boylan, M.R.; Elhamiasl, M.; Pruitt, J.M.; Ranjan, S.; Riels, K.; Sahoo, A.K.; Mirifar, A.; Keil, A.	Effects of neurofeedback training on performance in laboratory tasks: A systematic review	International Journal of Psycho- physiology	189		42-56	10.1016/j.ijpsycho.202 3.04.005	No
Farrens, A.J.; Vahdat, S.; Sergi, F.	Changes in Resting State Functional Connectivity Associated with Dynamic Adaptation of Wrist Movements	Journal of Neuroscience	43	19	3520 3537	10.1523/JNEUROSCI. 1916-22.2023	No
Gullett, J.M.; DeFelice, J.; Richards, V.L.; Porges, E.C.; Cohen, R.A.; Govind, V.; Salan, T.; Wang, Y.; Zhou, Z.; Cook, R.L.	Resting state connectivity in people living with HIV before and after stopping heavy drinking	Front Psychiatry	14		110236 8	10.3389/fpsyt.2023.11 02368	No
Horta, M.; Polk, R.; Ebner, N.C.	Single dose intranasal oxytocin administration: Data from healthy younger and older adults	Data in Brief	51		109669	10.1016/j.dib.2023.10 9669	No
Ioachim, G.; Warren, H.; Powers, J.M.; Staud, R.; Pukall, C.F.; Stroman, P.W.	Distinct neural signaling characteristics between fibromyalgia and provoked vestibulodynia revealed by means of functional magnetic resonance imaging in the brainstem and spinal cord	Front Pain Res (Lausanne)	4		117116 0	10.3389/fpain.2023.11 71160	No
Ji, H.; Zhang, X.; Chen, B.L.; Yuan, Z.; Zheng, N.; Keil, A.	Groupwise structural sparsity for discriminative voxels identification	Front Neurosci	17		124731 5	10.3389/fnins.2023.12 47315	No
Kim, S.I.; Willcocks, R.J.; Daniels, M.J.; Morales, J.F.; Yoon, D.Y.; Triplett, W.T.; Barnard, A.M.; Conrado, D.J.; Aggarwal, V.; Belfiore-Oshan, R.; Martinez, T.N.; Walter, G.A.; Rooney, W.D.; Vandenborne, K.H.	Multivariate modeling of magnetic resonance biomarkers and clinical outcome measures for Duchenne muscular dystrophy clinical trials	CPT Pharma- cometrics Syst Pharmacol	12	10	1437- 1449	10.1002/psp4.13021	No
Kinany, N.; Khatibi, A.; Lungu, O.; Finsterbusch, J.; Büchel, C.; Marchand-Pauvert, V.; Van De Ville, D.; Vahdat, S.; Doyon, J.	Decoding cerebro-spinal signatures of human behavior: Application to motor sequence learning	Neurolmage	275		120174	10.1016/j.neuroimage. 2023.120174	No
Langer, K.; Joy Johnson, K.; Williamson, J.B.; Gullett, J.M.; Porges, E.C.; Gunstad, J.; Friedman, J.; Woods, A.J.; Cohen, R.A.	Resting-state network functional connectivity before and after bariatric surgery	Surgery for Obesity and Related Diseases	19	7	673- 679	10.1016/j.soard.2022. 12.026	No
Li, W.; Keil, A.	Sensing fear: fast and precise threat evaluation in human sensory cortex	Trends in Cognitive Sciences	27	4	341- 352	10.1016/j.tics.2023.01 .001	No
Liang, Y.; Zhao, Q.; Hu, Z.; Boockholdt, K.H.; Meyyappan, S.; Neubert, J.; Ding, M.	Imaging the neural substrate of trigeminal neuralgia pain using deep learning	Frontiers in Human Neuroscience	17			10.3389/fnhum.2023. 1144159	No
Liu, C.; Downey, R.J.; Mu, Y.; Richer, N.; Hwang, J.; Shah, V.A.; Sato, S.D.; Clark, D.J.; Hass, C.J.; Manini, T.M.; Seidler, R.D.; Ferris, D.P.	Comparison of EEG Source Localization Using Simplified and Anatomically Accurate Head Models in Younger and Older Adults	IEEE Transactions on Neural Systems and Rehabilitation Engineering	31		2591- 2602	10.1109/TNSRE.2023 .3281356	No
Liu, T.; Vickers, B.; Seidler, R.; Preston, S.	Neural correlates of overvaluation and the effort to save possessions in a novel decision task: An exploratory fMRI study	Frontiers in Psychology	14		105905 1	10.3389/fpsyg.2023.1 059051	No
Lopez, F.; O'Shea, A.; Rosenberg, J.; Leeuwenburgh, C.; Anton, S.; Bowers, D.; Woods, A.	Frontal adenosine triphosphate markers from ³¹ P MRS are associated with cognitive performance in healthy older adults: preliminary findings	Frontiers in Aging Neuroscience	15			10.3389/fnagi.2023.11 80994	No
Mickle, A.M.; Tanner, J.J.; Olowofela, B.; Wu, S.; Garvan, C.; Lai, S.; Addison, A.; Przkora, R.; Edberg, J.C.; Staud, R.; Redden, D.; Goodin, B.R.; Price, C.C.; Fillingim, R.B.; Sibille, K.T.	Elucidating individual differences in chronic pain and whole person health with allostatic load biomarkers	Brain, Behavior, & Immunity - Health	33		100682	10.1016/j.bbih.2023.1 00682	Yes
Mohassel, P.; Yun, P.; Syeda, S.; Batra, A.; Bradley, A.J.; Donkervoort, S.; Monges, S.; Cohen, J.S.; Leung, D.G.; Munell, F.; Ortez, C.; Sánchez-Montáñez, A.; Karachunski, P.; Brandsema, J.; Medne, L.; Chaudhry, V.; Tasca, G.; Foley, A.R.; Udd, B.; Arai, A.E.; Walter, G.A.; Bönnemann, C.G.	A comprehensive study of skeletal muscle imaging in FHL1-related reducing body myopathy	Annals of Clinical and Translational Neurology	10	8	1442- 1455	10.1002/acn3.51834	No

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Authors	Title	Journal Name	Vol	Issue	Pages	DOI	Cites NSF Core
Montesino-Goicolea, S.; Nin, O.; Gonzalez, B.M.; Sawczuk, N.J.; Laffitte Nodarse, C.; Antonio Valdes-Hernandez, P.; Jackson, E.; Huo, Z.; Elise T. Somerville, J.; Porges, E.C.; Smith, C.; Fillingim, R.B.; Cruz-Almeida, Y.	Protocol for a pilot and feasibility randomized-controlled trial of four weeks of oral γ-aminobutyric acid (GABA) intake and its effect on pain and sleep in middle-to-older aged adults	Contemporary Clinical Trials Communica- tions	32		101066	10.1016/j.conctc.2023 .101066	Grant No
Montesino-Goicolea, S.; Valdes- Hernandez, P.; Laffitte Nodarse, C.; Johnson, A.J.; Cole, J.H.; Antoine, L.H.; Goodin, B.R.; Fillingim, R.B.; Cruz-Almeida, Y.	Brain-predicted age difference mediates the association between PROMIS sleep impairment, and self-reported pain measure in persons with knee pain	Aging Brain	4		100088	10.1016/j.nbas.2023.1 00088	Yes
Murphy, A.; O'Neal, A.; Cohen, R.; Lamb, D.; Porges, E.; Bottari, S.; Ho, B.; Trifilio, E.; DeKosky, S.; Heilman, K.; Williamson, J.	The Effects of Transcutaneous Vagus Nerve Stimulation on Functional Connectivity Within Semantic and Hippocampal Networks in Mild Cognitive Impairment	Neuro- therapeutics	20	2	419 430	10.1007/s13311-022- 01318-4	Yes
Obenaus, A.; Kinney-Lang, E.; Jullienne, A.; Haddad, E.; Wendel, K.M.; Shereen, A.D.; Solodkin, A.; Dunn, J.F.; Baram, T.Z.	Seeking the Amygdala: Novel Use of Diffusion Tensor Imaging to Delineate the Basolateral Amygdala	Biomedicines	11	2	Unkno wn	10.3390/biomedicines 11020535	No
Ofori, E.; Vaillancourt, D.E.; Greig- Custo, M.T.; Barker, W.; Hanson, K.; DeKosky, S.T.; Garvan, C.S.; Adjouadi, M.; Golde, T.; Loewenstein, D.A.; Stecher, C.; Fowers, R.; Duara, R.	Free-water imaging reveals unique brain microstructural deficits in hispanic individuals with Dementia	Brain Imaging Behav	18		10-116	10.1007/s11682-023- 00819-w	No
Peterson, J.; Johnson, A.; Nordarse, C.; Huo, Z.; Cole, J.; Fillingim, R.; Cruz-Almeida, Y.	Brain predicted age difference mediates pain impact on physical performance in community dwelling middle to older aged adults	Geriatric Nursing	50		181 187	10.1016/j.gerinurse.20 23.01.019	Yes
Qing, K.; Altes, T.A.; Mugler, J.; Mata, J.F.; Tustison, N.J.; Ruppert, K.; Bueno, J.; Flors, L.; Shim, Y.M.; Zhao, L.; Cassani, J.; Teague, W.G.; Kim, J.S.; Wang, Z.; Ruset, I.C.; Hersman, F.W.; Mehrad, B.	Hyperpolarized Xenon-129: A New Tool to Assess Pulmonary Physiology in Patients with Pulmonary Fibrosis	Biomedicines	11	6		10.3390/biomedicines 11061533	No
Richmond, S.; Rane, S.; Hanson, M.; Albayram, M.; Iliff, J.; Kernagis, D.; Rosenberg, J.T.; Seidler, R.	Quantification Approaches for Magnetic Resonance Imaging Following Intravenous Gadolinium Injection: A Window into Brain- Wide Glymphatic Function	European Journal of Neuroscience	57	10	1689 1704	10.1111/ejn.15974	No
Staud, R.; Godfrey, M.M.; Stroman, P.W.	Fibromyalgia is associated with hypersensitivity but not with abnormal pain modulation: evidence from QST trials and spinal fMRI	Front Pain Res (Lausanne)	4		128410 3	10.3389/fpain.2023.12 84103	No
Stennett-Blackmon, B.; Sevel, L.; Boissoneault, J.	Association of cerebellar and pre- motor cortex gray matter density with subjective intoxication and subjective response following acute alcohol intake	Scientific Reports	13	1		10.1038/s41598-023- 34546-5	No
Strath, L.; Peterson, J.; Meng, L.; Rani, A.; Huo, Z.; Foster, T.; Fillingim, R.; Cruz-Almeida, Y.	Socioeconomic Status, Knee Pain, And Epigenetic Aging In Community-Dwelling Middle-To- Older Age Adults	Journal of Pain	24	4	68-68	10.1016/j.jpain.2023.0 6.002	Yes
Tanner, J.J.; Amin, M.; Dion, C.; Parvataneni, H.K.; Mareci, T.H.; Price, C.C.	Perioperative Extracellular Brain Free-Water Changes for Older Adults Electing Total Knee Arthroplasty with General versus Spinal Anesthesia: A Pilot Study	J Alzheimers Dis	96	3	1243- 1252	10.3233/JAD-221246	No
Trifilio, E.; Shortell, D.; Olshan, S.; O'Neal, A.; Coyne, J.; Lambert, D.L.; Porges, E.; Williamson, J.	Impact of transcutaneous vagus nerve stimulation on healthy cognitive and brain aging	Front Neurosci	17		118405 1	10.3389/fnins.2023.11 84051	No
Valdes-Hernandez, P.A.; Laffitte Nodarse, C.; Cole, J.H.; Cruz- Almeida, Y.	Feasibility of brain age predictions from clinical T1-weighted MRIs	Brain Research Bulletin	205		110811	10.1016/j.brainresbull. 2023.110811	No
Valdes-Hernandez, P.A.; Laffitte Nodarse, C.; Johnson, A.J.; Montesino-Goicolea, S.; Bashyam, V.; Davatzikos, C.; Peraza, J.A.; Cole, J.H.; Huo, Z.; Fillingim, R.B.; Cruz-Almeida, Y.	Brain-predicted age difference estimated using DeepBrainNet is significantly associated with pain and function-a multi-institutional and multiscanner study	Pain	164	12	2822- 2838	10.1097/j.pain.000000 0000002984	Yes
Valdes-Hernandez, P.A.; Laffitte Nodarse, C.; Peraza, J.A.; Cole, J.H.; Cruz-Almeida, Y.	Toward MR protocol-agnostic, unbiased brain age predicted from clinical-grade MRIs	Sci Rep	13	1	19570	10.1038/s41598-023- 47021-y	No

Authors	Title	Journal Name	Vol	Issue	Pages	DOI	Cites NSF Core Grant
Waner, J.L.; Hausman, H.K.; Kraft, J.N.; Hardcastle, C.; Evangelista, N.D.; O'Shea, A.; Albizu, A.; Boutzoukas, E.M.; Van Etten, E.J.; Bharadwaj, P.K.; Song, H.; Smith, S.G.; DeKosky, S.T.; Hishaw, G.A.; Wu, S.S.; Marsiske, M.; Cohen, R.; Alexander, G.E.; Porges, E.C.; Woods, A.J.	Connecting memory and functional brain networks in older adults: a resting-state fMRI study	Geroscience	45	5	3079- 3093	10.1007/s11357-023- 00967-3	No
Wilkes, B.J.; Tobin, E.R.; Arpin, D.J.; Wang, W.E.; Okun, M.S.; Jaffee, M.S.; McFarland, N.R.; Corcos, D.M.; Vaillancourt, D.E.	Distinct cortical and subcortical predictors of Purdue Pegboard decline in Parkinson's disease and atypical parkinsonism	NPJ Parkinsons Dis	9	1	85	10.1038/s41531-023- 00521-0	Yes

5.1.14 PUBLICATIONS GENERATED BY UF PHYSICS (2)

Authors	Title	Journal Name	Vol	lssue	Pages	DOI	Cites NSF Core Grant
Elmslie, T.A.; Startt, J.; Yang, Y.; Soto-Medina, S.; Zappala, E.; Meisel, M.W.; Manuel, M.V.; Frandsen, B.A.; Dingreville, R.; Hamlin, J.J.	Tuning the magnetic properties of the CrMnFeCoNi Cantor alloy	Physical Review B	108		94437	10.1103/PhysRevB.10 8.094437	Yes
Lewkowitz, M.; Adams, J.; Sullivan, N.S.; Wang, P.; Shatruk, M.; Zapf, V.; Arvij, A.S.	Direct observation of electric field- induced magnetism in a molecular magnet	Scientific Reports	13	1	2769- 2784	10.1038/s41598-023- 29840-1	Yes

5.2 BOOKS, CHAPTERS, REVIEWS, AND OTHER ONE-TIME PUBLICATIONS (6)

Authors	Title	Facilities
Cooley, Lance D.	Introduction to Section G1: Structure/Microstructure	Applied Superconductivity Center
Cooley, Lance D.; Gladyshevskii, R. and Siegrist, T.	X-Ray Studies: Chemical Crystallography	Applied Superconductivity Center
Cooley, Lance D.; Lee, Peter J. and Larbalestier, David, C.	Processing of Low Tc Conductors: The Alloy NbTi	Applied Superconductivity Center
Jiang, J. and Hellstrom, E.E.	Processing of High Tc Conductors: The Compound Bi-2212	Applied Superconductivity Center
Noe, G.T. II; Leadley, D.R.; Singleton, J.;	Cyclotron Resonance: Semiconductors	Pulsed Field Facility at LANL
Singleton, J.	Cyclotron resonance in metals, with a focus on quasiparticle	Pulsed Field Facility at LANL
	scattering rates	

5.3 INTERNET DISSEMINATION (9)

Authors	Title	Facilities
Blawat, J.; Speer, S.; Singleton, J.; Xie, W.; Jin, R.	Quantum-limit phenomena and bandstructure in the magnetic topological semimetal EuZn2As2	Pulsed Field Facility at LANL
Frank, C.E.; Lewin, S.K.; Saucedosalas, G.; Czajka, P.; Hayes, I.; Yoon, H.; Metz, T.; Paglione, J.; Singleton, J.; Butch, N.P.	Orphan High Field Superconductivity in Non- Superconducting Uranium Ditelluride	Pulsed Field Facility at LANL
Jiang, Q.; Palmstrom, J.C.; Singleton, J.; Chikara, S.; Graf, D.; Wang, C.; Shi, Y.; Malinowski, P.; Wang, A.; Lin, Z.; Shen, L.; Xu, X.; Xiao, D.; Chu, J.	Fermi Surface Evolution and Anomalous Hall Effect in an Ideal Type-II Weyl Semimetal	Pulsed Field Facility at LANL
Lee, S.H.; Graf, D.; Robinson, R.; Singleton, J.; Palmstrom, J.C.; Mao, Z.	Giant spin-valve effect and chiral anomaly in antiferromagnetic topological insulators Mn(Bi1-xSbx)2Te4	Pulsed Field Facility at LANL
Vaidya, S.; Coak, M.J.; Mayoh, D.A.; Lees, M.R.; Balakrishnan, G.; Singleton, J.; Goddard, P.A.	Direct evidence from high-field magnetotransport for a dramatic change of quasiparticle character in van der Waals ferromagnet Fe3-xGeTe2	Pulsed Field Facility at LANL
Yi, H.; Zhao, Y.; Chan, Y.; Cai, J.; Mei, R.; Wu, X.; Yan, Z.; Zhou, L.; Zhang, R.; Wang, Z.; Paolini, S.; Xiao, R.; Wang, k.; Richardella, A.R.; Singleton, J.; Winter, L.E.; Prokscha, T.; Salman, Z.; Suter, A.; Balakrishnan, P.P.; Grutter, A.J.; Chan, M.H.; Samarth, N.; Xu, X.; Wu, W.; Liu, C.; Chang, C.	Interface-Induced Superconductivity in Magnetic Topological Insulator-Iron Chalcogenide Heterostructures	Pulsed Field Facility at LANL
Zhao, Wancheng	Structural elucidation of lignocellulose and wetland soil by solid-state nmr and dynamic nuclear polarization	NMR Facility
Zheng, G.; Zhu, Y.; Chen, K.; Kang, B.; Zhang, D.; Jenkins, K.; Chan, A.; Zeng, Z.; Xu, A.; Valenzuela, O.A.; Blawat, J.; Singleton, J.; Lee, P.A.; Li, S.; Li, L.	Unconventional Magnetic Oscillations in Kagome Mott Insulators	Pulsed Field Facility at LANL
Zhu, Y.; Huang, C.; Wang, Y.; Graf, D.E.; Lin, H.; Lee, S.H.; Singleton, J.; Min, L.; Palmstrom, J.C.; Bansil, A.; Singh, B.; Mao	Surprisingly large anomalous Hall effect and giant negative magnetoresistance in half-topological semimetals	Pulsed Field Facility at LANL

5.4 PRODUCTS (3)

Authors	Title	Product Information	Facilities
Dubroca, T.; Trociewitz, B.;	Rotor cap removing tools,	https://www.research.fsu.edu/research-	EMR Facility, NMR Facility
McKay, J.; Mentink-Vigier, F.	microwave guides, and methods	offices/oc/technologies/rotor-cap-removal-tool-and-	
		microwave-guide/	

Publications

Authors	Title	Product Information	Facilities
Jaroszynski, J.	Force Magnetometer for Reel-to- reel Assessment of Superconducting Tapes	US patent application pending (2023)	DC Field Facility, CMT/E
Li , H.; Han, K.; Xin, Y.; Zheng,S.; Wang, L. and Zhai, Q.	Low carbon steel having improved hardness and methods of making the same	US Patent 11,761,067 (2023)	MS & T

5.5 DEGREES

5.5.1 M.S. DEGREES (4 LOCAL/4 EXTERNAL)

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Authors Bhardwaj, Ashish	Titles Master of Science in Electrical Engineering	MagLab Facilities Pulsed Field Facility at LANL	University FSU	Department Electrical and Computer Engineering	Degrees M.S. (local)
Moore, Megan	Permafrost Retrogressive Thaw Slump Dissolved Organic Matter Molecular Signatures On The Peel Plateau, Canada	ICR Facility	FSU	Department of Earth, Ocean & Atmospheric Science	M.S. (local)
Perez, Eliany	The role of risk tolerance in navigation strategy decisions	MBI-UF	UF	Psychology	M.S. (local)
Shen, Qingyang	Colonization of the Mouse Gut with Conditional Butyrogenic Bacteria	AMRIS Facility at UF	UF	Biochemistry and Molecular Biology	M.S. (local)
Alsafi, Nora	lcing Dynamics in the Lake- Dominated, Discontinuous Permafrost Taiga Shield, and Effects on Fluvial Biogeochemistry, Carbon Cycling and Microbial Communities	ICR Facility	University of Alberta	Department of Biological Sciences	M.S. (external)
LeCompte, Alejandra	Exploring a Lab-scale Cascade Upflow Bioreactor System for Nitrogen Removal via Biosorption-activated Media	ICR Facility	University of Central Florida	Department of Civil, Environmental and Construction Engineering	M.S. (external)
Lecompte, Alejandra	Exploring a Lab-scale Cascade Upflow Bioreactor System for Nitrogen Removal Via Biosorption Activated Media	ICR Facility	University of Central Florida	Department of Civil, Environmental and Construction Engineering	M.S. (external)
Rodgers, Aryaba	NMR Analysis of Amyloid Beta Fibrils and Random Coil Peptide	NMR Facility	University of Colorado Denver	Chemistry	M.S. (external)

5.5.2 PH.D. DEGREES (19 LOCAL/15 EXTERNAL)

Authors	Titles	MagLab Facilities	University	Department	Degrees
Buchanan, Anna Caroline	Speciation of the Dissolved, Particulate and	AMRIS Facility at UF	UF	Soil and Water Science	Ph.D. (local)
Chetri, Santosh	Methodology for the Characterization of Surface Treated High Purity Niobium	Applied Superconductivity Center	FSU	Physics	Ph.D. (local)
Deck, Michael	Synthesis and Characterization of Oxysulfide-Based Fast-Ion Conductors for Solid-State Lithium Batteries	NMR Facility	FSU	Chemistry	Ph.D. (local)
Ehrenberger, Michelle	Biosynthesis of Terpenoid Natural Products : from Scaffold Synthesis to Functionalization	AMRIS Facility at UF	UF	Chemistry	Ph.D. (local)
Elsadek, Lobna	Unlocking Natures Specialized Metabolites: Discovery, Synthesis, Target Identification and Mechanisms of Action of New Bioactive Agents from Marine Cyanobacteria	AMRIS Facility at UF	UF	Medicinal Chemistry	Ph.D. (local)
Flessa Savvidou, Aikaterini Katafygi	Effects of a Complex Electronic Structure on the Physics Properties of Dirac Materials	DC Field Facility, CMT/E	FSU	Physics	Ph.D. (local)
Frye-Jones, Joseph	Molecular Characterization of Polyfunctional Heteroatom Compounds in Ultracomplex Mixtures with 21 tesla Fourier Transform Ion Cyclotron Resonance Mass Spectrometry	ICR Facility	FSU	Department of Chemistry and Biochemistry	Ph.D. (local)
Holder, Samuel	Migraine in Females and Estradiol: A Magnetic Resonance Examination	NMR Facility	FSU	Chemical & Biomedical Engineering	Ph.D. (local)
Kurek, Martin	Molecular Composition and Physiographic Controls of Dissolved Organic Matter Across North American Lakes and Wetlands	ICR Facility	FSU	Department of Earth, Atmospheric and Environmental Sciences	Ph.D. (local)

Authors	Titles	MagLab Facilities	University	Department	Degrees
Liang, Yun	Novel Approaches for Analyzing Neuroimaging Data	MBI-UF	UF	Biomedical Engineering	Ph.D. (local)
Liu, Mengtian	Electron Paramagnetic Resonance Analysis Of Hiv Gp41 Interaction With Raft- Forming Membranes	EMR Facility	FSU	Physics	Ph.D. (local)
McLeod, Marc	Probing Hepatic Oxidative Metabolism In NAFLD With Nuclear Magnetic Resonance Spectroscopy And Imaging	AMRIS Facility at UF	UF	Biochemistry and Molecular Biology	Ph.D. (local)
Oloye, Abiola	Investigation Of Micro-/ Nano- Structural Factors Responsible For □A-Axis' Grain Alignment And Its Correlations To Critical Current Density (Jc) In Over Pressure Heat Treated (Opht) Bi-2212 Round Wires	Applied Superconductivity Center	FSU	Materials Science and Engineering	Ph.D. (local)
Peach, Austin	Solid-State NMR Of Quadrupolar Nuclei In Organic Solids: New Directions In Mechanochemical Synthesis And Crystal Structure Prediction	NMR Facility	FSU	Department of Chemistry and Biochemistry	Ph.D. (local)
Pokharel, Bal	Electrical Transport Studies of Phase Transitions and Charge Dynamics in Two-Dimensional Superconducting Systems	DC Field Facility, CMT/E	FSU	Physics	Ph.D. (local)
Sharma, Prakash	Numerical studies of magnetic properties in low dimensional strongly correlated systems	CMT/E	FSU	Physics	Ph.D. (local)
Tan, Yuting	Quantum Critical Regimes Around the Metal-Insulator Transition	CMT/E	FSU	Physics	Ph.D. (local)
Trusty, Blake	Examination of simultaneous self-diffusion of molecules in membranes and mesoporous materials via pulsed field gradient (PFG) NMR	AMRIS Facility at UF	UF	Chemical Engineering	Ph.D. (local)
Vojvodin, Cameron	Mechanochemical Synthesis, Characterization, and Quadrupolar NMR Crystallography of Multicomponent Crystals	NMR Facility	FSU	Department of Chemistry and Biochemistry	Ph.D. (local)
Fernando, Liyanage	Structural Dynamics of Fungal Cell Walls Elucidated by Solid- State NMR	NMR Facility	Michigan State University	Chemistry	Ph.D. (external)
Gabriel, Eric	Stabilization of Layered Transition Metal Oxide Positive Electrodes at High Potential for Sodium Ion Batteries	NMR Facility	Boise State University	Micron School of Materials Science and Engineering	Ph.D. (external)
Gamage, Eranga	Solvothermal synthesis and characterization of magnetic hybrid transition metal chalcogenide frameworks	EMR Facility	Iowa State University	Chemistry	Ph.D. (external)
Leclerc, Heather	Molecular Pathway Analysis of Biocrude Formation in Hydrothermal Liquefaction	ICR Facility	Worcester Polytechnic Institute	Department of Chemical Engineering	Ph.D. (external)
Martineac, Rachel	Transformation And Transport Of Dissolved Organic Matter In Coastal Systems Using Molecular And Ocean Color Approaches	ICR Facility	University of Georgia	School of Marine Programs	Ph.D. (external)
Nisson, Devan	Hydrogeochemical Support For Microbial Habitability In An Ancient, Hypersaline, Thermal, and Radiogenic Subsurface Brine In South Africa	ICR Facility	Princeton University	Department of Geosciences	Ph.D. (external)
Ontiveros-Ángel, Perla	Neuropathological Signatures Connecting Early-Life Trauma to Compulsive Eating Behavior and Obesity	MBI-UF	Loma Linda University	Neurosciences, Systems Biology, and Engineering	Ph.D. (external)
Roth, Holly	Evaluating the Effects of Fire on Carbon and Nitrogen Biogeochemistry in Forested Ecosystems	ICR Facility	Colorado State University	Department of Chemistry	Ph.D. (external)
Stokes, Sean	Soil Degradation and Water Scarcity: The Importance of Soil Organic Matter and Reuse of Non-Traditional Water Sources Within Agricultural Systems	ICR Facility	Colorado State University	Department of Soil & Crop Sciences	Ph.D. (external)

Authors	Titles	MagLab Facilities	University	Department	Degrees
Terra Telles Souza, Nathaniel	Cartography of Species Transferred Between Oil/Rock/Water Phases and their Interfaces in Relationship with Macroscopic Events of Wettability Changes	ICR Facility	University of Pau and the Pays de l'Adour	Doctoral School of Exact Sciences and their Applications	Ph.D. (external)
Thames, Tyrone	Solid State Nuclear Magnetic Resonance Probing of Structures of the Rous Sarcoma Virus Capsid, Amyloid Beta, and Reflectin Proteins	NMR Facility	University of Central Florida	Physics	Ph.D. (external)
Tin, Pagnareach	Comprehensive Studies of Magnetic Properties of Metal- Organic Frameworks and Molecular Compounds	DC Field Facility	University of Tennessee at Knoxville	Chemistry	Ph.D. (external)
Toubiana, Lea	Perfluorinated Alkoxide Iron(II) Complexes: Counter Cation Control Of Structural, Electronic, And O2 Reducing Properties And Undercoordinated Perfluorinated Chromium(Ii) Complexes: Synthesis, Characterization And Reduction Of Non-Innocent Imine Ligands	EMR Facility	Boston University	Chemistry	Ph.D. (external)
Walsh, Anna	Connecting Consumer Plastic Formulations to Marine Fates and Impacts	ICR Facility	Colorado State University	Dept. of Soil and Crop Sciences	Ph.D. (external)
Zhang, Zhe	Comprehensive Characterization of Natural Organic Matter in Aquatic Environment with Integration of Mathematical Analysis Methods	ICR Facility	University of Cincinnati	Environmental Engineering	Ph.D. (external)

APPENDIX 1 - PERSONNEL

Data as of January 8, 2024

MAGLAB AT FSU (713)

Name	Title	Personnel Category	Department
Ahmed Abuzar	Graduate Research Assistant	Graduate Student	ASC
Shaon Barua	Graduate Research Assistant	Graduate Student	ASC
Griffin Bradford	Graduate Research Assistant	Graduate Student	ASC
Adam Delong	Graduate Research Assistant	Graduate Student	ASC
Rafsun Jani	Graduate Research Assistant	Graduate Student	ASC
Andre Juliao	Graduate Research Assistant	Graduate Student	ASC
Jonathan Lee	Graduate Research Assistant	Graduate Student	ASC
Shah Alam Limon	Graduate Research Assistant	Graduate Student	ASC
Manish Mandal	Graduate Research Assistant	Graduate Student	ASC
Emma Martin	Graduate Research Assistant	Graduate Student	ASC
Tanmay Sarker Shuvo	Graduate Research Assistant	Graduate Student	ASC
John Tietsworth	Laboratory Assistant / Technician	Graduate Student	ASC
Connie Linville	Sr. Administrative Specialist	Other Professional	ASC
George Miller	Engineer	Other Professional	ASC
Felicia Rogers	Administrative Specialist	Other Professional	ASC
Simone Hruda	Visiting Professor	Other Professional	ASC
Caitlynn Linville	Laboratory Assistant / Technician	Other Professional	ASC
Garfield Murphy	Laboratory Assistant / Technician	Other Professional	ASC
Anatolii Polyanskii	Magnet Optical Research Specialist	Other Professional	ASC
Jeseok Bang	Postdoctoral Associate	Postdoc	ASC
Santosh Chetri	Postdoctoral Associate	Postdoc	ASC
Dmytro Abraimov	Research Faculty III	Senior Personnel	ASC
Shreyas Balachandran	Visiting Research Faculty I	Senior Personnel	ASC
Ernesto Bosque	Research Faculty II	Senior Personnel	ASC
Najib Cheggour	Research Faculty III	Senior Personnel	ASC
Lance Cooley	ASC Director/Professor	Senior Personnel	ASC
Daniel Davis	Postdoctoral Associate	Senior Personnel	ASC
Van Griffin	Sr. Research Associate	Senior Personnel	ASC
Seungyong Hahn	Professor	Senior Personnel	ASC
Eric Hellstrom	Professor	Senior Personnel	ASC
Jianyi Jiang	Research Faculty III	Senior Personnel	ASC
Fumitake Kametani	Assistant Professor	Senior Personnel	ASC

Name	Title	Personnel Category	Department
Youngjae Kim	Research Faculty II	Senior Personnel	ASC
David Larbalestier	Chief Materials Scientist	Senior Personnel	ASC
Peter Lee	Research Faculty III	Senior Personnel	ASC
Sastry Pamidi	Associate Professor, Electrical & Computing Engineering; Associate Director, Center for Advanced Power Systems	Senior Personnel	ASC
Wan Kyu Park	Research Faculty III	Senior Personnel	ASC
William Starch	Sr. Research Associate	Senior Personnel	ASC
Chiara Tarantini	Research Faculty III	Senior Personnel	ASC
Ulf Trociewitz	Research Faculty III	Senior Personnel	ASC
Aixia Xu	Visiting Scientist/Researcher	Senior Personnel	ASC
Sophie Carter	Clerk	Support Staff - Secretarial/Clerical	ASC
Jade Elling	Administrative Specialist	Support Staff - Secretarial/Clerical	ASC
Cindonia Brady	Research Assistant	Support Staff - Technical/Managerial	ASC
Charles English	Research Engineer	Support Staff - Technical/Managerial	ASC
James Gillman	Research Engineer	Support Staff - Technical/Managerial	ASC
Jozef Kvitkovic	Sr. Research Associate	Support Staff - Technical/Managerial	ASC
Adonay Almanza-Enriquez	Laboratory Assistant / Technician	Undergraduate Student	ASC
Nicole Bishop	Laboratory Assistant / Technician	Undergraduate Student	ASC
Jamia Brown	Laboratory Assistant / Technician	Undergraduate Student	ASC
Asael Caballero Reyes	Laboratory Assistant / Technician	Undergraduate Student	ASC
Nikola Cadavid	Laboratory Assistant / Technician	Undergraduate Student	ASC
Ryan Dreibelbis	Laboratory Assistant / Technician	Undergraduate Student	ASC
Aidan Hoolihan	Laboratory Assistant / Technician	Undergraduate Student	ASC
Claudia Irausquin	Laboratory Assistant / Technician	Undergraduate Student	ASC
JaKeyvan Jones	Laboratory Assistant / Technician	Undergraduate Student	ASC
Shamil JOnes	Laboratory Assistant / Technician	Undergraduate Student	ASC
Thomas Lockhart	Laboratory Assistant / Technician	Undergraduate Student	ASC
Liora Louis	Laboratory Assistant / Technician	Undergraduate Student	ASC
Emilio Morillo	Laboratory Assistant / Technician	Undergraduate Student	ASC
Anthony Plana	Laboratory Assistant / Technician	Undergraduate Student	ASC
Logan Shvartsman	Laboratory Assistant / Technician	Undergraduate Student	ASC
Alexandro Valdez	Laboratory Assistant / Technician	Undergraduate Student	ASC
Gabriel Watson	Laboratory Assistant / Technician	Undergraduate Student	ASC
Anthony Wuerth	Laboratory Assistant 1	Undergraduate Student	ASC

Samantha Nelson Budget Analyst Other Professional Budget Administrat Karol Bickett Assistant Director, Business Systems Senior Personnel Budget Administrat Carlos Villa K-12 Education Outreach Coordinator Other Professional Center for Integrating Research and Learning Roxanne Hughes Director, Center for Integrating Research Acuty II Senior Personnel Center for Integrating Research & Learning Kawana Johnson Research Assistant Graduate Student Theory Center for Integrating Research & Learning Wai-Ga Ho Graduate Research Assistant Graduate Student Theory Condensed Matte Theory Moharmed Ibrahim Hammam Graduate Research Assistant Graduate Student Theory Theory Muiyang Ma Graduate Research Assistant Graduate Student Theory Theory Ronald Melendrez Graduate Research Assistant Graduate Student Theory Condensed Matte Theory Keshav Singh Graduate Research Assistant Graduate Student Theory Keshav Singh Graduate Research Assistant Graduate Student Theory Ruojun Wang Graduate Research Assistant Graduate Student Th	Name	Title	Personnel Category	Department
Samantha Nelson Budget Analyst Other Professional Budget Administrat Karol Bickett Assistant Director, Business Systems Senior Personnel Budget Administrat Carlos Villa K-12 Education Outreach Coordinator Other Professional Center for Integrating Research and Learning Roxanne Hughes Director, Center for Integrating Research Ascuty II Senior Personnel Center for Integrating Research & Learning Kawana Johnson Research Ascuty II Senior Personnel Center for Integrating Research & Learning Wai-Ga Ho Graduate Research Assistant Graduate Student Theory Zhengfei Hu Graduate Research Assistant Graduate Student Theory Mohammed Ibrahim Hammarn Graduate Research Assistant Graduate Student Theory Huiyang Ma Graduate Research Assistant Graduate Student Theory Sogoud Sherif Undergraduate Research Assistant Graduate Student Condensed Mate Theory Keshav Singh Graduate Research Assistant Graduate Student Condensed Mate Theory Keshav Singh Graduate Research Assistant Graduate Student Condensed Mate Theory <td>Miaoyan Zha</td> <td>Laboratory Assistant / Technician</td> <td>Undergraduate Student</td> <td>ASC</td>	Miaoyan Zha	Laboratory Assistant / Technician	Undergraduate Student	ASC
Karol Bickett Assistant Director, Business Systems Senior Personnel Budget Administrat Research & Learning Carlos Villa K-12 Education Outreach Coordinator Other Professional Center for Integrati Research & Learning Roxanne Hughes Director, Center for Integrating Research A Learning Senior Personnel Center for Integrati Research & Learning Kawana Johnson Research Faculty II Senior Personnel Center for Integrati Research & Learning Wai-Ga Ho Graduate Research Assistant Graduate Student Condensed Matte Theory Zhengfei Hu Graduate Research Assistant Graduate Student Condensed Matte Theory Mohammed Ibrahim Hammam Graduate Research Assistant Graduate Student Condensed Matte Theory Ronald Melendrez Graduate Research Assistant Graduate Student Condensed Matte Theory Sogoud Sherif Undergraduate Research Assistant Graduate Student Theory Ruojun Wang Graduate Research Associate Postdoc Condensed Matte Theory Quz Turker Postdoctoral Associate Postdoc Condensed Matte Theory Quz Turker Postdoctoral Associate Postdoc	Kellie Alford	Accounting Specialist	Other Professional	Budget Administration
Karto bickett Systems Senior Personnel Budget Administration Carlos Villa K-12 Education Outreach Coordinator Other Professional Center for Integrating Research and Learning Senior Personnel Research & Learning Kawana Johnson Research Arustiang Senior Personnel Research & Learning Wai-Ga Ho Graduate Research Assistant Graduate Student Condensed Matte Theory Zhengfei Hu Graduate Research Assistant Graduate Student Condensed Matte Theory Mohammed Ibrahim Hammam Graduate Research Assistant Graduate Student Condensed Matte Theory Ronald Melendrez Graduate Research Assistant Graduate Student Condensed Matte Theory Sogoud Sherif Undergraduate Research Assistant Graduate Student Condensed Matte Theory Keshav Singh Graduate Research Assistant Graduate Student Theory Ruojun Wang Graduate Research Associate Postdoc Condensed Matte Theory Dmitry Chichinadze Postdoctoral Associate Postdoc Condensed Matte Theory Quz Turker Postdoctoral Associate Postdoc Condensed Matte Theory <td>Samantha Nelson</td> <td>Budget Analyst</td> <td>Other Professional</td> <td>Budget Administration</td>	Samantha Nelson	Budget Analyst	Other Professional	Budget Administration
Carlos Villa K-12 Education Outreach Coordinator Other Professional Center for Integrating Research and Learning Roxanne Hughes Director, Center for Integrating Research and Learning Senior Personnel Center for Integrating Research & Learning Kawana Johnson Research Faculty II Senior Personnel Center for Integrating Research & Learning Wai-Ga Ho Graduate Research Assistant Graduate Student Condensed Matte Condensed Matte Mohammed Ibrahim Hamman Graduate Research Assistant Graduate Student Condensed Matte Theory Mohammed Ibrahim Huiyang Ma Graduate Research Assistant Graduate Student Condensed Matte Theory Ronald Melendrez Graduate Research Assistant Graduate Student Condensed Matte Theory Sogoud Sherif Undergraduate Research Assistant Graduate Student Condensed Matte Theory Ruojun Wang Graduate Research Assistant Graduate Student Theory Manna Kumar Postdoctoral Associate Postdoc Condensed Matte Theory Quz Turker Postdoctoral Associate Postdoc Condensed Matte Theory Matter Postdoctoral Associate Postdoc <	Karol Bickett		Senior Personnel	Budget Administration
Roxanne Hughes Director, Center for Integrating Research and Learning Senior Personnel Center for Integrating Research & Learning Kawana Johnson Research Faculty II Senior Personnel Center for Integrating Research & Learning Wai-Ga Ho Graduate Research Assistant Graduate Student Condensed Matte Theory Zhengfei Hu Graduate Research Assistant Graduate Student Condensed Matte Theory Mohammed Ibrahim Hamman Graduate Research Assistant Graduate Student Condensed Matte Theory Huiyang Ma Graduate Research Assistant Graduate Student Condensed Matte Theory Ronald Melendrez Graduate Research Assistant Graduate Student Condensed Matte Theory Sogoud Sherif Undergraduate Research Assistant Graduate Student Condensed Matte Theory Ruojun Wang Graduate Research Assistant Graduate Student Condensed Matte Theory Dmitry Chichinadze Postdoctoral Associate Postdoc Condensed Matte Theory Quz Turker Postdoctoral Associate Postdoc Condensed Matte Theory Phong Vo Postdoctoral Associate Postdoc Condensed Matte Theory	Carlos Villa	K-12 Education Outreach	Other Professional	Center for Integrating Research & Learning
Kawana Johnson Research Faculty II Senior Personnel Center for Integrat Research & Learn Wai-Ga Ho Graduate Research Assistant Graduate Student Condensed Matte Theory Zhengfei Hu Graduate Research Assistant Graduate Student Condensed Matte Theory Mohammed Ibrahim Hammarn Graduate Research Assistant Graduate Student Condensed Matte Theory Kohammed Ibrahim Haimmarn Graduate Research Assistant Graduate Student Condensed Matte Theory Ronald Melendrez Graduate Research Assistant Graduate Student Condensed Matte Theory Sogoud Sherif Undergraduate Research Assistant Graduate Student Condensed Matte Theory Ruojun Wang Graduate Research Assistant Graduate Student Condensed Matte Theory Dmitry Chichinadze Postdoctoral Associate Postdoc Condensed Matte Theory Quz Turker Postdoctoral Associate Postdoc Condensed Matte Theory Vladimir Dobrosavljevic Professor Senior Personnel Condensed Matte Theory Vladimir Dobrosavljevic Professor of Physics Senior Personnel Condensed Matte Theory	Roxanne Hughes	Director, Center for Integrating	Senior Personnel	Center for Integrating Research & Learning
Wai-Ga Ho Graduate Research Assistant Graduate Student Condensed Matte Theory Zhengfei Hu Graduate Research Assistant Graduate Student Condensed Matte Theory Mohammed Ibrahim Hammam Graduate Research Assistant Graduate Student Condensed Matte Theory Wiyang Ma Graduate Research Assistant Graduate Student Condensed Matte Theory Ronald Melendrez Graduate Research Assistant Graduate Student Condensed Matte Theory Sogoud Sherif Undergraduate Research Assistant Graduate Student Condensed Matte Theory Keshav Singh Graduate Research Assistant Graduate Student Condensed Matte Theory Ruojun Wang Graduate Research Assistant Graduate Student Condensed Matte Theory Dmitry Chichinadze Postdoctoral Associate Postdoc Condensed Matte Theory Quz Turker Postdoctoral Associate Postdoc Condensed Matte Theory Vladimir Dobrosav/jevic Professor of Physics Senior Personnel Condensed Matte Theory Vladimir Dobrosav/jevic Professor of Physics Senior Personnel Condensed Matte Theory Vladimir D	Kawana Johnson		Senior Personnel	Center for Integrating
Zhengfei Hu Graduate Research Assistant Graduate Student Condensed Matte Theory Mohammed Ibrahim Hammam Graduate Research Assistant Graduate Student Condensed Matte Theory Huiyang Ma Graduate Research Assistant Graduate Student Condensed Matte Theory Ronald Melendrez Graduate Research Assistant Graduate Student Condensed Matte Theory Sogoud Sherif Undergraduate Research Assistant Graduate Student Condensed Matte Theory Keshav Singh Graduate Research Assistant Graduate Student Condensed Matte Theory Ruojun Wang Graduate Research Assistant Graduate Student Condensed Matte Theory Dmitry Chichinadze Postdoctoral Associate Postdoc Condensed Matte Theory Quz Turker Postdoctoral Associate Postdoc Condensed Matte Theory Oguz Turker Postdoctoral Associate Postdoc Condensed Matte Theory Vladimir Dobrosavljevic Professor of Physics Senior Personnel Theory Vladimir Dobrosavljevic Professor Senior Personnel Theory Condensed Matte Theory Condensed Matte	Wai-Ga Ho	Graduate Research Assistant	Graduate Student	Condensed Matter /
Mohammed Ibrahim Hamman Graduate Research Assistant Graduate Student Condensed Matte Theory Huiyang Ma Graduate Research Assistant Graduate Student Condensed Matte Theory Ronald Melendrez Graduate Research Assistant Graduate Student Condensed Matte Theory Sogoud Sherif Undergraduate Research Assistant Graduate Student Condensed Matte Theory Keshav Singh Graduate Research Assistant Graduate Student Condensed Matte Theory Ruojun Wang Graduate Research Assistant Graduate Student Condensed Matte Theory Dmitry Chichinadze Postdoctoral Associate Postdoc Condensed Matte Theory Quz Turker Postdoctoral Research Associate Postdoc Condensed Matte Theory Phong Vo Postdoctoral Associate Postdoc Condensed Matte Theory Vladimir Dobrosavljevic Professor of Physics Senior Personnel Theory Cyprian Lewandowski Assistant Professor Senior Personnel Condensed Matte Theory Oskar Vafek Professor Senior Personnel Condensed Matte Theory Oskar Vafek Professor <t< td=""><td>Zhengfei Hu</td><td>Graduate Research Assistant</td><td>Graduate Student</td><td>Condensed Matter /</td></t<>	Zhengfei Hu	Graduate Research Assistant	Graduate Student	Condensed Matter /
Huiyang Ma Graduate Research Assistant Graduate Student Condensed Matte Theory Ronald Melendrez Graduate Research Assistant Graduate Student Condensed Matte Theory Sogoud Sherif Undergraduate Research Assistant Graduate Student Condensed Matte Theory Keshav Singh Graduate Research Assistant Graduate Student Condensed Matte Theory Ruojun Wang Graduate Research Assistant Graduate Student Condensed Matte Theory Dmitry Chichinadze Postdoctoral Associate Postdoc Condensed Matte Theory Quz Turker Postdoctoral Research Associate Postdoc Condensed Matte Theory Oguz Turker Postdoctoral Associate Postdoc Condensed Matte Theory Phong Vo Postdoctoral Associate Postdoc Condensed Matte Theory Vladimir Dobrosavljevic Professor of Physics Senior Personnel Condensed Matte Theory Cyprian Lewandowski Assistant Professor Senior Personnel Condensed Matte Theory Oskar Vafek Professor Senior Personnel Condensed Matte Theory Oskar Vafek Professor Senior P		Graduate Research Assistant	Graduate Student	Condensed Matter /
Ronald Melendrez Graduate Research Assistant Graduate Student Condensed Matte Theory Sogoud Sherif Undergraduate Research Assistant Graduate Student Condensed Matte Theory Keshav Singh Graduate Research Assistant Graduate Student Condensed Matte Theory Ruojun Wang Graduate Research Assistant Graduate Student Condensed Matte Theory Dmitry Chichinadze Postdoctoral Associate Postdoc Condensed Matte Theory Quz Turker Postdoctoral Research Associate Postdoc Condensed Matte Theory Oguz Turker Postdoctoral Associate Postdoc Condensed Matte Theory Phong Vo Postdoctoral Associate Postdoc Condensed Matte Theory Vladimir Dobrosavljevic Professor of Physics Senior Personnel Condensed Matte Theory Vladimir Dobrosavljevic Assistant Professor Senior Personnel Condensed Matte Theory Veprian Lewandowski Assistant Professor Senior Personnel Condensed Matte Theory Veprian Lewandowski Assistant Professor Senior Personnel Condensed Matte Theory Veprian Lewandowski Assi		Graduate Research Assistant	Graduate Student	Condensed Matter /
Sogoud Sherif Undergraduate Research Assistant Graduate Student Condensed Matte Theory Keshav Singh Graduate Research Assistant Graduate Student Condensed Matte Theory Ruojun Wang Graduate Research Assistant Graduate Student Condensed Matte Theory Dmitry Chichinadze Postdoctoral Associate Postdoc Condensed Matte Theory Aman Kumar Postdoctoral Research Associate Postdoc Condensed Matte Theory Oguz Turker Postdoctoral Research Associate Postdoc Condensed Matte Theory Phong Vo Postdoctoral Associate Postdoc Condensed Matte Theory Vladimir Dobrosavljevic Professor Senior Personnel Condensed Matte Theory Vladimir Dobrosavljevic Professor Senior Personnel Condensed Matte Theory Vedro Schlottmann Professor Senior Personnel Condensed Matte Theory Vedro Schlottmann Professor Senior Personnel Condensed Matte Theory Vataoyu Wang Visiting Research Faculty, I Senior Personnel Condensed Matte Theory	Ronald Melendrez	Graduate Research Assistant	Graduate Student	Condensed Matter /
Keshav Singh Graduate Research Assistant Graduate Student Condensed Matte Theory Ruojun Wang Graduate Research Assistant Graduate Student Condensed Matte Theory Dmitry Chichinadze Postdoctoral Associate Postdoc Condensed Matte Theory Aman Kumar Postdoctoral Research Associate Postdoc Condensed Matte Theory Oguz Turker Postdoctoral Research Associate Postdoc Condensed Matte Theory Phong Vo Postdoctoral Associate Postdoc Condensed Matte Theory Vladimir Dobrosavljevic Professor of Physics Senior Personnel Condensed Matte Theory Vladimir Lewandowski Assistant Professor Senior Personnel Condensed Matte Theory Vprina Lewandowski Assistant Professor Senior Personnel Condensed Matte Theory Vedro Schlottmann Professor Senior Personnel Condensed Matte Theory Vasoru Vasoru Professor Senior Personnel Theory Condensed Matte Theory Condensed Matte Theory Condensed Matte Theory Condensed Matte Theory <td>Sogoud Sherif</td> <td></td> <td>Graduate Student</td> <td>Condensed Matter /</td>	Sogoud Sherif		Graduate Student	Condensed Matter /
Ruojun WangGraduate Research AssistantGraduate StudentCondensed Matte TheoryDmitry ChichinadzePostdoctoral AssociatePostdocCondensed Matte TheoryAman KumarPostdoctoral Research AssociatePostdocCondensed Matte TheoryOguz TurkerPostdoctoral Research AssociatePostdocCondensed Matte TheoryPhong VoPostdoctoral AssociatePostdocCondensed Matte TheoryHitesh ChanglaniAssistant ProfessorSenior PersonnelCondensed Matte TheoryVladimir DobrosavljevicProfessor of PhysicsSenior PersonnelCondensed Matte TheoryChen HuangAssociate ProfessorSenior PersonnelCondensed Matte TheoryCyprian LewandowskiAssistant ProfessorSenior PersonnelCondensed Matte TheoryPedro SchlottmannProfessorSenior PersonnelCondensed Matte TheoryOskar VafekProfessorSenior PersonnelCondensed Matte TheoryXiaoyu WangVisiting Research Faculty, ISenior PersonnelCondensed Matte Theory	Keshav Singh		Graduate Student	Condensed Matter /
Dmitry ChichinadzePostdoctoral AssociatePostdocCondensed Matte TheoryAman KumarPostdoctoral Research AssociatePostdocCondensed Matte TheoryOguz TurkerPostdoctoral AssociatePostdocCondensed Matte TheoryPhong VoPostdoctoral AssociatePostdocCondensed Matte TheoryHitesh ChanglaniAssistant ProfessorSenior PersonnelCondensed Matte TheoryVladimir DobrosavljevicProfessor of PhysicsSenior PersonnelCondensed Matte TheoryChen HuangAssociate ProfessorSenior PersonnelCondensed Matte TheoryCyprian LewandowskiAssistant ProfessorSenior PersonnelCondensed Matte TheoryPedro SchlottmannProfessorSenior PersonnelCondensed Matte TheoryOskar VafekProfessorSenior PersonnelCondensed Matte TheoryXiaoyu WangVisiting Research Faculty, ISenior PersonnelCondensed Matte Theory	Ruojun Wang	Graduate Research Assistant	Graduate Student	Condensed Matter /
Aman KumarPostdoctoral Research AssociatePostdocCondensed Matte TheoryOguz TurkerPostdoctoral AssociatePostdocCondensed Matte TheoryPhong VoPostdoctoral AssociatePostdocCondensed Matte TheoryHitesh ChanglaniAssistant ProfessorSenior PersonnelCondensed Matte TheoryVladimir DobrosavljevicProfessor of PhysicsSenior PersonnelCondensed Matte TheoryChen HuangAssociate ProfessorSenior PersonnelCondensed Matte TheoryCyprian LewandowskiAssistant ProfessorSenior PersonnelCondensed Matte TheoryPedro SchlottmannProfessorSenior PersonnelCondensed Matte TheoryOskar VafekProfessorSenior PersonnelCondensed Matte TheoryXiaoyu WangVisiting Research Faculty, ISenior PersonnelCondensed Matte Theory	Dmitry Chichinadze	Postdoctoral Associate	Postdoc	Condensed Matter /
Oguz TurkerPostdoctoral AssociatePostdocCondensed Matte TheoryPhong VoPostdoctoral AssociatePostdocCondensed Matte TheoryHitesh ChanglaniAssistant ProfessorSenior PersonnelCondensed Matte TheoryVladimir DobrosavljevicProfessor of PhysicsSenior PersonnelCondensed Matte TheoryChen HuangAssociate ProfessorSenior PersonnelCondensed Matte TheoryCyprian LewandowskiAssistant ProfessorSenior PersonnelCondensed Matte TheoryPedro SchlottmannProfessorSenior PersonnelCondensed Matte TheoryOskar VafekProfessorSenior PersonnelCondensed Matte TheoryXiaoyu WangVisiting Research Faculty, ISenior PersonnelCondensed Matte TheoryCondensed MatteMatte TheoryTheoryOstar VafekProfessorSenior PersonnelCondensed Matte TheoryMatteProfessorSenior PersonnelCondensed Matte TheoryOstar VafekProfessorSenior PersonnelCondensed Matte TheoryMatteProfessorSenior PersonnelCondensed Matte TheoryMatteProfessorSenior PersonnelCondensed Matte TheoryMatteProfessorSenior PersonnelCondensed Matte TheoryMatteProfessorSenior PersonnelCondensed Matte TheoryMatteProfessorSenior PersonnelCondensed Matte TheoryMatteProfessorSenior PersonnelCondensed Matte Th	Aman Kumar	Postdoctoral Research Associate	Postdoc	Condensed Matter /
Phong VoPostdoctoral AssociatePostdocCondensed Matte TheoryHitesh ChanglaniAssistant ProfessorSenior PersonnelCondensed Matte TheoryVladimir DobrosavljevicProfessor of PhysicsSenior PersonnelCondensed Matte TheoryChen HuangAssociate ProfessorSenior PersonnelCondensed Matte TheoryCyprian LewandowskiAssistant ProfessorSenior PersonnelCondensed Matte TheoryPedro SchlottmannProfessorSenior PersonnelCondensed Matte TheoryOskar VafekProfessorSenior PersonnelCondensed Matte TheoryXiaoyu WangVisiting Research Faculty, ISenior PersonnelCondensed Matte Theory	Oguz Turker	Postdoctoral Associate	Postdoc	Condensed Matter /
Hitesh ChanglaniAssistant ProfessorSenior PersonnelCondensed Matte TheoryVladimir DobrosavljevicProfessor of PhysicsSenior PersonnelCondensed Matte TheoryChen HuangAssociate ProfessorSenior PersonnelCondensed Matte TheoryCyprian LewandowskiAssistant ProfessorSenior PersonnelCondensed Matte TheoryPedro SchlottmannProfessorSenior PersonnelCondensed Matte TheoryOskar VafekProfessorSenior PersonnelCondensed Matte TheoryXiaoyu WangVisiting Research Faculty, ISenior PersonnelCondensed Matte Theory	Phong Vo	Postdoctoral Associate	Postdoc	Condensed Matter /
Vladimir Dobrosavljevic Professor of Physics Senior Personnel Condensed Matte Theory Chen Huang Associate Professor Senior Personnel Condensed Matte Theory Cyprian Lewandowski Assistant Professor Senior Personnel Condensed Matte Theory Pedro Schlottmann Professor Senior Personnel Condensed Matte Theory Oskar Vafek Professor Senior Personnel Condensed Matte Theory Xiaoyu Wang Visiting Research Faculty, I Senior Personnel Condensed Matte Theory	Hitesh Changlani	Assistant Professor	Senior Personnel	Condensed Matter /
Chen Huang Associate Professor Senior Personnel Condensed Matte Theory Cyprian Lewandowski Assistant Professor Senior Personnel Condensed Matte Theory Pedro Schlottmann Professor Senior Personnel Condensed Matte Theory Oskar Vafek Professor Senior Personnel Condensed Matte Theory Xiaoyu Wang Visiting Research Faculty, I Senior Personnel Condensed Matte Theory	Vladimir Dobrosavljevic	Professor of Physics	Senior Personnel	Condensed Matter /
Cyprian Lewandowski Assistant Professor Senior Personnel Condensed Matte Theory Pedro Schlottmann Professor Senior Personnel Condensed Matte Theory Oskar Vafek Professor Senior Personnel Condensed Matte Theory Xiaoyu Wang Visiting Research Faculty, I Senior Personnel Condensed Matte Theory	Chen Huang	Associate Professor	Senior Personnel	Condensed Matter /
Pedro Schlottmann Professor Senior Personnel Condensed Matte Theory Oskar Vafek Professor Senior Personnel Condensed Matte Theory Xiaoyu Wang Visiting Research Faculty, I Senior Personnel Condensed Matte Theory	Cyprian Lewandowski	Assistant Professor	Senior Personnel	Condensed Matter /
Oskar Vafek Professor Senior Personnel Condensed Matte Theory Xiaoyu Wang Visiting Research Faculty, I Senior Personnel Condensed Matte Theory	Pedro Schlottmann	Professor	Senior Personnel	Condensed Matter /
Xiaoyu Wang Visiting Research Faculty, I Senior Personnel Condensed Matte Theory Condensed Matte Condensed Matte Condensed Matte Condensed Matte	Oskar Vafek	Professor	Senior Personnel	Condensed Matter /
Condensed Matte	Xiaoyu Wang	Visiting Research Faculty, I	Senior Personnel	Condensed Matter /
Kun Yang Professor of Physics Senior Personnel Theory	Kun Yang	Professor of Physics	Senior Personnel	Condensed Matter /
Theory	-		Graduate Student	Condensed Matter Science
	-	Research Assistant	Graduate Student	Condensed Matter Science
Faezeh Ahangarfirouzjaei Graduate Research Assistant Graduate Student Condensed Matter Sc	Faezeh Ahangarfirouzjaei	Graduate Research Assistant	Graduate Student	Condensed Matter Science
Yousef Alihosseini Graduate Research Assistant Graduate Student Condensed Matter Sc	Yousef Alihosseini	Graduate Research Assistant	Graduate Student	Condensed Matter Science
Nafiza Anjum Graduate Research Assistant Graduate Student Condensed Matter Sc	Nafiza Anjum	Graduate Research Assistant	Graduate Student	Condensed Matter Science
Ian Campbell Graduate Research Assistant Graduate Student Condensed Matter Sc	lan Campbell	Graduate Research Assistant	Graduate Student	Condensed Matter Science

Personnel

Name	Title	Personnel Category	Department
Andrew Cantrell	Graduate Research Assistant	Graduate Student	Condensed Matter Science
Briona Carswell	Graduate Research Assistant	Graduate Student	Condensed Matter Science
Bijay DC	Graduate Research Assistant	Graduate Student	Condensed Matter Science
Okunzuwa Ekuase	Graduate Research Assistant	Graduate Student	Condensed Matter Science
Paul Eugenio	Research Assistant	Graduate Student	Condensed Matter Science
Catherine Fabiano	Graduate Research Assistant	Graduate Student	Condensed Matter Science
Jorge Galeano Cabral	Graduate Research Assistant	Graduate Student	Condensed Matter Science
Jonathan Giraldo	Graduate Research Assistant	Graduate Student	Condensed Matter Science
Tyler Gregory	Graduate Research Assistant	Graduate Student	Condensed Matter Science
Arijit Gupta	Graduate Research Assistant	Graduate Student	Condensed Matter Science
Clemente Guzman	Graduate Research Assistant	Graduate Student	Condensed Matter Science
Md. Alamgir Hossain	Graduate Research Assistant	Graduate Student	Condensed Matter Science
Mikai Hulse	Graduate Research Assistant	Graduate Student	Condensed Matter Science
Mohammad Irfan	Graduate Research Assistant	Graduate Student	Condensed Matter Science
Toshiaki Kanai	Graduate Research Assistant	Graduate Student	Condensed Matter Science
Mehmet Kaplan	Graduate Research Assistant	Graduate Student	Condensed Matter Science
Shyam Raj Karullithodi	Graduate Research Assistant	Graduate Student	Condensed Matter Science
Sangsoo Kim	Graduate Research Assistant	Graduate Student	Condensed Matter Science
Matthew Kurilich	Graduate Research Assistant	Graduate Student	Condensed Matter Science
Victoria Li	Graduate Research Assistant	Graduate Student	Condensed Matter Science
Yating Mao	Graduate Research Assistant	Graduate Student	Condensed Matter Science
Masoud Mardani	Graduate Research Assistant	Graduate Student	Condensed Matter Science
Lingrui Mei	Graduate Research Assistant	Graduate Student	Condensed Matter Science
Adam Mooers	Research Assistant	Graduate Student	Condensed Matter Science
Alex Moon	Graduate Research Assistant	Graduate Student	Condensed Matter Science
Jennifer Neu	Graduate Research Assistant	Graduate Student	Condensed Matter Science
Olatunde Oladehin	Graduate Research Assistant	Graduate Student	Condensed Matter Science
Bal Pokharel	Graduate Research Assistant	Graduate Student	Condensed Matter Science
David Quashie Jr	Graduate Research Assistant	Graduate Student	Condensed Matter Science
Qutadah Rababah	Graduate Research Assistant	Graduate Student	Condensed Matter Science
Ahmad Raza	Graduate Research Assistant	Graduate Student	Condensed Matter Science
Milan Rede	Graduate Research Assistant	Graduate Student	Condensed Matter Science
Alexander Roubos	Graduate Research Assistant	Graduate Student	Condensed Matter Science
Govind Sasi Kumar	Graduate Research Assistant	Graduate Student	Condensed Matter Science

Name	Title	Personnel Category	Department
Annie Scutte	Research Assistant	Graduate Student	Condensed Matter Science
Leila Shahriari	Graduate Research Assistant	Graduate Student	Condensed Matter Science
Hossein Shiravi	Graduate Research Assistant	Graduate Student	Condensed Matter Science
Ayomide Sijuade	Research Assistant	Graduate Student	Condensed Matter Science
Colette Sullivan	Graduate Research Assistant	Graduate Student	Condensed Matter Science
Sergio Torino	Research Assistant	Graduate Student	Condensed Matter Science
Olalekan Usman	Graduate Research Assistant	Graduate Student	Condensed Matter Science
Parmit Virdi	Graduate Research Assistant	Graduate Student	Condensed Matter Science
Matthew Wadsworth	Graduate Research Assistant	Graduate Student	Condensed Matter Science
Yuxin Wang	Graduate Research Assistant	Graduate Student	Condensed Matter Science
Tsegai Yhdego	Graduate Research Assistant	Graduate Student	Condensed Matter Science
Amirhossein Zareihassangheshlaghi	Graduate Research Assistant	Graduate Student	Condensed Matter Science
Gabriel Brooks	Research Assistant	Graduate Student	Condensed Matter Science
Stephen Arce	Visiting Scientist/Researcher	Other Professional	Condensed Matter Science
Yan Li	Visiting Scientist/Researcher	Other Professional	Condensed Matter Science
Walter Njoroge	Visiting Scientist/Researcher	Other Professional	Condensed Matter Science
Lily Stanley	Graduate Research Assistant	Other Professional	Condensed Matter Science
Huixuan Wu	Research Assistant	Other Professional	Condensed Matter Science
Seyyed Shaho Alaviani	Postdoctoral Associate	Postdoc	Condensed Matter Science
Prateek Benhal	Postdoctoral Associate	Postdoc	Condensed Matter Science
Shantanu Chakraborty	Postdoctoral Associate	Postdoc	Condensed Matter Science
William Comaskey	Postdoctoral Associate	Postdoc	Condensed Matter Science
Songbin Cui	Postdoctoral Associate	Postdoc	Condensed Matter Science
Amr Elattar	Postdoctoral Associate	Postdoc	Condensed Matter Science
Pitchaimari Gnanasekar	Postdoctoral Associate	Postdoc	Condensed Matter Science
Sosuke Inui	Postdoctoral Associate	Postdoc	Condensed Matter Science
Jaideep Katuri	Postdoctoral Associate	Postdoc	Condensed Matter Science
Navneet kaur	Postdoctoral Associate	Postdoc	Condensed Matter Science
Shirin Mozaffari	Postdoctoral Associate	Postdoc	Condensed Matter Science
William Nelson	FSU Provost Postdoctoral Fellow	Postdoc	Condensed Matter Science
Gabriela Plautz Ratkovski	Postdoctoral Associate	Postdoc	Condensed Matter Science
Yinghe Qi	Postdoctoral Associate	Postdoc	Condensed Matter Science
Danilo Ratkovski	Visiting Scientist/Researcher	Postdoc	Condensed Matter Science
Jennifer Reid	Crow - Schuler Postdoctoral Fellow	Postdoc	Condensed Matter Science

Name	Title	Personnel Category	Department
Shivani Sharma	Postdoctoral Associate	Postdoc	Condensed Matter Science
Jasminka Terzic	Postdoctoral Associate	Postdoc	Condensed Matter Science
Yiming Xing	Postdoctoral Associate	Postdoc	Condensed Matter Science
Naipeng Zhang	Postdoctoral Associate	Postdoc	Condensed Matter Science
Garry Lawrence	Coordinator, Administrative Services	Senior Personnel	Condensed Matter Science
Thomas Albrecht-Schmitt	Professor	Senior Personnel	Condensed Matter Science
Jamel Ali	Assistant Professor	Senior Personnel	Condensed Matter Science
Petru Andrei	Associate Professor	Senior Personnel	Condensed Matter Science
Christianne Beekman	Associate Professor	Senior Personnel	Condensed Matter Science
Jianming Cao	Professor of Physics	Senior Personnel	Condensed Matter Science
Irinel Chiorescu	Professor	Senior Personnel	Condensed Matter Science
Hanwei Gao	Assistant Professor	Senior Personnel	Condensed Matter Science
Wei Guo	Professor	Senior Personnel	Condensed Matter Science
Jerome Irianto	Postdoctoral Associate	Senior Personnel	Condensed Matter Science
Vadym Kulichenko	Visiting Scientist/Researcher	Senior Personnel	Condensed Matter Science
Eric Lochner	Research Faculty II	Senior Personnel	Condensed Matter Science
Guangxin Ni	Assistant Professor	Senior Personnel	Condensed Matter Science
Lea Nienhaus	Assistant Professor	Senior Personnel	Condensed Matter Science
William Oates	Assistant Professor	Senior Personnel	Condensed Matter Science
Jin Gyu Park	Associate in Research	Senior Personnel	Condensed Matter Science
Subramanian Ramakrishnan	Associate Professor	Senior Personnel	Condensed Matter Science
John Schlueter	Visiting Scientist/Researcher	Senior Personnel	Condensed Matter Science
Mykhailo Shatruk	Assistant Professor	Senior Personnel	Condensed Matter Science
Theo Siegrist	Professor	Senior Personnel	Condensed Matter Science
Peng Xiong	Professor	Senior Personnel	Condensed Matter Science
Zhibin Yu	Assistant Professor	Senior Personnel	Condensed Matter Science
Changchun Zeng	Assistant Professor	Senior Personnel	Condensed Matter Science
Mei Zhang	Associate Professor	Senior Personnel	Condensed Matter Science
Nicholas Bonesteel	Professor of Physics	Senior Personnel	Condensed Matter Science
Mark Rynel Guarda	Research Assistant	Support Staff - Technical/Managerial	Condensed Matter Science
Robert Huber	Research Assistant	Support Staff - Technical/Managerial	Condensed Matter Science
Nicole Arca	Research Assistant	Undergraduate Student	Condensed Matter Science
Trevor Ard	Research Assistant	Undergraduate Student	Condensed Matter Science
Catalina Blanzaco	Undergraduate Research Assistant	Undergraduate Student	Condensed Matter Science

Name	Title	Personnel Category	Department
Tyler Boshaw	Research Assistant	Undergraduate Student	Condensed Matter Science
Pranathi Brungi	Undergraduate Research Assistant	Undergraduate Student	Condensed Matter Science
Juliana Castelli	Undergraduate Research Assistant	Undergraduate Student	Condensed Matter Science
Melanie Castro	Research Assistant	Undergraduate Student	Condensed Matter Science
Collin Chen	Undergraduate Research Assistant	Undergraduate Student	Condensed Matter Science
Michael Chonillo	Undergraduate Research Assistant	Undergraduate Student	Condensed Matter Science
Allison Cornelius	Research Assistant	Undergraduate Student	Condensed Matter Science
Sarah Dadey	Undergraduate Research Assistant	Undergraduate Student	Condensed Matter Science
Astrid Daugherty	Research Assistant	Undergraduate Student	Condensed Matter Science
Arianna Escalona	Research Assistant	Undergraduate Student	Condensed Matter Science
Nathaniel Falb	Research Assistant	Undergraduate Student	Condensed Matter Science
Ana Fernandez	Research Assistant	Undergraduate Student	Condensed Matter Science
Gary Germanton	Research Assistant	Undergraduate Student	Condensed Matter Science
Aaron Gonzalez	Undergraduate Research Assistant	Undergraduate Student	Condensed Matter Science
Ryan Goodson	Undergraduate Research Assistant	Undergraduate Student	Condensed Matter Science
Kiram Harrison	Research Assistant	Undergraduate Student	Condensed Matter Science
Noelle Horne	Undergraduate Research Assistant	Undergraduate Student	Condensed Matter Science
Sophie Jermyn	Research Assistant	Undergraduate Student	Condensed Matter Science
Brandee Jones	Research Assistant	Undergraduate Student	Condensed Matter Science
Izabela Kowalik	Research Assistant	Undergraduate Student	Condensed Matter Science
Denis Le	Research Assistant	Undergraduate Student	Condensed Matter Science
Damian Lopez	Undergraduate Research Assistant	Undergraduate Student	Condensed Matter Science
Amisha Martin	Research Assistant	Undergraduate Student	Condensed Matter Science
Naoum Mashraqi	Research Assistant	Undergraduate Student	Condensed Matter Science
Roshani Mehta	Research Assistant	Undergraduate Student	Condensed Matter Science
Rama Naem	Undergraduate Research Assistant	Undergraduate Student	Condensed Matter Science
Samuel Omeke	Research Assistant	Undergraduate Student	Condensed Matter Science
Damian Reed	Undergraduate Research Assistant	Undergraduate Student	Condensed Matter Science
Jordyn Riley	Undergraduate Research Assistant	Undergraduate Student	Condensed Matter Science
Lauren Roche	Undergraduate Intern	Undergraduate Student	Condensed Matter Science
Alexyss Savannah	Undergraduate Research Assistant	Undergraduate Student	Condensed Matter Science
Mary Jean Savitsky	Research Assistant	Undergraduate Student	Condensed Matter Science
Kaden Sesay	Undergraduate Research Assistant	Undergraduate Student	Condensed Matter Science
Sofia Sheffler	Research Assistant	Undergraduate Student	Condensed Matter Science

Name	Title	Personnel Category	Department
Taiwo Sogbesan	Research Assistant	Undergraduate Student	Condensed Matter Science
Jeffrey Telusmond	Undergraduate Summer Intern - Cryo Lab - Tech Support	Undergraduate Student	Condensed Matter Science
Sydney Tindall	Research Assistant	Undergraduate Student	Condensed Matter Science
Mariana Trujillo	Research Assistant	Undergraduate Student	Condensed Matter Science
Britney Vu	Undergraduate Research Assistant	Undergraduate Student	Condensed Matter Science
Qi Wang	Research Assistant	Undergraduate Student	Condensed Matter Science
Patrick Williams	Undergraduate Research Assistant	Undergraduate Student	Condensed Matter Science
Ty Wilson	Research Assistant	Undergraduate Student	Condensed Matter Science
Ingalls Witte	Undergraduate Research Assistant	Undergraduate Student	Condensed Matter Science
Amelia Workman	Research Assistant	Undergraduate Student	Condensed Matter Science
Lauren Yates	Undergraduate Research Assistant	Undergraduate Student	Condensed Matter Science
Vivienne Zacher	Undergraduate Research Assistant	Undergraduate Student	Condensed Matter Science
James Berhalter	Director of IT	Senior Personnel	CSG
Kyle Hawkins	Systems Administrator	Support Staff - Technical/Managerial	CSG
Gabriel O'Steen-Mann	Technical Support Analyst	Support Staff - Technical/Managerial	CSG
Andrew Rettig	Technical Support Analyst	Support Staff - Technical/Managerial	CSG
Mehak Ghafoor	Graduate Research Assistant	Graduate Student	DC Field CMS
Jason Kuszynski	Research Assistant	Graduate Student	DC Field CMS
Benny Schundelmier	Graduate Research Assistant	Graduate Student	DC Field CMS
Renee Luallen	Program Coordinator	Other Professional	DC Field CMS
Jeffrey Schiano	Visiting Researcher	Other Professional	DC Field CMS
Charuni Dissanayake	Postdoctoral Research Associate	Postdoc	DC Field CMS
Sang-Eon Lee	Research Assistant	Postdoc	DC Field CMS
Li Xiang	Postdoctoral Associate	Postdoc	DC Field CMS
Luis Balicas	Research Faculty III	Senior Personnel	DC Field CMS
Alimamy Bangura	Research Faculty II, User Technical Support Chief	Senior Personnel	DC Field CMS
Shermane Benjamin	Research Faculty I	Senior Personnel	DC Field CMS
Eun Sang Choi	Research Faculty III	Senior Personnel	DC Field CMS
Rong Cong	Research Faculty I	Senior Personnel	DC Field CMS
Lloyd Engel	Research Faculty III	Senior Personnel	DC Field CMS
David Graf	Research Faculty III	Senior Personnel	DC Field CMS
Jan Jaroszynski	Research Faculty III	Senior Personnel	DC Field CMS
Stephen McGill	Research Faculty III	Senior Personnel	DC Field CMS
Timothy Murphy	Director, DC Field Facility	Senior Personnel	DC Field CMS

Name	Title	Personnel Category	Department
Mykhaylo Ozerov	Research Faculty II	Senior Personnel	DC Field CMS
Dragana Popovic	Research Faculty III	Senior Personnel	DC Field CMS
Arneil Reyes	Research Faculty III	Senior Personnel	DC Field CMS
Dmitry Smirnov	Research Faculty III	Senior Personnel	DC Field CMS
Julia Smith	Research Faculty II	Senior Personnel	DC Field CMS
Alexey Suslov	Research Faculty III	Senior Personnel	DC Field CMS
Komalavalli Thirunavukkuarasu	Assistant Professor at FAMU	Senior Personnel	DC Field CMS
Stanley Tozer	Research Faculty III	Senior Personnel	DC Field CMS
Kaya Wei	Research Faculty I	Senior Personnel	DC Field CMS
Andrew Woods	Research Faculty I	Senior Personnel	DC Field CMS
Abigail Centers	Application Developer/Designer	Support Staff - Technical/Managerial	DC Field CMS
Sarah Bennett	Research Assistant	Undergraduate Student	DC Field CMS
Yanique Lawrence	Research Engineer	Other Professional	DC Instrumentation
James Powell	Electronics Engineer	Other Professional	DC Instrumentation
Eric Stiers	Research Engineer	Other Professional	DC Instrumentation
Mark Vanderlaan	Research Engineer, Cryogenic Operations	Other Professional	DC Instrumentation
Daniel McIntosh	Scientific Research Specialist	Other Professional	DC Instrumentation
Jonathan Melendez	Technical/Research Designer	Other Professional	DC Instrumentation
Edward Rubes	Research Engineer	Other Professional	DC Instrumentation
Heinrich Boenig	Engineer	Other Professional	DC Instrumentation
Troy Brumm	User Technical Support	Other Professional	DC Instrumentation
Glover Jones	Scientific Research Specialist	Other Professional	DC Instrumentation
Scott Maier	Scientific Research Specialist	Other Professional	DC Instrumentation
Clyde Martin	Scientific Research Specialist	Other Professional	DC Instrumentation
Robert Nowell	Scientific Research Specialist	Other Professional	DC Instrumentation
Dmitry Semenov	Scientific Research Specialist	Other Professional	DC Instrumentation
Scott Hannahs	Director for Scientific Instrumentation and Operations	Senior Personnel	DC Instrumentation
Larry Gordon	Control Room Operator	Support Staff - Technical/Managerial	DC Instrumentation
Michael Hicks	Technical/Research Designer	Support Staff - Technical/Managerial	DC Instrumentation
Joel Piotrowski	Control Room Operator	Support Staff - Technical/Managerial	DC Instrumentation
Christopher Thomas	Control Room Operator	Support Staff - Technical/Managerial	DC Instrumentation
Robert Carrier	Technical/Research Designer	Support Staff - Technical/Managerial	DC Instrumentation
Daniel Freeman	Technical/Research Designer	Support Staff - Technical/Managerial	DC Instrumentation
Jesus Torres Camacho	Technical/Research Designer	Support Staff - Technical/Managerial	DC Instrumentation

Name	Title	Personnel Category	Department
William Brehm	Technician/Research Designer	Support Staff - Technical/Managerial	DC Instrumentation
David Sloan	Technician/Research Designer	Support Staff - Technical/Managerial	DC Instrumentation
Lauren Miller	Receptionist	Other Professional	Director's Office
Colleen Ochat	Engagement Manager	Other Professional	Director's Office
Lezlee Richerson	Administrative Specialist	Other Professional	Director's Office
Anke Toth	User Chief of Staff	Other Professional	Director's Office
Norman Anderson	VP Research	Senior Personnel	Director's Office
Mark Bird	MagLab Chief Technology Officer	Senior Personnel	Director's Office
Gregory Boebinger	Director, Professor of Physics	Senior Personnel	Director's Office
Eric Palm	Deputy Lab Director	Senior Personnel	Director's Office
Bettina Roberson	Assistant Director, Administrative Services	Senior Personnel	Director's Office
Albert Migliori	Staff Member and LANL Fellow	Senior Personnel	Director's Office
Michael Tentnowski	Licensing Manager, FSU	Support Staff - Technical/Managerial	Director's Office
Fiorella Mejia	Receptionist	Undergraduate Student	Director's Office
Holly Sacca	Receptionist	Undergraduate Student	Director's Office
Shubham Bisht	Graduate Research Assistant	Graduate Student	EMR
Wei-Hao Chou	Graduate Research Assistant	Graduate Student	EMR
Miguel Gakiya	Graduate Research Assistant	Graduate Student	EMR
Brittany Grimm	Graduate Research Assistant	Graduate Student	EMR
Manoj Vinayaka Hanabe Subramanya	Graduate Research Assistant	Graduate Student	EMR
Robert Stewart	Graduate Research Assistant	Graduate Student	EMR
Sandugash Yergeshbayeva	Graduate Research Assistant	Graduate Student	EMR
Bianca Trociewitz	Research Engineer	Other Professional	EMR
Ferdous Ara	Postdoctoral Associate	Postdoc	EMR
Jakub Hrubý	Postdoctoral Associate	Postdoc	EMR
Krishnendu Kundu	Postdoctoral Associate	Postdoc	EMR
Naresh Dalal	Professor of Chemistry	Senior Personnel	EMR
Thierry Dubroca	Research Faculty I	Senior Personnel	EMR
Piotr Fajer	Professor	Senior Personnel	EMR
Stephen Hill	Distinguished Research Professor - EMR Director	Senior Personnel	EMR
Jurek Krzystek	Research Faculty III	Senior Personnel	EMR
Tomas Orlando	Research Faculty I	Senior Personnel	EMR
Andrzej Ozarowski	Research Faculty III	Senior Personnel	EMR
Likai Song	Research Faculty II	Senior Personnel	EMR

Personnel

Name	Title	Personnel Category	Department
Sebastian Stoian	Assistant Professor	Senior Personnel	EMR
Johan van Tol	Research Faculty III	Senior Personnel	EMR
Maria Carla Gonzalez Paz	Intern	Undergraduate Student	EMR
Lapadre Proctor	Intern FSU	Undergraduate Student	EMR
Ibukunolu Shofolu	Intern	Undergraduate Student	EMR
Ashleigh Bolstridge	Coordinator, Environmental Health & Safety	Other Professional	Environmental, Health, Safety and Security
Alfie Brown	Industrial Safety & Health Eng	Other Professional	Environmental, Health, Safety and Security
Cody Burch	Critical Systems Controls Tech	Other Professional	Environmental, Health, Safety and Security
Andrew Davis	Asst Chemical Safety Officer	Other Professional	Environmental, Health, Safety and Security
Tom Deckert	Building Code, Assistant Director Environmental Health & Safety Campus	Other Professional	Environmental, Health, Safety and Security
Laymon Gray	Associate Director Safety & Security	Other Professional	Environmental, Health, Safety and Security
William Hill	Director of LAR	Other Professional	Environmental, Health, Safety and Security
Mark Klawinski	Industrial Hygienist	Other Professional	Environmental, Health, Safety and Security
Richard Le	Biological Safety Officer	Other Professional	Environmental, Health, Safety and Security
Neely Lewis	Building Code Inspector	Other Professional	Environmental, Health, Safety and Security
Jason Marconnet	Industrial Hygienist	Other Professional	Environmental, Health, Safety and Security
Renee Murray	Chemical Safety Officer	Other Professional	Environmental, Health, Safety and Security
Christopher Rodman	Industrial Safety & Health Eng.	Other Professional	Environmental, Health, Safety and Security
Sam Sevor	Fire Safety Coordinator	Other Professional	Environmental, Health, Safety and Security
Laurie Whetstone	Quality Control Program Coord	Other Professional	Environmental, Health, Safety and Security
Jaime White-James	Assistant Director, Laboratory Animal Resources	Other Professional	Environmental, Health, Safety and Security
Marvin Woods	Assistant Director of Research Support	Other Professional	Environmental, Health, Safety and Security
Amy Allen	Radiation Safety Officer (RSO)	Senior Personnel	Environmental, Health, Safety and Security
Marisha Ash	Assistant Lab Safety Officer	Senior Personnel	Environmental, Health, Safety and Security
Mary Creason	Fire Code Inspector	Senior Personnel	Environmental, Health, Safety and Security
Jean Jacques	Assoc Biological Safety Officer	Senior Personnel	Environmental, Health, Safety and Security
William Jessie	Industrial Health & Safety Technician	Senior Personnel	Environmental, Health, Safety and Security
Alex Masterton	Electrical Building Inspector.	Senior Personnel	Environmental, Health, Safety and Security
Raymond Allen	FSU Fire Tech	Support Staff - Technical/Managerial	Environmental, Health, Safety and Security
Carol Andresen	Radiation Safety Technician	Support Staff - Technical/Managerial	Environmental, Health, Safety and Security
Benjamin Arline	Asst Chem Safety Officer	Support Staff -	Environmental, Health,
Sara Bell	Asst. Lab Animal Technician	Technical/Managerial Support Staff - Technical/Managerial	Safety and Security Environmental, Health, Safety and Security

Name	Title	Personnel Category	Department
Thomas Brasher	Fire Systems Technician	Support Staff - Technical/Managerial	Environmental, Health, Safety and Security
Rodney Brimm	Asst. Lab Animal Technician	Support Staff -	Environmental, Health,
		Technical/Managerial Support Staff -	Safety and Security Environmental, Health,
Crystal Brown	Assistant Lab Animal tech	Technical/Managerial	Safety and Security
Charles Coshatt	Assistant Animal Lab Tech	Support Staff - Technical/Managerial	Environmental, Health, Safety and Security
Darren Dime	FSU Fire Tech	Support Staff - Technical/Managerial	Environmental, Health, Safety and Security
Lauren Dunlap	assistant animal care technician	Support Staff -	Environmental, Health,
-		Technical/Managerial Support Staff -	Safety and Security Environmental, Health,
Stephen Dyal	Critical Systems Technician IH & Indoor Air Qual Program	Technical/Managerial Support Staff -	Safety and Security Environmental, Health,
Jeffrey Feinberg	Manager	Technical/Managerial	Safety and Security
Corey Furbee	Fire Tech	Support Staff - Technical/Managerial	Environmental, Health, Safety and Security
Matt Howell	Fire Systems Technician	Support Staff -	Environmental, Health,
Savadahaahar Mahammadi	-	Technical/Managerial Support Staff -	Safety and Security Environmental, Health,
Seyedehsahar Mohammadi	Industrial Safety Hygienist	Technical/Managerial Support Staff -	Safety and Security Environmental, Health,
Jason Nipper	lab animal technologist	Technical/Managerial	Safety and Security
Aaron Nobles	Assistant Laboratory Animals Technician	Support Staff - Technical/Managerial	Environmental, Health, Safety and Security
Johnathan Parker	Critical Systems	Support Staff -	Environmental, Health,
		Technical/Managerial Support Staff -	Safety and Security Environmental, Health,
Forrest Perry	Assistant Radiation Safety Officer	Technical/Managerial Support Staff -	Safety and Security Environmental, Health,
Curt Rogers	EHS Fire Tech	Technical/Managerial	Safety and Security
Chad Shillito	Lab Animal Tech	Support Staff - Technical/Managerial	Environmental, Health, Safety and Security
Christian Strickland	Chemical Safety Technician	Support Staff -	Environmental, Health,
Jason Watford	Laboratory Safety Specialist	Technical/Managerial Support Staff -	Safety and Security Environmental, Health,
		Technical/Managerial Support Staff -	Safety and Security Environmental, Health,
Thomas Williams	Critical Systems Technician	Technical/Managerial	Safety and Security
Dea Arenth	Preventative Maintenance Tech	Other Professional	Facilities
Tra Hunter	Plant Engineer	Other Professional	Facilities
James Kalnin	Facilities Specialist	Other Professional	Facilities
Joshua Robertson	Preventative Maintenance Tech	Other Professional	Facilities
Marshall Wood	Facilities Electrical Supervisor	Other Professional	Facilities
Ben Grant	Area Manager	Senior Personnel	Facilities
John Kynoch	Department Head & Mechanical Engineer	Senior Personnel	Facilities
Marsha Jones	Administrative Specialist	Support Staff - Secretarial/Clerical	Facilities
Matthew Anderson	Sr. Rotary Equipment Technician	Support Staff - Technical/Managerial	Facilities
David Barnes	Electrician	Support Staff - Technical/Managerial	Facilities
Jamari Bennett	Maintenance Technician	Support Staff - Technical/Managerial	Facilities
Jerel Braun	Controls Technician	Support Staff - Technical/Managerial	Facilities
Kenneth Braverman	Mechanical Engineer Tech.	Support Staff - Technical/Managerial	Facilities

Name	Title	Personnel Category	Department
Marques Buggs	General Maintenance Tech	Support Staff - Technical/Managerial	Facilities
Melbin Cannon	Rotary Equipment Technician	Support Staff - Technical/Managerial	Facilities
Tyler Carrier	Maintenance Technician	Support Staff - Technical/Managerial	Facilities
Marcela Castano	Maintenance Engineer	Support Staff - Technical/Managerial	Facilities
Ricado Ceasor	Pipe Shop Tech	Support Staff - Technical/Managerial	Facilities
Douglas Clemons	Rotary Tech	Support Staff - Technical/Managerial	Facilities
Darrell Colvin	Mechanical Tech	Support Staff - Technical/Managerial	Facilities
Russ Cooper	Senior Electrician FSU Campus	Support Staff - Technical/Managerial	Facilities
Daniel Daughtry	Plumber	Support Staff - Technical/Managerial	Facilities
Larry English	Pipe Fitter/Welder	Support Staff - Technical/Managerial	Facilities
Brian Fienemann	Plumber	Support Staff - Technical/Managerial	Facilities
Christopher Furst	Preventative Maintenance Tech	Support Staff - Technical/Managerial	Facilities
Kevin Gamble	Facilities Superintendent	Support Staff - Technical/Managerial	Facilities
Michael Hamill	Plumber	Support Staff - Technical/Managerial	Facilities
Marc Helton	Fountain Maintenance Tech	Support Staff - Technical/Managerial	Facilities
Wayne Hemighaus	Controls Technician	Support Staff - Technical/Managerial	Facilities
Quentin Hines	Electrician	Support Staff - Technical/Managerial	Facilities
Mark Hosey	pest control technician	Support Staff - Technical/Managerial	Facilities
Jonathon Howell	Controls/HVAC Technician	Support Staff - Technical/Managerial	Facilities
Micheal Ivester	Maintenance Technician	Support Staff - Technical/Managerial	Facilities
Christopher Jackson	Maintenance Tech.	Support Staff - Technical/Managerial	Facilities
Steve Johnson	Maintenance Mechanic	Support Staff - Technical/Managerial	Facilities
Sylvonta Johnson	Maintenance Technician	Support Staff - Technical/Managerial	Facilities
Danny Lesley	Plumber	Support Staff - Technical/Managerial	Facilities
Ermal Liko	Welder	Support Staff - Technical/Managerial	Facilities
Ronald McKenzie	Mechanical Research Assistant	Support Staff - Technical/Managerial	Facilities
William Morgan	Maintenance Technician	Support Staff - Technical/Managerial	Facilities
Michael Ochat	General Trades Technician	Support Staff - Technical/Managerial	Facilities
Christopher Oxendine	Engineering Technician / Designer	Support Staff - Technical/Managerial	Facilities
Don Pagel	Maintenance Mechanic	Support Staff - Technical/Managerial	Facilities
Eric Perkins	Critical Systems Shop Supervisor	Support Staff - Technical/Managerial	Facilities
Billy Phinazee	Maintenance Mechanic	Support Staff - Technical/Managerial	Facilities

Name	Title	Personnel Category	Department
Ryan Porter	Maintenance Supervisor	Support Staff - Technical/Managerial	Facilities
Daniel Preston	Maintenance Mechanic	Support Staff - Technical/Managerial	Facilities
Becky Price	Network Architect	Support Staff - Technical/Managerial	Facilities
Biff Quarles	FSU Facilities PM	Support Staff - Technical/Managerial	Facilities
Greg Richardson	Rotary Equipment Technician	Support Staff - Technical/Managerial	Facilities
Andre Rollison	Maintenance Mechanic	Support Staff - Technical/Managerial	Facilities
Verbon Scott	Plumber	Support Staff - Technical/Managerial	Facilities
James Shinn	Control Tech	Support Staff - Technical/Managerial	Facilities
Rodney Shreve	Industrial Engineer	Support Staff - Technical/Managerial	Facilities
Brian Steiner	Preventative Maintenance Tech	Support Staff - Technical/Managerial	Facilities
Dustin Stevens	Mechanical Trades Technician	Support Staff - Technical/Managerial	Facilities
Jeffery Sutton	Maintenance Technician	Support Staff - Technical/Managerial	Facilities
Monroe Walker	Network Specialist	Support Staff - Technical/Managerial	Facilities
Cary Winkler	Controls / Alarm Systems Technician	Support Staff - Technical/Managerial	Facilities
Aaron Young	Engineer Technician	Support Staff - Technical/Managerial	Facilities
Lindsi Allman	Graduate Research Assistant	Graduate Student	Geochemistry
Gwen Barnes	Graduate Research Assistant	Graduate Student	Geochemistry
Samantha Bosman	Graduate Research Assistant	Graduate Student	Geochemistry
Stephen Clapp	Graduate Research Assistant	Graduate Student	Geochemistry
Taylor Conklin	Graduate Research Assistant	Graduate Student	Geochemistry
Brittany Duffey	Graduate Research Assistant	Graduate Student	Geochemistry
Nathaniel Evenson	Graduate Research Assistant	Graduate Student	Geochemistry
Gary Fowler	Graduate Research Assistant	Graduate Student	Geochemistry
Christian Gfatter	Graduate Research Assistant	Graduate Student	Geochemistry
John Goodin	Graduate Research Assistant	Graduate Student	Geochemistry
Jade Greene	Graduate Research Assistant	Graduate Student	Geochemistry
Chance Hannold	Graduate Research Assistant	Graduate Student	Geochemistry
Amy Holt	Graduate Research Assistant	Graduate Student	Geochemistry
Mimi Kelsey	Laboratory Assistant / Technician	Graduate Student	Geochemistry
Martin Kurek	Graduate Research Assistant	Graduate Student	Geochemistry
Mahdi Maaleki moghadam	Graduate Research Assistant	Graduate Student	Geochemistry
Neda Mobasher	Graduate Research Assistant	Graduate Student	Geochemistry
Luis Rodriguez	Graduate Research Assistant	Graduate Student	Geochemistry
Maya Roselli	Undergraduate Research Assistant	Graduate Student	Geochemistry

Name	Title	Personnel Category	Department
Sayantan Saha	Graduate Research Assistant	Graduate Student	Geochemistry
Kanwa Sengupta	Graduate Research Assistant	Graduate Student	Geochemistry
Riley Thomason	Graduate Research Assistant	Graduate Student	Geochemistry
Yin Zhang	Graduate Research Assistant	Graduate Student	Geochemistry
Anwen Zhou	Graduate Research Assistant	Graduate Student	Geochemistry
Gary White	Scientific Research Specialist	Other Professional	Geochemistry
Gokhan Hacisalihoglu	Professor	Postdoc	Geochemistry
Anne Kellerman	Postdoctoral Associate	Postdoc	Geochemistry
Alyssa Atwood	Assistant Professor	Senior Personnel	Geochemistry
Jeff Chanton	Professor	Senior Personnel	Geochemistry
Philip Froelich	Research Faculty III	Senior Personnel	Geochemistry
William Landing	Professor	Senior Personnel	Geochemistry
Peter Morton	Visiting Assistant In Research	Senior Personnel	Geochemistry
Leroy Odom	Professor of Geology	Senior Personnel	Geochemistry
Jeremy Owens	Assistant Professor	Senior Personnel	Geochemistry
Vincent Salters	Professor and Director, Geochemistry Program	Senior Personnel	Geochemistry
Robert Spencer	Assistant Professor	Senior Personnel	Geochemistry
Emily Stewart	Assistant Professor	Senior Personnel	Geochemistry
Michael Stukel	Assistant Professor	Senior Personnel	Geochemistry
Yang Wang	Professor	Senior Personnel	Geochemistry
Burt Wolff	Assistant in Research	Senior Personnel	Geochemistry
Seth Young	Assistant Professor	Senior Personnel	Geochemistry
Theodore Zateslo	Senior Engineer	Support Staff - Technical/Managerial	Geochemistry
Alvin Haire	Office Assistant	Undergraduate Student	Geochemistry
Isabelle Barta	Undergraduate Research Assistant	Undergraduate Student	Geochemistry
Ranjit Chandra Das	Graduate Research Assistant	Graduate Student	Gypsum/Rare Earth
Muhammad Garba	Graduate Research Assistant	Graduate Student	Gypsum/Rare Earth
Bailey Lake	Graduate Research Assistant	Graduate Student	Gypsum/Rare Earth
Aidan Lowery	Graduate Research Assistant	Graduate Student	Gypsum/Rare Earth
Alwell Nwachukwu	Graduate Student Researcher	Graduate Student	Gypsum/Rare Earth
Steffanie Sillitoe-Kukas	Graduate Research Assistant	Graduate Student	Gypsum/Rare Earth
Jacqueline Kornegay	Program Manager	Other Professional	Gypsum/Rare Earth
Frank Pugh	Project Manager	Other Professional	Gypsum/Rare Earth
Eisa Khwaja	Laboratory Assistant-Level 2	Other Professional	Gypsum/Rare Earth

Name	Title	Personnel Category	Department
Donald Hendrix	Postdoctoral Associate	Postdoc	Gypsum/Rare Earth
Mohd Khan	Postdoctoral Associate	Postdoc	Gypsum/Rare Earth
Junhee Park	Postdoctoral Associate	Postdoc	Gypsum/Rare Earth
Peter Rassolov	Postdoctoral Associate	Postdoc	Gypsum/Rare Earth
Mahmoud Sherif	Postdoctoral Associate	Postdoc	Gypsum/Rare Earth
Adrienn Szucs	Postdoctoral Associate	Postdoc	Gypsum/Rare Earth
Shuying Yang	Postdoctoral Associate	Postdoc	Gypsum/Rare Earth
Munir Humayun	Professor	Senior Personnel	Gypsum/Rare Earth
Jeffrey Whalen	Research Faculty I	Senior Personnel	Gypsum/Rare Earth
Raiona Collins	Laboratory Assistant / Technician	Support Staff - Technical/Managerial	Gypsum/Rare Earth
Anthony Igboanugo	Technician	Support Staff - Technical/Managerial	Gypsum/Rare Earth
Jane Wadhams	Undergraduate Research Assistant	Support Staff - Technical/Managerial	Gypsum/Rare Earth
Stefano Cardenas	Research Assistant	Undergraduate Student	Gypsum/Rare Earth
Nicholas Carlstedt	Research Assistant	Undergraduate Student	Gypsum/Rare Earth
Valeria Santos Gonzalez	Research Assistant	Undergraduate Student	Gypsum/Rare Earth
Holly Stafford	Administrative Specialist	Other Professional	Human Resources
Nyah Billups	Momentum Scholar Intern	Undergraduate Student	Human Resources
Binda Andongma	Graduate Research Assistant	Graduate Student	ICR
Benhur Asefaw	Graduate Research Assistant	Graduate Student	ICR
Grisel Fierros Romero	Graduate Research Assistant	Graduate Student	ICR
Brittany Lindsay	Graduate Research Assistant	Graduate Student	ICR
Dennis Ssekimpi	Graduate Research Assistant	Graduate Student	ICR
Ermias Tesfamariam	Graduate Research Assistant	Graduate Student	ICR
Jie Lu	Assistant in Research	Other Professional	ICR
John Quinn	Research Engineer	Other Professional	ICR
Lydia Babcock-Adams	Postdoctoral Associate	Postdoc	ICR
Taylor Glattke	Graduate Research Assistant	Postdoc	ICR
Lissa Anderson	Research Faculty II	Senior Personnel	ICR
Gregory Blakney	Research Faculty II	Senior Personnel	ICR
David Butcher	Research Faculty I	Senior Personnel	ICR
Martha Chacon Patino	Research Faculty I	Senior Personnel	ICR
Huan Chen	Research Faculty II	Senior Personnel	ICR
Christopher Hendrickson	Research Faculty III/Director of ICR Program	Senior Personnel	ICR
Alan Marshall	Professor, Chief Scientist for Ion Cyclotron Resonance (ICR) and	Senior Personnel	ICR

Name	Title	Personnel Category	Department
	Robert O. Lawton Distinguished Professor of Chemistry		
Amy McKenna	Research Faculty III	Senior Personnel	ICR
Ryan Rodgers	Research Faculty III	Senior Personnel	ICR
Chad Weisbrod	Research Faculty II	Senior Personnel	ICR
Krista Jemmott	Program Associate	Support Staff - Secretarial/Clerical	ICR
Joseph Frye-Jones	Graduate Research Assistant	Support Staff - Technical/Managerial	ICR
Christopher Holder Montenegro	Graduate Research Assistant	Support Staff - Technical/Managerial	ICR
Daniel Lowenstein	Technician	Support Staff - Technical/Managerial	ICR
Shahid Sher	Technician	Support Staff - Technical/Managerial	ICR
Alvaro Tello Rodriguez	Technician	Support Staff - Technical/Managerial	ICR
Alireza Abbasi	Research Assistant	Graduate Student	Magnet Science & Technology
Danyale Berry	Graduate Research Assistant	Graduate Student	Magnet Science & Technology
Xingchi Chen	Graduate Research Assistant	Graduate Student	Magnet Science & Technology
Ana De Leon	Research Assistant	Graduate Student	Magnet Science & Technology
Cecil Evers	Research Assistant	Graduate Student	Magnet Science & Technology
Catherine Fidd	Graduate Research Assistant	Graduate Student	Magnet Science & Technology
Sarajeen Saima Hoque	Graduate Research Assistant	Graduate Student	Magnet Science & Technology
Zahraa Khamis	Laboratory Assistant / Technician	Graduate Student	Magnet Science & Technology
He Liu	Laboratory Assistant / Technician	Graduate Student	Magnet Science & Technology
Terrencia Martin	Research Assistant	Graduate Student	Magnet Science & Technology
Aspen Reyes	Graduate Research Assistant	Graduate Student	Magnet Science & Technology
Omar Taleb	Microscopist	Graduate Student	Magnet Science & Technology
Mehul Tank	Graduate Research Assistant	Graduate Student	Magnet Science & Technology
Peng Wang	Laboratory Assistant / Technician	Graduate Student	Magnet Science & Technology
Haoyang Liu	Laboratory Assistant / Technician	Graduate Student	Magnet Science & Technology
Lindsay Eaton	Senior Administrative Specialist	Other Professional	Magnet Science & Technology
Todd Adkins	Mechanical Engineering & Design Group Lead	Other Professional	Magnet Science & Technology
Matthew Belton	Research Engineer	Other Professional	Magnet Science & Technology
Kurtis Cantrell	Engineer	Other Professional	Magnet Science & Technology
Scott Gundlach	Engineer	Other Professional	Magnet Science & Technology
Emsley Marks	Research Engineer	Other Professional	Magnet Science & Technology
Dharmendra Prasad Shukla	Postdoctoral Associate	Other Professional	Magnet Science & Technology
Vince Toplosky	Scientific Research Specialist	Other Professional	Magnet Science & Technology

Name	Title	Personnel Category	Department
James White	Research Engineer	Other Professional	Magnet Science & Technology
Murray Gibson	Visiting Scientist/Researcher	Other Professional	Magnet Science & Technology
Aniket Ingrole	Research Assistant	Other Professional	Magnet Science & Technology
Erick Arroyo	Research Engineer	Other Professional	Magnet Science & Technology
Jeffrey Jarvis	Technician	Other Professional	Magnet Science & Technology
James O'Reilly	Technician	Other Professional	Magnet Science & Technology
Robert Stanton	Research Engineer	Other Professional	Magnet Science & Technology
Bruno Batista	Laboratory Assistant / Technician	Postdoc	Magnet Science & Technology
Sanjay Kumar Devendhar Singh	Postdoctoral Associate	Postdoc	Magnet Science & Technology
Natalie Arnett	Associate Professor	Senior Personnel	Magnet Science & Technology
Hongyu Bai	Research Faculty II	Senior Personnel	Magnet Science & Technology
lain Dixon	Research Faculty III	Senior Personnel	Magnet Science & Technology
Greg Erickson	Biology Professor	Senior Personnel	Magnet Science & Technology
Andrey Gavrilin	Research Faculty III	Senior Personnel	Magnet Science & Technology
Ke Han	Research Faculty III	Senior Personnel	Magnet Science & Technology
Kwangmin Kim	Research Faculty I	Senior Personnel	Magnet Science & Technology
Jun Lu	Research Faculty III	Senior Personnel	Magnet Science & Technology
Keyou Mao	Microscopist	Senior Personnel	Magnet Science & Technology
William Markiewicz	Research Faculty III	Senior Personnel	Magnet Science & Technology
William Marshall	Sr. Research Associate	Senior Personnel	Magnet Science & Technology
Hannah Matos Pimentel	Assistant In Research	Senior Personnel	Magnet Science & Technology
Rongmei Niu	Associate in Research	Senior Personnel	Magnet Science & Technology
Thomas Painter	Interim Director of MS&T	Senior Personnel	Magnet Science & Technology
Yu Suetomi	Research Faculty I	Senior Personnel	Magnet Science & Technology
Rebekah Sweat	Assistant in Industrial and Manufacturing Engineering	Senior Personnel	Magnet Science & Technology
Jack Toth	Research Faculty III, Resistive Magnet Program Leader	Senior Personnel	Magnet Science & Technology
Steven Van Sciver	Emeritus Professor	Senior Personnel	Magnet Science & Technology
Yan Xin	Research Faculty III	Senior Personnel	Magnet Science & Technology
Al Zeller	Visiting Scientist/Researcher	Senior Personnel	Magnet Science & Technology
Raymond Cone	Maintenance Mechanic	Support Staff - Technical/Managerial	Magnet Science & Technology
Christopher Ray	Research Engineer	Support Staff - Technical/Managerial	Magnet Science & Technology
Justin Deterding	Research Engineer	Support Staff - Technical/Managerial	Magnet Science & Technology

Name	Title	Personnel Category	Department
Jeremy Levitan	Research Engineer	Support Staff - Technical/Managerial	Magnet Science & Technology
Joseph Lucia	Welder/Technician	Support Staff - Technical/Managerial	Magnet Science & Technology
Joshua Nguyen	Technician	Support Staff - Technical/Managerial	Magnet Science & Technology
Amari Garrett	Research Assistant	Undergraduate Student	Magnet Science & Technology
Aruoture Egoh	Laboratory Assistant / Technician	Undergraduate Student	Magnet Science & Technology
Aliya Hutley	Research Assistant	Undergraduate Student	Magnet Science & Technology
Pavan Polisetty	Research Assistant	Undergraduate Student	Magnet Science & Technology
Tunde Shonde	Laboratory Assistant / Technician	Undergraduate Student	Magnet Science & Technology
Kaylee Thagard	Laboratory Assistant / Technician	Undergraduate Student	Magnet Science & Technology
John Sorensen	Laboratory Assistant / Technician	Undergraduate Student	Magnet Science & Technology
Alexander Rowney	Program Manager	Other Professional	Management and Administration
Andrew Sapronetti	Administrative Specialist	Other Professional	Management and Administration
Debra Booth	Business Systems Director	Senior Personnel	Management and Administration
Laura Greene	Chief Scientist	Senior Personnel	Management and Administration
David Lunger	Project Manager	Senior Personnel	Management and Administration
Scott Hermance	Campus Service Assistant	Support Staff - Secretarial/Clerical	Management and Administration
Christina Wackes	Administrative Specialist	Support Staff - Secretarial/Clerical	Management and Administration
Skylar Wilhoit	Administrative Assistant	Support Staff - Secretarial/Clerical	Management and Administration
William Barker	Campus Service Assistant	Support Staff - Technical/Managerial	Management and Administration
Arshia Arbabian	Graduate Research Assistant	Graduate Student	NMR
Jamini Bhagu	Graduate Research Assistant	Graduate Student	NMR
Hannah Bryant	Undergraduate Research Assistant	Graduate Student	NMR
Zachary Dowdell	Graduate Research Assistant	Graduate Student	NMR
Jiaxing Fan	Graduate Research Assistant	Graduate Student	NMR
Carl Fleischer III	Graduate Student	Graduate Student	NMR
Blaine Gordon	Graduate Research Assistant	Graduate Student	NMR
Wenhao Hu	Graduate Research Assistant	Graduate Student	NMR
Yongkang Jin	Graduate Research Assistant	Graduate Student	NMR
James Kimball	Graduate Research Assistant	Graduate Student	NMR
Tej Poudel	Graduate Research Assistant	Graduate Student	NMR
Jenna Radovich	Undergraduate Student	Graduate Student	NMR
Dayna Richter	Graduate Research Assistant	Graduate Student	NMR
Anamika Roy	Graduate Research Assistant	Graduate Student	NMR

Name	Title	Personnel Category	Department
Jazmine Sanchez	Graduate Research Assistant	Graduate Student	NMR
Alfredo Scigliani	Graduate Research Assistant	Graduate Student	NMR
Robert Smith	Graduate Student	Graduate Student	NMR
Sara Termos	Graduate Research Assistant	Graduate Student	NMR
Erica Truong	Graduate Research Assistant	Graduate Student	NMR
Jason Kitchen	NMR Engineer	Other Professional	NMR
Steven Ranner	Research Engineer	Other Professional	NMR
Kimberly Mozolic	Sr Administrative Specialist	Other Professional	NMR
Debasmita Banerjee	Graduate Research Assistant	Postdoc	NMR
Yudan Chen	Postdoctoral Associate	Postdoc	NMR
Malitha Dickwella Widanage	Postdoctoral Associate	Postdoc	NMR
Pradeepraj Durairaj	Postdoctoral Associate	Postdoc	NMR
Sean Holmes	Postdoctoral Associate	Postdoc	NMR
Sanjay Metkar	Postdoctoral Associate	Postdoc	NMR
Bright Ogbolu	Postdoctoral Associate	Postdoc	NMR
Ifeoluwa Oyekunle	Postdoctoral Associate	Postdoc	NMR
Jhinuk Saha	Postdoctoral Associate	Postdoc	NMR
Faith Scott	Postdoctoral Associate	Postdoc	NMR
Rongfu Zhang	Postdoctoral Associate	Postdoc	NMR
William Brey	Research Faculty III	Senior Personnel	NMR
Shinho Cho	Research Faculty I	Senior Personnel	NMR
Timothy Cross	Professor	Senior Personnel	NMR
Malathy Elumalai	Associate in Research	Senior Personnel	NMR
Lucio Frydman	Chief Scientist for Chemistry & Biology	Senior Personnel	NMR
Riqiang Fu	Research Faculty III	Senior Personnel	NMR
Zhehong Gan	Research Faculty III	Senior Personnel	NMR
Peter Gor'kov	Sr. Research Associate	Senior Personnel	NMR
Samuel Grant	Professor	Senior Personnel	NMR
Daniel Hallinan	Associate Professor	Senior Personnel	NMR
Yan-Yan Hu	Assistant Professor	Senior Personnel	NMR
Ivan Hung	Associate in Research	Senior Personnel	NMR
Ilya Litvak	Associate in Research	Senior Personnel	NMR
Wenping Mao	Visiting Assistant In Research	Senior Personnel	NMR
Nesmine Maptue	Biological Scientist III (external NMR user)	Senior Personnel	NMR

Name	Title	Personnel Category	Department
Frederic Mentink-Vigier	Research Faculty II	Senior Personnel	NMR
Hadi Mohammadigoushki	Assistant Professor	Senior Personnel	NMR
Ayyalusamy Ramamoorthy	Professor	Senior Personnel	NMR
Robert Schurko	NMR Program Director, Professor of Chemistry	Senior Personnel	NMR
Robert Silvers	Assistant Professor	Senior Personnel	NMR
Amrit Venkatesh	Research Faculty I	Senior Personnel	NMR
Sungsool Wi	Research Faculty II	Senior Personnel	NMR
Heather Barnes	Program Assistant	Support Staff - Secretarial/Clerical	NMR
Ashley Blue	Technical/Research Designer	Support Staff - Technical/Managerial	NMR
Joseph Collins	Scientific Research Specialist	Support Staff - Technical/Managerial	NMR
Huyen Bui	Research Assistant	Undergraduate Student	NMR
James Cohan	Undergraduate Research Assistant	Undergraduate Student	NMR
Surya Hemraj	Undergraduate Research Assistant	Undergraduate Student	NMR
Katherine Martinez	Research Assistant	Undergraduate Student	NMR
Alexander Perez	Undergraduate Research Assistant	Undergraduate Student	NMR
Christian Ramamoorthy	Undergraduate Research Assistant	Undergraduate Student	NMR
Jerson Restrepo	Undergrad Research Assistant	Undergraduate Student	NMR
Camila Roman	Research Assistant	Undergraduate Student	NMR
Abby Scott	Research Assistant	Undergraduate Student	NMR
Tristny Ta	Undergraduate Research Assistant	Undergraduate Student	NMR
Taylor Vanderlinden	Research Assistant	Undergraduate Student	NMR
Christine Yu	Undergraduate Research Assistant	Undergraduate Student	NMR
Stephen Bilenky	Videographer	Other Professional	Public Affairs
Caroline McNiel	Graphic Designer	Other Professional	Public Affairs
Edan Schultz	Media Specialist	Other Professional	Public Affairs
Nilubon Tabtimtong	Media Specialist	Other Professional	Public Affairs
Kristin Roberts	Director of Public Affairs	Senior Personnel	Public Affairs
Lindsay Grooms	UBA Associate Director	Other Professional	UBA/Purchasing
Amanda Larrison	Property Manager	Other Professional	UBA/Purchasing
Michael Pendergast	Program Associate	Other Professional	UBA/Purchasing
Jessica Scott	Senior Accounting Specialist	Other Professional	UBA/Purchasing
Manjari Verma	Program Coordinator	Other Professional	UBA/Purchasing
Walter Lee	Budget Analyst	Senior Personnel	UBA/Purchasing
Luis Bonilla	Accounting Associate	Support Staff - Secretarial/Clerical	UBA/Purchasing

Name	Title	Personnel Category	Department
Robert Steven Braman III	Clerk	Support Staff - Secretarial/Clerical	UBA/Purchasing
Sarah Fields	Administrative Assistant	Support Staff - Secretarial/Clerical	UBA/Purchasing
Eufrosina Harrell	Accounting Specialist	Support Staff - Secretarial/Clerical	UBA/Purchasing
Philip Hill	Clerk	Support Staff - Secretarial/Clerical	UBA/Purchasing
John Daugherty	Technical Research Designer	Support Staff - Technical/Managerial	UBA/Purchasing
Melisa Tabtimtong	Application Developer	Other Professional	WAG / Printing Services
Eric Clark	Assistant Director, Technology Services	Senior Personnel	WAG / Printing Services
John Childs	Graphic Artist	Support Staff - Technical/Managerial	WAG / Printing Services
Sarita Finn	Web Designer/Programmer	Support Staff - Technical/Managerial	WAG / Printing Services
David Hahn	Web Designer/Programmer	Support Staff - Technical/Managerial	WAG / Printing Services
Kevin John	Graphic Artist	Support Staff - Technical/Managerial	WAG / Printing Services
Richard Ludlow	Graphic Artist	Support Staff - Technical/Managerial	WAG / Printing Services
Dustin Szelong	Systems Programmer	Support Staff - Technical/Managerial	WAG / Printing Services

MAGLAB AT LANL (38)

Name	Title	Personnel Category	Department
Joanna Blawat	Postdoctoral Associate	Postdoc	Pulsed Field Facility
Sangyun Lee	Postdoctoral Associate	Postdoc	Pulsed Field Facility
Andrea Mucchietto	Postdoctoral Associate	Postdoc	Pulsed Field Facility
Linh Nguyen	Postdoctoral Associate	Postdoc	Pulsed Field Facility
Km Rubi	Postdoctoral Associate	Postdoc	Pulsed Field Facility
Gregory Smith	Postdoctoral Associate	Postdoc	Pulsed Field Facility
James Wampler	Postdoctoral Associate	Postdoc	Pulsed Field Facility
Jingyuan Wang	Postdoctoral Associate	Postdoc	Pulsed Field Facility
Shengzhi Zhang	Postdoctoral Associate	Postdoc	Pulsed Field Facility
Fedor Balakirev	Staff Member	Senior Personnel	Pulsed Field Facility
Ashish Bhardwaj	R&D Engineer	Senior Personnel	Pulsed Field Facility
Mun Keat Chan	Staff Member	Senior Personnel	Pulsed Field Facility
Scott Crooker	Staff Member	Senior Personnel	Pulsed Field Facility
Neil Harrison	Staff Member	Senior Personnel	Pulsed Field Facility
Minseong Lee	Staff Member	Senior Personnel	Pulsed Field Facility
Boris Maiorov	Staff Member	Senior Personnel	Pulsed Field Facility
Ross McDonald	Director, Pulsed Field Facility	Senior Personnel	Pulsed Field Facility
Christopher Mizzi	Staff Member	Senior Personnel	Pulsed Field Facility
Doan Nguyen	Director of Pulsed Field Facility Magnet Science and Technology	Senior Personnel	Pulsed Field Facility

Name	Title	Personnel Category	Department
Johanna Palmstrom	Staff Member	Senior Personnel	Pulsed Field Facility
Dwight Rickel	Emeritus Staff Member	Senior Personnel	Pulsed Field Facility
Arkady Shehter	Staff Member	Senior Personnel	Pulsed Field Facility
John Singleton	Staff Member and LANL Fellow	Senior Personnel	Pulsed Field Facility
Laurel Winter	Deputy Director, User Program Director, Pulsed Field Facility	Senior Personnel	Pulsed Field Facility
Vivien Zapf	Staff Member	Senior Personnel	Pulsed Field Facility
Sonya Almeida	Administrative Assistant	Support Staff - Secretarial/Clerical	Pulsed Field Facility
Oscar Ayala Valenzuela	Research Technologist	Support Staff - Technical/Managerial	Pulsed Field Facility
Scott Betts	Research Technologist	Support Staff - Technical/Managerial	Pulsed Field Facility
Leonard Gonzales	Research Technologist	Support Staff - Technical/Managerial	Pulsed Field Facility
Richard Herrera	Research Technologist	Support Staff - Technical/Managerial	Pulsed Field Facility
Thomas Kline	Research Technologist	Support Staff - Technical/Managerial	Pulsed Field Facility
Jason Lucero	Research Technologist	Support Staff - Technical/Managerial	Pulsed Field Facility
James Michel	Research Technologist	Support Staff - Technical/Managerial	Pulsed Field Facility
Gary Noe	Research Technologist	Support Staff - Technical/Managerial	Pulsed Field Facility
Jonathan Noerper	Research Technologist	Support Staff - Technical/Managerial	Pulsed Field Facility
Josiah Srock	R&D Engineer	Support Staff - Technical/Managerial	Pulsed Field Facility
Hazuki Teshima	Research Technologist	Support Staff - Technical/Managerial	Pulsed Field Facility
Abran Valdez	Research Technologist	Support Staff - Technical/Managerial	Pulsed Field Facility

MAGLAB AT UF (58)

Name	Title	Personnel Category	Department
Mario Chang	Graduate Research Assistant	Graduate Student	Chemistry Affiliated Faculty & Staff
Alexander Angerhofer	Professor and Associate Chair of Chemistry	Senior Personnel	Chemistry Affiliated Faculty & Staff
Clifford Bowers	Professor	Senior Personnel	Chemistry Affiliated Faculty & Staff
Rebecca Butcher	Associate Professor	Senior Personnel	Chemistry Affiliated Faculty & Staff
Matthew Eddy	Assistant Professor	Senior Personnel	Chemistry Affiliated Faculty & Staff
Austin Evans	Assistant Professor	Senior Personnel	Chemistry Affiliated Faculty & Staff
Gail Fanucci	Professor	Senior Personnel	Chemistry Affiliated Faculty & Staff
Daniel Talham	Professor	Senior Personnel	Chemistry Affiliated Faculty & Staff
Nicolas Silva	Postdoctoral Associate	Postdoc	High B/T Affiliated Faculty & Staff
Rasul Gazizulin	Assistant In Research	Senior Personnel	High B/T Affiliated Faculty & Staff
James Hamlin	Associate Professor	Senior Personnel	High B/T Affiliated Faculty & Staff
Chao Huan	Research Faculty I	Senior Personnel	High B/T Affiliated Faculty & Staff

Name	Title	Personnel Category	Department
Dominique Laroche	Assistant Professor	Senior Personnel	High B/T Affiliated Faculty & Staff
Yoonseok Lee	Professor	Senior Personnel	High B/T Affiliated Faculty & Staff
Mark Meisel	Director of High B/T Facility, Professor of Physics	Senior Personnel	High B/T Affiliated Faculty & Staff
Neil Sullivan	Professor of Physics	Senior Personnel	High B/T Affiliated Faculty & Staff
Yasumasa Takano	Professor of Physics	Senior Personnel	High B/T Affiliated Faculty & Staff
Xiao-Xiao Zhang	Assistant Professor	Senior Personnel	High B/T Affiliated Faculty & Staff
Chris Ollmann	Engineer II	Support Staff - Technical/Managerial	High B/T Affiliated Faculty & Staff
Alexander Donald	Graduate Research Assistant	Graduate Student	Physics Affiliated Faculty & Staff
Arthur Hebard	Distinguished Professor of Emeritus	Senior Personnel	Physics Affiliated Faculty & Staff
Selman Hershfield	Professor of Physics	Senior Personnel	Physics Affiliated Faculty & Staff
Peter Hirschfeld	Distinguished Professor	Senior Personnel	Physics Affiliated Faculty & Staff
Kevin Ingersent	Professor of Physics	Senior Personnel	Physics Affiliated Faculty & Staff
Dmitrii Maslov	Professor of Physics	Senior Personnel	Physics Affiliated Faculty & Staff
Christopher Stanton	Professor of Physics	Senior Personnel	Physics Affiliated Faculty & Staff
Gregory Stewart	Professor of Physics	Senior Personnel	Physics Affiliated Faculty & Staff
David Tanner	Distinguished Professor of Physics	Senior Personnel	Physics Affiliated Faculty & Staff
Anna Rushin	Graduate Research Assistant	Graduate Student	AMRIS Affiliated Faculty & Staff
Gregory Dowling	Engineer	Other Professional	AMRIS Affiliated Faculty & Staff
Kelly Jenkins	RF Coil Engineer	Other Professional	AMRIS Affiliated Faculty & Staff
Anil Mehta	Core Research Facility Manager	Other Professional	AMRIS Affiliated Faculty & Staff
Tammy Nicholson	Certified Radiology Technology Mgr. (3T Imaging Applications)	Other Professional	AMRIS Affiliated Faculty & Staff
James Rocca	Senior Chemist	Other Professional	AMRIS Affiliated Faculty & Staff
Jens Rosenberg	Core Research Facility Manager / AMRIS Facilities Manager of Clinical MRI Instrumentation	Other Professional	AMRIS Affiliated Faculty & Staff
Maria Luiza Caldas Nogueira	Postdoctoral Associate	Postdoc	AMRIS Affiliated Faculty & Staff
Stephen Blackband	Professor, Neuroscience	Senior Personnel	AMRIS Affiliated Faculty & Staff
Yousong Ding	Assistant Professor	Senior Personnel	AMRIS Affiliated Faculty & Staff
Marcelo Febo	Associate Professor	Senior Personnel	AMRIS Affiliated Faculty & Staff
Sean Forbes	Research Assistant Professor	Senior Personnel	AMRIS Affiliated Faculty & Staff
Chalermchai Khemtong	Associate Professor	Senior Personnel	AMRIS Affiliated Faculty & Staff
Joanna Long	Professor, NHMFL Director of AMRIS	Senior Personnel	AMRIS Affiliated Faculty & Staff
Hendrik Luesch	Professor and Chair, Department of Medicinal Chemistry	Senior Personnel	AMRIS Affiliated Faculty & Staff
Thomas Mareci	Professor, Biochemistry & Molecular Biology	Senior Personnel	AMRIS Affiliated Faculty & Staff

Name	Title	Personnel Category	Department	
Matthew Merritt	Associate Professor	Senior Personnel	AMRIS Affiliated Faculty & Staff	
Shahab Vahdat	Assistant Professor	Senior Personnel	AMRIS Affiliated Faculty & Staff	
David Vaillancourt	Professor	Senior Personnel	AMRIS Affiliated Faculty & Staff	
Krista Vandenborne	Professor and Chair, Physical Therapy	Senior Personnel	AMRIS Affiliated Faculty & Staff	
Sergey Vasenkov	Professor	Senior Personnel	AMRIS Affiliated Faculty & Staff	
Glenn Walter	Vice Chair and Professor of Physiology	Senior Personnel	AMRIS Affiliated Faculty & Staff	
Huadong Zeng	Specialist, Animal MRI/S Applications	Senior Personnel	AMRIS Affiliated Faculty & Staff	
Kaley Ali	Office Manager	Support Staff - Secretarial/Clerical	AMRIS Affiliated Faculty & Staff	
Shane Chatfield	3 T MRI Technologist	Support Staff - Technical/Managerial	AMRIS Affiliated Faculty & Staff	
James Collins	Core Research Facility Manager	Support Staff - Technical/Managerial	AMRIS Affiliated Faculty & Staff	
Amy Howe	Research Coordinator II	Support Staff - Technical/Managerial	AMRIS Affiliated Faculty & Staff	
Joshua Slade	Engineering Technician	Support Staff - Technical/Managerial	AMRIS Affiliated Faculty & Staff	
Judith Steadman	MRI Technologist	Support Staff - Technical/Managerial	AMRIS Affiliated Faculty & Staff	
Eli Wolf	Research Coordinator	Support Staff - Technical/Managerial	AMRIS Affiliated Faculty & Staff	

APPENDIX 2 – USER FACILITY STATISTICS

OVERVIEW

Seven user facilities — AMRIS (NMR-MRI@UF), DC Field, EMR, High B/T, ICR, NMR-MRI @FSU, and Pulsed Field — each with exceptional instrumentation and highly qualified staff scientists and staff, comprise the magnet lab's user program. In this appendix, each facility presents detailed information about its user demographics, operations statistics and requests for magnet time. A user is an individual or a member of a research group that is allocated magnet time. The user does not have to be "on site" for the experiment. A researcher who sends samples for analysis; a scientist who uses new lab technologies to conduct experiments remotely; or a PI who sends students to the magnet lab, are all considered users. All user numbers reflect distinct individuals, i.e., if a user has multiple proposals (different scientific thrusts) or is allocated magnet time more than once during the year, he/she is counted only once.

AMRIS FACILITY

Table 1a. Users by Demographic – NSF-Funded

	Users ¹	Minority ²	Non- Minority ²	No Response to Race ³	Male	Female	Other	No Response to Gender ³
Senior Personnel, U.S.	46	2	30	14	26	8	0	12
Senior Personnel, non-U.S.	2	0	0	2	0	0	0	2
Postdocs, U.S.	15	1	5	9	6	2	0	7
Postdocs, non-U.S.	0	0	0	0	0	0	0	0
Students, U.S.	58	4	17	37	14	17	0	27
Students, non-U.S.	0	0	0	0	0	0	0	0
Technician, U.S.	4	0	3	1	1	2	0	1
Technician, non-U.S.	0	0	0	0	0	0	0	0
TOTAL	125	7	55	63	47	29	0	49

¹ Users using multiple facilities are counted in each facility listed.

² NSF Minority status includes the following races: American Indian, Alaska Native, Black or African American, Hispanic, Native Hawaiian or other Pacific Islander.

The definition also includes Hispanic Ethnicity as a minority group. Minority status excludes Asian and White-Not of Hispanic Origin.

³ Includes pending user account activations.

Table 1b. Users by Demographic – Non-NHMFL Funded

	Users ¹	Minority ²	Non- Minority ²	No Response to Race ³	Male	Female	Other	No Response to Gender ³
Senior Personnel, U.S.	51	4	33	14	29	10	0	12
Senior Personnel, non-U.S.	0	0	0	0	0	0	0	0
Postdocs, U.S.	19	2	9	8	6	9	0	4
Postdocs, non-U.S.	0	0	0	0	0	0	0	0
Students, U.S.	58	8	24	26	12	27	0	19
Students, non-U.S.	0	0	0	0	0	0	0	0
Technician, U.S.	9	2	4	3	3	4	0	2
Technician, non-U.S.	0	0	0	0	0	0	0	0
TOTAL	137	16	70	51	50	50	0	37

Table 1c. Users by Demographic – Summary

	Users ¹	Minority ²	Non- Minority ²	No Response to Race ³	Male	Female	Other	No Response to Gender ³
NSF Funded	125	7	55	63	47	29	0	49
Non-NHMFL Funded	137	16	70	51	50	50	0	37
TOTAL	262	23	125	114	97	79	0	86

Table 2a. Users by Participation - NSF-Funded

	Users ¹	Users Present	Users Operating Remotely ²	Users Sending Sample ³	Off-Site User⁴	User Present Virtually
Senior Personnel, U.S.	46	25	1	0	20	0
Senior Personnel, non-U.S.	2	0	0	0	2	0
Postdocs, U.S.	15	12	0	0	3	0
Postdocs, non-U.S.	0	0	0	0	0	0
Students, U.S.	58	47	0	0	11	0
Students, non-U.S.	0	0	0	0	0	0
Technician, U.S.	4	3	0	0	1	0
Technician, non-U.S.	0	0	0	0	0	0
TOTAL	125	87	1	0	37	0

¹ Users using multiple facilities are counted in each facility listed.

² "Users Operating Remotely" refers to users who operate the magnet system from a remote location. Remote operations are not currently available in all facilities.
³ "Users Sending Sample" refers to users who send the sample to the facility and/or research group and the experiment is conducted by other collaborators on the

experiment. Users at UF, FSU, and LANL cannot be "sample senders" for facilities located on their campuses.

⁴ "Off-Site Users" are scientific or technical participants on the experiment; who will not be present, sending sample, or operating the magnet system remotely; and who are not located on the campus of that facility (i.e., they are off-site).

Table 2b. Users by Participation - Non-NHMFL Funded

	Users ¹	Users Present	Users Operating Remotely ²	Users Sending Sample ³	Off-Site User ⁴	User Present Virtually
Senior Personnel, U.S.	51	35	0	0	16	0
Senior Personnel, non-U.S.	0	0	0	0	0	0
Postdocs, U.S.	19	15	1	0	3	0
Postdocs, non-U.S.	0	0	0	0	0	0
Students, U.S.	58	53	1	0	4	0
Students, non-U.S.	0	0	0	0	0	0
Technician, U.S.	9	8	1	0	0	0
Technician, non-U.S.	0	0	0	0	0	0
TOTAL	137	111	3	0	23	0

Table 2c. Users by Participation – Summary

	Users ¹	Users Present	Users Operating Remotely ²	Users Sending Sample ³	Off-Site User ⁴	User Present Virtually
NSF Funded	125	87	1	0	37	0
Non-NHMFL Funded	137	111	3	0	23	0
TOTAL	262	198	4	0	60	0

Table 3a. Users by Organization - NSF-Funded

	Users ¹	External Users	Local Users ²	NHMFL-Affiliated Users ^{2,3,4}	Laboratory ^{3,5}	University ^{4,5}	Industry ⁵
Senior Personnel, U.S.	46	14	16	16	0	45	1
Senior Personnel, non-U.S.	2	2	0	0	0	2	0
Postdocs, U.S.	15	6	8	1	0	15	0
Postdocs, non-U.S.	0	0	0	0	0	0	0
Students, U.S.	58	19	39	0	1	57	0
Students, non-U.S.	0	0	0	0	0	0	0
Technician, U.S.	4	1	1	2	0	4	0
Technician, non-U.S.	0	0	0	0	0	0	0
TOTAL	125	42	64	19	1	123	1

¹ Users using multiple facilities are counted in each facility listed.

² NHMFL-Affiliated users are defined as anyone in the lab's personnel system (i.e., on our website/directory), even if they travel to another site. Local users are defined as any non-NHMFL-Affiliated researchers originating at any of the institutions in proximity to the MagLab sites (i.e., researchers at FSU, UF, FAMU, or LANL), even if they travel to another site.

³ Users with primary affiliations at NHMFL/LANL are reported in NHMFL-Affiliated Users and National Laboratory.

4 Users with primary affiliations at FSU, UF, or FAMU are reported in NHMFL-Affiliated Users and National University.

⁵ The TOTAL of university, industry, and national lab users will equal the TOTAL number of users.

Table 3b. Users by Organization – Non-NHMFL Funded

	Users ¹	External Users	Local Users ²	NHMFL-Affiliated Users ^{2,3,4}	Laboratory ^{3,5}	University ^{4,5}	Industry⁵
Senior Personnel, U.S.	51	5	31	15	0	48	3
Senior Personnel, non-U.S.	0	0	0	0	0	0	0
Postdocs, U.S.	19	3	15	1	0	18	1
Postdocs, non-U.S.	0	0	0	0	0	0	0
Students, U.S.	58	3	53	2	0	57	1
Students, non-U.S.	0	0	0	0	0	0	0
Technician, U.S.	9	1	7	1	0	9	0
Technician, non-U.S.	0	0	0	0	0	0	0
TOTAL	137	12	106	19	0	132	5

Table 3c. Users by Organization – Summary

	Users ¹	External Users	Local Users ²	NHMFL-Affiliated Users ^{2,3,4}	Laboratory ^{3,5}	University ^{4,5}	Industry⁵
NSF Funded	125	42	64	19	1	123	1
Non-NHMFL Funded	137	12	106	19	0	132	5
TOTAL	262	54	170	38	1	255	6

Table 4a. Users by Discipline - NSF-Funded

	Users ¹	Condensed Matter Physics	Chemistry	Engineering	Development of Magnet Technology	Biology, Bio- chemistry, Biophysics	Material Science
Senior Personnel, U.S.	46	0	15	9	0	22	0
Senior Personnel, non-U.S.	2	0	2	0	0	0	0
Postdocs, U.S.	15	0	3	1	1	10	0
Postdocs, non-U.S.	0	0	0	0	0	0	0
Students, U.S.	58	0	20	14	0	24	0
Students, non-U.S.	0	0	0	0	0	0	0
Technician, U.S.	4	0	0	2	0	2	0
Technician, non-U.S.	0	0	0	0	0	0	0

	Users ¹	Condensed Matter Physics	Chemistry	Engineering	Development of Magnet Technology	Biology, Bio- chemistry, Biophysics	Material Science
TOTAL	125	0	40	26	1	58	0

¹ Users using multiple facilities are counted in each facility listed.

Table 4b. Users	by Discipline -	– Non-NHMFL	Funded
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	Users ¹	Condensed Matter Physics	Chemistry	Engineering	Development of Magnet Technology	Biology, Bio- chemistry, Biophysics	Material Science
Senior Personnel, U.S.	51	0	9	7	0	35	0
Senior Personnel, non-U.S.	0	0	0	0	0	0	0
Postdocs, U.S.	19	0	3	0	0	16	0
Postdocs, non-U.S.	0	0	0	0	0	0	0
Students, U.S.	58	0	9	13	1	35	0
Students, non-U.S.	0	0	0	0	0	0	0
Technician, U.S.	9	0	1	0	0	8	0
Technician, non-U.S.	0	0	0	0	0	0	0
TOTAL	137	0	22	20	1	94	0

Table 4c. Users by Discipline – Summary

	Users ¹	Condensed Matter Physics	Chemistry	Engineering	Development of Magnet Technology	Biology, Bio- chemistry, Biophysics	Material Science
NSF Funded	125	0	40	26	1	58	0
Non-NHMFL Funded	137	0	22	20	1	94	0
TOTAL	262	0	62	46	2	152	0

Table 5. Subscription Rate - Summary

	Experiments Submitted (Current Year)	Experiments Submitted (Deferred from prev. year)	Experi- ments w/ Usage	Experiments w/ Usage Percentage	Experi- ments Declined	Experiments Declined Percentage	Experi- ments Reviewed	Experiment Subscription Rate	Experiments Subscription Percentage
NSF Funded	14	21	32	91.4 %	3	8.6 %	35	1.1	109.4 %
Non-NHMFL Funded	9	24	32	97 %	1	3 %	33	1	103.1 %
TOTAL	23	45	64		4		68		

Table 6a. Research Proposals¹ Profile (Demographics) with Magnet Time

	TOTAL Proposals ¹	Minority ²	Non-Minority	No Race Response	Female ³	Male	Other	No Gender Response
NSF Funded	32	1	25	6	9	18	0	5
Non-NHMFL Funded	31	3	23	5	7	20	0	4
TOTAL	63	4	48	11	16	38	0	9

¹ A "proposal" may have associated with it a single experiment or a group of closely related experiments. A PI may have more than one proposal.

² The number of proposals satisfying the following condition: The PI is a minority.

³ The number of proposals satisfying the following condition: The PI is a female.

Note: The table refers to proposal disciplines.

Table 6b. Research Proposals Profile (Discipline) with Magnet Time

	TOTAL Proposals	Condensed Matter Physics	Chemistry	Engineering	Development of Magnet Technology	Biology, Biochem., Biophys.	Material Science
NSF Funded	32	0	6	5	5	16	0
Non-NHMFL Funded	31	0	0	0	0	31	0
TOTAL	63	0	6	5	5	47	0

Find the list of user proposals in Appendix 5 and on our website

Table 7a. Operations by Magnet System Group - NSF-Funded

	Total Days Used ¹	% of Total Days Used	600 MHz NMR Spectro- meter with Cryoprobe	600 MHz NMR Spectro- meter - Hypersense	600 MHz Wide Bore Spectro- meter	750 MHz Wide Bore Spectro- meter	800 MHz, 63 mm bore NMR Spectro- meter	11 T/40 MRI System
NHMFL-Affiliated	48.3	0	0	17.8	21	0	4	2.5
Local	190.5	19.6 %	8.3	0	49	7	2	115.7
University, U.S.	225.5	23.2 %	21	126	3.5	70	5	0
University, non-U.S.	0	0 %	0	0	0	0	0	0
Government Lab, U.S.	0	0 %	0	0	0	0	0	0
Government Lab, non-U.S.	0	0 %	0	0	0	0	0	0
Industry, U.S.	0	0 %	0	0	0	0	0	0
Industry, non-U.S.	0	0 %	0	0	0	0	0	0
Test/Calibration/Maintenance	240.3	24.8 %	41.5	27.2	29	35.5	17	6.2
Method Development	122.5	12.6 %	84.8	0	0	0	11	21.7

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	Total Days Used ¹	% of Total Days Used	600 MHz NMR Spectro- meter with Cryoprobe	600 MHz NMR Spectro- meter - Hypersense	600 MHz Wide Bore Spectro- meter	750 MHz Wide Bore Spectro- meter	800 MHz, 63 mm bore NMR Spectro- meter	11 T/40 MRI System
Analytical Chemistry	0	0 %	0	0	0	0	0	0
Upgrade Cell Design/Hardware	29.7	3.1 %	8.2	6	2	7	3	0
Setup	114.2	11.8 %	19.2	13	14.5	29.5	18	12
Repair	0	0 %	0	0	0	0	0	0
TOTAL	971		183	190	119	149	60	158

Table 7b. Operations by Magnet System Group – Non-NHMFL Funded

	Total Days Used ¹	% of Total Days Used	600 MHz NMR Spectro- meter with Cryoprobe	600 MHz NMR Spectro- meter - Hypersense	600 MHz Wide Bore Spectro- meter	750 MHz Wide Bore Spectro- meter	800 MHz, 63 mm bore NMR Spectro- meter	11 T/40 MRI System
NHMFL-Affiliated	569.5	70.2 %	86	49	146	44	71	58
Local	108	13.3 %	0	0	12.5	1	0	0
University, U.S.	98	12.1 %	0	0	0	12	0	85
University, non-U.S.	0	0 %	0	0	0	0	0	0
Government Lab, U.S.	0	0 %	0	0	0	0	0	0
Government Lab, non-U.S.	0	0 %	0	0	0	0	0	0
Industry, U.S.	35.5	4.4 %	0	14	21.5	0	0	0
Industry, non-U.S.	0	0 %	0	0	0	0	0	0
Test/Calibration/Maintenance	0	0 %	0	0	0	0	0	0
Method Development	0	0 %	0	0	0	0	0	0
Analytical Chemistry	0	0 %	0	0	0	0	0	0
Upgrade Cell Design/Hardware	0	0 %	0	0	0	0	0	0
Setup	0	0 %	0	0	0	0	0	0
Repair	0	0 %	0	0	0	0	0	0
TOTAL	811		86	63	180	57	71	143

Table 7c. Operations by Magnet System Group –Summary

	Total Days Used ¹	600 MHz NMR Spectrometer with Cryoprobe	600 MHz NMR Spectrometer - Hypersense	600 MHz Wide Bore Spectrometer	750 MHz Wide Bore Spectrometer	800 MHz, 63 mm bore NMR Spectrometer	11 T/40 MRI System
NSF Funded	971	183	190	119	149	60	158
Non-NHMFL Funded	811	86	63	180	57	71	143
TOTAL	269	253	299	206	131	301	269

Table 8a. Operations by Discipline – NSF-Funded

	Total Days Used	Condensed Matter Physics	Chemistry	Engineering	Development of Magnet Technology	Biology, Biochem., Biophys.	Material Science
NHMFL-Affiliated	48.3	0	32.3	0	8.5	7.5	0
Local	190.5	0	53.2	0	0	137.3	0
University, U.S.	225.5	0	17.3	135.2	0	73	0
University, non-U.S.	0	0	0	0	0	0	0
Government Lab, U.S.	0	0	0	0	0	0	0
Government Lab, non-U.S.	0	0	0	0	0	0	0
Industry, U.S.	0	0	0	0	0	0	0
Industry, non-U.S.	0	0	0	0	0	0	0
Test/ Calibration/ Maintenance	240.3	0	0	0	240.3	0	0
Method Development	122.5	0	0	0	122.5	0	0
Analytical Chemistry	0	0	0	0	0	0	0
Upgrade Cell Design/Hardware	29.7	0	0	0	29.7	0	0
Setup	114.2	0	0	0	114.2	0	0
Repair	0	0	0	0	0	0	0
TOTAL	971	0	102.8	135.2	515.2	217.8	0

Table 8b. Operations by Discipline – NSF-Funded

	Total Days Used	Condensed Matter Physics	Chemistry	Engineering	Development of Magnet Technology	Biology, Biochem., Biophys.	Material Science
NHMFL-Affiliated	569.5	0	23	0	26	520.5	0
Local	108	0	0	0	0	108	0
University, U.S.	98	0	85	0	0	13	0
University, non-U.S.	0	0	0	0	0	0	0
Government Lab, U.S.	0	0	0	0	0	0	0
Government Lab, non-U.S.	0	0	0	0	0	0	0
Industry, U.S.	35.5	0	35.5	0	0	0	0
Industry, non-U.S.	0	0	0	0	0	0	0

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	Total Days Used	Condensed Matter Physics	Chemistry	Engineering	Development of Magnet Technology	Biology, Biochem., Biophys.	Material Science
Test/ Calibration/ Maintenance	0	0	0	0	0	0	0
Method Development	0	0	0	0	0	0	0
Analytical Chemistry	0	0	0	0	0	0	0
Upgrade Cell Design/Hardware	0	0	0	0	0	0	0
Setup	0	0	0	0	0	0	0
Repair	0	0	0	0	0	0	0
TOTAL	811	0	143.5	0	26	641.5	0

Table 8c. Operations by Discipline – Summary

	Total Days Used	Condensed Matter Physics	Chemistry	Engineering	Development of Magnet Technology	Biology, Biochem., Biophys.	Material Science
NSF Funded	971	0	102.8	135.2	515.2	217.8	0
Non-NHMFL Funded	811	0	143.5	0	26	641.5	0
TOTAL	1782	0	246.3	135.2	541.2	859.3	0

Table 9a. New Pls¹ and New Users – NSF-Funded

	All Pis	New PIs at the MagLab	New PIs at Facility	Returning Pls at Facility	All Users	New Users at the MagLab	New Users at Facility	Returning Users at Facility
Senior Personnel, U.S.	31	4	7	24	46	4	6	40
Senior Personnel, non-U.S.	0	0	0	0	2	2	2	0
Postdocs, U.S.	0	0	0	0	15	5	6	9
Postdocs, non-U.S.	0	0	0	0	0	0	0	0
Students, U.S.	0	0	0	0	58	5	7	51
Students, non-U.S.	0	0	0	0	0	0	0	0
Technician, U.S.	0	0	0	0	4	0	1	3
Technician, non-U.S.	0	0	0	0	0	0	0	0
TOTAL	31	4	7	24	125	16	22	103

¹ PIs who received magnet time for the first time.

Table 9b. New PIs¹ and New Users – Non-NHMFL Funded

	All Pis	New PIs at the MagLab	New PIs at Facility	Returning PIs at Facility	All Users	New Users at the MagLab	New Users at Facility	Returning Users at Facility
Senior Personnel, U.S.	28	3	3	25	51	2	3	48
Senior Personnel, non-U.S.	0	0	0	0	0	0	0	0
Postdocs, U.S.	1	0	0	1	19	2	2	17
Postdocs, non-U.S.	0	0	0	0	0	0	0	0
Students, U.S.	0	0	0	0	58	5	8	50
Students, non-U.S.	0	0	0	0	0	0	0	0
Technician, U.S.	0	0	0	0	9	0	0	9
Technician, non-U.S.	0	0	0	0	0	0	0	0
TOTAL	29	3	3	26	137	9	13	124

Table 9c. New Pls¹ and New Users – Summary

	All PIs	New PIs at the MagLab	New PIs at Facility	Returning PIs at Facility	All Users	New Users at the MagLab	New Users at Facility	Returning Users at Facility
NSF Funded	31	4	7	24	125	16	22	103
Non-NHMFL Funded	29	3	3	26	137	9	13	124
TOTAL	60	7	10	50	262	25	35	227

Table 10a. New¹ User Pls – NSF-Funded

Name	Organization	Proposal	Year of Magnet Time	Is New to MagLab
Jehangir Bhadha	Everglades Research and Education Center at UF	P20339	Received 2023	Yes
Tracy Centanni	University of Florida	P20455	Received 2023	Yes
Zhongwu Guo	University of Florida	P20426	Received 2023	No
Songi Han	University of California, Santa Barbara	P20460	Received 2023	No
Robert McKenna	University of Florida	P20173	Received 2023	No
Brent Sumerlin	University of Florida	P20225	Received 2023	Yes
Dionisios Vlachos	University of Delaware	P20204	Received 2023	Yes

¹ PIs who received magnet time for the first time.

Table 10b. New¹ User Pls – Non-NHMFL Funded

Name	Organization	Proposal	Year of Magnet Time	Is New to MagLab
Jehangir Bhadha	Everglades Research and Education Center at UF	P20336	Received 2023	Yes
Matthew Farrer	University of Florida	P20325	Received 2023	Yes
Elise Morrison	University of Florida	P20496	Received 2023	Yes

DC FIELD FACILITY

Table 1. Users by Demographic

	Users ¹	Minority ²	Non- Minority ²	No Response to Race ³	Male	Female	Other	No Response to Gender ³
Senior Personnel, U.S.	195	8	160	27	149	28	0	18
Senior Personnel, non-U.S.	60	4	35	21	38	11	0	11
Postdocs, U.S.	85	4	69	12	61	19	0	5
Postdocs, non-U.S.	13	2	9	2	9	2	0	2
Students, U.S.	208	11	160	37	145	37	0	26
Students, non-U.S.	55	2	37	16	38	8	0	9
Technician, U.S.	14	1	12	1	9	4	0	1
Technician, non-U.S.	1	1	0	0	1	0	0	0
TOTAL	631	33	482	116	450	109	0	72

¹ Users using multiple facilities are counted in each facility listed.

² NSF Minority status includes the following races: American Indian, Alaska Native, Black or African American, Hispanic, Native Hawaiian or other Pacific Islander. The definition also includes Hispanic Ethnicity as a minority group. Minority status excludes Asian and White-Not of Hispanic Origin.

³ Includes pending user account activations.

Table 2. Users by Participation

	Users ¹	Users Present	Users Operating Remotely ²	Users Sending Sample ³	Off-Site User⁴	User Present Virtually
Senior Personnel, U.S.	195	85	0	16	93	1
Senior Personnel, non-U.S.	60	14	0	13	33	0
Postdocs, U.S.	85	55	0	1	29	0
Postdocs, non-U.S.	13	5	0	1	7	0
Students, U.S.	208	148	0	11	48	1
Students, non-U.S.	55	33	0	5	17	0
Technician, U.S.	14	12	0	0	2	0
Technician, non-U.S.	1	1	0	0	0	0
TOTAL	631	353	0	47	229	2

¹ Users using multiple facilities are counted in each facility listed.

² "Users Operating Remotely" refers to users who operate the magnet system from a remote location. Remote operations are not currently available in all facilities.
 ³ "Users Sending Sample" refers to users who send the sample to the facility and/or research group and the experiment is conducted by other collaborators on the

experiment. Users at UF, FSU, and LANL cannot be "sample senders" for facilities located on their campuses. 4 "Off-Site Users" are scientific or technical participants on the experiment; who will not be present, sending sample, or operating the magnet system remotely; and who are not located on the campus of that facility (i.e., they are off-site).

Table 3. Users by Organization

	Users ¹	External Users	Local Users ²	NHMFL- Affiliated Users ^{2,3,4}	Laboratory ^{3,5}	University ^{4,5}	Industry⁵
Senior Personnel, U.S.	195	123	16	56	22	162	11
Senior Personnel, non-U.S.	60	60	0	0	7	53	0
Postdocs, U.S.	85	58	17	10	13	72	0
Postdocs, non-U.S.	13	13	0	0	3	10	0
Students, U.S.	208	164	24	20	2	206	0
Students, non-U.S.	55	55	0	0	5	50	0
Technician, U.S.	14	7	0	7	0	11	3
Technician, non-U.S.	1	1	0	0	0	1	0
TOTAL	631	481	57	93	52	565	14

¹ Users using multiple facilities are counted in each facility listed.

2 NHMFL-Affiliated users are defined as anyone in the lab's personnel system (i.e., on our web site/directory), even if they travel to another site. Local users are defined as any non-NHMFL-Affiliated researchers originating at any of the institutions in proximity to the MagLab sites (i.e., researchers at FSU, UF, FAMU, or LANL), even if they travel to another site. ³ Users with primary affiliations at NHMFL/LANL are reported in NHMFL-Affiliated Users and National Laboratory

⁴ Users with primary affiliations at FSU, UF, or FAMU are reported in NHMFL-Affiliated Users and National University.
 ⁵ The TOTAL of university, industry, and national lab users will equal the TOTAL number of users.

Table 4. Users by Discipline

	Users ¹	Condensed Matter Physics	Chemistry	Engineering	Development of Magnet Technology	Biology, Bio- chemistry, Biophysics	Material Science
Senior Personnel, U.S.	195	122	24	16	21	9	3
Senior Personnel, non-U.S.	60	50	7	1	0	2	0
Postdocs, U.S.	85	63	7	4	8	1	2
Postdocs, non-U.S.	13	10	2	0	1	0	0
Students, U.S.	208	148	32	10	10	1	7
Students, non-U.S.	55	49	4	0	1	0	1
Technician, U.S.	14	0	0	7	5	1	1
Technician, non-U.S.	1	1	0	0	0	0	0
TOTAL	631	443	76	38	46	14	14

¹ Users using multiple facilities are counted in each facility listed.

Table 5a. Subscription Rate (Experiments)

Experiments Submitted (Current Year)	Experiments Submitted (Deferred from prev. year)	Experi- ments w/ Usage	Experiments w/ Usage Percentage	Experi- ments Declined	Experiments Declined Percentage	Experi- ments Reviewed	Experiment Subscription Rate	Experiments Subscription Percentage
408	37	304	68.3 %	141	31.7 %	445	1.5	146.4 %

Table 5b. Subscription Rate (Magnet Days)

Days Submitted	Days Used by External User	Days Used by Local User	Days Used by NHMFL-Affiliated User	Days Used for Inst., Dev., Test and Maintenance ¹	Total Days Used	Days Subscription Rate	Days Subscription Percentage
3,359	1,539.8	21	406.4	128	2,095.2	1.6	160.3 %

¹ Test/Calibration/ Maintenance, Method Development, Analytical Chemistry, Upgrade Cell Design/Hardware Setup, Repair

Table 6a. Research Proposals ¹ Profile (Demographics) with Magnet Time

TOTAL Proposals ¹	Minority ²	Non-Minority	No Race Response	Female ³	Male	Other	No Gender Response
162	6	132	24	27	124	0	11

¹ A "proposal" may have associated with it a single experiment or a group of closely related experiments. A PI may have more than one proposal.

² The number of proposals satisfying the following condition: The PI is a minority.

³ The number of proposals satisfying the following condition: The PI is a female.

Note: The table refers to proposal disciplines.

Table 6b. Research Proposals Profile (Discipline) with Magnet Time

TOTAL Proposals	Condensed Matter Physics	Chemistry	Engineering	Development of Magnet Technology	Biology, Biochem., Biophys.	Material Science
162	118	18	2	16	5	3

Find the list of user proposals in Appendix 5 and on our website

Table 7. Operations by Magnet System Group

	Total Days Used ¹	% of Total Days Used	45T	Resistive	SCH	Super- conducting
NHMFL-Affiliated	406.4	19.4 %	2	92.4	22	290
Local	21	1 %	0	0	0	21
University, U.S.	934.6	44.6 %	38	198.6	28	670
University, non-U.S.	425.9	20.3 %	10	215.9	30	170
Government Lab, U.S.	133.9	6.4 %	0	43.9	0	90
Government Lab, non-U.S.	30.4	1.4 %	0	9.4	0	21
Industry, U.S.	15.1	0.7 %	0	15.1	0	0
Industry, non-U.S.	0	0 %	0	0	0	0
Test/Calibration/Maintenance	0	0 %	0	0	0	0
Method Development	128	6.1 %	0	0	0	128
Analytical Chemistry	0	0 %	0	0	0	0
Upgrade Cell Design/Hardware	0	0 %	0	0	0	0
Setup	0	0 %	0	0	0	0
Repair	0	0 %	0	0	0	0
TOTAL	2,095.2		50	575.2	80	1,390

¹ Each 20MW resistive magnet requires two power supplies to run, the 45T hybrid magnet requires three power supplies, and the 36T Series Connected Hybrid requires one power supply. Thus, there can be four resistive magnets + three superconducting magnets operating or the 45T hybrid, series connected hybrid, two resistive magnets and three superconducting magnets. User Units are defined as magnet days. Users of water-cooled resistive or hybrid magnets can typically expect to receive enough energy for 7 hours a day of magnet usage, so a magnet day is defined as 7 hours. Superconducting magnets are scheduled typically 24 hours a day.

Table 8. Operations by Discipline

	Total Days Used	Condensed Matter Physics	Chemistry	Engineering	Development of Magnet Technology	Biology, Biochem., Biophys.	Material Science
NHMFL-Affiliated	406.4	258.6	19	4.1	124.7	0	0
Local	21	21	0	0	0	0	0
University, U.S.	934.6	778.1	120.8	9	13	0	13.6
University, non-U.S.	425.9	378.9	42	0	0	5	0
Government Lab, U.S.	133.9	119.9	0	0	0	0	14
Government Lab, non-U.S.	30.4	30.4	0	0	0	0	0
Industry, U.S.	15.1	0	0	0	14.7	0	0.4
Industry, non-U.S.	0	0	0	0	0	0	0
Test/ Calibration/ Maintenance	0	0	0	0	0	0	0
Method Development	128	121	0	0	7	0	0
Analytical Chemistry	0	0	0	0	0	0	0
Upgrade Cell Design/Hardware	0	0	0	0	0	0	0
Setup	0	0	0	0	0	0	0
Repair	0	0	0	0	0	0	0
TOTAL	2,095.2	1,707.8	181.8	13.1	159.4	5	28

Table 9. New Pls¹ and New Users

	All Pis	New PIs at the MagLab	New PIs at Facility	Returning PIs at Facility	All Users	New Users at the MagLab	New Users at Facility	Returning Users at Facility
Senior Personnel, U.S.	108	15	20	88	195	11	18	177
Senior Personnel, non-U.S.	38	12	14	24	60	2	3	57
Postdocs, U.S.	2	1	1	1	85	27	35	50
Postdocs, non-U.S.	0	0	0	0	13	3	4	9
Students, U.S.	0	0	0	0	208	63	71	137
Students, non-U.S.	0	0	0	0	55	32	34	21
Technician, U.S.	0	0	0	0	14	8	9	5
Technician, non-U.S.	0	0	0	0	1	1	1	0
TOTAL	148	28	35	113	631	147	175	456

¹ PIs who received magnet time for the first time.

Table 10. New Pls1

Name	Organization	Proposal	Year of Magnet Time	Is New to MagLab
Charles Ahn	Yale University	P20381	Received 2023	Yes
Dmitri Basov	Columbia University	P20238	Received 2023	Yes
Frédéric Blanc	University of Liverpool	P20322	Received 2023	Yes
Collin Broholm	Johns Hopkins University	P20266	Received 2023	No
Juraj Cernak	Pavol Jozef Safarik University in Kosice	P20220	Received 2023	Yes
E. Dan Dahlberg	University of Minnesota, Twin Cities	P20269	Received 2023	Yes
Louise Debefve	Cornell University	P20304	Received 2023	Yes
Zachery Enderson	Georgia Institute of Technology	P20271	Received 2023	Yes
Songi Han	University of California, Santa Barbara	P20211	Received 2023	No
Bo Hu	Jiangxi University of Science and Technology	P20153	Received 2023	Yes
Deepshikha Jaiswal-Nagar	IISER Thiruvananthapuram	P20237	Received 2023	No
Michael Jensen	Ohio University	P20071	Received 2023	No
Minseong Lee	National High Magnetic Field Laboratory	P19848	Received 2023	No
Ilya Litvak	National High Magnetic Field Laboratory	P19346	Received 2023	Yes
Changjiang Liu	State University of New York, Buffalo	P20132	Received 2023	Yes
Eran Maniv	Ben Gurion University of the Negev	P20034	Received 2023	Yes
Liviu Mirica	University of Illinois at Urbana-Champaign	P20248	Received 2023	Yes
Kimberly Modic	Institute of Science and Technology Austria	P19945	Received 2023	No
Andrew Mounce	Sandia National Laboratories	P20164	Received 2023	Yes
Lucie Norel	Université de Rennes 1	P20122	Received 2023	Yes
Dmitry Ovchinnikov	University of Kansas	P20270	Received 2023	Yes
Sumit Pokhriyal	Graphic Era Hill University	P20474	Received 2023	Yes
Antonio Politano	l'aquila	P20261	Received 2023	Yes
Artem Pronin	University of Stuttgart	P20389	Received 2023	Yes
Jeffrey Reimer	University of California, Berkeley	P20168	Received 2023	No
Daniel Rhodes	University of Wisconsin, Madison (UW)	P20410	Received 2023	Yes
Michael Rose	University of Texas, Austin	P20117	Received 2023	Yes
Stephen Rowley	University of Cambridge	P20134	Received 2023	Yes
Javier Sanchez- Yamagishi	University of California, Irvine	P20159	Received 2023	Yes
Qianhui Shi	University of California, Los Angeles	P19890	Received 2023	Yes
Athinaryanan Sundaresan	Jawaharlal Nehru Centre for Advanced Scientific Research	P19813	Received 2023	Yes
Subhash Thota	Indian Institute of Technology, Guwahati	P20130	Received 2023	Yes
Jian Wang	Peking University	P20256	Received 2023	Yes
Andrew Woods	National High Magnetic Field Laboratory	P20509	Received 2023	Yes
Suyang Xu	Harvard University	P20287	Received 2023	Yes

EMR FACILITY

Table 1. Users by Demographic

	Users ¹	Minority ²	Non- Minority ²	No Response to Race ³	Male	Female	Other	No Response to Gender ³
Senior Personnel, U.S.	58	3	47	8	42	11	0	5
Senior Personnel, non-U.S.	24	2	18	4	15	7	0	2
Postdocs, U.S.	24	1	17	6	15	7	0	2
Postdocs, non-U.S.	7	0	4	3	4	2	0	1
Students, U.S.	54	6	40	8	34	12	0	8
Students, non-U.S.	5	0	4	1	2	2	0	1
Technician, U.S.	1	0	1	0	0	1	0	0
Technician, non-U.S.	0	0	0	0	0	0	0	0
TOTAL	173	12	131	30	112	42	0	19

¹ Users using multiple facilities are counted in each facility listed.

² NSF Minority status includes the following races: American Indian, Alaska Native, Black or African American, Hispanic, Native Hawaiian or other Pacific Islander. The definition also includes Hispanic Ethnicity as a minority group. Minority status excludes Asian and White-Not of Hispanic Origin.

³ Includes pending user account activations.

Table 2. Users by Participation

	Users ¹	Users Present	Users Operating Remotely ²	Users Sending Sample ³	Off-Site User ⁴	User Present Virtually
Senior Personnel, U.S.	58	19	0	12	27	C
Senior Personnel, non-U.S.	24	6	0	9	9	(
Postdocs, U.S.	24	18	0	2	4	(
Postdocs, non-U.S.	7	3	0	1	3	(
Students, U.S.	54	21	0	17	16	(
Students, non-U.S.	5	2	0	2	1	(
Technician, U.S.	1	1	0	0	0	(
Technician, non-U.S.	0	0	0	0	0	(
TOTAL	173	70	0	43	60	(

¹ Users using multiple facilities are counted in each facility listed.

² "Users Operating Remotely" refers to users who operate the magnet system from a remote location. Remote operations are not currently available in all facilities.
 ³ "Users Sending Sample" refers to users who send the sample to the facility and/or research group and the experiment is conducted by other collaborators on the

experiment. Users at UF, FSU, and LANL cannot be "sample senders" for facilities located on their campuses. 4 "Off-Site Users" are scientific or technical participants on the experiment; who will not be present, sending sample, or operating the magnet system remotely; and who are not located on the campus of that facility (i.e., they are off-site).

Table 3. Users by Organization

	Users ¹	External Users	Local Users ²	NHMFL- Affiliated Users ^{2,3,4}	Laboratory ^{3,5}	University ^{4,5}	Industry⁵
Senior Personnel, U.S.	58	40	4	14	6	52	0
Senior Personnel, non-U.S.	24	24	0	0	2	22	0
Postdocs, U.S.	24	16	5	3	3	21	0
Postdocs, non-U.S.	7	7	0	0	0	7	0
Students, U.S.	54	30	14	10	0	54	0
Students, non-U.S.	5	5	0	0	0	5	0
Technician, U.S.	1	0	0	1	0	1	0
Technician, non-U.S.	0	0	0	0	0	0	0
TOTAL	173	122	23	28	11	162	0

¹ Users using multiple facilities are counted in each facility listed.

² NHMFL-Affiliated users are defined as anyone in the lab's personnel system (i.e., on our web site/directory), even if they travel to another site. Local users are defined as any non-NHMFL-Affiliated researchers originating at any of the institutions in proximity to the MagLab sites (i.e., researchers at FSU, UF, FAMU, or

LANL), even if they travel to another site. ³ Users with primary affiliations at NHMFL/LANL are reported in NHMFL-Affiliated Users and National Laboratory

⁴ Users with primary affiliations at FSU, UF, or FAMU are reported in NHMFL-Affiliated Users and National University.
 ⁵ The TOTAL of university, industry, and national lab users will equal the TOTAL number of users.

Table 4. Users by Discipline

	Users ¹	Condensed Matter Physics	Chemistry	Engineering	Development of Magnet Technology	Biology, Bio- chemistry, Biophysics	Material Science
Senior Personnel, U.S.	58	11	37	1	0	6	3
Senior Personnel, non-U.S.	24	5	15	0	1	2	1
Postdocs, U.S.	24	6	13	0	2	0	3
Postdocs, non-U.S.	7	2	5	0	0	0	0
Students, U.S.	54	5	46	0	0	3	0
Students, non-U.S.	5	0	5	0	0	0	0
Technician, U.S.	1	0	0	0	0	1	0
Technician, non-U.S.	0	0	0	0	0	0	0
TOTAL	173	29	121	1	3	12	7

¹ Users using multiple facilities are counted in each facility listed.

Experiments Submitted (Current Year)	Experiments Submitted (Deferred from prev. year)	Experi- ments w/ Usage	Experiments w/ Usage Percentage	Experi- ments Declined	Experiments Declined Percentage	Experi- ments Reviewed	Experiment Subscription Rate	Experiments Subscription Percentage
131	15	135	92.5 %	11	7.5 %	146	1.1	108.1 %

Table 5b. Subscription Rate (Magnet Days)

Days Submitted	Days Used by External User	Days Used by Local User	Days Used by NHMFL-Affiliated User	Days Used for Inst., Dev., Test and Maintenance ¹	Total Days Used	Days Subscription Rate	Days Subscription Percentage
1,367	458.7	55	107	122.3	743	1.8	184 %

¹ Test/Calibration/ Maintenance, Method Development, Analytical Chemistry, Upgrade Cell Design/Hardware Setup, Repair

Table 6a. Research Proposals¹ Profile (Demographics) with Magnet Time

TOTAL Proposals ¹	Minority ²	Non-Minority	No Race Response	Female ³	Male	Other	No Gender Response
57	4	45	8	14	38	0	5

¹ A "proposal" may have associated with it a single experiment or a group of closely related experiments. A PI may have more than one proposal.

² The number of proposals satisfying the following condition: The PI is a minority.

³ The number of proposals satisfying the following condition: The PI is a female.

Note: The table refers to proposal disciplines.

Table 6b. Research Proposals Profile (Discipline) with Magnet Time

TOTAL Proposals	Condensed Matter Physics	Chemistry	Engineering	Development of Magnet Technology	Biology, Biochem., Biophys.	Material Science
57	8	32	1	6	5	5

Find the list of user proposals in Appendix 5 and on our website

Table 7. Operations by Magnet System Group

	Total Days Used ¹	% of Total Days Used	12.5T SC, Pulsed EPR	17T SCM	Bruker ²	HiPER
NHMFL-Affiliated	107	14.4 %	57.5	32.5	2	15
Local	55	7.4 %	0	12	36	7
University, U.S.	283.5	38.2 %	84	125.5	24	50
University, non-U.S.	137.2	18.5 %	33.5	66.2	0	37.5
Government Lab, U.S.	5	0.7 %	0	0	0	5
Government Lab, non-U.S.	33	4.4 %	21	12	0	0
Industry, U.S.	0	0 %	0	0	0	0
Industry, non-U.S.	0	0 %	0	0	0	0
Test/Calibration/Maintenance	87.3	11.8 %	2	12.8	0	72.5
Method Development	9.5	1.3 %	0	0	0	9.5
Analytical Chemistry	0	0 %	0	0	0	0
Upgrade Cell Design/Hardware	25.5	3.4 %	0	0	0	25.5
Setup	0	0 %	0	0	0	0
Repair	0	0 %	0	0	0	0
TOTAL	743		198	261	62	222

¹User Units are defined as magnet days. One magnet day is defined as 24 hours in superconducting magnets.

Table 8. Operations by Discipline

	Total Days Used	Condensed Matter Physics	Chemistry	Engineering	Development of Magnet Technology	Biology, Biochem., Biophys.	Material Science
NHMFL-Affiliated	107	14.5	43.5	13	36	0	0
Local	55	0	55	0	0	0	0
University, U.S.	283.5	40	186	0	0	21	36.5
University, non-U.S.	137.2	24.7	76.5	0	4	0	32
Government Lab, U.S.	5	0	5	0	0	0	0
Government Lab, non-U.S.	33	24	9	0	0	0	0
Industry, U.S.	0	0	0	0	0	0	0
Industry, non-U.S.	0	0	0	0	0	0	0
Test/ Calibration/ Maintenance	87.3	0	6.8	72.5	8	0	0
Method Development	9.5	0	0	8.5	1	0	0
Analytical Chemistry	0	0	0	0	0	0	0
Upgrade Cell Design/Hardware	25.5	0	0	25.5	0	0	0
Setup	0	0	0	0	0	0	0
Repair	0	0	0	0	0	0	0
TOTAL	743	103.2	381.8	119.5	49	21	68.5

Table 9. New Pls¹ and New Users

	All PIs	New PIs at the MagLab	New Pls at Facility	Returning Pls at Facility	All Users	New Users at the MagLab	New Users at Facility	Returning Users at Facility
Senior Personnel, U.S.	39	12	13	26	58	5	10	48
Senior Personnel, non-U.S.	13	4	4	9	24	5	7	17
Postdocs, U.S.	0	0	0	0	24	12	13	11
Postdocs, non-U.S.	2	1	1	1	7	3	4	3
Students, U.S.	0	0	0	0	54	17	21	33
Students, non-U.S.	0	0	0	0	5	3	3	2
Technician, U.S.	0	0	0	0	1	0	0	1
Technician, non-U.S.	0	0	0	0	0	0	0	0
TOTAL	54	17	18	36	173	45	58	115

¹ PIs who received magnet time for the first time.

Table 10. New Pls1

Name	Organization	Proposal	Year of Magnet Time	Is New to MagLab
Claudia Avalos	New York University	P20459	Received 2023	Yes
Raphaële Clément	University of California, Santa Barbara	P20312	Received 2023	Yes
Andreas Danopoulos	National and Kapodistrian University of Athens	P20208	Received 2023	Yes
Selvan Demir	Michigan State University	P20218	Received 2023	Yes
Thierry Dubroca	National High Magnetic Field Laboratory	P20379	Received 2023	Yes
Emre Erdem	Sabanci University	P20302	Received 2023	Yes
Samuel Greer	Los Alamos National Laboratory	P20288	Received 2023	Yes
P. Hammel	Ohio State University	P20308	Received 2023	Yes
Suheon Lee	IBS Center for Artificial Low Dimensional Electronic Systems	P20330	Received 2023	Yes
Jiasong LI	University of Texas, San Antonio	P20342	Received 2023	Yes
Liviu Mirica	University of Illinois at Urbana-Champaign	P20248	Received 2023	Yes
Niels Nielsen	Aarhus University	P20146	Received 2023	Yes
Tomas Orlando	National High Magnetic Field Laboratory	P20433	Received 2023	Yes
Michael Rose	University of Texas, Austin	P20117	Received 2023	Yes
Aaron Sadow	Iowa State University	P20206	Received 2023	Yes
Carolina Sanudo	University of Barcelona	P20305	Received 2023	Yes
Hui Xiong	Boise State University	P20451	Received 2023	No
Mariya Zhuravleva	University of Tennessee, Knoxville	P20554	Received 2023	Yes

¹ PIs who received magnet time for the first time.

HIGH B/T FACILITY

Table 1. Users by Demographic

	Users ¹	Minority ²	Non- Minority ²	No Response to Race ³	Male	Female	Other	No Response to Gender ³
Senior Personnel, U.S.	7	0	7	0	6	1	0	0
Senior Personnel, non-U.S.	0	0	0	0	0	0	0	0
Postdocs, U.S.	4	0	2	2	2	0	0	2
Postdocs, non-U.S.	0	0	0	0	0	0	0	0
Students, U.S.	6	0	6	0	5	1	0	0
Students, non-U.S.	0	0	0	0	0	0	0	0
Technician, U.S.	1	0	0	1	0	0	0	1
Technician, non-U.S.	0	0	0	0	0	0	0	0
TOTAL	18	0	15	3	13	2	0	3

¹ Users using multiple facilities are counted in each facility listed.

² NSF Minority status includes the following races: American Indian, Alaska Native, Black or African American, Hispanic, Native Hawaiian or other Pacific Islander. The definition also includes Hispanic Ethnicity as a minority group. Minority status excludes Asian and White-Not of Hispanic Origin.

³ Includes pending user account activations.

Table 2. Users by Participation

	Users ¹	Users Present	Users Operating Remotely ²	Users Sending Sample ³	Off-Site User⁴	User Present Virtually
Senior Personnel, U.S.	7	5	0	0	2	0
Senior Personnel, non-U.S.	0	0	0	0	0	0
Postdocs, U.S.	4	4	0	0	0	0
Postdocs, non-U.S.	0	0	0	0	0	0
Students, U.S.	6	5	0	0	1	0
Students, non-U.S.	0	0	0	0	0	0
Technician, U.S.	1	1	0	0	0	0
Technician, non-U.S.	0	0	0	0	0	0
TOTAL	18	15	0	0	3	0

¹ Users using multiple facilities are counted in each facility listed.

² "Users Operating Remotely" refers to users who operate the magnet system from a remote location. Remote operations are not currently available in all facilities.
 ³ "Users Sending Sample" refers to users who send the sample to the facility and/or research group and the experiment is conducted by other collaborators on the

 ⁴ "Off-Site Users" are scientific or technical participants on the experiment; who will not be present, sending sample, or operating the magnet system remotely; and who are not located on the campus of that facility (i.e., they are off-site).

Table 3. Users by Organization

	Users ¹	External Users	Local Users ²	NHMFL-Affiliated Users ^{2,3,4}	Laboratory ^{3,5}	University ^{4,5}	Industry ⁵
Senior Personnel, U.S.	7	4	0	3	0	6	1
Senior Personnel, non-U.S.	0	0	0	0	0	0	0
Postdocs, U.S.	4	2	1	1	0	4	0
Postdocs, non-U.S.	0	0	0	0	0	0	0
Students, U.S.	6	4	1	1	0	6	0
Students, non-U.S.	0	0	0	0	0	0	0
Technician, U.S.	1	0	0	1	0	1	0
Technician, non-U.S.	0	0	0	0	0	0	0
TOTAL	18	10	2	6	0	17	1

¹ Users using multiple facilities are counted in each facility listed.

2 NHMFL-Affiliated users are defined as anyone in the lab's personnel system (i.e., on our web site/directory), even if they travel to another site. Local users are defined as any non-NHMFL-Affiliated researchers originating at any of the institutions in proximity to the MagLab sites (i.e., researchers at FSU, UF, FAMU, or

LANL), even if they travel to another site.

³ Users with primary affiliations at NHMFL/LANL are reported in NHMFL-Affiliated Users and National Laboratory.
 ⁴ Users with primary affiliations at FSU, UF, or FAMU are reported in NHMFL-Affiliated Users and National University.

⁵ The TOTAL of university, industry, and national lab users will equal the TOTAL number of users.

Table 4. Users by Discipline

	Users ¹	Condensed Matter Physics	Chemistry	Engineering	Development of Magnet Technology	Biology, Bio- chemistry, Biophysics	Material Science
Senior Personnel, U.S.	7	7	0	0	0	0	0
Senior Personnel, non-U.S.	0	0	0	0	0	0	0
Postdocs, U.S.	4	4	0	0	0	0	0
Postdocs, non-U.S.	0	0	0	0	0	0	0
Students, U.S.	6	6	0	0	0	0	0
Students, non-U.S.	0	0	0	0	0	0	0
Technician, U.S.	1	0	0	1	0	0	0
Technician, non-U.S.	0	0	0	0	0	0	0
TOTAL	18	17	0	1	0	0	0

¹ Users using multiple facilities are counted in each facility listed.

Table 5a. Subscription Rate (Experiments)

Experiments Submitted (Current Year)	Experiments Submitted (Deferred from prev. year)	Experime nts w/ Usage	Experiments w/ Usage Percentage	Experi- ments Declined	Experiments Declined Percentage	Experi- ments Reviewed	Experiment Subscription Rate	Experiments Subscription Percentage
6	0	6	100 %	0	0 %	6	1	100%

Table 5b. Subscription Rate (Magnet Days)

Da Subm	iys nitted	Days Used by External User	Days Used by Local User	Days Used by NHMFL-Affiliated User	Days Used for Inst., Dev., Test and Maintenance ¹	Total Days Used	Days Subscription Rate	Days Subscription Percentage
	902	375	17.5	93.5	416	902	1	100%

¹ Test/Calibration/ Maintenance, Method Development, Analytical Chemistry, Upgrade Cell Design/Hardware Setup, Repair

Table 6a. Research Proposals¹ Profile (Demographics) with Magnet Time

TOTAL Proposals ¹	Minority ²	Non-Minority	No Race Response	Female ³	Male	Other	No Gender Response
5	0	5	0	1	4	0	0

¹ A "proposal" may have associated with it a single experiment or a group of closely related experiments. A PI may have more than one proposal.

² The number of proposals satisfying the following condition: The PI is a minority.
 ³ The number of proposals satisfying the following condition: The PI is a female.

Note: The table refers to proposal disciplines.

Table 6b. Research Proposals Profile (Discipline) with Magnet Time

TOTAL Proposals	Condensed Matter Physics	Chemistry	Engineering	Development of Magnet Technology	Biology, Biochem., Biophys.	Material Science
5	4	0	0	0	1	0

Find the list of user proposals in Appendix 5 and on our website

Table 7. Operations by Magnet System Group

	Total Days Used ¹	% of Total Days Used	17T SCM	Bruker ²	HiPER
NHMFL-Affiliated	93.5	10.4 %	60	0	33.5
Local	17.5	1.9 %	0	0	17.5
University, U.S.	375	41.6 %	119	256	0
University, non-U.S.	0	0 %	0	0	0
Government Lab, U.S.	0	0 %	0	0	0
Government Lab, non-U.S.	0	0 %	0	0	0
Industry, U.S.	0	0 %	0	0	0
Industry, non-U.S.	0	0 %	0	0	0
Test/Calibration/Maintenance	260	28.8 %	75	7	178
Method Development	0	0 %	0	0	0
Analytical Chemistry	0	0 %	0	0	0
Upgrade Cell Design/Hardware	26	2.9 %	26	0	0
Setup	130	14.4 %	47	83	0
Repair	0	0 %	0	0	0
TOTAL	902		327	346	229

¹ User Units are defined as magnet days. One magnet day is defined as 24 hours in superconducting magnets.

Table 8. Operations by Discipline

	Total Days Used	Condensed Matter Physics	Chemistry	Engineering	Development of Magnet Technology	Biology, Biochem., Biophys.	Material Science
NHMFL-Affiliated	93.5	60	0	0	0	33.5	0
Local	17.5	17.5	0	0	0	0	0
University, U.S.	375	375	0	0	0	0	0
University, non-U.S.	0	0	0	0	0	0	0
Government Lab, U.S.	0	0	0	0	0	0	0
Government Lab, non-U.S.	0	0	0	0	0	0	0
Industry, U.S.	0	0	0	0	0	0	0
Industry, non-U.S.	0	0	0	0	0	0	0
Test/ Calibration/ Maintenance	260	164.5	0	0	0	95.5	0
Method Development	0	0	0	0	0	0	0
Analytical Chemistry	0	0	0	0	0	0	0
Upgrade Cell Design/Hardware	26	26	0	0	0	0	0
Setup	130	130	0	0	0	0	0
Repair	0	0	0	0	0	0	0
TOTAL	902	773	0	0	0	129	0

Table 9. New Pls¹ and New Users

	All Pis	New PIs at the MagLab	New PIs at Facility	Returning PIs at Facility	All Users	New Users at the MagLab	New Users at Facility	Returning Users at Facility
Senior Personnel, U.S.	5	0	1	4	7	0	0	7
Senior Personnel, non-U.S.	0	0	0	0	0	0	0	0
Postdocs, U.S.	0	0	0	0	4	0	1	3
Postdocs, non-U.S.	0	0	0	0	0	0	0	0
Students, U.S.	0	0	0	0	6	1	3	3
Students, non-U.S.	0	0	0	0	0	0	0	0
Technician, U.S.	0	0	0	0	1	1	1	0
Technician, non-U.S.	0	0	0	0	0	0	0	0
TOTAL	5	0	1	4	18	2	5	13

¹ PIs who received magnet time for the first time.

Table 10. New Pls

Name	Organization	Proposal	Year of Magnet Time	Is New to MagLab
lan Fisher	Stanford University	P20371	Received 2023	No

ICR FACILITY

Table 1. Users by Demographic

	Users ¹	Minority ²	Non- Minority ²	No Response to Race ³	Male	Female	Other	No Response to Gender ³
Senior Personnel, U.S.	99	8	55	36	43	30	0	26
Senior Personnel, non-U.S.	44	4	14	26	15	5	0	24
Postdocs, U.S.	16	3	11	2	7	7	0	2
Postdocs, non-U.S.	10	1	5	4	6	4	0	0
Students, U.S.	56	8	41	7	22	28	1	5
Students, non-U.S.	14	2	7	5	6	5	0	3
Technician, U.S.	3	0	2	1	1	1	0	1
Technician, non-U.S.	4	0	1	3	0	1	0	3
TOTAL	246	26	136	84	100	81	1	64

¹ Users using multiple facilities are counted in each facility listed.

² NSF Minority status includes the following races: American Indian, Alaska Native, Black or African American, Hispanic, Native Hawaiian or other Pacific Islander. The definition also includes Hispanic Ethnicity as a minority group. Minority status excludes Asian and White-Not of Hispanic Origin.

³ Includes pending user account activations.

Table 2. Users by Participation

	Users ¹	Users Present	Users Operating Remotely ²	Users Sending Sample ³	Off-Site User4	User Present Virtually
Senior Personnel, U.S.	99	12	0	6	81	0
Senior Personnel, non-U.S.	44	2	0	4	38	0
Postdocs, U.S.	16	4	0	4	8	0
Postdocs, non-U.S.	10	0	0	0	10	0
Students, U.S.	56	16	0	8	32	0
Students, non-U.S.	14	6	0	0	8	0
Technician, U.S.	3	0	0	0	3	0
Technician, non-U.S.	4	0	0	0	4	0
TOTAL	246	40	0	22	184	0

¹ Users using multiple facilities are counted in each facility listed.

² "Users Operating Remotely" refers to users who operate the magnet system from a remote location. Remote operations are not currently available in all facilities.
 ³ "Users Sending Sample" refers to users who send the sample to the facility and/or research group and the experiment is conducted by other collaborators on the

experiment. Users at UF, FSU, and LANL cannot be "sample senders" for facilities located on their campuses. 4 "Off-Site Users" are scientific or technical participants on the experiment; who will not be present, sending sample, or operating the magnet system remotely; and who are not located on the campus of that facility (i.e., they are off-site).

Table 3. Users by Organization

	Users ¹	External Users	Local Users ²	NHMFL- Affiliated Users ^{2,3,4}	Laboratory ^{3,5}	University ^{4,5}	Industry⁵
Senior Personnel, U.S.	99	80	7	12	23	71	5
Senior Personnel, non-U.S.	44	44	0	0	9	32	3
Postdocs, U.S.	16	11	2	3	3	13	0
Postdocs, non-U.S.	10	10	0	0	4	6	0
Students, U.S.	56	41	13	2	1	55	0
Students, non-U.S.	14	14	0	0	0	14	0
Technician, U.S.	3	3	0	0	0	1	2
Technician, non-U.S.	4	4	0	0	0	4	0
TOTAL	246	207	22	17	40	196	10

¹ Users using multiple facilities are counted in each facility listed.

² NHMEL-Affiliated users are defined as anyone in the lab's personnel system (i.e., on our website/directory), even if they travel to another site. Local users are defined as any non-NHMFL-Affiliated researchers originating at any of the institutions in proximity to the MagLab sites (i.e., researchers at FSU, UF, FAMU, or LANL), even if they travel to another site. ³ Users with primary affiliations at NHMFL/LANL are reported in NHMFL-Affiliated Users and National Laboratory

⁴ Users with primary affiliations at FSU, UF, or FAMU are reported in NHMFL-Affiliated Users and National University.
 ⁵ The TOTAL of university, industry, and national lab users will equal the TOTAL number of users.

Table 4. Users by Discipline

	Users ¹	Condensed Matter Physics	Chemistry	Engineering	Development of Magnet Technology	Biology, Bio- chemistry, Biophysics	Material Science
Senior Personnel, U.S.	99	0	57	18	0	24	0
Senior Personnel, non-U.S.	44	0	28	4	0	12	0
Postdocs, U.S.	16	0	9	4	0	3	0
Postdocs, non-U.S.	10	0	4	0	0	6	0
Students, U.S.	56	0	29	16	0	11	0
Students, non-U.S.	14	0	9	2	0	3	0
Technician, U.S.	3	0	1	1	0	1	0
Technician, non-U.S.	4	0	0	2	0	2	0
TOTAL	246	0	137	47	0	62	0

¹ Users using multiple facilities are counted in each facility listed.

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Table 5a. Subscription Rate (Experiments)

	Experiments Submitted (Current Year)	Experiments Submitted (Deferred from prev. year)	Experi- ments w/ Usage	Experiments w/ Usage Percentage	Experi- ments Declined	Experiments Declined Percentage	Experi- ments Reviewed	Experiment Subscription Rate	Experiments Subscription Percentage
ſ	93	10	92	89.3 %	11	10.7 %	103	1.1	112 %

Table 5b. Subscription Rate (Magnet Days)

Days Submitted	Days Used by External User	Days Used by Local User	Days Used by NHMFL-Affiliated User	Days Used for Inst., Dev., Test and Maintenance ¹	Total Days Used	Days Subscription Rate	Days Subscription Percentage
1,303	253.6	4.8	18.2	670.5	947	1.4	137.6 %

¹ Test/Calibration/ Maintenance, Method Development, Analytical Chemistry, Upgrade Cell Design/Hardware Setup, Repair

Table 6a. Research Proposals¹ Profile (Demographics) with Magnet Time

	TOTAL Proposals ¹	Minority ²	Non-Minority	No Race Response	Female ³	Male	Other	No Gender Response	
Γ	73	8	50	15	19	46	0	8	ł

¹ A "proposal" may have associated with it a single experiment or a group of closely related experiments. A PI may have more than one proposal.

² The number of proposals satisfying the following condition: The PI is a minority.

³ The number of proposals satisfying the following condition: The PI is a female.

Note: The table refers to proposal disciplines.

Table 6b. Research Proposals Profile (Discipline) with Magnet Time

TOTAL Proposals	Condensed Matter Physics	Chemistry	Engineering	Development of Magnet Technology	Biology, Biochem., Biophys.	Material Science
73	0	55	9	0	9	0

Find the list of user proposals in Appendix 5 and on our website

Table 7. Operations by Magnet System Group

	Total Days Used ¹	% of Total Days Used	9.4 T, 220 mm bore FT-ICR MS	14.5 T Hybrid LTQ/FT-ICR MS	21 T Hybrid LTQ/FT-ICR MS
NHMFL-Affiliated	18.2	1.9 %	0	0	18.2
Local	4.8	0.5 %	0	0	4.8
University, U.S.	64	6.8 %	0	0	64
University, non-U.S.	67.3	7.1 %	0	6.5	60.8
Government Lab, U.S.	1.4	0.1 %	0	0	1.4
Government Lab, non-U.S.	8.7	0.9 %	0	0	8.7
Industry, U.S.	112.2	11.8 %	0	0	112.2
Industry, non-U.S.	0	0 %	0	0	0
Test/Calibration/Maintenance	4	0.4 %	0	0	4
Method Development	0	0 %	0	0	0
Analytical Chemistry	18	1.9 %	0	0	18
Upgrade Cell Design/Hardware	648.5	68.5 %	275	358.5	15
Setup	0	0 %	0	0	0
Repair	0	0 %	0	0	0
TOTAL	947		275	365	307

¹User Units are defined as magnet days. One magnet day is defined as 24 hours in superconducting magnets.

² The 9.4T active system was retired, and the 9.4T passive suffered a costly turbo pump failure that limited instrument usage.

Table 8. Operations by Discipline

	Total Days Used	Condensed Matter Physics	Chemistry	Engineering	Development of Magnet Technology	Biology, Biochem., Biophys.	Material Science
NHMFL-Affiliated	18.2	0	18.2	0	0	0	0
Local	4.8	0	3.9	0.8	0	0	0
University, U.S.	64	0	45.8	6.9	0	11.4	0
University, non-U.S.	67.3	0	65	1.8	0	0.5	0
Government Lab, U.S.	1.4	0	1.4	0	0	0	0
Government Lab, non-U.S.	8.7	0	8.3	0.3	0	0	0
Industry, U.S.	112.2	0	109.7	0	0	2.5	0
Industry, non-U.S.	0	0	0	0	0	0	0
Test/ Calibration/ Maintenance	4	0	4	0	0	0	0
Method Development	0	0	0	0	0	0	0
Analytical Chemistry	18	0	18	0	0	0	0
Upgrade Cell Design/Hardware	648.5	0	648.5	0	0	0	0
Setup	0	0	0	0	0	0	0
Repair	0	0	0	0	0	0	0
TOTAL	947	0	922.8	9.9	0	14.4	0

¹ User Units are defined as magnet days. One magnet day is defined as 24 hours in superconducting magnets.

Table 9. New Pls¹ and New Users

	All PIs	New PIs at the MagLab	New PIs at Facility	Returning PIs at Facility	All Users	New Users at the MagLab	New Users at Facility	Returning Users at Facility
Senior Personnel, U.S.	42	11	11	31	99	21	21	78
Senior Personnel, non-U.S.	19	11	11	8	44	6	6	38
Postdocs, U.S.	0	0	0	0	16	2	2	14
Postdocs, non-U.S.	2	1	1	1	10	5	5	5
Students, U.S.	0	0	0	0	56	25	25	31
Students, non-U.S.	0	0	0	0	14	6	6	8
Technician, U.S.	0	0	0	0	3	0	0	3
Technician, non-U.S.	0	0	0	0	4	0	0	4
TOTAL	63	23	23	40	246	65	65	181

¹ PIs who received magnet time for the first time.

Table 10. New ¹ User Pis

Name	Organization	Proposal	Year of Magnet Time	Is New to MagLab
Hamada Abdelrahman	Cairo University	P20429	Received 2023	Yes
Puspa Adhikari	Florida Gulf Coast University	P20423	Received 2023	Yes
Liane Benning	Helmholtz Zentrum-Potsdam	P19980	Received 2023	Yes
Jennifer Brodbelt	University of Texas, Austin	P20177	Received 2023	Yes
Randelle Bundy	University of Washington	P20222	Received 2023	Yes
Alex Chow	Chinese University of Hong Kong	P20215	Received 2023	Yes
Colin Cooke	University of Alberta	P20052	Received 2023	Yes
Joshua Dean	University of Bristol	P20293	Received 2023	Yes
Dionysios Dionysiou	University of Cincinnati	P20001	Received 2023	Yes
Nir Galili	Swiss Federal Institute of Technology in Zurich	P20226	Received 2023	Yes
Jeffrey Hawkes	Uppsala University	P20174	Received 2023	Yes
Giselle Knudsen	Alaunus Biosciences, Inc.	P20453	Received 2023	Yes
Dolly Kothawala	Uppsala University	P20311	Received 2023	Yes
Kiara Lech	Environmental Protection Agency	P20182	Received 2023	Yes
Mary Lusk	University of Florida	P20205	Received 2023	Yes
Natalia Malina	Auburn University	P20494	Received 2023	Yes
Elise Morrison	University of Florida	P20291	Received 2023	Yes
Diana Palacio	University of Warwick	P20505	Received 2023	Yes
Aidin Panahi	Worcester Polytechnic Institute	P20380	Received 2023	Yes
Daniel Petras	Eberhard Karls University of Tuebingen	P20244	Received 2023	Yes
Ayla Sant'Ana da Silva	National Institute of Technology	P20219	Received 2023	Yes
Bradley Tolar	University of North Carolina, Wilmington	P20200	Received 2023	Yes
Kevin Van Geem	Ghent University	P20216	Received 2023	Yes

NMR FACILITY

Table 1. Users by Demographic

	Users ¹	Minority ²	Non- Minority ²	No Response to Race ³	Male	Female	Other	No Response to Gender ³
Senior Personnel, U.S.	116	5	71	40	67	12	0	37
Senior Personnel, non-U.S.	56	3	22	31	21	9	0	26
Postdocs, U.S.	28	0	20	8	15	6	0	7
Postdocs, non-U.S.	7	0	3	4	1	2	0	4
Students, U.S.	96	13	53	30	46	29	0	21
Students, non-U.S.	32	2	9	21	13	4	0	15
Technician, U.S.	4	0	2	2	2	0	0	2
Technician, non-U.S.	2	0	0	2	0	0	0	2
TOTAL	341	23	180	138	165	62	0	114

¹ Users using multiple facilities are counted in each facility listed.

² NSF Minority status includes the following races: American Indian, Alaska Native, Black or African American, Hispanic, Native Hawaiian or other Pacific Islander. The definition also includes Hispanic Ethnicity as a minority group. Minority status excludes Asian and White-Not of Hispanic Origin.

³ Includes pending user account activations.

Table 2. Users by Participation

	Users ¹	Users Present	Users Operating Remotely ²	Users Sending Sample ³	Off-Site User4	User Present Virtually
Senior Personnel, U.S.	116	25	12	19	60	0
Senior Personnel, non-U.S.	56	2	3	14	37	0
Postdocs, U.S.	28	11	2	0	15	0
Postdocs, non-U.S.	7	0	0	5	2	0
Students, U.S.	96	39	8	15	34	0
Students, non-U.S.	32	4	2	9	17	0
Technician, U.S.	4	2	0	0	2	0
Technician, non-U.S.	2	0	0	1	1	0
TOTAL	341	83	27	63	168	0

¹ Users using multiple facilities are counted in each facility listed.

² "Users Operating Remotely" refers to users who operate the magnet system from a remote location. Remote operations are not currently available in all facilities. ³ "Users Sending Sample" refers to users who send the sample to the facility and/or research group and the experiment is conducted by other collaborators on the

experiment. Users at UF, FSU, and LANL cannot be "sample senders" for facilities located on their campuses. ⁴ "Off-Site Users" are scientific or technical participants on the experiment; who will not be present, sending sample, or operating the magnet system remotely; and who are not located on the campus of that facility (i.e., they are off-site).

Table 3. Users by Organization

	Users ¹	External Users	Local Users ²	NHMFL- Affiliated Users ^{2,3,4}	Laboratory ^{3,5}	University ^{4,5}	Industry⁵
Senior Personnel, U.S.	116	83	12	21	7	105	4
Senior Personnel, non-U.S.	56	56	0	0	6	46	4
Postdocs, U.S.	28	18	5	5	4	23	1
Postdocs, non-U.S.	7	7	0	0	1	6	0
Students, U.S.	96	51	27	18	0	96	0
Students, non-U.S.	32	32	0	0	2	30	0
Technician, U.S.	4	1	1	2	1	3	0
Technician, non-U.S.	2	2	0	0	1	1	0
TOTAL	341	250	45	46	22	310	9

¹ Users using multiple facilities are counted in each facility listed.

² NHMFL-Affiliated users are defined as anyone in the lab's personnel system (i.e., on our web site/directory), even if they travel to another site. Local users are defined as any non-NHMFL-Affiliated researchers originating at any of the institutions in proximity to the MagLab sites (i.e., researchers at FSU, UF, FAMU, or LANL), even if they travel to another site.

³ Users with primary affiliations at NHMFL/LANL are reported in NHMFL-Affiliated Users and National Laboratory

⁴ Users with primary affiliations at FSU, UF, or FAMU are reported in NHMFL-Affiliated Users and National University.

⁵ The TOTAL of university, industry, and national lab users will equal the TOTAL number of users.

Table 4. Users by Discipline

	Users ¹	Condensed Matter Physics	Chemistry	Engineering	Development of Magnet Technology	Biology, Bio- chemistry, Biophysics	Material Science
Senior Personnel, U.S.	116	3	45	20	2	38	8
Senior Personnel, non-U.S.	56	3	30	7	2	7	7
Postdocs, U.S.	28	0	8	5	3	8	4
Postdocs, non-U.S.	7	0	6	1	0	0	0
Students, U.S.	96	0	49	22	1	21	3
Students, non-U.S.	32	0	23	8	0	1	0
Technician, U.S.	4	0	0	1	1	1	1
Technician, non-U.S.	2	0	2	0	0	0	0
TOTAL	341	6	163	64	9	76	23

¹ Users using multiple facilities are counted in each facility listed.

Table 5a. Subscription Rate (Experiments)

	Experiments Submitted (Current Year)	Experiments Submitted (Deferred from prev. year)	Experi- ments w/ Usage	Experiments w/ Usage Percentage	Experi- ments Declined	Experiments Declined Percentage	Experi- ments Reviewed	Experiment Subscription Rate	Experiments Subscription Percentage
ſ	695	13	664	93.8 %	44	6.2 %	708	1.1	106.6 %

Table 5b. Subscription Rate (Magnet Days)

Days Submitted	Days Used by External User	Days Used by Local User	Days Used by NHMFL-Affiliated User	Days Used for Inst., Dev., Test and Maintenance ¹	Total Days Used	Days Subscription Rate	Days Subscription Percentage
3,222	1,558.5	281.5	543.5	77.5	2,461	1.3	130.9 %

¹ Test/Calibration/ Maintenance, Method Development, Analytical Chemistry, Upgrade Cell Design/Hardware Setup, Repair

Table 6a. Research Proposals¹ Profile (Demographics) with Magnet Time

TOTAL Proposals ¹	Minority ²	Non-Minority	No Race Response	Female ³	Male	Other	No Gender Response
74	3	53	18	13	47	0	14

¹ A "proposal" may have associated with it a single experiment or a group of closely related experiments. A PI may have more than one proposal.
² The number of proposals satisfying the following condition: The PI is a minority.

³ The number of proposals satisfying the following condition: The PI is a female.

Note: The table refers to proposal disciplines.

Table 6b. Research Proposals Profile (Discipline) with Magnet Time

TOTAL Proposals	Condensed Matter Physics	Chemistry	Engineering	Development of Magnet Technology	Biology, Biochem., Biophys.	Material Science
74	0	26	7	3	31	7

Find the list of user proposals in Appendix 5 and on our website

Table 7. Operations by Magnet System Group

	Total Days Used ¹	% of Total Days Used	900MHz, 105mm bore, 21.1T	800MHz, 63 mm bore, (MB) 18.8T #1	800MHz, 63mm bore, (MB) 18.8T #2	600MHz, 89mm bore, 14T #1	600MHz, 89mm bore, 14T #2	600MHz, 89mm bore MAS DNP	600MHz, 52mm bore, 14T	500MHz, 89mm bore, 11.7T	Cell 14 36T 40mm SCH
NHMFL-Affiliated	543.5	22.1 %	12	86	133.5	186	53	31.5	0	24.5	17
Local	281.5	11.4 %	107	0	0	3.0	29	5	23	114.5	0
University, U.S.	1,271.5	51.7 %	139	192	184.5	142	262	119	0	216	17
University, non-U.S.	200	8.1 %	0	66	47	24	10	27	0	0	26
Government Lab, U.S.	0	0 %	0	0	0	0	0	0	0	0	0
Government Lab, non-U.S.	0	0 %	0	0	0	0	0	0	0	0	0
Industry, U.S.	87	3.5 %	85	0	0	0	0	0	0	2.0	0
Industry, non-U.S.	0	0 %	0	0	0	0	0	0	0	0	0
Test/Calibration/Maintenance	36.5	1.5 %	0	0	0	3	9	24.5	0	0	0
Method Development	21	0.9 %	0	17	0	4	0	0	0	0	0
Analytical Chemistry	0	0 %	0	0	0	0	0	0	0	0	0
Upgrade Cell Design/Hardware	20	0.8 %	0	0	0	0	0	20	0	0	0
Setup	0	0 %	0	0	0	0	0	0	0	0	0
Repair	0	0 %	0	0	0	0	0	0	0	0	0
TOTAL	2,461		343	361	365	362	363	227	23	357	60

¹User Units are defined as magnet days. One magnet day is defined as 24 hours in superconducting magnets.

Table 8. Operations by Discipline

	Total Days Used	Condensed Matter Physics	Chemistry	Engineering	Development of Magnet Technology	Biology, Biochem., Biophys.	Material Science
NHMFL-Affiliated	543.5	0	393.5	25.5	35.5	89	0
Local	281.5	0	49	196.5	0	33	3
University, U.S.	1,271.5	0	523.5	64	0	622.5	61.5
University, non-U.S.	200	0	155	0	0	7	38
Government Lab, U.S.	0	0	0	0	0	0	0
Government Lab, non-U.S.	0	0	0	0	0	0	0
Industry, U.S.	87	0	0	2	0	85	0
Industry, non-U.S.	0	0	0	0	0	0	0
Test/ Calibration/ Maintenance	36.5	0	3	0	12.5	21	0
Method Development	21	0	9	0	12	0	0
Analytical Chemistry	0	0	0	0	0	0	0
Upgrade Cell Design/Hardware	20	0	0	0	0	20	0
Setup	0	0	0	0	0	0	0
Repair	0	0	0	0	0	0	0
TOTAL	2,461	0	1,133	288	60	877.5	102.5

¹ User Units are defined as magnet days. One magnet day is defined as 24 hours in superconducting magnets.

Table 9. New Pls¹ and New Users

	All PIs	New PIs at the MagLab	New PIs at Facility	Returning PIs at Facility	All Users	New Users at the MagLab	New Users at Facility	Returning Users at Facility
Senior Personnel, U.S.	50	15	15	35	116	27	29	87
Senior Personnel, non-U.S.	13	6	6	7	56	22	22	34
Postdocs, U.S.	2	1	1	1	28	8	9	19
Postdocs, non-U.S.	0	0	0	0	7	2	2	5
Students, U.S.	0	0	0	0	96	32	36	60
Students, non-U.S.	0	0	0	0	32	14	15	17
Technician, U.S.	1	0	0	1	4	1	1	3
Technician, non-U.S.	0	0	0	0	2	1	1	1
TOTAL	66	22	22	44	341	107	115	226

¹ PIs who received magnet time for the first time.

Table 10. New¹ User Pls

Name	Organization	Proposal	Year of Magnet Time	Is New to MagLab
Umit Akbey	University of Pittsburgh	P20289	Received 2023	Yes
Jochen Autschbach	University of Buffalo	P20231	Received 2023	Yes
Frédéric Blanc	University of Liverpool	P20322	Received 2023	Yes
Kaisorn Chaichana	Mayo Clinic, Jacksonville	P20227	Received 2023	Yes
Hoyong Chung	Florida State University	P20469	Received 2023	Yes
Christophe Coperet	ETH Zurich	P20447	Received 2023	Yes
Marcus Foston	Washington University in St. Louis	P19800	Received 2023	Yes
Xingkang Huang	University of Chicago	P20281	Received 2023	Yes
Dinu luga	University of Warwick	P20442	Received 2023	Yes
Sheetal Jain	Indian Institute of Science, Bengaluru	P20357	Received 2023	Yes
Zhihua Jiang	Auburn University	P20306	Received 2023	Yes
Jinsang Kim	University of Michigan	P20444	Received 2023	Yes
Nicholas Kotov	University of Michigan	P20465	Received 2023	Yes
Feng Lin	Virginia Polytechnic Institute and State University	P20482	Received 2023	Yes
Ilya Litvak	National High Magnetic Field Laboratory	P19346	Received 2023	Yes
Clayton Mathews	University of Florida	P20310	Received 2023	Yes
Adam Matzger	University of Michigan	P20497	Received 2023	Yes
Ryan O'Hayre	Colorado School of Mines	P20313	Received 2023	Yes
Vivek Polshettiwar	Tata Institute of Fundamental Research	P20104	Received 2023	Yes
Wei Qiang	State University of New York, Binghamton	P20075	Received 2023	Yes
Snorri Sigurdsson	University of Iceland	P20530	Received 2023	Yes
Amrit Venkatesh	National High Magnetic Field Laboratory	P20323	Received 2023	Yes

PULSED FIELD FACILITY

Table 1. Users by Demographic

	Users ¹	Minority ²	Non- Minority ²	No Response to Race ³	Male	Female	Other	No Response to Gender ³
Senior Personnel, U.S.	61	6	49	6	51	5	0	5
Senior Personnel, non-U.S.	18	1	11	6	12	3	0	3
Postdocs, U.S.	30	0	23	7	20	8	0	2
Postdocs, non-U.S.	8	0	5	3	6	1	0	1
Students, U.S.	30	3	20	7	21	4	0	5
Students, non-U.S.	7	0	5	2	6	1	0	0
Technician, U.S.	1	0	1	0	1	0	0	0
Technician, non-U.S.	0	0	0	0	0	0	0	0
TOTAL	155	10	114	31	117	22	0	16

¹ Users using multiple facilities are counted in each facility listed.

² NSF Minority status includes the following races: American Indian, Alaska Native, Black or African American, Hispanic, Native Hawaiian or other Pacific Islander. The definition also includes Hispanic Ethnicity as a minority group. Minority status excludes Asian and White-Not of Hispanic Origin.

³ Includes pending user account activations.

Table 2. Users by Participation

	Users ¹	Users Present	Users Operating Remotely ²	Users Sending Sample ³	Off-Site User ⁴	User Present Virtually
Senior Personnel, U.S.	61	19	0	4	38	0
Senior Personnel, non-U.S.	18	2	0	1	15	0
Postdocs, U.S.	30	20	0	3	7	0
Postdocs, non-U.S.	8	3	0	0	5	0
Students, U.S.	30	19	0	2	9	0
Students, non-U.S.	7	4	0	0	3	0
Technician, U.S.	1	1	0	0	0	0
Technician, non-U.S.	0	0	0	0	0	0
TOTAL	155	68	0	10	77	0

¹ Users using multiple facilities are counted in each facility listed.

² "Users Operating Remotely" refers to users who operate the magnet system from a remote location. Remote operations are not currently available in all facilities.
 ³ "Users Sending Sample" refers to users who send the sample to the facility and/or research group and the experiment is conducted by other collaborators on the

experiment. Users at UF, FSU, and LANL cannot be "sample senders" for facilities located on their campuses. 4 "Off-Site Users" are scientific or technical participants on the experiment; who will not be present, sending sample, or operating the magnet system remotely; and who are not located on the campus of that facility (i.e., they are off-site).

Table 3. Users by Organization

	Users ¹	External Users	Local Users ²	NHMFL- Affiliated Users ^{2,3,4}	Laboratory ^{3,5}	University ^{4,5}	Industry⁵
Senior Personnel, U.S.	61	37	7	17	25	36	0
Senior Personnel, non-U.S.	18	18	0	0	5	13	0
Postdocs, U.S.	30	15	9	6	15	15	0
Postdocs, non-U.S.	8	8	0	0	1	7	0
Students, U.S.	30	26	2	2	3	27	0
Students, non-U.S.	7	7	0	0	2	5	0
Technician, U.S.	1	0	0	1	1	0	0
Technician, non-U.S.	0	0	0	0	0	0	0
TOTAL	155	111	18	26	52	103	0

¹ Users using multiple facilities are counted in each facility listed.

2 NHMFL-Affiliated users are defined as anyone in the lab's personnel system (i.e., on our web site/directory), even if they travel to another site. Local users are defined as any non-NHMFL-Affiliated researchers originating at any of the institutions in proximity to the MagLab sites (i.e., researchers at FSU, UF, FAMU, or

LANL), even if they travel to another site. ³ Users with primary affiliations at NHMFL/LANL are reported in NHMFL-Affiliated Users and National Laboratory.

⁴ Users with primary affiliations at FSU, UF, or FAMU are reported in NHMFL-Affiliated Users and National University.
 ⁵ The TOTAL of university, industry, and national lab users will equal the TOTAL number of users.

Table 4. Users by Discipline

	Users ¹	Condensed Matter Physics	Chemistry	Engineering	Development of Magnet Technology	Biology, Biochemistry, Biophysics	Material Science
Senior Personnel, U.S.	61	52	3	4	1	1	0
Senior Personnel, non-U.S.	18	15	0	0	0	1	2
Postdocs, U.S.	30	25	2	1	1	0	1
Postdocs, non-U.S.	8	6	0	0	1	0	1
Students, U.S.	30	22	4	1	2	0	1
Students, non-U.S.	7	6	0	0	0	0	1
Technician, U.S.	1	1	0	0	0	0	0
Technician, non-U.S.	0	0	0	0	0	0	0
TOTAL	155	127	9	6	5	2	6

¹ Users using multiple facilities are counted in each facility listed.

Table 5a. Subscription Rate (Experiments)

Experiments Submitted (Current Year)	Experiments Submitted (Deferred from prev. year)	Experi- ments w/ Usage	Experiments w/ Usage Percentage	Experi- ments Declined	Experiments Declined Percentage	Experi- ments Reviewed	Experiment Subscription Rate	Experiments Subscription Percentage
104	12	83	71.6 %	33	28.4 %	116	1.4	139.8 %

Table 5b. Subscription Rate (Magnet Davs)

Days Submitted	Days Used by External User	Days Used by Local User	Days Used by NHMFL-Affiliated User	Days Used for Inst., Dev., Test and Maintenance ¹	Total Days Used	Days Subscription Rate	Days Subscription Percentage
820	420	30	78	37	565	1.5	145.1 %

¹ Test/Calibration/ Maintenance, Method Development, Analytical Chemistry, Upgrade Cell Design/Hardware Setup, Repair

Table 6a. Research Proposals¹ Profile (Demographics) with Magnet Time

TOTAL Proposals ¹	Minority ²	Non-Minority	No Race Response	Female ³	Male	Other	No Gender Response
47	2	42	3	9	37	0	1

¹ A "proposal" may have associated with it a single experiment or a group of closely related experiments. A PI may have more than one proposal.

² The number of proposals satisfying the following condition: The PI is a minority.
 ³ The number of proposals satisfying the following condition: The PI is a female.

Note: The table refers to proposal disciplines.

Table 6b. Research Proposals Profile (Discipline) with Magnet Time

TOTAL Proposals	Condensed Matter Physics	Chemistry	Engineering	Development of Magnet Technology	Biology, Biochem., Biophys.	Material Science
47	38	3	0	2	2	2

Find the list of user proposals in Appendix 5 and on our website

Table 7. Operations by Magnet System Group

	Total Days Used ¹	% of Total Days Used	Duplex	Mid Pulse	Short Pulse
NHMFL-Affiliated	78	13.8 %	0	14	64
Local	30	5.3 %	5	0	25
University, U.S.	227	40.2 %	60	20	147
University, non-U.S.	45	8 %	0	15	30
Government Lab, U.S.	122	21.6 %	20	10	92
Government Lab, non-U.S.	26	4.6 %	0	16	10
Industry, U.S.	0	0 %	0	0	0
Industry, non-U.S.	0	0 %	0	0	0
Test/Calibration/Maintenance	20	3.5 %	0	0	20
Method Development	17	3 %	0	10	7
Analytical Chemistry	0	0 %	0	0	0
Upgrade Cell Design/Hardware	0	0 %	0	0	0
Setup	0	0 %	0	0	0
Repair	0	0 %	0	0	0
TOTAL	565		85	85	395

Table 8. Operations by Discipline

	Total Days Used	Condensed Matter Physics	Chemistry	Engineering	Development of Magnet Technology	Biology, Biochem., Biophys.	Material Science
NHMFL-Affiliated	78	74	0	0	0	0	4
Local	30	30	0	0	0	0	0
University, U.S.	227	202	25	0	0	0	0
University, non-U.S.	45	35	0	0	0	0	10
Government Lab, U.S.	122	122	0	0	0	0	0
Government Lab, non-U.S.	26	26	0	0	0	0	0
Industry, U.S.	0	0	0	0	0	0	0
Industry, non-U.S.	0	0	0	0	0	0	0
Test/ Calibration/ Maintenance	20	20	0	0	0	0	0
Method Development	17	17	0	0	0	0	0
Analytical Chemistry	0	0	0	0	0	0	0
Upgrade Cell Design/Hardware	0	0	0	0	0	0	0
Setup	0	0	0	0	0	0	0
Repair	0	0	0	0	0	0	0
TOTAL	565	526	25	0	0	0	14

Table 9. New Pls¹ and New Users

	All Pis	New PIs at the MagLab	New PIs at Facility	Returning Pls at Facility	All Users	New Users at the MagLab	New Users at Facility	Returning Users at Facility
Senior Personnel, U.S.	29	2	7	22	61	5	9	52
Senior Personnel, non-U.S.	8	3	3	5	18	2	4	14
Postdocs, U.S.	4	2	2	2	30	7	9	21
Postdocs, non-U.S.	0	0	0	0	8	2	2	6
Students, U.S.	0	0	0	0	30	10	20	10
Students, non-U.S.	0	0	0	0	7	3	4	3
Technician, U.S.	0	0	0	0	1	0	1	0
Technician, non-U.S.	0	0	0	0	0	0	0	0
TOTAL	41	7	12	29	155	29	49	106

¹ PIs who received magnet time for the first time.

Table 10. New¹ User Pls

Name	Organization	Proposal	Year of Magnet Time	Is New to MagLab
Ariando Ariando	National University of Singapore	P20051	Received 2023	Yes
Sujit Das	Indian Institute of Science, Bengaluru	P20391	Received 2023	Yes
Debdeep Jena	Cornell University	P19838	Received 2023	No
Sunil Karna	Prairie View A&M University	P20264	Received 2023	No
Sangyun Lee	National High Magnetic Field Laboratory	P20151	Received 2023	Yes
Christopher Mizzi	National High Magnetic Field Laboratory	P20382	Received 2023	Yes
Johanna Palmstrom	National High Magnetic Field Laboratory	P20419	Received 2023	Yes
Sheng Ran	Washington University in St. Louis	P20150	Received 2023	No
Xavier Roy	Columbia University	P19632	Received 2023	No
Keshav Shrestha	Texas A&M University	P19467	Received 2023	No
Susannah Speller	University of Oxford	P20133	Received 2023	Yes
Junjie Yang	New Jersey Institute of Technology	P20048	Received 2023	Yes

APPENDIX 3 – USER FACILITY OVERVIEW

Table 1a. Users by Demographic of All Facilities

	Users ¹	Minority ²	Non- Minority ²	No Response to Race ³	Male	Female	Other	No Response to Gender ³
Senior Personnel, U.S.	633	36	452	145	413	105	0	115
Senior Personnel, non-U.S.	204	14	100	90	101	35	0	68
Postdocs, U.S.	221	11	156	54	132	58	0	31
Postdocs, non-U.S.	45	3	26	16	26	11	0	8
Students, U.S.	566	53	361	152	299	155	1	111
Students, non-U.S.	113	6	62	45	65	20	0	28
Technician, U.S.	37	3	25	9	17	12	0	8
Technician, non-U.S.	7	1	1	5	1	1	0	5
TOTAL	1,826	127	1,183	516	1,054	397	1	374

¹ Users using multiple facilities are counted in each facility listed.

² NSF Minority status includes the following races: American Indian, Alaska Native, Black or African American, Hispanic, Native Hawaiian or other Pacific Islander.

The definition also includes Hispanic Ethnicity as a minority group. Minority status excludes Asian and White-Not of Hispanic Origin.

³ Includes pending user account activations.

Table 1b. Users by Demographic by Facilities

	Users	Minority	Non- Minority	No Response to Race	Male	Female	Other	No Response to Gender
AMRIS – NSF-Funded	125	7	55	63	47	29	0	49
AMRIS – Non-NHMFL Funded	137	16	70	51	50	50	0	37
DC Field	631	33	482	116	450	109	0	72
EMR	173	12	131	30	112	42	0	19
High B/T	18	0	15	3	13	2	0	3
ICR	246	26	136	84	100	81	1	64
NMR	341	23	180	138	165	62	0	114
Pulsed Field	155	10	114	31	117	22	0	16
TOTAL	1,826	127	1,183	516	1,054	397	1	374

Table 2a. Users by Participation of All Facilities

	Users ¹	Users Present ²	Users Present Virtually ³	Users Operating Remotely ⁴	Users Sending Sample⁵	Off-Site Users ⁶
Senior Personnel, U.S.	633	225	1	13	57	337
Senior Personnel, non-U.S.	204	26	0	3	41	134
Postdocs, U.S.	221	139	0	3	10	69
Postdocs, non-U.S.	45	11	0	0	7	27
Students, U.S.	566	348	1	9	53	155
Students, non-U.S.	113	49	0	2	16	46
Technician, U.S.	37	28	0	1	0	8
Technician, non-U.S.	7	1	0	0	1	5
TOTAL	1,826	827	2	31	185	781

¹ Users using multiple facilities are counted in each facility listed. If a user has multiple participations within the facility, it does not double count, instead reports the first occurrence in the following order: User Present takes precedence over User Present Virtually, next User Operating Remotely, and User Sending

Sample and Off-Site User has the least precedence. ² User Present: This person will be physically present in the MagLab user facility during the experiment.

³ User Present Virtually: This person will participate virtually in the data acquisition process under the control of present MagLab user support personnel. Users at FSU, LANL, and UF cannot be "User Present Virtually" for facilities located at their campuses.

⁴ User Operating Remotely: This person will be operating the magnet system from a remote location. Remote operations are not currently available in all facilities. ⁵ User Sending Sample: This person will be sending the sample and the experiment will be conducted by in-house user support personnel. Users at FSU (except ICR), LANL, and UF cannot be "sample senders" for facilities located at their campuses.

⁶ Off-Site User: This person is a scientific or technical participant on the experiment, but will not be present, sending samples, operating the magnet system remotely nor be present virtually.

Table 2b. Users by Participation by Facilities

	Users	Users Present	Users Present Virtually	Users Operating Remotely	Users Sending Sample	Off-Site Users
AMRIS – NSF-Funded	125	87	0	1	0	37
AMRIS – Non-NHMFL Funded	137	111	0	3	0	23
DC Field	631	353	2	0	47	229
EMR	173	70	0	0	43	60
High B/T	18	15	0	0	0	3
ICR	246	40	0	0	22	184
NMR	341	83	0	27	63	168
Pulsed Field	155	68	0	0	10	77
TOTAL	1,826	827	2	31	185	781

Table 3a. Users by Organization of All Facilities

	Users ¹	External Users	Local Users ²	NHMFL- Affiliated Users ^{2,3,4}	Laboratory ^{3,5}	University ^{4,5}	Industry⁵
Senior Personnel, U.S.	633	386	93	154	83	525	25
Senior Personnel, non-U.S.	204	204	0	0	29	168	7
Postdocs, U.S.	221	129	62	30	38	181	2
Postdocs, non-U.S.	45	45	0	0	9	36	0
Students, U.S.	566	338	173	55	7	558	1
Students, non-U.S.	113	113	0	0	9	104	0
Technician, U.S.	37	13	9	15	2	30	5
Technician, non-U.S.	7	7	0	0	1	6	0
TOTAL	1,826	1,235	337	254	178	1,608	40

¹ Users using multiple facilities are counted in each facility listed.

² NHMFL-Affiliated users are defined as anyone in the lab's personnel system (i.e., on our website/directory), even if they travel to another site. Local users are defined as any non-NHMFL-Affiliated researchers originating at any of the institutions in proximity to the MagLab sites (i.e., researchers at FSU, UF, FAMU, or

LANL), even if they travel to another site.
 ³ Users with primary affiliations at NHMFL/LANL are reported in NHMFL-Affiliated Users and National Laboratory.
 ⁴ Users with primary affiliations at FSU, UF, or FAMU are reported in NHMFL-Affiliated Users and National University.
 ⁵ The total of university, industry, and national lab users will equal the total number of users.

Table 3b. Users by Organization by Facilities

	Users	External Users	Local Users	NHMFL- Affiliated Users	Laboratory	University	Industry
AMRIS – NSF-Funded	125	42	64	19	1	123	1
AMRIS – Non-NHMFL Funded	137	12	106	19	0	132	5
DC Field	631	481	57	93	52	565	14
EMR	173	122	23	28	11	162	0
High B/T	18	10	2	6	0	17	1
ICR	246	207	22	17	40	196	10
NMR	341	250	45	46	22	310	9
Pulsed Field	155	111	18	26	52	103	0
TOTAL	1,826	1,235	337	254	178	1,608	40

Table 4a. Users by Discipline of All Facilities

	Users ¹	Condensed Matter Physics	Chemistry	Engineering	Development of Magnet Technology	Biology, Biochemistry, Biophysics	Material Science
Senior Personnel, U.S.	633	195	190	75	24	135	14
Senior Personnel, non-U.S.	204	73	82	12	3	24	10

	Users ¹	Condensed Matter Physics	Chemistry	Engineering	Development of Magnet Technology	Biology, Biochemistry, Biophysics	Material Science
Postdocs, U.S.	221	98	45	15	15	38	10
Postdocs, non-U.S.	45	18	17	1	2	6	1
Students, U.S.	566	181	189	76	14	95	11
Students, non-U.S.	113	55	41	10	1	4	2
Technician, U.S.	37	1	2	12	6	14	2
Technician, non-U.S.	7	1	2	2	0	2	0
TOTAL	1,826	622	568	203	65	318	50

¹ Users using multiple facilities are counted in each facility listed.

Table 4b. Users by Discipline by Facilities

	Users	Condensed Matter Physics	Chemistry	Engineering	Development of Magnet Technology	Biology, Biochemistry, Biophysics	Material Science
AMRIS – NSF-Funded	125	0	40	26	1	58	0
AMRIS – Non-NHMFL Funded	137	0	22	20	1	94	0
DC Field	631	443	76	38	46	14	14
EMR	173	29	121	1	3	12	7
High B/T	18	17	0	1	0	0	0
ICR	246	0	137	47	0	62	0
NMR	341	6	163	64	9	76	23
Pulsed Field	155	127	9	6	5	2	6
TOTAL	1,826	622	568	203	65	318	50

Table 5a. Subscription Rate (Experiments) by Facilities

	Experiments Submitted (Current Year)	Experiments Submitted (De- ferred from prev. year)	Experi- ments With Usage	Experiments With Usage Percentage	Experiments Declined	Experiments Declined Per- centage	Experiments Re viewed	Experiment Subscription Rate	Experiments Subscription Percentage
AMRIS – NSF-Funded	14	21	32	91.4 %	3	8.6 %	35	1.1	109.4 %
AMRIS – Non-NHMFL Funded	9	24	32	97 %	1	3 %	33	1	103.1 %
DC Field	408	37	304	68.3 %	141	31.7 %	445	1.5	146.4 %
EMR	131	15	135	92.5 %	11	7.5 %	146	1.1	108.1 %
High B/T	6	0	6	100 %	0	0 %	6	1	100 %
ICR	93	10	92	89.3 %	11	10.7 %	103	1.1	112 %
NMR	695	13	664	93.8 %	44	6.2 %	708	1.1	106.6 %
Pulsed Field	104	12	83	71.6 %	33	28.4 %	116	1.4	139.8 %
TOTAL	1,460	132	1,348		244		1,592		

Table 5b. Subscription Rate (Magnet Days) by Facilities

	Days Submitted	Days Used by External User	Days Used by Local User	Days Used by NHMFL- Affiliated User	Days Used for Inst., Dev., Test, Maintenance	Total Days Used	Days Sub- scription Rate	Days Sub- scription Percentage
AMRIS – NSF-Funded	971	225.5	190.5	48.3	506.7	971	1	100 %
AMRIS – Non-NHMFL Funded	811	133.5	108	569.5	0	811	1	100 %
DC Field	3,359	1,539.8	21	406.4	128	2,095.2	1.6	160.3 %
EMR	1,367	458.7	55	107	122.3	743	1.8	184 %
High B/T	902	375	17.5	93.5	416	902	1	100 %
ICR	1,303	253.6	4.8	18.2	670.5	947	1.4	137.6 %
NMR	3,222	1,558.5	281.5	543.5	77.5	2,461	1.3	130.9 %

	Days Submitted	Days Used by External User	Days Used by Local User	Days Used by NHMFL- Affiliated User	Days Used for Inst., Dev., Test, Maintenance	Total Days Used	Days Sub- scription Rate	Days Sub- scription Percentage
Pulsed Field	820	420	30	78	37	565	1.5	145.1 %
TOTAL	12,755	4,964.6	708.3	1,864.4	1,958	9,495.2		

Table 6. Research Proposals¹ Profile with Magnet Time by Facilities

	Total Pro- posals ¹	Minor- ity²	Non-Mi- nority	No Race Response	Female ³	Male	Other	No Gen- der Re- sponse	СМР	Chem- istry	Engi- neer- ing	Develop- ment of Magnet Tech- nology	Biology, Bio- chem, Biophys.	Material Science
AMRIS – NSF- Funded	32	1	25	6	9	18	0	5	0	6	5	5	16	0
AMRIS – Non- NHMFL Funded	31	3	23	5	7	20	0	4	0	0	0	0	31	0
DC Field	162	6	132	24	27	124	0	11	118	18	2	16	5	3
EMR	57	4	45	8	14	38	0	5	8	32	1	6	5	5
High B/T	5	0	5	0	1	4	0	0	4	0	0	0	1	0
ICR	73	8	50	15	19	46	0	8	0	55	9	0	9	0
NMR	74	3	53	18	13	47	0	14	0	26	7	3	31	7
Pulsed Field	47	2	42	3	9	37	0	1	38	3	0	2	2	2
TOTAL	481	27	375	79	99	334	0	48	168	140	24	32	100	17

¹A "proposal" may have associated with it a single experiment or a group of closely related experiments. A PI may have more than one proposal.

² The number of proposals satisfying the following condition: The PI is a minority.

³ The number of proposals satisfying the following condition: The PI is a female.

Note: The table refers to proposal disciplines.

Find the list of user proposals in Appendix 5 and on our website

Table 7. Operations by User Type by Facilities

	Total Days Used	Days Used by External User ⁸	Days Used by Local User ⁹	Days Used by NHMFL-Affiliated User ¹⁰	Days of Instrumentation Development and Maintenance ¹¹
AMRIS – NSF-Funded ¹	971	225.5	190.5	48.3	971
AMRIS – Non-NHMFL Funded ¹	811	133.5	108	569.5	811
DC Field ²	2,095.2	1,539.8	21	406.4	2,095.2
EMR ³	743	458.7	55	107	743
High B/T⁴	902	375	17.5	93.5	902
ICR⁵	947	253.6	4.8	18.2	947
NMR ⁶	2,461	1,558.5	281.5	543.5	2,461
Pulsed Field ⁷	565	420	30	78	565
TOTAL	9,495.2	4,964.6	708.3	1,864.4	9,495.2

¹User Units are defined as magnet days; time utilized is recorded to the nearest 15 minutes. Magnet day definitions for AMRIS instruments: Verticals (500, 600s, & 750MHz), 1 magnet day = 24 hours. Horizontals (4.7 and 11.1T), 1 magnet day = 8 hours. This accounts for the difficulty in running animal or human studies overnight. Magnet days were calculated by adding the total number of real used for each instrument and dividing by 24 (vertical) or 8 (horizontal). Note: Due to the nature of the 4.7T and 11T studies, almost all studies with external users were collaborative with UF investigators.

² Each 20MW resistive magnet requires two power supplies to run, the 45T hybrid magnet requires three power supplies, and the 36T Series Connected Hybrid requires one power supply. Thus, there can be four resistive magnets + three superconducting magnets operating or the 45T hybrid, series connected hybrid, two resistive magnets and three superconducting magnets. User Units are defined as magnet days. Users of water-cooled resistive or hybrid magnets can typically expect to receive enough energy for 7 hours a day of magnet usage, so a magnet day is defined as 7 hours. Superconducting magnets are scheduled typically 24 hours a day.

^{3,4,5,6} User Units are defined as magnet days. One magnet day is defined as 24 hours in superconducting magnets.
 ⁷ User Units are defined as magnet days. Magnets are scheduled typically 12 hours a day.

⁸ Days to external users at facility => all U.S. University, U.S. Govt. Lab., U.S. Industry, Non-U.S. excluding NHMFL Affiliated, Local, Test, Calibration, Set-up, Maintenance, Inst. Dev.

⁹ Days to local => local only

¹⁰ Days to NHMFL-Affiliated (in-house) research => NHMFL-Affiliated only

¹¹ Days to instrument development and maintenance (combined) => Test/Calibration/ Maintenance, Method Development, Analytical Chemistry, Upgrade Cell Design/Hardware Setup, Repair

	Total Days Used	Condensed Matter Physics	Chemistry	Engineering	Development of Magnet Technology	Biology, Biochemistry Biophysics	Material Science
NHMFL-Affiliated	1,864.4	407.1	529.5	42.6	230.7	650.5	4
Local	708.3	68.5	161.1	197.3	0	278.3	3
University, U.S.	3,479.1	1,395.1	1,003.5	215	13	740.9	111.6
University, non-U.S.	875.4	438.5	338.5	1.8	4	12.5	80
Government Lab, U.S.	262.3	241.9	6.4	0	0	0	14
Government Lab, non-U.S.	98	80.4	17.3	0.3	0	0	0
Industry, U.S.	249.8	0	145.2	2	14.7	87.5	0.4
Industry, non-U.S.	0	0	0	0	0	0	0
Test/Calibration/ Maintenance	648.2	184.5	13.8	72.5	260.8	116.5	0
Method Development	298	138	9	8.5	142.5	0	0
Analytical Chemistry	18	0	18	0	0	0	0
Upgrade Cell Design/Hardware	749.7	26	648.5	25.5	29.7	20	0
Setup	244.2	130	0	0	114.2	0	0
Repair	0	0	0	0	0	0	0
TOTAL	9,495.2	3,110	2,890.8	565.7	809.6	1,906.2	213

Table 8. Operations by Discipline of All Facilities

Table 8b. Operations by Discipline of All Facilities

	Total Days Used	Condensed Matter Physics	Chemistry	Engineering	Development of Magnet Technology	Biology Biochemistry Biophysics	Material Science
AMRIS – NSF-Funded	971	0	102.8	135.2	515.2	217.8	0
AMRIS – Non-NHMFL Funded	811	0	143.5	0	26	641.5	0
DC Field	2,095.2	1,707.8	181.8	13.1	159.4	5	28
EMR	743	103.2	381.8	119.5	49	21	68.5
High B/T	902	773	0	0	0	129	0
ICR	947	0	922.8	9.9	0	14.4	0
NMR	2,461	0	1,133	288	60	877.5	102.5
Pulsed Field	565	526	25	0	0	0	14
TOTAL	9,495.2	3,110	2,890.8	565.7	809.6	1,906.2	213

Table 9a. New PIs¹ and New Users of All Facilities

	All Pis	New PIs at the MagLab	New PIs at Facility	Returning Pls at Facility	All Users	New Users at the MagLab	New Users at Facility	Returning Users at Facility
Senior Personnel, U.S.	332	62	77	255	633	75	96	537
Senior Personnel, non- U.S.	91	36	38	53	204	39	44	160
Postdocs, U.S.	9	4	4	5	221	63	77	144
Postdocs, non-U.S.	4	2	2	2	45	15	17	28
Students, U.S.	0	0	0	0	566	158	191	375
Students, non-U.S.	0	0	0	0	113	58	62	51
Technician, U.S.	1	0	0	1	37	10	13	24
Technician, non-U.S.	0	0	0	0	7	2	2	5
TOTAL	437	104	121	316	1,826	420	502	1,324

Table 9b. New PIs and New Users by Facilities

	All Pis	New Pls at the MagLab	New PIs at Facility	Returning PIs at Facility	All Users	New Users at the MagLab	New Users at Facility	Returning Users at Facility
AMRIS – NSF-Funded	31	4	7	24	125	16	22	103
AMRIS – Non-NHMFL Funded	29	3	3	26	137	9	13	124
DC Field	148	28	35	113	631	147	175	456
EMR	54	17	18	36	173	45	58	115
High B/T	5	0	1	4	18	2	5	13
ICR	63	23	23	40	246	65	65	181
NMR	66	22	22	44	341	107	115	226
Pulsed Field	41	7	12	29	155	29	49	106
TOTAL	437	104	121	316	1,826	420	502	1,324

Table 10a. Funding Source of Users' Research-Day Allotted (Counts) by Facilities

	Total Days Used	NSF ¹	NIH	DOE	DOD ²	VSP	FFI	UF MBI	EPA	Interna- tional	Na- tional	In- dustry ³	Other
AMRIS – NSF- Funded	971	742.8	184.7	0	0	0	0	0	0	0	43.5	0	0
AMRIS – Non- NHMFL Funded	811	39	497.4	0	0	0	0	0	0	0	224.1	50.5	0
DC Field	2,095.2	991.9	5	458.5	32.8	0	0	0	0	403.5	177.3	26.3	0
EMR	743	458.8	19	111.5	9	0	0	0	0	108.2	28	8.5	0
High B/T	902	556	0	189	157	0	0	0	0	0	0	0	0
ICR	947	843.3	5	1.1	4.6	0	0	0	0.3	62.1	20.1	9.4	1.1
NMR	2,461	885.7	556.7	333.3	5.3	0	0	0	0	220.3	323.7	10	126
Pulsed Field	565	168.2	0	286.8	19	5	0	0	0	46	40	0	0
TOTAL	9,495.2	4,685.7	1,267.8	1,380.3	227.8	5	0	0	0.3	840.1	856.6	104.7	127.1

Includes NSF, UCGP, and 'No other support'.
 Includes NASA, US Army, US Navy, and US Air Force.
 Includes US Industry and Non-US Industry.

Table 10b. Funding Source of Users' Research-Day Allotted (Percentage) by Facilities

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	NSF ¹	NIH	DOE	DOD ²	VSP	FFI	UF MBI	EPA	Interna- tional	National	In- dustry³	Other
AMRIS – NSF-Funded	76.5 %	19 %	0 %	0 %	0 %	0 %	0 %	0 %	0 %	4.5 %	0 %	0 %
AMRIS – Non-NHMFL Funded	4.8 %	61.3 %	0 %	0 %	0 %	0 %	0 %	0 %	0 %	27.6 %	6.2 %	0 %
DC Field	47.3 %	0.2 %	21.9 %	1.6 %	0 %	0 %	0 %	0 %	19.3 %	8.5 %	1.3 %	0 %
EMR	61.8 %	2.6 %	15 %	1.2 %	0 %	0 %	0 %	0 %	14.6 %	3.8 %	1.1 %	0 %
High B/T	61.6 %	0 %	21 %	17.4 %	0 %	0 %	0 %	0 %	0 %	0 %	0 %	0 %
ICR	89.1 %	0.5 %	0.1 %	0.3 %	0 %	0 %	0 %	0 %	6.6 %	2.1 %	1 %	0.1 %
NMR	36 %	22.6 %	13.5 %	0.1 %	0 %	0 %	0 %	0 %	9 %	13.2 %	0.4 %	5.1 %
Pulsed Field	29.8 %	0 %	50.8 %	3.4 %	0.9 %	0 %	0 %	0 %	8.1 %	7.1 %	0 %	0 %

APPENDIX 4 – USERS' GEOGRAPHIC DISTRIBUTION

AMRIS FACILITY

NSF FUNDED NATIONAL USERS (123)

First Name	Last Name	Organization	State	Country
Sam	Afoullouss	University of South Florida	FL	USA
Diba	Allameh Zadeh	University of Florida	FL	USA
Tyler	Alsup	University of Florida	FL	USA
Kara	Anazia	University of Florida	FL	USA
Anastasios	Angelopoulos	University of Cincinnati	OH	USA
Bill	Baker	University of South Florida	FL	USA
Sarah	Barber	University of Cincinnati	OH	USA
Jehangir	Bhadha	Everglades Research and Education Center at UF	FL	USA
Rebecca	Bivins	Georgia Institute of Technology	GA	USA
Omar	Boloki	University of Florida	FL	USA
Joe	Bracegirdle	University of South Florida	FL	USA
Jeannine	Brady	University of Florida	FL	USA
William	Brey	National High Magnetic Field Laboratory	FL	USA
A. Caroline	Buchanan	University of Florida	FL	USA
Maria Luiza	Caldas Nogueira	University of Florida	FL	USA
Tracy	Centanni	University of Florida	FL	USA
Amanda	Chappel	University of Florida	FL	USA
Coray	Colina	University of Florida	FL	USA
Brenton	Cooper	Texas Christian University	ТХ	USA
Jinlei	Cui	Washington University in St. Louis	MO	USA
Sreyashi	Das	University of Florida	FL	USA
lke	de la Pena	Loma Linda University	CA	USA
Omar	Ebrahim	Northwestern University	IL	USA
Matthew	Eddy	University of Florida	FL	USA
Michelle	Ehrenberger	University of Florida	FL	USA
Junchuan	Fang	University of Cincinnati	OH	USA
Gail	Fanucci	University of Florida	FL	USA
Marcelo	Febo	University of Florida	FL	USA
Marcos	Ferreira	University of Florida	FL	USA
Johnny	Figueroa	Loma Linda University	CA	USA
Sean	Forbes	University of Florida	FL	USA
Nathan	Gianneschi	Northwestern University	IL	USA
Niloofar	Gopal Pour	University of Florida	FL	USA
Zhongwu	Guo	University of Florida	FL	USA
Hala	Hachem	University of Florida	FL	USA
Eric	Hahnert	Massachusetts Institute of Technology	MA	USA
Songi	Han	University of California, Santa Barbara	CA	USA
Michael	Harris	University of Florida	FL	USA

First Name	Last Name	Organization	State	Country
Cora	Hart	University of Florida	FL	USA
Daniel	Icenhour	University of Florida	FL	USA
Philippe	Jean-Baptiste	Massachusetts Institute of Technology	MA	USA
Kelly	Jenkins	University of Florida	FL	USA
Beining (Kim)	Jin	University of Florida	FL	USA
Vishwas	Jindal	University of Florida	FL	USA
Jonathan	Judy	University of Florida	FL	USA
Amandine	Jullienne	University of California, Irvine	CA	USA
Samuel	Kaser	Massachusetts Institute of Technology	MA	USA
Sushain	Kaul	University of Florida	FL	USA
SAYAN	Kundu	University of Florida	FL	USA
Renuk	Lakshmanan	University of Florida	FL	USA
Sree	Laxmi	University of Florida	FL	USA
Zining	Li	University of Florida	FL	USA
Ryan	Lively	Georgia Institute of Technology	GA	USA
Sandra	Loesgen	University of Florida	FL	USA
Joanna	Long	University of Florida	FL	USA
MD Anik	Mahmud	University of Florida	FL	USA
Thomas	Mareci	University of Florida	FL	USA
Erin	Marshall	University of Florida	FL	USA
Mark	Mattingly	Bruker Biospin	MA	USA
Caitlin	McCadden	University of Florida	FL	USA
Robert	McKenna	University of Florida	FL	USA
Anil	Mehta	University of Florida	FL	USA
Matthew	Merritt	University of Florida	FL	USA
Federica	Montesanto	University of Florida	FL	USA
Elise	Morrison	University of Florida	FL	USA
Venkanna	Mullapudi	University of Florida	FL	USA
Emma	Mulry	University of Florida	FL	USA
Jennifer	Munson	Virginia Tech	VA	USA
Sean	Najmi	University of Delaware	DE	USA
Jonathan	Nickels	University of Cincinnati	ОН	USA
Wenbo	Ning	University of Florida	FL	USA
Brenda Patricia	Noarbe	University of California, Irvine	CA	USA
Chase	Norton	University of Florida	FL	USA
Andre	Obenaus	University of California, Irvine	CA	USA
Julia	Oktawiec	Northwestern University	IL	USA
Stine Sofie	Olsen	University of South Florida	FL	USA
Perla	Ontiveros-Ángel	Loma Linda University	CA	USA
Evelyn	Patterson	University of Florida	FL	USA
Radoslav	Pavlovic	Northwestern University	IL	USA
Qingqing (Emily)	Peng	University of Florida	FL	USA

First Name	Last Name	Organization	State	Country
Nessa	Pesaran Afsharian	University of Florida	FL	USA
Bastien	Petit	University of Florida	FL	USA
Enzo	Petracco	University of Florida	FL	USA
Isabella	Pinto	University of Florida	FL	USA
Marjory	Pompilus	University of Florida	PR	USA
Shane	Priester	University of Florida	FL	USA
Arka Prabha	Ray	University of Florida	FL	USA
Isabel	Rivera Santiago	University of Florida	FL	USA
James	Rocca	University of Florida	FL	USA
Rajendra	Rohokale	University of Florida	FL	USA
Jeffrey	Rudolf	University of Florida	FL	USA
Malisa	Sarntinoranont	University of Florida	FL	USA
Esun	Selvam	University of Delaware	DE	USA
Fransua	Sharafeddin	Loma Linda University	CA	USA
Julio	Sierra	Loma Linda University	CA	USA
Timothy	Simon	Loma Linda University	CA	USA
Joshua	Slade	University of Florida	FL	USA
Benjamin	Smith	University of Florida	FL	USA
Zachary	Smith	Massachusetts Institute of Technology	MA	USA
Diana	Stancic	University of Florida	FL	USA
Emma	Stowell	University of Florida	FL	USA
Brent	Sumerlin	University of Florida	FL	USA
Lee	Sweeney	University of Florida	FL	USA
Daniel R.	Talham	University of Florida	FL	USA
Naveen	Thakur	University of Florida	FL	USA
Jeremy	Thomas	University of Florida	FL	USA
Blake	Trusty	University of Florida	FL	USA
Shahabeddin	Vahdat	University of Florida	FL	USA
David	Vaillancourt	University of Florida	FL	USA
Lilit	Vardanyan	University of Florida	FL	USA
Sergey	Vasenkov	University of Florida	FL	USA
Julio	Vega-Torres	Loma Linda University	CA	USA
Dionisios	Vlachos	University of Delaware	DE	USA
Elizabeth	Vo	Malcom Randall VA Medical Center	FL	USA
Glenn	Walter	University of Florida	FL	USA
Xiuting	Wei	University of Florida	FL	USA
Josh	Welsch	University of South Florida	FL	USA
Daniel	Wesson	University of Florida	FL	USA
Anuradha	Wijesekara	University of Florida	FL	USA
Jennifer	Williams	University of South Florida	FL	USA
Baofu	Xu	University of Florida	FL	USA
24014		Georgia Institute of Technology	GA	USA

First Name	Last Name	Organization	State	Country
Huadong	Zeng	University of Florida	FL	USA
NSF FUNDED II	NTERNATIONAL US	ERS (2)		
First Name	Last Name	Organization	Co	untry
Rosana	Assunção	Federal University of Uberlândia do Pontal	В	razil
Rodrigo	Panatieri	Federal University of Uberlândia do Pontal	В	razil
NON NHMFL FU	JNDED NATIONAL U	JSERS (137)		
First Name	Last Name	Organization	State	Country
Jose	Abisambra	University of Florida	FL	USA
Fatma	Al-Awadhi	University of Florida	FL	USA
Diba	Allameh Zadeh	University of Florida	FL	USA
Kyle	Allen	University of Florida	FL	USA
Eiko	Alzamora	University of Florida	FL	USA
Kara	Anazia	University of Florida	FL	USA
David	Arpin	University of Florida	FL	USA
Jared	Baisden	Scripps Research Institute - Florida	FL	USA
Alison	Barnard	University of Florida	FL	USA
Abhinandan	Batra	University of Florida	FL	USA
Jehangir	Bhadha	Everglades Research and Education Center at	FL	USA
Omar	Boloki	University of Florida	FL	USA
Markia	Bowe	University of Florida	FL	USA
A. Caroline	Buchanan	University of Florida	FL	USA
Ta-Tyonna	Buck	University of Florida	FL	USA
Joy	Buraima	University of Florida	FL	USA
Roxana	Burciu	University of Florida	FL	USA
Sara	Burke	University of Florida	FL	USA
Rebecca	Butcher	University of Florida	FL	USA
Maria Luiza	Caldas Nogueira	University of Florida	FL	USA
Eduardo	Candelario-Jalil	University of Florida	FL	USA
Paramita	Chakrabarty	University of Florida	FL	USA
Mario	Chang Reyes	University of Florida	FL	USA
Amanda	Chappel	University of Florida	FL	USA
Qiyin	Chen	University of Florida	FL	USA
Evangelos	Christou	University of Florida	FL	USA
Luis	Concepcion	University of Florida	FL	USA
Jonathan	Cooper	University of Florida	FL	USA
Taylor	Corcoran	University of Florida	FL	USA
Mackenzie	Davenport	University of Florida	FL	USA
Jesse	DeSimone	University of Texas, Southwestern	ТΧ	USA
Matthew	Eddy	University of Florida	FL	USA
Ahmed	Elbanna	University of Florida	FL	USA
Anna	Farmer (Liner)	University of Florida	FL	USA

First Name	Last Name	Organization	State	Country
Matthew	Farrer	University of Florida	FL	USA
Marcelo	Febo	University of Florida	FL	USA
Phillippe	Fernandes	University of Florida	FL	USA
Sean	Forbes	University of Florida	FL	USA
Leslie	Gaynor	University of Florida	FL	USA
Anthony	Giacalone	University of Florida	FL	USA
Drew	Gillett	University of Florida	FL	USA
Niloofar	Gopal Pour	University of Florida	FL	USA
Jacob	Griffith	University of Florida	FL	USA
Matteo	Grudny	University of Florida	FL	USA
Kimberly	Guice	University of Florida	FL	USA
Hala	Hachem	University of Florida	FL	USA
Matthew	Hamm	Lacerta Therapeutics	FL	USA
Michael	Harris	University of Florida	FL	USA
Beining (Kim)	Jin	University of Florida	FL	USA
Jonathan	Judy	University of Florida	FL	USA
Amandine	Jullienne	University of California, Irvine	CA	USA
Catherine	Kaczorowski	Jackson Laboratory	ME	USA
Mallesh	Kathe	University of Florida	FL	USA
Sushain	Kaul	University of Florida	FL	USA
Chalermchai	Khemtong	University of Florida	FL	USA
Habibeh	Khoshbouei	University of Florida	FL	USA
Benjamin	Kidd	University of Florida	FL	USA
Sofia	Kokkaliari	University of Florida	FL	USA
Eric	Krause	University of Florida	FL	USA
Sree	Laxmi	University of Florida	FL	USA
Jada	Lewis	University of Florida	FL	USA
Hong	Li	Florida State University	FL	USA
Yuqing	Li	University of Florida	FL	USA
Suzanne	Lightsey	University of Florida	FL	USA
Joanna	Long	University of Florida	FL	USA
Christopher	Lopez	University of Florida	FL	USA
Donovan	Lott	University of Florida	FL	USA
Hendrik	Luesch	University of Florida	FL	USA
Melissa	Maczis	University of Florida	FL	USA
MD Anik	Mahmud	University of Florida	FL	USA
Nesmine	Maptue	University of Florida	FL	USA
Joseph	Marcinko	Polymer Synergies, LLC	FL	USA
Johanna	McCracken	University of Florida	FL	USA
Nikolaus	McFarland	University of Florida	FL	USA
Marc	McLeod	University of Florida	FL	USA
Anil	Mehta	University of Florida	FL	USA

First Name	Last Name	Organization	State	Country
Matthew	Merritt	University of Florida	FL	USA
Aaron	Mickle	University of Florida	FL	USA
Ann	Mislovic	University of Florida	FL	USA
Elise	Morrison	University of Florida	FL	USA
Emma	Mulry	University of Florida	FL	USA
John	Neubert	University of Florida	FL	USA
Brenda Patricia	Noarbe	University of California, Irvine	CA	USA
Andre	Obenaus	University of California, Irvine	CA	USA
Edward	Ofori	University of Florida	FL	USA
Michael	Okun	University of Florida	FL	USA
Caitlin	Orsini	University of Florida	FL	USA
Rojina	Pad	University of California, Irvine	CA	USA
Shrina	Patel	University of Florida	FL	USA
Evelyn	Patterson	University of Florida	FL	USA
Joshua	Pegoraro	University of Florida	FL	USA
Qingqing (Emily)	Peng	University of Florida	FL	USA
Nessa	Pesaran Afsharian	University of Florida	FL	USA
Enzo	Petracco	University of Florida	FL	USA
Isabella	Pinto	University of Florida	FL	USA
Michael	Pizzi	University of Florida	FL	USA
Marjory	Pompilus	University of Florida	PR	USA
Cathy	Powers	University of Florida	FL	USA
Shane	Priester	University of Florida	FL	USA
Jackson	Pugmire	University of Florida	FL	USA
Wonn	Pyon	University of Florida	FL	USA
Mukundan	Ragavan	St. Jude Children's Research Hospital	TN	USA
Sakthivel	Ravi	University of Florida	FL	USA
Arka Prabha	Ray	University of Florida	FL	USA
Leah	Reznikov	University of Florida	FL	USA
James	Rocca	University of Florida	FL	USA
Nicholas	Rodriguez	University of Florida	FL	USA
Aleyna	Ross	University of Florida	FL	USA
Anna	Rushin	University of Florida	FL	USA
Blanka	Sharma	University of Florida	FL	USA
Qingyang	Shen	University of Florida	FL	USA
Zachary	Simon	University of Florida	FL	USA
Jasmine	Smith	University of Florida	FL	USA
Kaitlin	Southern	University of Florida	FL	USA
Michael	Strinden	University of Florida	FL	USA
Maurice	Swanson	University of Florida	FL	USA
Lee	Sweeney	University of Florida	FL	USA
Daniel R.	Talham	University of Florida	FL	USA

First Name	Last Name	Organization	State	Country
Madison	Temples	University of Florida	FL	USA
Naveen	Thakur	University of Florida	FL	USA
Emily	Tobin	University of Florida	FL	USA
Blake	Trusty	University of Florida	FL	USA
Dana	Tuyn	University of Florida	FL	USA
Diana	Tymochko	University of Florida	FL	USA
Shahabeddin	Vahdat	University of Florida	FL	USA
David	Vaillancourt	University of Florida	FL	USA
Pedro Antonio	Valdes Hernandez	University of Florida	FL	USA
Sergey	Vasenkov	University of Florida	FL	USA
Glenn	Walter	University of Florida	FL	USA
Kevin (Ka)	Wang	University of Florida	FL	USA
Kara	Wendel	University of California, Irvine	CA	USA
Anuradha	Wijesekara	University of Florida	FL	USA
Lakiesha	Williams	University of Florida	FL	USA
Marcelo	Wood	University of California, Irvine	CA	USA
Taylor	Yeater	University of Florida	FL	USA
ChiSu	Yoon	University of Florida	FL	USA
Huadong	Zeng	University of Florida	FL	USA

NON NHMFL FUNDED INTERNATIONAL USERS (0)

First Name	Last Name	Organization	Country
		-	

DC FIELD FACILITY

NATIONAL USERS (502)

First Name	Last Name	Organization	State	Country
Muhsin	Abdul Karim	University of Notre Dame	IN	USA
Dmytro	Abraimov	National High Magnetic Field Laboratory	FL	USA
Gokul	Acharya	University of Arkansas	AR	USA
Kaveh	Ahadi	Ohio State University	NC	USA
Charles	Ahn	Yale University	СТ	USA
Md Salman	Ahsanullah	University of Kansas	KS	USA
Arash	Akbari-Sharbaf	Villanova University	PA	USA
Jamel	Ali	Florida Agricultural and Mechanical University	FL	USA
Adam	Altenhof	Florida State University	FL	USA
Margaret	Andersen	State University of New York, Buffalo	NY	USA
Melissa	Anderson	Baylor University	TX	USA
Badih	Assaf	University of Notre Dame	IN	USA
Seul-Ki	Bac	University of Notre Dame	IN	USA
Hongyu	Bai	National High Magnetic Field Laboratory	FL	USA
Zhuanling	Bai	Florida State University	FL	USA
Austin	Baker	University of California, Los Angeles	CA	USA
Fedor	Balakirev	National High Magnetic Field Laboratory	NM	USA
Calvin	Bales	Brown University	RI	USA

First Name	Last Name	Organization	State	Country
Sudhaman	Balguri	Boston College	MA	USA
Luis	Balicas	National High Magnetic Field Laboratory	FL	USA
Abhishek	Banerjee	Harvard University	MA	USA
Jeseok	Bang	National High Magnetic Field Laboratory	FL	USA
Alimamy	Bangura	National High Magnetic Field Laboratory	FL	USA
Paola	Barbara	Georgetown University	DC	USA
Arup	Barua	University of South Florida	FL	USA
Shaon	Barua	National High Magnetic Field Laboratory	FL	USA
Rabindra	Basnet	University of Arkansas	AR	USA
Dmitri	Basov	Columbia University	NY	USA
Ryan	Baumbach	National High Magnetic Field Laboratory	FL	USA
Christianne	Beekman	National High Magnetic Field Laboratory	FL	USA
Mark	Bird	National High Magnetic Field Laboratory	FL	USA
Shubham	Bisht	Florida State University	FL	USA
Ananya	Biswas	Rice University	ТΧ	USA
Rikard	Bodin	University of Utah	UT	USA
Elisabeth	Bodnaruk	Cornell University	NY	USA
Alexandria	Bone	University of Tennessee, Knoxville	TN	USA
Ernesto	Bosque	National High Magnetic Field Laboratory	FL	USA
Bailey	Bouley	University of Illinois at Urbana-Champaign	IL	USA
Alexander	Brassington	University of Tennessee, Knoxville	TN	USA
William	Brey	National High Magnetic Field Laboratory	FL	USA
Collin	Broholm	Johns Hopkins University	MD	USA
Stuart	Brown	University of California, Los Angeles	CA	USA
Zachary	Brown	Dectris Ltd.	PA	USA
Wilson	Brown	Baylor University	ТХ	USA
Isaac	Brown	University of Utah	UT	USA
Christopher	Broyles	Washington University in St. Louis	MO	USA
Troy	Brumm	National High Magnetic Field Laboratory	FL	USA
Nicholas	Butch	National Institute of Standards and Technology MD	MD	USA
Casey	Calhoun	Princeton University	NJ	USA
lan	Campbell	Florida State University	FL	USA
Gang	Cao	University of Colorado, Boulder	CO	USA
Hui	Cao	Argonne National Laboratory	IL	USA
Brian	Casas	National High Magnetic Field Laboratory	FL	USA
Brenna	Cashman	University of Texas, Austin	ТΧ	USA
Ju Byeong	Chae	University of Illinois at Urbana-Champaign	IL	USA
Jak	Chakhalian	Rutgers University	NJ	USA
Sagnik	Chakrabarti	University of Illinois at Urbana-Champaign	IL	USA
Aaron	Chan	University of Michigan	MI	USA
Julia	Chan	Baylor University	ТΧ	USA
Cui-Zu	Chang	Pennsylvania State University	PA	USA
Joseph	Checkelsky	Massachusetts Institute of Technology	MA	USA
Laisi	Chen	University of California, Irvine	CA	USA
Alan	Chen	Massachusetts Institute of Technology	MA	USA
Yingtai	Chen	Commonwealth Fusion Systems	MA	USA

First Name	Last Name	Organization	State	Country
Tong	Chen	Johns Hopkins University	MD	USA
Kuan-Wen	Chen	University of Michigan	MI	USA
Lu	Chen	University of Michigan	MI	USA
Xiaotong	Chen	Rensselaer Polytechnic Institute	NY	USA
JL	Cheng	Commonwealth Fusion Systems	MA	USA
Santosh	Chhetri	University of Arkansas	AR	USA
Daniel	Chica	Columbia University	NY	USA
Shalinee	Chikara	National High Magnetic Field Laboratory	FL	USA
Eun Sang	Choi	National High Magnetic Field Laboratory	FL	USA
Su Kong	Chong	University of California, Los Angeles	CA	USA
Jiun-Haw	Chu	University of Washington	WA	USA
Judith	Clark	Florida State University	FL	USA
Xin	Cong	University of Florida	FL	USA
Rong	Cong	Brown University	RI	USA
Anca	Constantinescu	National High Magnetic Field Laboratory	FL	USA
Carl	Conti	Florida State University	FL	USA
Lance	Cooley	National High Magnetic Field Laboratory	FL	USA
Paul	Corbae	University of California, Santa Barbara	CA	USA
Matthew	Cothrine	University of Tennessee, Knoxville	TN	USA
Myriam	Cotten	College of William and Mary	VA	USA
Tim	Cross	National High Magnetic Field Laboratory	FL	USA
Songbin	Cui	Florida State University	FL	USA
Jinlei	Cui	Washington University in St. Louis	MO	USA
Peter	Czajka	National Institute of Standards and Technology MD	MD	USA
E. Dan	Dahlberg	University of Minnesota, Twin Cities	MN	USA
Pengcheng	Dai	University of Tennessee, Knoxville	TN	USA
Ranjit Chandra	Das	Florida State University	FL	USA
Daniel	Davis	National High Magnetic Field Laboratory	FL	USA
Bijay	DC	Florida State University	FL	USA
Cory	Dean	City College of New York	NY	USA
Maximilien	Debbas	Massachusetts Institute of Technology	MA	USA
Louise	Debefve	Cornell University	NY	USA
Connor	Dempsey	University of California, Santa Barbara	CA	USA
Vikram	Deshpande	University of Utah	UT	USA
Jonathan	DeStefano	University of Washington	WA	USA
Aravind	Devarakonda	Columbia University	NY	USA
Chetan	Dhital	Kennesaw State University	GA	USA
Rui	Diaz-Pacheco	Commonwealth Fusion Systems	MA	USA
Scott	Dietrich	Villanova University	PA	USA
Charuni	Dissanayake	National High Magnetic Field Laboratory	FL	USA
lain	Dixon	National High Magnetic Field Laboratory	FL	USA
Alexis	Dominguez	Baylor University	ТΧ	USA
Alexander	Donald	University of Florida	FL	USA
Jason	Dong	University of California, Santa Barbara	CA	USA
Thierry	Dubroca	National High Magnetic Field Laboratory	FL	USA
Daniel	Duong	University of South Carolina	SC	USA

First Name	Last Name	Organization	State	Country
James	Ehrets	Harvard University	MA	USA
Zachery	Enderson	Georgia Institute of Technology	GA	USA
Lloyd	Engel	National High Magnetic Field Laboratory	FL	USA
Kevin	Euscher	State University of New York, Buffalo	NY	USA
Catherine	Fabiano	Florida State University	FL	USA
Adiat	Fakolujo	University of Tennessee, Knoxville	TN	USA
Philip	Feng	University of Florida	FL	USA
Tania	Fernández Félix	Cornell University	NY	USA
Adam	Fiedler	Marquette University	WI	USA
lan	Fisher	Stanford University	CA	USA
Aikaterini	Flessa Savvidou	National High Magnetic Field Laboratory	FL	USA
Nathanael	Fortune	Smith College	MA	USA
Ashleigh	Francis	Commonwealth Fusion Systems	FL	USA
Corey	Frank	National Institute of Standards and Technology MD	MD	USA
Riqiang	Fu	National High Magnetic Field Laboratory	FL	USA
Hailong	Fu	Pennsylvania State University	PA	USA
Gabriel	Gaertner	New Mexico Institute of Mining and Technology	NM	USA
Miguel	Gakiya	Florida State University	FL	USA
Jorge	Galeano Cabral	Florida State University	FL	USA
Eduard	Galstyan	University of Houston	ТХ	USA
Zhehong	Gan	National High Magnetic Field Laboratory	FL	USA
Anyuan	Gao	Harvard University	MA	USA
Xueshi	Gao	Ohio State University	ОН	USA
Albert	Gapud	University of South Alabama	AL	USA
Alireza	Ghasemi	Johns Hopkins University	MD	USA
Augusto	Ghiotto	Columbia University	NY	USA
Lisa	Glatt	Dectris Ltd.	PA	USA
David	Graf	National High Magnetic Field Laboratory	FL	USA
Elizabeth	Green	National High Magnetic Field Laboratory	FL	USA
Aliya	Greenberg	Commonwealth Fusion Systems	MA	USA
Richard	Greene	University of Maryland, College Park	MD	USA
Brittany	Grimm	Florida State University	FL	USA
Yanhong	Gu	University of Tennessee, Knoxville	TN	USA
Yanbo	Guo	University of Florida	FL	USA
Chengqi	Guo	Pennsylvania State University	PA	USA
Aakash	Gupta	Florida State University	FL	USA
Adbhut	Gupta	Princeton University	NJ	USA
David	Halat	Lawrence Berkeley National Laboratory	CA	USA
Songi	Han	University of California, Santa Barbara	CA	USA
Minyong	Han	Massachusetts Institute of Technology	MA	USA
Tonghang	Han	Massachusetts Institute of Technology	MA	USA
Zhongdong	Han	Cornell University	NY	USA
Manoj Vinayaka	Hanabe Subramanya	Florida State University	FL	USA
Adam	Hand	University of Tennessee, Knoxville	TN	USA
Scott	Hannahs	National High Magnetic Field Laboratory	FL	USA
Zeyu	Нао	Harvard University	MA	USA

First Name	Last Name	Organization	State	Country
Sara	Haravifard	Duke University	NC	USA
Zahid	Hasan	Princeton University	NJ	USA
Yangchen	Не	University of Wisconsin, Madison	WI	USA
Heshan	Hewa Walpitage	University of Utah	UT	USA
Stephen	Hill	National High Magnetic Field Laboratory	FL	USA
David	Hilton	University of Alabama, Birmingham	AL	USA
Michihiro	Hirata	Los Alamos National Laboratory	NM	USA
James	Hone	Columbia University	NY	USA
Md Shafayat	Hossain	Princeton University	NJ	USA
Jin	Hu	University of Arkansas	AR	USA
Chaowei	Hu	University of California, Los Angeles	CA	USA
Zhenqi	Hua	Florida State University	FL	USA
Silu	Huang	Louisiana State University	LA	USA
Tianye	Huang	Harvard University	MA	USA
Ke	Huang	Pennsylvania State University	PA	USA
John	Huckabee	New Mexico Institute of Mining and Technology	NM	USA
Munir	Humayun	National High Magnetic Field Laboratory	FL	USA
Ivan	Hung	National High Magnetic Field Laboratory	FL	USA
Uyen	Huynh	University of Utah	UT	USA
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Michael	Jenkins	University of Tennessee, Knoxville	TN	USA
Michael	Jensen	Ohio University	OH	USA
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Qianni	Jiang	Stanford University	CA	USA
Zhigang	Jiang	Georgia Institute of Technology	GA	USA
Rongying	Jin	University of South Carolina	SC	USA
Apoorv	Jindal	Columbia University	NY	USA
Caolan	John	Massachusetts Institute of Technology	MA	USA
Glover	Jones	National High Magnetic Field Laboratory	FL	USA
Robert	Joynt	University of Wisconsin, Madison	WI	USA
Long	Ju	Massachusetts Institute of Technology	MA	USA
Nikolai	Kalugin	New Mexico Institute of Mining and Technology	NM	USA
Denis	Karaiskaj	University of South Florida	FL	USA
Shyam Raj	Karullithodi	National High Magnetic Field Laboratory	FL	USA
Baris	Key	Argonne National Laboratory	IL	USA
Sangsoo	Kim	Florida State University	FL	USA
Youngjae	Kim	National High Magnetic Field Laboratory	FL	USA
Philip	Kim	Harvard University	MA	USA
Jason	Kitchen	National High Magnetic Field Laboratory	FL	USA
Sean	Knapp	University of South Florida	FL	USA
Christie	Koay	Columbia University	NY	USA

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Vadym	Kulichenko	National High Magnetic Field Laboratory	FL	USA
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Manish	Kumar	University of Washington	WA	USA
Krishnendu	Kundu	National High Magnetic Field Laboratory	FL	USA
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Hyuk	Kwon	Ohio State University	ОН	USA
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Jeremy	Levitan	National High Magnetic Field Laboratory	FL	USA
Sylvia	Lewin	University of Maryland, College Park	MD	USA
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Lu	Li	University of Michigan	MA	USA
Cequn	Li	Pennsylvania State University	PA	USA
Zizhong	Li	University of Wisconsin, Madison	WI	USA
Shan	Lin	Oak Ridge National Laboratory	TN	USA
llya	Litvak	National High Magnetic Field Laboratory	FL	USA
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Yijing	Liu	Georgetown University	DC	USA
Hengzhou	Liu	University of South Florida	FL	USA
Haoyu	Liu	Argonne National Laboratory	IL	USA
Xinyu	Liu	University of Notre Dame	IN	USA
Ruihao	Liu	Massachusetts Institute of Technology	MA	USA
Yufei	Liu	Harvard University	MA	USA
Changjiang	Liu	State University of New York, Buffalo	NY	USA
Jian	Liu	University of Tennessee, Knoxville	TN	USA
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Jun	Lu	National High Magnetic Field Laboratory	FL	USA
Zhengguang	Lu	Massachusetts Institute of Technology	MA	USA
Daphné	Lubert-Perquel	University of Florida	FL	USA
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TakanobuMatoFlorida State UniversityFLUSARossMcDonaldNational High Magnetic Field LaboratoryNMUSAStephenMcGillNational High Magnetic Field LaboratoryFLUSAMichaelMcGuireOak Ridge National LaboratoryTNUSAAugustMeadsKennesaw State UniversityGAUSASirakMekonenJohns Hopkins UniversityMDUSAYuzeMengRensselaer Polytechnic InstituteNYUSAFredericMentinkNational High Magnetic Field LaboratoryFLUSALudiMiaoUniversity of Maryland, College ParkMDUSADmitriMihaliovUniversity of Illinois at Urbana-ChampaignILUSALiviuMordalFlorida State UniversityFLUSADibyaMondalFlorida State UniversityFLUSAAlexMoonNational High Magnetic Field LaboratoryFLUSAChildMorsanFlorida State UniversityFLUSAMinaliovUniversity of Illinois at Urbana-ChampaignILUSALiviuMondalFlorida State UniversityFLUSALiviaMondalFlorida State UniversityFLUSALiviaMondalRice University of Texas, AustinTXUSAAlexMoonNational High Magnetic Field LaboratoryFLUSAAlexMoonRice UniversityTXUSA	anobu Mato s McDonald hen McGill hael McGuire ust Meads k Mekonen e Meng leric Mentink Miao
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Thinh Nguyen West Texas A&M University TX USA	h Nguyen
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MichaelRoseUniversity of Texas, AustinTXUSAElliottRosenbergStanford UniversityCAUSAAaronRossiniIowa State UniversityIAUSAXavierRoyColumbia UniversityNYUSAAyaRutherfordUniversity of Tennessee, KnoxvilleTNUSAShantaSahaUniversity of Maryland, College ParkMDUSAElvinSalernoNational High Magnetic Field LaboratoryFLUSA	Gia	Rivers	Florida State University	FL	USA
ElliottRosenbergStanford UniversityCAUSAAaronRossiniIowa State UniversityIAUSAXavierRoyColumbia UniversityNYUSAAyaRutherfordUniversity of Tennessee, KnoxvilleTNUSAShantaSahaUniversity of Maryland, College ParkMDUSAElvinSalernoNational High Magnetic Field LaboratoryFLUSA	Jacob	Rochester	Ohio State University	OH	USA
AaronRossiniIowa State UniversityIAUSAXavierRoyColumbia UniversityNYUSAAyaRutherfordUniversity of Tennessee, KnoxvilleTNUSAShantaSahaUniversity of Maryland, College ParkMDUSAElvinSalernoNational High Magnetic Field LaboratoryFLUSA	Michael	Rose	University of Texas, Austin	TX	USA
XavierRoyColumbia UniversityNYUSAAyaRutherfordUniversity of Tennessee, KnoxvilleTNUSAShantaSahaUniversity of Maryland, College ParkMDUSAElvinSalernoNational High Magnetic Field LaboratoryFLUSA	Elliott	Rosenberg	Stanford University	CA	USA
AyaRutherfordUniversity of Tennessee, KnoxvilleTNUSAShantaSahaUniversity of Maryland, College ParkMDUSAElvinSalernoNational High Magnetic Field LaboratoryFLUSA	Aaron	Rossini	Iowa State University	IA	USA
ShantaSahaUniversity of Maryland, College ParkMDUSAElvinSalernoNational High Magnetic Field LaboratoryFLUSA	Xavier	Roy	Columbia University	NY	USA
Elvin Salerno National High Magnetic Field Laboratory FL USA	Ауа	Rutherford	University of Tennessee, Knoxville	TN	USA
	Shanta	Saha	University of Maryland, College Park	MD	USA
Javier Sanchez-Yamagishi University of California, Irvine CA USA	Elvin	Salerno	National High Magnetic Field Laboratory	FL	USA
	Javier	Sanchez-Yamagishi	University of California, Irvine	CA	USA

DC FIELD

First Name	Last Name	Organization	State	Country
Brandon	Sanders	University of Tennessee, Knoxville	TN	USA
Bhabesh	Sarangi	University of Houston	ТХ	USA
Tarapada	Sarkar	University of Maryland, College Park	MD	USA
Govind	Sasi Kumar	Florida State University	FL	USA
Gicela	Saucedo Salas	University of Maryland, College Park	MD	USA
Rico	Schoenemann	Los Alamos National Laboratory	NM	USA
Benny	Schundelmier	Florida State University	FL	USA
Robert	Schurko	Florida State University	FL	USA
Mohindar	Seehra	West Virginia University	WV	USA
Venkat	Selvamanickam	University of Houston	ТХ	USA
Dmitry	Semenov	National High Magnetic Field Laboratory	FL	USA
Sabyasachi	Sen	University of California, Davis	CA	USA
Jie	Shan	Pennsylvania State University	PA	USA
Yinming	Shao	Columbia University	NY	USA
Daria	Sharifi	Ohio State University	ОН	USA
Shivani	Sharma	Alfred University	NY	USA
Michael	Shatruk	National High Magnetic Field Laboratory	FL	USA
Mansour	Shayegan	Princeton University	NJ	USA
Arkady	Shehter	National High Magnetic Field Laboratory	NM	USA
Zhi-Xun	Shen	Stanford University	CA	USA
Maise	Shepard	Commonwealth Fusion Systems	MA	USA
Phurba	Sherpa	Los Alamos National Laboratory	NM	USA
Mark	Sherwin	University of California, Santa Barbara	CA	USA
Qianhui	Shi	University of California, Los Angeles	CA	USA
Sufei	Shi	Rensselaer Polytechnic Institute	NY	USA
Yue	Shi	University of Washington	WA	USA
Javad	Shokraiyan	Ohio University	ОН	USA
Keshav	Shrestha	Texas A&M University	ТХ	USA
Wenda	Si	Duke University	NC	USA
Hasan	Siddiquee	Washington University in St. Louis	МО	USA
Theo	Siegrist	National High Magnetic Field Laboratory	FL	USA
Nikolai	Simonov	Georgia Institute of Technology	GA	USA
Siddharth Kumar	Singh	Princeton University	NJ	USA
John	Singleton	National High Magnetic Field Laboratory	NM	USA
Dmitry	Smirnov	National High Magnetic Field Laboratory	FL	USA
Julia	Smith	National High Magnetic Field Laboratory	FL	USA
Robert	Smith	Florida State University	FL	USA
Kevin	Smith	University of Tennessee, Knoxville	TN	USA
Danila	Sokratov	University of Maryland, College Park	MD	USA
Xiaoyu	Song	Columbia University	NY	USA
Yuan	Song	Columbia University	NY	USA
Seunghoon	Song	University of Tennessee, Knoxville	TN	USA
Brandon	Sorbom	Commonwealth Fusion Systems	MA	USA
Lucia	Steinke	Maybell Quantum Industries	CO	USA
Robert	Stewart	Florida State University	FL	USA
Geoffrey	Strouse	National High Magnetic Field Laboratory	FL	USA
Mike	Sumption	Ohio State University	OH	USA
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AlexeySuslovNational High Agnetic Field LaboratoryFLUSAJoshSwannColumbia UniversityNYUSALixuanTaiBoston CollegeMAUSALixuanTaiUniversity of California, Los AngelesCAUSAChia-TseTaiPrinceton University FloridaFLUSAYasuTakanoUniversity of FloridaFLUSAPukunTanGeorgia Institute of TechnologyGAUSAAya BatoulTateColumbia UniversityNYUSAJoshuaTelserRosevelt UniversityNJUSAMichaelTertiliRutgers UniversityNJUSAJaylorTerronesNew Mexico Institute of Mining and TechnologyNJUSAPanavThekke MadathilPrinceton UniversityNJUSAStanleyTorzerNational High Magnetic Field LaboratoryFLUSABlancaTroclewitzNational High Magnetic Field LaboratoryFLUSAUffTroclewitzNational High Magnetic Field LaboratoryFLUSAAviramUriUniversity of VanshingtonWAUSAAvaramUriversity of VashingtonWAUSAAvaramUriversity of VashingtonWAUSAAvaramUriMassachusetts Institute of TechnologyMAUSAAvaramUriMassachusetts Institute of TechnologyMAUSAAvaramUriNational High Magnetic Field Laboratory </th <th>First Name</th> <th>Last Name</th> <th>Organization</th> <th>State</th> <th>Country</th>	First Name	Last Name	Organization	State	Country
JoshSwannColumbia UniversityNYUSAFazelTatiBoston CollegeMAUSAFazelTatiUniversity of California, Los AngelesCAUGAChia-TseTaiPrinceton UniversityNJUSAYasuTakanoUniversity of FloridaFLUSAPukunTanPurdue UniversityINUSAYasuTakanoUniversity of FloridaFLUSAPukunTariColumbia UniversityNYUSAAya BatoulTaziColumbia UniversityNYUSAJoshuaTelserRossevelt UniversityNJUSAMchaelTariliRutgers UniversityNJUSAPagnareachTinronavutkuarasuFlorida Agricultural and Mechanical UniversityNJUSAPagnareachTinUniversity of Tennessee, KnoxilleTNUSABiancaTrociewitzNational High Magnetic Field LaboratoryFLUSAChun-ChihTsengUniversity of WashingtonWAUSAAviramUniversity of UshUTUSAUSAAriterTysonNew Jersey Institute of TechnologyMAUSAJohanvan TolNational High Magnetic Field LaboratoryFLUSAChun-ChihTsengUniversity of WashingtonWAUSAAritaVardenyUniversity of UshUTUSAAritaVardenyUniversity of UshUTUSAAritaVardeny </td <td>Keith</td> <td>Surrena</td> <td>Cornell University</td> <td>NY</td> <td>USA</td>	Keith	Surrena	Cornell University	NY	USA
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YasuTakanoUniversity of FloridaFLUSAPukunTanPurdue UniversityINUSAHarukoTateyamaGeorgia Institute of TechnologyGAUSAAya BatoulTaziColumbia UniversityNYUSAJoshuaTelserRoosevelt UniversityILUSAMichaelTerilliRutgers UniversityNJUSATaylorTerronesNew Mexico Institute of Mining and TechnologyNMUSAPranavThekke MadathilPrinceton UniversityFLUSAStanleyTozerNational High Magnetic Field LaboratoryFLUSABiancaTrociewitzNational High Magnetic Field LaboratoryFLUSAOrusorTysonNeusresy Institute of TechnologyMAUSAArizorTysonNew Sexico Institute of TechnologyMAUSAJohanvan TolNational High Magnetic Field LaboratoryFLUSAArizorTysonNew Jersey Institute of TechnologyMAUSAJohanvan TolNational High Magnetic Field LaboratoryFLUSAAritiVashistUniversity of UtahUTUSAAritiVashistUniversity of UtahUTUSAAritiVashistUniversity of UtahUTUSAAritiVashistNational High Magnetic Field LaboratoryFLUSAJohanvan TolNational High Magnetic Field LaboratoryFLUSAJohanv	Lixuan	Tai	University of California, Los Angeles	CA	USA
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HarukoTateyamaGeorgia Institute of TechnologyGAUSAAya BatoulTaziColumbia UniversityNYUSAJoshuaTelserRoosevelt UniversityILUSAMichaelTerilliRutgers UniversityNJUSATaylorTerronesNew Mexico Institute of Mining and TechnologyNJUSAPranavThekke MadathilPrinceton UniversityNJUSAKomalavalliiThirunavukkuarasuFlorida Agricultural and Mechanical UniversityFLUSAPagnareachTinUniversity of Tennessee, KnoxvilleTNUSASlanleyTozerNational High Magnetic Field LaboratoryFLUSABiancaTrociewitzNational High Magnetic Field LaboratoryFLUSAOhun-ChihTsengUniversity of WashingtonWAUSAAviramUriMassachusetts Institute of TechnologyNJUSAAviramUriMassachusetts Institute of TechnologyMAUSAAnritVardenyUniversity of UtahUTUSAAmitVardenyUniversity of UtahUTUSAAmitVenkateshNational High Magnetic Field LaboratoryFLUSAGreysonVoigtOhio State UniversityOHUSAJoshuaWaaGaldminal State UniversityCTUSAFederickWalkerYale UniversityCTUSAYaleyVangGalfornia Itas AngelesCAUSAYaleu </td <td>Yasu</td> <td>Takano</td> <td>University of Florida</td> <td>FL</td> <td>USA</td>	Yasu	Takano	University of Florida	FL	USA
Aya BatoulTazlColumbia UniversityNYUSAJoshuaTelserRoosevelt UniversityILUSAMichaelTerilliRutgers UniversityNJUSATaylorTerronesNew Maxico Institute of Mining and TechnologyNJUSAPranavThekke MadathilPrinceton UniversityNJUSAKomalavalliThirunavukkuarasuFlorida Agricultural and Mechanical UniversityFLUSAPagnareachTinUniversity of Tennessee, KnoxvilleTNUSAStanleyTozerNational High Magnetic Field LaboratoryFLUSAUlifTrociewitzNational High Magnetic Field LaboratoryFLUSAChun-ChihTsengUniversity of WashingtonWAUSAAviramUriMassachusetts Institute of TechnologyNJUSAAviramUriMassachusetts Institute of TechnologyMAUSAJohanvan TolNational High Magnetic Field LaboratoryFLUSAAmitVadenyUniversity of UtahUTUSAAmitVashistUniversity of UtahUTUSAJoshuaWakefieldMassachusetts Institute of TechnologyMAUSAJoshuaVadenyUniversity of UtahUTUSAZvalyVardenyUniversityCTUSAJohanvanFerminational Accelerator LaboratoryFLUSAJohanVanFerminational Accelerator LaboratoryFLUSA <t< td=""><td>Pukun</td><td>Tan</td><td>Purdue University</td><td>IN</td><td>USA</td></t<>	Pukun	Tan	Purdue University	IN	USA
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MichaelTerilliRutgers UniversityNJUSATaylorTeronesNew Mexico Institute of Mining and TechnologyNMUSAPranavThekke MadathilPrinceton UniversityNJUSAKomalavallitThirunavukkuarasuFlorida Agricuttural and Mechanical UniversityFLUSAPagnareachTinUniversity of Tennessee, KnoxvilleTNUSABlancaTrociewitzNational High Magnetic Field LaboratoryFLUSABlancaTrociewitzNational High Magnetic Field LaboratoryFLUSAUlfTrociewitzNational High Magnetic Field LaboratoryFLUSAChun-ChihTsengUniversity of WashingtonWAUSAAviramUriMassachusetts Institute of TechnologyNJUSAJohanvan TolNational High Magnetic Field LaboratoryFLUSAAviramUriMassachusetts Institute of TechnologyNJUSAAmitVardenyUniversity of UtahUTUSAAmitVarketshNational High Magnetic Field LaboratoryFLUSAGreysonVoigtOhio State UniversityCTUSAJohnaWaYale University of UtahUTUSAJoshaWasFerderickWalkerYale UniversityCTUSAJongVuYale UniversityCTUSASAJongWanFermi National Accelerator LaboratoryILUSAYandingWangCalif	Aya Batoul	Tazi	Columbia University	NY	USA
TaylorTerronesNew Action Institute of Mining and TechnologyNMUSAPranavThekke MadathilPrinceton UniversityNJUSAKomalavalliThirunavukkuarasuFlorida Agricultural and Mechanical UniversityFLUSAPagnareachTinUniversity of Tennessee, KnoxvilleTNUSAStanleyTozerNational High Magnetic Field LaboratoryFLUSABilancaTrociewitzNational High Magnetic Field LaboratoryFLUSAUlfTrociewitzNational High Magnetic Field LaboratoryFLUSAChun-ChihTsengUniversity of WashingtonWAUSAAviramUriMassachusetts Institute of TechnologyNJUSAJohanvan TolNational High Magnetic Field LaboratoryFLUSAAviramVardenyUniversity of UtahUTUSAAmitVashistUniversity of UtahUTUSAAmitVashistOhio State UniversityOHUSAJoshauWakefieldMassachusetts Institute of TechnologyMAUSAJoshauWakefieldMassachusetts Institute of TechnologyMAUSAYou of uYale UniversityCTUSAUSAJoshauWakefieldMassachusetts Institute of TechnologyMAUSAKrangWangCalifornia State UniversityCTUSAYouchengWangCalifornia State UniversityCTUSAYouchengWangCalifornia	Joshua	Telser	Roosevelt University	IL	USA
TaylonTechnologyCNMUSAPranavThekke MadathilPrinceton UniversityNJUSAPranavThekke MadathilPrinceton UniversityFLUSAPagnareachTinUniversity of Tennessee, KnoxvilleTNUSAStanleyTozerNational High Magnetic Field LaboratoryFLUSABiancaTrociewitzNational High Magnetic Field LaboratoryFLUSAUlfTrociewitzNational High Magnetic Field LaboratoryFLUSAChun-ChihTsengUniversity of WashingtonWAUSAAviramUriMassachusetts Institute of TechnologyMAUSAJohanvan TolNational High Magnetic Field LaboratoryFLUSAAviramUriMassachusetts Institute of TechnologyMAUSAAviramVariValenyUniversity of UtahUTUSAAmitVanketshNational High Magnetic Field LaboratoryFLUSAAmitVashistUniversity of UtahUTUSAAmitVashistUniversity of UtahUTUSACrUSAVale UniversityCTUSAJoshuaWakefieldMassachusetts Institute of TechnologyMAUSAFederickWalkerYale UniversityCTUSAYaugVanYale UniversityCTUSAYaugWangCalifornia Los AngelesCAUSAYuangWangCalifornia State University<	Michael	Terilli	Rutgers University	NJ	USA
KomalavalliThirunavukkuarasuFlorida Agricultural and Mechanical UniversityFLUSAPagnareachTinUniversity of Tennessee, KnoxvilleTNUSAStanleyTozerNational High Magnetic Field LaboratoryFLUSABiancaTrociewitzNational High Magnetic Field LaboratoryFLUSAUlfTrociewitzNational High Magnetic Field LaboratoryFLUSAChun-ChihTsengUniversity of WashingtonWAUSATrevorTysonNew Jersey Institute of TechnologyMAUSAAviramUriMassachusetts Institute of TechnologyMAUSAJohanvan TolNational High Magnetic Field LaboratoryFLUSAAritaVardenyUniversity of UtahUTUSAAmitVardenyUniversity of UtahUTUSAAmitVarkateshNational High Magnetic Field LaboratoryFLUSACrugVoigtOhio State UniversityOHUSADungVuYale UniversityCTUSAJoshuaWakefieldMassachusetts Institute of TechnologyMAUSAFagWanFermi National Accelerator LaboratoryILUSAJoshuaWakefieldMassachusetts Institute of TechnologyMAUSAYale University of California, Los AngelesCAUSAUSAYaleungWangCalifornia State University, East BayCAUSAYuangWangFlorida State University<	Taylor	Terrones	•	NM	USA
PagnareachTinUniversity of Tennessee, KnoxvilleTNUSAStanleyTozerNational High Magnetic Field LaboratoryFLUSABiancaTroclewitzNational High Magnetic Field LaboratoryFLUSAUlfTrociewitzNational High Magnetic Field LaboratoryFLUSAChun-ChihTsengUniversity of WashingtonWAUSATrevorTysonNew Jersey Institute of TechnologyMJUSAAviramUriMassachusetts Institute of TechnologyMAUSAJohanvan TolNational High Magnetic Field LaboratoryFLUSAZ. ValyVardenyUniversity of UtahUTUSAAmitVashistUniversity of UtahUTUSAGreysonVoigtOhio State UniversityOHUSAJoshuaWakefieldMassachusetts Institute of TechnologyMAUSAJoshuaWakefieldMassachusetts Institute of TechnologyMAUSAKangWanFermi National Accelerator LaboratoryILUSAJoshuaWakefieldMassachusetts Institute of TechnologyMAUSAKangWangCalifornia, Los AngelesCAUSAYuunngWangCalifornia Accelerator LaboratoryILUSAYuunngWangCalifornia State University, East BayCAUSAYuunngWangFlorida State University, East BayCAUSAYuunngWangFlorida State UniversityFL </td <td>Pranav</td> <td>Thekke Madathil</td> <td>Princeton University</td> <td>NJ</td> <td>USA</td>	Pranav	Thekke Madathil	Princeton University	NJ	USA
StanleyTozerNational High Magnetic Field LaboratoryFLUSABiancaTrociewitzNational High Magnetic Field LaboratoryFLUSAUlfTrociewitzNational High Magnetic Field LaboratoryFLUSAChun-ChihTsengUniversity of WashingtonWAUSATrevorTysonNew Jersey Institute of TechnologyNJUSAAviramUriMassachusetis Institute of TechnologyMAUSAJohanvan TolNational High Magnetic Field LaboratoryFLUSAZ. ValyVardenyUniversity of UtahUTUSAAmitVashistUniversity of UtahUTUSAAmitVashistUniversity of UtahUTUSAAmitVenkateshNational High Magnetic Field LaboratoryFLUSAGreysonVoigtOhio State UniversityOHUSAJoshuaWakefieldMassachusetts Institute of TechnologyMAUSAFrederickWalkerYale UniversityCTUSAKangWangErrmi National Accelerator LaboratoryILUSAYunongWangCalifornia State University, East BayCAUSAYuungWangFlorida State University, East BayCAUSAYuungWangElorida State University, East BayCAUSAYuungWangIniversity of Notre DameINUSAJiashuWangMassachusetts Institute of TechnologyMAUSA<	Komalavalli	Thirunavukkuarasu	Florida Agricultural and Mechanical University	FL	USA
BiancaTrociewitzNational High Magnetic Field LaboratoryFLUSAUlfTrociewitzNational High Magnetic Field LaboratoryFLUSAChun-ChihTsengUniversity of WashingtonWAUSATrevorTysonNew Jersey Institute of TechnologyNJUSAAviramUriMassachusetts Institute of TechnologyMAUSAJohanvan TolNational High Magnetic Field LaboratoryFLUSAZ ValyVardenyUniversity of UtahUTUSAAmitVashistUniversity of UtahUTUSAAmitVenkateshNational High Magnetic Field LaboratoryFLUSAGreysonVoigtOhio State UniversityOHUSAJoshuaWakefieldMassachusetts Institute of TechnologyMAUSAJoshuaWakefieldMassachusetts Institute of TechnologyMAUSAJoshuaWakefieldMassachusetts Institute of TechnologyMAUSAFrederickWalkerYale UniversityCTUSAKangWangEermi National Accelerator LaboratoryILUSAYunongWangCalifornia State University, East BayCAUSAYuuniWangFlorida State UniversityFLUSAYuuniWangFlorida State UniversityFLUSAYuuniWangFlorida State UniversityFLUSAXiruiWangMassachusetts Institute of TechnologyMAUSA <tr< td=""><td>Pagnareach</td><td>Tin</td><td>University of Tennessee, Knoxville</td><td>TN</td><td>USA</td></tr<>	Pagnareach	Tin	University of Tennessee, Knoxville	TN	USA
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Chun-ChihTsengUniversity of WashingtonWAUSATrevorTysonNew Jersey Institute of TechnologyNJUSAAviramUriMassachusetts Institute of TechnologyMAUSAJohanvan TolNational High Magnetic Field LaboratoryFLUSAZ. ValyVardenyUniversity of UtahUTUSAAmitVashistUniversity of UtahUTUSAAmitVashistUniversity of UtahUTUSAAmitVenkateshNational High Magnetic Field LaboratoryFLUSACreysonVoigtOhio State UniversityOHUSAJoshuaWakefieldMassachusetts Institute of TechnologyMAUSAFrederickWalkerYale UniversityCTUSAFangWanFermi National Accelerator LaboratoryILUSAXiaolingWangUniversity of California, Los AngelesCAUSAYunongWangCalifornia State University, East BayCAUSAYunongWangFlorida State University of FloridaFLUSAYuxinWangHorida State UniversityFLUSAXiruiWangMassachusetts Institute of TechnologyMAUSAYuxinWangPinceton UniversityFLUSAYunongWangPinceton UniversityFLUSAYunongWangPinceton UniversityNJUSAXiruiWangPinceton UniversityNJ <t< td=""><td>Bianca</td><td>Trociewitz</td><td>National High Magnetic Field Laboratory</td><td>FL</td><td>USA</td></t<>	Bianca	Trociewitz	National High Magnetic Field Laboratory	FL	USA
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Robert Welser University of California, Irvine CA USA	Wenzheng	Wei	Yale University	СТ	USA
	Kaya	Wei	National High Magnetic Field Laboratory	FL	USA
Thomas Werkmeister Harvard University MA USA	Robert	Welser	University of California, Irvine	CA	USA
	Thomas	Werkmeister	Harvard University	MA	USA

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SuyangXuHarvard UniversityMAUSASiJieXuDuke University of WashingtonNCUSAXiaodongXuUniversity of Tennessee, KnoxvilleTNUSAZilingXueUniversity of Tennessee, KnoxvilleTNUSALalitYadavDuke UniversityNCUSARikuYamamotoLos Alamos National LaboratoryNMUSALiYanRensselaer Polytechnic InstituteNYUSAZi-JieYanPennsylvania State UniversityPAUSAJiaqiangYanOak Ridge National LaboratoryTNUSAJiaqiangYanOak Ridge National LaboratoryTNUSAJiaqiangYanOak Ridge National LaboratoryTNUSAJixiangYangUniversity of California, Los AngelesCAUSAMatthewYangUniversity of WashingtonWAUSAMatthewYankowitzUniversity of WashingtonWAUSAXiaohanYaoBoston CollegeMAUSAKenjiYasudaCornell UniversityNYUSAPeideYePurdue UniversityFLUSALeeYiPennsylvania State UniversityPAUSAJuadaUniversity of Maryland, College ParkMDUSALeeYoUniversity of FloridaFLUSAJueskYounUniversity of California, DavisCAUSAS M Enamul HoqueYousufUniversi	Yijue	Xu	National High Magnetic Field Laboratory	FL	USA
SilieXuDuke UniversityNCUSAXiaodongXuUniversity of WashingtonWAUSAZilingXueUniversity of Tennessee, KnoxvilleTNUSALalitYadavDuke UniversityNCUSARikuYamamotoLos Alamos National LaboratoryNMUSALiYanRensselaer Polytechnic InstituteNYUSAZi-JieYanPennsylvania State UniversityPAUSAJiaqiangYanOak Ridge National LaboratoryTNUSAJiaqiangYanOak Ridge National LaboratoryTNUSAJiaqiangYanOak Ridge National LaboratoryTNUSAJixingYangUniversity of California, Los AngelesCAUSAJixiangYangMassachusetts Institute of TechnologyMAUSAXiaohanYaoBoston CollegeMAUSAKenjiYasudaCornell UniversityNYUSAPeideYePurdue UniversityINUSAAdugashYergeshbayevaFlorida State UniversityPAUSAHemianYiPennsylvania State UniversityPAUSALeYiPennsylvania State UniversityPAUSAS M Enamul HoqueYounUniversity of FloridaFLUSAGuoYuPrinceton UniversityNJUSAS M Enamul HoqueZakotnikUriversity of California, DavisCAUSAMihaZakotnik </td <td>Xingchen</td> <td>Xu</td> <td>Fermi National Accelerator Laboratory</td> <td>IL</td> <td>USA</td>	Xingchen	Xu	Fermi National Accelerator Laboratory	IL	USA
XiaodongXuUniversity of VashingtonWAUSAZilingXueUniversity of Tennessee, KnoxvilleTNUSALalitYadavDuke UniversityNCUSARikuYamamotoLos Alamos National LaboratoryNMUSALiYanRensselaer Polytechnic InstituteNYUSAZi-JieYanPennsylvania State UniversityPAUSAJiaqiangYanOak Ridge National LaboratoryTNUSAJiaqiangYanOak Ridge National LaboratoryTNUSAJixangYangUniversity of California, Los AngelesCAUSAJixiangYangMassachusetts Institute of TechnologyMAUSAXiaohanYaoBoston CollegeMAUSAXiaohanYaoPurdue UniversityINUSAPeideYePurdue UniversityINUSALeYiPennsylvania State UniversityFLUSALeYiPennsylvania State UniversityPAUSASM Enamul HoqueYousufUniversity of Maryland, College ParkMDUSAGuoYuPrinceton University of FloridaFLUSAGuoYuUniversity of California, DavisCAUSAMihaZakotnikUrban Mining CompanyTXUSAVivienZapfNational High Magnetic Field LaboratoryNMUSAYihangZengCornell UniversityMAUSAYihangZap	Suyang	Xu	Harvard University	MA	USA
ZilingXueUniversity of Tennessee, KnoxvilleTNUSALalitYadavDuke UniversityNCUSARikuYamamotoLos Alamos National LaboratoryNMUSALiYanRensselaer Polytechnic InstituteNYUSAZi-JieYanPennsylvania State UniversityPAUSAJiaqiangYanOak Ridge National LaboratoryTNUSAJiaqiangYanOak Ridge National LaboratoryTNUSAJixangYangUniversity of California, Los AngelesCAUSAJixiangYangMassachusetts Institute of TechnologyMAUSAMatthewYankowitzUniversity of WashingtonWAUSAXiaohanYaoBoston CollegeMAUSAKenjiYasudaCornell UniversityINUSAPeideYePurdue UniversityINUSALeYiPennsylvania State UniversityPAUSALeYoUniversity of Maryland, College ParkMDUSAGuoYuPrinceton University of FloridaFLUSAGuoYuanUniversity of California, DavisCAUSAMihaZakotnikUrban Mining CompanyTXUSAVivienZapfNational High Magnetic Field LaboratoryNMUSAYihangZengCornell UniversityMAUSA	SiJie	Xu	Duke University	NC	USA
LalitYadavDuke UniversityNCUSARikuYamamotoLos Alamos National LaboratoryNMUSALiYanRensselaer Polytechnic InstituteNYUSAZi-JieYanPennsylvania State UniversityPAUSAJiaqiangYanOak Ridge National LaboratoryTNUSAJiaqiangYanOak Ridge National LaboratoryTNUSAJiaqiangYangUniversity of California, Los AngelesCAUSAJixiangYangMassachusetts Institute of TechnologyMAUSAMatthewYankowitzUniversity of WashingtonWAUSAXiaohanYaoBoston CollegeMAUSAKenjiYasudaCornell UniversityNYUSAPeideYePurdue UniversityINUSASandugashYergeshbayevaFlorida State UniversityFLUSALeYiPennsylvania State UniversityPAUSAJyoonUniversity of Maryland, College ParkMDUSAGuoYuanUniversity of FloridaFLUSAGuoYuanUniversity of California, DavisCAUSAMihaZakotnikUrban Mining CompanyTXUSAVivienZapfNational High Magnetic Field LaboratoryNMUSAYihangZengCornell UniversityNAUSA	Xiaodong	Xu	University of Washington	WA	USA
RikuYamamotoLos Alamos National LaboratoryNMUSALiYanRensselaer Polytechnic InstituteNYUSAZi-JieYanPennsylvania State UniversityPAUSAJiaqiangYanOak Ridge National LaboratoryTNUSAJiaqiangYangOak Ridge National LaboratoryTNUSATing-HsunYangUniversity of California, Los AngelesCAUSAJixiangYangMassachusetts Institute of TechnologyMAUSAMatthewYangBoston CollegeMAUSAXiaohanYaoBoston CollegeMAUSAKenjiYasudaCornell UniversityNYUSAPeideYePurdue UniversityFLUSASandugashYergeshbayevaFlorida State UniversityFLUSAHemianYiPennsylvania State UniversityPAUSALeYiPennsylvania State UniversityPAUSAGuoYuViniversity of Maryland, College ParkMDUSAGuoYuPrinceton UniversityNJUSABingYuanUniversity of California, DavisCAUSAMihaZakotnikUrban Mining CompanyTXUSAVivienZapfNational High Magnetic Field LaboratoryNMAUSAYihangZengCornell UniversityAMAUSA	Ziling	Xue	University of Tennessee, Knoxville	TN	USA
LiYanRensselaer Polytechnic InstituteNYUSAZi-JieYanPennsylvania State UniversityPAUSAJiaqiangYanOak Ridge National LaboratoryTNUSATing-HsunYangUniversity of California, Los AngelesCAUSAJixiangYangMasachusetts Institute of TechnologyMAUSAMatthewYangMasachusetts Institute of TechnologyMAUSAMatthewYangBoston CollegeMAUSAXiaohanYaoBoston CollegeMAUSAPeideYePurdue UniversityNYUSAPeideYe Pennsylvania State UniversityINUSASandugashYergeshbayevaFlorida State UniversityPAUSALeYiPennsylvania State UniversityPAUSAHyookYoonUniversity of Maryland, College ParkMDUSAGuoYuPrinceton UniversityNJUSAGuoYuPrinceton University of California, DavisCAUSAMihaZakotnikUrban Mining CompanyTXUSAVivienZapfNational High Magnetic Field LaboratoryNMUSAYihangZengCornell UniversityMAUSA	Lalit	Yadav	Duke University	NC	USA
Zi-JieYanPennsylvania State UniversityPAUSAJiaqiangYanOak Ridge National LaboratoryTNUSATing-HsunYangUniversity of California, Los AngelesCAUSAJixiangYangMassachusetts Institute of TechnologyMAUSAMatthewYankowitzUniversity of WashingtonWAAUSAXiaohanYaoBoston CollegeMAUSAKenjiYasudaCornell UniversityNYUSAPeideYePurdue UniversityNYUSASandugashYergeshbayevaFlorida State UniversityFLUSALeYiPennsylvania State UniversityPAUSAHyokYoonUniversity of Maryland, College ParkMDUSAGuoYuPrinceton UniversityNJUSAGuoYuanUniversity of California, DavisCAUSANihaZayfNational High Magnetic Field LaboratoryNMUSAJinagYuanCornell UniversityNMUSAJinagZayfNational High Magnetic Field LaboratoryNMUSAYihangZengCornell UniversityMAUSA	Riku	Yamamoto	Los Alamos National Laboratory	NM	USA
JiaqiangYanOak Ridge National LaboratoryTNUSATing-HsunYangUniversity of California, Los AngelesCAUSAJixiangYangMassachusetts Institute of TechnologyMAUSAMatthewYangUniversity of WashingtonWAUSAXiaohanYaoBoston CollegeMAUSAKenjiYasudaCornell UniversityNYUSAPeideYePurdue UniversityINUSASandugashYergeshbayevaFlorida State UniversityFLUSAHemianYiPennsylvania State UniversityPAUSALeYiPennsylvania State UniversityPAUSASM Enamul HoqueYousufUniversity of FloridaFLUSAGuoYuPrinceton UniversityNJUSABingYuanUniversity of California, DavisCAUSAWihaZakotnikUrban Mining CompanyTXUSAVivienZapfNational High Magnetic Field LaboratoryNMUSAYihangZengCornell UniversityNAUSA	Li	Yan	Rensselaer Polytechnic Institute	NY	USA
IndustryYangUniversity of California, Los AngelesCAUSAJixiangYangMassachusetts Institute of TechnologyMAUSAMatthewYankowitzUniversity of WashingtonWAUSAXiaohanYaoBoston CollegeMAUSAKenjiYasudaCornell UniversityNYUSAPeideYePurdue UniversityINUSASandugashYergeshbayevaFlorida State UniversityFLUSAHemianYiPennsylvania State UniversityPAUSALeYiPennsylvania State UniversityPAUSASM Enamul HoqueYounUniversity of Maryland, College ParkMDUSASingYuanUniversity of California, DavisCAUSAMihaZakotnikUrban Mining CompanyTXUSAVivienZapfNational High Magnetic Field LaboratoryNMUSAYihangZengCornell UniversityNMUSA	Zi-Jie	Yan	Pennsylvania State University	PA	USA
JixiangYangMassachusetts Institute of TechnologyMAUSAMatthewYankowitzUniversity of WashingtonWAUSAXiaohanYaoBoston CollegeMAUSAKenjiYasudaCornell UniversityNYUSAPeideYePurdue UniversityNYUSASandugashYergeshbayevaFlorida State UniversityFLUSAHemianYiPennsylvania State UniversityPAUSALeYiPennsylvania State UniversityPAUSAHyokYoonUniversity of Maryland, College ParkMDUSAGuoYuPrinceton UniversityFLUSABingYuanUniversity of California, DavisCAUSAVivienZapfNational High Magnetic Field LaboratoryNMUSAYihangZengCornell UniversityNAUSA	Jiaqiang	Yan	Oak Ridge National Laboratory	TN	USA
MatthewYankowitzUniversity of WashingtonWAUSAXiaohanYaoBoston CollegeMAUSAKenjiYasudaCornell UniversityNYUSAPeideYePurdue UniversityINUSASandugashYergeshbayevaFlorida State UniversityFLUSAHemianYiPennsylvania State UniversityPAUSALeYiPennsylvania State UniversityPAUSAHyookYoonUniversity of Maryland, College ParkMDUSAGuoYuPrinceton UniversityNJUSABingYuanUniversity of California, DavisCAUSANihaZakotnikUrban Mining CompanyTXUSAVivienZapfNational High Magnetic Field LaboratoryNMUSAYihangZengCornell UniversityNAUSA	Ting-Hsun	Yang	University of California, Los Angeles	CA	USA
XiaohanYaoBoston CollegeMAUSAKenjiYasudaCornell UniversityNYUSAPeideYePurdue UniversityINUSASandugashYergeshbayevaFlorida State UniversityFLUSAHemianYiPennsylvania State UniversityPAUSALeYiPennsylvania State UniversityPAUSAHyeokYoonUniversity of Maryland, College ParkMDUSAGuoYuPrinceton UniversityNJUSABingYuanUniversity of California, DavisCAUSAMihaZakotnikUrban Mining CompanyTXUSAVivienZapfNational High Magnetic Field LaboratoryMAUSAYihangZengCornell UniversityMAUSA	Jixiang	Yang	Massachusetts Institute of Technology	MA	USA
KenjiYasudaCornell UniversityNYUSAPeideYePurdue UniversityINUSASandugashYergeshbayevaFlorida State UniversityFLUSAHemianYiPennsylvania State UniversityPAUSALeYiPennsylvania State UniversityPAUSAHyeokYoonUniversity of Maryland, College ParkMDUSAS M Enamul HoqueYousufUniversity of FloridaFLUSAGuoYuPrinceton UniversityNJUSABingYuanUniversity of California, DavisCAUSAVivienZapfNational High Magnetic Field LaboratoryNMUSAYihangZengCornell UniversityMAUSA	Matthew	Yankowitz	University of Washington	WA	USA
PeideYePurdue UniversityINUSASandugashYergeshbayevaFlorida State UniversityFLUSAHemianYiPennsylvania State UniversityPAUSALeYiPennsylvania State UniversityPAUSAHyeokYoonUniversity of Maryland, College ParkMDUSAS M Enamul HoqueYousufUniversity of FloridaFLUSAGuoYuPrinceton UniversityNJUSABingYuanUniversity of California, DavisCAUSAMihaZakotnikUrban Mining CompanyTXUSAVivienZapfNational High Magnetic Field LaboratoryMMUSAYihangZengCornell UniversityMAUSA	Xiaohan	Yao	Boston College	MA	USA
SandugashYergeshbayevaFlorida State UniversityFLUSAHemianYiPennsylvania State UniversityPAUSALeYiPennsylvania State UniversityPAUSAHyeokYoonUniversity of Maryland, College ParkMDUSAS M Enamul HoqueYousufUniversity of FloridaFLUSAGuoYuPrinceton UniversityNJUSABingYuanUniversity of California, DavisCAUSAWihaZakotnikUrban Mining CompanyTXUSAVivienZapfNational High Magnetic Field LaboratoryMAUSAYihangZengCornell UniversityNYUSA	Kenji	Yasuda	Cornell University	NY	USA
HemianYiPennsylvania State UniversityPAUSALeYiPennsylvania State UniversityPAUSAHyeokYoonUniversity of Maryland, College ParkMDUSAS M Enamul HoqueYousufUniversity of FloridaFLUSAGuoYuPrinceton UniversityNJUSABingYuanUniversity of California, DavisCAUSANihaZakotnikUrban Mining CompanyTXUSAVivienZapfNational High Magnetic Field LaboratoryNMUSAYihangZengCornell UniversityNYUSA	Peide	Ye	Purdue University	IN	USA
LeYiPennsylvania State UniversityPAUSAHyeokYoonUniversity of Maryland, College ParkMDUSAS M Enamul HoqueYousufUniversity of FloridaFLUSAGuoYuPrinceton UniversityNJUSABingYuanUniversity of California, DavisCAUSAMihaZakotnikUrban Mining CompanyTXUSAVivienZapfNational High Magnetic Field LaboratoryNMUSAYihangZengCornell UniversityNYUSA	Sandugash	Yergeshbayeva	Florida State University	FL	USA
HyeokYoonUniversity of Maryland, College ParkMDUSAS M Enamul HoqueYousufUniversity of FloridaFLUSAGuoYuPrinceton UniversityNJUSABingYuanUniversity of California, DavisCAUSAMihaZakotnikUrban Mining CompanyTXUSAVivienZapfNational High Magnetic Field LaboratoryNMUSAJonathanZengCornell UniversityNAUSA	Hemian	Yi	Pennsylvania State University	PA	USA
S M Enamul HoqueYousufUniversity of FloridaFLUSAGuoYuPrinceton UniversityNJUSABingYuanUniversity of California, DavisCAUSAMihaZakotnikUrban Mining CompanyTXUSAVivienZapfNational High Magnetic Field LaboratoryNMUSAJonathanZaubermanHarvard UniversityMAUSAYihangZengCornell UniversityNYUSA	Le	Yi	Pennsylvania State University	PA	USA
GuoYuPrinceton UniversityNJUSABingYuanUniversity of California, DavisCAUSAMihaZakotnikUrban Mining CompanyTXUSAVivienZapfNational High Magnetic Field LaboratoryNMUSAJonathanZaubermanHarvard UniversityMAUSAYihangZengCornell UniversityNYUSA	Hyeok	Yoon	University of Maryland, College Park	MD	USA
BingYuanUniversity of California, DavisCAUSAMihaZakotnikUrban Mining CompanyTXUSAVivienZapfNational High Magnetic Field LaboratoryNMUSAJonathanZaubermanHarvard UniversityMAUSAYihangZengCornell UniversityNYUSA	S M Enamul Hoque	Yousuf	University of Florida	FL	USA
MihaZakotnikUrban Mining CompanyTXUSAVivienZapfNational High Magnetic Field LaboratoryNMUSAJonathanZaubermanHarvard UniversityMAUSAYihangZengCornell UniversityNYUSA	Guo	Yu	Princeton University	NJ	USA
VivienZapfNational High Magnetic Field LaboratoryNMUSAJonathanZaubermanHarvard UniversityMAUSAYihangZengCornell UniversityNYUSA	Bing	Yuan	University of California, Davis	CA	USA
JonathanZaubermanHarvard UniversityMAUSAYihangZengCornell UniversityNYUSA	Miha	Zakotnik	Urban Mining Company	TX	USA
YihangZengCornell UniversityNYUSA	Vivien	Zapf	National High Magnetic Field Laboratory	NM	USA
	Jonathan	Zauberman	Harvard University	MA	USA
Naipeng Zhang Florida State University FL USA	Yihang	Zeng	Cornell University	NY	USA
	Naipeng	Zhang	Florida State University	FL	USA
Rongfu Zhang National High Magnetic Field Laboratory FL USA	Rongfu	Zhang	National High Magnetic Field Laboratory	FL	USA
Xiao-Xiao Zhang University of Florida FL USA	Xiao-Xiao	Zhang	University of Florida	FL	USA

First Name	Last Name	Organization	State	Country
Dechen	Zhang	University of Michigan	MI	USA
Qi	Zhang	Princeton University	NJ	USA
Shengzhi	Zhang	National High Magnetic Field Laboratory	NM	USA
Yifei	Zhang	SuperPower, Inc.	NY	USA
Yuxin	Zhang	Ohio State University	OH	USA
Zheneng	Zhang	Ohio State University	OH	USA
RuoXi	Zhang	Pennsylvania State University	PA	USA
Shu Yang	Zhao	Massachusetts Institute of Technology	MA	USA
Yi-Fan	Zhao	Pennsylvania State University	PA	USA
Zhiren	Zheng	Massachusetts Institute of Technology	MA	USA
Guoxin	Zheng	University of Michigan	MI	USA
Kent (Jingxu)	Zheng	Massachusetts Institute of Technology	NY	USA
Lingjie	Zhou	Pennsylvania State University	PA	USA
Haidong	Zhou	University of Tennessee, Knoxville	TN	USA
Junbo	Zhu	Massachusetts Institute of Technology	MA	USA
Yuan	Zhu	University of Michigan	MI	USA
Jun	Zhu	Pennsylvania State University	PA	USA
Michael	Ziebel	Columbia University	NY	USA
Andrew	Zimmerman	Harvard University	MA	USA

INTERNATIONAL USERS (129)

First Name	Last Name	Organization	Country
Patricia	Alireza	University of Cambridge	UK
Henri	Alloul	French National Center for Scientific Research	France
Munkhtuguldur	Altangerel	University of Sherbrooke	Canada
Emil	Ares	University of Cambridge	UK
Amirreza	Ataei	University of Sherbrooke	Canada
Jordan	Baglo	University of Sherbrooke	Canada
Geetha	Balakrishnan	University of Warwick	UK
Frédéric	Blanc	University of Liverpool	UK
Roman	Воса	Slovak University of Technology in Bratislava	Slovakia
Frédéric	Boivin	McGill University	Canada
Marie-Eve	Boulanger	University of Sherbrooke	Canada
Bernd	Buechner	Technical University of Dresden	Germany
Juraj	Cernak	Pavol Jozef Safarik University in Kosice	Slovakia
Jessica	Chapman	University of Cambridge	UK
Hanyi	Chen	University of Cambridge	UK
Jiasheng	Chen	University of Cambridge	UK
Eunjip	Choi	University of Seoul	South Korea
Joonyoung	Choi	Kyungpook National University	South Korea
Min Hyuk	Choi	Pohang University of Science and Technology	South Korea
Lucia	Corti	University of Liverpool	UK
Tsotne	Dadiani	University of L'Aquila	Italy
Fernando Luis	de Araujo Machado	Federal University of Pernambuco	Brazil
Sergio	de la Barrera	University of Toronto (Toronto)	Canada
Christian	de Podesta	University of Cambridge	UK

First Name	Last Name	Organization	Country
Al-Amin	Dhirani	University of Toronto (Toronto)	Canada
Irina	Drichko	loffe Physical-Technical Institute of the Russian Academy of Sciences	Russia
Yuhan	Du	East China Normal University	China
Caitlin	Duffy	High Field Magnet Laboratory, Radboud University	Netherlands
Alex	Eaton	University of Cambridge	UK
Luis	Foa Torres	University of Chile	Chile
Masaki	Fujita	Tohoku University IMR	Japan
Jose	Galvis Echeverri	Central University Colombia	Colombia
Guillaume	Gervais	McGill University	Canada
Christel	Gervais	Sorbonne University	France
Paula	Giraldo-Gallo	University of Los Andes	Colombia
Swee	Goh	Chinese University of Hong Kong	Hong Kong
leva	Goldberga	French National Center for Scientific Research	France
Gael	Grissonnanche	Institute Polytechnic De Paris	France
Malte	Grosche	University of Cambridge	UK
Isabel	Guillamon	University of Bristol	UK
Edwin	Herrera Vasco	Autonomous University of Madrid	Spain
Alex	Hickey	University of Cambridge	UK
Во	Hu	Jiangxi University of Science and Technology	China
Yining	Huang	University of Western Ontario	Canada
Deepshikha	Jaiswal-Nagar	IISER Thiruvananthapuram	India
Ho Seong	Jeon	Pohang University of Science and Technology	South Korea
Jiwon	Jeon	University of Seoul	South Korea
Xiangyu	Jiang	East China Normal University	China
Lin	Jiao	Zhejiang University	China
Yuxuan	Jin	University of Cambridge	UK
YounJung	Jo	Kyungpook National University	South Korea
Woun	Kang	Ewha Womans University	South Korea
Bernhard	Keimer	Max Planck Institute for Solid State Research, Stuttgart	Germany
Akash	Khansili	Stockholm University	Sweden
Hyun Don	Kim	University of Seoul	South Korea
Jun Sung	Kim	Pohang University of Science and Technology	South Korea
Min Jae	Kim	Pusan National University	South Korea
Seohee	Kim	Pusan National University	South Korea
Neha	Kondedan	Stockholm University	Sweden
Kwing To	Lai	Chinese University of Hong Kong	Hong Kong
Danielle	Laurencin	University of Montpellier	France
Hyunkyung	Lee	Pusan National University	South Korea
Hui	Li	University of Cambridge	UK
Yanzhao	Liu	Peking University	China
Yiran	Liu	Max Planck Institute for Solid State Research, Stuttgart	Germany
Mengmeng	Long	University of Cambridge	UK

First Name	Last Name	Organization	Country
Eran	Maniv	Ben Gurion University of the Negev	Israel
Yuji	Matsuda	Kyoto University	Japan
Kimberly	Modic	Institute of Science and Technology Austria	Austria
Irek	Mukhamedshin	Kazan Federal University	Russia
Muntaser	Naamneh	Ben Gurion University of the Negev	Israel
Archie	Nash	Institute of Science and Technology Austria	Austria
Amit	Nathwani	Institute of Science and Technology Austria	Austria
Muhammad	Nauman	Institute of Science and Technology Austria	Austria
Adam	Nelson	Sorbonne University	France
Lucie	Norel	Université de Rennes 1	France
Xinhua	Peng	University of Science and Technology of China	China
Sumit	Pokhriyal	Graphic Era Hill University	India
Antonio	Politano	l'aquila	Italy
Nicholas	Popiel	University of Cambridge	UK
Artem	Pronin	University of Stuttgart	Germany
Danilo	Ratkovski	Federal University of Pernambuco	Brazil
Henry	Realpe	Ben Gurion University of the Negev	Israel
Sergio	Rezende	Federal University of Pernambuco	Brazil
Gilles	Rodway-Gant	University of Cambridge	UK
Julian	Rojas	University of Los Andes	Colombia
Stephen	Rowley	University of Cambridge	UK
Mouli	Roy Chowdhury	Indian Institute of Technology, Guwahati	India
Andreas	Rydh	Stockholm University	Sweden
Daniel	SantaLucia	Max Planck Institute for Chemical Energy Conversion, Muelheim	Germany
Suchitra	Sebastian	University of Cambridge	UK
Dongmin	Seo	University of Seoul	South Korea
Hyeongwoo	Seo	Pohang University of Science and Technology	South Korea
Zeping	Shi	East China Normal University	China
Zhenzhong	Shi	Soochow University	China
Diego	Silvera Vega	University of Los Andes	Colombia
Ivan	Smirnov	loffe Physical-Technical Institute of the Russian Academy of Sciences	Russia
Richard	Smolko	Pavol Jozef Safarik University in Kosice	Slovakia
Cesar	Sônego	Federal University of ABC	Brazil
Oliver	Squire	University of Cambridge	UK
Hermann	Suderow	Autonomous University of Madrid	Spain
Athinaryanan	Sundaresan	Jawaharlal Nehru Centre for Advanced Scientific Research	India
Thomas	Szkopek	McGill University	Canada
Louis	Taillefer	University of Sherbrooke	Canada
Hidekazu	Tanaka	Tokyo Institute of Technology	Japan
Takanori	Taniguchi	Tohoku University IMR	Japan
Ken Heng	Teoh	University of Cambridge	UK
Subhash	Thota	Indian Institute of Technology, Guwahati	India

First Name	Last Name	Organization	Country
Pedro	Trocado Vianez	University of Cambridge	UK
Michal	Valiska	Charles University, Prague, Czechia	Czech Republic
Olesia	Voloshyna	Technical University of Dresden	Germany
Jian	Wang	Peking University	China
Lingfei	Wang	Chinese University of Hong Kong	China
Wenyan	Wang	Chinese University of Hong Kong	China
Ziqiao	Wang	Peking University	China
Theo	Weinberger	University of Cambridge	UK
Joachim	Wosnitza	Helmholtz Zentrum Dresden-Rossendorf	Germany
Wenbin	Wu	East China Normal University	China
Ziming	Wu	Soochow University	China
Zheyu	Wu	University of Cambridge	UK
Dror	Yahav	Ben Gurion University of the Negev	Israel
King Yau	Yip	Chinese University of Hong Kong	Hong Kong
Oulin	Yu	McGill University	Canada
Xiang	Yuan	East China Normal University	China
Valeska	Zambra	Institute of Science and Technology Austria	Austria
Wanli	Zhang	University of Western Ontario	Canada
Cheng	Zhang	Fudan University	China
Wei	Zhang	Chinese University of Hong Kong	Hong Kong
Sergei	Zvyagin	Helmholtz Zentrum Dresden-Rossendorf	Germany

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NATIONAL USERS (137)

First Name	Last Name	Organization	State	Country
Yao	Abusa	Iowa State University	IA	USA
Rajarshi	Acharyya	Florida State University	FL	USA
Anitha	Alanthadka	University of Nevada Reno	NV	USA
Adam	Altenhof	Florida State University	FL	USA
Lauren	Anderson-Sanchez	University of California, Irvine	CA	USA
Ferdous	Ara	National High Magnetic Field Laboratory	FL	USA
Kathleen	Arpin	Georgia Southern University	GA	USA
Claudia	Avalos	New York University	NY	USA
Euan	Bassey	University of California, Santa Barbara	CA	USA
Florian	Benner	Michigan State University	MI	USA
Maximilian	Bernbeck	Georgia Institute of Technology	GA	USA
Shubham	Bisht	Florida State University	FL	USA
Alexandria	Bone	University of Tennessee, Knoxville	TN	USA
Bailey	Bouley	University of Illinois at Urbana-Champaign	IL	USA
ChristiAnna	Brantley	University of Florida	FL	USA
Sergey	Bud'ko	Ames Laboratory	IA	USA
Huyen	Bui	Florida State University	FL	USA
Nhat Nguyen	Bui	National High Magnetic Field Laboratory	FL	USA

BrennaCashmanUniversity of Texas, AustinTXUSAJu ByeorgChaeUniversity of Illinois at Urbana-ChampaignI.LUSASagnkChakrabartiUniversity of Illinois at Urbana-ChampaignI.LUSASagnkChoiNational High Magnetic Field LaboratoryF.LUSAWei-HaoChouFlorida State UniversityF.LUSAGeorgeChristouUniversity of FloridaBarbaraC.AUSARaphaeleClementUniversity of Michigan - DearbornMIIUSASaroshanDesnirMichigan State UniversityMIIUSASaroshanDeshapriyaMichigan State UniversityMAUSALindaDoerrerBoston University of FloridaF.LUSAJassicaElinburgBoston University of FloridaF.LUSAJassicaElinburgBoston University of FloridaF.LUSAVilliamEvansUniversity of FloridaF.LUSAAtsataFrachUniversity of FloridaF.LUSAAtsataFisherUniversity of Vadar RenoNVUSADanaFreedmanNorthwestern UniversityI.LUSADanaFreedmanNorthwestern UniversityF.LUSADanaGrompaGeorgia Institute of TechnologyG.AUSADanaGreerLo Alamos National LaboratoryF.LUSASubrataGhoshUniversity of Nevada RenoNVUSADana	First Name	Last Name	Organization	State	Country
Ju ByeongChaeUniversity of Illinois at Urbana-ChampaignILUSASagnikChakrabartiUniversity of Illinois at Urbana-ChampaignILUSAEun SangChoiNational High Magnetic Field LaboratoryFLUSABeorgeChristouUniversity of FloridaStatUSAGeorgeChristouUniversity of FloridaStatUSAChristosConstantinidesUniversity of Michigan Stata BarbaraCAUSAChristosConstantinidesUniversity of Michigan Stata BarbaraCAUSASaroshanDeshapriyaMichigan Stata UniversityMIUSAAlexanderDiodatiUniversity of FloridaFLUSAJassicaElinburgBoston UniversityMAUSAJassicaElinburgBoston UniversityMAUSAVilliamEvansUniversity of California, IrvineCAUSAValitaFrankUniversity of California, IrvineCAUSAValitaFrankUniversity of FloridaFLUSANatiaFrankUniversity of Nevada RenoNVUSADanaFreedmanNorthversityFLUSASubrataGhoshUniversity of Nevada RenoNVUSASubrataGhoshUniversity of Nevada RenoNVUSASubrataGhoshUniversity of Nevada RenoNVUSASubrataGhoshUniversity of California, BerkeleyGAUSASubrata	Korey	Carter	University of Iowa	IA	USA
SagnikChakrabartiUniversity of Illinois at Urbana-ChampaignI.LUSAEun SangChoiNational High Magnetic Field LaboratoryF.LUSAWei-HaoChouFlorida State UniversityF.LUSARaphaeleClémentUniversity of California, Santa BarbaraC.AUSAChristosConstantinidesUniversity of Michigan - DearbornMIIUSASelvanDemirMichigan State UniversityMIIUSASaroshanDeshapriyaMichigan State UniversityMIUSAAlexanderDiodatiUniversity of FloridaF.LUSALindaDoerrerBoston UniversityMAUSAJascaElinburgBoston University of California, IrvineC.AUSALindaDoerrerBoston University of California, IrvineC.AUSACatherineFabianoFlorida State University of FloridaFLUSACatherineFisherUniversity of FloridaFLUSANatiaFrankUniversity of Novada RenoNVUSALucioFrydmanNational High Magnetic Field LaboratoryFLUSASubrataGhoshUniversity of Novada RenoNVUSALucioFrydmanNational High Magnetic Field LaboratoryFLUSASubrataGhoshUniversity of Navada RenoNVUSAColinGouldUniversity of Navada RenoNVUSASubrataGhoshUniversity of Navada RenoN	Brenna	Cashman	University of Texas, Austin	ТΧ	USA
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StephenHillNational High Magnetic Field LaboratoryFLUSADewenHouBoise State UniversityIDUSAJakubHrubyNational High Magnetic Field LaboratoryFLUSAYan-YanHuFlorida State UniversityFLUSAMichaelJensenOhio UniversityOHUSA	Neil	Harrison	National High Magnetic Field Laboratory	NM	USA
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Yan-YanHuFlorida State UniversityFLUSAMichaelJenkinsUniversity of Tennessee, KnoxvilleTNUSAMichaelJensenOhio UniversityOHUSA	Dewen	Hou	Boise State University	ID	USA
MichaelJenkinsUniversity of Tennessee, KnoxvilleTNUSAMichaelJensenOhio UniversityOHUSA	Jakub	Hruby	National High Magnetic Field Laboratory	FL	USA
Michael Jensen Ohio University OH USA	Yan-Yan	Hu	Florida State University	FL	USA
	Michael	Jenkins	University of Tennessee, Knoxville	TN	USA
Dane Johnson Massachusetts Institute of Technology MA USA	Michael	Jensen	Ohio University	OH	USA
	Dane	Johnson	Massachusetts Institute of Technology	MA	USA

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First Name	Last Name	Organization	State	Country
Martin	Kirk	University of New Mexico	NM	USA
Kirill	Kovnir	Iowa State University	IA	USA
Jurek	Krzystek	National High Magnetic Field Laboratory	FL	USA
Krishnendu	Kundu	National High Magnetic Field Laboratory	FL	USA
Jason	Kuszynski	Florida State University	FL	USA
Hyunchul	Kwon	University of California, Berkeley	CA	USA
Henry	La Pierre	Georgia Institute of Technology	GA	USA
Inhee	Lee	Ohio State University	ОН	USA
Luke	Lewis	Ohio State University	OH	USA
Yan	Li	University of California, Los Angeles	CA	USA
Jiasong	LI	University of Texas, San Antonio	TX	USA
Aimin	Liu	University of Texas, San Antonio	ΤХ	USA
Jeffrey	Long	University of California, Berkeley	CA	USA
Daphné	Lubert-Perquel	University of Florida	FL	USA
Lloyd	Lumata	University of Texas, Dallas	TX	USA
Daniel	Mindiola	University of Pennsylvania	PA	USA
Liviu	Mirica	University of Illinois at Urbana-Champaign	IL	USA
Jacob	Mohar	University of Pennsylvania	PA	USA
Dibya	Mondal	Florida State University	FL	USA
Ranajit	Mondol	University of Texas, Austin	ΤХ	USA
Shawn	Moore	Boston University	MA	USA
Danh	Ngo	University of California, Berkeley	CA	USA
Tomas	Orlando	National High Magnetic Field Laboratory	FL	USA
Raul	Ortega	Florida State University	FL	USA
Brenden	Ortiz	Oak Ridge National Laboratory	TN	USA
Yifu	Ouyang	Massachusetts Institute of Technology	MA	USA
lfeoluwa	Oyekunle	Florida State University	FL	USA
Andrew	Ozarowski	National High Magnetic Field Laboratory	FL	USA
Mykhaylo	Ozerov	National High Magnetic Field Laboratory	FL	USA
Austin	Peach	Florida State University	FL	USA
Frédéric	Perras	Ames Laboratory	IA	USA
Dianna	Pledger	Florida State University	FL	USA
Yifan	Quan	Massachusetts Institute of Technology	MA	USA
Joshua	Queen	University of California, Irvine	CA	USA
Gia	Rivers	Florida State University	FL	USA
Michael	Rose	University of Texas, Austin	TX	USA
Aaron	Rossini	Iowa State University	IA	USA
Aaron	Sadow	Iowa State University	IA	USA
Elvin	Salerno	National High Magnetic Field Laboratory	FL	USA
Paul	Sarte	University of California, Santa Barbara	CA	USA
Robert	Schurko	Florida State University	FL	USA
Kyle	Seabourn	University of Idaho	ID	USA
Hannah	Shafaat	Ohio State University	ОН	USA
Michael	Shatruk	National High Magnetic Field Laboratory	FL	USA

First Name	Last Name	Organization	State	Country
Javad	Shokraiyan	Ohio University	ОН	USA
David	Shultz	North Carolina State University	NC	USA
Srinivasa Rao	Singamaneni	University of Texas, El Paso	ТХ	USA
Patrick	Smith	Lawrence Berkeley National Laboratory	CA	USA
Robert	Smith	Florida State University	FL	USA
Robert	Smith	National High Magnetic Field Laboratory	FL	USA
Scott	Southern	Ames Laboratory	IA	USA
Benjamin	Stein	Los Alamos National Laboratory	NM	USA
Robert	Stewart	Florida State University	FL	USA
Sebastian	Stoian	University of Idaho	ID	USA
Geoffrey	Strouse	National High Magnetic Field Laboratory	FL	USA
Fazel	Tafti	Boston College	MA	USA
Joshua	Telser	Roosevelt University	IL	USA
Janet	Tests	Columbia University	NY	USA
Pagnareach	Tin	University of Tennessee, Knoxville	TN	USA
Nathan	Tolva	Boston College	MA	USA
Léa	Toubiana	Boston University	MA	USA
Yauhen	Tratsiak	University of Tennessee, Knoxville	TN	USA
Bianca	Trociewitz	National High Magnetic Field Laboratory	FL	USA
Erica	Truong	Florida State University	FL	USA
Adam	Valaydon-Pillay	University of Idaho	ID	USA
Johan	van Tol	National High Magnetic Field Laboratory	FL	USA
Cameron	Vojvodin	Florida State University	FL	USA
Xiaoling	Wang	California State University, East Bay	CA	USA
Sungsool	Wi	National High Magnetic Field Laboratory	FL	USA
Grant	Wilkinson	Georgia Institute of Technology	GA	USA
Nikki	Wolford	Los Alamos National Laboratory	NM	USA
Hui	Xiong	Boise State University	IN	USA
Ziling	Xue	University of Tennessee, Knoxville	TN	USA
Sandugash	Yergeshbayeva	Florida State University	FL	USA
Agnes	Yi	Massachusetts Institute of Technology	MA	USA
Mariya	Zhuravleva	University of Tennessee, Knoxville	TN	USA
Mary Ellen	Zvanut	University of Alabama, Birmingham	AL	USA

INTERNATIONAL USERS (36)

First Name	Last Name	Organization	Country
Francesca	Adami	University College Dublin	Ireland
Alina	Bienko	University of Wroclaw	Poland
Rodolphe	Clérac	Centre de Recherche Paul Pascal	France
Enrique	Colacio	University of Granada	Spain
Emmelyne	Cuza	University College Dublin	Ireland
Andreas	Danopoulos	National and Kapodistrian University of Athens	Greece
Emre	Erdem	Sabanci University	Turkey

First Name	Last Name	Organization	Country
Dyaln	Errulat	University of Ottawa	Canada
Guillem	Gabarró-Riera	University of Barcelona	Spain
Angeliki	Giannouli	Weizmann Institute of Science	Israel
Daniel	Jardón Álvarez	Weizmann Institute of Science	Israel
Jun Sung	Kim	Pohang University of Science and Technology	South Korea
Ulrich	Kortz	Jacobs University	Germany
Panayiotis	Koutentis	University of Cyprus	Cyprus
Panayotis	Kyritsis	National and Kapodistrian University of Athens	Greece
Zoi	Lada	University College Dublin	Ireland
Suheon	Lee	IBS Center for Artificial Low Dimensional Electronic Systems	South Korea
Wonjun	Lee	IBS Center for Artificial Low Dimensional Electronic Systems	South Korea
Julie	Lerche	University of Copenhagen	Denmark
Michal	Leskes	Weizmann Institute of Science	Israel
Yoh	Matsuki	Osaka University	Japan
Grace	Morgan	University College Dublin	Ireland
Muralee	Murugesu	University of Ottawa	Canada
Dmytro	Nesterov	Technical University of Lisbon	Portugal
Niels	Nielsen	Aarhus University	Denmark
Olivier	Ouari	Aix-Marseille University	France
Cedomir	Petrovic	Vinca Nuclear Research Institute University of Belgrade Serbia	Serbia
Svitlana	Petrusenko	Taras Shevchenko National University of Kyiv	Ukraine
Stergios	Piligkos	University of Copenhagen	Denmark
Carolina	Sanudo	University of Barcelona	Spain
Oleg	Stetsiuk	Taras Shevchenko National University of Kyiv	Ukraine
Olga	Vassilyeva	Taras Shevchenko National University of Kyiv	Ukraine
Hans Jurgen	von Bardeleben	Sorbonne University	France
Nino	Wili	Aarhus University	Denmark
Choongjae	Won	Pohang University of Science and Technology	South Korea
Andrej	Zorko	Jozef Stefan Institute	Slovenia

HIGH B/T FACILITY

NATIONAL USERS (18)

First Name	Last Name	Organization	State	Country
Collin	Broholm	Johns Hopkins University	MD	USA
Alexander	Donald	University of Florida	FL	USA
lan	Fisher	Stanford University	CA	USA
Rasul	Gazizulin	University of Florida	FL	USA

First Name	Last Name	Organization	State	Country
Alireza	Ghasemi	Johns Hopkins University	MD	USA
Tianyi	Han	Massachusetts Institute of Technology	MA	USA
Tonghang	Han	Massachusetts Institute of Technology	MA	USA
Chao	Huan	University of Florida	FL	USA
Long	Ju	Massachusetts Institute of Technology	MA	USA
Dominique	Laroche	University of Florida	FL	USA
Zhengguang	Lu	Massachusetts Institute of Technology	MA	USA
Mark	Meisel	University of Florida	FL	USA
Chris	Ollmann	University of Florida	FL	USA
Nicolas	Silva	University of Florida	FL	USA
Lucia	Steinke	Maybell Quantum Industries	CO	USA
Linda	Ye	Massachusetts Institute of Technology	MA	USA
Mingyang	Zheng	University of Florida	FL	USA
Mark	Zic	Stanford University	CA	USA

INTERNATIONAL USERS (0)

Last Name

First Name

Organization

Country

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NATIONAL USERS (174)

First Name	Last Name	Organization	State	Country
Puspa	Adhikari	Florida Gulf Coast University	FL	USA
Felix	Agblemanyo	University of Delaware	DE	USA
MD Ashik	Ahmed	North Carolina Agricultural and Technical State University	NC	USA
João Henrique	Amaral	University of Florida	FL	USA
Lissa	Anderson	National High Magnetic Field Laboratory	FL	USA
Jeffery	Atkins	USDA Forest Service	GA	USA
Thomas	Atkinson	University of Alabama, Birmingham	AL	USA
Lydia	Babcock-Adams	National High Magnetic Field Laboratory	FL	USA
Allan	Bacon	University of Florida	FL	USA
William	Bahureksa	Colorado State University	CO	USA
Rance	Bare	University of Idaho	ID	USA
Megan	Behnke	University of Alaska, Southeast	AK	USA
Ryan	Bellmore	forestry service	AK	USA
Thomas	Bianchi	University of Florida	FL	USA
Greg	Blakney	National High Magnetic Field Laboratory	FL	USA
Rene	Boiteau	University of Minnesota, Twin Cities	MN	USA
Thomas	Borch	Colorado State University	CO	USA
Brian	Brazil	Waste Management Inc.	MD	USA
Emily	Bristol	University of Texas, Austin	ТΧ	USA
Jennifer	Brodbelt	University of Texas, Austin	ТΧ	USA

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First Name	Last Name	Organization	State	Country
Scott	Brooks	Oak Ridge National Laboratory	TN	USA
Randelle	Bundy	University of Washington	WA	USA
Alyssa	Burns	University of California, Davis	CA	USA
Jesse	Canterbury	Thermo Fisher Scientific	CA	USA
Renato	Castelao	University of Georgia	GA	USA
Adam	Catasus	Florida Gulf Coast University	FL	USA
Franky	Celestin	University of Florida	FL	USA
Peter	Chace	Oregon State University	OR	USA
Martha	Chacon	National High Magnetic Field Laboratory	FL	USA
Romy	Chakraborty	Lawrence Berkeley National Laboratory	CA	USA
Ryan	Champiny	University of Florida	FL	USA
Ni-Bin	Chang	University of Central Florida	FL	USA
Mingfei	Chen	Lawrence Berkeley National Laboratory	CA	USA
Huan	Chen	National High Magnetic Field Laboratory	FL	USA
Huan	Chen	Clemson University	SC	USA
Jinxiang	Cheng	University of Central Florida	FL	USA
Henderson	Cleaves	Carnegie Institution of Washington	DC	USA
Nicole	Coffey	University of Delaware	DE	USA
Robyn	Conmy	Environmental Protection Agency	ОН	USA
Silvia	Córdova	University of Nebraska-Lincoln	NE	USA
Romulo	Cruz-Simbron	Blue Marble Space Institute of Science	WA	USA
James	Daubenspeck	University of Alabama, Birmingham	AL	USA
Todd	Dawson	University of California, Berkeley	CA	USA
David	Dayton	Research Triangle Institute International	NC	USA
Christian	Dewey	Oregon State University	OR	USA
Markus	Dieser	Montana State University	MT	USA
Dionysios	Dionysiou	University of Cincinnati	ОН	USA
Eva	Doting	University of Pennsylvania	PA	USA
Sean	Dunham	University of Texas, Austin	ТХ	USA
Kevin	Dybvig	University of Alabama, Birmingham	AL	USA
Alina	Ebling	University of Delaware	DE	USA
Brandon	Enalls	Lawrence Berkeley National Laboratory	CA	USA
llana	Farrell	Oregon State University	OR	USA
Timothy	Fegel	USDA Forest Service	CO	USA
Jason	Fellman	University of Alaska, Southeast	AK	USA
Francisco	Fernandez-Lima	Florida International University	FL	USA
Christine	Foreman	Montana State University	MT	USA
Heather	Forrer	Florida State University	FL	USA
Danielle	Freeman	Woods Hole Oceanographic Institution	MA	USA
Deborah	French-McKay	RPS ASA	RI	USA
Amanda	Frossard	University of Georgia	GA	USA
		National High Magnetic Field Laboratory	0/1	USA

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First Name	Last Name	Organization	State	Country
Jacob	Gaddy	University of Florida	FL	USA
Sailee	Gawande	Lamar University	ТХ	USA
Audrey	Goeckner	University of Florida	FL	USA
David	Griffith	Willamette University	OR	USA
Sara	Gushgari-Doyle	Lawrence Berkeley National Laboratory	CA	USA
Hadeer	Hamid	University of Cincinnati	ОН	USA
Cynthia	Heil	Mote Marine Laboratory	FL	USA
Jordon	Hemingway	MIT/WHOI Joint Program in Oceanography	MA	USA
Chris	Hendrickson	National High Magnetic Field Laboratory	FL	USA
Anna	Hermes	University of Colorado, Boulder	со	USA
Christopher	Higgins	Colorado School of Mines	СО	USA
Eve-Lyn	Hinckley	University of Colorado, Boulder	со	USA
F. Omar	Holguin	New Mexico State University, Main Campus	NM	USA
Patricia	Holland	Mote Marine Laboratory	FL	USA
Amy	Holt	Florida State University	FL	USA
Eran	Hood	University of Alaska, Southeast	AK	USA
Jim	Ippolito	Colorado State University	СО	USA
Daqian	Jiang	University of Alabama, Tuscaloosa	AL	USA
Anne	Kellerman	Florida State University	FL	USA
Eugene	Kelly	Colorado State University	со	USA
Angela	Knapp	Florida State University	FL	USA
Giselle	Knudsen	Alaunus Biosciences, Inc.	CA	USA
Minghao	Kong	University of Cincinnati	ОН	USA
John	Kornuc	U.S. Naval Research Laboratory	DC	USA
Sven	Kranz	Rice University	ТХ	USA
Peijia	Ku	Oak Ridge National Laboratory	TN	USA
Martin	Kurek	Florida State University	FL	USA
Parker	Lawrence	University of North Carolina, Wilmington	NC	USA
Kiara	Lech	Environmental Protection Agency	OH	USA
Yang	Lin	University of Florida	FL	USA
Merritt	Logan	Colorado State University	CO	USA
Krista	Longnecker	Woods Hole Oceanographic Institution	MA	USA
Mary	Lusk	University of Florida	FL	USA
Rachel	Mackelprang	California State University, Northridge	CA	USA
Swarnali	Mahmood	University of Florida	FL	USA
Natalia	Malina	Auburn University	AL	USA
Synthia Parveen	Mallick	Marquette University	WI	USA
Tahir	Maqbool	University of Alabama, Tuscaloosa	AL	USA
Alan	Marshall	National High Magnetic Field Laboratory	FL	USA
James	McClelland	University of Texas, Austin	TX	USA
	McKenna	National High Magnetic Field Laboratory	FL	USA
Amy				
Patricia	Medeiros	University of Georgia	GA	USA

First Name	Last Name	Organization	State	Country
Frederic	Mentink	National High Magnetic Field Laboratory	FL	USA
Aubrey	Miller	Florida State University	FL	USA
Amin	Mirkouei	University of Idaho	ID	USA
Laura	Moore	University of Washington	WA	USA
Elise	Morrison	University of Florida	FL	USA
Amanda	Muni-Morgan	University of Florida	FL	USA
Amelia	Nelson	Colorado State University	CO	USA
Robert	Nelson	Woods Hole Oceanographic Institution	MA	USA
Sydney	Niles	National High Magnetic Field Laboratory	FL	USA
Mohamad	Odeh	University of Central Florida	FL	USA
Ann	Ojeda	Auburn University	AL	USA
Dan	Olk	U.S. Department of Agriculture	IA	USA
Diana	Ordonez	University of Central Florida	FL	USA
Todd	Osborne	University of Florida	FL	USA
Kenneth	Overturf	U.S. Department of Agriculture	ID	USA
Rachel	Owrutsky	University of Delaware	DE	USA
Scott	Painter	Oak Ridge National Laboratory	TN	USA
Aidin	Panahi	Worcester Polytechnic Institute	MA	USA
Jiwoon	Park	University of Washington	WA	USA
Harsh	Patel	North Carolina Agricultural and Technical State University	NC	USA
Nasim	Pica	Colorado State University	CO	USA
Zeljka	Popovic	Florida State University	FL	USA
Brett	Poulin	University of California, Davis	CA	USA
Krishnan	Raja	University of Idaho	ID	USA
Md Redowan	Rashid	North Carolina Agricultural and Technical State University	NC	USA
Chris	Reddy	Woods Hole Oceanographic Institution	MA	USA
Clare	Reimers	Oregon State University	OR	USA
Charles	Rhoades	U.S. Department of Agriculture	CO	USA
Alejandra	Robles Lecompte	University of Central Florida	FL	USA
Ryan	Rodgers	National High Magnetic Field Laboratory	FL	USA
Isabel	Romero	University of South Florida	ТХ	USA
Holly	Roth	Colorado State University	CO	USA
John	Sanford	University of Alabama, Birmingham	AL	USA
Jacob	Schmidt	University of California, Santa Barbara	CA	USA
Michael	Senko	Thermo Fisher Scientific	VA	USA
Hamidreza	Sharifan	Colorado State University	CO	USA
Alexis	Slentz	Florida State University	FL	USA
Heidi	Smith	Montana State University	MT	USA
Robert	Spencer	Florida State University	FL	USA
Christine	Sprunger	Michigan State University	MI	USA
Sommer	Starr	Florida State University	FL	USA
Ethan	Struhs	University of Idaho	ID	USA

First Name	Last Name	Organization	State	Country
Michael	Stukel	Florida State University	FL	USA
Devi	Sundaravadivelu	Pegasus Technical Services Inc	ОН	USA
Michael	Timko	Worcester Polytechnic Institute	MA	USA
Bradley	Tolar	University of North Carolina, Wilmington	NC	USA
Carl	Trettin	USDA Forest Service	SC	USA
Maria	Tzortziou	City College of New York	NY	USA
Giovanna	Utsumi	University of Georgia	GA	USA
Lilian	Valadares Tose	Florida International University	FL	USA
Andrea	Valencia	University of Central Florida	FL	USA
Dave	Valentine	University of California, Santa Barbara	CA	USA
Jacob	VanderRoest	Colorado State University	CO	USA
Alfred	Wadee	Lamar University	ТΧ	USA
Collin	Ward	Woods Hole Oceanographic Institution	MA	USA
Chad	Weisbrod	National High Magnetic Field Laboratory	FL	USA
Katelin	Weitzel	University of Cincinnati	ОН	USA
Rachel	White	National High Magnetic Field Laboratory	FL	USA
Kimberly	Wickland	U.S. Geological Survey	CO	USA
Mike	Wilkins	Colorado State University	CO	USA
Madelyne	Willis	Montana State University	MT	USA
Boswell	Wing	University of Colorado, Boulder	CO	USA
Andrew	Wozniak	University of Delaware	DE	USA
Xiaoqin	Wu	Lawrence Berkeley National Laboratory	CA	USA
Li	Xiao	University of Alabama, Birmingham	AL	USA
Robert	Young	New Mexico State University, Main Campus	NM	USA
Oriane	Yvin	Florida State University	FL	USA
Zhe	Zhang	University of Cincinnati	ОН	USA
Renzun	Zhao	North Carolina Agricultural and Technical State University	NC	USA
Yuhua	Zheng	Clemson University	SC	USA

INTERNATIONAL USERS (72)

First Name	Last Name	Organization	Country
Hamada	Abdelrahman	Cairo University	Egypt
Carlos	Afonso	Normandy University	France
Jason	Ahad	Natural Resources Canada	Canada
Jakob	Andersen	University of Southern Denmark	Denmark
Martin	Andersen	University of New South Wales	Australia
Alexandre	Anesio	Aarhus University	Denmark
Runa	Antony	Helmholtz Zentrum-Potsdam	Germany
Andy	Baker	University of New South Wales	Australia
Liane	Benning	Helmholtz Zentrum-Potsdam	Germany
Cristian	Blanco-Tirado	Industrial University of Santander	Colombia
Jens	Blotevogel	Commonwealth Scientific and Industrial Research Organization	Australia

First Name

Brice

Sara

Alex

Colin

Marianny

Alexander

Hendryk

Joshua

Luis

Craig

Nir Paul

Deisy Pierre

Marloes

Jeffrey

Robert

Paul

Dolly

Marvin

Julien

Silvia

Liza

Karina

Anika

Denis

Diana

Daniel

Olga

Gabriel

Pamela

Helen

Christopher

Phetdala

Xiaohan

Guillermo Leon

Charlotte

Caroline

Christopher

Stephanie

Francesca

Christopher

Last Name

Bouyssiere

Combariza

Cheema

Chow

Cooke

Craig

Czech

Dean

Díaz-Sánchez

Emmerton

Gammon

Giraldo Davila

Groeneveld

Hawkes

Hilton

Kerton

Kösling

Kothawala

Kusenberg

MacQuarrie

Maillard

Mangote

Martinez

McDonough

Montoya Pelaez

Meredith

Neumann

O'Carroll

Oudone

Palacio

Petras

Rossel

Rüger

Rutlidge

Popovicheva

Rocha Martins

Мо

Marjo

Mase

Organisation

Peking University

ICESI University

University of Rostock

University of Warwick

University of New South Wales

University of New South Wales

Eberhard Karls University of Tuebingen

Lomonosov Moscow State University

National Institute of Technology

Helmholtz Zentrum-Potsdam

University of New South Wales

Australia's Nuclear Science and Technology

Evans

Galili

Giusti

2023 MagLab Annual Report	
Organization	Country
University of Pau and the Adour Region	France
Memorial University of Newfoundland	Canada
Chinese University of Hong Kong	Hong Kong
Industrial University of Santander	Colombia
University of Alberta	Canada
Uppsala University	Sweden
University of Rostock	Germany
University of Bristol	UK
Industrial University of Santander	Colombia
Government of Alberta	Canada
UK Centre for Ecology and Hydrology	UK
Swiss Federal Institute of Technology in Zurich	Switzerland
Natural Resources Canada	Canada
University of Pau and the Adour Region	France
TotalEnergies	France
Uppsala University	Sweden
Uppsala University	Sweden
University of Oxford	UK
Memorial University of Newfoundland	Canada
University of Rostock	Germany
Uppsala University	Sweden
Ghent University	Belgium
Cape Breton University	Canada
Versailles Saint-Quentin-en-Yvelines University	France
TotalEnergies	France
University of New South Wales	Australia
University of Rostock	Germany
University of Rouen	France
Australian Nuclear Science and Technology Organization	Australia

University of Rostock

Australia

China

Colombia

Germany

Australia

Australia

GB

Germany

Russia

Brazil

Germany

Germany

Australia

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First Name	Last Name	Organization	Country
Ayla	Sant'Ana da Silva	National Institute of Technology	Brazil
Isaac	Santos	Southern Cross University	Australia
Krystyna	Saunders	Australian Nuclear Science and Technology Organization	Australia
Eric	Schneider	University of Rostock	Germany
Siddhant	Sharma	ashoka university	India
Myrna	Simpson	University of Toronto (Toronto)	Canada
Olli	Sippula	University of Eastern Finland	Finland
Nivetha	Srikanthan	University of Toronto (Toronto)	Canada
lan	Stevens	Aarhus University	Denmark
Paolo	Stincone	Eberhard Karls University of Tuebingen	Germany
Martyn	Tranter	Aarhus University	Denmark
Yannick	Ureel	Ghent University	Belgium
Kevin	Van Geem	Ghent University	Belgium
Silvia Juliana	Vesga Martinez	University of Rostock	Germany
Juliana	Vidal	Memorial University of Newfoundland	Canada
Giovanni Andrea	Vitale	Eberhard Karls University of Tübingen	Germany
Martin	Willa	University of Warwick	UK
Wenzheng	Yu	Fujian Institute of Research on the Structure of Matter, Chinese Academy of Sciences	China
Ralf	Zimmermann	University of Rostock	Germany

NMR FACILITY

NATIONAL USERS (240)

First Name	Last Name	Organization	State	Country
Christer	Aakeroy	Kansas State University	KS	USA
Shiva	Agarwal	Western Michigan University	MI	USA
Umit	Akbey	University of Pittsburgh	PA	USA
Hunter	Aldridge	Florida State University	FL	USA
Django	Allegretti	University of Illinois at Chicago	IL	USA
Jessica	Allen	University of Massachusetts	MA	USA
Adam	Altenhof	Florida State University	FL	USA
Jacob	Athey	Florida State University	FL	USA
Jochen	Autschbach	University of Buffalo	NY	USA
Arvin	Bagde	Florida Agricultural and Mechanical University	FL	USA
Haydn	Ball	University of Texas, Southwestern	ТХ	USA
Jamini	Bhagu	Florida State University	FL	USA
Ashley	Blue	National High Magnetic Field Laboratory	FL	USA
Camereon	Boley	Washington and Jefferson College	PA	USA
Cesario	Borlongan	University of South Florida	FL	USA
Clifford (Russ)	Bowers	University of Florida	FL	USA
Russell	Bowers	University of Florida	FL	USA
William	Brey	National High Magnetic Field Laboratory	FL	USA

First Name	Last Name	Organization	State	Country
Hannah	Bryant	Florida State University	FL	USA
Bruce	Bunnell	Tulane University	LA	USA
Maria Luiza	Caldas Nogueira	University of Florida	FL	USA
Estely	Carranza	University of California, Davis	CA	USA
Jaclyn	Catalano	Montclair State University	NJ	USA
Silvia	Centeno	Metropolitan Museum of Art	NY	USA
Kaisorn	Chaichana	Mayo Clinic, Jacksonville	FL	USA
Zbigniew	Chajecki	Western Michigan University	MI	USA
Mario	Chang Reyes	University of Florida	FL	USA
Malitha	Chathuranga	National High Magnetic Field Laboratory	FL	USA
Banghao	CHen	Florida State University	FL	USA
Во	Chen	University of Central Florida	FL	USA
Kuizhi	Chen	National High Magnetic Field Laboratory	FL	USA
Yudan	Chen	Florida State University	FL	USA
Yong	Chu	Brookhaven National Laboratory	NY	USA
Hoyong	Chung	Florida State University	FL	USA
Mathew	Coats	East Carolina University	NC	USA
Carl	Conti	Florida State University	FL	USA
Robert	Cook	Louisiana State University	LA	USA
Myriam	Cotten	College of William and Mary	VA	USA
Tim	Cross	National High Magnetic Field Laboratory	FL	USA
Jinlei	Cui	Washington University in St. Louis	МО	USA
Anvesh Kumar Reddy	Dasari	East Carolina University	NC	USA
Debkumar	Debnath	Michigan State University	MI	USA
Michael	Deck	Florida State University	FL	USA
Angelika	Dewicki	Washington and Jefferson College	PA	USA
Valeria	Di Tullio	Metropolitan Museum of Art	NY	USA
Malitha	Dickwella Widanage	Louisiana State University	LA	USA
Hannah	Distaffen	University of Rochester	NY	USA
Yanhao	Dong	Massachusetts Institute of Technology	MA	USA
Yanhao	Dong	University of Pennsylvania	PA	USA
Justin	Douglas	University of Kansas	KS	USA
Zach	Dowdell	Florida State University	FL	USA
Thierry	Dubroca	National High Magnetic Field Laboratory	FL	USA
Cecil	Dybowski	University of Delaware	DE	USA
Samuel	Eddy	West Virginia University	WV	USA
Alec	Esper	University of Florida	FL	USA
Catherine	Fabiano	Florida State University	FL	USA
Michael	Famiano	Western Michigan University	MI	USA
Jiaxing	Fan	Florida State University	FL	USA
Daniel	Farb	University of California, Davis	CA	USA
Liyanage	Fernando	Michigan State University	MI	USA

First Name	Last Name	Organization	State	Country
Carl	Fleischer	Florida State University	FL	USA
Blake	Fonda	University of California, Davis	CA	USA
Marcus	Foston	Washington University in St. Louis	MI	USA
Reza	Foudazi	University of Oklahoma	OK	USA
Lucio	Frydman	National High Magnetic Field Laboratory	FL	USA
Riqiang	Fu	National High Magnetic Field Laboratory	FL	USA
Zhehong	Gan	National High Magnetic Field Laboratory	FL	USA
Zachary	Gardner	Washington and Jefferson College	PA	USA
Isha	Gautam	Michigan State University	MI	USA
Rittik	Ghosh	University of California, Riverside	CA	USA
Vanessa	Gonzalez	Florida State University	FL	USA
Evan	Goodell	College of William and Mary	VA	USA
Petr	Gor'kov	National High Magnetic Field Laboratory	FL	USA
Samuel	Grant	National High Magnetic Field Laboratory	FL	USA
Robert	Griffin	Massachusetts Institute of Technology	MA	USA
Josef	Grundy	Colorado State University	CO	USA
Terry	Gullion	West Virginia University	WV	USA
Sossina	Haile	Northwestern University	IL	USA
David	Halat	Lawrence Berkeley National Laboratory	CA	USA
Songi	Han	University of California, Santa Barbara	CA	USA
Michael	Harrington	Huntington Medical Research Institutes	CA	USA
Qi	He	Massachusetts Institute of Technology	MA	USA
Shannon	Helsper	National High Magnetic Field Laboratory	FL	USA
David	Hike	Florida State University	FL	USA
David	Hirsh	Iowa State University	IA	USA
Samuel	Holder	Florida State University	FL	USA
Sean	Holmes	Florida State University	FL	USA
Wenhao	Hu	Florida State University	FL	USA
Yan-Yan	Hu	Florida State University	FL	USA
Xingkang	Huang	University of Chicago	IL	USA
Yineng	Huang	Massachusetts Institute of Technology	MA	USA
Xiaojing	Huang	Brookhaven National Laboratory	NY	USA
Ivan	Hung	National High Magnetic Field Laboratory	FL	USA
Sonjong	Hwang	California Institute of Technology	CA	USA
Robbie	Iuliucci	Washington and Jefferson College	PA	USA
Anand	Jacob	Michigan State University	MI	USA
Khaled	Jami	University of California, Davis	CA	USA
Jaekyun	Jeon	National Institutes of Health	MD	USA
Zhihua	Jiang	Auburn University	AL	USA
Yongkang	Jin	Florida State University	FL	USA
Masato	Kato	University of Texas, Southwestern	ТХ	USA
Eric	Keeler	Massachusetts Institute of Technology	MA	USA

First Name	Last Name	Organization	State	Country
Baris	Кеу	Argonne National Laboratory	IL	USA
Md Imran	Khan	University of Central Florida	PR	USA
Jinsang	Kim	University of Michigan	MI	USA
James	Kimball	Florida State University	FL	USA
Abe	Kolko	University of California, Santa Barbara	CA	USA
Nicholas	Kotov	University of Michigan	MI	USA
Federico	Krauch	Pennsylvania State University	PA	USA
Bankala	Krishnarjuna	Michigan State University	MI	USA
Alex	Kurleman	Florida State University	FL	USA
Jason	Kuszynski	Florida State University	FL	USA
Woonghee	Lee	University of Colorado, Denver	CO	USA
Choogon	Lee	Florida State University	FL	USA
Ju	Li	Massachusetts Institute of Technology	MA	USA
Jingyao	Li	Washington University in St. Louis	MO	USA
Yanna	Liang	University at Albany	NY	USA
Kwang Hun	Lim	East Carolina University	NC	USA
Feng	Lin	Virginia Polytechnic Institute and State University	VA	USA
Haoyu	Liu	Argonne National Laboratory	IL	USA
Wenjun	Liu	Argonne National Laboratory	IL	USA
Michael	Lohse	Florida State University	FL	USA
Joanna	Long	University of Florida	FL	USA
Leonard	MacGillivray	University of Iowa	IA	USA
Thorsten	Maly	Bridge12, Technologies, Inc.	MA	USA
Wenping	Мао	National High Magnetic Field Laboratory	FL	USA
Roxanna	Martinez	Colorado State University	CO	USA
Clayton	Mathews	University of Florida	FL	USA
Hedi	Mattoussi	Florida State University	FL	USA
Adam	Matzger	University of Michigan	MI	USA
William	McCall	Augusta University	GA	USA
Sam	McCalpin	University of Michigan	MI	USA
Scott	McCormack	University of California, Davis	CA	USA
C. James	McKnight	Boston University	MA	USA
Steven	McKnight	University of Texas, Southwestern	TX	USA
Frederic	Mentink	National High Magnetic Field Laboratory	FL	USA
Matthew	Merritt	University of Florida	FL	USA
Gellert	Mezei	Western Michigan University	MI	USA
Zhihui	Miao	University of Florida	FL	USA
John	Miller	Western Michigan University	MI	USA
Andrew	Miner	Lawrence Berkeley National Laboratory	CA	USA
David	Mitzi	Duke University	NC	USA
Hadi	Mohammadigoushki	Florida State University	FL	USA
Lisa	Monluc	Florida State University	FL	USA

First Name	Last Name	Organization	State	Country
Leonard	Mueller	University of California, Riverside	CA	USA
Dylan	Murray	University of California, Davis	CA	USA
Bradley	Nilsson	University of Rochester	NY	USA
Ryan	O'Hayre	Colorado School of Mines	СО	USA
Bright	Ogbolu	Florida State University	FL	USA
Jordan	Ogg	Florida State University	FL	USA
Raul	Ortega	Florida State University	FL	USA
Kevin	O'Shea	Florida International University	FL	USA
Dmitry	Ostrovsky	University of Colorado, Denver	CO	USA
Kayla	Osumi	University of California, Davis	CA	USA
lfeoluwa	Oyekunle	Florida State University	FL	USA
Tyler	Ozvat	Colorado State University	СО	USA
Chloe	Patterson	Florida State University	FL	USA
Austin	Peach	Florida State University	FL	USA
Linda	Petzold	University of California, Santa Barbara	CA	USA
Karen	Pham	University of Colorado, Denver	со	USA
Adam	Phillips	University of Buffalo	NY	USA
Kenneth	Poeppelmeier	Northwestern University	IL	USA
Wei	Qiang	State University of New York, Binghamton	NY	USA
Elena	Quigley	University of Rochester	NY	USA
Rosalynn	Quiñones	Marshall University	WV	USA
Jenna	Radovich	Florida State University	FL	USA
Ayyalusamy	Ramamoorthy	University of Michigan	MI	USA
Thirupathi	Ravula	University of Michigan	MI	USA
Jeffrey	Reimer	University of California, Berkeley	CA	USA
Dayna	Richter	Florida State University	FL	USA
Aryana	Rodgers	University of Colorado, Denver	СО	USA
Daniel	Rosenbaum	University of Texas, Southwestern	ТΧ	USA
Mandip	Sachdeva	Florida Agricultural and Mechanical University	FL	USA
Stephanie	Sanchez	Colorado State University	со	USA
Jazmine	Sanchez	Florida State University	FL	USA
Jasmin	Schoenzart	Florida State University	FL	USA
Robert	Schurko	Florida State University	FL	USA
Alfredo	Scigliani	Florida State University	FL	USA
Faith	Scott	National High Magnetic Field Laboratory	FL	USA
Sabyasachi	Sen	University of California, Davis	CA	USA
Changgyu	Seok	Virginia Polytechnic Institute and State University	VA	USA
Charles	Settens	Massachusetts Institute of Technology	MA	USA
Michael	Shatruk	National High Magnetic Field Laboratory	FL	USA
Yewon	Shin	Colorado School of Mines	СО	USA
Kalpana	Singh	Michigan State University	MI	USA
Robert	Smith	Florida State University	FL	USA

First Name	Last Name	Organization	State	Country
Willie	Spight	Florida Agricultural and Mechanical University	FL	USA
Jonathan	Stebbins	Stanford University	CA	USA
Rachelle	Stowell	University of Washington	WA	USA
Geoffrey	Strouse	National High Magnetic Field Laboratory	FL	USA
Brent	Sumerlin	University of Florida	FL	USA
Yongwen	Sun	Pennsylvania State University	PA	USA
Randi	Swanson	University of California, Davis	CA	USA
Vasily	Sysoev	University of Texas, Southwestern	ТХ	USA
Sara	Termos	Florida State University	FL	USA
Lynmarie	Thompson	University of Massachusetts	MA	USA
Fang	Tian	Pennsylvania State University	PA	USA
David	Torres-Delgado	Florida State University	FL	USA
Erica	Truong	Florida State University	FL	USA
Diana	Tymochko	University of Florida	FL	USA
Okten	Ungor	Colorado State University	CO	USA
Jose	Uribe	University of California, Irvine	CA	USA
Johan	van Tol	National High Magnetic Field Laboratory	FL	USA
Adam	Veige	University of Florida	FL	USA
Amrit	Venkatesh	National High Magnetic Field Laboratory	FL	USA
Cameron	Vojvodin	Florida State University	FL	USA
Liliya	Vugmeyster	University of Colorado, Denver	CO	USA
Molly	Wagner	University of Delaware	DE	USA
Xiaoling	Wang	California State University, East Bay	CA	USA
Baoming	Wang	Massachusetts Institute of Technology	MA	USA
Hua	Wang	Massachusetts Institute of Technology	MA	USA
Chunsheng	Wang	University of Maryland, College Park	MD	USA
Tuo	Wang	Michigan State University	MI	USA
Sungsool	Wi	National High Magnetic Field Laboratory	FL	USA
Aaron	Wilber	Florida State University	FL	USA
Blake	Wilson	National Institutes of Health	MD	USA
Yuuki	Wittmer	University of California, Davis	CA	USA
Xianghui	Xiao	Brookhaven National Laboratory	NY	USA
Zunqiu	Xiao	Brookhaven National Laboratory	NY	USA
Yi	Xie	Duke University	NC	USA
Yan	Xin	National High Magnetic Field Laboratory	FL	USA
Hui	Xiong	Boise State University	IN	USA
Yawei	Xiong	College of William and Mary	VA	US
Yijue	Xu	National High Magnetic Field Laboratory	FL	USA
Haowei	Xu	Massachusetts Institute of Technology	MA	USA
Yang	Yang	Pennsylvania State University	PA	USA
Jayasubba Reddy	Yarava	Michigan State University	MI	USA
Sujung	Yi	East Carolina University	NC	USA

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First Name	Last Name	Organization	State	Country
Christine	Yu	Florida State University	FL	USA
Bing	Yuan	University of California, Davis	CA	USA
Xuegang	Yuan	Florida State University	FL	USA
Joseph	Zadrozny	Ohio State University	ОН	USA
Rongfu	Zhang	National High Magnetic Field Laboratory	FL	USA
Fuzhong	Zhang	Washington University in St. Louis	МО	USA
Weilan	Zhang	University at Albany	NY	USA
Lijiang	Zhao	Massachusetts Institute of Technology	MA	USA
Wancheng	Zhao	Michigan State University	MI	USA
Huan-Xiang	Zhou	University of Illinois at Chicago	IL	USA
Andrea	Zourou	College of William and Mary	VA	USA
Nicholas	Zumbulyadis	Independent Scholar and Consultant	NY	USA

INTERNATIONAL USERS (95)

First Name	Last Name	Organization	Country
Louae	Abdulla	University of Windsor	Canada
Jose Luis	Belmonte	National Autonomous University of Mexico	Mexico
Christian	Bonhomme	Pierre and Marie Curie University	France
Eric	Breynaert	Catholic University Leuven	Belgium
David	Bryce	University of Ottawa	Canada
Miriam	Calabrese	University in Milan	Italy
Satyaki	Chatterjee	University of Iceland	Iceland
Christophe	Coperet	ETH Zurich	Switzerland
David	De Haro Del Rio	Autonomous University of Nuevo León	Mexico
Rivera	de la Rosa	Autonomous University of Nuevo León	Mexico
Gael	De Paepe	French Alternative Energies and Atomic Energy Commission	France
Nicola	Demitri	Elettra Sincrotrone Trieste	Italy
Dirk	Dom	Catholic University Leuven	Belgium
Yanhao	Dong	Beihang University	China
Tanmoy	Dutta	Tata Institute of Fundamental Research	India
Pierre	Florian	French National Center for Scientific Research	France
Tomislav	Friscic	McGill University	Canada
Marco	Garza-Navarro	Autonomous University of Nuevo León	Mexico
Christel	Gervais	Sorbonne University	France
Angeliki	Giannouli	Weizmann Institute of Science	Israel
leva	Goldberga	French National Center for Scientific Research	France
Nina	Gunde Cimerman	University of Ljubljana	Slovenia
Thomas	Halbritter	University of Iceland	Iceland
Rania	Harrabi	French Alternative Energies and Atomic Energy Commission	France
Alia	Hassan	Bruker Biospin AG Switzerland	Switzerland
Sabine	Hediger	French Alternative Energies and Atomic Energy Commission	France
Ernesto	Hernandez-Morales	National Autonomous University of Mexico	Mexico

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First Name	Last Name	Organization	Country
Erick	Hernandez-Santiago	National Autonomous University of Mexico	Mexico
Jian	Hou	Dankook University	South Korea
Maarten	Houlleberghs	Catholic University Leuven	Belgium
Yining	Huang	University of Western Ontario	Canada
Marina	Ilkaeva	University of Aveiro	Portugal
Dinu	luga	University of Warwick	UK
Sheetal	Jain	Indian Institute of Science, Bengaluru	India
Michael	Jaroszewicz	University of Windsor	Canada
Wooyoung	Kim	Dankook University	South Korea
Jean-Paul	Latge	University of Crete	Greece
Danielle	Laurencin	University of Montpellier	France
Chang Hyun	Lee	Dankook University	South Korea
Daniel	Lee	University of Manchester	UK
Conggang	Li	Wuhan Institute of Physics & Mathematics, Chinese Academy of Sciences	China
Qiang	Li	Southwest Texas Junior College	China
Yutong	Li	Tsinghua University	China
Ziteng	Liang	Xiamen University	China
Jun Hyun	Lim	Dankook University	South Korea
Qi	Liu	City University of Hong Kong	China
Carlos Javier	Lucio Ortiz	Autonomous University of Nuevo León	Mexico
Luís	Mafra	University of Aveiro	Portugal
lldefonso	Marin-Montesinos	University of Aveiro	Portugal
Liliana	Martinez-Avila	Autonomous University of the State of Morelos	Mexico
Vinicius	Martins	University of Western Ontario	Canada
Gergo	Matajsz	IBEC · Institute for Bioengineering of Catalonia	Spain
Jose	Mejia-Aleman	National Autonomous University of Mexico	Mexico
Thomas-Xavier	Métro	Institut des Biomolécules Max Mousseron	France
Martine	Monette	Bruker Biospin Canada	Canada
Francisco José	Morales-Leal	Autonomous University of Nuevo León	Mexico
Tamali	Nag	University of Ottawa	Canada
Armando	Navarro-Huerta	National Autonomous University of Mexico	Mexico
Adam	Nelson	Sorbonne University	France
Ulla Gro	Nielsen	University of Southern Denmark	Denmark
Subrhadip	Paul	French Alternative Energies and Atomic Energy Commission	France
Daniel	Pereira	University of Aveiro	Portugal
Andrea	Pizzi	University in Milan	Italy
Vivek	Polshettiwar	Tata Institute of Fundamental Research	India
Wei	Quan	China Guolian Automotive Battery Research Institute Co	China
Sambhu	Radhakrishnan	Catholic University Leuven	Belgium
Nikita	Rao	Indian Institute of Science, Bengaluru	India

First Name	Last Name	Organization	Country
Yang	Ren	City University of Hong Kong	China
Lizbeth	Rodriguez-Cortes	National Autonomous University of Mexico	Mexico
Braulio	Rodríguez-Molina	National Autonomous University of Mexico	Mexico
Evelin	Ruiz-Zamora	Autonomous University of Nuevo León	Mexico
Ladislao	Sandoval-Rangel	Monterrey Institute of Technology and Higher Education	Mexico
Mariana	Sardo	University of Aveiro	Portugal
Snorri	Sigurdsson	University of Iceland	Iceland
Carolina	Solis Maldonado	Veracruzan University	Mexico
Jessica	Spackova	University of Montpellier	France
Jochem	Struppe	Bruker Biospin AG Switzerland	Switzerland
Zilong	Tang	Tsinghua University	China
Victor	Terskikh	University of Ottawa	Canada
Rishi	Verma	Tata Institute of Fundamental Research	India
Kangjun	Wang	Xiamen University	China
Lara	Watanabe	University of Windsor	Canada
Martin	Winter	Muenster Electrochemical Energy Technology	Ireland
Gang	Wu	Queen's University at Kingston	Canada
Yuxuan	Xiang	Westlake University	China
Jiabin	Xu	University of Western Ontario	Canada
Alexander	Yakimov	ETH Zurich	Switzerland
Yong	Yang	Xiamen University	China
Taemin	Yeo	Pohang University of Science and Technology	South Korea
Yakun	Yuan	Shanghai Jiao Tong University	China
Wanli	Zhang	University of Western Ontario	Canada
Zhongtai	Zhang	Tsinghua University	China
Не	Zhu	University of Hong Kong	China
Jianping	Zhu	Xiamen University	China

PULSED FIELD FACILITY

NATIONAL USERS (122)

First Name	Last Name	Organization	State	Country
Charles	Agosta	Clark University	MA	USA
Lauren	Allen	Prairie View A&M University	ТΧ	USA
James	Analytis	University of California, Berkeley	CA	USA
Fedor	Balakirev	National High Magnetic Field Laboratory	NM	USA
Luis	Balicas	National High Magnetic Field Laboratory	FL	USA
Alimamy	Bangura	National High Magnetic Field Laboratory	FL	USA
Ryan	Baumbach	National High Magnetic Field Laboratory	FL	USA
Shubham	Bisht	Florida State University	FL	USA
Joanna	Blawat	National High Magnetic Field Laboratory	NM	USA
Avery	Blockmon	University of Tennessee, Knoxville	TN	USA

First Name	Last Name	Organization	State	Country
Collin	Broholm	Johns Hopkins University	MD	USA
Christopher	Broyles	Washington University in St. Louis	МО	USA
John	Bulmer	Air Force Research Laboratory	FL	USA
Nicholas	Butch	National Institute of Standards and Technology MD	MD	USA
Marshall	Campbell	Los Alamos National Laboratory	NM	USA
Paul	Canfield	Ames Laboratory	IA	USA
Huibo	Cao	Oak Ridge National Laboratory	TN	USA
Aaron	Chan	University of Michigan	MI	USA
Mun	Chan	National High Magnetic Field Laboratory	NM	USA
Chuan	Chang	Cornell University	NY	USA
Cui-Zu	Chang	Pennsylvania State University	PA	USA
Greta	Chappell	Los Alamos National Laboratory	NM	USA
Joseph	Checkelsky	Massachusetts Institute of Technology	MA	USA
Alan	Chen	Massachusetts Institute of Technology	MA	USA
Tong	Chen	Johns Hopkins University	MD	USA
Kuan-Wen	Chen	University of Michigan	MI	USA
Aiping	Chen	Los Alamos National Laboratory	NM	USA
Yu-Hsin	Chen	Cornell University	NY	USA
Hai Ping	Cheng	University of Florida	FL	USA
Sang Wook	Cheong	Rutgers University	NJ	USA
Junho	Choi	Los Alamos National Laboratory	NM	USA
Jiun-Haw	Chu	University of Washington	WA	USA
Orrin	Clarke Delgado	Norfolk State University	VA	USA
Scott	Crooker	National High Magnetic Field Laboratory	NM	USA
Peter	Czajka	National Institute of Standards and Technology MD	MD	USA
Yuhang	Deng	University of California, San Diego	CA	USA
Seung-Hwan	Do	University of Tennessee, Knoxville	TN	USA
Daniel	Duong	University of South Carolina	SC	USA
Jimy	Encomendero	Cornell University	NY	USA
Priscila	Ferrari Silveira Rosa	Los Alamos National Laboratory	NM	USA
Corey	Frank	National Institute of Standards and Technology MD	MD	USA
Miguel	Gakiya	Florida State University	FL	USA
Yunpeng	Gao	New Jersey Institute of Technology	NJ	USA
Alireza	Ghasemi	Johns Hopkins University	MD	USA
David	Graf	National High Magnetic Field Laboratory	FL	USA
Thomas	Halloran	National Institute of Standards and Technology MD	MD	USA
Neil	Harrison	National High Magnetic Field Laboratory	NM	USA
Tim	Haugan	Air Force Research Laboratory	ОН	USA
Marcelo	Jaime	National High Magnetic Field Laboratory	NM	USA
Luis	Jauregui	University of California, Irvine	CA	USA
Debdeep	Jena	Cornell University	NY	USA

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First Name	Last Name	Organization	State	Country
Kaila	Jenkins	University of Michigan	MI	USA
Rongying	Jin	University of South Carolina	SC	USA
Sunil	Karna	Prairie View A&M University	ТΧ	USA
Caue	Kaufmann Ribeiro	Los Alamos National Laboratory	NM	USA
Rubi	Km	Los Alamos National Laboratory	NM	USA
Таі	Kong	University of Arizona	AZ	USA
Brett	Laramee	Clark University	СТ	USA
Minseong	Lee	National High Magnetic Field Laboratory	NM	USA
Sangyun	Lee	National High Magnetic Field Laboratory	NM	USA
Seng Huat	Lee	Pennsylvania State University	PA	USA
Sylvia	Lewin	University of Maryland, College Park	MD	USA
Lu	Li	University of Michigan	MA	USA
Jinyu	Liu	University of California, Irvine	CA	USA
Shuanglong	Liu	University of Florida	FL	USA
Yuanqi	Lyu	University of California, Berkeley	CA	USA
Boris	Maiorov	National High Magnetic Field Laboratory	NM	USA
David	Mandrus	University of Tennessee, Knoxville	TN	USA
Jamie	Manson	Eastern Washington University	WA	USA
Zhiqiang	Мао	Pennsylvania State University	PA	USA
Brian	Maple	University of California, San Diego	CA	USA
Ross	McDonald	National High Magnetic Field Laboratory	NM	USA
Robert	McQueeney	Ames Laboratory	IA	USA
Sanu	Mishra	Los Alamos National Laboratory	NM	USA
Christopher	Mizzi	National High Magnetic Field Laboratory	NM	USA
Camilla	Moir	University of California, San Diego	CA	USA
Dibya	Mondal	Florida State University	FL	USA
Janice	Musfeldt	University of Tennessee, Knoxville	TN	USA
Paul	Neves	Massachusetts Institute of Technology	MA	USA
Doan	Nguyen	National High Magnetic Field Laboratory	NM	USA
Thinh	Nguyen	West Texas A&M University	ΤХ	USA
Martin	Nikolo	Saint Louis University	МО	USA
Gary	Noe	National High Magnetic Field Laboratory	NM	USA
Magdalena	Owczarek	Los Alamos National Laboratory	NM	USA
Johanna	Palmstrom	National High Magnetic Field Laboratory	NM	USA
Jun	Park	Los Alamos National Laboratory	NM	USA
Michael	Pettes	Los Alamos National Laboratory	NM	USA
Cole	Phillips	West Texas A&M University	ΤХ	USA
Victoria	Posey	Columbia University	NY	USA
Luke	Pritchard Cairns	University of California, Berkeley	CA	USA
Brad	Ramshaw	Cornell University	NY	USA
Sheng	Ran	Washington University in St. Louis	МО	USA
Filip	Ronning	Los Alamos National Laboratory	NM	USA

First Name	Last Name	Organization	State	Country
Xavier	Roy	Columbia University	NY	USA
Gicela	Saucedo Salas	University of Maryland, College Park	MD	USA
Michael	Shatruk	National High Magnetic Field Laboratory	FL	USA
Arkady	Shehter	National High Magnetic Field Laboratory	NM	USA
Keshav	Shrestha	Texas A&M University	ТХ	USA
John	Singleton	National High Magnetic Field Laboratory	NM	USA
Tyler	Slade	Ames Laboratory	IA	USA
Kevin	Storr	Prairie View A&M University	ТХ	USA
Doyle	Temple	Norfolk State University	VA	USA
Sean	Thomas	Los Alamos National Laboratory	NM	USA
Benjamin	Ueland	Ames Laboratory	IA	USA
Joshua	Wakefield	Massachusetts Institute of Technology	MA	USA
James	Wampler	National High Magnetic Field Laboratory	NM	USA
Ping	Wang	University of Florida	FL	USA
Laurel	Winter	National High Magnetic Field Laboratory	NM	USA
Ziji	Xiang	University of Michigan	MI	USA
Huili	Xing	Cornell University	NY	USA
Kohtaro	Yamakawa	University of California, Berkeley	CA	USA
Junjie	Yang	New Jersey Institute of Technology	NJ	USA
Hemian	Yi	Pennsylvania State University	PA	USA
Vivien	Zapf	National High Magnetic Field Laboratory	NM	USA
Dechen	Zhang	University of Michigan	MI	USA
Shengzhi	Zhang	National High Magnetic Field Laboratory	NM	USA
Shu Yang	Zhao	Massachusetts Institute of Technology	MA	USA
Yi-Fan	Zhao	Pennsylvania State University	PA	USA
Guoxin	Zheng	University of Michigan	MI	USA
Haidong	Zhou	University of Tennessee, Knoxville	TN	USA
Yuan	Zhu	University of Michigan	MI	USA
Michael	Ziebel	Columbia University	NY	USA

INTERNATIONAL USERS (33)

First Name	Last Name	Organization	Country
Kirk	Adams	University of Oxford	UK
Ariando	Ariando	National University of Singapore	Singapore
Sujit	Das	Indian Institute of Science, Bengaluru	India
Jayjit	Dey	Indian Institute of Science Materials Research Centre, Bengaluru	India
Mijkhail	Eremets	Max Planck Institute for Chemistry, Mainz	Germany
Paul	Goddard	University of Warwick	UK
Swee	Goh	Chinese University of Hong Kong	Hong Kong
Chris	Grovenor	University of Oxford	UK
Chunyu	Guo	Max Planck Institute for Structure and Dynamics of Matter, Hamburg	Germany
Junxiong	Hu	National University of Singapore	Singapore

kashKhansiliStockholm UniversitySwedenkikoKobyashiUniversity of TokyoJapanwing ToLaiChinese University of Hong KongHong KonggnieszkaLekawa-RausUniversity of CambridgeUKngLiHuazhong University of Science and TechnologyChinaavierMarieNational Institute for Applied Sciences, ToulouseFranceujiMatsudaKyoto UniversityJapanasilyMolicInstitute of Science and Technology AustriaAustriailipMolicInstitute of Science and Technology AustriaAustriainlipMolilMax Planck Institute for Structure and Dynamics of Matter, HamburgGermanymitNatiwaniInstitute of Science and Technology AustriaAustriauhammadNaumanInstitute of Applied Sciences, ToulouseFranceusannahSpellerUniversity of OxfordUKernhardUrbaszekNational Institute for Applied Sciences, ToulouseFranceusannahSpellerUniversity of WarwickUKernhardWangChinese University of Hong KongChinaernhardWang	First Name	Last Name	Organization	Country
AndmanAndmanAndmancikkoKobyashiUniversity of TokyoJapanwing ToLaiChinese University of Hong KongHong KonggnieszkaLekawa-RausUniversity of CambridgeUKngLiHuazhong University of Science and TechnologyChinaavierMarieNational Institute for Applied Sciences, ToulouseFranceajiMatsudaKyoto UniversityJapanasilyMinkovMax Planck Institute for Chemistry, MainzGermanymberlyModicInstitute of Science and Technology AustriaAustrianilipMollMax Planck Institute for Structure and Dynamics of Matter, HamburgGermanymitNathwaniInstitute of Science and Technology AustriaAustriauhammadNaumanInstitute of ChrordUKusannahSpellerUniversity of OxfordUKuroyaVaidyaUniversity of WarwickUKuroyaWangChinese University of Hong KongChinaenyanWangChinese University of Science and TechnologySouth Korea	William	lliffe	CCFE STEP	UK
wing ToLaiChinese University of Hong KongHong KonggnieszkaLekawa-RausUniversity of CambridgeUKngLiHuazhong University of Science and TechnologyChinaavierMarieNational Institute for Applied Sciences, ToulouseFranceavierMatsudaKyoto UniversityJapanasilyMinkovMax Planck Institute for Chemistry, MainzGermanymberlyModicInstitute of Science and Technology AustriaAustrianilipMollMax Planck Institute for Structure and Dynamics of Matter, HamburgGermanymitNathwaniInstitute of Science and Technology AustriaAustriauhammadNaumanInstitute for Applied Sciences, ToulouseFranceusannahSpellerUniversity of WarwickUKuroyaVaidyaUniversity of WarwickUKuroyaVaidyaChinese University of Hong KongChinaennyaWangChinese University of Hong KongChinaennyaWonPohang University of Science and TechnologySouth Korea <td>Akash</td> <td>Khansili</td> <td>Stockholm University</td> <td>Sweden</td>	Akash	Khansili	Stockholm University	Sweden
gnieszkaLekawa-RausUniversity of CambridgeUKngLiHuazhong University of Science and TechnologyChinaavierMarieNational Institute for Applied Sciences, ToulouseFranceajiMatsudaKyoto UniversityJapanasilyMinkovMax Planck Institute for Chemistry, MainzGermanymberlyModicInstitute of Science and Technology AustriaAustrianilipMollMax Planck Institute for Structure and Dynamics of Matter, HamburgGermanymitNathwaniInstitute of Science and Technology AustriaAustriauhammadNaumanInstitute of Science and Technology AustriaAustriausannahSpellerUniversity of OxfordUKusannahSpellerUniversity of OxfordUKuroyaVaidyaUniversity of WarwickUKungfeiWangChinese University of Hong KongChinauongfeiWangChinese University of Science and TechnologySouth Korea	Akiko	Kobyashi	University of Tokyo	Japan
ImageLiHuazhong University of Science and TechnologyChinaavierMarieNational Institute for Applied Sciences, ToulouseFranceujiMatsudaKyoto UniversityJapanasilyMinkovMax Planck Institute for Chemistry, MainzGermanymberlyModicInstitute of Science and Technology AustriaAustrianilipMollMax Planck Institute for Structure and Dynamics of Matter, HamburgGermanymitNathwaniInstitute of Science and Technology AustriaAustriauhammadNaumanInstitute of Science and Technology AustriaAustriausannahSpellerUniversity of OxfordUKusannahSpellerUniversity of OxfordUKuroyaVaidyaUniversity of WarwickUKungfeiWangChinese University of Hong KongChinaenyanWangChinese University of Science and TechnologySouth Korea	Kwing To	Lai	Chinese University of Hong Kong	Hong Kong
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MollMax Planck Institute for Structure and Dynamics of Matter, HamburgGermanymitNathwaniInstitute of Science and Technology AustriaAustriauhammadNaumanInstitute of Science and Technology AustriaAustriauhammadNaumanInstitute of Science and Technology AustriaAustriauhammadSpellerUniversity of OxfordUKusannahSpellerUniversity of OxfordUKurbaszekNational Institute for Applied Sciences, ToulouseFrancenroyaVaidyaUniversity of WarwickUKngfeiWangChinese University of Hong KongChinahoongjaeWonPohang University of Science and TechnologySouth Korea	Vasily	Minkov	Max Planck Institute for Chemistry, Mainz	Germany
MoliDynamics of Matter, HamburgGermanymitNathwaniInstitute of Science and Technology AustriaAustriauhammadNaumanInstitute of Science and Technology AustriaAustriauhammadRydhStockholm UniversitySwedenusannahSpellerUniversity of OxfordUKernhardUrbaszekNational Institute for Applied Sciences, ToulouseFrancenorgaVaidyaUniversity of WarwickUKengfeiWangChinese University of Hong KongChinahoongjaeWonPohang University of Science and TechnologySouth Korea	Kimberly	Modic	Institute of Science and Technology Austria	Austria
uhammadNaumanInstitute of Science and Technology AustriaAustriauhammadRydhStockholm UniversitySwedenusannahSpellerUniversity of OxfordUKusannahUrbaszekNational Institute for Applied Sciences, ToulouseFrancenroyaVaidyaUniversity of WarwickUKngfeiWangChinese University of Hong KongChinanoongjaeWonPohang University of Science and TechnologySouth Korea	Philip	Moll		Germany
Indication<	Amit	Nathwani	Institute of Science and Technology Austria	Austria
JusannahSpellerUniversity of OxfordUKernhardUrbaszekNational Institute for Applied Sciences, ToulouseFrancenroyaVaidyaUniversity of WarwickUKngfeiWangChinese University of Hong KongChinaenyanWangChinese University of Hong KongChinahoongjaeWonPohang University of Science and TechnologySouth Korea	Muhammad	Nauman	Institute of Science and Technology Austria	Austria
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ArrandeOrbaszekToulouseFrancenroyaVaidyaUniversity of WarwickUKngfeiWangChinese University of Hong KongChinaenyanWangChinese University of Hong KongChinahoongjaeWonPohang University of Science and TechnologySouth Korea	Susannah	Speller	University of Oxford	UK
IngfeiWangChinese University of Hong KongChinaVenyanWangChinese University of Hong KongChinahoongjaeWonPohang University of Science and TechnologySouth Korea	Bernhard	Urbaszek		France
Venyan Wang Chinese University of Hong Kong China hoongjae Won Pohang University of Science and Technology South Korea	Shroya	Vaidya	University of Warwick	UK
hoongjae Won Pohang University of Science and Technology South Korea	Lingfei	Wang	Chinese University of Hong Kong	China
	Wenyan	Wang	Chinese University of Hong Kong	China
mitri Yakovlev University of Dortmund Germany	Choongjae	Won	Pohang University of Science and Technology	South Korea
	Dmitri	Yakovlev	University of Dortmund	Germany
aleska Zambra Institute of Science and Technology Austria Austria	Valeska	Zambra	Institute of Science and Technology Austria	Austria
Zhang Chinese University of Hong Kong Hong Kong	Wei	Zhang	Chinese University of Hong Kong	Hong Kong

		Participants (Name, Role, Org., Dept.)			Funding Sources Agency, Division, Award #)		Proposal #	Proposal Title	Discipline	Exp. #	Days Used
Matthew Eddy (S)	PI	University of Florida	Chemistry	NIH	NIGMS - National Institute of General	GM138291	P19419	ML-EDDY-002: Small molecule fragment	Biology, Biochemistry, Biophysics	1	6.5
Kana America (O)	~	Halos and the of Florida			Medical Sciences			screening with GPCRs in natural membranes by HRMAS NMR			
Kara Anazia (G) James H.P. Collins (O)	C	University of Florida University of Florida	Chemistry department Biochemistry & Molecular Biology					membranes by mixing mining			
Sreyashi Das (G)	C C	University of Florida	Chemistry & Molecular Biology								
	c	University of Florida	Chemistry								
Hala Hachem (G)	c	University of Florida	Chemistry								
Michael Harris (S)	ĉ	University of Florida	Chemistry								
Beining (Kim) Jin (G)	ĉ	University of Florida	Chemistry								
Emma Mulry (G)	c	University of Florida	Chemistry								
Nessa Pesaran Afsharian (G)	c.	University of Florida	Chemistry								
Enzo Petracco (G)	c	University of Florida	Chemistry								
Arka Prabha Ray (G)	č	University of Florida	Chemistry								
Naveen Thakur (G)	č	University of Florida	Chemistry								
Anuradha Wijesekara (G)	c	University of Florida	Chemistry								
Jeffrey Rudolf (S)	PI	University of Florida	Chemistry	No other support			P19437	Bacterial terpenoids and their biosynthesis	Biology, Biochemistry, Biophysics	1	9.33
Tyler Alsup (G)	С	University of Florida	Chemistry								
Michelle Ehrenberger (G)	с	University of Florida	Chemistry								
Daniel Icenhour (G)	С	University of Florida	Chemistry								
Zining Li (P)	С	University of Florida	Chemistry								
Caitlin McCadden (G)	с	University of Florida	Chemistry								
Wenbo Ning (G)	С	University of Florida	Chemistry							1	1
Diana Stancic (G)	С	University of Florida	Chemistry							1	1
	С	University of Florida	Chemistry							1	1
Xiuting Wei (G)	С	University of Florida	Chemistry					1		1	1
Baofu Xu (P)	С	University of Florida	chemistry							1	1
Jonathan Judy (S)	PI	University of Florida	Soil and Water Sciences	South Florida Water Management District	Other		P19466	Evaluating the Nature of Phosphorus	Chemistry	1	27.5
Jehangir Bhadha (S)	С	Everglades Research and Education Center at UF	Soil, Water, and Ecosystem Sciences	~				Entering, Within and Leaving Everglades Stormwater Treatment Areas (STAs)			
A. Caroline Buchanan (G)	С	University of Florida	Ag - Soil and Water Science								
Amanda Chappel (G)	С	University of Florida	Enviornmental Engineering Sciences								
MD Anik Mahmud (G)	С	University of Florida	Soil, Water, and Ecosystem Sciences								
Elise Morrison (S)	c		Environmental Engineering Sciences								
Lilit Vardanyan (S)	С	University of Florida	Soil and Water Science								
Michael Harris (S)	PI	University of Florida	Chemistry	NIH	NIGMS - National Institute of General Medical Sciences	GM127100	P19469	ML-HARRIS-001: Analysis of RNA induced protein folding during ribonucleoprotein	Biology, Biochemistry, Biophysics	1	2.5
Sreyashi Das (G)	С	University of Florida	Chemistry	NSF	DMR - Division of Materials Research	DMR2339330		assembly			
Matthew Eddy (S)	č	University of Florida	Chemistry								
Emma Mulry (G)	č	University of Florida	Chemistry								
Sandra Loesgen (S)	PI	University of Florida	Chemistry	No other support			P19658	Structural characterization of novel microbial	Chemistry	1	2.5
Erin Marshall (G)	С	University of Florida	Whitney Lab					metabolites and their biological activity			
Federica Montesanto (P)	С	University of Florida	Whitney Lab								
Bastien Petit (P)	С	University of Florida	Whitney Lab								
Bill Baker (S)	PI	University of South Florida	Chemistry	No other support			P19767	Natural Product Drug Discovery for	Biology, Biochemistry, Biophysics	1	18.5
Sam Afoullouss (P)	С	University of South Florida	USF Chemistry					Infectious Diseases and the need for High-			
Joe Bracegirdle (P)	С	University of South Florida	Chemistry					Sensitivity NMR Equipment			
Stine Sofie Olsen (G)	С	University of South Florida	USF Chemistry								
Fransua Sharafeddin (G)	С	Loma Linda University	Basic Sciences, Physiology								
Julio Sierra (G)	С	Loma Linda University	Basic Sciences, Physiology								
Benjamin Smith (G)	С	University of Florida	Chemistry								
Josh Welsch (G)	С	University of South Florida	USF Chemistry					1		1	1
Jennifer Williams (G)	С	University of South Florida	USF Chemistry					l			
Zachary Smith (S)	PI	Massachusetts Institute of Technology	Chemical Engineering	NSF	CBET - Chemical, Bioengineering,	CBET2034734	P19806	PFG NMR quantification of gas diffusion	Engineering	1	19
					Environmental, and Transport Systems			inside composite membranes based on		1	1
Omar Boloki (G)	С	University of Florida	Chemical Engineering					metal-organic frameworks as a function of		1	1
Eric Hahnert (G)	С	Massachusetts Institute of Technology	Chemical Engineering					diffusion length scale and membrane		1	1
Philippe Jean-Baptiste (G)	С	Massachusetts Institute of Technology	Chemical Engineering					composition		1	1
Samuel Kaser (G)	С	Massachusetts Institute of Technology	Chemical Engineering							1	1
Sree Laxmi (G)	С	University of Florida	Chemical Engineering Department							1	1
Sergey Vasenkov (S)	С	University of Florida	Chemical Engineering							L	<u> </u>
Ryan Lively (S)	PI	Georgia Institute of Technology	School of Chemical & Biomolecular	NSF	CBET - Chemical, Bioengineering,	CBET2135662	P19852	Influence of polymer crosslinking on	Engineering	1	14.5
Rebecca Bivins (G)	с	Georgia Institute of Technology	Engineering, Chemical and Biomolecular Engineering	NSF	Environmental, and Transport Systems CBET - Chemical, Bioengineering,	CBET2135766		microscopic diffusion in ZIF-based mixed- matrix membranes by high field diffusion			
Blake Trusty (G)	с	University of Florida	Chemical Engineering		Environmental, and Transport Systems			NMR			
Sergey Vasenkov (S)	С	University of Florida	Chemical Engineering							1	1
Young Hee Yoon (G)	С	Georgia Institute of Technology	School of Chemical & Biomolecular					1		1	
Anastasios Angelopoulos (S)	PI	University of Cincinnati	Engineering Department of Chemical and Environmental	NSF	CBET - Chemical, Bioengineering,	CBET1836551	P19860	ML-ANGELOPOULOS-002: Quantification	Engineering	1	40.67
Sarah Barber (G)	с	University of Cincinnati	Engineering Department of Chemical and Environmental	NSF	Environmental, and Transport Systems CBET - Chemical, Bioengineering,	CBET1836556		of diffusion of molecules with the "Janus" structure in Nafion by high field diffusion	-		
	1		Engineering		Environmental, and Transport Systems			NMR		1	1
Omar Boloki (G)	С	University of Florida	Chemical Engineering							1	1
Junchuan Fang (G)	С	University of Cincinnati	Chemical Engineering					1		1	1
Jonathan Nickels (S)	С	University of Cincinnati	Department of Chemical and Environmental					1		1	1
			Engineering							1	1
								1		1	1
Blake Trusty (G) Sergey Vasenkov (S)	С	University of Florida University of Florida	Chemical Engineering Chemical Engineering								

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		Participants (Name, Role, Org., Dept.)		(Funding	Funding Sources Agency, Division, Award #)		Proposal #	Proposal Title	Discipline	Exp. #	Days Used
Michael Harris (S)	PI	University of Florida	Chemistry	NIH	NIGMS - National Institute of General	GM127100	P19877	ML-HARRIS-002: NMR Spectroscopic	Biology, Biochemistry, Biophysics	1	1 14
					Medical Sciences			Characterization of Protein-Polymer			
Coray Colina (S)	C	University of Florida	Chemistry	NSF	DMR - Division of Materials Research	DMR2339330		Conjugates in Aqueous Solutions			
Sreyashi Das (G)	C	University of Florida University of Florida	Chemistry								
Matthew Eddy (S)	C	University of Florida	Chemistry								
Emma Mulry (G) Brent Sumerlin (S)	ĉ	University of Florida	Chemistry Chemistry								
Shahabeddin Vahdat (S)	PI	University of Florida	Applied Physiology and Kinesiology	NIH	NIDDK - National Institute of Diabetes and	DK132003	P19971	ML-VAHDAT-001: Identification of neural	Biology, Biochemistry, Biophysics	1	1 5
onanabeddin vandar (0)		chivelary of Florida	Applied 1 Hysiology and Rifesiology		Digestive and Kidney Diseases	DI(102000	113371	mechanisms of force control using awake	biology, biochemiady, biophysics		
Vishwas Jindal (G)	С	University of Florida	Applied Physiology and Kinesiology	NIH	NIBIB - National Institute for Biomedical	EB031249		mouse optogenetic fMRI			
	-				Imaging and Bioengineering						
Sushain Kaul (G)	С	University of Florida	Biomedical Engineering								
Isabella Pinto (U)	С	University of Florida	Physiological Sciences								
Shane Priester (G)	С	University of Florida	Physiological Sciences								
David Vaillancourt (S)	С	University of Florida	Applied Physiology and Kinesiology								
Daniel Wesson (S)	С	University of Florida	Pharmacology								_
Daniel R. Talham (S)	PI	University of Florida	Chemistry	NSF	DMR - Division of Materials Research	DMR1904596	P20026	Self-Assembled Polymer Nanostructures as	Chemistry	1	1 32.
Diba Allameh Zadeh (G)	С	University of Florida	Chemistry					paraCEST MRI Contrast Agents			
Brent Sumerlin (S)	C	University of Florida	Chemistry						ALL ALL L. ALL L	ļ	
Lee Sweeney (S)	ы	University of Florida	Pharmacology & Therapeutics	NIH	NIAMS - National Institute of Arthritis and	AR052646	P20062	Interrogating the role of perturbed	Biology, Biochemistry, Biophysics	1	1
a = 1 (a)	~				Musculoskeletal and Skin Diseases			bioenergetics in the dystrophin-deficient heart			
Sean Forbes (S)	C	University of Florida	Departments of Physical Therapy and					licalt			
0	~	Halter in a fille date	Physiology								
Cora Hart (G) Mark Mattingly (S)	č	University of Florida Bruker Biospin	Pharmacology and Therapeutics Biospin								1
Glenn Walter (S)	č	University of Florida	Physiology and Aging								1
Johnny Figueroa (S)	PI	Loma Linda University		NIH	NIDDK - National Institute of Diabetes and	DK124727	P20078	NEUROANATOMIC ABNORMALITIES IN	Biology Biochemistry Biophysics	1 1	1 3
sommy rigueroa (o)	Ľ	coma cinda Oniversity	Medicine		Digestive and Kidney Diseases	5.5127121	1 20010	STRESS-INDUCED OBESITY	Sistegy, Diotromaty, Diophysics	1	
James H.P. Collins (O)	с	University of Florida	Biochemistry & Molecular Biology		- ,					1	1
Ike de la Pena (S)	c	Loma Linda University	Pharmaceutical & Administrative Sciences							1	1
· · /	1										1
Marcelo Febo (S)	С	University of Florida	Psychiatry								
Amandine Jullienne (P)	С	University of California, Irvine	Pediatrics, Anatomy & Neurobiology								
Brenda Patricia Noarbe (T)	С	University of California, Irvine	Pediatrics								
Andre Obenaus (S)	С	University of California, Irvine	Pediatrics								
Perla Ontiveros-Ángel (G)	С	Loma Linda University	Center of Health Disparities and Molecular								
		-	Medicine								
Marjory Pompilus (G)	С	University of Florida	Psychiatry								
Timothy Simon (U)	С	Loma Linda University	Neuroscience								
Julio Vega-Torres (G)	С	Loma Linda University	Center of Health Disparities and Molecular								
			Medicine								
Malisa Sarntinoranont (S)	PI	University of Florida	unknown	NIH	NCI - National Cancer Institute	CA012185	P20171	Multi-modal approach to probe tumor-	Biology, Biochemistry, Biophysics	1	1 .
Thomas Mareci (S)	С	University of Florida	Biochemistry and Molecular Biology					induced perivascular space disruption			
Jennifer Munson (S)	С	virginia tech	Biomedical Engineering and Mechanics								
Isabel Rivera Santiago (G) Robert McKenna (S)	C t	University of Florida University of Florida	Mechanical Engineering	NIH	NIAID - National Institute of Allergy and	AI149304	D00470	Structural studies of the recentor hinding	Biology, Biochemistry, Biophysics		1 16.
Robert McKenna (S)	PI	University of Florida	Biochemistry and Molecular Biology		Infectious Diseases	AI149504	P20173	Structural studies of the receptor binding domain of human parvovirus B19	Biology, Biochemistry, Biophysics		10.
Maria Luiza Caldas Nogueira	c	University of Florida	Biochemistry and Molecular Biology	NIH	NIGMS - National Institute of General	GM082946		domain or numain parvovirus bits			
(P)	Ŭ	chivelary of Florida	Diochemistry and Molecular Diology		Medical Sciences	0111002340					
Renuk Lakshmanan (P)	С	University of Florida	Biochemistry and Molecular Biology								
Joanna Long (S)	С	University of Florida	Biochemistry & Molecular Biology								
Thomas Mareci (S)	PI	University of Florida	Biochemistry and Molecular Biology	No other support			P20193	Cryocooled X-nucleus Coil	Biology, Biochemistry, Biophysics	1	1
William Brey (S)	С	National High Magnetic Field Laboratory	NMR					-			
Greg Dowling (O)	С	University of Florida	AMRIS Facility								
Matthew Merritt (S)	С	University of Florida	Biochemistry and Molecular Biology								
Jeremy Thomas (P)	С	University of Florida	Biochemistry and Molecular Biology							1	1
Elizabeth Vo (G)	С	Malcom Randall VA Medical Center	Biomedical								1
Huadong Zeng (S)	С	University of Florida	AMRIS Affiliated Faculty & Staff								+
Dionisios Vlachos (S)	PI *	University of Delaware	Chemical and Biomolecular Engineering	Center for Plastics Innovation, an Energy Frontier Research Center funded by the US	US Ministry	DE-SC0021166	P20204	Diffusion of long-chain alkanes as model molecules for polyethylene diffusion through	Engineering	1 1	4
	1	1		Prontier Research Center funded by the US Dept. of Energy, Office of Science, Office of				molecules for polyethylene diffusion through mesoporous aluminosilicates		1	1
	1	1		Basic Energy Sciences				,		1	1
Sean Najmi (P)	C	University of Delaware	Chemical Engineering								1
Esun Selvam (G)	č	University of Delaware	Chemical and Biomolecular Engineering							1	1
Ryan Lively (S)	PI	Georgia Institute of Technology	School of Chemical & Biomolecular	NSF	CBET - Chemical, Bioengineering,	CBET2135662	P20207	Quantifying Microscopic Liquid Diffusion	Engineering	1 1	1 30
	Ľ	gia montato en roomology	Engineering,		Environmental, and Transport Systems	55212100002	1 20201	inside Carbon Molecular Sieve Membranes		1	
Rebecca Bivins (G)	с	Georgia Institute of Technology	Chemical and Biomolecular Engineering	NSF	CBET - Chemical, Bioengineering,	CBET2135766				1	1
	1				Environmental, and Transport Systems					1	1
Sree Laxmi (G)	С	University of Florida	Chemical Engineering Department							1	1
Blake Trusty (G)	С	University of Florida	Chemical Engineering							1	1
Sergey Vasenkov (S)	С	University of Florida	Chemical Engineering								
Brent Sumerlin (S)	PI *	University of Florida	Chemistry	No other support			P20225	Synthesis of Enzyme-Cellulose Derivatives	Chemistry	1	1
Rosana Assunção (S)	С	Federal University of Uberlândia do Pontal	Institute of Exact and Natural Sciences of					Bioconjugates by Thiol-Yne Click Reaction		1	1
	1	1	Pontal							1	1
Marcos Ferreira (G)	С	University of Florida	Department of Chemistry							1	1
Anil Mehta (S)	С	University of Florida	AMRIS							1	1
Rodrigo Panatieri (S)	С	Federal University of Uberlândia do Pontal	Institute of Exact and Natural Sciences of							1	1
	1		Pontal								+
Zachary Smith (S)	PI	Massachusetts Institute of Technology	Chemical Engineering	NSF	CBET - Chemical, Bioengineering,	CBET2034734	P20299	Microscopic Gas Diffusion inside Hybrid	Biology, Biochemistry, Biophysics	1	1 1
a		han a contra			Environmental, and Transport Systems			Membranes Formed by Dispersing Metal–Organic Framework of the Type UiO-		1	1
Omar Boloki (G)	C	University of Florida	Chemical Engineering					Metal–Organic Framework of the Type UiO- 66-NH2 in Polymers		1	1
Eric Hahnert (G)	C	Massachusetts Institute of Technology	Chemical Engineering					00-INTZ III F UIVIIIGIS		1	1
Philippe Jean-Baptiste (G)	С	Massachusetts Institute of Technology	Chemical Engineering							1	1
Samuel Kaser (G)	C	Massachusetts Institute of Technology	Chemical Engineering							1	1
	IC	University of Florida	Chemical Engineering Department				1	1	1	1	1
Sree Laxmi (G) Sergey Vasenkov (S)	-	University of Florida	Chemical Engineering								

		Participants (Name, Role, Org., Dept.)			Funding Sources (Funding Agency, Division, Award #)		Proposal #	Proposal Title	Discipline	Exp. #	Days Used
Jeannine Brady (S)	PI		Oral Biology	NIH	NIDCR - National Institute of Dental and	DE021789	P20327	ML-BRADY-003: AMRIS components of	Biology, Biochemistry, Biophysics	1	
Maria Luiza Caldas Nogueira	с	University of Florida	Biochemistry and Molecular Biology		Craniofacial Research			NMR Facility's P20106			
P) oanna Long (S)	c	University of Florida	Biochemistry & Molecular Biology								
Chase Norton (T)	c	University of Florida	UF Biochemistry								
Evelyn Patterson (U)	c	University of Florida	CoM								
Qingqing (Emily) Peng (G)	С	University of Florida	Department of Biochemistry and Molecular Biology								
Jehangir Bhadha (S)	PI *	Everglades Research and Education Center at UF		No other support			P20339	Unlocking legacy phosphorus from soils and sediments to meet agricultural demand	Biology, Biochemistry, Biophysics	1	
A. Caroline Buchanan (G)	с	University of Florida	Ag - Soil and Water Science					and a healthy environment.			
Jonathan Judy (S)	С	University of Florida	Soil and Water Sciences								
MD Anik Mahmud (G)	С	University of Florida	Soil, Water, and Ecosystem Sciences								
Joanna Long (S) James H.P. Collins (O)	PI C	University of Florida University of Florida	Biochemistry & Molecular Biology Biochemistry & Molecular Biology	No other support			P20343	MAINTENANCE: Routine maintenance of existing AMRIS Facility equipment (formerly	Development of Magnet Technology	1	22
Greg Dowling (O)	c	University of Florida	AMRIS Facility					P09510, P17541, P19543)			
Kelly Jenkins (T)	С	University of Florida	AMRIS Affiliated Faculty & Staff								
Anil Mehta (S)	С	University of Florida	AMRIS								
James Rocca (S)	С	University of Florida	AMRIS Affiliated Faculty & Staff								
Joshua Slade (T)	C	University of Florida University of Florida	AMRIS AMRIS Affiliated Faculty & Staff								
Huadong Zeng (S) Joanna Long (S)	PI	University of Florida	Biochemistry & Molecular Biology	No other support			P20345	MLDEV-Setup: training new users,	Development of Magnet Technology	1	117
James H.P. Collins (O)	С	University of Florida	Biochemistry & Molecular Biology				. 20040	workshops, updating cortab, prosol tables,	;·····;····-;····;;		
Greg Dowling (O)	С	University of Florida	AMRIS Facility					or shim files (formerly P17542 and P19554)			
Anil Mehta (S)	С	University of Florida	AMRIS								
James Rocca (S) Huadong Zeng (S)	С	University of Florida University of Florida	AMRIS Affiliated Faculty & Staff AMRIS Affiliated Faculty & Staff								
Joanna Long (S)	DI DI	University of Florida	Biochemistry & Molecular Biology	No other support			P20346	MLDEV-Method: setting up new protocols	Development of Magnet Technology	1	1:
James H.P. Collins (O)	С	University of Florida	Biochemistry & Molecular Biology	No other support			F20340	or pulse sequences; preliminary	bevelopment of magnet recimology		
Anil Mehta (S)	С	University of Florida	AMRIS					characterization of samples for feasibility			
Matthew Merritt (S)	С	University of Florida	Biochemistry and Molecular Biology								
James Rocca (S)	С	University of Florida	AMRIS Affiliated Faculty & Staff								
Huadong Zeng (S) Joanna Long (S)	C	University of Florida University of Florida	AMRIS Affiliated Faculty & Staff Biochemistry & Molecular Biology	No other support			P20347	MLDEV-Repair: work on magnets, replacing	Development of Magnet Technology	1	
James H.P. Collins (O)	C	University of Florida	Biochemistry & Molecular Biology	No other support			P20347	broken amplifiers, troubleshooting consoles,	Development of Magnet Technology		
Greg Dowling (O)	c	University of Florida	AMRIS Facility					tracking down the source of a problem			
Kelly Jenkins (T)	С	University of Florida	AMRIS Affiliated Faculty & Staff								
Anil Mehta (S)	С	onitoidiy of Fionad	AMRIS								
James Rocca (S)	C	University of Florida University of Florida	AMRIS Affiliated Faculty & Staff AMRIS								
Joshua Slade (T) Huadong Zeng (S)	c	University of Florida	AMRIS AMRIS Affiliated Faculty & Staff								
Joanna Long (S)	PI	University of Florida	Biochemistry & Molecular Biology	No other support			P20348	MLDEV-Hardware: installation, calibration.	Development of Magnet Technology	1	34
James H.P. Collins (O)	С	University of Florida	Biochemistry & Molecular Biology					and testing of new probes, consoles,	1 5 5,		
Greg Dowling (O)	С	University of Florida	AMRIS Facility					amplifiers, gradients			
Kelly Jenkins (T)	С	University of Florida	AMRIS Affiliated Faculty & Staff AMRIS								
Anil Mehta (S) Matthew Merritt (S)	C	University of Florida University of Florida	AMRIS Biochemistry and Molecular Biology								
James Rocca (S)	c	University of Florida	AMRIS Affiliated Faculty & Staff								
Joshua Slade (T)	c	University of Florida	AMRIS								
Huadong Zeng (S)	С	University of Florida	AMRIS Affiliated Faculty & Staff								
Zhongwu Guo (S)	PI *	University of Florida	Chemistry	No other support			P20426	2H and 31P NMR characterization of Novel	Chemistry	1	17
Gail Fanucci (S) SAYAN Kundu (G)	C	University of Florida University of Florida	Chemistry Chemistry					Glycolipid Analogs			
Venkanna Mullapudi (P)	c	University of Florida	UF Chemistry								
Rajendra Rohokale (P)	c	University of Florida	UF Chemistry								
Jeffrey Rudolf (S)	PI	University of Florida	Chemistry	NIH	NIGMS - National Institute of General Medical Sciences	GM142574	P20449	ML-RUDOLF-002 Exploring the Chemical Space of Bacterial Terpenes	Chemistry	1	8
Tyler Alsup (G)	с	University of Florida	Chemistry		modical colorida						1
Michelle Ehrenberger (G)	С	University of Florida	Chemistry								1
Daniel Icenhour (G)	С	University of Florida	Chemistry						1	1	1
Zining Li (P) Caitlin McCadden (G)	C	University of Florida University of Florida	Chemistry Chemistry								1
Wenbo Ning (G)	c	University of Florida	Chemistry								1
Diana Stancic (G)	c	University of Florida	Chemistry								
Emma Stowell (G)	С	University of Florida	Chemistry								
Xiuting Wei (G)	С	University of Florida	Chemistry								
Baofu Xu (P) Tracy Centanni (S)	C PI *	University of Florida University of Florida	chemistry Speech, Language, and Hearing Sciences	NIH	NICHD - Eunice Kennedy Shriver Nationa	al HD103479	P20455	Effect of genetic knockout on neural	Biology, Biochemistry, Biophysics	1	
					Institute of Child Health and Human Development			plasticity in a rat model			
Brenton Cooper (S)	С	Texas Christian University	Psychology								
Songi Han (S)	PI *	University of California, Santa Barbara	Department of Chemistry and Biochemistry	NIH	Other	5F32GM14392 5	P20460	ML-HAN-001: Probing the Structure and Dynamics of Protein-Like Polymers Using	Biology, Biochemistry, Biophysics	1	
Jinlei Cui (G)	С	Washington University in St. Louis	Chemistry					1H and 13C HRMAS NMR			1
Omar Ebrahim (G)	С	Northwestern University	Northwestern Biomedical Engineering						1	1	1
	С	Northwestern University	Northwestern Chemistry								1
Nathan Gianneschi (S)	~										
Julia Oktawiec (P)	C C	Northwestern University	Northwestern Biomedical Engineering Simpson Querrey Institute for								
	c c	Northwestern University Northwestern University	Northwestern Biomedical Engineering Simpson Querrey Institute for Bionanotechnology								

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		Participants			Funding Sources						
		(Name, Role, Org., Dept.)			(Funding Agency, Division, Award #)		Proposal #	Proposal Title	Discipline	Exp. #	Days Used
David Vaillancourt (S)	PI	University of Florida	Applied Physiology and Kinesiology	NIH	NINDS - National Institute of Neurological Disorders and	NS058487	P19373	[Independently-funded Research Proposal]	Biology, Biochemistry, Biophysics		1 12
Roxana Burciu (P)	c	University of Florida	Applied Physiology and Kinesiology	NIH	Stroke NINDS - National Institute of Neurological Disorders and	NS075012					
.,	Ŭ				Stroke						
Marcelo Febo (S)	с	University of Florida	Psychiatry	NIH	NINDS - National Institute of Neurological Disorders and Stroke	NS082168					
Hong Li (S)	с	Florida State University	Chemistry		Stoke						
Yuqing Li (S)	С	University of Florida	Neurology								
Johanna McCracken (U) Nikolaus McFarland (S)	C C	University of Florida University of Florida	Applied Physiology and Kinesiology Department of Neurology								
Edward Ofori (P)	c	University of Florida	Laboratory for Rehabilitation Neuroscience								
Michael Okun (S)	с	University of Florida	Neurology								
Matthew Merritt (S)	PI	University of Florida	Biochemistry and Molecular Biology	NIH	NIDDK - National Institute of Diabetes and Digestive and Kidney Diseases	DK105346	P19387	[Independently-funded Research Proposal]: Merritt Projects	Biology, Biochemistry, Biophysics		1 37.5
Mario Chang Reyes (G)	с	University of Florida	Biochemistry & Molecular Biology	NIH	NIBIB - National Institute for Biomedical Imaging and	EB032376		r lujecia			
					Bioengineering						
Anthony Giacalone (T) Marc McLeod (G)	C	University of Florida University of Florida	Biochemistry/ Molecular Biology Biochemistry and Molecular Biology								
Mukundan Ragavan (S)	c	St. Jude Children's Research Hospital	Biochemistry and NMR Spectroscopy								
Anna Rushin (G)	С	University of Florida	Biochemistry and Molecular Biology	NIH	NIGMS - National Institute of General Medical Sciences		P19523				1 158
Matthew Eddy (S)	ы	University of Fiorida	Chemistry	NIH	NIGMS - National Institute of General Medical Sciences	GM138291	P19523	EDDY-001: [Independently-funded Research Proposal]	Biology, Biochemistry, Biophysics		1 158
Kara Anazia (G)	c c	University of Florida	Chemistry department								
James H.P. Collins (O) Niloofar Gopal Pour (G)	C	University of Florida University of Florida	Biochemistry & Molecular Biology Chemistry								
Hala Hachem (G)	c	University of Florida	Chemistry								
Michael Harris (S)	с	University of Florida	Chemistry								
Beining (Kim) Jin (G)	C	University of Florida	Chemistry								
Emma Mulry (G) Nessa Pesaran Afsharian (G)	c	University of Florida University of Florida	Chemistry Chemistry								
Enzo Petracco (G)	С	University of Florida	Chemistry								
Arka Prabha Ray (G) Naveen Thakur (G)	C	University of Florida University of Florida	Chemistry Chemistry								
Anuradha Wijesekara (G)	c	University of Florida	Chemistry								
Marcelo Febo (S)	PI	University of Florida	Psychiatry	NIH	NIA - National Institute on Aging	AG065819	P19524	[Independently-funded Research Proposal]	Biology, Biochemistry, Biophysics		1 10
Joy Buraima (U) Sara Burke (S)	C	University of Florida University of Florida	Neuroscience Neuroscience	NIH	NIA - National Institute on Aging NINDS - National Institute of Neurological Disorders and	AG070913 NS106938					
	Ŭ		Neuroscience		Stroke						
Eduardo Candelario-Jalil (S)	С	University of Florida	Neuroscience	NIH	NINDS - National Institute of Neurological Disorders and	NS125089					
Anna Farmer (Liner) (G)	с	University of Florida	Psychology	University of Florida Research	Stroke US College and University	WD06142					
Leslie Gaynor (G)	c	University of Florida	Department of Clinical and Health Psychology	University of Fiorida Research	00 College and Onliverally	11000142					
Matteo Grudny (G)	С	University of Florida	Psychiatry - ADRC								
Catherine Kaczorowski (S) Eric Krause (S)	C	Jackson Laboratory University of Florida	Neuroscience Pharmacodynamics								
John Neubert (S)	c	University of Florida	Orthodontics								
Caitlin Orsini (P)	С	University of Florida	Psychiatry								
Michael Pizzi (S) Mariory Pompilus (G)	C C	University of Florida University of Florida	Neurology Psychiatry								
Wonn Pyon (G)	c	University of Florida	Neuroscience								
Leah Reznikov (S)	С	University of Florida	Physiological Sciences								
Nicholas Rodriguez (T) Aleyna Ross (G)	c	University of Florida University of Florida	Psychiatry Neuroscience								
Zachary Simon (G)	c	University of Florida	Neuroscience								
Kevin (Ka) Wang (S)	С	University of Florida	Emergency Medicine								
Lakiesha Williams (S) Eiko Alzamora (U)	PI	University of Florida University of Florida	Biomedical Engineering Department of Biomedical Engineering	UF Research Alzheimer's Association	US College and University US Foundation	AWD08483 AARGD-NTF-22-	P19527	[Independently-funded Research Proposal]	Biology, Biochemistry, Biophysics		1 22
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Ta-Tyonna Buck (G)	С	University of Florida	Biomedical Engineering								
Jasmine Smith (G) Blanka Sharma (S)	PI	University of Florida University of Florida	Biomedical Engineering Biomedical Engineering	NSF	CBET - Chemical, Bioengineering, Environmental, and	CBET1845728	P19594	[Independently-funded Research Proposal]	Biology, Biochemistry, Biophysics		1 1
					Transport Systems						
Suzanne Lightsey (G)	С	University of Florida	Biomedical Engineering	NIH	NIAMS - National Institute of Arthritis and Musculoskeleta and Skin Diseases	AR071335					
Madison Temples (G)	с	University of Florida	biomedical engineering		and Skill Diseases						
Joanna Long (S)	PI	University of Florida	biomedical engineering Biochemistry & Molecular Biology	University of Florida	US College and University	DSR Match	P19644	LONG-DNP: [Independently-funded Research Proposa	 Biology, Biochemistry, Biophysics 		1 69.5
Andre Obenaus (S)	PI	University of California, Irvine	Pediatrics	NIH	NINDS - National Institute of Neurological Disorders and	NS121246	P19645	[Independently-funded Research Proposal]	Biology, Biochemistry, Biophysics		1 12
	[⁻				Stroke		P19043	[moopendentry-runded Research Froposal]	biology, biochemistry, biophysics		12
James H.P. Collins (O)	С	University of Florida	Biochemistry & Molecular Biology	NIH	NIA - National Institute on Aging	AG067613				1	
Amandine Jullienne (P) Brenda Patricia Noarbe (T)	C	University of California, Irvine University of California, Irvine	Pediatrics, Anatomy & Neurobiology Pediatrics	NIH	NIA - National Institute on Aging NIA - National Institute on Aging	AG054345 AG054349				1	
Rojina Pad (U)	c	University of California, Irvine	Biological Sciences								
Kara Wendel (G)	С	University of California, Irvine	Anatomy and Neurobiology								
Marcelo Wood (S) Chalermchai Khemtong (S)	C PI	University of California, Irvine University of Florida	Neurology and Behavior Medicine	NIH	NIBIB - National Institute for Biomedical Imaging and	EB027698	P19735	[Independently-funded Research Proposal]	Biology, Biochemistry, Biophysics	+	2 34.5
	Ľ.,				Bioengineering			interpretation in the second of the topology		1	
Phillippe Fernandes (U)	С	University of Florida	undergrad	University of Florida	US College and University	Seed Fund				1	
Nesmine Maptue (T) Shrina Patel (U)	c	University of Florida University of Florida	Medicine Endocrinology								
Joshua Pegoraro (G)	c	University of Florida	Medicine	1						1	
Jackson Pugmire (T)	С	University of Florida	Endocrinology								
Qingyang Shen (G) Katherine Tansky (O)	c	University of Florida University of Florida	Medicine Medicine								
Rebecca Butcher (S)	PI	University of Florida	Chemistry	NSF	CHE - Chemistry	CHE1555050	P19761	BUTCHER-001: [Independently-funded Research	Biology, Biochemistry, Biophysics	1	1 26
Ahmed Elbanna (P)	С	University of Florida	Chemistry					Proposal]			
James Rocca (S) ChiSu Yoon (P)	c	University of Florida University of Florida	AMRIS Affiliated Faculty & Staff Chemistry								
ChiSu Yoon (P) Kyle Allen (S)	PI	University of Florida	Biomedical Engineering	NIH	NIAMS - National Institute of Arthritis and Musculoskeleta	AR071431	P19984	[Independently-funded Research Proposal]	Biology, Biochemistry, Biophysics	1	1 5
	с	University of Florida	UE Bismedical Engineering	NIH	and Skin Diseases	40070974					
Markia Bowe (S)	L.	University of Florida	UF Biomedical Engineering	19171	NIAMS - National Institute of Arthritis and Musculoskeleta and Skin Diseases	ARU/98/4					
Jonathan Cooper (U)	с	University of Florida	UF Biomedical Engineering	NIH	NIAMS - National Institute of Arthritis and Musculoskeleta	AR082196					
					and Skin Diseases						
Jacob Griffith (G) Kaitlin Southern (G)	C	University of Florida University of Florida	Biomedical Engineering Biomedical Engineering								
Michael Strinden (P)	c	University of Florida	UF Biomedical Engineering								
Pedro Antonio Valdes Hernandez (P)	С	University of Florida	Dentistry - Public Health								
Taylor Yeater (G)	с	University of Florida	UF Biomedical Engineering								
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Jose Abisambra (S) PI Daylin Barroso (O) C	Participants (Name, Role, Org., Dept.)			Funding Sources (Funding Agency, Division, Award #)		Proposal #	Proposal Title	Discipline	Exp. #	Days Used
Daylin Barroso (O) C	University of Florida	Neuroscience	NIH	NIA - National Institute on Aging	AG075900	P20059	ABISAMBRA-001: Interaction between early tau protein	Biology, Biochemistry, Biophysics		1 33
	University of Florida	Neuroscience				. 20000	abnormalities and amyloid beta proteins in the brain,			
Paramita Chakrabarty (P) C	University of Florida	Biology					hallmarks of Alzheimer's disease			
Drew Gillett (G) C	University of Florida	Neuroscience								
Matthew Hamm (G) C	Lacerta Therapeutics	UF-Neuroscience								
Jada Lewis (S) C	University of Florida	Biology								
Sakthivel Ravi (T) C	University of Florida	Dentistry	Exxon Mobil Corp. Research		AWD12241		lis day of the first of December December 1	Distant Dischardate Dischards		
Sergey Vasenkov (S) PI Omar Boloki (G) C	University of Florida University of Florida	Chemical Engineering Chemical Engineering	Exton Mobil Corp. Research		AWD12241	P20079	[Independently-funded Research Proposal]	Biology, Biochemistry, Biophysics		1 15
Sree Laxmi (G) C	University of Florida	Chemical Engineering Chemical Engineering Department								
Blake Trusty (G) C	University of Florida	Chemical Engineering								
Aaron Mickle (S) PI	University of Florida	Physiological Sciences	Rita Allen Foundation	US Foundation	AWD11783	P20094	[Independently-funded Research Proposal]	Biology, Biochemistry, Biophysics		1 11
Sushain Kaul (G) C	University of Florida	Biomedical Engineering	Tita Alerri Gundation	00 Touridation	AWDIII05	1 20034	[Independentity-funded research rioposal]	biology, biochemistry, biophysics		
Isabella Pinto (U) C	University of Florida	Physiological Sciences								
Shane Priester (G) C	University of Florida	Physiological Sciences								
Shahabeddin Vahdat (S) C	University of Florida	Applied Physiology and Kinesiology								
Habibeh Khoshbouei (S) PI	University of Florida	Neuroscience	NIH	NINDS - National Institute of Neurological Disorders and	NS071122	P20109	[Independently-funded Research Proposal]	Biology, Biochemistry, Biophysics		1 3
	-			Stroke						
Marcelo Febo (S) C	University of Florida	Psychiatry								
Marjory Pompilus (G) C	University of Florida	Psychiatry								
Jared Baisden (P) PI	Scripps Research Institute - Florida	Chemistry	Expansion Therapeutics, Jupiter, FL	Other	Peter Connolly	P20189	CONNOLLY-001: [Independently-funded Research	Biology, Biochemistry, Biophysics		1 85
Jasanh Marsinka (S)	Belumer Sumeration 11.C	President	Polymer Synergies LLC				Proposal [Independently-funded Research Proposal]	Biology, Biochemistry, Biophysics	-	1 35.5
Joseph Marcinko (S) PI Sara Burke (S) PI	Polymer Synergies, LLC University of Florida	Neuroscience	NILL	NIA - National Institute on Aging	AG049722	P20320 P20321	[Independently-funded Research Proposal]	Biology, Biochemistry, Biophysics		1 33.5
Marcelo Febo (S)	University of Florida	Psychiatry		NiA - National Institute on Aging	A0048722	P20321	[Independentity-funded research rioposal]	biology, biochemistry, biophysics		
Aleyna Ross (G) C	University of Florida	Neuroscience	1			1			1	
Matthew Farrer (S) PI	* University of Florida	Neurology	MSA Coalition	US Foundation	CoreG-2021-07-002	P20325	[Independently-funded Research Proposal]	Biology, Biochemistry, Biophysics		1 10
Marcelo Febo (S) C	University of Florida	Psychiatry					,		1	
Matteo Grudny (G) C	University of Florida	Psychiatry - ADRC	1			1			1	
Melissa Maczis (P) C	University of Florida	Neurology	1			1			1	
Matthew Merritt (S) PI	University of Florida	Biochemistry and Molecular Biology	NIH	NIBIB - National Institute for Biomedical Imaging and	EB032376	P20326	[Independently-funded Research Proposal]	Biology, Biochemistry, Biophysics		1 73
			1	Bioengineering		1			1	
Mario Chang Reyes (G) C	University of Florida	Biochemistry & Molecular Biology								
Anna Rushin (G) C	University of Florida	Biochemistry and Molecular Biology					<u> </u>			
Maurice Swanson (S) PI	University of Florida	Molecular Genetics and Microbiology	NIH	NINDS - National Institute of Neurological Disorders and	NS048843	P20328	[Independently-funded Research Proposal]	Biology, Biochemistry, Biophysics		1 7
1			1	Stroke		1			1	
Mackenzie Davenport (P) C	University of Florida	Molecular Genetics and Microbiology	Florida Department of Health	US Government Lab	Stroke Recovery	1			1	
Marcelo Febo (S) C	University of Florida	Psychiatry	U Rochester - Wellstone Center	US College and University	P50 NS048843	1	1	1	1	1
Benjamin Kidd (G) C	University of Florida	Neuroscience - Molecular Genetics	University of Florida Brain Grant	US College and University						
Dana Tuyn (U) C	University of Florida	UF Neuroscience		NIAMS - National Institute of Arthritis and Musculoskeleta						
Glenn Walter (S) PI	University of Florida	Physiology and Aging	NIH	NIAMS - National Institute of Arthritis and Musculoskeleta and Skin Diseases	I AR052646	P20329	[Independently-funded Research Proposal]	Biology, Biochemistry, Biophysics		1 2
Abhinandan Batra (G) C	University of Florida	Physical therapy		and Skin Diseases						
James H.P. Collins (O) C	University of Florida	Physical therapy Biochemistry & Molecular Biology								
Sean Forbes (S)	University of Florida	Departments of Physical Therapy and Physiology								
Donovan Lott (S) C	University of Florida	Physical Therapy								
Cathy Powers (T) C	University of Florida	Department of Physical Therapy								
Lee Sweeney (S) C	University of Florida	Pharmacology & Therapeutics								
Jehangir Bhadha (S) PI	* Everglades Research and Education Center	Soil, Water, and Ecosystem Sciences	NSF	Other	CBET-2019435	P20336	[Independently-funded Research Proposal]	Biology, Biochemistry, Biophysics		1 7.5
	at UF	,,,				. 20000				
A. Caroline Buchanan (G) C	University of Florida	Ag - Soil and Water Science								
Jonathan Judy (S) C	University of Florida	Soil and Water Sciences								
MD Anik Mahmud (G) C	University of Florida	Soil, Water, and Ecosystem Sciences								
Joanna Long (S) PI	University of Florida	Biochemistry & Molecular Biology	NIH	NIGMS - National Institute of General Medical Sciences	GM148766	P20349	[Independently-funded Research Proposal]	Biology, Biochemistry, Biophysics		1 26
Maria Luiza Caldas Nogueira (P) C	University of Florida	Biochemistry and Molecular Biology								
Matthew Eddy (S) C	University of Florida	Chemistry								
Anil Mehta (S) C	University of Florida	AMRIS								
Matthew Merritt (S) C	University of Florida	Biochemistry and Molecular Biology								
Evelyn Patterson (U) C	University of Florida	CoM								
Qingqing (Emily) Peng (G) C	University of Florida	Department of Biochemistry and Molecular Biology								
Diana Tymochko (U) C	University of Florida	Biochemistry & Molecular Biology								
Daniel R. Talham (S) PI	University of Florida	Chemistry	University of Florida	US College and University	UFRF Research Support	P20350	[Independently-funded Research Proposal]	Biology, Biochemistry, Biophysics	1	1 8
Diba Allameh Zadeh (G) C	University of Florida	Chemistry	1		oupport	1			1	
Diba Allameh Zadeh (G) C David Vaillancourt (S) Pl	University of Florida University of Florida	Applied Physiology and Kinesiology	NIH	NINDS - National Institute of Neurological Disorders and	NS058487	P20351	[Independently-funded Research Proposal]	Biology, Biochemistry, Biophysics		1 40
PI	Shaveloky of Fiolitia	separa i nyalology and runosiology		Stroke		F20351	[maspendentiy-turided (veadal Cit PT0p08al]	crossy, biochemiary, biophysics		40
David Arpin (P) C	University of Florida	Applied Physiology and Kinesiology	1			1	1	1	1	1
Evangelos Christou (S) C	University of Florida	Applied Physiology and Kinesiology	1			1			1	
Luis Concepcion (T) C	University of Florida	Applied Physiology & Kinesiology	1			1	1	1	1	1
Jesse DeSimone (P) C	University of Texas, Southwestern	ANSIR Laboratory, Radiology	1			1	1	1	1	1
Marcelo Febo (S) C	University of Florida	Psychiatry	1			1	1	1	1	1
Mara Higginbotham (O) C	University of Florida	Applied Physiology and Kinesiology	1			1			1	
Hong Li (S) C	Florida State University	Chemistry	1			1			1	
	University of Florida	Neurology	1			1	1	1	1	1
Yuqing Li (S) C	University of Florida	Department of Neurology	1			1	1	1	1	1
Yuqing Li (S) C Nikolaus McFarland (S) C		Neurology	1			1			1	
Yuqing Li (S) C Nikolaus McFarland (S) C Michael Okun (S) C	University of Florida					-			-	-
Yuqing Li (S) C Nikolaus McFarland (S) C Michael Okun (S) C Emily Tobin (G) C	University of Florida University of Florida	Applied Physiology and Kinesiology				P20352		Biology, Biochemistry, Biophysics		
Yuqing Li (S) C Nikolaus McFarland (S) C Michael Okun (S) C	University of Florida		NIH	NIAMS - National Institute of Arthritis and Musculoskeleta	I AR056973	F20352	[Independently-funded Research Proposal]	Biology, Bioblicitiony, Biophysics		1 22
Yuqing Li (S) C Nikolaus McFarland (S) C Michael Okun (S) C Emily Tobin (G) C Glenn Walter (S) PI	University of Florida University of Florida University of Florida	Applied Physiology and Kinesiology Physiology and Aging	NIH	NIAMS - National Institute of Arthritis and Musculoskeleta and Skin Diseases	I AR056973	P20352	[independentiy-lunded Research Proposal]	biology, biositemistry, biophysics		1 22
Yuqing Li (S) C Nikolaus McFarland (S) C Michael Okun (S) C Emily Tobin (G) C Glenn Walter (S) PI Alison Barnard (G) C	University of Florida University of Florida University of Florida University of Florida	Applied Physiology and Kinesiology Physiology and Aging Physical Therapy	NIH		I AR056973	P20352	[independentiy-lunded Research Proposal]	Diology, Dicentinitary, Dispiryono		1 22
Yuqing Li (S) C Nikolaus McFarland (S) C Michael Okun (S) C Emily Tobin (G) C Glenn Walter (S) PI Alison Barnard (G) C Abhinandam Batra (G) C	University of Florida University of Florida University of Florida University of Florida University of Florida	Applied Physiology and Kinesiology Physiology and Aging Physical Therapy Physical therapy	NIH		I AR056973	F20332	[independentity-funded Research Proposal]	Dialogy, Dionicinitary, Dispriyolo		1 22
Yuqing Li (S) C Mikolaus McFarland (S) C Michael Okun (S) C Genen Watter (S) PI Alison Barnard (G) C Abinandan Batra (G) C Sean Forbes (S) C	University of Florida University of Florida University of Florida University of Florida University of Florida	Appied Physiology and Kinesiology Physiology and Aging Physical Therapy Physical therapy Departments of Physical Therapy and Physiology	NIH		il AR056973	P20352	[Independentity-tunded Research Proposal]	analogy, and named y, angli jobo		1 22
Yuqing Li (S) C Nikolaus McFarland (S) C Michael Okun (S) C Emily Tobin (G) C Glenn Walter (S) PI Alison Barnard (G) C Abinandan Barta (G) C Sean Forbes (S) C	University of Florida University of Florida University of Florida University of Florida University of Florida University of Florida	Applied Physiology and Kinesiology Physiology and Aging Physical Therapy Physical therapy Departments of Physical Therapy and Physiology Physical Therapy	NIH		il AR056973	P20332	(independentiy-lunded Kesearch Proposal)	analy, analianiany, ango yana		1 22
Yunjin Li (S) C Michael Okun (S) C Emily Tobin (G) C Gilem Water (S) P1 Alison Barnard (G) C Abinandam Batra (G) C Saan Forbes (S) C Kimberty Guide (U) C	University of Florida University of Florida	Applied Physiology and Klensiology Physiology and Aging Physical Therapy Physical therapy Departments of Physical Therapy and Physiology Physical Therapy Physical Therapy	NH		al AR056973	P20332	(independentiy-lunded Kesearch Proposa)	unogy, unoncennery, unonytood		1 22
Yuqing Li (S) C Michael Okun (S) C Michael Okun (S) C Emily Tobin (G) C Glern Walter (S) PI Alison Barnard (G) C Sam Forbers (S) C Kimberly Guize (U) C Christopher Lopze (P) C An Mislovic (S) C	University of Florida University of Florida	Applied Physiology and Kinesiology Physiology and Aging Physical Therapy Physical Therapy Departments of Physical Therapy and Physiology Physical Therapy Physical Therapy Department of Physical Therapy	NH		il AR056973	P20332	(independentity-lunded Kesearch Proposa)	energy, energine in a second second		1 22
Yunjin Li (S) C Michael Okun (S) C Michael Okun (S) C Emly Tobin (G) C Glern Walter (S) PI Alison Barnard (G) C Abinandam Batra (G) C Sam Forbes (S) C Kimber (S) C Christopher Logze (P) C Ann Mislowic (S) C Cathy Powers (T) C	University of Florida University of Florida	Applied Physiology and Klensiology Physiology and Aging Physical Therapy Physical Interapy Departments of Physical Therapy and Physiology Physical Therapy Physical Therapy Department of Physical Therapy Department of Physical Therapy	NIH		il AR056973	P20332	(moependenty-unded russardn Proposa)	energy, secretariany, seprijace		1 22
Yuqing Li (S) C Michael Okun (S) C Michael Okun (S) C Emily Tobin (G) C Glern Walter (S) PI Alison Barnard (G) C Sam Forbers (S) C Kimberly Guize (U) C Christopher Lopze (P) C An Mislovic (S) C Cathy Powers (T) C Huadong Zeng (S) C	University of Florida University of Florida	Applied Physiology and Kinesiology Physiology and Aging Physical Therapy Physical Therapy Departments of Physical Therapy and Physiology Physical Therapy Department of Physical Therapy Department of Physical Therapy Department of Physical Therapy AMISI Afiliade Faculty & Staff	NIH	and Skin Diseases	CA172310					1 22
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Yuqing Li (S) C Michael Okun (S) C Michael Okun (S) C Glern Walter (S) C Alison Barnard (G) C Alison Barnard (G) C Kimbery Guia (G) C Sean Forbes (S) C Kimbery Guiae (U) C Christopher Lopze (P) C An Mislovic (S) C Cathy Powers (T) C Headrig Lossch (S) PI Fatma Al-Awath (P) C Charlo Kathel (S) C Sofia Kokkalina (P) C	University of Florida University of Florida	Applied Physiology and Kinesiology Physiology and Aging Physiology and Aging Physiola Therapy Physical Therapy Physical Therapy Physical Therapy Department of Physical Therapy Department of Physical Therapy AMISI Afiliade Faculty & Staff College of Pharmacou Pharmacoutical Chemistry unknown Medicinal Chemistry Medicinal Chemistry	NIH	and Skin Diseases NCI - National Cancer Institute CBET - Chemical, Bioengineering, Environmental, and	CA172310	P20353	[Independently-funded Research Proposal]	Biology, Biochemistry, Biophysics		1 22

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Participants (Name, Role, Org., Dept.)		Funding Sources (Funding Agency, Division, Award #)			Proposal Title	Discipline	Exp. #	Days Used		
Shahabeddin Vahdat (S)	PI	University of Florida	Applied Physiology and Kinesiology	NIH	NIDDK - National Institute of Diabetes and Digestive and DK132003 Kidney Diseases	P20561	VAHDAT-003: [Independently-funded Research Proposal]	Biology, Biochemistry, Biophysics	1	1
Sushain Kaul (G)	с	University of Florida	Biomedical Engineering	NIH	NIBIB - National Institute for Biomedical Imaging and EB031249 Bioengineering					
Isabella Pinto (U)	С	University of Florida	Physiological Sciences	Florida Department of Health	Other					
Shane Priester (G)	С	University of Florida	Physiological Sciences							
Shahabeddin Vahdat (S)	PI	University of Florida	Applied Physiology and Kinesiology	NIH	NIDDK - National Institute of Diabetes and Digestive and DK132003 Kidney Diseases	P20562	VAHDAT-004: [Independently-funded Research Proposal]	Biology, Biochemistry, Biophysics	1	2.5
Sushain Kaul (G)	с	University of Florida	Biomedical Engineering	NIH	NIBIB - National Institute for Biomedical Imaging and EB031249 Bioengineering					
Isabella Pinto (U)	С	University of Florida	Physiological Sciences							
Shane Priester (G)	С	University of Florida	Physiological Sciences							
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	Participanta (Name, Role, Org., Dept.)	and the second se		(Funding Agenc	r, Division, Award #)	Proposal #	Proposal Title	Discipline	Exp.#	Used
Badh Asad (S) Muhan Adad Katn (G) Saci-Ki (Ba (P) David Gadi (S) Xing Liu (G) Mohawio (Catero (S) David Science (S) David Vilang (C) Harry Le Paren (S)	Productor / Name, Textu, Cog, Cape) Descript of Name, Fact, Cog, Cape) Uncerning of Name Face Uncerning of Name Uncerning of Name Face Uncerning of Name Uncerning of Name Uncerning of Name Uncerning of Name Uncerning of Nam Uncerning of Nam Uncerning of Nam Uncerni	Phonica Physica Physica DC Field / CMS	NSP University of Notre Dame	DMR - Division of Materials Research US College and University	DMR1905277	P17982	Symmetry breaking in Landau quantized topological crystalline insulators	Condensed Matter Physics		29.75
Seul-Ki Bac (P) David Graf (S)	C University of Notre Dame C National High Magnatic Field Laboratory	Physics DC Field / CMS								
Xinyu Liu (5)	C University of Notre Dame									
Mvkhavio Ozerov (5) Dmitry Smirnov (5)	C National High Magnetic Field Laboratory C National High Magnetic Field Laboratory	Condensed Matter Science. DC Field CMS Instrumentation & Operations Physics School of Chemistry and Biochemistry								
Jashu Wang (G)	C University of Notes Dame	Physics Related of Chaminton and Rinchemister	NOT	CADEED Exectly Easts Courses	1943452	P19236	Magnetic Properties Characterization of Kagome Lattice Compounds, (CH3NH3)2MM 3F 12 (M = Na+, K+ and NH4+, M = V3+ and TC	Ref. Chamilder		-
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Mvkhavlo Ozerov (S) Arun Ramanathan (G)	C National High Magnetic Field Laboratory C Georgia Institute of Technology	Condensed for Community and Endomminary Condensed Net Science, DC Field CMS Disternity								
Haruko Tatevama (G)	C Georgia Institute of Technology		in cost	BES - Basic Energy Sciences	DE-8C0022008					
Gokul Acharva (G)	C University of Advantage	Phraica Phraica Phraica DC Field / CMS	DOE	DED - Date Entroy Solenois	DE-52.0022006	P19201	rign risio i nanapon or Nonaymmorphic i opological semimetala	Condensed Marter Physics		. 5.70
Rabindra Basnet (G) David Graf (S)	C University of Arkanasa C National High Magnetic Field Laboratory	Physics DC Field / CMS								
Md Rafique Un Nabi (G)	C University of Advances	Photos	in cost			P19343		44 J -		
Yanhoro Gu (P)	C University of Tennessee, Knowle	Chemiatry	DOE	BES - Basic Energy Sciences BES - Basic Energy Sciences	DE-SC0023144 DE-SC00223144	P19343	rign neo apeciroscopy or maiariaia with proken symmetry and arong apin-orde coupling	Chamary		12.05
Stephen McGill (S) Mikhavin Chenny (S)	C National High Magnetic Field Laboratory C National High Magnetic Field Laboratory	Condensed Matter Science Condensed Matter Science, DC Field CMS								
Kiman Park (G)	C University of Termessee. Knowille	Chemistry								
Kevin Smith (G) Itya Litvak (S)	C University of Termessee, Knowlie PI * National High Magnetic Field Laboratory	Chambry CMARNMR	No other support			P19346	Development of passive shims for resistive magnets	Development of Magnet Technology		1 10
William Brev (S)	C National High Magnetic Field Laboratory C National High Magnetic Field Laboratory	Annue Annue Dearthread of Charana's Charana's Dearthread of Charanas Charanas Dearthread of Charanas Charanas Mark Mark								
Mahang Cases (5) Anna Tanuar (6) Anna	Comparison of the second	1980 Paper of Industrial Engineering Department Description of Physics, FCPM Meaning Engenering Hermitian Particiption of Physics of Physics Confinement Confinement Market Sciences Confinement Market Sciences Confinement Market Sciences Confinement Market Sciences Confinement Confine C	NSF	DMR - Division of Materials Research DMR - Division of Materials Research	DMI2120475 DMI2104770	P19351	Floquel-Bloch states in Quantum Hall systems	Condensed Matter Physics		1 21
Paola Barbara (S) Luis Foa Torres (S)	C Georgelown University C University of Chile	Physics Department of Physics. FCFM	NSP	DMR - Division of Materials Research	DMR2104770					
Gabriel Gaertner (U)	C New Mexico Institute of Mining and Technology	Materials Engineering Materials Engineering								
Yilina Liu (G)	C Recretown University	Physics								
Alexery Suslov (S) Taxlor Terrores (II)	C National High Magnetic Field Laboratory C New Master Institute of Minima and Tachmology	Condensed Matter Science Materials Environment								
Junek Krzyatek (S)	PI National High Magnetic Field Laboratory	Condensed Auster Science Materialis Excitencien Decatment Condensed Matter Science	No other aupport			P19369	Development of high-resolution THz EPR spectrometer based on the series-connected hybrid	Development of Magnet Technology		: 5
Stephen Hill (5)	C National High Magnetic Field Laboratory C National High Magnetic Field Laboratory	EMR								
Frederic Mentink (S) Aaron Bossini (S)	C National rite Macrosoft Palls Laboratory National rite Macrosoft Palls Laboratory C Iova State University of Calorina, Sarta Sadana C National rite Macrosoft Palls Laboratory C Calorina Soft Lobrandy Fall Laboratory C Calorina Soft Lobrandy Falls	Contensed Matter Science DAR DAR Claure Claure Prania Prania EAR								
Mark Sherein (S)		Physics								
Biance Trocievitz (T) Xiaolino Wang (S)	C National High Magnetic Field Laboratory C California State University. East Bay									
Geothey Stronge (S)	PI National High Magnetic Field Laboratory C Elected State University	Chemistry Chemistry and Backwalder	NSF	DMR - Division of Materials Research	DMR1905757	P19372	Multinuclear solid-state NMR investigation of plasmonic and photoluminescent nanocrystals	Chemistry		4 5
Carl Conti (G)	C Florida State University	Chamiatry & Biochemiatry	1						1	
Catherine Pablano (G) Zhehong Gan (S)	C National High Magnetic Field Laboratory	Owneday and Biochemistry Owneday and Biochemistry Owneday & Biochemistry NetWith Calley/SNAR Owneday & Biochemistry	1					1	1	1 [
han Huno (S) Jacon Korowski (S)	C National High Magnetic Field Laboratory C Fixelds State University	CMARNMR Chamistry & Rischamistry	1					1	1	1 [
Robert Scharko (S)	C Florida State University	Chamiaty	1						1	
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Abhishek Banerios (P)		Uppersonna or Projekta Provision Projekta Projekta Provision Provision Provision Provision	1					1	1	1 1
Zeyu Hao (G)	C Record Elevanty C Record Elevanty Elevant Elevanty C Record Elevanty	Physics	1					1	1	1 [
Joon Young Park (P) Isabelle Phirney (G)	C Harvard University C Harvard University	Physics Physics	1						1	
Thomas Werkmeister (G)	C Harvard University	Acolised Physics	1						1	
Jonaman Zauberman (G) Andrew Zimmerman (P)	C Harvard University	Product Physica								
Abhay Pasupathy (S)	P1 Countral University	Physics	NSF	MRSEC - Materials Research Science an Engineering Centers MRSEC - Materials Research Science an Engineering Centers	DMR-1420634	P19383	Topologically protected quasiparticle excitations in 2D superconductors	Condensed Matter Physics	4	22.33
	C Columbia University	Physics	NSF	MRSEC - Materials Research Science an	1420534			1	1	1 [
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Zizhona Li (G) Daniel Onteres (C)	C University of Wisconsin. Madison	Physics Decembrant of Materials Science and Engineering Physics Materials Science and Engineering Physics	1					1	1	1 [
Daniel Rhodes (S)	C University of Waconsin. Madison	Materials Science and Engineering								
Yuan Sono (G) for Related Test (C)	C Columbia University	Physics								
Mike Sumption (S)	PI Ohio State University	Physics CSMM, MSE	DOE	SBIR - Small Business Innovation Resear	h DE-600017755	P19391	High Field Transport in Ternary and Quaternary APC type Nb3Sn Conductors with Increased Engineering Je and Stability	Development of Magnet Technology		1 2.85
Jan Jaroszymski (S)	C National High Magnetic Field Laboratory	CMS								
Hyuk Kwon (G)	C Idarrad High Marrad Field Laboratory C Dia State University C Dia State University C Dia State University C Perm National Accelerator Laboratory C Perm National Accelerator Laboratory P Dia State University D Dia State University P Dia State Universi	CMS Material Science and Engineering Materials Science APPLED PHYSICS AND SUPERCONDUCTING TECHNOLOGY DMSION								
Fano Wan (P)	C Drie State University C Fermi National Accelerator Laboratory	APPLED PHYSICS AND SUPERCONDUCTING TECHNOLOGY DMSION								
Xingchen Xu (5) Chun Ninn (Jeanie) Leu (5)	C Ferri National Accelerator Laboratory PI Obio State University	stagnet System	NSF	DMB - Division of Materials Research	DM81922076	P10102	Symmetry-broken phases and lopological phenomena in layered guantum materials	Contenant Matter Physics		1 14.01
Xueshi Geo (G)	P	Deservent of Privila and Anteromy Privila Internet Antonio Constanti Internet Antonio Constanti Internet Antonio Constanti Internet Antonio Constanti Privila Privila	NSF	DMR - Division of Materials Research DMR - Division of Materials Research	DMR1922076 DMR2219048		ортатики училини развина или переторни развитити и прукаке филалист таконана	Competition Property		14.01
Daria Sharifi (G) Dmitry Smimoy (S)	C Ohio State University C National High Magnetic Field Laboratory	Physics Instrumentation & Operations								
Greven Voict (G)	C Ohio State University	Dect of Physics								
Yusin Zhang (G)	C Ohio Sala University C Ohio State University	Physics Physics								
Zheneno Zhano (G) Zhinano Jiano (S)	C Ohio State University Pl General Institute of Technology		DOF	BES - Basic Energy Sciences	DE-FG02-07ER46451	P19401	Magneto-infrared Spectroscopy Study of Emerging Topological Materials with Layered Structures	Condensed Malter Physics		3 26.9
Zachery Enderson (P)	C Georgia Institute of Technology	School of Physica School of Physica Condinued Matter Science, DC Field CMS School of Physica School of Physica Instruction & Cosmitiona								
Mvkhavio Caerov (5) Nikolai Simonov (U)	C National High Magnetic Field Laboratory C Georgia Institute of Technology	Contensed Matter Science. DC Field CMS School of Physics								
Dmitry Smimov (S) Li Xiano (P)		Instrumentation & Operations DC field								
Shalinee Chikara (S)	P1 National High Magnetic Field Laboratory	CMS. DC Field Facility	NSF	DMR - Division of Materials Research	DMR2128555	P19402	Strange frustration and quantum liquid behavior in an insulating trimer Ba4k3O10	Condensed Matter Physics		1 6
Eun Sano Choi (S)	C Internation Decision Decision	DL Net De Contractive Department of Physics. Physics December 1								
David Graf (S) Cere Dean (S)	C National High Magnetic Field Laboratory Pl City College of New York	DC Field / CMS Evolution	DOF	RES - Basic Francy Sciences	DE-800016703	BIAIAI	Electron constation and transform in yars day Wash balanceiturture under birb memalic field	Condensed Matter Physics		3 26
Daniel Chica (P)	C Columbia University	Chemistry	DOE	BES - Basic Energy Sciences BES - Basic Energy Sciences	DE-SC0016703 DE-SC00167703					
Aravind Devarakonda (S) Christie Kosy (G)	C Columbia University C Columbia University	Acoled Physics and Acoled Mathematics Chemistry								
Josh Swann (G) Meidean Terre (R)	C Columbia University	Physics	Net	DMR - Division of Materials Research	DMR2003117	P19406	Magnetic field-induced quantum phase transitions in a Kitaev spin liquid candidate.	Constructed Mathematics	_	-
Alexander Brassington (G)	C University of Termessee, Knowle	Physics Physics	Nor	DMH - DWatch of Materials Patieterch	Dimeduativ	P19406	wagnesc texo-induced quantum prase transitions in a Kraev spin squid candidate.	Condensed Marter Physics		
Eun Sano Chol (S) Minaeron Lee (S)	C National High Magnetic Field Laboratory C National High Magnetic Field Laboratory	Physics December 1								
Santwun Lee (P)	C National High Magnetic Field Laboratory	MPA-MACLAB								
William Peria (P)	C Los Asmos National Laboratory C Los Asmos National Laboratory	MPA-MAGLAB								
Chenokun Xino (G) Vision Zard (S)	Contract Science Strength Contract Science Strength Contract Science Science Strength Contract Science Scienc	IC fair (11) Constit C								
Sherothi Zharo (P)	C National Hork Mamuelle Hold Laboratory Mathematic Hand Laboratory Mathematic Hand Laboratory Mathematic Hand Laboratory C National Hork Mamuelle Hold Laboratory C National Hork Mamuelle Hold Laboratory C Phanes University of Samera and Technology P Anaso University of Samera and Technology		National Research Foundation of Korea	Non US Foundation		P19408	Topological transport of Half-metallic Weyl semimetal candidates		-	
rounJuno Jo (S) Eun Sano Choi (S)	P1 Kvuncoook National University C National High Macretic Field Laboratory	Physics Physics Decentment	reational Research Foundation of Korea	Non US Foundation		P19408	i opoogical instantio of Half-metallic Weyl semimetal candidates	Concerned Matter Physics	1	12.98
Joonvours Choi (G) Min Herk Choi (G)	C Kuunoook National University C Debare University of Science and Technology	Printing Physics Physics Physics	1					1	1	1 1
Ho Seono Jeon (G)	C Pohano University of Science and Technology		1					1	1	1 1
wloun Kano (5) Hvunkvuna Lee (6)	C Pusan National University	Department of Physics Physics	1					1	1	1 1
Hyeongwoo Seo (G) Irina Drinhim (S)	C Pohang University of Science and Technology Pl Joffe Dissioni, Technologi Andrews of Poissons	Physics Department Division of Semiconductors and Dialectrics	No other support		19-02-00124	BIO	Magnetotransport Properties of High-Mobility p-A/GaAa/GaAa/A/GaAa Structures: Acoustic Studies.	Condemard Matter Disairs	+ .	-
Loren Pfeiffer (S)	C Planes Ubwark of Saince and Technology Planes Ubwark of Ubwark Paus Niemer Ubwark of the Russien Academy of Sainces Mark Physics-Technical India of the Russien Academy of Sainces Mark Physics-Technical India of the Russien Academy of Sainces Mark Physics-Technical India of the Russien Academy of Sainces	Leastmann of Privice Physics Department Physics of Semiconductors and Delectrics Electrical Engineering Physics of Semiconductors and Delectrics					 Common or eight commonly process on an example of contrasts. Proceeds, contrasts. 		1	1 1
Alexery Sunicy (S)	C National High Macretic Field Laboratory	Electrical Environmento Physics of Semiconductors and Dielectrics Condenses Maler Science Princeton Institute for the Science and Technology of Materials Crate							1	1
Ken West (S) Jan Jaroszynaki (S)	C Princeton University PI National High Magnetic Field Laboratory	Princeton institute for the Science and Technology of Materials CMS	UCGP		5206	P19446	Torque acting on REBCO costed conductors in external magnetic field	Development of Magnet Technology		3 18.05
Shaon Barua (G) Emode Researce (R)	C National High Macrostic Field Laboratory	CNIS KECNHMPL KECNHT Applied Superconductivity Center	UCGP DOE NSF	Office of Science DMR - Division of Materials Research	5206 DE-8C1234 DMR20				1	
Griffin Bradford (O)	C National High Magnetic Field Laboratory	Applied Superconductivity Center		Javes - Loveson of Materials Research	Lengthan (1	1	1 1
Daniel Davis (G) Ashleich Francis (S)	C National High Magnetic Field Laboratory C Commonwealth Fusion Systems	ASC RED	1						1	
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Jonaman Lee (G1 Emma Martin (G)	C National High Magnetic Field Laboratory C National High Magnetic Field Laboratory	Apprecia superconductivity Center Applied Superconductivity Center							1	1
Liff Trockewitz (S) Abta Xu (O)	C National High Magnetic Field Laboratory C Fiorida State University	ASC ASC	1						1	
Pablo Jarilo-Herrero (S)	PI Massachusetts Institute of Technology		NSF	DMR - Division of Materiala Research ARO - Army Research Office BES - Basic Energy Sciences BES - Basic Energy Sciences US Foundation	DMR180802	P19463	Exploring high field re-entrant phenomena in twiated multilayer graphene	Condensed Matter Physics	4	4 28
cercio de la Barrera (S) Ruhao Liu (G)	university of Toronto (Toronto) Massachusetta Institute of Technology	Phraice Decartment of Phraics Electrical Engineeing and Computer Science	NSF DOD DOE DOE	ARO - Army Research Office BES - Basic Energy Sciences	DMI1000022 W011007120147 E-4022470111308 DBI-AC02470111308 DBI-AC02470111358 CBMI1043			1	1	1 1
Aviram Ltri (P) Xinni Warre (C)	C Massachusetta Institute of Technology C Massachusetta Institute of Technology	Physics Physics Physics Physics School of Abolied and Engineering Physics	DOE Control and Bally Morra Excentration	BES - Basic Energy Sciences US Foundation	DE-AC02-07CH11358 CRAMINART			1	1	1 1
Xueqiao Wang (G)	C Massachusetta institute of Technology	Physics	and the service of th						1	1 1
Keni Yasuda (S)	C Anasascrusema institute of Technology C Cornell University	Privaca School of Applied and Engineering Physics							1	1 1
Zhinen Zheng (G) Sheng Ran (S)	C Massachusetts haltute of Technology PI Washindon University in St. Losis		Washindon University in St. Louis	US College and University		P19470	Study of high magnetic field induced superconductivity and Fermi surface of UTe2	Condensed Matter Physics	+ .	5.52
Christopher Brovies (G)	C Washindon University in St. Louis	Provice Provice Provice CMS	and an				, , , , , , , , , , , , , , , , , , ,		1	
Lawid Graf (5) Zackerv Rehfuss (G)	vanona High Magnetic Field Laboratory Washindon University in St. Louis	UC Field / CMS Physics	1					1	1	1 1
Hasan Siddouse (P) Michael Shotek (P)	C Washington University in St. Louis	Physics Presentation of Chaminton and Rinchespieles	No other aupport			P19472	EPR Investigation of Lantanide Complexes as Potential Hosts for Clock Transitions and Molecular Cubits	Development of Magnet Technology	+ .	<u></u>
Mouel Galine (G)	C Florida State University	Chemistry and Biochemistry	wo wher support			P13972	or revenues of conversed Completes as Posinial Foreign for Cock I randoms and Molecular Cubits	Sweets and a stagner recordingy	1	1 1
Brittany Grimm (G) Manoi Vinavaka Hanabe Subramanya (G)	C Florida State University C Florida State University	Phraics Phraics	1						1	
Stephen Hill (5)	C National High Magnetic Field Laboratory	EMR Date							1	1
-stannenzu Kundu (P) Dachné Lubert-Perquel (P)	Comparing a second	Note Control of Charteria and Boldwinetov Control and Boldwinetov Process Process Process DAR Process Process Boldwinetov Dare Process DAR Process Process Boldwinetov DAR Process Process Boldwinetov	1						1	
Gia Rivers (U) Elvin Salerno (P)	C Florida State University C National High Magnetic Field Laboratory	Chemistry and Biochemistry EMR							1	1
Robert Stewart (G)	C Florida State University	Physics							1	1
Johan van Tol (5) Lin Jao (5)	C National Hish Mannie Field Laboratory PI Zhalano University C National Hish Mannie Field Laboratory PI Zhalano University C National Hish Mannie Field Laboratory	EMR	NSF	DMR - Division of Materials Research	DMR2128555	P19480	High Magnetic Field Probe Design and Technique Development	Condensed Matter Physics	+ .	1 7
David Graf (S) Zhengi Hua (G)	C National High Magnetic Field Laboratory C Fiorida State University	PTraics DC Fluid / CMS PTypics	1						1	
Crangel No. (5)	C Florida State University P1 National High Magnetic Field Laboratory	Physica	NSF	CAREER - Faculty Early Career Development Program	227000-520-101123	P19501	Optical investigation of spin-triplet superconductor candidate UTe2 in high magnetic fields	Condensed Matter Physics	1	1 8
Sanabin Cui (P)	C Florida State University	Proto	1	Development Program					1	
Sitak Mekonen (G)	C Johns Hopkins University	Physics Department of Physics and Astronomy NetHPL	1						1	
Kaitai Xao (G)	C National High Magnetic Field Laboratory	CMS	1					1	1	1
Naipeng Zhang (P) Yining Huang (S)	C Florida State University P1 University of Western Ontario	Physics Osenistry	NSERC of Canada	Other		P19515	17O and 91Zr solid-state NWR of metal-organic frameworks at 35.2 T	Chemistry	+ .	2 0
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wan Hung (S) Wanii Zhang (G)	vanonai High Magnetic Field Laboratory University of Western Ontario	Chemistry	1					1	1	1 1

	Participants (Name, Role, Oro., Dept.)			Funding Approx	g Sources	Proposal #	Proposal Title	Discipline	Exp.# Days Used
Badh Assaf (S) Pl Muhain Abdul Karim (G) C	University of Notes Dame University of Notes Dame University of Notes Dame	Physics Divolute	NSF University of Notre Dame	Fundin (Funding Agency DMR - Division of Materials Research US College and University	DMR1905277	P17382	Symmetry breaking in Landau quantized topological crystalline insulators	Condensed Matter Physics	5 29.75
Badh Assaf (S) P Muhain Abdul Karim (G) C Seul-Xi Bac (P) C David Carl (S) C Xnyu Liu (S) C	University of Notre Dame National High Macretic Field Laboratory	Photos Physics Protos DC Field / CMS							
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Mvkhavlo Ozerov (S) C Danielle Laurencin (S) Pi	National Hich Macretic Field Laboratory University of Montpellier	Condensed Matter Science, DC Field CMS Institut Charles Gerhardt de Montoellier	ERC	Other		P19532	Identification of interfacial bonding environments in functional nanomaterials and biomaterials using high resolution solid state NMR to (Units)-high fields	at Chemistry	3 8
Danielle Laurencin (5) P1 Zhehono Gan (5) C Christel Garwis (5) C Ievas Goldberga (P) C Ievas Hono (5) C Adam Nelson (G) C	University of Monitosilian National Hich Managelia Flaid Laboratory Sorborne Linkersity Sorborne Linkersity French National Center for Scientific Research	Institut Charles Gerhardt de Montoeller NHMFL Laboratoire de Chimie de la Matière Condensée Institut Charles Gerhardt de Montoeller	ERC CNRS ANR	Other Other Other			(ultra)-High fields		
leva Goldberga (P) C Ivan Hung (S) C Adam Malam (C) C	French National Center for Scientific Research National High Microsoft Field Laboratory Sorborne Linkversity	Institut Charles Gemant: de Montpeller CMARNAR Chemitry							
Armit Venkalesh (5) C	National High Magnetic Field Laboratory	National High Magnetic Field Laboratory	NSF	DMR - Division of Materials Research	DMR1231319	P12540	High Field Studies of Novel Layered Materials	Condensed Matter Physics	6 438
Almany Banoura (S) C Alan Chen (G) C	Massachusetta Ivatitute of Tachnoloov National High Macretic Field Laboratorv Massachusetta Ivatitute of Tachnoloov	Physics CMS EECS Privation Applied Physics and Applied Mathematics Co. These 1 CMS Co. These 1 CMS							
Maximilien Debbas (G) C Anavind Devanakonda (S) C	Massachusetta Institute of Technoloov Columbia University	Physics Applied Physics and Applied Mathematics							
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Sara Haravifard (S) Pi Eun Sano Chol (S) C	1 Duke University National High Magnetic Field Laboratory	Department of Physics Physics Department	NSF DOE DOE	DMR - Division of Materiala Research BES - Basic Energy Sciences BES - Basic Energy Sciences Other	DMR2011876 287153 287753	P19562	Thermal Properties of Frustrated Magnets	Condensed Matter Physics	4 29
Kent Jurnaul Zhane (P) C Johds Zhu (C) D Landa Zhu (C) D Exn Share Old (S) C David Garl (S) C Manazoni Lan (S) C Sala Shar (D) C Sala Shar (D) C Sala Shar (D) C Lait Yadaw (D) C Zahd Haam (S) C	Dual brevente Katona Hiro Mannach Held Laboratory Nationa Hiro Mannach Held Laboratory Nationa Hiro Mannach Held Laboratory Nationa Hiro Mannach Held Laboratory Dual brevente Dual brevente Dual brevente	Denotitives of Provids Provida Denotitiver of 10° Piela (245) Provida Provida Markov Denotitives of Provids Provida Provida	DOE Duke University	BES – Basic Energy Sciences Other	297153				
Wenda Si (U) C Side Xu (G) C	Duke University Duke University	Department of Physics Physics							
Lalit Yaday (G) C Zahid Hasan (S) Pi	Duke University Princeton University National High Magnetic Field Laboratory	Physics Physics Condensed Matter Experiment	Gordon and Betty Moore Foundation	US Foundation	GBMF4547	P13566	Magnetotransport atudies of topological magnets under hydrostatic pressure	Condensed Matter Physics	5 35
Luis Balicas (S) C Brian Casas (P) C	National High Magnetic Field Laboratory	Condensed Matter Sciences							
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Qi Zhano (P) C Michael Shatruk (S) Pi	Princetor University Princetor University National High Macretic Field Laboratory	Physica Decertment of Chemistry and Biochemistry	NSF	CHE - Chemistry	CHE 1955754	PIOLOG	Investigation of Low-Dimensional Magnetiam in Inorganic and Organic Materials	Development of Magnet Technology	7 53
Shubham Biaht (G) C Ian Carrobell (G) C	Florida State University Florida State University	Chemistry and Biochemistry Chemistry and Biochemistry	NSF DOE NSF NSF	CHE - Chemistry BES - Basic Energy Sciences DMR - Division of Materials Research CHE - Chemistry	CHE 1955754 DESC0019330 DMR2233002 CHE2360779				1
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Louis Tailefer (5) P1 Mankhtuguldur Atangeni (G) C	1 University of Sheebrooke	Physics Département de Physique				P19605	www.www.wearge meas prysics and pseudogap prase of cuprates	CALIFORNIA AND AND A CALIFORNIA	
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Jordan Bacio (P)	University of Steebrooke								
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Caitin Duffv (G) C Gael Grissonnanche (S) C	Hish Field Masnet Laboratory. Radboud University Institute Polytechnic De Paris	HFML Physics							
Drad Ramshaw (5) C Zhi-Xan Shen (5) C Kelun Xu (C)	2 Cornell University 2 Stanford University 2 Stanford University	Laboratory of Alberric and Solid State Physics Physics Acolied Physics							
Tim Murohv (S) Pl Almamy Bangura (S) C	National High Magnetic Fluid Laboratory National High Magnetic Fluid Laboratory	Corrations	No other support			P19611	Tealing of DCFF magnets, power supplies and associated equipment	Condensed Matter Physics	8 41.15
Trov Brumm (T) C Shalinee Chikara (S) C		Crisid CCField CMS: DCField Facility Physics Department DCField CMS DCField CMS							
Eun Sang Choi (S) C David Graf (S) C	National High Magnetic Field Laboratory National High Magnetic Field Laboratory	Physics Department DC Field / CMS							
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Trevor Tvson (S) Pr Alexery Kovaley (S) C	New Jersev Institute of Technology National High Magnetic Field Laboratory	Physics CMS	NSF	DMR - Division of Materials Research	DMR180931	P19612	Probing Magnetic Field-Induced Order and Field-Coupled Structural Changes in Multiferroic Ho/43(803)4	Condensed Matter Physics	1 3.92
Masoud Mardani (G) C William Nelson (G) C	National High Macretic Field Laboratory National High Macretic Field Laboratory	CMS CMS-Physics							
Theo Siecrist (5) C	National High Machelle Field Laboratory National High Machelle Field Laboratory National High Machelle Field Laboratory	Chemical and Biomedical Engineering Chemical and Biomedical Engineering Condensed Matter Science							
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David Graf (S) C Jan Jaroszvnski (S) C	National High Magnetic Field Laboratory National High Macretic Field Laboratory	DC Field / CMS CMS							
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	University of California. Los Anseles University of California, Los Angeles	Electrical Engineering Electric and Computer Engineering							
Cui-Zu Chano (S) Pi Zi-Jie Yan (G) C	1 Pennavivania State University 2 Pennavivania State University	Physics Physics Decentment of physics Physics	DOE	BES - Basic Energy Sciences	DE-8C0019064	P19615	Quantum Anomalous Hall Sandwiches Under High Magnetic Fields	Condensed Matter Physics	1 6.44
Hemian Yi (P) C RuoXi Zhano (G) C	Controls of controls and controls Controls of controls Percendence State Detendit	Department of physics Physics							
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		DC Field / CMS	NDP	EPMA - Emerging Frontiers and Multidisciplinary Activities	EP1041433450	P13617	Quantum transport in n-type china aemiconductor i esurene	Condensed Marser Physics	3 19.0
Chano Nu (G) C Pukun Tan (G) C	Purdue University Purdue University	Electrical and Computer Engineering Electrical Engineering							
Jun Zhu (S) Pi Halono Fu (P) C	1 Perewitvania State University 2 Perewitvania State University	Prinsica Prinsica Prinsica Prinsica	NSF DOE	DMR - Division of Materials Research BES - Basic Energy Sciences	DMR1904985 DE-5C0022947	P19619	Valley teospin-Driven Correlated Phenomena in Bilayer Graphene	Condensed Matter Physics	6 33.15
Chenosi Guo (G) C Ke Huano (G) C	2 Pennavlvania State University 2 Pennavlvania State University	Physics Physics							
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Almamv Banoura (S) C Akaah Khanali (G)	National High Magnetic Field Laboratory Stockholm University	CMS Department of Physics	Swedah Research Council Swedah Research Foundation	Non US Council Non US Foundation	2021-04360 2021-04360	+ 1824	and the second sec		a tard
	Stockholm University National High Magnetic Field Laboratory	Department of Physics LANE MPA-MAGLAB	<u> </u>						
Lu Li (S) Almany Bancura (S) C	1 University of Michigan	Physics	DOE NSF	BES - Basic Energy Sciences DMR - Division of Materials Research	DE-8C0020184 DMR2004288	P19627	Search for novel electronic, magnetic, and thermal properties in intense magnetic fields	Condensed Matter Physics	6 33.37
Aaron Chan (G) C Kuan-Wen Chen (P) C	University of Michigan University of Michigan	CAS Decembrandi of Physics Decembrandi of Physics Decembrandi of Physics Harknink Science of Decembrand Physics Acciliad Physics							
C David Mandrus (S) C Viti Mahada (S)	University of Michigan University of Tennessee, Knowlin Koulo Lineareth	Materials Science and Engineering							
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John Sincleton (S) Dechen Zhano (G)	National High Macrosofic Field Laboratory University of Michigan	Provice and Analyticality Provides Descriment of Physics Descriment of Physics							
Guoxin Zheno (G) C Yuan Zhu (G) C	University of Michigan University of Michigan	Department of Physics Department of Physics	-				Electrical Transport Studies of Quasi-Two-Dimensional Strongly Correlated Materials		
Caucin Zherra (C) C Yana Zha (C) C Danie Zhan (C) C Danie Zhan (C) C Charan (Zhananosha (P) C Charan (Zhananosha (P) C Jan Sik Lee (S) C Sa Sik Lee (S) C Sa Sik Lee (S) C Charan (Zhananosha (P) C Charan (Walanhan (P) C Valor Waran (C) C	Stream of Mathematican Second Secon	Jetamente di Privilea Desentraria di Neta Science / Esperimenta Institute di Solice Matte Resarch Institute di Solice Desench Materiale Matte Science, OC'Inid CMS Materiale Nation	NSF	DMR - Division of Materials Research DMR - Division of Materials Research	DMR1707785 DMR2104123	P19625	Executions a transport Studies of Quasi-Two-Dimensional Strongly Correlated Materials	Condensed Matter Physics	2 14
Manaki Fujita (S) C Jun Sik Lee (S) C	Tobola University IMR SLAC National Academics Laboratory								
Bal Pokharel (G) C Takanori Taniguchi (S) C	National Hich Macroslic Field Laboratory Tobolou University IMR								
Olexia Voloshima (P) Yuxin Wano (G)		Phraice Materiale Poperty Division Internation for Solid State Research CMS							
Yuaki Wana (Ci C MacMillin Whealer (C) C Zhankhone Shi (Si Pi Eune Sanc Ohni (Si C Ball Publiarer (Ci C Dessena Poolini (Si C Dessena Poolini (Si C Validi Wana (Ci C Taxian Will (Ci C	2 Florida State University 1 Socihow University 2 National Hich Macanile Field Laboratory	Physics School of Physical Science and Technology & Institute for Advanced Study	Soochow University	Non US College and University		P19630	Bludies of Thermal Transport Properties of cuprates in High Magnetic Field	Condensed Matter Physics	2 14
Bal Pokharel (G) C Dragana Popovic (S)	National Hich Manostie Filial Laboratorv National Hich Manostie Filial Laboratorv National Hich Manostie Filial Laboratorv Piorida Stati Lihovnatie	Physics Decarbrent Physics Condensed Matter Science / Experimental CMS	1						
Yuxin Wano (G) C Zimino Wu (G) C	Florida State University Scochow University		<u> </u>						
Xavier Rov (S) PI Daniel Chica (P) C	1 Columbia University Columbia University	Chemistry Otemistry	DOE	BES - Basic Energy Sciences	DE-8C0019443	P19632	Magnetic Order and Correlated Electronic Phenomena in Novel 2D van der Waats Materials	Chemistry	3 13.69
Aravind Devarakonda (S) C David Graf (S) C	Extension Shourth Cadedia Usership	School of Physical School and Carbonicz & Institute for Advanced Staty Committy Periodic Physical and Acoles Mathematics to Criteric Code Committy	1						
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Yanbo Guo (G) C Al-Amin Dhirani (S) Pi	University of Florida 19 University of Toronto (Toronto)	Phraice Chemistry	Natural Sciences and Engineering Resea Council for Canada	ech Non US Council	RGPN-2020-06244	P19676	The Kondo Effect at High Inpurity Densities in Nancatuchared Materials	Condensed Matter Physics	1 14
Rvan Baumbach (5) C Guangsin Ni (5) Pi	2 National Hish Mismelic Pield Laboratory 7 National High Magnetic Field Laboratory	CMS	Council for Canada						
Guangsin Ni (5) Pi	National High Magnetic Field Laboratory Patronkie University	Physics.	NSF	CAREER - Faculty Early Career Development Program	2145074	P19684	Exploring the nature of 2D twistronics under photon excitations	Condensed Matter Physics	
James none (5) C Philip Kim (5) C Katel Xian (C)	Columbia University Harvard Drivessity National Hinki Marvaillo Field Laboratory	Mechanical Engineering Department of Physics Cash							
Naipeng Zhang (P) C Zéing Xue (S) P	Florida State University University of Temperage, Knowlife	Physics Chamilton	NSF	CHE - Chemistry	CHE2055409	P19694	Probing Molecular Magnetism by Far-IR and Raman Magneto-Spectroscopies	Chemistry	2 14
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	Participanta (Name, Role, Org., Dept.)			Fundin (Funding Agency	g Sources	Proposal #	Proposal Title	Discipline	Exp.# Days Used
Badh Assaf (5) Muhan Adal Karin (G) Sea4 Ki Bac (P) David Carl (5) Xonya Lu (5) Mohanio Casaro (5) Deniry Smirov (5) Jaho Wang (5) Mahanio (5)	Physics of the Dense (performance) (performation of the Dense (performance) (Densering of the Dense (Physics	NSF D	DMR - Division of Materials Research US College and University	DMR1905277	P17362	Symmetry breaking in Landau quantized topological crystalline insulators	Condensed Matter Physics	5 29.75
Seul-Ki Bac (P)	C University of Notes Dame C University of Notes Dame C Multiversity of Notes Dame	Phraica Physica Phraica DC Field / CMS	Chinesiany of House Califier Co	oo conge and conversely					
Xinyu Liu (S)	C University of Noire Dame								
Dmitry Smirnov (S) Janitry Warry (G)	C National High Nacretic Field Laboratory C High-random Control Contro	Condensed Matter Science. DC Field CMS Instrumentation & Coerations Ethnice							
Mykhaylo Ozerov (5)	P1 National High Magnetic Field Laboratory	Physics Condensed Matter Science, DC Field CMS	No other support			P19696	Far-Infrared magneto-spectroscopy at DC-facility, NHMFL: New developments, tests and optimization of experimental protocols	Condensed Matter Physics	6 42.8
Delity Smirov (3) Richard Genera (3) Luch Mao (9) Taranoda Sarkar (9) Ganora Nolas (3) Jone Galesaro Cabard (G) Kora Wai (9) Nicholas Butch (3)	C National High Manufac, Palat Laboratory PI Disrovania of Manufac, Colona Part, Strandowski Markan, Colona Part, Disrovania of Manufac, Colona Parti Pi Uservania of Manufac, Colona Parti Pi Uservania of Manufac, Palat Laboratory Pi National High and Calonadars and Panadom MD Pi National High and Calonadars and Panadom MD Pi National High and Calonadars and Panadom MD	haturentation & Operationa		DMB Division of Materials Research		NAM			
Richard Greene (S) Ludi Miso (P)	PI University of Maryland, College Park C University of Maryland, College Park	Physics Physics	NSF D	DMR - Division of Materials Research	DMR2502855	P19698	High Field Studies of Electron-Doped Coprate Thin Films	Condensed Matter Physics	1 4.01
Tarazada Sarkar (P) George Nolas (S)	C University of Maryland. College Park. P1 University of South Florida	Physics Department of Physics	NSF D	DMR - Division of Materials Research	DMR1746185	P12700	Investigation of transport and potential topological complexity in GdTe1.8 using high magnetic field	Condensed Matter Physics	
Joros Galeano Cabral (G) Kava Wei (P)	C Florida State University C National High Magnetic Field Laboratory	College of Engineering CMS NST Center for Neuton Research							
		NST Center for Neutron Research CMS	NSF D National Institute of Standards and U	DMR - Division of Materials Research US Government Lab	DMR2105191	P12704	Studies of high-field states of UTe2	Condensed Matter Physics	2 11.4
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Danilo Roberto Rafkovski (P) Gosla Saurado Sales (G)	C National High Macratic Field Laboratory C University of Mandand College Dark	CMS							
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Jonathan DeStafano (G) David Carl (S) Chaonai Mu (G) Olaani Jano (P) Eliot Rosenbero (G) Yue Shi (G) Denis Karalakaj (S)	Linvestive of Washington	Acolud Physics MSE			ECC51952957		Electronic and spin dynamics of materials at very high magnetic fields explored with coherent multidimensional spectroscopy		
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Sean Knapo (G) Samuel Lancelund Carerra (G)	C University of South Florida C University of South Florida	Physics Physics							
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Nathanael Fortune (S) Yanbo Guo (G)	P1 Smith College C University of Florida	Physics Department of Physics Physica	No other aupport			P12714	Ibermodynamic atudes of novel quantum materials as a function of magnetic field strength and orientation	Condensed Matter Physics	1 5.1
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Yasu Takano (S) Jiapiang Yan (S)	C University of Florida C Oak Ridge National Laboratory	Physics Materials Science and Technology Division	1						
Jaglang Yan (5) Suchitra Sebastian (5) Emil Area (U)	P1 University of Cambridge C University of Cambridge	Physics Department of Physics	European Research Council N	Non US Council		P19724	Quantum Oscillations in an Unconventional Insulator	Condensed Matter Physics	1 33
Almamy Bangura (S) Jessica Chapman (G)	C National High Magnetic Field Laboratory C University of Cambridge	CMS Physica	1						
Hanvi Chen (G) David Graf (S)	C University of Cambridge C National High Mecrylic Field Laboratory	Physics cuantum matter DC Field / CMS	1						
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lan Camobell (G) Judith Clark (G)	C Florida State University C Florida State University	Chemistry and Biochemistry Chemistry and Biochemistry	NSF D	DMR - Division of Materials Research DMR - Division of Materials Research DMR - Division of Materials Research	DMR2216125 DMR223501				
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Brandon Sorbom (S)	A metalitation funder Carlot for Andromoto Science Analasses For Community Annual Analasses For Community Annual Analasses For Community Annual Analasses Community A	Research & Development	Science and Engineering Research Board, C DST, India Commonwealth Fusion Systema			P19831	Angularly Resolved Critical Current Characterization of REBCO High Temperature Superconductors for High-Field Fusion Magnets	Development of Magnet Technology	2 14.7
Yinotai Chen (T) JL Cheno (S)	C Commonwealth Fusion Systems C Commonwealth Fusion Systems	R&D Research & Development Research & Development							
Rui Diaz-Pacheco (S) Aableich Francis (S)	C Commonwealth Fusion Systems C Commonwealth Fusion Systems								
Alva Greenbero (S) Jan Jaroszynski (S)	C Commonwealth Fusion Systems C National High Magnetic Field Laboratory	Research & Development CMS							
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Zhehong Gan (S)	PI National High Magnetic Field Laboratory	NeMPL AND	No other support			P19856	Development and implementation of solid-state NMR methods at high magnetic fields	Chemialry	
Elizabeth Green (S)	C National High Magnetic Field Laboratory	Condensed Matter Science							
Ivan Hund (5) Iva Litvak (5)	C National High Magnetic Field Laboratory	Caladonar							
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Luis Balicas (S) Almamy Banoura (S)	C National High Macretic Field Laboratory C National High Macretic Field Laboratory	Condensed Matter Experiment CMS	CNP6 C	Diher					
Danilo Ratkovski (G) Sergio Rezende (S)	C Federal University of Pernambuco C Federal University of Pernambuco	Departmento de Fínica Department of Physica		DMB - Division of Materials Research		PISHS			
Stuart Brown (S) Austin Baker (G)	C Field Ubinst of Permittaion C Field Ubinst of Permittaion Permittion	Decertment of Physics and Astronomy Physics MPA-Q	NSF D	DMR - Division of Materials Research	DMR2004553	P19865	NMR investigation of the field-induced phases of UTe2	Condensed Matter Physics	1
Michibiro Hirata (S) Arnell Revea (S)	C Los Alamos National Laboratory C National High Magnetic Field Laboratory	MPA-Q Condensed Matter Science							
Phurba Sherpa (G) Xisoling Wang (S)	C Los Alamos National Laboratory C California State University, East Bay	Condensed Matter Science MPAC Chemistry							
Rku Yamamoto (P) Sabvasachi Sen (S)	C Los Alamos National Laboratory P1 University of California. Davis	1994U	NSF D	DMR - Division of Materials Research	DMR1855176	P19076	High-Field NMR Investigation of the Structural Evolution during Nucleation in Glass-Ceramics: Towards an Atomistic Understanding	Engineering	3
Zhehong Gan (S) Ivan Hung (S)	C Las Rames National Laboratory Pt Drovensh of California. Davis O National Phylogenaic Ph	Chemical Endneeting and Maxarate Science NetWift CMAR/NMR National Hint Macretic Field Laboratory	-						
Arreit Venkatesh (S) Bing Yuan (G)	C National High Magnetic Field Laboratory C University of California, Davia	National High Magnetic Field Laboratory Endreering	1						1
Qianhui Shi (S) Vicentus Li (??)	P1 * University of California. Los Anoeles	Postineering Privata Bidetrical and Computer Engineering	UCLA start-up fund C	Dther		P19850	Probing spin and pseudospin degrees of freedom in 2D semiconducting Iteration metal dichalcogenide heterostructures	Condensed Matter Physics	2 1
Mian Mandioo-Stoba (G) Gara Oa (P)	C National Hish Memolic Peter La Constance Longenetic Actional Social Longenetic Actional Social Constantial Conference Las Ancolas Devenanto et Conference Las Ancolas Devenanto et Conference Las Ancolas Universito et Conference Las Ancolas	Executeur and Computer Engineering Physics Electrical and Computer Engineering							
Tino-Hsun Yang (G) Sout Diatoch (S)	C University of California. Los Anseles Di Willeman University	Electric and Computer Engineering	NGF -	DMR - Division of Materials Research	DMR1943389	P12017	Microwave apechroaccov of van der Waals helerostuctures	Condensed Matter Physics	+ .
Areah Akbari-Sharbaf (P) Linot Ennel (S)	C Vilanova University C Nichmal High Manualin Field Laboratory	Physics Physics Cale				- 1401 F	,	and the second sec	1 1
Minhves Lee (S) Thisses lines (R)	PI University of Colorado. Boulder	CMS Physics School of Physics Cordensed Matter Science. DC Field CMS	DOE B	BES - Basic Energy Sciences	DE-8C0021377	P19922	Investigation of the crystal electric field effects in rare earth magnets	Condensed Matter Physics	2 10.4
Mvkhavlo Ozerov (5)	C National Hoh Macretic Field Laboratory	Condensed Matter Science, DC Field CMS							1
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David Graf (5)	C National High Macretic Field Laboratory	DC Field / CMS	1						1
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Jawa Graf (5) Jinya Liu (P)	C University of California. Irvine	Protein - Image Department of Physics and Autoromy DC Pladel CABS Descriment of Physics and Autoromy Department of Physics and Autoromy Department of Physics	1						
robert Weber (G) Sanfeno Wu (S)	University of California, Irvine Pi Princeton University	Department of Physics and Astronomy Department of Physics	NSF D	DMR - Division of Materials Research	DMR1942942	P12036	Constated Quantum Matter in the Two-Dimensional WTe2 Systems	Condensed Matter Physics	2 10.2
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Guo Yu (G) Jian Liu (S)	C Princeton University P1 University of Tennessee, Knoxille	Physics Physics		BES - Basic Energy Sciences	DE-6C0020254	P12028	Emergent magnetotransport phenomena of geometrically frustrated helerostructures	Condensed Matter Physics	2 5
Eun Sano Chol (S) Seunchoon Sono (G)	C National High Macrostic Field Laboratory C University of Tennessee. Knoxille	Physics Decartment Department of Physics and Astronomy	1						
Chenokun Xing (G) Long Ju (S)	C University of Tennessee. Knowlie P1 Massachusetts Institute of Technology		NSF	DMR - Division of Materials Research	DMR1231319	P19939	Electron Correlation in A Phombohedral Trilayer Graphene/hSN Moiré Superfation	Condensed Matter Physics	2 14
Tonghang Han (G) Zhengouang Lu (P)	C Massachusetts Institute of Technology C Massachusetts Institute of Technology	Physics Physics Physics		and a subscription of the second of the	-				1 1
Jistero Yano (G) David Larbaleatier (S)	C Massachusetts institute of Technology PI National High Macroslic Field Laboratory	Photos RSC	DOE -	FES - Office of Fusion Energy Sciences	DE-5C0022011	PIONO	Torque magnetionality study of the full field, angle, and temperature desendence of the optical reversi density in PHPCO Particul	Development of Magnet Technolww	+
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Jan Jaroazynaki (S) Kaanomin Kim (D)	C National High Magnetic Field Laboratory C Network High Magnetic Laboratory	CMS Annied Romerconductivity Center							
Jonathan Lee (G) Tubandar Mete (C)	C National High Macretic Field Laboratory C National High Macretic Field Laboratory	Acciled Superconductivity Center Acciled Superconductivity Center							
Abia Xu (O)	G Fierda State University G Fierda State University	800 M		Non US Council		P19943	High magnetic field study of a spin-hiplet superconductor candidate		
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Aacc money (G) Michal Valiska (S)	C University or Cambridge C Charles University. Pracue. Caechia	Decement of Privalca Physica							
Theo Weinberger (G) Zhevu Wu (G)	C University of Cambridge C University of Cambridge	Cavencish Laboratory Decartment of Physics							1
Sulei Shi (S) Xiaotono Chen (P)	PI Renaselaer Polytechnic Institute C Renaselaer Polytechnic Institute	Chemical and Biological Engineering Chemical and Biological Engineering	NSP D	DMR - Division of Materials Research	DMR1945420	P12244	Magneto-optical Spectroscopy of Correlated Physics in Semiconducting Molei Superlattices	Condensed Matter Physics	3 2
Lei Ma (G) Yuze Menz (P)	C Renaselaer Polytechnic Institute C Renaselaer Polytechnic Institute	Chemical and Biological Engineering Chemical and Biological Engineering							
Dmitry Smimov (S) Li Xiano (P)	C National High Magnetic Field Laboratory C National High Magnetic Field Laboratory	Instrumentation & Operations DC field							
Li Yan (G) Kimberly Modic (S)	C Renaminer Polytechnic Institute PI * Institute of Science and Technology Austria	Chemical engineering Physica	European Research Coursel	Diher	DMR1157489	P12945	Thermodynamic measurements of topological superconductors	Condensed Matter Physics	
Nicholas Butch (S) Breas McConsold (S)	C National Institute of Standards and Technology MD C National High Manuality Bird Laboratory	NIST Center for Neutron Research	Contraction of the Contraction o					and the second sec	
Archie Nash (U)	C Institute of Science and Technology Austria	Provide Terror Product Foreign Control (1997) Provide Danisation of Markenantical and Physical Sciences Laboration of Administration Statis State Physica Laboration of Administration Statis State Physica							
Muhammad Nauman (P)	C Institute of Science and Technology Autors	Division of Mathematical and Physical Sciences							
oreo Remshaw (5) Arkady Shehter (5)	C National High Magnetic Field Laboratory	Laboratory of Alterric and Solid State Physics LANL MPA-MAGLAB							
Valeska Zambra (G) Corv Dean (S)	C Institute of Science and Technology Austria PI City College of New York	Physics Physics Applied Physics and Applied Mathematics Physics	DOE B	SES - Basic Energy Sciences	DE-8C00167703	P12247	Uncovering Fractional Quantum Hall States in Decoupled Graphene Double Layers	Condensed Matter Physics	1 42
Aravind Devarakonda (S) Jordan Pack (G)	C Columbia University C Columbia University	Applied Physics and Applied Mathematics Physics							

	Participants (Name, Role, Org., Dept.)			Funding (Funding Agenc) DMR - Division of Materials Research US College and University	ng Sources				Days
Badih Assaf (5)		Physics	NSF	(Funding Agency DMR - Division of Materials Research	p, Division, Award #) DMR1905277	Proposal # P17262	Proposal Title Symmetry breaking in Landau quantized topological crystalline insulators	Discipline Exp Condensed Matter Physics	txp.# Days Used 5 29.75
Muhain Abdul Karim (G) Sani Ki Bar (P)	C University of Notes Dame C University of Notes Dame	Physics Physics Physics DC Flaid / CMS	NSP University of Notre Dame	US College and University				· · · · ·	
David Graf (S)	C National High Macratic Field Laboratory	DC Field / CMS							
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Dmitry Smimoy (S) Jaahu Wang (G)	C National High Magnetic Field Laboratory C University of Notre Dame	Instrumentation & Operations Physics							
Zhi-Xun Shen (S) Emil Anni (D)	PI Stanford University C University of Cambridge	Physics Department of Physics	DOE	BES - Basic Energy Sciences	DE-AC02-765/F00515	P12242	Quantum oscillations in an unconventional insulator	Condensed Matter Physics	1 4.83
Jessica Chapman (G)	C University of Cambridge	Physics Physics							
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Ken Hend Tech (G) Keize Xiz (G)	C University of Cambridge C Stanford University	Physics Applied Physics							
Suchitra Sebastian (S)	Consensity of Carefords Statistical Section	Media Taxat Branchover of Photos Cell Cell Physica quadmentality Databased D	European Research Council EPSRC	Non US Council Other		P19950	Phase diagram of a Correlated Insulator	Condensed Matter Physics	2 9.84
Almamy Banoura (S)	C National High Magnetic Field Laboratory	CMS	EP and	Conta					
Jessica Chapman (G) Hanyi Chen (G)	C University of Cambridge C University of Cambridge	Physics Physics quantum matter							
Yusuan Jin (G) Menomeno Lono (G)	C University of Cambridge C University of Cambridge	Department of Physics Department of Physics							
Nicholas Popial (G) Giles Bretano Gard (11)	C University of Cambridge	Physics Councelish Laboratory							
Alexery Sunloy (S)	C National High Magnetic Field Laboratory	Condensed Matter Science							
Geetha Balakrishnan (S)	P1 University of Warwick		European Research Council	Non US Council		P12051	Quantum Decillations in New Families of Correlated Insulators	Condensed Matter Physics	2 9.09
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Jak Chakhalian (S) Euro Rene Chai (R)	PI Rutoers University C National Mich Manualis Birld Laboratory	ohvaica Rhuning Dependented	Gordon and Belty Moore Foundation	Other		P12254	Magnetotransport study on Weyl semimetal pyrochlore inidate thin films	Condensed Matter Physics	4 25.41
David Graf (S)	PT Extense unvester C National High Macretic Field Laboratory C National High Macretic Field Laboratory C Britema Information	oninica Physica Decarbrent DC Flidd / CMS Physica							
Tauno-Chi Wu (G)	C Public University C Rufers University						Study of the Magneto-elastic Coupling in Thin Films and Bulk Samples of Frusteeled Magnets		
Christianne Beekman (S) Ranit Chandra Das (G)	PI National High Magnetic Field Laboratory C Florida State University	Physics Materials Science and Engineering	NSP	DMR - Division of Materials Research	DMR1847887	P19955	Study of the Magneto-elastic Coupling in Thin Films and Bulk Samples of Frustrated Magnets	Condensed Matter Physics	8 64.93
Blav DC (G) David Graf (S)	C Florida State University C National High Magnetic Field Laboratory	Physics DC Field / CMS						1	
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William Nelson (G) Mekhavin Creany (S)	C National High Magnetic Field Laboratory C National High Magnetic Field Laboratory	CMS-Physics Condensed Metter Science: DC Field CMS						1	
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Junek Krzvatek (S) Andrew Ozarowski (S)	C National High Magnetic Field Laboratory C National High Magnetic Field Laboratory	Condensed Matter Science	1						
Mykhavio Ozerov (S) Daniel Sanhi unie (P)	C National High Magnetic Field Laboratory C May Disork Institute for Commissi France Community, Magheim	Condensed Matter Science, DC Field CMS Molecular Theory and Sciencescow	1						
Joshun Tolser (S)	C Board Plance Institute to Chemical Energy Conversion, Musinem C Roosewell University P1 University of Science and Technology of China	EXPT Conferenced Martler Sciences, DC Fleid CMS Molecular Theory and Sciencesv Biolocical, Physical and Health Sciences Physica			(24/122928	P12283	New 120 MMR method for notein channel uniter shoty	Biology, Biochemiatry, Biophysica	
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Myriam Collen (S) Tim Cross (S)	C Collece of William and Marv C National High Magnetic Field Laboratory	Applied Science NHMFL/Chemistry & Biochemistry						1	
Risiano Fu (S) Arrrit Vankalesh (S)	C National High Magnetic Field Laboratory C National High Magnetic Field Laboratory	NMR National High Magnetic Field Laboratory	1						
Rendu Zhang (P)	C National High Magnetic Field Laboratory	NEMITL Phonics DC Field / CMS	MPE	DMR - Division of Materials Research	PARITANAAR	P20004	Understanding metallic behavior in Pe3Ce4 under application of pressure	Development of Magnet Technology	
David Graf (S)	C National High Magnetic Field Laboratory	DC Field / CMS	na		DE-NACO-03	Filler		be a set of the set of	
Zachery Enderson (P)	C Georgia Institute of Technology	Bentionshalts Delesa and Science School of Phrains School of Phrains Condense Maler Science. DC Field CMS Instrumentation & Counstions	Sandia National Labs	LDRD - Laboratory Directed R&D US Government Lab	DE-NAU-US	P20121	Electoric transport and opecal association astrocorducer analosis quantum materials	Condensed Mader Physics	• 2
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Z. Valv Vandersv (S) Bikard Borlin (G)	P1 University of Utah C University of Utah	Desertment of Physics & Advecome Physics & Advecome Physics & Advecome Desertment of Physics and Advecome Desertment of Physics and Advecome Physics Condenses Matter Science	DOE	BES - Basic Energy Sciences	DESC0014579	P20028	Anomalous Landau levels and magneto-excitons in chiral 2D hybrid organic inorganic perovskiles with strong Rashba spin ofbit coupling	Condensed Matter Physics	3 22.91
haac Brown (G)	C University of Utah	Physics & Astronomy							
Uven Haveh (P)	C University of Utah	Prvsica							
Stephen McGill (S) Daniel Nikiforov (P)	C National High Megnetic Field Laboratory C University of Utah								
Miha Zakotnik (S) Davide Prosperi (S)	P1 Urban Mining Company C Urban Mining Company	wsearch wsearch Physica Decartment of Physics Physica	Noveon Magnetica Inc			P20030	Slow Magnetization Dynamics of GBE NdFeB Rare Earth Permanent Magneta	Material Science	1 0.42
Eran Maniv (S) Muntaser Naarmeh (S)	PI * Ben Gurion University of the Necey C Ben Gurion University of the Necey	Privaics Department of Physics	Ben-Gurion University of the Necey	Non US College and University		P20034	Elucidating the Nature of a Possible Unconventional Odd-Parity Superconductor	Condensed Matter Physics	1 7
Henry Realor (T) Devr Yahav (D)	C Ben Guton University of the Neosy C Ben Guton University of the Neosy	Physics							
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Hidekazu Tanaka (S)	C Tokyo Institute of Technology C Heimholtz Zentrum Deviden-Rossendorf	Physics							
Manaour Shavecan (S)	Provatility devined is devined in the second s	Prijelis Danate link fantale Pala La sociari (HLD) Danate link fantale Observation Beckola and Corpular Disparsing Danical Corpular Disparsing Danical Corpular Disparsing Danical Corpular Disparsing Danical Corpular Disparsing Danical Corpular Disparsing Danical Corputer Disparsing Danical Corputer Disparsing Danical Corputer Disparsing Danical Disparsing Disparsing Danical Disparsing Disparsing Danical Disparsing Disparsing Danical Disparsing Disparsing Danical Disparsing Dispar	NSF DOE	DMR - Division of Materials Research BES - Basic Energy Sciences	DMR2104771	P20041	Role of layer thickness on enhancement of spin susceptibility of an interacting 2DES	Condensed Matter Physics	2 28
Casey Calhoun (G) Adohut Guota (P)	C Princeton University C Princeton University	Electrical and Computer Engineering Electrical and Computer Engineering	DOE	BES - Basic Energy Sciences	DEF G02-00-EN46841				
Siddharth Kumar Sinch (G) Chia-Tae Tai (G)	C Princeton University C Princeton University	Electrical Engineering Electrical and Computer Engineering							
Pranav Thekke Madathil (G) Chammer Wares (C)	C Princeton University C Discrete University	Electrical Engineering Electrical and Community Engineering							
Henri Alloul (5)	C Princeton University Pi French National Center for Scientific Research	Physics	International Institute on complex Adapts	ative Other		P20046	Interplay between strong correlations and electronic topology in the underlying kagome lattice of Na2/3CoO2	Condensed Matter Physics	1 5.26
Luis Balicas (S)	C National Hich Macnetic Fleid Laboratory C National Hich Macnetic Fleid Laboratory C Kazen Federal University	Condensed Matter Experiment	NUMBER OF THE OWNER						
Brian Casas (P) Inek Mukhamedahin (S)	C National High Megnetic Field Laboratory C Kazan Federal University	Condensed Matter Sciences Institute of Physics. General Physics Department							
Luis Balcas (S) Erian Casas (P) Inte Mukhamedahin (S) Rico Schemmann (P) Venkat Selvamanickam (S)	C Los Aamos Alabaia Calendariov P1 University of Houston	Condensed Matter Essentment Condensed Matter Essentment Institute of Physics. General/Physics Decentment Mithewise Engineering	DOE	SBIR - Small Business Innovation Research	h DE-8C0020717	P20049	Critical current characterization of STARB REBCO wires at 4.2 K and very high magnetic fields	Development of Magnet Technology	1 5.19
	G University of Hyperteen	Terms Canter for Superconductivity							
Nohia Mai (G)	C University of Houston	Mechanical Engineering Molacial Science and Engineering							
Michael Jersen (S)	PI * Ohio University	amana organo Tran Careto Manaronalación Mana Lana esta Caretoria Denina Electrica esta Caretoria Denina Electrica esta Caretoria Denina Electrica de Caretoria Denina esta Caretori Denina esta Caretoria Denina esta Caretoria Denina esta Careto	No other support			P20071	High-Frequency and -Field EPR Spectroscopy of High-Spin, Paeudo-latrahedral Nickel(I)-Phenylchalcogenide Complexes	Biology, Biochemistry, Biophysics	1 7
Andrew Ozarowski (S)	C National High Nacretic Field Laboratory	EMR						1	
Mvkhavio Czerov (S) Javad Shokraivan (G)	C National High Magnetic Field Laboratory C Ohio University	Condensed Matter Science, DC Field CMS Obernistry and Biochemiatry						1	
Joshus Telser (S) Julia Chan (S)	C Rossevel University P1 Bavior University	Biological Physical and Health Sciences Chemistry and Biochemistry	NSF DOE	DMR - Division of Materials Research BES - Basic Energy Sciences	DM%220904 DE-5C0022854	P20085	Characterization of Highly Correlated félictron Systems	Chemistry	2 14
Melisaa Anderson (G) Luis Balcas (S)	C Baylor University C National High Magnetic Field Laboratory	Chemistry and Biochemistry Condensed Matter Experiment	DOE	BES - Basic Energy Sciences	DE-SC022854				1 1
Rvan Baumbach (5) Wilson Brown (G)	C National High Magnetic Field Laboratory C Baylor University	CMS Chemistry and Biochemistry						1	
Alexis Dominicuez (G)	C Baylor University	Chemistry and Biochemistry						1	
Kaya Wei (P)	C National High Magnetic Field Laboratory	CMS		DMR - Division of Materials Research	DMR2213443		Investigation of topological magnetic testures in non-centrosymmetric coldes		
uhetan Dhital (S) Ausuat Meads (U)	C Kennessev State University	Provide Physics	457	uMR - Division of Materials Research	D8962(10463	P20050		Condensed Matter Physics	2 14
prady Wilson (U) Eunilo Chol (S)	Vennessev State University P1 University of Secul	Physics	Korea Research Foundation	Other		P20100	Magneto-optical Spectroscopy of a Nodal-ring semimatal	Condensed Matter Physics	1 21
Jiwon Jeon (G) Hwan Don Kim (G)	C University of Secul C University of Secul	ohvaica Physica	1						
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Brenne Cashman (P) Banait Montol (P)	C University of Texas. Austin C University of Texas. Austin	Chemistry Chemistry	1		-		· · · · · · · · · · · · · · · · · · ·		11
Joshun Telser (S)	C Roosevel University	Chematry Biological Physical and Health Sciences			DE debasses of				
Luis Balcas (5) Brian Casas (P)	P1 nazonal High Magnetic Field Laboratory C National High Magnetic Field Laboratory	Belowise Doubling of Teleformate Conservation	JOE	BES - Basic Energy Sciences	DE-8C0002613	P20119	Understanding the topological spin textures in the magnetic topological semi-metallic candidates Fe3GeTe2 and Fe5GeTe2	Concerned Matter Physics	6 54.13
Shvam Rai Karulithodi (G) Vadvm Kulichenko (S)	C National High Magnetic Field Laboratory C National High Magnetic Field Laboratory	Condensed matter acience Condensed matter acience						1	
Sang-Eon Lee (P) Alex Moon (G)	C National High Magnetic Field Laboratory C National High Magnetic Field Laboratory	Physics Condensed Matter						1	
Lucie Norel (S) Mykławjo Czerov (S)	P1 * Université de Remes 1 C National Hich Macnetic Field Laboratory	BCR Contensed Matter Science, DC Field CMS	Agence National de la Recherche	Other	18-CE07-0041-01	P20122	Multiferctionnal Molecular Magnets based on Lanthanide ions and Functional Ligands	Chemistry	1 6
Kenhav Shreatha (S)	P1 Texas ASM University	Chemistry and Physica Do Elucir (DMR	Welch Foundation	Other	AE-0025	P20127	Electronic properties of topological materials under high pressure	Condensed Matter Physics	1 4
Lawa Graf (S) Thinh Nguyen (G)	C Instantial man watchelic Field Laboratory C West Texas ASM University	Chemistry and Physics	1						
Cole Phillics (U) Subhash Thota (S)	C West Texas AM University P1 * Indan Institute of Technolocy, Guyahati		No other autoort			P20130	Determination of the Magnetic Ground-state of New Frustrated Antiferromagnets	Condensed Matter Physics	1 1.63
Eun Sano Choi (S) Mouli Rov Chowdhurv (G)	C National High Magnetic Field Laboratory C Indian Institute of Technology, Guwahati	Physics Decartment Physics						1	
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Amel Reven (5) Changlang Liu (5)	C National High Megnetic Field Laboratory P1 * State University of New York, Buffalo	Condensed Matter Science Physics	University at Buffalo, College of Arts and	1		P20132	Synthesizing conductive ferroelectric heterointerfaces for tunable charge and apin transport	Condensed Matter Physics	1 7
Manzanet Andersen (U)		Physics	Science					1	
Hui Cao (P) Kevin Euscher (U)	C Anorne National Laboratory C State University of New York, Buffalo	Physica Materiala Science Division Physica Physica	1						
Brodie Lembo (U) Manuel Rushes (K)	C Static lowenite of two Yesk Subia C Anoren Nicolai London's C Bata Lowenite of two Yesk, Subia Static Lowenite of two Yesk, Subia P C Static Lowenite of Lowenite P C Lowenite of Controlling C Lowenite of Controlling C Lowenite of Controlling C Lowenite of Controlling	Physics						1	
Stephen Rowley (S)	Pi University of Cambridge	Provice Conferences Matter Science Caveration Laborator: Desartment of Physics Mit 7-44/PL Desertment of Physics CCNH	Henry Rovce Institute	Other	EPHRODES1X/1	P20134	Unconventional charge, magnetic and superconducting phases of d and f electron metals	Condensed Matter Physics	1 5.4
Jason Lashlev (S) Hui Li (G)	C Los Alamos National Laboratory C University of Cambridge	MST-NHMPL Decartment of Physics	1					1	
Cesar Sónego (G) Pedro Trocado Vianez (P)	C Federal University of ABC C University of Cambridge	CONH Physics							
Malte Grosche (S) Patricia Alireza (S)	P1 University of Cambridge C University of Cambridge	Cavendiah Laboratory Physics	EPSRC of the United Kinodom EPSRC of the UK	Non US Council Non US Council	EP0011992/1	P20136	High-field measurements of heavy electrons at pressure-induced quantum phase transitions	Condensed Matter Physics	4 24.91
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Oliver Squire (G) Stenley Toner (S)	C National High Magnetic Field Laboratory								

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	Condensed Matter Physics 2	Magneto-infrared spectroscopy and quantum oscillations of novel quantum materials 0%	P20238	EFRC - Energy Fontier Research Centers DE-SC001943	Physics Department		Eun Sano Choi (S) C Desitri Bascy (S) PI
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ia Jiana (S) vio Ozerov (S)	PI C	National High Magnetic Field Laboratory	School of Physics Condensed Matter Science. DC Field CMS	DOE	BES - Basic Energy Sciences DE-FG02-07ER46451	P20265	Magneto-Infrared Spectroscopy Study of Emerging Quantum Materials with Layered Structures	Condensed Matter Physics	
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ing Jin (S)	PI	University of South Carolina	Department of Physics and Astronomy	DOE	EPSCoR - Established Program to Stimulate DE-SC0012432 Competitive Research	P20268	Investigation of low-temperature transport properties in quasi-one-dimensional conductor LIDSMc6O17	Condensed Matter Physics	
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d Kalmer (S) d Kalmer (S)	PI C	Max Planck Institute for Solid State Research. Stuticart University of Cambridge	Solid State Spectroscopy Department of Physics	European Research Council (ERC)	Non US Council	P20277	Electrical transport study of rare earth cuprate superconductors	Condensed Matter Physics	1
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Sird (S) to Boscue (S)	c	National High Magnetic Field Laboratory National High Magnetic Field Laboratory	MS&T MS&T ASCIMET						
Geef (S)	c	National High Magnetic Field Laboratory National High Magnetic Field Laboratory	DC Field / CMS						
rin Kim (0) fandrus (S)	PI	University of Tennessee, Knoxville	Applied Superconductivity Center Materials Science and Engineering	Gordon and Belly Moore Foundation	Other GBM/5009	P20286	Pressure study of LuMSn6 and (Sc,Lu/WSn6	Biology, Biochemistry, Biophysics	-
Graf (S) Mozaffari (P)	c	National Hich Manarite Field Laboratory University of Termessee, Knowlin Harvard University	DC Field / CMS Materials Science and Engineering Chemistry and Chemical Biology						
Mozaffari (P) n Xu (S) n Gao (G)	PI *	Harvard University Harvard University	Chemistry and Chemical Biology Chemistry and Chemical Biology	DOE	BES - Basic Energy Sciences DE-AC0207CH11358	P20287	Pressure tuning of the intrinsic magnetic topological insulator family MnBiTe	Biology, Biochemiatry, Biophysica	
Huano (G) iu (G)	c c	Harvard University Harvard University	Chemistry and chemical biology Physics						
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	C PI	National High Magnetic Field Laboratory McGil University	National High Magnetic Field Laboratory Physics department	naerc	Öther	P20369	Ultra high mobility biamuth and GaAe 2DE Ga	Biology, Biochemistry, Biophysics	
ic Bolvin (G) m Schonek (S)	c	McGil University McGil University	Physics Electrical and Computer Engineering						
Yu (G)	č	McGil University University of Marvland. College Park	Phraica Center for Nancohveics and Advanced Materials. Decentment of Phraics DC Field (Charles and Advanced Materials. Decentment of Phraics DC Wild (Phraica		BES – Basic Enerov Sciences DESC0019154		High-field superconducting phase in UTe2 probed by point-contact spectroscopy	Condensed Matter Physics	
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	c	University of Marvland, College Park University of Marvland, College Park	OMC. Physics Physics						
Sokratov (G) Yoon (P) a Ahn (S)	c	University of Maryland, College Park University of Maryland, College Park	Physics Department of Physics						
a Ahn (S) (n (P)	PI *	Yale University Yale University		DOE	BES – Basic Energy Sciences DE-SC0019211	P20381	High field magneto-transport study of Nd1-dEutNO2 thin films	Condensed Matter Physics	
Au (P) ick Walker (S)	c	Yale University Yale University	Apolied Physics Applied Physics Apolied Physics						
ena Wei (G) Pronin (S)	P1 *	University of Stutgart	Mathematics and Physics	No other support		P20369	Probing the low-energy electron dynamics in chiral quantum materials by magneto-optical spectroscopy	Condensed Matter Physics	-
vio Ozerov (5)	c	National Hish Megnetic Field Laboratory	Condensed Matter Science, DC Field CMS						
Ving (Jeanie) Lau (S) alcas (S)	PI C	Ohio State University National Hich Macrietic Field Laboratory	Department of Physics and Astronomy Condensed Matter Experiment	NSP	DMR - Division of Materials Research DMR1922076	P20390	Symmetry-broken Phases and Phase Transitions in Layered Quantum Materials	Condensed Matter Physics	1
alcas (S) Smirnov (S) Wang (G) Zhano (G)	c	National Hish Macrolle Field Laboratory Ohio State University	Condensed Matter Exercisions Instrumentation & Counsilons Physica					1	1
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	PI	National High Magnatic Field Laboratory	CMS Acciled Superconductivity Center	NSF	DMR - Division of Materials Research DMR2128555	P20394	Critical Current in REBCO Superconducting Tapes Assessed by Torque	Development of Magnet Technology	
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Inadiord (O) In Lee (G)	с	Florida State University					Pressure and site in tuning of correlated states and superconductivity in graphitic flat bands	Condensed Matter Physics	
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(O) Yankowitz (S)	C C PI	University of Washington	Physics Physics	NSF	MRSEC - Materials Research Science and DMR-2308079 Endineering Centers	P20305	Pressure and strain tuning or correlated states and superconductivity in graphic has darked	Condensed Marser Physics	
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Dariel Mindola (S) PI University of Pernsylvania Chemistry NSF CHE - Chemistry CHE 0848248 P20072 Applying High-Frequency and -Field EPR Spectroscopy of High-Spin First Row Transition Metal Chemistry	
Jacob Mohar (G) C University of Pennsylvania Chemistry	
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John Teer (S) C Rosenet University Biological Physical and Headin Sciences P P P John Teer (S) PI Californa Static University Description EES = Basic Energy Sciences DE-SCO017722 Pagorary Instigation of Magnetic Properties of Quantum Sign to Candidates using High Field SPR Contrast Mathematical Sciences DE-SCO017722 Pagorary Instigation of Magnetic Properties of Quantum Sign to Candidates using High Field SPR Contrast Mathematical Sciences DE-SCO017722 Pagorary Instigation of Magnetic Properties of Quantum Sign to Candidates using High Field SPR Contrast Mathematical Sciences DE-SCO017722 Pagorary Instigation of Magnetic Properties of Quantum Sign to Candidates using High Field SPR Contrast Mathematical Sciences DE-SCO017722 Pagorary Instigation of Magnetic Properties of Quantum Sign to Candidates using High Field SPR Contrast Mathematical Sciences DE-SCO01772 Pagorary Instigation of Magnetic Properties of Quantum Sign to Candidates Using High Field SPR Contrast Mathematical Sciences De-Sciences	
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	Participants (Name, Role, Org., Dept.)			Funding Sources (Funding Agency, Division, Award #)		Proposal #	Proposal Title	Discipline	Exp.#	Days Used
George Christou (S) F Ferdous Ara (P) 0	PI University of Florida C National High Magnetic Field Laboratory	Chemistry NHMFL	DOE	BES - Basic Energy Sciences	DE-SC0019330	P20172	EPR Investigation of 3d Transition Metal Complexes as Molecular Qubits	Chemistry	5	i 35.5
ChristiAnna Brantley (P) (ChristiAnna Brantley (P) (ChristiAnna Brantley (Christian Christian (Christian Christian (Christian Christian (Christian Christian (Christian (Christi	C University of Florida C Elocida State University	Chemistry Physics								
Alexander Diodati (G) C Ethan Fisher (G) C	C University of Florida	Physics Chemistry Chemistry								
Ethan Fisher (G) Manoj Vinayaka Hanabe Subramanya	C University of Florida C Florida State University	Chemistry Physics								
(G) Stephen Hill (S) Tomas Orlando (S)	C National High Magnetic Field Laboratory C National High Magnetic Field Laboratory	EMB								
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Robert Stewart (G) (William Evans (S) F Lauren Anderson-Sanchez (G) (PI University of California, Irvine C University of California, Irvine	Department of Chemistry Department of Chemistry	No other support DOE	BES - Basic Energy Sciences	DE-SC00012738	P20194	Investigation of clock transitions in lanthanide-based molecular qubits	Chemistry	3	s 13
Manoj Vinayaka Hanabe Subramanya	C Florida State University	Physics	DOE	BE3 - Basic Energy aciences	DE-300012738					
(G) Stephen Hill (S) Jakub Hruby (P)	C National High Magnetic Field Laboratory C National High Magnetic Field Laboratory	EMR								
Krishnendu Kundu (P) 0	C National High Magnetic Field Laboratory	EMR								
Joshua Queen (P) 0 Danna Freedman (S) F	C University of California. Irvine PI Northwestern University	Department of Chemistry Chemistry	DOE	BES - Basic Energy Sciences	DE-SC0019356	P20197	Developing the next generation of optically addressable molecular qubits	Chemistry	4	4 16
Rianna Greer (G) Control Stephen Hill (S) Control Cont	C Massachusetts Institute of Technology C National High Magnetic Field Laboratory	Chemistry EMR				. 20137				
Dane Johnson (G)	C Massachusetts Institute of Technology	Chemistry								
Jurek Krzvstek (S) Andrew Ozarowski (S)	C National High Magnetic Field Laboratory C National High Magnetic Field Laboratory	Condensed Matter Science EMR								
Johan van Tol (S) Agnes Yi (G)	C National High Magnetic Field Laboratory C Massachusetts Institute of Technology	EMR chemistry								
Aaron Sadow (S) F	PI * Iowa State University C Ameril aboratory	Chemistry Physics and Astronomy	DOE	BES – Basic Energy Sciences	DE-AC02-07CH11358	P20206	EPR spectroscopy of gadolinium homoleptic organometallics	Chemistry	1	. 2
Thierry Dubroca (S) Aaron Rossini (S)	C National High Magnetic Field Laboratory C Iowa State University	EMR Chemistry								
	C National High Magnetic Field Laboratory	EMR	National and Kanodistrain University of Athens	Non US College and University					_	
Andreas Danopoulos (S) F Jurek Krzystek (S) 0	PI * National and Kapodistrian University of Athens C National High Magnetic Field Laboratory	Condensed Matter Science	National and Kapodistrain University of Athens	Non US College and University		P20208	Zero-field splitting in mononuclear 3-coordinate S = 2 Cr(II) and oligonuclear lower exidation state chromium complexes, probed by HFEPR	Chemistry	1	4
Panayotis Kyritsis (S) (C Selvan Demir (S) F Fibrian Benner (G) (C	C National and Kapodistrian University of Athens PI * Michigan State University C Michigan State University	Chemistry Department of Chemistry	No other support			P20218	Magnetic Properties of Radical-Bridged Lanthanide Complexes	Chemistry	3	3 15
Florian Benner (G) G Saroshan Deshapriya (G) G	C Michigan State University C Michigan State University	Department of Chemistry Department of Chemistry Chemistry								
Manoj Vinayaka Hanabe Subramanya (G)	C Florida State University	Physics								
Stephen Hill (S) Jakub Hruby (P)	C National High Magnetic Field Laboratory	EMR								
Lloyd Lumata (S)	C National High Magnetic Field Laboratory PI University of Texas, Dallas	Physics	DOD	CDMRP - Congressionally Directed Medical Research	HT9425-23-1-0062	P20245	EPR and Hyperpolarization studies of Potential DNP Polarizing Agents TEMPO-loaded Q-beta and TMV Viral Shells	Biology, Biochemistry, Biophysics	3	3 9
Thierry Dubroca (S)	C National High Magnetic Field Laboratory	EMR		Programs			and TMV Viral Shells			
Tomas Orlando (S) 0 Johan van Tol (S) 0 Liviu Mirica (S) F	C National High Magnetic Field Laboratory C National High Magnetic Field Laboratory	Electron Magnetic Resonance EMR								
Liviu Mirica (S) Bailey Bouley (G)	PI * University of Illinois at Urbana-Champaign C University of Illinois at Urbana-Champaign	Chemistry Chemistry	NSF	CHE - Chemistry	CHE2155160	P20248	High-Frequency and High-Field Electron Magnetic Resonance Investigation of Square-Planar Ni(II) Complexes Exhibiting Paramagnetism	Chemistry	1	. 5
lu Russen Chae (G)	C University of Illinois at Urbana, Champaign	Chemistry								
Sagnik Chakrabarti (G) Jurek Krzystek (S)	C University of Illinois at Urbana-Champaign C National High Magnetic Field Laboratory	Chemistry Condensed Matter Science Condensed Matter Science, DC Field CMS								
Mykhaylo Ozerov (S) O Joshua Telser (S) O	C National High Magnetic Field Laboratory C Roosevelt University	Condensed Matter Science, DC Field CMS Biological, Physical and Health Sciences								
Joshua Telser (S) (C Linda Doerrer (S) F Jessica Elinburg (G) (C	PI Boston University C Boston University	Chemistry Department Chemistry	NSF	CHE - Chemistry	CHE1800313	P20278	Dimeric {MnIII2(12-CO3)} Compound, Mixed-valent {Mn6} Cluster and Related MnIV Species	Chemistry	2	13.5
Shawn Moore (G) Andrew Ozarowski (S)	C Boston University C National High Magnetic Field Laboratory	Chemistry								
Léa Toubiana (G) G Mary Ellen Zvanut (S) F	C Boston University PI University of Alabama, Birmingham	Department of Chemistry	No other support			P20280	Field Dependence of Electron Spin Lattice Relaxation in Spin Qubit Candidates	Condensed Matter Physics	_	1 22.5
Johan van Tol (S)	C National High Magnetic Field Laboratory	EMR C.PCS: PHYSICAL CHEM & APPLIED SPECTROSCOPY		1000 1 1 0 1040	05.11	P20280		Condensed Maller Physics		22.5
Korey Carter (S)	C University of Iowa	Chemistry	DOE	LDRD - Laboratory Directed R&D LDRD - Laboratory Directed R&D	DE-NA - DE	P20288	Electron Paramagnetic Resonance Investigations of Magneto-Structural Correlations in isoelectronic Lanthanide/Actinide Coordination Complexes	Chemistry	3	21
Thaige Gompa (G) (G) Stephen Hill (S) (G) Benjamin Stein (S) (G)	C Georgia Institute of Technology C National High Magnetic Field Laboratory	School of Chemistry and Biochemistry EMR								
Benjamin Stein (S) Nikki Wolford (P)	C Los Alamos National Laboratory C Los Alamos National Laboratory	C-PCS: PHYSICAL CHEM & APPLIED SPECTROSCOPY Chemistry								
Dmytro Nesterov (P) F Andrew Ozarowski (S) 0	PI Technical University of Lisbon C National High Magnetic Field Laboratory	Chemistry Department	The Foundation for Science and Technology (Portugal)	Non US Foundation		P20294	High-Field EPR Spectroscopy of Polynuclear Transition Metal Complexes	Chemistry	2	2 14
Kiril Kovnir (S) Yao Abusa (G)	PI Iowa State University C Iowa State University	Chemistry Chemistry	NSF	DMR - Division of Materials Research	DMR2003783	P20296	EPR investigation of the metastable 3d transition metal layered compounds	Chemistry	2	2 6
Andrew Ozarowski (S) C Andrew Ozarowski (S) C Andrej Zorko (S) F	C National High Magnetic Field Laboratory	EMR Solid State Physics Department				P20297				
Andrej Zorko (S) F Johan van Tol (S) (C) Thierry Dubroca (S) F	PI Jozef Stefan Institute C National High Magnetic Field Laboratory PI * National High Magnetic Field Laboratory	Solid State Physics Department EMR	Slovenian Research Agency	Other	J1-2461, BI-US/22-24-065	1 20231	ESR Investigation of Spin-Liquid candidates from the Rare-Earth Heptatantalate Family	Condensed Matter Physics	2	24
Thierry Dubroca (S) F Brittany Grimm (G) C	PI * National High Magnetic Field Laboratory C Florida State University	EMR Physics	No other support NSF	DMR - Division of Materials Research	DMR2128556	P20301	Hardware development, upgrades and maintenance of Electron Magnetic Resonance spectrometers	Engineering	7	7 122.5
Manoj Vinayaka Hanabe Subramanya (C Florida State University	Physics	NSF	DMR - Division of Materials Research	DMR1644779					
Stephen Hil (S) 0 Jurek Krzystek (S) 0 Tomas Orlando (S) 0	C National High Magnetic Field Laboratory	EMR Condensed Matter Science								
Tomas Orlando (S)	C National High Magnetic Field Laboratory C National High Magnetic Field Laboratory	Electron Magnetic Resonance								
Andrew Ozarowski (S) Bianca Troclewitz (T)	C National High Magnetic Field Laboratory C National High Magnetic Field Laboratory	EMR								
Johan van Tol (S) C Emre Erdem (S) F	C National High Magnetic Field Laboratory PI * Sabanci University	EMR Materials Science and Nano Engineering	Sabanci University	Other		P20302	High-field EPR investigations of metal ion doped metal oxide nanomaterials	Material Science	1	1 12
Andrew Ozarowski (S)	C National High Magnetic Field Laboratory PI * University of Parcelona	EMR Chemistry	No other support			P20305	Phase-Memory Time of Large Area Arrays of Qubits	Material Science	5	5 20
Carolina Sanudo (S) F Guillem Gabarró-Riera (G) C	PI * University of Barcelona C University of Barcelona	Inorganic and Organic Chemistry department. Inorganic Chemistry Section.				. 20505	r maximum y mino o cango pros pringa o quara		5	20
Manoj Vinayaka Hanabe Subramanya	C Florida State University	Physics								
(G) Stephen Hill (S)	C National High Magnetic Field Laboratory	EMR								
Jakub Hruby (P) C P. Hammel (S) F	C National High Magnetic Field Laboratory PI * Ohio State University	EMR Physics	No other support			P20308	High Frequency Electron Magnetic Resonance of Two-Dimensional van der Waals Magnets	Condensed Matter Physics	1	1 5
P. Hammel (S) F Inhee Lee (P) (C) Johan van Tol (S) (C)	PI * Ohio State University C Ohio State University C National High Magnetic Field Laboratory	Physics EMR								
Raphaēle Clément (S) F	PI * University of California, Santa Barbara	Materials	Office of Naval Research	Other	N00014-23-1-2333	P20312	High-frequency EPR investigation of condensed paramagnetic materials for Li- and Na-ion	Material Science	1	1 4
Euan Bassey (P)	C University of California, Santa Barbara	Materials Research Laboratory		DMR - Division of Materials Research	DMR1905757		Datienes			
Geoffrev Strouse (S) F Catherine Fabiano (G) G	PI National High Magnetic Field Laboratory C Florida State University	Chemistry	NSF	DMR - Division of Materials Research	DMR1905757	P20318	Multinuclear solid-state NMR investigation of plasmonic andphotoluminsecent nanocrystals	Chemistry	3	22
Raul Ortega (G) (G)	C Florida State University C Florida State University	Chemistry & Biochemistry Chemistry and Biochemistry								
Dianna Pledger (U) C Robert Schurko (S) C	C Florida State University C Florida State University	Chemistry and Biochemistry Chemistry								
Robert Smith (G) (C)	C National High Magnetic Field Laboratory									
Robert Smith (G) C Subeon Lee (P) F Jun Sung Kim (S) C	C Florida State University PI * IBS Center for Artificial Low Dimensional Electronic Systems	Chemistry and Biochemistry Center for Artificial Low Dimensional Electronic Systems	Institue for Basic Science. Republic of Korea	Other Other		P20330	ESR study of the nodal-line semiconductor Mn3Si2Te6	Condensed Matter Physics	2	2 18.17
Wonjun Lee (S)	C Pohang University of Science and Technology C IBS Center for Artificial Low Dimensional Electronic Systems	Physics Center for Artifical Low Dimensional Electronic Systems	Institute for Basic Science, Republic of Korea	Other						
Choongjae Won (P) C Hannah Shafaat (S) F	C Pohang University of Science and Technology PI Ohio State University	Physics Chemistry and Biochemistry	DOE	BES – Basic Energy Sciences	SC0023137	P20333	Advanced EPR investigations of a nickel-iron-sulfide cluster in a ferredoxin protein as a model for [NIFe] carbon monoxide dehydrogenase	Biology, Biochemistry, Biophysics	1	1 5
Luke Lewis (G)	C Obio State University	Chemistry and Biochemistry Chemistry and Biochemistry	NIH	NIGMS - National Institute of General Medical Sciences	GM128852					1 1
Van Li (P) G Jiasong Li (S) F Thierry Dubroca (S) G	C University of California, Los Angeles PI * University of Texas, San Antonio C National High Magnetic Field Laboratory	Chemistry and Boonemistry Chemistry EMR	NIH	NIGMS - National Institute of General Medical Sciences CHE - Chemistry	GM108988 CHE2204225	P20342	High frequency high-resolution EPR studies of the crosslinked cofactor radical intermediate in bifunctional enzyme KatG from Mycobacterium tuberculosis	Biology, Biochemistry, Biophysics	2	2 7
	C National High Magnetic Field Laboratory	Condensed Matter Science		Gradie Chemistry	G ==== 20+220		unservationer unschlift Parto Holli Mycobacter Idli (UDBPCUDSIS			
Aimin Liu (S) C Grace Morgan (S) F	C University of Texas. San Antonio PI University College Dublin	Chemistry School of Chemistry and Chemical Biology	No other support			P20360	High Field EPR Analysis of Redox and Spin State in Spin Crossover Complexes	Chemistry	3	3 24
Francesca Adami (G) (C) Emmelvne Cuza (P) (C)	C University College Dublin C University College Dublin	School of Chemistry Chemistry	NSF	DMR - Division of Materials Research	DMR1644779					
		Physics	1			1		1		
Brittany Grimm (G)	C Florida State University	ENO.								
Stephen Hill (S)	C National High Magnetic Field Laboratory National High Magnetic Field Laboratory	EMR Condensed Matter Science								
Stephen Hill (S) 0	C National High Magnetic Field Laboratory	EMR								

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	Participants (Name, Role, Org., Dept.)			Funding Sources (Funding Agency, Division, Award #)		Proposal #	Proposal Title	Discipline	Exp.	# Days
Thierry Dubroca (S)	PI * National High Magnetic Field Laboratory	EMB	No other support	(P20379	Performance improvement of high-resolution THz EPR spectrometer based on the series-	Development of Magnet Technology		1 2
Stephen Hill (S)	C National High Magnetic Field Laboratory	EMR					connected hybrid			
Jurek Krzystek (S)	C National High Magnetic Field Laboratory	Condensed Matter Science								
Tomas Orlando (S)	C National High Magnetic Field Laboratory	Electron Magnetic Resonance								
Bianca Trociewitz (T)	C National High Magnetic Field Laboratory	EMR							_	
Henry La Pierre (S)	PI Georgia Institute of Technology	School of Chemistry and Biochemistry	DOE	BES – Basic Energy Sciences	DE-SC0023455	P20424	Measuring and Tuning the Effects of Crystal Field and Vibrational Degrees of Freedom on the Static and Dynamic Properties of Lanthanide and Actinide Molecular Nanomagnets	Chemistry		1
Maximilian Bernbeck (P)	C Georgia Institute of Technology	Chemistry								
Andrew Ozarowski (S)	C National High Magnetic Field Laboratory	EMR								
Grant Wilkinson (G)	C Georgia Institute of Technology	School of Chemistry							_	
Tomas Orlando (S)	PI * National High Magnetic Field Laboratory	Electron Magnetic Resonance	No other support			P20433	Characterization of EPR properties of organic radicals in liquids at high frequencies	Chemistry		3 1
Huyen Bui (U)	C Florida State University	EMR								
Thierry Dubroca (S)	C National High Magnetic Field Laboratory	EMR								
Lucio Frydman (S)	C National High Magnetic Field Laboratory	NMR								
Angeliki Giannouli (S)	C Weizmann Institute of Science	Chemical and biological physics								
Stephen Hill (S)	C National High Magnetic Field Laboratory	EMR								
Johan van Tol (S)	C National High Magnetic Field Laboratory	EMR								
Sungsool Wi (S)	C National High Magnetic Field Laboratory								_	_
Hui Xiong (S)	PI * Boise State University	Materials Science and Engineering	DOE	ASCR - Advanced Scientific Computing Research	DE-SC0019121	P20451	Understanding the synergy of anion and transition metal redox in in P2-type cathodes for	Material Science		1
Dewen Hou (P) Yan Yan Hu (S)	C Boise State University	Department of Materials Science and Engineering					sodium-ion batteries using EPR spectroscopy.			
	C Florida State University	Chemistry & Biochemistry								
Ifeoluwa Oyekunle (G)	C Florida State University C Florida State University	Chemistry Chemistry and Biochemistry								
Erica Truong (G) Claudia Avalos (S)	PI * New York University			US College and University			Optically induced spin polarization in strongly-coupled chromophore-radical systems studied via		_	-
Martin Kirk (S)	C University of New Mexico	Chemistry Department of Chemistry	New York University	US College and University			Optically induced spin polarization in strongly-coupled chromophore-radical systems studied via transient electron magnetic resonance	Chemistry		2
Olivier Ouari (S)	C University of New Mexico	Institute of Free Radical Chemistry					calisient electron magnetic resonance			
David Shultz (S)	C Alx-Marselle University C North Carolina State University	Institute of Free Radical Criemistry Chemistry								
Johan van Tol (S)	C Norm Carolina State University C National High Magnetic Field Laboratory	Chemistry								
Stergios Pillokos (S)	PI University of Copenhagen	EMR Department of Chemistry	Forskningsraadet for Teknologi og Produktion			P20488	EPR study of heterodinuclear lanthanoid cryptate	Chemistry	+-	-
Julie Lerche (G)	C University of Copenhagen	Department of Chemistry Department of Chemistry	Porskingsraades for Texiblogi og Produktion			F20488	Erre stopy of neterodinucear annianolo crypate	Crembuy		-
Mariya Zhuravleva (S)	PI * University of Copenhaden	Materials Science and Engineering	NSE	DMR - Division of Materials Research	DMR1846935	P20554	Investigation of paramagnetic centers and their contribution to scintillation mechanism in cutting-	Material Science	+-	1
Tomas Orlando (S)	C National High Magnetic Field Laboratory	Electron Magnetic Resonance	1994	Drink - Drivaton or mananima Research	Dimitroffoada		edoe scintilators	The second		1
Yauhen Tratsiak (P)	C University of Tennessee, Knoxville	Scintilation Materials Research Center					endle actualment a			
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		Participants			Funding Sources	A	Proposal #	Proposal Title	Discipline	Exp. #	Days
	-	(Name, Role, Org., Dept.)	-		(Funding Agency, Division,			•			Used
Collin Broholm (S)	ΡI	Johns Hopkins University	Physics and Astronomy	DOE	BES – Basic Energy Sciences	DE-SC0019331	P19504	NaBaYb(BO3)2, spin liquid candidate with	Condensed Matter Physics	1	18
Rasul Gazizulin (S)	С	University of Florida	Physics					triangular lattice			
Alireza Ghasemi (G)	С	Johns Hopkins University	Physics and Astronomy								
Chao Huan (P)	С	University of Florida	Physics								
Gregory Labbe (O)	С	University of Florida	Physics								
Chris Ollmann (T)	С	University of Florida	High B/T								
Lucia Steinke (S)	ΡI	Maybell Quantum Industries	N/A	NSF	Other	R000002799	P19653	Probing exotic quasiparticles in calorimetric and	Condensed Matter Physics	1	10
Alexander Donald (G)	С	University of Florida	Physics					thermal transport experiments at ultra-low			
Nicolas Silva (P)	С	University of Florida	High B/T					temperatures			
Long Ju (S)	ΡI	Massachusetts Institute of Technology	Physics	NSF	DMR - Division of Materials Research	DMR1231319	P19811	Study of Electron Correlation in 2D Moire	Condensed Matter Physics	1	23
Rasul Gazizulin (S)	С	University of Florida	Physics					Superlattices			
Tianyi Han (P)	С	Massachusetts Institute of Technology	Physics								
Tonghang Han (G)	С	Massachusetts Institute of Technology	Physics								
Gregory Labbe (O)	С	University of Florida	Physics								
Zhengguang Lu (P)	С	Massachusetts Institute of Technology	Physics								
Mark Meisel (S)	С	University of Florida	Department of Physics								
Chris Ollmann (T)	С	University of Florida	High B/T								
Lucia Steinke (S)	С	Maybell Quantum Industries	N/A								
lan Fisher (S)	PI *	Stanford University	Applied Physics	DOD	US Air Force	FA9550-20-1-0252	P20371	Measurement of the Low Temperature Phase	Condensed Matter Physics	1	15
Jake Bourdage (O)	С	University of Florida	Physics					Boundary of Ferroquadrupolar Insulator TmVO4			
Chris Ollmann (T)	С	University of Florida	High B/T								
Nicolas Silva (P)	С	University of Florida	High B/T								
Linda Ye (G)	С	Massachusetts Institute of Technology	Physics								
Mark Zic (G)	С	Stanford University	Physics								
Dominique Laroche (S)	PI	University of Florida	Physics	UCGF	P		P20507	Coulomb drag of spin-polarized Luttinger liquids	Biology, Biochemistry, Biophysics	2	22
Rasul Gazizulin (S)	С	University of Florida	Physics					at ultra-lowtemperatures - continuation of NHMFL			
Chao Huan (P)	С	University of Florida	Physics					UCGP due to pandemic			
Gregory Labbe (O)	c	University of Florida	Physics								
Chris Ollmann (T)	c	University of Florida	High B/T								
Nicolas Silva (P)	С	University of Florida	High B/T	1							
Lucia Steinke (S)	c	Maybell Quantum Industries	N/A	1							
Mingyang Zheng (G)	č	University of Florida	Physics Department	1							
	.~							Total Proposals:	Fx	periments:	Days
								rotal Proposals:		po. iniciito.	90

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	_	Participants (Name, Role, Org., Dept.)			Funding Sources (Funding Agency, Division, Award #)		Proposal #	Proposal Title	Discipline	Exp. # Day Use
Thomas Borch (S)	PI	Colorado State University	Soil and Crop Science	DOE	Other	SC0021349	P19338	Forest fire-impacted soil organic matter chemistry	Chemistry	1 Use
William Bahureksa (G)	С	Colorado State University	Chemistry	DOE	Other	DE-SC0020205		,		1 1
Martha Chacon (S)	С	National High Magnetic Field Laboratory	Ion Cyclotron Resonance	USDA - Department of Agriculture		AFRI 2021-67019034608				
Timothy Fegel (S) Jim Ippolito (S)	c	USDA Forest Service Colorado State University	Rocky Mountain Research Station Soil and Crop Sciences	USDA - Department of Agriculture NSF	CBET - Chemical, Bioengineering, Environmental, and	COL00292D/1020695 CBET1512670	1			
	Ĭ				Transport Systems		1			
Eugene Kelly (S)	С	Colorado State University Colorado State University	College of Agricultural Sciences	USDA - Department of Agriculture	250 DILL (5 1	AFRI2021-67019-33726 DEB2114868	1			
Merritt Logan (G) Amy McKenna (S)	c	Colorado State University National High Magnetic Field Laboratory	Chemistry	NSF United States-Israel Binational Science Foundation	DEB - Division of Environmental Biology Other	DEB2114868 2018130				
,	C			United States-Israel Binational Science Poundation	Other	2018130				
Frederic Mentink (S)	с	National High Magnetic Field Laboratory	CIMAR							
Amelia Nelson (G)	C	Colorado State University	Soil and Crop Sciences							
Charles Rhoades (S) Holly Roth (G)	C	U.S. Department of Agriculture Colorado State University	Rocky Mountain Research Station Chemistry							
Myrna Simpson (S)	c	University of Toronto (Toronto)	Environmental NMR Centre and Department of Physical &							
	-		Environmental Sciences							
Nivetha Srikanthan (S)	С	University of Toronto (Toronto)	Environmental NMR Centre and Department of Physical & Environmental Sciences							
Jacob VanderRoest (G)	c	Colorado State University	Environmental Sciences Chemistry							
Mike Wilkins (S)	c	Colorado State University	College of Agricultural Sciences							
Robert Young (S)	С	New Mexico State University, Main Campus	Chemical Analysis & Instrumentation Laboratory							
Ryan Rodgers (S)	PI	National High Magnetic Field Laboratory	ICR	NSF	GRFP - Graduate Research Fellowship Program	GRFP174530_	P19464	Understanding of Emulsion Formation from Photo- Oxidized Crude Oils	Chemistry	1
Danielle Freeman (G)	c	Woods Hole Oceanographic Institution	Marine Chemistry & Geochemistry	Fisheries and Oceans Canada Multi-Partner Research		1.06		Oxidized Crude Oils		
	0	roods note occardigraphic institution	manne onemany a ocoaremany	Initiative		1.00				
Deborah French-McKay (S)	С	Unknown	Chemistry				1			
Joseph Frye (G) Krista Longnecker (S)	C	National High Magnetic Field Laboratory Woods Hole Oceanographic Institution	CIMAR Marine Chemistry & Geochemistry				1			
Krista Longnecker (S) Alan Marshall (S)	c	Woods Hole Oceanographic Institution National High Magnetic Field Laboratory	Marine Chemistry & Geochemistry ICR				1			
Sydney Niles (G)	č	National High Magnetic Field Laboratory	Chemistry				1			
Chris Reddy (S)	с	Woods Hole Oceanographic Institution	Geochemistry	1			1			
Collin Ward (S)	С	Woods Hole Oceanographic Institution	Department of Marine Chemistry and Geochemistry,				1			
Alexander Annaia (2)	01	Analysis I belowed to	Environmental Science	European Research Commission	Other	856416		Chaint him share combined	Dislam: Disabarrista: Di	
Alexandre Anesio (S) Runa Antony (P)	C PI	Aarhus University Helmholtz Zentrum-Potsdam	Environmental Science Interface Geochemistry	European Research Commission Danish Ministry of Higher Education and Science	Other Non US Ministry	856416 9096-00101B	P19510	Glacial biomarkers: searching for source-specific glacial algae proxies	Biology, Biochemistry, Biophysics	1
	Ŭ.		Internate Geochichillibili y	Sanon wassey of higher coocation and SGENDE	Not do meably	5000-00 (01D	1			
Liane Benning (S)	С	Helmholtz Zentrum-Potsdam	Geochemistry				1			
Eva Doting (P)	С	University of Pennsylvania	Earth and Environmental Science				1			
Anne Kellerman (P)	C	Florida State University	Earth, Ocean and Atmospheric Science							
Amy McKenna (S) Pamela Rossel (P)	C	National High Magnetic Field Laboratory Helmholtz Zentrum-Potsdam	ICR Section 3.5 Interface Geochemistry							
Robert Spencer (S)	c	Florida State University	Farth Ocean & Atmospheric Science							
Ian Stevens (P)	c	Aarhus University	Department of Environmental Science							
Martyn Tranter (S)	с	Aarhus University	Department of Environmental Science							
Rene Boiteau (S)	PI	University of Minnesota, Twin Cities	Chemistry	UCGP			P19547	Deciphering the sources of trace element binding organic	Chemistry	4 10
Lydia Babcock-Adams (P)	С	National High Magnetic Field Laboratory	CIMAR, ICR	NSF	OCE - Ocean Sciences	OCE1829761		ligands in coastal sediments.		
Peter Chace (G) Nicole Coffey (G)	C	Oregon State University University of Delaware	College of Earth, Ocean and Atmospheric Science School of Marine Science and Policy							
Christian Dewey (P)	c	Oregon State University	CEOAS							
Ilana Farrell (G)	č	Oregon State University	College of Earth. Ocean. Atmospheric Sciences							
Angela Knapp (S)	с	Florida State University	Earth, Ocean and Atmospheric Sciences				1			
Amy McKenna (S)	С	National High Magnetic Field Laboratory	ICR				1			
Zeljka Popovic (G)	С	Florida State University	Ion Cyclotron Resonance				1			
Clare Reimers (S) Chad Weisbrod (S)	c	Oregon State University National High Magnetic Field Laboratory	College Earth, Ocean and Atmospheric Sciences				1			
Michael Senko (S)	PI	Thermo Fisher Scientific	R&D	No other support			P19548	Analytical Method Development for FT-ICR MS	Chemistry	2 769
Lissa Anderson (S)	С	National High Magnetic Field Laboratory	ICR							
Greg Blakney (S)	С	National High Magnetic Field Laboratory	ICR							
Jesse Canterbury (T)	С	Thermo Fisher Scientific	LSMS R&D							
Amy McKenna (S)	c	National High Magnetic Field Laboratory	ICR							
Chad Weisbrod (S) Brett Poulin (S)	PI	National High Magnetic Field Laboratory University of California, Davis	Environmental Toxicology	NSE	CAREER - Faculty Early Career Development Program	1945388	P19575	Tracing agricultural sulfur inputs to the environment using	Chemistry	1 1
			57					advanced dissolved organic sulfur characterization		
Thomas Borch (S)	С	Colorado State University	Soil and Crop Science	NSF	EAR - Earth Sciences	EAR1629698				
Todd Dawson (S)	С	University of California, Berkeley	Department of Integrative Biology	University of Colorado Boulder Center for Water, Earth	US College and University					
Anna Hermes (G)	c	University of Colorado. Boulder	Institute of Arctic and Alpine Research	Science and Technology University of Colorado Center for Water, Earth Science,	US College and University		1			
	ĭ		Contraction and reprice (Vestalion)	and Technology George R. Aiken Endowed Memorial			1			
				Research Fellowship			1			
							1			
Eve-Lyn Hinckley (S)	C .	University of Colorado, Boulder	Cooperative Institute for Research in Environmental Sciences				1			
Merritt Logan (G)	с	Colorado State University	Chemistry				1			
Amy McKenna (S)	c	National High Magnetic Field Laboratory	ICR				1			
Boswell Wing (S)	с	University of Colorado, Boulder	Department of Geological Sciences				<u> </u>			
Ryan Rodgers (S)	PI	National High Magnetic Field Laboratory	ICR	Graduate School for Research XL-Chem		ANR-18EURE-0020	P19648	Biofuels derived from Algae and Wood / Plastic Pyrolysis	Chemistry	1
Carlos Afonso (S) Brice Bouyssiere (S)	C	Normandy University University of Pau and the Adour Region	Chemistry	University of Rouen Normandy Labex SynOrg		ERDF, HN0001343 ANR-11- LABX-	1			
Brice Bouyssiere (S) Martha Chacon (S)	c	University of Pau and the Adour Region National High Magnetic Field Laboratory	IPREM Ion Cvclotron Resonance	Labex SynOrg Carnot Institute I2C		ADD: 11- LADA-	1			
David Dayton (T)	č	Research Triangle Institute International	Biofuels	European Union's Horizon 2020 Research		731077	1			
, , ,	-			Infrastructures Program			1			
Pierre Giusti (S)	С	TotalEnergies	Research & Technology	iC2MC grant (IPA-5923)	Non US College and University		1			
Julien Maillard (G) Caroline Mangote (S)	c	Versailles Saint-Quentin-en-Yvelines University	LATMOS Research & Technology				1			
Caroline Mangote (S) Charlotte Mase (G)	c	TotalEnergies University of Rouen	Research & Technology Seine maritime				1			
Romy Chakraborty (S)	PI	Lawrence Berkeley National Laboratory	Ecology	DOE	BER - Biological & Environmental Research	DE-SC0205112	P19706	Characterizing transformation of natural organic matter by	Chemistry	1
Mingfei Chen (P)	с	Lawrence Berkeley National Laboratory	Earth and Environmental Science Area	Lawrence Berkely Lab	US Government Lab	ENIGMA-Ecosystems and Networks		key indigenous microorganisms interrestrial subsurface	-	1 1
						Integrated with Genes and Molecular	1	sediments		
Brandon Enalls (P)		Lawrence Berkeley National Laboratory	Fasters			Assemblies	1			
Brandon Enalls (P) Sara Gushgari-Doyle (P)	C C	Lawrence Berkeley National Laboratory Lawrence Berkeley National Laboratory	Ecology Earth & Environmental Sciences				1			
Sara Gushgari-Dovie (P) Amy McKenna (S)	c	Lawrence Berkeley National Laboratory National High Magnetic Field Laboratory	ICR				1			
Xiaoqin Wu (S)	c	Lawrence Berkeley National Laboratory	Department of Ecology							
Francesca Kerton (S)	PI	Memorial University of Newfoundland	Chemistry		Non US Foundation		P19754	Analytical methods for biochar characterization by FT-ICR	Chemistry	1 1
				(NSERC)			1	MS		
	С	National High Magnetic Field Laboratory Memorial University of Newfoundland	Ion Cyclotron Resonance	Canada Foundation for Innovation	Non US Foundation		1			
Martha Chacon (S)			Chemistry	Provincial Govt of Newfoundland and Labrador	Other Non US Federal Agency		1	1		1 1
Martha Chacon (S) Sara Cheema (G)	С	Wernonal Oniversity of Newbolholand								
Martha Chacon (S) Sara Cheema (G) Huan Chen (S)	c		Ion Cyclotron Resonance	Memorial University of Newfoundland (MUN)	Non US College and University					
Sara Cheema (G) Huan Chen (S) Stephanie MacQuarrie (S)	c c c	National High Magnetic Field Laboratory Cace Breton University	Ion Cyclotron Resonance Chemistry							
Sara Cheema (G) Huan Chen (S)	с с с	National High Magnetic Field Laboratory	Ion Cyclotron Resonance							

Normal Control Co			Participants (Name, Role, Org., Dept.)			Funding Sources		Proposal #	Proposal Title	Discipline	Exp.#	Da Us	/S
Marcal Marca Marcal Marca Marcal Marca Marcal Marcal Marcal Marcal Marcal Mar	ndrew Wozniak (S)	PI		School of Marine Science and Policy	NSE	(Funding Agency, Division, Award #)	OCE2123402	-		Chemistry	2	2 Us	ed 1.33
Name Name <th< td=""><td>uan Chen (S)</td><td>c</td><td>National High Magnetic Field Laboratory</td><td>Ion Cyclotron Resonance</td><td></td><td></td><td></td><td></td><td>Great Marsh, DE</td><td>,</td><td>-</td><td></td><td></td></th<>	uan Chen (S)	c	National High Magnetic Field Laboratory	Ion Cyclotron Resonance					Great Marsh, DE	,	-		
Name Note Note <th< td=""><td>ina Ebling (T) my McKenna (S)</td><td>C C</td><td>University of Delaware National High Magnetic Field Laboratory</td><td>EARTH, OCEAN & ENVIRONMENT</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></th<>	ina Ebling (T) my McKenna (S)	C C	University of Delaware National High Magnetic Field Laboratory	EARTH, OCEAN & ENVIRONMENT									
And Angel	achel Owrutsky (G)	č	University of Delaware	School of Marine Science and Policy									
And Market Constrained		PI	University of Central Florida National High Magnetic Field Laboratory	Department of Civil Engineering	NSF	Other	RISE-1830036	P19790	Effects of dissolved organic matter (DOM) and dissolved organic nitrogen (DON) on the removal of nutrients algal	Engineering	2	2	3.03
Max Mark Mark Mark Mark Mark Mark Mark Mark	nxiang Cheng (G)	č	University of Central Florida	civil environmental and contruction					toxins, and PFAS through green sorption media				
Biolog Biol Biolog Constrained Constraine	my McKenna (S)	c	National High Magnetic Field Laboratory										
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match Max Max </td <td></td> <td>С</td> <td></td>		С											
Name Sol Sol <td>ison Ahad (S)</td> <td>PI</td> <td>Natural Resources Canada</td> <td>Geological Survey of Canada</td> <td>Natural Resources Canada GEM Geo-North Program</td> <td>Non US Government Lab</td> <td></td> <td>P19807</td> <td>Innovative geochemical methods for investigating</td> <td>Chemistry</td> <td>1</td> <td>1</td> <td>1.28</td>	ison Ahad (S)	PI	Natural Resources Canada	Geological Survey of Canada	Natural Resources Canada GEM Geo-North Program	Non US Government Lab		P19807	Innovative geochemical methods for investigating	Chemistry	1	1	1.28
Name Control		~			_				permafrost and active layer processes in northern Canada	-			
Name Solution Solution <th< td=""><td>aul Gammon (S) mv Holt (G)</td><td>c</td><td>Natural Resources Canada Florida State University</td><td>EAOS</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></th<>	aul Gammon (S) mv Holt (G)	c	Natural Resources Canada Florida State University	EAOS									
Description C Transformation Description Descripion Descripion <thdes< td=""><td>nne Kellerman (P)</td><td>с</td><td></td><td>Earth, Ocean and Atmospheric Science</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></thdes<>	nne Kellerman (P)	с		Earth, Ocean and Atmospheric Science									
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International 2 Name and space international Notice an	hristopher Rüger (S)	PI	University of Rostock	Interdisciplinary Faculty, Department Life, Light & Matter	European Network of Fourier-Transform Ion-Cyclotron	- Other Non US Federal Agency	ID: 731077	P19814	Chemical characterization of carbonaceous wildfire	Chemistry	1	1	2
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Non-Normal Set Non-Normal		с											
Link Barry (1) C Discription Discripi Discription <thd< td=""><td>endryk Czech (S)</td><td>с</td><td>University of Rostock</td><td>Analytical Chemistry, Joint Mass Spectrometry Centre</td><td>Helmholtz International Lab</td><td>Non US Government Lab</td><td>12083</td><td></td><td></td><td></td><td></td><td></td><td></td></thd<>	endryk Czech (S)	с	University of Rostock	Analytical Chemistry, Joint Mass Spectrometry Centre	Helmholtz International Lab	Non US Government Lab	12083						
Market Mark Constraints Cons		с											
Bitsbard Statistical	Ivia Martinez (S)	c	University of Rostock	Joint Mass Spectrometry Centre									
Shortham Shortham <th< td=""><td>nika Neumann (G)</td><td>č</td><td>University of Rostock</td><td>Department Life Light & Matter</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>1</td><td></td></th<>	nika Neumann (G)	č	University of Rostock	Department Life Light & Matter								1	
Bit Bandon G Wing Window Manual Manu		c	Lomonosov Moscow State University									1	
Partner Control Second		c	University of Hostock University of Eastern Finland	Department of Environmental and Biological Sciences. Fine								1	
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Label Control P1 Restant Aller Market Description P1-2000 P1-20000 P1-20000 P1	alf Zimmermann (S)	с	University of Rostock	Division of Analytical and Technical Chemistry					1			1	
Dep Bookstanding C Municip Bookstanding Display Bookstanding		PI	Commonwealth Scientific and Industrial Research Organization	Land and Water	DOD	ER - Environmental Research Program	ER21_3550	P19867	High-Field 21 Tesla FT-ICR Mass Spectrometry for	Engineering	1	1	0.33
Supplement C Backer Munders C Backer Munders C Backer Munders Enders	rdia Babcock-Adams (P)	с	National High Magnetic Field Laboratory	CIMAR- ICR	DOD	ER - Environmental Research Program	ER21-SO-3550 - CY21		Forensic Identification of MEASs			1	
Dimension of the second of the seco	reg Blakney (S)	с	National High Magnetic Field Laboratory	ICR	DOD	ER - Environmental Research Program	ER20-1265		1			1	
Display Display <t< td=""><td>tomas Borch (S) bris Hendrickson (S)</td><td>C</td><td>Colorado State University National High Magnetic Field Laboratory</td><td>Soil and Crop Science</td><td>DOD</td><td>ER - Environmental Research Program</td><td>ER-2718</td><td></td><td></td><td></td><td></td><td></td><td></td></t<>	tomas Borch (S) bris Hendrickson (S)	C	Colorado State University National High Magnetic Field Laboratory	Soil and Crop Science	DOD	ER - Environmental Research Program	ER-2718						
Implement Control Product grant	hristopher Higgins (S)	c	Colorado School of Mines	Civil and Environmental Enginnering									
Image of a bin state is s	hn Komuc (S)	C	U.S. Naval Research Laboratory	Emerging contaminants, site characterization									
Instruction Col Description Operation	asim Pica (P)	c	Colorado State University										
Inter Ing (h) C Name Status Constrained Application Constrained Application Description Princip Name Status Name Status Name Status Name Status Name Status Name Status Name Status <td>olly Roth (G)</td> <td>с</td> <td>Colorado State University</td> <td>Chemistry</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	olly Roth (G)	с	Colorado State University	Chemistry									
Alter boom P Wandpart Phile P Wandpart Phile P Wandpart Phile P P P P		C C	New Mexico State University, Main Campus	Chemical Analysis & Instrumentation Laboratory									
Answer (1) C Red, Statu Survey Ref, Coart Answer (Status) Ref, Co	Ian Bacon (S)	PI	University of Florida	Soil and Water Sciences	No other support			P19879	Chemical Signatures of Biosolid Movement Across the St	Biology, Biochemistry, Biophysics	2	ž	1.17
Non-Marken 1 C Non-See Assess CC Non-See Assess CC Non-See Assess CC Non-See Assess Non-See	uan Chen (S) nne Kellerman (P)	C C	National High Magnetic Field Laboratory Florida State University	Ion Cyclotron Resonance Faith Ocean and Atmospheric Science					Johns River Watershed				
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Interference Carlo Interference Carlo Control Status Unique Status Carlos Status Statu	my McKenna (S) ubrev Miller (G)	C	National High Magnetic Field Laboratory										
Instantian Instani	obert Spencer (S)	č	Florida State University										
And Barls (1) C Jundy dam	za McDonough (P)	PI	Australian Nuclear Science and Technology Organization	Environment		e Other Non US Federal Agency	Project ID SR200100005	P19907	Investigating carbon cycling in Antarctic and sub-Antarctic lakes	Chemistry	2	2	1.45
And Barls (1) C Jundy dam													
Name Alsonance of the solution of the	artin Andersen (S)	С	University of New South Wales	School of Civil and Environmental Engineering	Australian Research Council under Discovery Project	Other Non US Federal Agency	DP160101379						
Mage Bindley (P) C Underwid Walks, Sockhald Namal	ndy Baker (S)	с	University of New South Wales	School of Biological, Earth and Environmental Sciences	National Collaborative Research Infrastructure Strategy	Other Non US Federal Agency							
k_{ij}^{ij}	ogon Roboko (R)	c	University of Alaska, Southoast	Natural Science	(NCRIS).								
Ny Nakona Ng, Nakona Ng, Nakona Ng, Nagang Sang, Nakona Sang, Nakana Nakona Sang, Nakana Sang, Nakona Sang, Nakona Sang, Nakona Sa	my Holt (G)	c	Florida State University	EAOS									
Interface C Unitarity Nuesch (1) C Unitarity Nuesch 2000000000000000000000000000000000000	hristopher Marjo (T)	с	University of New South Wales	School of Biological, Earth and Environmental Sciences									
Desk Desk <th< td=""><td></td><td>с</td><td>National High Magnetic Field Laboratory</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></th<>		с	National High Magnetic Field Laboratory										
Phetade Location (i) C University Affect Social Market Social Land and Enformmental Engenering Land Enfor	arina Meredith (T)	С	Unknown	Australia's Nuclear Science and Technology Organisation									
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Isake Statics (6) (5) C Subtime Costs University Australian Walke Science and Technology Organization Name Science Costs Environment NSF OPP - Ofice of Point Programs OPP 1938873 P19915 Description and Point Science and Science and Science	hetdala Oudone (G)	С	University of New South Wales	School of Biological, Earth and Environmental Sciences,								1	
Isace State (6) C Subtrom Costs University Manda Marine Science Coste Marine Robert Sensor (S) C Folds State University Earl, Ocean & Antranian Marine Science Coste Inclusion Marine Marine Coste Inclusion Mar		с		School of Civil and Environmental Engineering					1			1	
No. C Point Sum Earth, Oxean & Atmosphert, Science Profile Prof	aac Santos (S)	c	Southern Cross University	National Marine Science Centre					1			1	
Megane Bernke (P) C Unkersity of Atabaka, Southeast Matural Science a Subtramenent Estuary along the Alaskan Beaufort Sea Annum Megane Estuary along the Alaskan Beaufort Sea Constr Unkersity of Teasa, Austin Matural Algo University CA Matural Science Coast Cast Cas		C.											
Megane Bernke (P) C Unkersity of Atabaka, Southeast Matural Science a Subtramenent Estuary along the Alaskan Beaufort Sea Annum Megane Estuary along the Alaskan Beaufort Sea Constr Unkersity of Teasa, Austin Matural Algo University CA Matural Science Coast Cast Cas	obert Spencer (S)	C	Florida State University	Earth, Ocean & Atmospheric Science	NCE	OPP Office of Polar Program	0001020072	Diana and	Dissolved Omenia Matter Communities and Press	Chamintar		+	0.83
Emb grissia (G) C University of Texas, Assim Maines Science	egan Behnke (P)	C	University of Alaska, Southeast	Natural Science	nor:	OFF - Onice of Polar Programs	OF F 1830073	P19915	a Subterranean Estuary along the Alaskan Beaufort Sea	chemistry	1	1	J.63
Robert Spance (S) C Pinda State University Earth. Doean & Anonyte Spance Compose (S) Pinda State University Control Action and Technical State University Control Action Action Action and Technical State University Control Action Actin Action Actin Action Action Action Action Actin Action Action Ac	mily Bristol (G)	c	University of Texas, Austin						Coast				
Personal Space (S) Pl Noth Carolina Agricultural and Technical State University Cold. Acchaectural and Environmental Engineering NSF CBET - Chemical, Bioorgineering, Environmental, and CBET2101053 P19962 Elevineeting and implications characterization and implications. Engineering Engin	ny wcKenna (S) obert Spencer (S)	c	Florida State University									1	
Brian Brazil (S) C Wate Management Inc. Wate Management Inc. Wate Management Inc. Inc. Opticition Resonance Huan Chen (S) C Lame Uthwensity Out Order Undersonance Out Order Undersonance Synthin Parveen Mallek (G) C Manguette Uthwensity Out Order Undersonance Out Order Undersonance Any McKenna (S) C National High Magnette Field Laboratory Out Order Undersonance Out Order Undersonance Any McKenna (S) C National High Magnette Field Laboratory Out Order Undersonance Out Order Undersonance Management (S) C Notice Contral Agricultural and Technical State University Out Order Undersonance Out Order Undersonance Market (S) C Notice Contral Agricultural and Technical State University Out Architectural and Environmental Engineering Market (S) C Lame Uthwensity Out Architectural and Environmental Engineering Morthard (S) C Lame Uthwensity Out Architectural and Environmental Engineering Morthard (S) C Lame Uthwensity Out Architectural and Environmental Engineering Morthard (S) C Lame Uthwensity Out Architectural and Environmental Engineering Morthard (S) C Lame Uthwensity Out Architectural and Environmental Engineering Morthard		PI			NSF	CBET - Chemical, Bioengineering, Environmental, and	CBET2101053	P19962	Elevated temperature landfill leachate characterization	Engineering	2	2	2
Brian Brazil (S) C Wate Management Inc. Wate Management Inc. Wate Management Inc. Inc. Opticition Resonance Huan Chen (S) C Lame Uthwensity Out Order Undersonance Out Order Undersonance Synthin Parveen Mallek (G) C Manguette Uthwensity Out Order Undersonance Out Order Undersonance Any McKenna (S) C National High Magnette Field Laboratory Out Order Undersonance Out Order Undersonance Any McKenna (S) C National High Magnette Field Laboratory Out Order Undersonance Out Order Undersonance Management (S) C Notice Contral Agricultural and Technical State University Out Order Undersonance Out Order Undersonance Market (S) C Notice Contral Agricultural and Technical State University Out Architectural and Environmental Engineering Market (S) C Lame Uthwensity Out Architectural and Environmental Engineering Morthard (S) C Lame Uthwensity Out Architectural and Environmental Engineering Morthard (S) C Lame Uthwensity Out Architectural and Environmental Engineering Morthard (S) C Lame Uthwensity Out Architectural and Environmental Engineering Morthard (S) C Lame Uthwensity Out Architectural and Environmental Engineering Morthard	D Ashik Ahmed (G)	с	North Carolina Agricultural and Technical State University	Nanoengineering		ransport Systems			and implications: Humic substance isolation, aromaticity, and biodegradability			1	
Huan Cherri (S) C National High Magnetic Feld Laboratory No Cyclotrom Resonance Specific Magnetic Feld Laboratory C/L dame University Cold and Environmental Engineering Synthin Parvenen Mallek (G) C Marquette University Cold and Environmental Engineering Anym McKennen (S) C Natorial High Magnetic Feld Laboratory ICR Hanh Pate (G) C Noth Carolina Agricultural and Technical State University Computational agricultural and Technical State University Computational agricultural and Technical State University Mold Workship (G) C Lamorul University Cold Individual and Technical State University Cold Individual and Technical State University Mold Workship (G) C Lamorul University Cold Individual and Technical Engineering Workship (G) C Lamorul University Cold Individual Individual Individual Engineering Workship (G) C Lamorul University Cold Individual Individual Individual Engineering Workship (G) C Lamorul University State Key Laboratory of Environmental Engineering Workship (G) C Lamorul University State Key Laboratory of Environmental Engineering Workship (G) C Lamorul University State Key Laboratory of Environmental Engineering			,	5 5					-				
Salee Gaunande (G) C Lamar University ON and Environmental Engineering Departments Syntha Parsen Malko (G) C Maryona Hybrik (S) CN Salee Caunande (S) CN Amy Machenia (S) C Natonia High Magnetic Field Laboratory ICR Computational Engineering Amy Machenia (S) C Natonia High Magnetic Field Laboratory Computational Science and Engineering Computational Science and Engineering Markowana Rashid (G) C North Carolina Agnicultural and Technical State University Computational Engineering Markowana Rashid (S) C North Carolina Agnicultural and Technical State University Computational Engineering Markowana Rashid (S) C North Carolina Agnicultural and Technical State University Computational Engineering Markowana Rashid (S) C Lamor University Coll Admotineering Engineering Werzheng Yu (S) C Lamor University State Key Laboratory Environmental Aquatic Chemistry Verzheng Yu (S) C Lamor University State Key Laboratory Environmental Aquatic Chemistry		C C	Waste Management Inc. National High Magnetic Field Laboratory									1	
Amy Machema (S) C National High Magnetic Field Laboratory ICR ICR Harsh Pitel (G) Noth Carolina Agricultural and Technical State University Computational Science and Engineering Computational Science and Engineering Md Redowan Rashid (G) C Noth Carolina Agricultural and Technical State University Civil Architectural and Engineering Md Redowan Rashid (G) C Lamor University Civil Architectural and Engineering Wenzheng Yu (S) C Lamor University Civil and Environmental Engineering Vienzheng Yu (S) C Lamor University Civil and Environmental Aquatic Chemistry	ailee Gawande (G)	c	Lamar University	Civil and Environmental Engineering Department									
Hanh Pate (G) C North Carolina Agricultural and Technical State University Computational Science and Engineering Md Redowan Rash (G) C North Carolina Agricultural and Technical State University ONA Activity Mind Water C Lamer University Columents Figure Nations of Sciences Columents Enformmental Engineering Viscother Yu (S) C Lamer University Columents Figure Nations of Sciences State May Laboratory of Environmental Aquatic Chemistry		C C	Marquette University National High Magnetic Field Laboratory	Civil, Construction & Environmental Engineering ICR									
Alfed Wader (G) C Lamar University CM and Environmental Engineering Wenzheng Yu (S) C Engin Institute of Research on the Structure of Matter, Chinese State Key Laboratory of Environmental Aquatic Chemistry		č	North Carolina Agricultural and Technical State University	Computational Science and Engineering									
Alfed Wader (G) C Lamar University CM and Environmental Engineering Wenzheng Yu (S) C Engin Institute of Research on the Structure of Matter, Chinese State Key Laboratory of Environmental Aquatic Chemistry	d Redowan Rashid (G)	c	North Carolina Anricultural and Technical State Linkswrite	Civil Architectural and Environmental Engineering					1			1	
Wenzheng Yu (S) C Flain Institute of Research on the Structure of Matter, Chinese State Key Laboratory of Environmental Aquatic Chemistry Academy of State Key Laboratory of Environmental Aquatic Chemistry	(-)	Ĭ										1	
Academy of Sciences		C	Lamar University	Civil and Environmental Engineering									
Liane Benning (S) PI * Helmholtz Zentrum-Potsdam Geochemistry Alexander von Humboldt Foundation research grant Non US Foundation P19980 Development of analytical approaches to characterize Chemistry C		5	Academy of Sciences										_
	ane Benning (S)	PI *	Helmholtz Zentrum-Potsdam	Geochemistry	Alexander von Humboldt Foundation research grant	Non US Foundation		P19980	Development of analytical approaches to characterize particulate organic matter in glaciers	Chemistry	2	2	1.75
Runa Antony (P) C Helmholtz Zentrum-Potsdam Interface Geochemistry European Research Council Synergy Non US Council Deep Purple, 856416	una Antony (P)	с		Interface Geochemistry	European Research Council Synergy	Non US Council	Deep Purple, 856416		paracade organic matter in glaciers			1	
Huan Chen (S) C National High Magnetic Field Laboratory Ion Cyclotron Resonance	uan Chen (S)	с	National High Magnetic Field Laboratory	Ion Cyclotron Resonance									
Anne Keleman (P) C Florida State University Earth, Ocean and Atmospheric Science Any McKenne (S) C National Hybrid Magnetic Field Laboratory UCR	my McKenna (S)	C	National High Magnetic Field Laboratory	ICR					1			1	
Pamela Rossel (P) C Helmholtz Zentrum-Potsdam Section 3.5 Interface Geochemistry	amela Rossel (P)	с	Helmholtz Zentrum-Potsdam	Section 3.5 Interface Geochemistry									
Robert Spencer (S) C Florida State University Earth, Ocean & Atmospheric Science	obert Spencer (S)	Ċ	Florida State University	Earth, Ocean & Atmospheric Science				I	1	1		1	

	Participants (Name, Role, Org., Dept.)			Funding Sources		Proposal #	Proposal Title	Discipline	Exp.#	Days Used
Dionysios Dionysiou (S)	PI * University of Cincinnati	Environmental Engineering and Science	NSF	(Funding Agency, Division, Award #) CBET - Chemical, Bioengineering, Environmental, a	and CBET2042060	P20001	Characterization of AOM/NOM in the process of removal	Engineering	1	Used 0.5
Huan Chen (S)	C National High Magnetic Field Laboratory	Ion Cyclotron Resonance	Ohio State University SPC	Transport Systems US College and University	SPC-1000005162/GR121134 / ODH		of harmful algal blooms by clay-biopolymer composite			
Hadeer Hamid (G)	C University of Cincinnati	Chemical and Environmental Engineering								
Minghao Kong (G)	C University of Cincinnati	Department of Chemical and Environmental Engineering (ChEE)								
Amy McKenna (S) Katelin Weitzel (G)	C National High Magnetic Field Laboratory C University of Cincinnati	ICR Chemical and Environmental Engineering								
Zhe Zhang (G) Henderson Cleaves (S)	C University of Cincinnati PI Camegie Institution of Washington	Chemical and Environmental Engineering Earth and Planets Laboratory	John Templeton Foundation	US Foundation		P20009	Classifying Meteorites Via the Organic Features of their	Chominter		2
Jakob Andersen (S)	C University of Southern Denmark	Department of Mathematics and Computer Science	Novo Nordisk Foundation	03 Foundation	NNF19OC0057834	P20009	FT-ICR-MS spectra	Chemistry	1	5
Huan Chen (S) Romulo Cruz-Simbron (S)	C National High Magnetic Field Laboratory C Blue Marble Space Institute of Science	Ion Cyclotron Resonance Department of Chemistry	Novo Nordisk Foundation Independent Research Fund Denmark		NNF21OC0066551 DFF-0135-00420B					
Joseph Frye (G) Siddhant Sharma (G)	C National High Magnetic Field Laboratory C ashoka university	CIMAR Department of Biology	FONDECYT	Other	Convenio 208-2015-FONDECYT					
Thomas Atkinson (S)	PI University of Alabama, Birmingham	Pediatrics	University of Alabama at Birmingham	US College and University		P20022	Investigating Non-Canonical Glycosylation in Synthetic and Natural Minimal Genome Bacteria	Biology, Biochemistry, Biophysics	1	4.17
Lissa Anderson (S) James Daubenspeck (S)	C National High Magnetic Field Laboratory C University of Alabama, Birmingham	ICR Pediatrics-Allergy					and Natural Minimal Genome Bactena			
Kevin Dybvig (S) John Sanford (G)	C University of Alabama, Birmingham C University of Alabama, Birmingham	Pediatrics Pediatrics								
Li Xiao (S)	C University of Alabama, Birmingham	Medicine								
Alan Marshall (S) Martha Chacon (S)	PI National High Magnetic Field Laboratory C National High Magnetic Field Laboratory	ICR Ion Cyclotron Resonance	No other support			P20024	Molecular Characterization of Dissolved Organic Material in Non-terrestrial Samples	Chemistry	1	4
Joseph Frye (G) Ryan Rodgers (S)	C National High Magnetic Field Laboratory C National High Magnetic Field Laboratory	CIMAR ICR								
Colin Cooke (S)	PI * University of Alberta	Earth and Atmospheric Sciences	Alberta Environment and Parks and Environment and Climate Change Canada	Non US Government Lab		P20052	Molecular characterization of aromatic compounds in rivers dominated by petrogenic sources after a Boreal	Chemistry	1	1.17
Jason Ahad (S)	C Natural Resources Canada	Geological Survey of Canada	Climate Change Canada				megafire			
Martha Chacon (S) Huan Chen (S)	C National High Magnetic Field Laboratory C National High Magnetic Field Laboratory	Ion Cyclotron Resonance Ion Cyclotron Resonance								
Craig Emmerton (S)	C Government of Alberta	Dept.of Environment and Parks								
Amy McKenna (S) Francisco Fernandez-Lima (S)	C National High Magnetic Field Laboratory PI Florida International University	Chemistry and Biochemistry	NIH	NIAID - National Institute of Allergy and Infectious	Al121167	P20066	Lipid dynamics in mosquito ovarian using stable-isotope	Biology, Biochemistry, Biophysics	1	2.5
Lilian Valadares Tose (P)	C Florida International University	Chemistry and Biochemistry		Diseases			labeling			
Chad Weisbrod (S) Francisco Fernandez-Lima (S)	C National High Magnetic Field Laboratory PI Florida International University	ICR Chemistry and Biochemistry	NSE	HRD - Human Resource Development	1547798	P20067	LC-FT-ICR MS analysis of DOM samples	Biology, Biochemistry, Biophysics		
Lilian Valadares Tose (P)	C Florida International University	Chemistry and Biochemistry	1001	Tito - natial resource pevelopment	1047180	F20007	Cost inforcing analysis of Dow samples	Diology, Dioliterinouy, Diopriyono	1	4
Chad Weisbrod (S) Amin Mirkouei (S)	C National High Magnetic Field Laboratory PI University of Idaho	ICR Mechanical and Biological Engineering	Riverence provisions LLC			P20073	Molecular Characterization of used char filters after fish	Chemistry	1	0.5
Rance Bare (S) Martha Chacon (S)	C University of Idaho C National High Magnetic Field Laboratory	Dept Biological Engineering Ion Cyclotron Resonance	USDA - Department of Agriculture USGS	Other	104b grant		farm downstream water treatment: Multi-level chemical analyses and fractionation scheme			
Huan Chen (S)	C National High Magnetic Field Laboratory	Ion Cyclotron Resonance	univerisyt of idaho aquaculture research institute	US College and University						
Amy McKenna (S)	C National High Magnetic Field Laboratory	ICR	Idaho Water Resources Research Insititute	US Foundation						
Kenneth Overturf (S) Krishnan Raja (S)	C U.S. Department of Agriculture C University of Idaho	Agricultural Research Service Department of Nuclear Engineering & Industrial Mgmt								
Ethan Struhs (G)	C University of Idaho	Engineering								
Dagian Jiang (S)	PI University of Alabama, Tuscaloosa	Civil Construction and Environmental Engineering	USDA - Department of Agriculture		NIFA grant 2020-670223-31472	P20102		Engineering	1	0.33
Lydia Babcock-Adams (P) Huan Chen (S)	C National High Magnetic Field Laboratory C National High Magnetic Field Laboratory	CIMAR, ICR Ion Cyclotron Resonance					matter in electrokinetic remediation of sediments			
Tahir Maqbool (P) Amy McKenna (S)	C University of Alabama, Tuscaloosa C National High Magnetic Field Laboratory	Civil, Construction, and Environmental Engineering ICR								
Brice Bouyssiere (S)	PI University of Pau and the Adour Region	IPREM	International Humic Substances Society	Other		P20108	Tracing lead species in peat samples from the French	Biology, Biochemistry, Biophysics	4	23.75
Martha Chacon (S) Joseph Frye (G)	C National High Magnetic Field Laboratory C National High Magnetic Field Laboratory	Ion Cyclotron Resonance CIMAR	Université de Pay et des Pays de l'Adour	Other			Pyrenees as a function of depth using SEC-ICP-MS and FT ICR-MS			
Deisy Giraldo Davila (G) Ryan Rodgers (S)	C University of Pau and the Adour Region C National High Magnetic Field Laboratory	Chemistry ICR								
Jeffrey Hawkes (S)	PI * Uppsala University	Department of Chemistry CIMAR_ICR	FORMAS	Non US Foundation	2021-00543	P20174	Detailed investigation of the isomeric diversity of dissolved organic matter by UPLC-ESI-21T FTICR MS using Stored	Chemistry	1	0.5
Lydia Babcock-Adams (P) Huan Chen (S)	C National High Magnetic Field Laboratory C National High Magnetic Field Laboratory	Ion Cyclotron Resonance					Waveform Inverse Fourier Transform and Infrared multi			
Alexander Craig (P) Amy McKenna (S)	C Uppsala University C National High Magnetic Field Laboratory	Chemistry ICR					photon dissociation			
Christine Foreman (S)	PI Montana State University	Center for Biofilm Engineering & Dept. of Chemical and Biological Engineering	NASA		80NSSC18K0814	P20175	Opening the black box of glacial carbon cycling-providing fundamental insight into impacts of a changing climate	Biology, Biochemistry, Biophysics	2	0.7
Markus Dieser (G)	C Montana State University	Environmental Sciences	NSF	OPP - Office of Polar Programs	OPP2037963		indumental insight into impacto or a changing dimate			
Amy McKenna (S) Heidi Smith (G)	C National High Magnetic Field Laboratory C Montana State University	ICR Environmental Sciences								
Madelyne Willis (G)	C Montana State University	Land Resources and Env Sciences, Center for Biofilm Engineering								
Jennifer Brodbelt (S)	PI * University of Texas, Austin	Chemistry and Biochemistry	NSF	CHE - Chemistry	CHE2203602	P20177	The application of post-ETD PTCR ion parking to consolidate signals of large fragment ions generated	Chemistry	1	5
Sean Dunham (G)	C University of Texas, Austin	Department of Chemisty					during top-down MS/MS analysis of proteins			
Chad Weisbrod (S) Isabel Romero (S)	C National High Magnetic Field Laboratory PI University of South Florida	ICR College of Marine Science	NOAA	Other US Federal Agency		P20181	Characterization of chemical and biological impacts to	Chemistry	1	0.5
Huan Chen (S)	C National High Magnetic Field Laboratory	Ion Cyclotron Resonance	National Academies of Science Engineering and Medicine	US Foundation			zooplankton in the Tampa Bay after the Piney Point disaster			
Amy McKenna (S)	C National High Magnetic Field Laboratory	ICR							_	
Kiara Lech (S) Huan Chen (S)	PI * Environmental Protection Agency C National High Magnetic Field Laboratory	Oil Spill Response Research Area Ion Cyclotron Resonance	EPA			P20182	Moecular evaluation of oil burn efficiency to evaluate the effectiveness of in situ burning	Chemistry	1	0.33
Robyn Conmy (S) Amy McKenna (S)	C Environmental Protection Agency C National High Magnetic Field Laboratory	Office of Research and Development ICR								
Devi Sundaravadivelu (S)	C Pegasus Technical Services Inc	On-Site Contractor to U.S. EPA	Colombian Ministry of Science and Technology	Non US Ministry		Doortoo	Spatial distribution of pentacyclic tritemenes in root	Observator		0.6
Marianny Combariza (S)	PI Industrial University of Santander	Chemistry	colonialari ministry of science and Technology	won die Millistry		P20198	Spatial distribution of pentacyclic triterpenes in root systems from Cecropia spp. using MALDI IMS	Chemistry	1	2.5
Martha Chacon (S) Marianny Combariza (S)	C National High Magnetic Field Laboratory C Industrial University of Santander	Ion Cyclotron Resonance Chemistry								
Luis Díaz-Sánchez (G) Guillermo Leon Montoya Pelaez (S)	C Industrial University of Santander C ICESI University	Santander Department of Pharmaceutical Sciences								
Bradley Tolar (S) Lydia Babcock-Adams (P)	PI * University of North Carolina, Wilmington C National High Magnetic Field Laboratory	Biology and Marine Biology CIMAR, ICR	University of North Carolina Wilmington	US College and University		P20200	Molecular Level Characterization of Organically Bound Copper During the Seasonal Bloom of Thaumarchaeota	Chemistry	1	3.67
Parker Lawrence (G) Amy McKenna (S)	C University of North Carolina, Wilmington C National High Magnetic Field Laboratory	Biology and Marine Biology ICR					off the Coast of North Carolina			
Yang Lin (S) Franky Celestin (G)	PI University of Florida C University of Florida C	Soil and Water Sciences Department of Soil Sciences	University of Florida	US College and University		P20201	Chemical characterization of water-extractable organic carbon in soils from long-term agricultural systems	Chemistry	1	0.33
Ryan Champiny (G)	C University of Florida C University of Florida	Soil and Water Sciences					carbon in soils irom long-term agricultural systems			
Huan Chen (S) Silvia Córdova (S)	C National High Magnetic Field Laboratory C University of Nebraska-Lincoln	Ion Cyclotron Resonance Agronomy and Horticulture								
Swarnali Mahmood (G) Amy McKenna (S)	C University of Florida C National High Magnetic Field Laboratory	Soll, Water, and Ecosystem Sciences								
Christine Sprunger (S)	C Michigan State University	ICR W.K. Kellogg Biological Station				-				
Christopher Rüger (S)	PI University of Rostock	Interdisciplinary Faculty, Department Life, Light & Matter	industry research cooperation agreement (Ichthyol- Gesellschaft Cordes, Hermanni & Co. (GmbH & Co.)	Other		P20203	Chemical characterization of shale oil-based pharmaceuticals and its eponymous vegetable oil-based	Chemistry	1	6
Martha Chacon (S)	C National High Magnetic Field Laboratory	Ion Cyclotron Resonance					products by 21 T Fourier transform ion cyclotron resonance mass spectrometer			
Ralf Zimmermann (S)	C University of Rostock	Division of Analytical and Technical Chemistry			111 (01100 (20010)			9		
Mary Lusk (S) Huan Chen (S)	PI * University of Florida C National High Magnetic Field Laboratory	Soil Water and Ecosystem Sciences Department Ion Cyclotron Resonance	NOAA/NOS/NCCOS University of Florida	Other US Federal Agency US College and University	NA19NOS4780183	P20205	organic nutrients in urban stormwater runoff and rainfall to	Chemistry	1	1.5
Audrey Goeckner (P) Cynthia Heil (S)	C University of Florida C Mote Marine Laboratory	Department of Soil and Water Sciences Red Tide Institute		·		1	the Florida red tide dinoflagellate Karenia brevis and Pyrodinium bahamense			
Patricia Holland (S)	C Mote Marine Laboratory	HAB Ecology and Mitigation				1				
Amy McKenna (S) Amanda Muni-Morgan (G)	C National High Magnetic Field Laboratory C University of Florida	ICR Soil and Water Sciences								

ICR

	Participants (Name, Role, Org., Dept.)			Funding Sources (Funding Agency, Division, Award #)		Proposal #	Proposal Title	Discipline	Exp. #	Days Used
Michael Stukel (S)	PI Florida State University	Earth, Ocean, and Atmospheric Science	NSF	OCE - Ocean Sciences	OCE1637632	P20214	Characterization of Sediment Trap Water Soluble Organic	Chemistry	2	1
Huan Chen (S) Heather Forrer (G)	C National High Magnetic Field Laboratory C Florida State University	Ion Cyclotron Resonance Earth Ocean and Atmospheric Sciences	NSF	OCE - Ocean Sciences OCE - Ocean Sciences	OCE2224726 OCE1851347		Matter (WSOM)			i i
Amy Holt (G)	C Florida State University	EAOS	National Oceanic and Atmospheric Administration's	Other	NOAA-NOSNCCOS-2017-2004875					i i
Sven Kranz (S)	C Rice University	BioSciences	RESTORE Program							ı ¹
Amy McKenna (S)	C National High Magnetic Field Laboratory	ICR								
Robert Spencer (S)	C Florida State University	Earth, Ocean & Atmospheric Science						-		<u> </u>
Alex Chow (S) Jeffery Atkins (S)	PI * Chinese University of Hong Kong C USDA Forest Service	Earth and Environmental Sciences DOE Savannah River Site.	DOE	BER - Biological & Environmental Research EAR - Earth Sciences	DE-SC0023311 FAR1852020	P20215	Characteristics and Treatability of Pyrogenic Organic Carbon and Nitrogen	Engineering	1	1.08
Scott Brooks (S)	C Oak Ridge National Laboratory	Savannah River Site	National Institute of Food Agriculture Bioenergy Natura		2020-67019-31002 / 2021-670119-33682					ı ¹
			Resources and Environmenta							
Huan Chen (S)	C National High Magnetic Field Laboratory	Ion Cyclotron Resonance								ı ¹
Huan Chen (S)	C Clemson University	Department of Environment Engineering and Earth Science								ı ¹
Peijia Ku (S)	C Oak Ridge National Laboratory	ORNL								ı ¹
Amy McKenna (S)	C National High Magnetic Field Laboratory	ICR								ı ¹
Xiaohan Mo (G)	C Peking University	Shenzhen Graduate School, School of Urban Planning and								
Scott Painter (S)	C Oak Ridge National Laboratory	Design ORNL								ı ¹
Carl Trettin (S)	C USDA Forest Service	Santee Experimental Forest, SC								
Yuhua Zheng (G)	C Clemson University	Forestry and Environmental Conservation						-		·
Kevin Van Geem (S)	PI * Ghent University	Department Of Materials, Textiles And Chemical Engineering	g Ghent University, Laboratory of Chemical Technology	Non US College and University		P20216	Detailed compositional analysis of plastic pyrolysis oils	Engineering	1	7
Martha Chacon (S)	C National High Magnetic Field Laboratory	Ion Cyclotron Resonance								ı ¹
Marvin Kusenberg (G) Ryan Rodgers (S)	C Ghent University	Laboratory for Chemical Technology ICR								ı ¹
Yannick Ureel (G)	C National High Magnetic Field Laboratory C Ghent University	Chemical Engineering								
Marianny Combariza (S)	PI Industrial University of Santander	Chemistry	Universidad Industrial de Santander	Non US College and University		P20217	Enhancing the compositional characterization of	Chemistry	1	2.5
Cristian Blanco-Tirado (S) Martha Chacon (S)	C Industrial University of Santander C National High Magnetic Field Laboratory	Chemistry Ion Cyclotron Resonance					phospholipid from Colombian cocoa beans var CCN-51 using homemade ET-MALDI matrices			ı ¹
Luis Díaz-Sánchez (G)	C Industrial University of Santander	Santander	1					1		1
Deisy Giraldo Davila (G) Chad Weisbrod (S)	C University of Pau and the Adour Region C National High Magnetic Field Laboratory	Chemistry	1					1		1
Ayla Sant'Ana da Silva (S)	PI * National Institute of Technology	ICR Biocatalysis Laboratory	Serrapilheira Institute	Non US Foundation	Serra-1708-15009	P20219	Identification of bioactive fractions of açaí (Euterpe	Chemistry	1	0.83
Lydia Babcock-Adams (P)	C National High Magnetic Field Laboratory	CIMAR, ICR	Coordination for the Improvement of Higher Education	Non US Foundation	CAPES, AUXPE 0415/2016		oleracea Mart.) seed extract	1	11	1
Huan Chen (S)	C National High Magnetic Field Laboratory	Ion Cyclotron Resonance	Personnel Carlos Chagas Filho Foundation for Supporting	Non US Foundation	FAPERJ, JCNE-SEI-260003/004754/2021			1		i i
	 National Light Magnetic FIEld Laboratory 	Non Sympton resonance	Research in the State of Rio de Janeiro	rest oo roundalon	FAFEN3, 30NE-3EF200003/004734/2021			1		1
Orberto Darba Martin (191	O National Institute of Tax'	DIGAD		No. 10 Ferradation	E 00040 004000			1		1
Gabriel Rocha Martins (P)	C National Institute of Technology	DICAP	Carlos Chagas Filho Foundation for Supporting Research in the State of Rio de Janeiro	Non US Foundation	E-26/210.694/2021			1		1
										· '
Randelle Bundy (S) Lydia Babcock-Adams (P)	PI * University of Washington	School of Oceanography CIMAR, ICR	Simons Foundation SCOPE-Gradients	Other	7212333	P20222	Improving characterization of organic metal-binding ligands in seawater	Chemistry	1	6
Lydia Babcock-Adams (P) Amy McKenna (S)	C National High Magnetic Field Laboratory C National High Magnetic Field Laboratory	ICR					ligands in seawater			ı ¹
Laura Moore (G)	C University of Washington	Oceanography								
Jiwoon Park (P) Carlos Afonso (S)	C University of Washington PI Normandy University	Oceanography Chemistry	No other support			P20224	Molecular characterization of bio-oils from the pyrolysis of	Chemister	_	7
Martha Chacon (S)	C National High Magnetic Field Laboratory	Ion Cyclotron Resonance	No other support			P20224	lignocellulosic biomass using liquid chromatography	Chemisoy	1	, ⁽)
Pierre Giusti (S)	C TotalEnergies C Versailles Saint-Quentin-en-Yvelines University	Research & Technology					coupled to ultra-high resolution mass spectrometry (21- tesia FTICR MS)			
Julien Maillard (G) Charlotte Mase (G)	C Versailles Saint-Quentin-en-Yvelines University C University of Rouen	LATMOS Seine maritime					lesia Frick wid)			ı ¹
Ryan Rodgers (S)	C National High Magnetic Field Laboratory	ICR								
Chad Weisbrod (S) Nir Galili (P)	C National High Magnetic Field Laboratory PI * Swiss Federal Institute of Technology in Zurich	ICR Department of Earth Sciences	No other support			P20226	The geologic history of seawater DOC from marine iron	Biology, Biochemistry, Biophysics		1.33
Jordon Hemingway (G)	C MIT/WHOI Joint Program in Oceanography	Marine Chemistry & Geochemistry	No other support			P20226	oxides	Blobgy, Blochemistry, Blophysics		1.33
Martin Kurek (P)	C Florida State University	Earth, Ocean, and Atmospheric Science								
Amy McKenna (S) Robert Spencer (S)	C National High Magnetic Field Laboratory C Florida State University	ICR Earth, Ocean & Atmospheric Science								ı ¹
Chris Hendrickson (S)	PI National High Magnetic Field Laboratory	Ion Cyclotron Resonance Program	No other support			P20232	Hardware Upgrade to 21T FT-ICR Mass Analyzer	Chemistry	2	12.58
Lissa Anderson (S)	C National High Magnetic Field Laboratory	ICR								ı ¹
Lydia Babcock-Adams (P) Greg Blakney (S)	C National High Magnetic Field Laboratory C National High Magnetic Field Laboratory	CIMAR, ICR ICR								ı ¹
Amy McKenna (S)	C National High Magnetic Field Laboratory	ICR								
Chad Weisbrod (S) David Griffith (S)	C National High Magnetic Field Laboratory PI Willamette University	ICR Chemistry	No other support			P20234	Identification and resolution of isobaric interferences of	Chemistry	1	2.83
Lydia Babcock-Adams (P)	C National High Magnetic Field Laboratory	CIMAR, ICR				P20234	estrogens in wastewater	Chemistry	1	2.03
Huan Chen (S)	C National High Magnetic Field Laboratory	Ion Cyclotron Resonance								
Amy McKenna (S) Rachel Mackelprang (S)	C National High Magnetic Field Laboratory PI California State University, Northridge	ICR Department of Biology	NSE	DEB - Division of Environmental Biology	DEB2029585	P20235	Investigating linkages between DOM turnover and	Chemistry	1	0.5
Anne Kellerman (P)	C Florida State University	Earth, Ocean and Atmospheric Science					microbial community structureduring permafrost thaw	,	1	
Amy McKenna (S) Robert Spencer (S)	C National High Magnetic Field Laboratory C Florida State University	ICR Earth, Ocean & Atmospheric Science								ı ¹
Sommer Starr (G)	C Florida State University C Florida State University	Earth, Ocean & Atmospheric Science Earth, Ocean, and Atmospheric Science	1					1		1
Daniel Petras (S)	PI * Eberhard Karls University of Tuebingen	Functional Metabolomics Lab	German Research Foundation	Non US Foundation	Cluster of Excellence CMFI	P20244	Investigating the Chemical Complexities of Marine	Chemistry	1	5
Lydia Babcock-Adams (P) Amy McKenna (S)	C National High Magnetic Field Laboratory C National High Magnetic Field Laboratory	CIMAR, ICR ICR	1				Dissolved Organic Matter using a Molecular Networking Approach with LC-FT-ICR-MS Analysis at 21T	1		1
Paolo Stincone (P)	C Eberhard Karls University of Tuebingen	CMFI	1					1		1
Giovanni Andrea Vitale (P) Elise Morrison (S)	C Eberhard Karls University of Tuebingen PI * University of Florida	IMIT Environmental Engineering Sciences	No other support			Doctor	Evaluation of biological and photochemical	Chomista:	<u> </u>	0.83
João Henrique Amaral (P)	C University of Florida	Dept. of Environmental Engineering Sciences	no oner support			P20291	Evaluation of biological and photochemical transformations of treatment wetland organic matter	Chemistry	1	0.83
Thomas Bianchi (S)	C University of Florida	Geological Sciences	1				-	1		1
Jacob Gaddy (G) Martin Kurek (P)	C University of Florida C Florida State University	Geological Sciences Earth, Ocean, and Atmospheric Science	1							1
Amy McKenna (S)	C National High Magnetic Field Laboratory	ICR	1					1		1
Todd Osborne (S)	C University of Florida	Whitney Laboratory for Marine Bioscience	1					1		1
Robert Spencer (S) Joshua Dean (S)	C Florida State University PI * University of Bristol	Earth, Ocean & Atmospheric Science School of Geographical Sciences	UK early career funding	Non US College and University		P20293	Do peatland wildfires change the age of carbon released	Engineering	1	0.75
Christopher Evans (S)	C UK Centre for Ecology and Hydrology	Bangor	UK's Natural Environment Research Council (NERC)	Non US Government Lab	NE/V009001/1		into rivers?	5	1 1	0.75
	C University of Oxford	Earth Sciences	grant					1		1
Robert Hilton (S) Amy Holt (G)	C Florida State University	EAOS	1					1		1
Amy McKenna (S)	C National High Magnetic Field Laboratory	ICR	1					1		1
Robert Spencer (S) Dolly Kothawala (S)	C Florida State University PI * Uposala University	Earth, Ocean & Atmospheric Science Department of Ecology and Genetics/Limnology	n/z			P20311	Adsorption of dissolved organic matter to mineral surfaces	a Chemistry		1.33
Marloes Groeneveld (P)	C Uppsala University	Ecology & Genetics / Limnology				. 20011	and resulting biodegradability potential			1.33
Anne Kellerman (P)	C Florida State University C National High Magnetic Field Laboratory	Earth, Ocean and Atmospheric Science	1					1		1
Amy McKenna (S) Myma Simpson (S)	C National High Magnetic Field Laboratory C University of Toronto (Toronto)	ICR Environmental NMR Centre and Department of Physical &	1					1		1
		Environmental Sciences								<u> </u>
		Ion Cyclotron Resonance	No other support			P20331	REU Project – Summer 2023Molecular-Level Characterization of Leached Chemicals from Food	Chemistry	1	3
Martha Chacon (S)	PI National High Magnetic Field Laboratory		1				Packaging	1		1
Rachel White (U)		Chemistry							- 1	
Martha Chacon (S) Rachel White (U) Christopher Rüger (S)	PI National High Magnetic Field Laboratory C National High Magnetic Field Laboratory PI University of Rostock	Chemistry Interdisciplinary Faculty, Department Life, Light & Matter	German Research Foundation (DFG)	Other	ZI 764/28-1	P20334	Compositional and Structural Analysis of Aerosol Humic-	Chemistry	1 1	2.5
Rachel White (U) Christopher Rüger (S)	C National High Magnetic Field Laboratory PI University of Rostock	Interdisciplinary Faculty, Department Life, Light & Matter	German Research Foundation (DFG)	Other	ZI 764/28-1	P20334	like Substances (HULIS) Using Online Liquid	Chemistry	1	2.5
Rachel White (U) Christopher Rüger (S) Martha Chacon (S)	C National High Magnetic Field Laboratory Pi University of Rostock C National High Magnetic Field Laboratory	Interdisciplinary Faculty, Department Life, Light & Matter Ion Cyclotron Resonance	German Research Foundation (DFG)	Other	ZI 764/28-1	P20334	Compositional and Structural Analysis of Aerosol Humic- like Substances (HULIS) Using Online Liquid Chromatography and 21T Fourier Transform Ion Cyclotror Resonance Mass Spectrometry	Chemistry		2.5
Rachel White (U) Christopher Rüger (S) Martha Chacon (S) Joseph Frye (G) Ryan Rodgers (S)	C National High Magnetic Field Laboratory PI University of Rostock C National High Magnetic Field Laboratory C National High Magnetic Field Laboratory National High Magnetic Field Laboratory	Interdisciplinary Faculty, Department Life, Light & Matter Ion Cyclotron Resonance CIMAR ICR	German Research Foundation (DFG)	Other	ZI 764/28-1	P20334	like Substances (HULIS) Using Online Liquid Chromatography and 21T Fourier Transform Ion Cyclotron	Chemistry n		2.5
Rachel White (U) Christopher Rüger (S) Martha Chacon (S) Joseph Frye (G) Ryan Rodgers (S) Silvia Juliana Vesga Martinez (G)	National High Magnetic Field Laboratory University of Rostock National High Magnetic Field Laboratory National High Magnetic Field Laboratory National High Magnetic Field Laboratory University of Rostock	Interdisciplinary Faculty, Department Life, Light & Matter Ion Cyclotron Resonance CIMAR ICR Analytical Chemistry	German Research Foundation (DFG)	Other	ZI 764/28-1	P20334	like Substances (HULIS) Using Online Liquid Chromatography and 21T Fourier Transform Ion Cyclotron	Chemistry		2.5
Rachel White (U) Christopher Rüger (S) Martha Chacon (S) Joseph Frye (G) Ryan Rodgers (S) Silvia Juliana Vesga Martinez (G) Rall Zimmermann (S) Robert Spencer (S)	C National High Magnetic Field Laboratory PI University of Rostock C National High Magnetic Field Laboratory C National High Magnetic Field Laboratory C National High Magnetic Field Laboratory C University of Rostock University of Rostock	Interdisciplinary Faculty, Department Life, Light & Matter Ion Cyclotron Resonance CIMAR CR Analytical Chemistry Division of Analytical and Technical Chemistry Earth, Ocean & Atmospheric Science	German Research Foundation (DFG)			P20334	like Substances (HULIS) Using Online Liquid Chromatography and 21T Fourier Transform Ion Cyclotror Resonance Mass Spectrometry	Chemistry Chemistry		
Rachel White (U) Christopher Rüger (S) Martha Chacon (S) Joseph Frye (G) Ryan Rodgers (S) Silvia Juliana Vesga Martinez (G) Rat Zimmermann (S) Robert Spencer (S) Robert Spencer (S)	C National High Magnetic Field Laboratory PI University of Rostock C National High Magnetic Field Laboratory C National High Magnetic Field Laboratory C University of Rostock University of Rostock PI Florida State University Forda State University	Interdinciplinary Faculty, Department Life, Light & Matter Ion Cyclotton Resonance CMAR Ion April Chamistry Division of Analytical and Technical Chemistry Division of Analytical and Technical Chemistry Earth, Ocean & Atmospheric Science Pacific Northware Research Station		Other OPP - Office of Polar Programs	ZI 764/28-1 OPP1914081		like Substances (HULS) Using Online Liquid Chromatography and 21T Fourier Transform Ion Cyclotror Resonance Mass Spectrometry Long-term Monitoring of the Influence of Terrestrial Econestem Succession on the Bionenchemistry of	1		0.45
Rachel White (U) Christopher Rüger (S) Martha Chacon (S) Joseph Frye (G) Ryan Rodgers (S) Silvia Julian Vesga Martinez (G) Raf Zimmermann (S) Robert Spencer (S) Ryan Belimore (S) Jason Fellman (S)	C National High Magnetic Field Laboratory PI University of Rostock C National High Magnetic Field Laboratory C National High Magnetic Field Laboratory C University of Rostock C University of Rostock PI Fiorida State University C forestry service C University of Alaska, Southeast	Interdisciplinary Faculty, Department Life, Light & Matter Ion Cyclotton Resonance CIMAR ICR Analytical Ohemistry Division of Analytical and Technical Chemistry Earth, Ocean & Atmospheric Science Pacific Northwest Research Station Environmental Science					like Substances (HULIS) Using Online Liquid Chromatography and 21 Fourier Transform Ion Cyclotror Resonance Mass Spectrometry Long-term Monitoring of the Influence of Terrestrial	1		
Rachel White (U) Christopher Rüger (S) Martha Chacon (S) Joseph Frye (G) Ryan Rodgers (S) Silvia Juliana Vesga Martinez (G) Raž Zimmermanan (S) Robert Spencer (S) Robert Spencer (S)	C National High Magnetic Field Laboratory PI University of Rostock C National High Magnetic Field Laboratory C National High Magnetic Field Laboratory C University of Rostock University of Rostock PI Florida State University Forda State University	Interdinciplinary Faculty, Department Life, Light & Matter Ion Cyclotton Resonance CMAR Ion April Chamistry Division of Analytical and Technical Chemistry Division of Analytical and Technical Chemistry Earth, Ocean & Atmospheric Science Pacific Northware Research Station					like Substances (HULS) Using Online Liquid Chromatography and 21T Fourier Transform Ion Cyclotror Resonance Mass Spectrometry Long-term Monitoring of the Influence of Terrestrial Econestem Succession on the Bionenchemistry of	1	1	

		Participants (Name, Role, Org., Dept.)			Funding Sources (Funding Agency, Division, Award #)		Proposal #	Proposal Title	Discipline	Exp.	.# Day
Brett Poulin (S)	PI	University of California, Davis	Environmental Toxicology	NSE	EAR - Earth Sciences	EAR1945388	P20340	Resolving the Molecular Nature of Dissolved Organic	Chemistry		1
homas Borch (S)	C.	Colorado State University	Soil and Crop Science	DOE	BES – Basic Energy Sciences	DE-AC02-76SF00515	. 20040	Sulfur	Chemony		
nna Hermes (G)	č	University of Colorado. Boulder	Institute of Arctic and Alpine Research	NSE	AFRI - Agriculture and Food Research Initiative	2114868					
and richies (c)	Ŭ	children y crockede, boarder	instate of resource and replice resources	101	far a signature and roos research initiative	2114000					
ve-Lyn Hinckley (S)	С	University of Colorado, Boulder	Cooperative Institute for Research in Environmental Science	s USDA - Department of Agriculture		. 2021-67019034608					
my McKenna (S)	с	National High Magnetic Field Laboratory	ICR								
Collin Ward (S)	PI	Woods Hole Oceanographic Institution	Department of Marine Chemistry and Geochemistry,	NSF	CHE - Chemistry	CHE2202621	P20341	Characterization of microplastics in seawater by 21 T FT-	Chemistry		1
								ICR MS	-		
Danielle Freeman (G)	С	Woods Hole Oceanographic Institution	Marine Chemistry & Geochemistry	NSF	OCE - Ocean Sciences	OCE2219660					
Amy McKenna (S) Andrew Wozniak (S)	C	National High Magnetic Field Laboratory University of Delaware	ICR School of Marine Science and Policy	NSF	OCE - Ocean Sciences	OCE2123368		A	0		_
elix Agblemanyo (G)	PI	University of Delaware University of Delaware	School of Marine Science and Policy School of Marine Science and Policy	NSF	OCE - Ocean Sciences	OCE2123368	P20359	Comprehensive insights into surfactant dynamics in seawater and the sea surface microlayer of the North	Chemistry		1 (
ydia Babcock-Adams (P)	č	National High Magnetic Field Laboratory	CIMAR, ICR					Atlantic			
Amanda Frossard (S)	č	University of Georgia	Chemistry								
Amy McKenna (S)	č	National High Magnetic Field Laboratory	ICR								
Aidin Panahi (S)	PI *	Worcester Polytechnic Institute	Chemical Engineering	No other support			P20380	Elucidating the Effects of Radical Sources on	Engineering		1
Amy McKenna (S)	с	National High Magnetic Field Laboratory	ICR					Hydrothermal Liquefaction Pathways to Produce Biocrude			
Michael Timko (S)	С	Worcester Polytechnic Institute	Chemical Engineering								
Puspa Adhikari (S)	PI *	Florida Gulf Coast University	Marine and Earth Sciences	NSF	OCE - Ocean Sciences	OCE2309659	P20423	Remineralization effects of enhanced allochthonous	Chemistry		2
Adam Catasus (S)	С	Florida Gulf Coast University	The Water School					dissolved organic matter in the West Florida Shelf			
Huan Chen (S)	С	National High Magnetic Field Laboratory	Ion Cyclotron Resonance					impacted by Hurricane Ian			
Amy McKenna (S)	С	National High Magnetic Field Laboratory	ICR	1					1		
sabel Romero (S)	С	University of South Florida	College of Marine Science								
Hamada Abdelrahman (S)	PI *	Cairo University	Soil Science	No other support			P20429	Agricultural management and its effects on soil organic	Chemistry		1 (
Huan Chen (S)	С	National High Magnetic Field Laboratory	Ion Cyclotron Resonance					matter molecular composition and possible transformation	1		
Amy McKenna (S)	С	National High Magnetic Field Laboratory	ICR								
Dan Olk (S)	С	U.S. Department of Agriculture	National Laboratory for Agriculture and the Environment								
Robert Spencer (S)	01	Florida State University	Earth, Ocean & Atmospheric Science	NASA			P20434	Chemical Signatures of Change in the Arctic: A Study of	Chamister		1
Alvssa Burns (G)	PI	University of California. Davis	Land. Air and Water Resources	NASA			P20434	Terrigenous Dissolved Organic Matter in the Yukon River	Chemistry		1
Anne Kellerman (P)	č	Florida State University	Earth, Ocean and Atmospheric Science					Delta			
Amy McKenna (S)	č	National High Magnetic Field Laboratory	ICP								
Alexis Slentz (G)	č	Florida State University	Earth, Ocean, & Atmospheric Sciences								
Maria Tzortziou (S)	č	City College of New York	Earth and Atmospheric Sciences								
Driane Yvin (G)	č	Florida State University	Earth Ocean and Atmospheric Science								
Kimberly Wickland (S)	PI	U.S. Geological Survey	National Research Program	US Geological Survey	Other LIS Federal Agency		P20435	Improved Understanding and Prediction of Prioritized	Chemistry		1 (
Martin Kurek (P)	c	Florida State University	Earth, Ocean, and Atmospheric Science		our of reducing and		. 20400	Water Quality Constituents in the Illinois River Basin	Chemberry		
Amy McKenna (S)	c	National High Magnetic Field Laboratory	ICR					-			
Patricia Medeiros (S)	PI	University of Georgia	Marine Sciences	NSF	OPP - Office of Polar Programs	OPP1941483	P20437	How Does Glacial Melt Affect Dissolved Organic Matter	Chemistry		1
Renato Castelao (S)	с	University of Georgia	Marine Sciences		5			Composition and Transformations in the Amundsen Sea			
Amy McKenna (S)	С	National High Magnetic Field Laboratory	ICR					Polynya?			
Giovanna Utsumi (G)	С	University of Georgia	Marine Sciences								
Robert Young (S)	PI	New Mexico State University, Main Campus	Chemical Analysis & Instrumentation Laboratory	DOD	SERDP - ESTCP		P20440	Evaluation of the Sensitivity and Selectivity of 21 T FT-ICF	Chemistry		2 2
Lydia Babcock-Adams (P)	С	National High Magnetic Field Laboratory	CIMAR, ICR					MS for PFAS Screening in Field Samples			
Jens Blotevogel (S)	С	Commonwealth Scientific and Industrial Research Organization	Land and Water								
F. Omar Holguin (S)	C	New Mexico State University, Main Campus	Department of Plant and Environmental Science								
Amy McKenna (S)	C	National High Magnetic Field Laboratory	ICR	NSE	005 0 0 1	005000000			0		_
Robert Spencer (S)	PI	Florida State University	Earth, Ocean & Atmospheric Science	NSF	OCE - Ocean Sciences	OCE2333961	P20441	El Niño Event Impacts on Organic Matter Export and Composition in the Amazon and Tapajós River	Chemistry		1 (
Martin Kurek (P) Amy McKenna (S)	C C	Florida State University National High Magnetic Field Laboratory	Earth, Ocean, and Atmospheric Science	1			1	composition in the Amazon and Tapajos River	1		
Amy McKenna (S) Giselle Knudsen (S)	DI *	Alaunus Biosciences, Inc.	Research	NIH	NCI - National Cancer Institute	CA254649	P20453	Identification and Quantification of Multispecific Antibody	Rieleny Riechemister Rienbusies		1
Sibelle Killuseri (S)	P1 -	Audunus prosciences, inc.	Nesearci	PMI I	NGI - National Cancer Institute	07204049	P20453	Domain-Containing Proteins in Biological Samples	Biology, Biochemistry, Biophysics		1
issa Anderson (S)	c	National High Magnetic Field Laboratory	ICR					bornam of annung rickano in biological dampes	1		
James McClelland (S)		National High Magnetic Field Laboratory University of Texas, Austin	Marine Science Institute	NSF	Other	1914081	P20462	Investigating Seasonal and Spatial Controls on Dissolved	Chomistry		2
Martin Kurek (P)	C C	Florida State University	Earth, Ocean, and Atmospheric Science	nor	Outer	1014001	F 20462	Organic Matter (DOM) Persistence across the Pan-Arctic	Chembuy		-
Amv McKenna (S)	č	National High Magnetic Field Laboratory	ICR	1			1	Watershed	1		
Oriane Yvin (G)	č	Florida State University	Earth,Ocean,and Atmospheric Science	1			1		1		
Dave Valentine (S)	PI	University of California, Santa Barbara	Department of Geological Sciences	State of California	Other	State of California Sea Grant of Southern	P20463	Molecular characterization of oil residues in San Pedro	Chemistry		1 (
(-/		,				California		Bason (California)	l' é		1
Robert Nelson (S)	С	Woods Hole Oceanographic Institution	Dept Marine Chemistry and Geochemistry	1			1		1		
Chris Reddy (S)	С	Woods Hole Oceanographic Institution	Geochemistry	1			1		1		
Ryan Rodgers (S)	С	National High Magnetic Field Laboratory	ICR	1			1		1		
Jacob Schmidt (G)	С	University of California, Santa Barbara	Interdepartmental Graduate Program in Marine Science						1		
			(IGPMS)								
Natalia Malina (S)	PI *	Auburn University	Geosciences	No other support			P20494	Analyzing larger molecular weight fractions of DOM by 21	Chemistry		1 (
Amy McKenna (S)	С	National High Magnetic Field Laboratory	ICR	1			1	T FT-ICR MS	1		
Ann Ojeda (S)	С	Auburn University	Geosciences								_
Diana Palacio (S)	PI *	University of Warwick	Chemistry	No other support			P20505	Assessing the chemical composition and hydroxyl group	Chemistry		1
	10	National High Magnetic Field Laboratory	ICR	1				content of pyrolytic fractions of bio-oils by FTICR MS	1		
Amy McKenna (S)	~										
my McKenna (S) fartin Willa (S)	č	University of Warwick	Chemistry					Total Proposals		Experiment	its: Da

	Participants (Name, Role, Org., De	of)		Funding Sources (Funding Agency, Division, Award #)		Proposal #	Proposal Title	Discipline	Exp.# Days Used
Samuel Grant (S)	PI National High Magnetic Field Laboratory	Chemical & Biomedical Engineering	No other support			P17423	900 Maintenance Related to MRI	Biology, Biochemistry, Biophysics	5 31
Ashlev Blue (T) Hannah Bryant (G)	C National High Magnetic Field Laboratory C Florida State University	NHMFL Chemical and Biomedical Engineering at the College of Engineering NMR-MRI	NSF	DMR - Division of Materials Research	DMR2128556				
Shinho Cho (O) Thierry Dubroca (S)	C National High Magnetic Field Laboratory C National High Magnetic Field Laboratory	NMR-MRI							
Malathy Elumalai (O)	C National High Magnetic Field Laboratory C National High Magnetic Field Laboratory	EMR NMR-MRI							
Malathy Education (0) Frederic Mentink (S) Faith Scott (P)	C National High Magnetic Field Laboratory C National High Magnetic Field Laboratory	CIMAR Biochemistry & Molecular Biology							
Failt Scole (F) Sungacol WW (S) Samuel Grant (S) Djargo Allegretti (U) Banghao Chen (S) Shinho Cho (O)	C National High Magnetic Field Laboratory PI National High Magnetic Field Laboratory	Biochemistry & Molecular Biology NMR Chemical & Biomedical Engineering Richard and Loan Hill Department of Biomedical engineering Chemicity & Biochemistry National Aleri National Aleri	No other support				500 MRI Maintenance		
Samuel Grant (S) Django Allegretti (U)	PI National High Magnetic Field Laboratory C University of Illinois at Chicago	Chemical & Biomedical Engineering Richard and Loan Hill Department of Biomedical engineering	No other support			P17559	500 MRI Maintenance	Engineering	6 21.5
Banghao CHen (S)	Validman High Magnetic Field Laboratory University of Illinois at Chicago Elorida State University National High Magnetic Field Laboratory	Chemistry & Biochemistry							
	C National High Magnetic Field Laboratory								
Federico Krauch (G) Geron Mataisz (G)	C Pencarati nga maganab na Catalonia C Pencarativana State University C IBEC - Institute for Bioengineering of Catalonia	Engineering science and Mechanics Department Melecular Immine for Precision Medicine Jahoratory							
Gergo Matajaz (G) Jenna Radovich (G)	C Florida State University	Engineering science and wechanics department Melecular Imaging for Procision Medicine laboratory Chemical & Biomedical Engineering							
Dayna Richter (G) Adam Veige (S) Clifford (Russ) Bowers (S)	C Florida State University PI University of Florida	Chemical & Biomedical Engineering Chemistry	NSF	CHE - Chemistry	CHE1808234	P19170	Quantification of End Groups in Cyclic vs. Linear Polyacetylenes by Carbon-1 Magic Angle Spinning Nuclear Magnetic Resonance Spectroscopy	Biology, Biochemistry, Biophysics	1 5
Clifford (Russ) Bowers (S)	C University of Florida C University of Florida	Chemistry					Magic Angle Spinning Nuclear Magnetic Resonance Spectroscopy		
Alec Esper (G) Zhihui Miao (G)	C University of Florida	Chemistry Department of Chemistry							
Brent Sumerlin (S) Ilva Litvak (S)	C University of Florida PI * National High Magnetic Field Laboratory	Chemistry	No other support			P19346	Development of passive shims for resistive magnets	Development of Magnet Technology	1 10
William Brey (S)	C National High Magnetic Field Laboratory	NMR							
Jason Kitchen (T) Geoffrev Strouse (S)	C National High Magnetic Field Laboratory PI National High Magnetic Field Laboratory	Chemistry	NSF	DMR - Division of Materials Research	DMR 1905757	P19372	Multinuclear solid-state NMR investigation of plasmonic and photoluminescent	Chemistry	7 19
Geoffrev Strouse (S) Adam Altenhof (G) Carl Conti (G)	PI National Hoth Magnetic Field Laboratory C Florida State University C Florida State University	Chemistry and Biochemistry Chemistry & Biochemistry Chemistry & Biochemistry					nanocrystals		
Catherine Fabiano (G) Zhehong Gan (S)	C Florida State University C National High Magnetic Field Laboratory	Chemistry							
Ivan Hung (S)	C National High Magnetic Field Laboratory C National High Magnetic Field Laboratory	NHMFL CIMARINMR							
Inan Hung (S) Jason Kuszynski (G) Raul Ortega (G)	C National High Magnetic Field Laboratory C Florida State University C Florida State University	Chemistry & Biochemistry Chemistry & Biochemistry							
Robert Schurko (S)	C Florida State University	Chemistry							
Robert Smith (G) Cameron Vojvodin (G)	C Florida State University C Florida State University	Chemistry and Biochemistry Chemistry and Biochemistry							
Hadi Mohammadigoushki (S)	PI Florida State University	Chemical and Biomedical Engineering	NSF	CAREER - Faculty Early Career Development Program	1942150	P19421	Probing in situ structure of monocional antibodies at water-air and water-oil interfaces via high field nuclear magnetic resonance spectroscopy	Engineering	7 52
Jamini Bhagu (G)	C Florida State University	Chemical ENG	Florida State University-CRC	Other			www.wc.www.wg/TINND INCOME INSURANCE RESONANCE Specifoscopy	1	
Samuel Grant (S) Alfredo Scioliani (G)	C National High Magnetic Field Laboratory C Elocida State University	Chemical & Biomedical Engineering Chemical & Biomedical Engineering						1	
Sunasool Wi (S) Liliya Vugmeyster (S)	C National High Magnetic Field Laboratory	NMR							
	PI University of Colorado, Deriver	Chemistry	NH	NIGMS - National Institute of General Medical Sciences	GM111681	P19439	Variant-specific dynamics of amyloid-beta fibrils by solid-state deuteron NMR.	Biology, Biochemistry, Biophysics	7 18
C. James McKnight (S) Dmitry Ostrovsky (S)	C Boston University C University of Colorado, Denver	Physiology & Biophysics Mathematics						1	
Aryana Rodgers (G)	C University of Colorado, Denver	Network							
Aryana Rodgers (G) Ashley Blue (T) William Brey (S) Justin Douglas (S)	Control any of contract, Deriver Control Very Control Ven		No other support No other support		GM122698	P19456	NMR System Maintenance	Development of Magnet Technology	3 13.5
Justin Douglas (S)	C University of Karsas C National High Magnetic Field Laboratory	NMR Molecular Structures Group NMR	the const apport						
Rajang Fu (S) Zhehong Gan (S) Petr Gorikov (S) Samuel Grant (S) Nan Hung (S)									
Petr Gorkov (S)	C National High Magnetic Field Laboratory C National High Magnetic Field Laboratory C National High Magnetic Field Laboratory C National High Magnetic Field Laboratory	CIMAR Chemical & Biomedical Engineering							
Ivan Hung (S)	C National High Magnetic Field Laboratory	CIMAR/NMR							
	C National Institutes of Health	Laboratory of Chemical Physics Biochemistry & Molecular Biology							
Joanna Long (S) Frederic Mentink (S) Jose Uribe (G)	C National High Magnetic Field Laboratory L Liviversity of California. Irvine C California State University. East Bav	CIMAB							
Jose Uribe (G) Xiaoling Wang (S)	C University of California. Irvine C California State University. East Bay	Chemistry Chemistry							
Xiaolino Wano (S) Sunosool Wi (S) Blake Wilson (P)	C National High Magnetic Field Laboratory C National Institutes of Health	NMR Laboratory of Chemical Physics, National Institute for Diabetes and Digestive and Kidney Diseases							
		Caloratory of Chemical Physics, National Institute for Diabetes and Digestive and Ridney Diseases							
Sungsool Wi (S) David De Haro Del Rio (G)	PI National High Magnetic Field Laboratory C Autonomous University of Nuevo León	NMR FACULTAD DE CIENCIAS QUIMICAS	No other support NIH	NINDS - National Institute of Neurological Disorders and Stroke	NS097490	P19492	Utilization of 1H-1H correlation schemes for the structural study of perdeuterated/non-perdeuterated 13C and/or 15N-labeled biosolids	Biology, Biochemistry, Biophysics	14 70.5
Rivera de la Rosa (S)	C Autonomous University of Nuevo León	Chemical Engineering		CHE - Chemistry	CHE2203405				
Thierry Dubroca (S)	C National High Magnetic Field Laboratory	EMR	NSF	CHE - Chemistry	CHE2203405				
Lucio Frvdman (S) Marco Garza-Navarro (S)	C National Hoh Magnetic Field Laboratory	NMR FACULTAD DE INGENIERIA MECANICA Y ELECTRICA							
Maroo Garza-Navarro (S) Anzeliki Giannouli (S) Jian Hou (P)	C Autonomous University of Naevo León Weizmann Institute of Science C Dankock University	Chemical and biological physics Energy Engineering							
		Energy Engineering							
James Kimball (G)	C Florida State University C Dankook University	Chemistry Energy Engineering Department							
Chang Hyun Lee (S) Woonghee Lee (S) Conggang Li (S)	C Linversity of Colorado, Derver C Wuhan Institute of Physics & Mathematics, Chinese Academy of Sciences	Chemistry							
Conggang Li (S)	C Wuhan Institute of Physics & Mathematics, Chinese Academy of Sciences	Chemistry State Key Lab of Magnetic Resonance							
Jun Hyun Lim (G)	C Dankook University C East Carolina University	Energy Engineering Department							
Kwang Hun Lim (5) Carlos Javier Lucio Ortiz (5) Frederic Mentink (5)	C East Carolina University C Autonomous University of Nuevo León	Chemistry FACULTAD DE CIENCIAS QUIMICAS							
Frederic Mentink (S) Francisco José Morales-Leal (S)	C Autonomous University of Naevo León National High Magnetic Field Laboratory C Autonomous University of Naevo León	CIMAR Chemical Sciences							
Karen Pham (G) Evelin Ruiz-Zamora (G)	C University of Colorado, Denver C Autonomous University of Nuevo León	Chemistry Chemistry							
Ladislao Sandoval-Rangel (P)	C Monterrey Institute of Technology and Higher Education C National High Magnetic Field Laboratory	Escuela de Ingenieria y Ciencias							
Ladislao Sandoval-Rangel (P) Faith Scott (P) Carolina Solis Maldonado (S)	C Veracruzan University	Biochemical Sciences Chemical Sciences							
	C National High Magnetic Field Laboratory Pl University of Wastern Optimia	EMR	NSERC of Canada	Other		P19515	170 and 91Zr solid-state NMR of metal-organic frameworks at 35.2 T	Chemistry	7 34
Zhehong Gan (S)	C National High Magnetic Field Laboratory	NHMFL						,	
Vining Huang (S) Zhehong Gan (S) Alla Hassan (S) Ivan Hung (S)	C National High Magnetic Field Laboratory C Bruker Biospin AG Switzerland C National High Magnetic Field Laboratory	Charles y NEWEL Charlisony CIMARINAR						1	
	C University of Western Ontario	Chemistry NMR						1	
Martine Monette (S) Jochem Struppe (S) Victor Terskikh (S)	C Bruker Biospin Canada C Bruker Biospin AG Switzerland	NMB						1	
Victor Terskikh (S) Jiabin Xu (G)	C University of Otawa C University of Western Ontario	National Utrahigh-field NMR Facility for Solids Chemistry						1	
Wani Zhang (G) Tim Cross (S)	C University of Western Ontario	Chemistry	No. 1	NIAID - National Institute of Allerov and Infectious Diseases	A14 (04 TD		Displayed Characteristics of CADO Cable 2 Constals in the	Distance Discharging Discharging	
	PI National High Magnetic Field Laboratory	NHMFL/Chemistry & Biochemistry	NE			P19516	Structural Characterization of SARS-CoV-2 E protein in lipid bilayer with Solid- State NMR	Biology, biochemistry, Biophysics	13 65
Jiaxing Fan (G)	C Florida State University	Chemistry and Biochemistry	NH	NIGMS - National Institute of General Medical Sciences	GM122698			1	
Wenhao Hu (G)	C Florida State University	Chemistry and Biochemistry						1	
Yan-Yan Hu (S) Lisa Monluc (G)	C Florida State University C Florida State University	Chemistry & Biochemistry Chemistry						1	
Ronglu Zhang (P)	C National High Magnetic Field Laboratory	NHMFL Device and Character						1	
Huan-Xiang Zhou (S) Danielle Laurencin (S)	C University of Illinois at Chicago PI University of Montpellier	Physics and Chemistry Institut Charles Genhandt de Montpellier NHMFL	ERC	Other	772204	P19532	Identification of interfacial bonding environments in functional nanomaterials as biomaterials using high resolution solid state NMR at (ultra)-high fields	d Chemistry	9 29
Zhehong Gan (S) Christel Gervais (S)	C National High Magnetic Field Laboratory C Sorborne University		ERC CNRS ERC ANR	Other Other Other			biomaterials using high resolution solid state NMR at (utra)-high fields	1	
	C Example Mathematic Constant for Calculation Descention	Institut Charles Gerhardt de Montneller	ANR	Other				1	
Ivan Hung (S) Sébastien Mittelette (O) Adam Nelson (G)	C National Hich Maentic Field Laboratory C French National Center for Scientific Research	CIMAR/NMR						1	
Adam Nelson (G) Austin Peach (G)	C Sorborne University C Florida State University	Chemistry Chemistry						1	
Austin Peach (G) Robert Schurko (S)	C Elorida State Liniversity	Chemistry						1	
Amrit Venkatesh (S) Cesario Borlongan (S)	C National High Magnetic Field Laboratory PI University of South Florida	National High Magnetic Field Laboratory College of Medicine, Neurosurgery	NH	NINDS - National Institute of Neurological Disorders and Stroke	NB102395	Places	In vivo assessment of cell-derived therapies for treatment of stroke: 23Na MR and 1H MRS	Biology, Biochemistry, Biophysics	49 74
			[P19969	and 1H MRS	gy,	/*
		Chemical & Biomedical Engineering	NH	NINDS - National Institute of Neurological Disorders and Stroke	NS115490	1	1	1	
Jacob Athey (U)	C Florida State University								
Jacob Athey (U)	C Elocido State Universito	Chemical ENG							
Jacob Athey (U) Jamini Bhacu (G) Hannah Brvant (G) Bruce Bunnell (S)	C Elocido State Universito	Chemical ENG Chemical and Biomedical Engineering at the College of Engineering Pharmacology							
Jacob Athey (U) Jamini Bhaou (G) Hannah Bruce Burnett (G) Bharnon Helsber (G) Bharnon Helsber (G) David Hike (G)	C Elocido State Universito	Chemical ENG Chemical and Biomedical Engineering at the College of Engineering Pharmacology							
Jacob Athey (U)		Chemical ENG Chemical and Biomedical Engineering at the College of Engineering							

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	Particip (Name, Role, 6	ants Org., Dept.)		Funding Sources (Funding Agency, Division, Award #)		Proposal #	Proposal Title	Discipline	Exp.#	Days Used
Leonard Mueller (S)	PI University of California, Riverside	Chemistry	NH	NIGMS - National Institute of General Medical Sciences	GM097569	P19571	DNP-Enabled Solid-State NMR of PLP Enzymes: Tyrosine Phenol Lyase	Chemistry		4 1
Maria Luiza Caldas Nogueira (P)	C University of Florida	Biochemistry and Molecular Biology	NH	NIGMS - National Institute of General Medical Sciences	GM122698					
Rittik Ghosh (G)	C University of California, Riverside	Chemistry	NH	NIGMS - National Institute of General Medical Sciences	GM137008					
Ivan Hung (S) Joanna Long (S) Frederic Mentink (S)	C National High Magnetic Field Laboratory C University of Florida	CIMARINIR Biochemistry & Molecular Biology								
	C Liniversity of Florida C National High Magnetic Field Laboratory C National High Magnetic Field Laboratory	CIMAR Biochemistry & Molecular Biology								
Diana Tymochko (U) Michael Famiano (S)	C University of Florida PI Western Michigan University	Biochemistry & Molecular Biology Physics	DOE			D10002	Applications of NMR to Astrobiology: Measurement of Shielding Tensor	Biology, Biochemistry, Biophysics		-
Shiva Agarwal (G) Zbigniew Chalecki (S)	C Western Michigan University C Western Michigan University	Physics	NASA Moore Foundation	Other	7799		Components of Chiral Molecules	boogy, booking, booking, booking		5
Ztighiew Chajecki (S) Sonjong Hwang (S) Gellert Mezei (S)	C Western Microgan University C California Institute of Technology C Western Michigan University	Physics Chemistry and Chemical Engineering	Moore Foundation	Other	7750					
		Chemistry Chemistry Dept								
Sungsool Wi (S) Kwang Hun Lim (S)	C National High Magnetic Field Laboratory PI East Carolina University	NMR	NH	NINDS - National Institute of Neurological Disorders and Strok	e NS097490	P19589	Characterization of Structural Features of Cytotoxic Transthyretin Digomens and their Interaction with Membranes	Biology, Biochemistry, Biophysics	1	11
Mathew Coats (G)	C East Carolina University	Chemistry					and their Interaction with Membranes			
Anvesh Kumar Reddy Dasari (G)	C East Carolina University	Chemistry								
Zhehong Gan (S) Ivan Hung (S)	C National High Magnetic Field Laboratory C National High Magnetic Field Laboratory	NHMFL CIMARINIR								
	C National High Magnetic Field Laboratory	NMR								
Sulung Yi (G) Bo Chen (S) Rigiang Fu (S)	C East Carolina University PI University of Central Florida	Chemistry Department of Physics	No other support			P19664	Molecular Basis of Tunable Iridescence of Cephalopods	Biology, Biochemistry, Biophysics	1	12
Rigiang Fu (S) Zhehong Gan (S)	C National High Magnetic Field Laboratory C National High Magnetic Field Laboratory	NMR NHMFL	NSF	MCB - Molecular and Cellular Biosciences	MCB1856055					
Ivan Hung (S) Md Imran Khan (P)	C National High Magnetic Field Laboratory C University of Central Florida	CIMAR/NMR								
Marina Ikaeva (S)	PI University of Aveiro	Physics Department of Chemistry	"Panacea", European Union's Horizon 2020 research and innovation	Other		P19665	Atomic-level understanding of the sorption mechanisms in Li silicate sorbents to pre-combustion CO2 capture	r Development of Magnet Technology		3
Pierre Florian (S)	C French National Center for Scientific Research	CEMTH	"Panacea", European Union's Horizon 2020 research and innovation	Non US Foundation			pre-combission CO2 capitale			
Zhehong Gan (S)	C National High Magnetic Field Laboratory	NHMFL	programme "Panacea", European Union's Horizon 2020 research and innovation							
Luís Mafra (S)	C University of Aveiro	Chemistry	programme "Panacea", European Union's Horizon 2020 research and innovation	Other						
lideforso Marin-Montesinos (S)	C University of Aveiro	Chemistry	programme							
Frederic Mentink (S)	C National High Magnetic Field Laboratory	CIMIR								
Daniel Pereira (G)	C University of Aveiro	CIMAR CICECC-Aveiro Institute of Materials				1				1
Mariana Sardo (S) Frederic Mentink (S)	C University of Aveiro PI National High Magnetic Field Laboratory	Chemistry CIMAR	NH	NIGMS - National Institute of General Medical Sciences	GM122898	P19765	P41 MAS-DNP probe development	Biology, Biochemistry, Biophysics		3
Thierry Dubroca (S)	C National High Magnetic Field Laboratory	EMR	NH	NIGMS - National Institute of General Medical Sciences	GM148766					
Thornet Hollwitter (B)	C University of Instand	Chemistry						1		1
Thorsten Maly (S) Faith Scott (P)	C Bridge 12, Technologies, Inc. C National High Megnetic Field Laboratory	R&D Biochemistry & Molecular Biology				1				1
Snorri Sigurdsson (S)	C University of lociand	Chemistry Chemistry	No other support			P19772	MAD Constallogments of Discovery disclosured Plate studie Plateau (Chemistry	_	
Robbie Iuliucci (S) Camereon Bolev (U) Anselika Dewicki (U)	C University of localand PI Washington and Jefferson College C Washington and Jefferson College C Washington and Jefferson College	Chemistry	reo orner support			P19/72	NMR Crystallography of Pharmaceuticals and Biologically Relevant Nanocrystals Augmented by Multinuclear High Field Solid-State NMR	y		1
Zacharv Gardner (U)		Chemistry Chemistry						1		1
Sean Holmes (P) Rosalvnn Quifones (S)	C Florida State University C Marshall University	Chemistry and Biochemistry Chemistry				1				1
Robert Schurko (S) Cameron Volvortin (G)	C Florida State University C Florida State University	Chemistry Chemistry and Biochemistry								
Cameron Volvodin (G) Myriam Cotten (S) Haydn Ball (S)	C Florida State University PI College of William and Mary C University of Texas. Southwestern	Applied Science Chemistry	NSF	MCB - Molecular and Cellular Biosciences NIGMS - National Institute of General Medical Sciences	MCB1716608 GM126527	P19777	Leveraging Solid-State NMR to Investigate Host Defense Mechanisms at Bininginal Membranes	Biology, Biochemistry, Biophysics	1	19 1
		Chemstry	NH	NIGMS - National Institute of General Medical Sciences	GM126527		Boogcal Membranes			
Rigiang Fu (S) Evan Goodell (G)	C National High Magnetic Field Laboratory C College of William and Mary	NMR Applied Science								
Daniel Rosenbaum (S) Yawei Xioon (G)	C University of Texas, Southwestern C College of William and Mary	Biophysics Applied Science								
Yawei Xiong (G) Ronglu Zhang (P) Andrea Zourou (G)	C College of William and Mary C National High Magnetic Field Laboratory C College of William and Mary	NH/FL Applied Science								
	PI * Washington University in St. Louis	Energy, Environmental & Chemical Engineering	NSF	DMR - Division of Materials Research	DMR2105150	P19800	Determining secondary structure in protein-based block copolymer fibers by carbon-carbon correlation solid-state NMR spectroscopy	Material Science		1 10
Jinovao Li (G) Frederic Mentink (S) Faith Scott (P)	PI Washington University in St. Louis C Washington University in St. Louis C National High Magnetic Field Laboratory	Department of Energy. Environmental & Chemical Engineering CIMAR					carbon-carbon correlation solid-state reark spectroscopy			
Faith Scott (P) Fuzhong Zhang (S)		Biochemistry & Molecular Biology Energy, Environmental & Chemical Engineering NHMFL								
Fuzhona Zhana (S) Zhehona Gan (S) William Brev (S) Petr Gorikov (S)	Washington Livivestiv in St. Louis Washington Livivestiv in St. Louis Pl National High Magnetic Field Laboratory National High Magnetic Field Laboratory National High Magnetic Field Laboratory		No other support			P19856	Development and implementation of solid-state NMR methods at high magnetic fields	Chemistry	1	17 59
Petr Gorlkov (S) Elizabeth Green (S)	C National High Magnetic Field Laboratory C National High Magnetic Field Laboratory	NMR CIMAR Condersed Matter Science								
Pohort Oritin (9)		Chemistry CIMARNNR								
Ivan Hung (S) Eric Keeler (G)	C National High Magnetic Field Laboratory C Massachusetts Institute of Technology	Chemistry								
Ilya Litvak (S) Wenping Mao (P)	C National High Magnetic Field Laboratory C National High Magnetic Field Laboratory	CIMRNMR								
Wenping Mao (P) Robert Schurko (S) Amit Verkatesh (S)	C Florida State University C National High Magnetic Field Laboratory	Chemistry National High Magnetic Field Laboratory								
Yijue Xu (P) Hadi Mohammadigoushki (S)	C National High Magnetic Field Laboratory PI Florida State University	solid-state NMR Chemical and Biomedical Engineering	NSF	CAREER - Faculty Early Career Development Program	1942150	P19875	Protein spectroscopy in emulsions	Engineering	1	14 9'
Jamini Bhaou (G)	C Florida State University	Chemical ENG	MadLab REU	Other						
Reza Foudazi (S) Samuel Grant (S)	C University of Oklahoma C National Hoh Magnetic Field Laboratory	School of Chemical, Biological and Materials Engineering	Printer and Percent	Gan						
Chice Patterson (U)	C Florida State University	Chemical & Biomedical Engineering Chemical and Biomedical Engineering Department								
Alfredo Scidiani (G) Sabyasachi Sen (S)	C Florida State University PI University of California, Davis	Chemical & Biomedical Engineering Chemical Engineering and Materials Science	NSF	DMR - Division of Materials Research	DMR 1855 176	P19876	High-Field NMR Investigation of the Structural Evolution during Nucleation in	Engineering		9
Christian Bonhomme (S) Jaclyn Catalano (S)	C Pierre and Marie Curie University C Montclair State University	Laboratoire de Chimie de la Matière Condensée Department of Chemistry and Biochemistry					Glass-Ceramics: Towards an Atomistic Understanding			
Silvia Centeno (S) Kulzhi Chen (P)	C Metropolitan Museum of Art C National High Magnetic Field Laboratory	Department of Chemistry and Biochemistry Scientifi Research NMR								
Valeria Di Tulio (P) Cecil Dybowski (S)	C Metropolitan Museum of Art C University of Delaware	Scientific Research Chemistry and Biochemistry								
Cecil Dybowski (S) Zhehong Gan (S) Christel Gervais (S)	C National High Magnetic Field Laboratory	NHMFL Laboratoire de Chimie de la Matière Condensée						1		1
	C Sorbonne University C University of Western Ontario	Chemistry						1		1
Ivan Hung (S) Vinicius Martins (G) Scott McCormack (S)	C National High Magnetic Field Laboratory C University of Western Ontario C University of California, Davis	CIMARINAR Chemistry								
	C Stanford University	Chemistry Materials Science & Engineering Geological Sciences						1		1
Pand Supprop (C)	C University of Colfernia David	Materials Science & Ecological						1		1
Amrit Verkatesh (S) Molly Wagner (G) Toerrin Verkatesh (S)	C National High Magnetic Field Laboratory C University of Delaware C Pohang University of Science and Technology	National High Magnetic Field Laboratory Department of Cherrisby and Biochemistry Graduate Institute of Ferrous & Energy Materials Technology						1		1
Taemin Yeo (G) Bing Yuan (G)		Graduate Institute of Ferrous & Energy Materials Technology Engineering Chamistra				1				1
Wanli Zhang (G) Nicholas Zumbulyadis (S)	C University of Western Ontario C Independent Scholar and Consultant	Chemistry Consultancy								+
Bradley Nilsson (S) Hannah Distaffen (G)	PI University of Rochester C University of Rochester	Chemistry Chemistry	NSF	CHE - Chemistry	CHE1904528	P19881	Interrogating the packing architecture of self-assembled biomaterials	Biology, Biochemistry, Biophysics		3
Elena Quidev (G) Robert Schurko (S)	C University of Rochester PI Florida State University	Chemistry Chemistry	NSF	CHE - Chemistry	CHE2003854	PIGARS	Multiruclear Solid-State NMR of Quadrupolar Nuclei in Active Pharmaceutical Ingredents: New Pathways for the Characterization of Polymorphs, Hydrates, Cocrystals, and Desage Forms	Chemistry		16
Christer Aakerov (S)	Florida State University Kansas State University University Windsor	Chemistry and Biochemistry	Noi+ Florida State University National Hidh Magnetic Field Laboratory	US College and University	Start up funds	+ 12000	Ingredients: New Pathways for the Characterization of Polymorphs, Hydrates, Connections and Deceme Forms	·····,	11	
Louae Abdulla (G) Adam Altenhof (G)	C Florida State University	Chemistry Chemistry and Biochemistry	National Hish Masnetic Field Laboratory Florida State University	US Government Lab US College and University	Start-up funds from DMR-1644779 Startup	1	and provide the second se			1
Jochen Autschbach (S) Eric Breynaert (S)	C University of Buffalo C Catholic University Leuven	Crieffishy M2S						1		1
Carl Conti (G)	C Florida State University C Catholic University Leaven	Chemistry & Biochemistry M2S						1		1
Catherine Fabiano (G) Catherine Fabiano (G) Carl Fleischer (G)	C Florida State University C Florida State University	Chemistry Chemistry						1		1
Carl Fleischer (G) Tomislav Friscic (S)	C Florida State University	Chemistry Chemistry						1		1
Zhehong Gan (S) leva Goldberga (P)	C McGill University C National High Magnetic Field Laboratory C French National Center for Scientific Research	NHMEL						1		1
David Hirsh (P)	C Iowa State University	Institut Charles Gerhardt de Montpellier Chemistry						1		1
Sean Holmes (P) Maarten Houleberghs (P) Ivan Hung (S)	C Florida State University C Catholic University Leuven C National High Magnetic Field Laboratory	Chemistry and Biochemistry M2S								
Michael Jaroszewicz (G)	C University of Windsor	CIMARINMR Chemistry						1		1
James Kimboll (C)	C Florida State University	Chemistry						1		1
Danielle Laurencin (S) Leonard MacGillvray (S)	C University of Montpeller C University of Iowa	Institut Charles Gerhardt de Montpellier Department of Chemistry and Biochemistr						1		1
Frederic Mentink (S) Thomas Vaviar Mitta (S)	C National High Magnetic Field Laboratory C Institut des Biomolécules Max Mousseron	CIMAR Ecuipe Chimie Verte et Technologies Innovantes								
Austin Peach (G) Adam Phillos (P)	C Florida State University C University of Buffalo	Chemistry and Biochemistry Chemistry						1		1
Sambhu Radhakrishnan (S) Jeremy Rawson (S)	C Catholic University Leuven C University of Windsor	M2S Department of Chemistry and Biochemistry						1		1
Jazmine Sanchez (G) Jazmin Schoerzart (G)		Chamietos and Biochemistos						1		1
Faith Scott (P)	C Florida State University C National High Magnetic Field Laboratory	Chemistry and Biochemistry Biochemistry & Molecular Biology								
Robert Smith (G)	C Florida State University C University of Montpellier	Chemistry and Biochemistry Chemistry						1		
Janeiro Spockoup (D)			1			1	1	1		1
Inertica Spackoup (P)	C National High Magnetic Field Laboratory	Chemistry Department of Chemistry and Rischemistry								
Jessica Spackova (P) Geoffrey Strouse (S) Sara Termos (G) Johan van Tol (S) Cameron Volvodin (G)	C National High Magnetic Field Laboratory C Florida State University C National High Magnetic Field Laboratory C Florida State University	Cheristry Department of Cherristry and Biochemistry EMR Cherristry and Biochemistry								

NMR

NMR

	Participa (Name, Role, O	nts g., Dept.)		Funding Sources (Funding Agency, Division, Award #)		Proposal #	Proposal Title	Discipline	Exp.# Days
Terry Gullion (S)	PI West Virginia University	Chemistry	No other support			P19889	DNP-MAS of Honey Bee Wings	Biology, Biochemistry, Biophysics	1
Samuel Eddv (G) Frederic Mentink (S) Faith Scott (P)	C West Viroinia Liniversity C National High Magnetic Field Laboratory C National High Magnetic Field Laboratory	Chemistry CIMAR Biochemistry & Molecular Biology							
Sungsool Wi (S) Fuo Wang (S)	C National High Magnetic Field Laboratory C National High Magnetic Field Laboratory	NMR			MCB1942665		Solid-State NMR and DNP Investigations of Moss Carbohydrates and		
luo wang (S) Malitha Chathuranga (P) Robert Cook (S)	C National High Magnetic Field Laboratory PI Michigan State University C National High Magnetic Field Laboratory	Chemistry National High Magnetic Field Laboratory	NSF	MCB - Molecular and Cellular Biosciences	MCB1942665	P19901	Biomaterials	Biology, Biochemistry, Biophysics	8
Sael De Paepe (S)	C Louisiana State University C French Alternative Energies and Atomic Energy Commission	Chemistry Institute for Nanoscience and Cryogenics							
lebkumar Debnath (G) Iyanage Fernando (G)	C Michigan State University C Michigan State University	Chemistry Chemistry							
yanaga Fernando (G) hehong Gan (S) hehong Gan (S) ha Gautan (G) ana Gunda Cimerman (S) anah Henral (G) abhe Heholger (S) ana Hung (S) mand Jacob (G) ana-Paul Latge (S) anah Hang (S)	Model and Marken/Entit Laboratory Model and Marken/Entit Labo	NMR NHMFL							
sha Gautam (G)	C Michigan State University	Chemistry Districtive al Faculty, Dept. Biology DIRFINGAMEMRM							
ina Gunde Cimerman (S) ania Harrabi (G)	C University of Ljubijana C French Alternative Energies and Atomic Energy Commission	DRF/IRIG/MEM/RM							
ibine Hediger (S) an Hung (S)	C French Alternative Energies and Atomic Energy Commission C National High Magnetic Field Laboratory	Institute for Nanoscience and Cryogenics CIMARNNR Department of Chemistry							
nand Jacob (G)	C Michigan State University C Michigan State University	Department of Chemistry Chamistry							
san-Paul Latge (S)	C University of Crete	Institute of Molecular Biology and Biotechnology							
iana Martinez-Avila (G)	C University of Manchester C Autonomous University of the State of Morelos C National High Maenetic Field Laboratory C French Alternative Energies and Atomic Energy Commission	Chemical Engineering Science							
aniel Lee (S) liana Martinez-Avila (G) rederic Mentink (S) ubrhadio Paul (T)	C National High Magnetic Field Laboratory C French Alternative Energies and Atomic Energy Commission	Science Ginar CIMAR DRF/IRIGIMEM/RM							
aith Scott (P)	C National High Magnetic Field Laboratory	Biochemistry & Molecular Biology Chemistry EMR							
aloana Sinoh (G) ohan van Tol (S) ayasubba Reddy Yarava (P)	C Michican State University C National High Magnetic Field Laboratory C Michigan State University	EMR Chemistry Department							
(ancheng Zhao (G) vian Murray (S)	C Michigan State University PI University of California, Davis	Chemistry Chemistry		NIGMS - National Institute of General Medical Sciences	GM142892	P10010	Molecular Determinants for the Assembly of Low Complexity Protein Domains		
, ,,,,		,	NH	NIGMS - National Institute of General Medical Sciences	GM142892	P19910	Molecular Determinants for the Assembly of Low Complexity Protein Domains	Biology, Biochemistry, Biophysics	1
stely Carranza (G) aniel Farb (G)	C University of California, Davis C University of California, Davis	Chemistry Chemistry							
ake Fonda (G)	C University of California, Davis	Chemistry							
asato Kato (S)	C University of Texas, Southwestern	Medical Center							
teven McKnight (S) ayla Osumi (G)	C University of Texas, Southwestern C University of California, Davis	Chantoloy Dominitary Dominitary Medical Center Medical Center Chantoloy							
stely Carranza (G) aniel Farb (G) lake Fonda (G) lakato Kato (S) lakato Kato (S) savja Osami (G) azhle Strowell (G) azhle Strowell (G) azhle Strowell (G)	C University of Washington C University of Texas, Southwestern	Chemistry Chemistry Biochemistry						1	
uvki Wittmer (G) avid Bryce (S)	Liversity of California, Duvis Liversity of California, Duvis Liversity of Teas, Southwatem Liversity of Teas, Southwatem Liversity of Valiesania, José Liversity of Valiesania, José Liversity of California, Davis Liversity of California, Davis Liversity of California, Davis	Chemistry Department of Chemistry and Biomolecular Sciences	Natural Sciences and Engineering Research Council Canada	Non US Council		P19976	Rhenium-185-187 Solid-State NMR Investigation of Non-Covalent Matere Ponds	Chemistry	
iriam Calabrase (G)	C University in Minn		resonant ourselow and ungeweining research Council Canada	····· del counter		F13979	Bonds		1 1
cola Demitri (S)	C Uriversity in Milan C Elettra Sincotoren Trieste C National High Magnetic Field Laboratory National High Magnetic Field Laboratory	Chemistry, Materials and Chemical Engineering "Gluio Natta" Imaging, Difflaction, Emission, Absorption and Scattering NMR NH/REL CIMARNAMR							
Iriam Calabrese (G) icola Demitri (S) iqiang Fu (S) hehong Gan (S) an Hung (S)	C National High Magnetic Field Laboratory C National High Magnetic Field Laboratory	NMR NHMFL							
an Hung (S) amali Nag (G)	C National High Magnetic Field Laboratory C University of Ottawa	CIMAR/NMR Department of Chemistry and Biomolecular Sciences						1	
ndrea Pizzi (S)	C University in Milan	Department of Chemistry and Biomolecular Sciences Chemistry, Materials and Chemical Engineering "Glulio Natta",							
ijue Xu (P) inhua Peng (S)	C National High Magnetic Field Laboratory PI University of Science and Technology of China	solid-state NMR Physics	NH	NIGMS - National Institute of General Medical Sciences	GM122698	P19983	New 170 NMR method for protein channel water study	Biology, Biochemistry, Biophysics	2
Ivriam Cotten (S) im Cross (S)	C College of William and Mary	Applied Science						1	
im Cross (S) Solano Fu (S)	C National High Magnetic Field Laboratory C National High Magnetic Field Laboratory	Azolied Science NHMFL/Chemistry & Biochemistry NMR							
iqiang Fu (S) mrit Venkatesh (S)	C National High Magnetic Field Laboratory C National High Magnetic Field Laboratory	NMR National High Magnetic Field Laboratory NH4FL							
ongfu Zhang (P) ang Wu (S)	PI Queen's University at Kingston	NHWEL	NSERC of Canada	Non US Council		P20014	Probing the hydrogen atom location in short OHN and OHO hydrogen bonds by 170 solid-state NMR	Chemistry	2
ethorg Gan (S) an Hung (S) mit Venkatesh (S) ichael Harrington (S)	PI Queen's University at Kingston C National High Magnetic Field Laboratory C National High Magnetic Field Laboratory	CIMARNMR					170 solid-state NMR		
mit Venkatesh (S)	C National High Magnetic Field Laboratory PI Huntington Medical Research Institutes	National High Magnetic Field Laboratory Melecular Maunitary	MU	NINDS - National Institute of Neurological Disorders and Stro	No. NO072407	P20016	CSF Dynamics, 23Na Fluxes and Ventricular Anatomy Interplay Between	Biology, Biochemistry, Biophysics	46
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amuel Holder (G)	C National High Magnetic Field Laboratory C Florida State University	Chemical & Biomedical Engineering Chemical & Biomedical Engineering Mechanical Engineering							
lamuel Holder (G) Ibe Kolko (G) Inda Petzold (S)	C Florida State University C University of California, Santa Barbara C University of California. Santa Barbara	Mechanical Engineering Computer Science							
Davna Richter (G)	C Florida State University PI National Autonomous University of Mexico	Chemical & Biomedical Engineering Institute of Chemistry	COMACYT	Non US Council		P20064	Dynamics in Fluorescent Crystalline Rotors using Solid-State Nuclear Magneti	c Chemistry	12
ose Luis Belmonte (P) Carl Fleischer (G)	C National Autonomous University of Mexico C Florida State University	Institute of Chemistry Chemistry					Resonance	,	-
Emesto Hemandez-Morales (G)	C National Autonomous University of Mexico	Institute of Chemistry							
Erick Hernandez-Santiago (G)	C National Autonomous University of Mexico	Institute of Chemistry							
iose Mejia-Aleman (G) Irmando Navarro-Huerta (G)	C National Autonomous University of Mexico C National Autonomous University of Mexico	Institute of Chemistry Institute of Chemistry							
izbeth Rodriguez-Cortes (G) Robert Schurko (S)	C National Autonomous University of Mexico C Florida State University	Institute of Chemistry Chemistry							
Cameron Vojvodin (G) Vel Qlang (S)	C Florida State University PI * State University of New York, Binghamton	Chemistry and Biochemistry		NIGMS - National Institute of General Medical Sciences	GM125853			Biology, Biochemistry, Biochysics	
ver Glang (5) aith Scott (P)		Chemstry	NH	NIGMS - National Institute of General Medical Sciences	GM125853	P20075	DNP-ssNMR Studies of Early-Stage Molecular Interactions Between Beta- Amyloid Aggregates and Biological Membranes	Biology, Biochemistry, Biophysics	1
	C National High Magnetic Field Laboratory C Michigan State University	Biochemistry & Molecular Biology Chemistry							
(ancheng Zhao (G) (an-Yan H) (S)	C Michigan State University PI Elorida State University	Chemistry Chamistry & Biochemistry Chemistry and Biochemistry Chemical & Biomedical Engineering	NSE	DMB - Division of Materials Research	DMR1720139	P20091	In Situ and Operando NMR & MRI Studies of All-Solid-State Batteries	Chemistry	6
rudan Chen (G)	L Individual Salad Contentiny Ported Salad Contentiny Ported Salad Contentiny Contention C	Chemistry and Biochemistry							-
feoluwa Oyekunie (G)	C Florida State University	Chemistry Chemistry Chemistry and Biochemistry							
ou Wang (5) (archeng Zbao (5) an-Yan H4 (5) (adar Chen (7) arnuel Carte (5) arnuel Carte (5) (5) (6) (6) (6) (6) (6) (7) (7) (7) (7) (7) (7) (7) (7) (7) (7		Cnemstry and Biochemistry MST							
oseph Zadrozny (S) hehong Gan (S)	PI Ohio State University C National High Magnetic Field Laboratory	MST Chemistry and Biochemistry NHMFL Chemistry	NSF	CHE - Chemistry	CHE2047325	P20082	Solid-state NMR characterization of 59Co NMR thermometers	Chemistry	24
osef Grundy (G) ean Holmes (P)	C Colorado State University	Chemistry Chemistry						1	
ean Homes (P) an Hung (S) ames Kimball (G)	C Florida State University C National High Magnetic Field Laboratory C Florida State University	Chemistry and Biochemistry Clearing Chemistry Clearing Chemistry						1	
In the relation (G)						1	1		
oxanna Martinez (G)	C Colorado State University	Chemistry							
ler Ozvat (G)	C Colorado State University C Colorado State University C Colorado State University	Chemistry Chemistry							
(er Ozvat (G) lephanie Sanchez (U) obert Schurko (S) ara Termos (G)	C Colorado State University C Colorado State University C Colorado State University C Florida State University C Florida State University	Chemistry							
ler Ozvat (G) ephanie Sanchez (U) obert Schurko (S) ra Termos (G) den Unor (P)	C Colorado State University Colorado State University C Colorado State University C Florida State University C Florida State University C Colorado State University	Chenistry Chenistry Chenistry Chenistry Department of Chenistry and Biochenistry		DIP. District Materia Research	PM 89 1 700 100			for Physical art	
ler Ozvat (G) sphanie Sanchez (U) betr Scharko (S) ra Termos (G) ten Lincor (P) saina Halle (S) n-Yan Hu (S)	C Colorado State University Colorado State University C Colorado State University C Florida State University C Florida State University C Colorado State University	Chemistry Chemistry Chemistry Chemistry	NSF	DMR - Division of Materials Research	DMR1720139	P20084	Multinuclear Solid-state NMR Investigations of Hydrogen Transport and Transf in Functional Inorganic Solids	er Chemistry	6
fer Ozvat (G) sphanic Sanchez (U) betri Schurko (S) tra Termos (G) tan Unoor (P) tan Unoor (P) tan Unoor (P) tan Unoor (P) tan Unoor (P) tan Unoor (P)	Colorado State University Podd State University Prodd State University C Prodd State University C Prodd State University	Chenistry Chenistry Chenistry Department of Chenistry and Biochenistry Department Chenistry Matanala Science and Envineeting, and Chenistry Chenistry & Biochenistry	NSF			P20084		fer Chemissity	6
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Participants

Proposal #

Proposal Title

		NMR
Discipline	Exp.#	Days Used
Biology, Biochemistry, Biophysics	5	12

	Participants (Name, Role, Org., Dep	L)		Funding Sources (Funding Agency, Division, Award #)		Proposal #	Proposal Title	Discipline	Exp.#	Days Used
Lynmarie Thompson (S) PI Jessica Allen (G) C	University of Massachusetts	Chemistry	NH	NIGMS - National Institute of General Medical Sciences	GM120195	P20129	Solid-state NMR and DNP of protein interactions in functional bacterial chemoreceptor signaling complexes	Biology, Biochemistry, Biophysics	5	
Jessica Allen (G) C Rigiang Fu (S) C Jeffrev Reimer (S) PI	University of Massachusetts National High Magnetic Field Laboratory	Chemistry NMR Chem and BioM Engineering					NMR Investigation of Anti-Perovskite Mo-Ion Solid Electrolytes	Material Science		
Zhehong Gan (S) C	University of California, Berkeley National High Magnetic Field Laboratory	Chem and BioM Engineering NHMFL	DOE	Other JCESR - Joint Center for Energy Storage Research	JCESR DE-AC02-06CH11357	P20168	NMR Investigation of Anti-Perovskite Mg-Ion Solid Electrolytes	Material Science	2	
David Halat (P) C	Lawrence Berkelev National Laboratory	Materials Sciences Division								
Baris Kev (S) C Haovu Liu (P) C	Aroone National Laboratory Aroone National Laboratory	CSE Chemical Sciences and Engineering Division								
David Halat (P) C Baris Kev (S) C Haovu Liu (P) C Robert Schurko (S) C Amrit Verkatesh (S) C	Florida State University National High Magnetic Field Laboratory	Chemistry National High Magnetic Field Laboratory								
Xiaoling Wang (S) C Mandip Sachdeva (S) PI	California State University, East Bay Florida Agricultural and Mechanical University	Chemistry College of Pharmacy and Pharmaceutical Sciences	No other support		This project is to support an proposal to the FDA	P20184	Effect of different excipients on the adhesives properties in trasdermal patches	Material Science	8	
Arvin Bagde (P) C	Florida Agricultural and Mechanical University	Pharmaceutical Sciences	No other support							
Robert Schurko (S) C Sungsool Wi (S) C	Florida State University National High Magnetic Field Laboratory	Chemistry NMR								
Sungsool Wi (S) C Songi Han (S) Pi Jinlei Cui (G) C	National High Magnetic Field Laboratory University of California, Santa Barbara Washington University in St. Louis	Department of Chemistry and Biochemistry Chemistry	Han68219-CHHSRV	Other		P20211	63Cu SSNMR investigation of Cu(I) site in Cu2O/TiO2 catalyst	Chemistry	3	
Kenneth Poeppeimeer (S) C Kaisorn Chaichana (S) PI	* Mayo Clinic, Jacksonville	Chemistry Neurosurgery	FAMU-FSU College of Engineering	US College and University		P20227	Neurotrast Biomarkers	Engineering	1	
Hunter Aldridge (U) C Vanessa Gonzalez (U) C	Florida State University Florida State University	College of Engineering Biomedical Engineering								
Samuel Grant (S) C Alex Kurleman (U) C	National High Magnetic Field Laboratory Florida State University	Chemical & Biomedical Engineering College of Engineering								
Michael Lohse (U) C Willie Spicht (U) C	Florida State University Florida Adricultural and Mechanical University	Colored of Endineering Biomedical Endineering Colore of Engineering Senior Deeign (BME & IE)								
Samuel (aran (s) C Alax Kuriama (U) C Alax Kuriama (U) C David Tomes-Delgado (U) C Jachen Aufschlach (S) PI Sean Holms (P) C Jarnes Kimball (G) C	Porda State University Porda State University Porda Adroutheral University Porda Adroutheral University Porda State University University of Buffalo Porda State University Porda State University University of Buffalo	Senior Design (BME & IE) Chemistry	DOE	BES - Basic Energy Sciences	DE-SC0022310	P20231	Unraveling the Mysteries of the Platinum Group Elements with Solid-State NMR Spectroscopy and Quantum Chemical Calculations	Chemistry	31	-
Sean Holmes (P) C James Kimball (G) C	Florida State University Florida State University	Chemistry and Biochemistry Chemistry Chemistry					Spectroscopy and Quantum Chemical Calculations			
Adam Philips (P) C Robert Schurko (S) C	University of Buffalo Florida State University	Chemistry Chemistry								
Pohort Smith (C)	Florida State University	Chemistry and Biochemistry								
Sara Termos (G) C Xingkang Huang (S) PI	Florida State University * University of Chicago	Department of Chemistry and Biochemistry Pritzker School of Molecular Engineering	NSF	CMMI - Civit, Mechanical & Manufacturing Innovation	CMMI2037026	P20281	Characterization of cathode materials with aqueous binders by Solid-state NMR	Material Science	7	1
Yong Chu (T) C	Brookhaven National Laboratory	National Synchrotron Light Source II								
Yong Chu (T) C Yanhao Dong (G) C Yanhao Dong (P) C Yanhao Dong (S) C Yanhao Dong (S) C	Biologia del calcona Calconado y University of Pennsylvania Massachusetts Institute of Technology	National Synchrotron Light Source II Materials Science and Engineering Department of Nuclear Science and Engineering School of Physics								
ruquing ru (o)	Beihang University National High Magnetic Field Laboratory									
Qi He (S) C Xiaolino Huano (S) C	Massachusetts Institute of Technology Brockhaven National Laboratory	Department of Nuclear Science and Engineering National Synchrotron Light Source								
Yineno Huano (S) C Ju Li (S) C	Massachusetts Institute of Technology Massachusetts Institute of Technology Southwest Texas Junior College	Materials Science and Engineering Nuclear Science and Engineering								
Cli He (5) C Xianina Huana (5) C Yanana Huana (5) C Qiang Li (5) C Zarag Li (5) C Zarag Li (6) C Zarag Li (6) C Qiang Li (5) C Addrew Mihar (5) C Addrew Mihar (5) C	Southwest Texas Junior College Tsinghua University	National Sinchroton Lidt Source Madraida Sidence and Ennineetrino Nacales Gioinne and Ennineetrino Madraida Sidence and Engineetring Ohenstary and Christical Engineetring								
Ziteng Liang (G) C Gi Liu (S) C	Southwest Tensa Junior Colege Tainghua Utiveratiy Xiamen Utiveratiy Ony Utiveratiy of Hong Kong Argonne National Laboratory Lawrence Berkeley National Laboratory	Chemistry and Chemical Engineering Physics								
Wenjun Liu (S) C	Argonne National Laboratory	Physics Advanced Photon Source National Center for Electron Microscopy								
Andrew Miner (S) C Wei Quan (S) C Xana Ban (S) C	Lawrence Benkely National Laboratory China Guolian Automotive Battery Research Institute Co Dity University of Hong Kong	National Center for Electron Netroscopy Chemistry and Chemical Engineering Physics								
Wei Quan (S) C Yang Ren (S) C Charles Settern (S) C Zhong Xang (G) C Zalong Tang (S) C Baoming (Wang (S) C Churdheng Wang (S) C Haa Wang (P) C Churdheng Wang (S) C		Medicately Delegant and Declaration								
Yongwen Sun (G) C Zilong Tang (S) C	Pennsylvania State University Tsinghua University	Instantia Solinica al criginaling Engineering Science and Acchanica Material Science and Engineering Chemistry and Chemical Engineering								
Baoming Wang (P) C Chursheng Wang (S) C	Massachusetts Instituto of Technology Pennsylvania Stabu Liviversity Tainghua Liviversity Massachusetti Instituto of Technology Liviversity of Manjand, College Park Massachusetti Instituto of Technology	Department of Engineering								
		Chemistry and Chemical Engineering Chemistry and Chemical Engineering								
Martin Winter (S) C	Muenster Electrochemical Energy Technology Westlake University	Electrochemical Energy								
Yuxuan Xang (G) C Xianghu Xiao (S) C Zunghu Xiao (S) C Haowei Xu (G) C Yang Yang (S) C Yong Yang (S) C Yong Yang (S) C Yong Yang (S) C	Brookhaven National Laboratory Brookhaven National Laboratory	Chemistry and Chemical Engineering Mational Synchroten Light Source II Department of National Source Source II Department of National Source and Engineering Material Socience and Engineering Department of National Socience and Engineering								
Haowel Xu (G) C	Brochnivel National Laboratory Brochniven National Laboratory Massachusetts Institute of Technology Pennsylvania State University	Department of Nuclear Science and Engineering								
Yong Yang (S) C	Xiamen University Starehai Jiao Tong University	Decartment of Chemistry								
Zhoontai Zhaon (S)		Mechanical Engineering Material Science Department of Nuclear Science and Engineering								
Liliano Zhao (S) C He Zhu (S) C	Massachusetts Institute of Technology University of Hong Kong	Physics								
Jianoino Zhu (G) C Ayyalusamy Ramamoorthy (S) PI	Xiamen University University of Michigan	Chemistry and Chemical Engineering Chemistry & Biophysics	NH	NIDDK - National Institute of Diabetes and Digestive and Kidn	ey DK132214	P20282	Structural Characterization of an IAPP Aggregation Intermediate	Biology, Biochemistry, Biophysics	2	
Malitha Dickwella Widanage (G) C	Louisiana State University	chemistry		Diseases						
	National High Magnetic Field Laboratory	NMR								
Riolano Fu (S) C Sam McCaldin (G) C Thirusathi Ravula (P) C	University of Michigan University of Michigan	Chemistry Chemistry								
Gano Wu (S) C Umit Akbey (S) PI	Queen's University at Kinoston	Chemistry Structural Biology - School of Medicine	No other support			P20289	Hypernolarized DNP NMR Observation of Eventional Amvinids and Natural	Biology, Biochemistry, Biophysics	2	
Erecturic Martink (8)	National High Megnetic Field Laboratory	CIMAB					Hyperpolarized DNP MMR Observation of Functional Amyloids and Natural Abundance Peptides for Fighting Antimicrobial Resistance by Targeting Functional Amyloids		-	
Faith Scott (P) C Liliya Vugmeyster (S) PI	National High Magnetic Field Laboratory	Biochemistry & Molecular Biology Chemistry	NH	NIGMS - National Institute of General Medical Sciences	GM111681	P20303	Characterization of water dynamics in the hydration layers of protein systems	Biology, Biochemistry, Biophysics	4	
		,					Characterization of water dynamics in the hydration layers of protein systems and soils using quadrupolar nuclei solid-state NMR methods			
Dmitry Ostrovsky (S) C	University of Colorado. Denver	Mathematics								
Dmitry Ostrovsky (S) C Zhihua Jiano (S) Pi Jiaxing Fan (G) C Yan-Yan Hu (S) C	Auburn University Fiorida State University Fiorida State University	Chemical Engineering Chemistry and Biochemistry Chemistry & Biochemistry	USDA - Department of Agriculture		G00013538	P20306	Investigating interactions between biomolecules in cellulose-based materials using 13C - 1H solid-state NMR	Biology, Biochemistry, Biophysics	32	13
Extent Terrane (C)	Florida State University	Chemistry and Biochemistry								
Rongfu Zhang (P) C Clayton Mathews (S) PI	National High Magnetic Field Laboratory * University of Florida	NHMFL Pathology, Immunology, and Laboratory Medicine	NH	NIAID - National Institute of Allergy and Infectious Diseases	Al010422	P20310	13C NMR measurements for estimating glucose flux in activated, effector human CD8+ T cells	Biology, Biochemistry, Biophysics	1	
Mario Chang Reyes (G) C	University of Florida	Biochemistry & Molecular Biology					CD8+ T cells			
Matthew Merritt (S) C Rvan O'Havre (S) PI	University of Florida Colorado School of Mines	Biochemistry and Molecular Biology Metallurgical and Materials Engineering	DOE	EFRC - Energy Frontier Research Centers	DE-SC0023450	P20313	Understanding hydrogen local structure, dynamics, and diffusion in BCFZY and analogues using solid-state NMR.	Chemistry	10	
Sossina Halle (S) C	Northwestern University Florida State University	Materials Science and Engineering, and Chemistry Chemistry & Biochemistry				1	analogues using solid-state NMR.		1	
Pright Option (G) C Yewon Shin (P) C Erica Truona (G) C	Florida State University Colorado School of Mines	Chemistry Metalluroical and Materials Engineering								
Erica Truona (G) C Genttrey Struise (S) DI	Florida State University	Chemistry and Biochemistry Chemistry	NSF	DMR - Division of Materials Research	DMR1905757	P20318	Multinuclear solid-state NMR investigation of plasmonic and photoluminsecent	Chemistry	0	
Catherine Fabiano (G) C	National High Magnetic Field Laboratory Florida State University Elocida State University	Chemistry Chemistry Chamistry 8 Bischemistry		A CONTRACTOR OF THE PROPERTY OF			nanocrystals	,	2	
Raul Orteoa (G) C Austin Peach (G) C Robert Schurko (S) C	Florida State University Florida State University Elocida State University	Chemistry & Biochemistry Chemistry and Biochemistry								
C C	Florida State University	Chemistry Chemistry and Biochemistry	Leverhulme Trust	Non US Foundation	Leverhulme Research Centre for Functional Materials		Hoh Field 71Ga MAS NMR: Observation 4 5 and 6-Fold Coordinated Ga	Charleto		
Robert Smith (G) C	Fibrical State Oniversity			won us Houndation	Developme Research Centre for Functional Materials	P20322	right risks / IGA MAS NMH: Ubservation 4-, 5-, and 6-Fold Coordinated Ga Sites	Chemistry	1	
Robert Smith (G) C Frédéric Blanc (S) Pl	Florida State University * University of Liverpool	Chemistry			Design					
1		Chemistry Chemistry NHMFL	Lever Port Manufacture Country		Dasign					
Lucia Corti (G) C Zhehong Gan (S) C Nan Hung (S) C Annit Venkatesh (S) C	University of Liverpool National High Magnetic Field Laboratory National High Magnetic Field Laboratory National High Magnetic Field Laboratory	Chenistry Chenistry NHAFL CIMARANARQuetto: Field Laboratory National High Magnetic: Field Laboratory			Lesign					
Lucia Corti (G) C Zhehong Gan (S) C Ivan Hang (S) C Arrrit Verkatesh (S) C Zhehong Gan (S) PI Zhehong Gan (S) C	University of Liverpool National High Magnetic Field Laboratory National High Magnetic Field Laboratory National High Magnetic Field Laboratory National High Magnetic Field Laboratory National High Magnetic Field Laboratory		No other support Darish Research Foundation (DFF Green Omstilling)	Non US Foundation	Grant: 95-305-23601-01130	P20323	Sensilivity-Enhanced Solid-State NMR at High Magnetic Fields using Fast Magic Angle Spinning and Dynamic Nuclear Polarization	Chamistry	7	
Lucia Corti (G) C Zhehong Gan (S) C Ivan Hung (S) C Armit Verkatash (S) C Zhehong Gan (S) C Ivan Hung (S) C	University of Liverpool National High Magnetic Field Laboratory National High Magnetic Field Laboratory National High Magnetic Field Laboratory National High Magnetic Field Laboratory National High Magnetic Field Laboratory	National High Magnetic Field Laboratory National High Magnetic Field Laboratory NHWFL CIMARNMR	No other support Darish Research Foundation (DFF Gren Desailling) European Linion's Horizon 2020 research and Innovation programme	Other	Marie Skłodowska-Curie grant agreement No 956454	P20323	Sensitivity-Enhanced Sold-State NMR at Hgh Magnetic Fields using Fast Magic Angle Spinning and Dynamic Nuclear Polarization	Chemiskry	7	
Lucia Conti (G) C Zhehong Gan (S) C Anni Kung (S) C Amit Verkalash (S) C Amit Verkalash (S) C Zhehong Gan (S) C David McG (S) C David McD (S) C David McD (S) C	uhwenig val Leuropa Hannon Hegi Magneti Felit Lakonskry Nanona Hegi Magneti Felit Lakonskry Nanona Hegi Magneti Felit Lakonskry Nanona Hegi Magneti Felit Lakonskry Nanona Hegi Magneti Felit Lakonskry Data University Lakonskry Magneti Felit Lakonskry Data University	National High Magnetic Friet Laboratory Network High Magnetic Field Laboratory Columentum Columentum Mechanica Engineering and Materials Science Physics, Density and Pharmacy	No other support Darish Research Foundation (DFF Green Omstilling)	Non UB Foundation Other Non UB Foundation	Graet: 95-305-23601-01130 Mario Skłodowska-Curie grant agreemant No 956454 Grant: 95-305-23601-01130	P20323	Sensibility-Enhanced Solid-State NMR at High Magnetic Frietis using Fast Magic Argle Spinning and Dynamic Nuclear Polarization	Chemisiky	7	
Lucia Cotti (G) C Zhehong Gan (B) C Jan Hung (S) C Amit Verkaletah (S) C Amit Verkaletah (S) C Man Hung (S) C David Mizi (S) C Ulla Gin Nelsen (S) C Ulla Gin Nelsen (S) C	University of Liversond Naciona High Magnetic Field Laboratory Naciona High Magnetic Field Laboratory Naciona High Magnetic Field Laboratory Naciona High Magnetic Field Laboratory Naciona High Magnetic Field Laboratory Data University of Endurant Communications Data University of Endurant Communications	National High Magnetic Faile Liberatory National High Magnetic Faile Liberatory CINM-RNR CINM-RNR Mechanical Englishment and Mathematic Science Provide Comments and Patients Science Englishment Engl	No other support Darish Research Foundation (DFF Gren Desailling) European Linion's Horizon 2020 research and Innovation programme	Other	Marie Skłodowska-Curie grant agreement No 956454	P20323	Sanathury Enflavored Solat-State MAR at High Magnetic Fields using Fact Magic Argis Spinning and Dynamic Nuclear Polarization	Chantoly	7	:
Lucia Cotti (G) C Zhehong Gan (B) C Jan Hung (S) C Amit Verkaletah (S) C Amit Verkaletah (S) C Man Hung (S) C David Mizi (S) C Ulla Gin Nelsen (S) C Ulla Gin Nelsen (S) C	University of Liversond Naciona High Magnetic Field Laboratory Naciona High Magnetic Field Laboratory Naciona High Magnetic Field Laboratory Naciona High Magnetic Field Laboratory Naciona High Magnetic Field Laboratory Data University of Endurant Communications Data University of Endurant Communications	Ideal Apple Magnetic Fact Laboratory Instrume Text Laboratory Instrume Text Laboratory CAMCRNAT Mochanical Explorition Automation Physics, Counsistly and Planmatic Data Machanical Explorition Data Machanical Explorition	No other support Darish Research Foundation (DFF Gren Desailling) European Linion's Horizon 2020 research and Innovation programme	Other	Marie Skłodowska-Curie grant agreement No 956454	P20323 P20357	Sensituly-Erhancel Sold-State MMR at High Magnetic Pietls using Fast Magn Angle Spranty and Dynamic Nuclear Pietratation Effect of carbonation on sol-based alkali-activated materials	Chemistry Material Science	7	:
Lask Golf (g) C Janking Ga (g) C Van Nark (G) C Van Nark (G) C Arrit Varkaskih (S) C Jan Nark (G) C Ga (G) C Jan Nark (G) C Ga (G) C Ga (G) C Ga (G) C Jan Nar (G) C Ga (G) C Jan Nar (G) C Ga (G) C Jan Nark (G) C Ga (G) C Jan Nark (G)	unenergy of Lenzola Hannan Feld Manguel Friet Laboratory Hannan Hey Manguel Friet Laboratory Hannan Hey Manguel Friet Laboratory Hannan Hey Manguel Friet Laboratory Hannan Hey Manguel Friet Laboratory Data Unenarity of Hannan Hannan Hey Manguel Friet Laboratory Data Unenarity Data Unenarity Data Unenarity Hannan Hey Manguel Friet Laboratory Data Unenarity Hannan Hey Manguel Friet Laboratory To Taba Unenarity Hannan Hey Manguel Friet Laboratory Taba Unenarity Hannan Hey Manguel Friet Laboratory	National Regist Magned: Fail Liborativ Hostina Liborativ Hostina Liborativ CAMARNAR Muchanish Endinering and Materials Science Physics, Chamber and Pharmacy Machanish Endinering Machanish Machanish Endinering Machanish	No often support De coll-indexect Freenables (DFF Dee Onselling) European Utriors Horizon 200 research and innovation programme Darich Research Franziston Indain Institute of Science Bangalore	Other Non US Foundation	Marie Skłodowska-Curie grant agreement No 956454	P20323	Effect of carbonation on soli-based alkali-activated materials	Chertoly Material Scince	7	
Lasa Corti (G) C Zhahong (Lag) P	United by a Langeod Hannon High Magnitic Field Laboratory Hannon High Magnitic Field Laboratory Data United High Magnitic Field Laboratory Hannon High Magnitic Field Laboratory Hannon High Magnitic Field Laboratory Hannon High Magnitic Field Laboratory Hannon High Magnitic Field Laboratory	National High Magnetic Fail Laboratory Heating Heating CAMARNAR Michanola Engineering and Materiala Solence Physics, Obumsky and Pharmacy Exist Methanola Engineering and Materiala Solence Exist Methanola Engineering and Materiala Solence Materiala Solence Engineering and Materiala Solence Materiala Solence Engineering and Materiala Solence Materiala Solence Engineering and Materiala Solence Materiala Engineering and Materiala Solence Materiala Solence Engineering and Materiala Solence Materiala Solence Engineering and Materiala Solence Materiala Solence Engineering and Materiala Solence Materiala Engineering and Materiala Solence Materiala Solence Engineering and Materiala Solence Engineering Materiala So	he offer support Darish Research Foundation (DFF Clen Omsilling) Encycles University (Editors) 2020 research and Innovation programme Darish Research Foundation Indian Institute of Science Bangation Hou Institute of Science Bangation	Other Non US Foundation	Marie Skłodowska-Curie grant agreement No 956454	P20323 P20357 P20442	Effect of customation on soli-based alkali-activated materials Exploring the sematilishy of 8720 https://activated.state NAR experiments	Chemistry Muterial Science Material Science	7	
Lask Golf (g) C Janking Ga (g) C Van Nark (G) C Van Nark (G) C Arrit Varkaskih (S) C Jan Nark (G) C Ga (G) C Jan Nark (G) C Ga (G) C Ga (G) C Ga (G) C Jan Nar (G) C Ga (G) C Jan Nar (G) C Ga (G) C Jan Nark (G) C Ga (G) C Jan Nark (G)	unenergy of Lenzola Hannan Feld Manguel Friet Laboratory Hannan Hey Manguel Friet Laboratory Hannan Hey Manguel Friet Laboratory Hannan Hey Manguel Friet Laboratory Hannan Hey Manguel Friet Laboratory Data Unenarity of Hannan Hannan Hey Manguel Friet Laboratory Data Unenarity Data Unenarity Data Unenarity Hannan Hey Manguel Friet Laboratory Data Unenarity Hannan Hey Manguel Friet Laboratory To Taba Unenarity Hannan Hey Manguel Friet Laboratory Taba Unenarity Hannan Hey Manguel Friet Laboratory	National Regist Magned: Fail Liborativ Hostina Liborativ Hostina Liborativ CAMARNAR Muchanish Endinering and Materials Science Physics, Chamber and Pharmacy Machanish Endinering Machanish Machanish Endinering Machanish	No offen inspect De coll-indexect Freenables (DFF Dee Onselling) European Utriers Horizon 200 research and innovation programme Darich Research Franziston Indain Institute of Science Bangalore	Other Non US Foundation	Marie Skłodowska-Curie grant agreement No 956454	P20323 P20357 P20442 P20444	Effect of carbonation on soli-based alkali-activated materials	Chentaly Chental Science Material Science Bology, Buchentaly, Bophysica	7	:
Label & Gold () C Label & Gold () C Nan Hog (1) C Nan Hog (2) C And W Wateshoft (5) C And W Wateshoft (5) C Chardt Wateshoft (5) C Chardt Wateshoft (5) C Chardt Wateshoft (5) C Standard And (5) C Shandard Jano (1) C Shandard Andro) C Chardt Wateshoft (5) C C C Shandard Andro) C C C Name (6) C C C Name (7) C C C Name (7) C C C Name (7) C Name (7) C C Name (7) C C Name (7) C Name (7) C Name (7) C Name (7) C Name (7) <t< td=""><td>unenergy of Lenzola Hanson Feld Manyon Fried Laboratory Hanson Hay Manyon Fried Laboratory Hanson Hay Manyon Fried Laboratory Hanson Hay Manyon Fried Laboratory Hanson Hay Manyon Fried Laboratory Data Unenergy Hay Manyon Fried Laboratory Data Unenergy Hay Manyon Fried Laboratory Hanson Hay Manyon Fried Laboratory Data Unenergy Hay Manyon Fried Laboratory Hanson Hay Manyon Fried Laboratory Hanson Hay Manyon Fried Laboratory I Instanti Hay Manyon Fried Laboratory</td><td>Indional lipid Monodo Faial Laboratory Health Construction Health Construction</td><td>No other sequent Postoric Research Translation (DFT Dars Onsatting) European Utriors Hotom 2020 research and Innovation programme Darich Research Foundation Indian Institute of Solonece Bangation No other sequent A comparison</td><td>Other Non US Foundation</td><td>Marie Skłodowska-Curie grant agreement No 956454</td><td></td><td>Effect of customation on soli-based alkali-activated materials Exploring the sematilishy of 8720 https://activated.state NAR experiments</td><td></td><td>4</td><td>· · · · · ·</td></t<>	unenergy of Lenzola Hanson Feld Manyon Fried Laboratory Hanson Hay Manyon Fried Laboratory Hanson Hay Manyon Fried Laboratory Hanson Hay Manyon Fried Laboratory Hanson Hay Manyon Fried Laboratory Data Unenergy Hay Manyon Fried Laboratory Data Unenergy Hay Manyon Fried Laboratory Hanson Hay Manyon Fried Laboratory Data Unenergy Hay Manyon Fried Laboratory Hanson Hay Manyon Fried Laboratory Hanson Hay Manyon Fried Laboratory I Instanti Hay Manyon Fried Laboratory	Indional lipid Monodo Faial Laboratory Health Construction	No other sequent Postoric Research Translation (DFT Dars Onsatting) European Utriors Hotom 2020 research and Innovation programme Darich Research Foundation Indian Institute of Solonece Bangation No other sequent A comparison	Other Non US Foundation	Marie Skłodowska-Curie grant agreement No 956454		Effect of customation on soli-based alkali-activated materials Exploring the sematilishy of 8720 https://activated.state NAR experiments		4	· · · · · ·
Lack Darff, D. C Zhahan, Gao, B) C Man Hag, B) C Mart Massada, B) C Zhahan, Gao, B) C Jana Hag, B) C Dawa Hag, B) P Dawa Hag, B) P Dawa Hag, B) P Dawa Hag, B) P	United by a Langeod Kennon High Mangelie Field Ladoratory Hardina High Mangelie Field Ladoratory Data Deventity De	National Figh Magnetic Fasi Laboratory Header, Header, Header, Header, CAMARNIR Muchanical Exploration Science Physics, Duministry and Pharmacy Biochamical Explorational Biology Biochamical Advances Biology Biochamical Advances Biology Biochamical Advances Biology Biochamical Chemistry Units Biochamical Chemistry Hadratic Biocean and Engineering chemistry	No other sequent Postoric Research Translation (DFT Dars Onsatting) European Utriors Hotom 2020 research and Innovation programme Darich Research Foundation Indian Institute of Solonece Bangation No other sequent A comparison	Other Non US Foundation	Marie Skłodowska-Curie grant agreement No 956454		Effect of customation on soli-based alkali-activated materials Exploring the sematilishy of 8720 https://activated.state NAR experiments		7	

	Participants (Name, Role, Org., Dep	eL)		Funding Sources (Funding Agency, Division, Award #)		Proposal #	Proposal Title	Discipline	Exp.#	Days Used
Sonol Han (S) Jinlei Cui (G)	PI University of California. Santa Barbara C Washington University in St. Louis	Department of Chemistry and Biochemistry Chemistry	AFOSR MURI	Other		P20454	Exploration of structure water in polymer and protein through 170 NMR	Biology, Biochemistry, Biophysics	3	6
Nicholas Kotov (S) Ayyalusamy Ramamoorthy (S)	Pt University of Michigan C University of Michigan	Chemical Engineering Chemistry & Blophysics	DOD	ONR - Office of Naval Research	ND00141812876	P20465	Structural Characterization of Chiral Perovskite	Engineering	1	3
Jinsang Kim (S) Malitha Dickwella Widanage (G)	PI University of Michigan C Louisiana State University	Material Science and Engineering chemistry	KLA corporation			P20467	Structural Characterization of Polydopamine Derivatives	Chemistry	1	3
Hovona Chuna (P) Malitha Chathuranaa (P) Malitha Dickwella Widanage (G) Ayyalusamy Ramamoorthy (S)	PI * Florida State Linvensity C National Hoh Magnetic Field Laboratory C Lodisiana State Linversity C University of Michigan	Chenical and Biomedical Environenino National Hoh Macmetic Field Laboratory chemistry & Biophysics	Ar Force Research Lab	US Government Lab		P20469	Polymerization of Self-Healing Polymens on Molene Surface	Biology, Biochemistry, Biophysics	2	5
Feng Lin (S) Changgyu Seok (G) Sungsool Wi (S)	PI * Virginia Polytechnic Institute and State University C Virginia Polytechnic Institute and State University C National High Magnetic Field Laboratory	Chemistry Chemistry NMR	NSF	DMR - Division of Materials Research	DMR2045570	P20482	Probing thermally induced evolution of atomic distribution in Li-excess disordered rocksalt cathode materials	Material Science	1	2
Adam Matzeer (S) Malitha Dickwella Widanage (G) Ayyalusamy Ramamoorthy (S)	PI University of Michigan C Louisiana State University C University of Michigan	Chemistrv chemistry Chemistry & Biophysics	University of Michigan	US College and University	70823050	P20497	Protonation state determination of two poorly soluble drugs in HPMCAS and PVPA-EDA for applications in oral drug delivery	Chemistry	2	5
Snorri Sigurdsson (S)	PI * University of Iceland	Chemistry	NH	NIGMS - National Institute of General Medical Sciences	GM148766	P20530	Improving biradicals for MAS-DNP at high field:a combined approach of Spin- Dynamics theory. DFT and high-field EPR	Biology, Biochemistry, Biophysics	1	5
Satyaki Chatterjee (G) Frederic Mentink (S) Falth Scott (P)	C University of Iceland C National High Magnetic Field Laboratory	Department of Chemistry CIMAR	Icelandic Research Funds European Union's Hortzon 2020 research and innovation programme	Other Other	239662 101008500		Dynamics unooy, or t and ingr-ned erec			
Fang Tian (S)	C National High Magnetic Field Laboratory Pl Pennsylvaria State University	Biochemistry & Molecular Biology Biochemistry and Molecular Biology, Penn State Medical School	NH	NIGMS - National Institute of General Medical Sciences	GM127730	P20549	Membrane Interactions of LC3 for LC3-Phosphatidylethanolamine (PE) Conjugation and Phagophore Expansion during Autophagy	Biology, Biochemistry, Biophysics	2	10
Rojang Fu (S) Yining Huang (S) Zhehong (Ban (S) Ivan Hung (S) Annit Venkatesh (S) Jiabin Xu (G) Wanli Zhang (G)	C National High Magnitic Field Laboratory PL Usiversity of Western Orden C National High Magnitic Field Laboratory National High Magnitic Field Laboratory C National High Magnitic Field Laboratory C Laboratory C Laboratory C Laboratory	NMR Chemidary CIMARANAR CIMARANAR CIMARANAR Chemidary Chemidary	Weatern Drivershy NSERC of Canada	Non US College and University Other		P20550	Solid-state NMR Characterization of Local Environments of Framework Halides in MOFs at Utrahigh Magnetic Field	Chemistry	1	7
Sungsool Wi (S) Lucio Frydman (S) Rigiang Fu (S) Ayyalusamy Ramamoorthy (S)	PI National High Magnetic Field Laboratory C National High Magnetic Field Laboratory National High Magnetic Field Laboratory C Liniversity of Michigan	NMR NMR Chemistry & Biophysics	No other support			P20552	Development of Novel NMR Techniques for Studies at High Magnetic Fields and under Fast Magic-Angle Spinning: Utilization of 1H-detection and Natural 13C Abundance	Biology, Biochemistry, Biophysics	1	8
		÷					Total Proposals 7	2 4	periments: 664	Days: 2.461.00

		Participants (Name, Role, Org., Dept.)			Funding Sources (Funding Agency, Division, Award #)		Proposal #	Proposal Title	Discipline	Exp. #	Days
Jamie Manson (S)	PI	Eastern Washington University	Chemistry and Biochemistry	NSF	DMR - Division of Materials Research	DMR2104167	P19233	New topologies in Ni(II) quantum magnets with XY	Condensed Matter Physics	1	5
Paul Goddard (S) John Singleton (S)	C C	University of Warwick National High Magnetic Field Laboratory	Department of Physics Physics					anisotropy			
Janice Musfeldt (S)	PI	University of Tennessee, Knoxville	Department of Chemistry	NSF	DMR - Division of Materials Research	DMR1707846	P19343	High field spectroscopy of materials with broken	Chemistry	1	5
Avery Blockmon (G)	С	University of Tennessee, Knoxville	Chemistry					symmetry and strong spin-orbit coupling			
Minseong Lee (S) Vivien Zapf (S)	C	National High Magnetic Field Laboratory National High Magnetic Field Laboratory	MPA-MAG Physics								
Keshav Shrestha (S)	PI *	Texas A&M University	Chemistry and Physics	Welch Foundation	US Foundation	AE-0025	P19467	Search of Topological Phases of Materials	Condensed Matter Physics	1	5
Thinh Nguyen (G)	С	West Texas A&M University	Chemistry and Physics								
Cole Phillips (U) Shengzhi Zhang (P)	C C	West Texas A&M University National High Magnetic Field Laboratory	Chemistry and Physics MPA-MAGLAB: MPA-MAG LAB NHMFL GROUP								
Lu Li (S)	PI	University of Michigan	Physics	DOE	BES – Basic Energy Sciences	DE-SC0020184	P19528	Search for novel electronic and magnetic state in	Condensed Matter Physics	10	<i>i</i> 50
Aaron Chan (G) Kuan-Wen Chen (P)	C	University of Michigan University of Michigan	Department of Physics Physics	NSF	DMR - Division of Materials Research	DMR2004288		ultraintensive magnetic fields			
Kaila Jenkins (G)	c	University of Michigan	Department of Physics								
David Mandrus (S)	С	University of Tennessee, Knoxville	Materials Science and Engineering								
Yuji Matsuda (S) Ziji Xiang (P)	c	Kyoto University University of Michigan	Physics								
Ziji Xiang (P) Dechen Zhang (G)	c	University of Michigan	Physics Department of Physics								
Guoxin Zheng (G)	c	University of Michigan	Department of Physics								
Yuan Zhu (G)	C	University of Michigan National High Magnetic Field Laboratory	Department of Physics	DOE	BES – Basic Energy Sciences	F10100			Condensed Matter Physics		
Mun Chan (S) Ariando Ariando (S)	C	National High Magnetic Field Laboratory National University of Singapore	Pulsed field Facility Department of Physics/ NUSNNI	DOE	BES – Basic Energy Sciences	F10100	P19534	Unconventional superconductivity in nickelates and cuprates	Condensed Matter Physics	1	5
Neil Harrison (S)	c	National High Magnetic Field Laboratory	Physics								
Rubi Km (P)	С	Los Alamos National Laboratory	MPA-MAGLAB								
Boris Maiorov (S) Joseph Checkelsky (S)	C	National High Magnetic Field Laboratory Massachusetts Institute of Technology	MPA-MAGLAB Physics	NSE	DMR - Division of Materials Research	DMR1231319	P10540	High Field Studies of Novel Lavered Materials	Condensed Matter Physics		3 23
Alan Chen (G)	С	Massachusetts Institute of Technology	EECS		Smith - Division or Materials ResearCh	San(1251519	P 19340	The second s	Condenaed matel Physics	3	23
Paul Neves (G)	С	Massachusetts Institute of Technology	Physics					1		1	1 1
Joshua Wakefield (G) Shu Yang Zhao (P)	C	Massachusetts Institute of Technology Massachusetts Institute of Technology	Physics Physics							1	
Scott Crooker (S)	PI	National High Magnetic Field Laboratory	Nat High Magnetic Field Lab	DOE	BES – Basic Energy Sciences	Science of 100T	P19567	Optical Spectroscopy of "Twisted" Moire Crystals in High	Condensed Matter Physics	1	10
Junho Choi (P)	С	Los Alamos National Laboratory	MPA-MAGLAB					Magnetic Fields		1	
Jing Li (S)	С	Huazhong University of Science and Technology	Physics								
Xavier Marie (S)	с	National Institute for Applied Sciences, Toulouse	Laboratoire de Physique et Chimie des Nano-objets								
Bernhard Urbaszek (S)	с	National Institute for Applied Sciences, Toulouse	Laboratoire de Physique et Chimie des Nano-objets								
Cui-Zu Chang (S)	PI	Pennsylvania State University	Physics	NSF	DMR - Division of Materials Research	DMR1847811	P19621	Interfacial Superconductivity in Bi2Te3/FeTe	Condensed Matter Physics	2	11
David Graf (S)	С	National High Magnetic Field Laboratory	DC Field / CMS					Heterostructures under High Magnetic Fields			
Seng Huat Lee (S) Zhiqiang Mao (S)	C	Pennsylvania State University Pennsylvania State University	Physics Department of Physics								
Hemian Yi (P)	c	Pennsylvania State University	Department of physics								
Yi-Fan Zhao (G)	C	Pennsylvania State University	Physics MPA-CMMS	DOE	BES – Basic Energy Sciences	E1FR	P19631		Condensed Matter Physics		
Filip Ronning (S) Ross McDonald (S)	C	Los Alamos National Laboratory National High Magnetic Field Laboratory	Physics	DOE	BES – Basic Energy Sciences	EIFR	P19631	Magnetically frustrated f-electron intermetallics	Condensed Matter Physics	1	5
Sanu Mishra (P)	č	Los Alamos National Laboratory	MPA-Q								
Xavier Roy (S)	PI *	Columbia University National High Magnetic Field Laboratory	Chemistry PFF	DOE	BES – Basic Energy Sciences	DE-SC0019443	P19632	Magnetic Order and Correlated Electronic Phenomena in Novel 2D van der Waals Materials	Chemistry	1	5
Fedor Balakirev (S) Ross McDonald (S)	c	National High Magnetic Field Laboratory National High Magnetic Field Laboratory	PFF Physics					Novel 2D vali del waals Materials			
Victoria Posey (G)	c	Columbia University	Chemistry								
Michael Ziebel (P) Philip Moll (S)	C	Columbia University Max Planck Institute for Structure and Dynamics of Matter,	Chemistry and Physics Max Planck Institute for Structure and Dynamics of Matter	No other support			P19688	Chiral-magnetotransport in CoSi	Condensed Matter Physics		
		Hamburg					P 19000	Chiramagnetoransport in Cool	Condensed Matter Physics		5
Chunyu Guo (P) Ross McDonald (S)	C	Max Planck Institute for Structure and Dynamics of Matter, Hamburg	MQM								
Ross McDonald (S) Nicholas Butch (S)	PI	National High Magnetic Field Laboratory National Institute of Standards and Technology MD	Physics NIST Center for Neutron Research	National Institute of Standards and	US Government Lab		P19704	Studies of high-field states of UTe2	Condensed Matter Physics	3	3 25
Peter Czajka (P)	с	National Institute of Standards and Technology MD	NCNR	Technology				5			
Corey Frank (P)	с	National Institute of Standards and Technology MD	NCNR								
Thomas Halloran (G)	с	National Institute of Standards and Technology MD	NIST Center for Neutron Research								
Sylvia Lewin (P)	с	University of Maryland, College Park	physics								
Gicela Saucedo Salas (G)	С	University of Maryland, College Park	Physics					1		1	
Laurel Winter (S) Debdeep Jena (S)	PI *	National High Magnetic Field Laboratory Cornell University	Physics ECE	NSF	MRSEC - Materials Research Science and	DMR-1719875	P19838	GaN-based 2D Electron Systems in the Quantum Regime	Condensed Matter Physics	1	10
	1	,			Engineering Centers			, <u>_</u>		1	
Chuan Chang (G)	С	Cornell University	Physics					1		1	1 1
Yu-Hsin Chen (G) Scott Crooker (S)	c	Cornell University National High Magnetic Field Laboratory	Material Science and Engineering Nat High Magnetic Field Lab				1	1		1	
Jimy Encomendero (P)	С	Cornell University	Electrical and Computer Engineering							1	
Ross McDonald (S)	C	National High Magnetic Field Laboratory	Physics ECE							1	
Huili Xing (S) Michael Pettes (S)	PI	Cornell University Los Alamos National Laboratory	Center for Integrated Nanotechnologies	DOE	Other	20230014DR	P19839	Anomalous High Field Transport in Dirac Semimetals	Development of Magnet Technology	2	30
Marshall Campbell (G)	с	Los Alamos National Laboratory	Center for Integrated Nanotechnologies	NSF	CAREER - Faculty Early Career Development Program	2146567		5 .			
Luis Jauregui (S)	с	University of California, Irvine	Department of Physics and Astronomy	DOE	LDRD - Laboratory Directed R&D	DE-AA00-00AA00000					
Jinyu Liu (P)	С	University of California, Irvine	Physics MPA-CINT				1				
Jun Park (P) Rubi Km (P)	PI	Los Alamos National Laboratory Los Alamos National Laboratory	MPA-CIN I MPA-MAGLAB	DOE	BES – Basic Energy Sciences	F10100	P19841	High-field magneto-transport on graphene/SrTiO3	Condensed Matter Physics	1	10
Ariando Ariando (S)	с	National University of Singapore	Department of Physics/ NUSNNI					devices		· ·	
Neil Harrison (S)	С	National High Magnetic Field Laboratory	Physics							1	
Junxiong Hu (P) Minseong Lee (S)	PI	National University of Singapore National High Magnetic Field Laboratory	Physics MPA-MAG	DOE	BES – Basic Energy Sciences		P19848	Kitaev spin liquid phase in a 3d transition metal oxides	Development of Magnet Technology	P	56
Marcelo Jaime (S)	С	National High Magnetic Field Laboratory	Physics	DOE	Other		. 10040	provide procession of a detailed in the an UNIDES			
Sangyun Lee (P)	С	National High Magnetic Field Laboratory	MPA-MAGLAB	DOE	BES – Basic Energy Sciences			1		1	
Vivien Zapf (S)	с	National High Magnetic Field Laboratory	Physics	DOE	LDRD - Laboratory Directed R&D	DE-AA00-00AA00000					
Shengzhi Zhang (P) Haidong Zhou (S)	c	National High Magnetic Field Laboratory University of Tennessee, Knoxville	MPA-MAGLAB: MPA-MAG LAB NHMFL GROUP Physics and Astronomy								
Haidong Zhou (S)	IC.	University of Lennessee, Knoxville	mysics and Astronomy				-	L	1	I	ل ـــــــــــا

		Participants (Name, Role, Org., Dept.)			Funding Sources (Funding Agency, Division, Award #)		Proposal #	Proposal Title	Discipline	Exp. #	Days Used
Magdalena Owczarek (P)	PI	Los Alamos National Laboratory	CINT	DOE	EFRC - Energy Frontier Research Cente	rs DE-SC0019330	P19934	Spin-electric coupling in molecular magnets	Biology, Biochemistry, Biophysics		4
Shubham Bisht (G)	с	Florida State University	Chemistry and Biochemistry	DOE	Office of Science	DE-SC0019330					
Hai Ping Cheng (S)	С	University of Florida	Physics								
Miguel Gakiya (G) Marcelo Jaime (S)	C	Florida State University National High Magnetic Field Laboratory	Chemistry and Biochemistry								
Marcelo Jaime (S) Minseong Lee (S)	c	National High Magnetic Field Laboratory National High Magnetic Field Laboratory	Physics MPA-MAG								
Shuanglong Liu (S)	c	University of Florida	Department of Physics								
Dibya Mondal (P)	С	Florida State University	Chemistry and Biochemistry								
Michael Shatruk (S)	C	National High Magnetic Field Laboratory	Department of Chemistry and Biochemistry								
James Wampler (P) Ping Wang (P)	c	National High Magnetic Field Laboratory University of Florida	MPA-MAGLAB physics								
Vivien Zapf (S)	c	National High Magnetic Field Laboratory	Physics								
Kimberly Modic (S)	PI	Institute of Science and Technology Austria	Physics	No other support			P19945	Thermodynamic measurements of topological	Condensed Matter Physics		1
Nicholas Butch (S)	с	National Institute of Standards and Technology MD	NIST Center for Neutron Research					superconductors			
Ross McDonald (S)	с	National High Magnetic Field Laboratory	Physics								
Amit Nathwani (U)	С	Institute of Science and Technology Austria	Physics								
Muhammad Nauman (P)	с	Institute of Science and Technology Austria	Division of Mathematical and Physical Sciences								
Brad Ramshaw (S)	с	Cornell University	Laboratory of Atomic and Solid State Physics								
Arkady Shehter (S)	c	National High Magnetic Field Laboratory	LANL MPA-MAGLAB								
Valeska Zambra (G)	с	Institute of Science and Technology Austria	Physics								
John Bulmer (S) Tim Haugan (S)	PI C	Air Force Research Laboratory Air Force Research Laboratory	Air Force Air Force	DOD	US Air Force	RQ18COR100	P19956	High Magnetic Field Transport in Advanced Carbon Conductors	Condensed Matter Physics		1
Agnieszka Lekawa-Raus (P)	c	Air Force Research Laboratory University of Cambridge	Department of Material Science							1	
Jamie Manson (S)	PI	Eastern Washington University	Chemistry and Biochemistry	NSF	DMR - Division of Materials Research	DMR2104167	P20007	Magnetic phase diagram of a spin-1/2 chiral chain	Condensed Matter Physics	:	2
Avery Blockmon (G)	С	University of Tennessee, Knoxville	Chemistry	EPSRC	Non US Council					1	
Paul Goddard (S)	C	University of Warwick	Department of Physics							1	
Janice Musfeldt (S) Shroya Vaidya (G)	c	University of Tennessee, Knoxville University of Warwick	Department of Chemistry Department of Physics							1	
Junjie Yang (S)	PI *	New Jersey Institute of Technology	Physics	DOE	BES – Basic Energy Sciences	DE- SC0021188	P20048	Investigate the large Anomalous Hall Effect over 20 T in a	Condensed Matter Physics	1 :	3
Sang Wook Cheong (S)	с	Rutgers University	Physics and Astronomy		57			chiral magnet Co1/3TaS2		1	
Yunpeng Gao (G)	С	New Jersey Institute of Technology	Physics							1	
Vivien Zapf (S) Shengzhi Zhang (P)	C	National High Magnetic Field Laboratory National High Magnetic Field Laboratory	Physics MPA-MAGLAB: MPA-MAG LAB NHMFL GROUP							1	
Ariando Ariando (S)	PI *	National High Magnetic Field Laboratory National University of Singapore	Department of Physics/ NUSNNI	DOE	BES – Basic Energy Sciences	F0101	P20051	Investigation of correlated states in the double-aligned	Condensed Matter Physics	1 :	2
Mun Chan (S)	с	National High Magnetic Field Laboratory	Pulsed field Facility	DOE	BES – Basic Energy Sciences	F10100		graphene supermoire' lattice		1	
Neil Harrison (S)	С	National High Magnetic Field Laboratory	Physics							1	
Rubi Km (P) Arkady Shehter (S)	C PI	Los Alamos National Laboratory National High Magnetic Field Laboratory	MPA-MAGLAB LANL MPA-MAGLAB	DOE	BES – Basic Energy Sciences	100T science	P20063	high-field magneto-transport in the strange metal state of	Condensed Matter Physics	1 .	1
Arkady Shenter (S) Mun Chan (S)	C	National High Magnetic Field Laboratory National High Magnetic Field Laboratory	Pulsed field Facility	NSF	DMR - Division of Materials Research	DMR1644779	P20063	rugn-neid magneto-transport in the strange metal state of curates across critical doping	Concensed Matter Physics		1
Neil Harrison (S)	С	National High Magnetic Field Laboratory	Physics							1	
Ross McDonald (S)	С	National High Magnetic Field Laboratory	Physics							1	
Kimberly Modic (S)	C	Institute of Science and Technology Austria	Physics								
Brad Ramshaw (S)	c	Cornell University	Laboratory of Atomic and Solid State Physics		No. 110.0	EP/W011743/1	-	Effect of irradiation damage on superconducting			
Susannah Speller (S)	PI ·	University of Oxford	Materials	UK Engineering and Physical Sciences Research Council (EPSRC)	Non US Council	EP/W011743/1	P20133	Effect of irradiation damage on superconducting properties of commercial coated conductors at ultra high	Material Science		1
Kirk Adams (G)	с	University of Oxford	Materials					field		1	
Chris Grovenor (S)	С	University of Oxford	Materials							1	
William lliffe (P) Roris Majorau (S)	C	CCFE STEP National High Magnetic Field Laboratory	Confinement Systems MPA-MAGLAB							1	
Boris Maiorov (S) Arkady Shehter (S)	PI	National High Magnetic Field Laboratory National High Magnetic Field Laboratory	LANL MPA-MAGLAB	NSF	DMR - Division of Materials Research	DMR1644779	P20143	Thermodynamics of correlated metals and	Condensed Matter Physics	1 .	1
Alimamy Bangura (S)	С	National High Magnetic Field Laboratory	CMS					superconductors from thermal impedance spectroscopy		1	
Priscila Ferrari Silveira Rosa (P)		It is an	MPA-CMMS					in pulsed magnetic fields.	1	1	
	С	Los Alamos National Laboratory									1
Neil Harrison (S)	c		Physics								
	c c c	Los Alamos National Laboratory National High Magnetic Field Laboratory Stockholm University	Physics Department of Physics								
Akash Khansili (G) Ross McDonald (S)	C C C	National High Magnetic Field Laboratory Stockholm University National High Magnetic Field Laboratory	Department of Physics Physics								
Neil Harrison (S) Akash Khansili (G) Ross McDonald (S) Kimberly Modic (S)	с с с с с с с с	National High Magnetic Field Laboratory Stockholm University	Department of Physics								
Akash Khansili (G) Ross McDonald (S) Kimberly Modic (S)	с сссс с	National High Magnetic Field Laboratory Stockholm University National High Magnetic Field Laboratory Institute of Science and Technology Austria	Department of Physics Physics Physics								
Akash Khansili (G) Ross McDonald (S) Kimberly Modic (S) Amit Nathwani (U)	с сссс с	National High Magnetic Field Laboratory Stockholm University National High Magnetic Field Laboratory Institute of Science and Technology Austria Institute of Science and Technology Austria	Department of Physics Physics Physics Physics								
Akash Khansili (G) Ross McDonald (S) Kimberly Modic (S) Amit Nathwani (U) Brad Ramshaw (S)	0 0000 0 000	National High Magnetic Field Laboratory Stockhom University National High Magnetic Field Laboratory Institute of Science and Technology Austria Institute of Science and Technology Austria Comell University	Department of Physics Physics Physics Physics Laboratory of Atomic and Solid State Physics								
Akash Khansili (G) Ross McDonald (S) Kimberly Modic (S) Amit Nathwani (U) Brad Ramshaw (S)	С СССС С С С С С С С С С С С С С С С С	National High Magnetic Field Laboratory Stockholm University National High Magnetic Field Laboratory Institute of Science and Technology Austria Institute of Science and Technology Austria	Department of Physics Physics Physics Physics	Washington University in St. Louis	US College and University		P20150	Skudy of high magnetic field induced supercondurbitive of	Condensed Matter Physics		1
Akash Khansili (G) Ross McDonald (S) Kimberly Modic (S) Amit Nathwani (U) Brad Ramshaw (S) Andreas Rydh (S) Sheng Ran (S) Christopher Broyles (G)	с сссс с с с с с	National High Magnetic Field Laboratory Stockholm University National High Magnetic Field Laboratory Institute of Science and Technology Austria Institute of Science and Technology Austria Cornell University Stockholm University Washington University in SL Louis	Department of Physics Physics Physics Laboratory of Atomic and Solid State Physics Department of Physics Physics Physics	Washington University in St. Louis	US College and University		P20150	Study of high magnetic field induced superconductivity of	Condensed Matter Physics		1
Akash Khansili (G) Ross McDonald (S) Kimberly Modic (S) Amit Nathwani (U) Brad Ramshaw (S) Andreas Rydh (S) Sheng Ran (S) Christopher Broyles (G) Martin Nikolo (S)	с сссс с с с с с с с	National High Magnetic Field Laboratory Slockholm University National High Magnetic Field Laboratory Institute of Science and Technology Austria Institute of Science and Technology Austria Cornell University Slockholm University Nathington University NSL Louis Washington University NSL Louis Saint Louis University	Department of Physics Physics Physics Laboratory of Atomic and Solid State Physics Department of Physics Physics Physics	Washington University in St. Louis	US College and University		P20150		Condensed Matter Physics		1
Akash Khansili (G) Ross McDonald (S) Kimberly Modic (S) Amit Nattwani (U) Brad Ramshaw (S) Andreas Rydn (S) Sheng Ran (S) Christopher Broyles (G) Martin Nikolo (S) John Singleton (S)		National High Magnetic Field Laboratory Stockhom University National High Magnetic Field Laboratory Institute of Science and Technology Austria Cornell University Stockhom University Washington University NSL Louis Saint Louis University NSL Louis Saint Louis University NSL Louis Saint Louis University National High Magnetic Field Laboratory	Department of Physics Physics Physics Laboratory of Atomic and Solid State Physics Department of Physics Physics Physics Physics Physics Physics					UTe2			1
Akash Khansili (G) Ross McDonald (S) Kimberly Modic (S) Amit Nathwani (U) Brad Ramshaw (S) Andreas Rydh (S) Sheng Ran (S) Christopher Broyles (G) Martin Nikolo (S)		National High Magnetic Field Laboratory Slockholm University National High Magnetic Field Laboratory Institute of Science and Technology Austria Institute of Science and Technology Austria Cornell University Slockholm University Nathington University NSL Louis Washington University NSL Louis Saint Louis University	Department of Physics Physics Physics Laboratory of Atomic and Solid State Physics Department of Physics Physics Physics	Washington University in St. Louis DOE	US College and University BES – Basic Energy Sciences				Condensed Matter Physics Condensed Matter Physics		1
Akash Khansili (G) Ross McDonad (S) Kimberly Modic (S) Brad Ramshaw (S) Andrean Ryth (S) Sheng Ran (S) Sheng Ran (S) Merin Nikol (S) John Singleton (S) Sanguru Le (P) Hubb Cao (S) Mercelo Jaime (S)	с сссс с ссс с ссс . ссс .	National High Magnetic Field Laboratory Slockholm University National High Magnets Field Laboratory Institute of Science and Technology Austria Institute of Science and Technology Austria Cornell University in Slockholm University in SL Louis Washington University in SL Louis Saint Louis University in SL Louis National High Magnetic Field Laboratory Oak Ridge National Laboratory National High Magnetic Field Laboratory	Department of Physics Physics Physics Laboratory of Atomic and Solid State Physics Department of Physics P					UTe2 High field studies of a new Shastry-Sutherland lattice			1
Akash Khansili (G) Ross McDorad (S) Kimberly Modic (S) Amit Nathwani (U) Brad Ramshaw (S) Andreas Rydr (S) Shang Ran (S) Christopher Broyles (G) Martin Nikolo (S) John Singleton (S) Sangyun Lee (P) Huibo Cao (S) Marcolo Jaime (S)	С СССС СССС СССС Р Р СССС ССС ССС ССС С	National High Magnetic Field Laboratory Stockhom University National High Magnetic Field Laboratory Institute of Science and Technology Austria Cornell University Stockhom University Washington University NSL Louis Saint Louis University NSL Louis Saint Louis University National High Magnetic Field Laboratory National High Magnetic Field Laboratory	Department of Physics Physics Physics Physics Laboratory of Atomic and Solid State Physics Department of Physics Physics Physics Physics Physics MPA-MAGLAB Meator acattering Physics Department of Ph					UTe2 High field studies of a new Shastry-Sutherland lattice			1
Akash Khansili (G) Ross McDonad (S) Kimberly Modic (S) Brad Ramshaw (S) Anti Nathwani (U) Brad Ramshaw (S) Antin Nikodo (S) Christopher Broyles (G) Martin Nikodo (S) Samguni Le (P) Huibo Cao (S) Marcolo Jame (S) Tai Kong (S) Minesena Lee (S)	С СССС С С С С С С С С С С С С С С С С	National High Magnetic Field Laboratory Slockholm University National High Magnetic Field Laboratory Institute of Science and Technology Austria Cornell University Slockholm University Slockholm University Washington University In St. Louis Washington University St. Louis Saint Louis University National High Magnetic Field Laboratory Oak Ridge National Laboratory National High Magnetic Field Laboratory University of Arizona National High Magnetic Field Laboratory University of Arizona National High Magnetic Field Laboratory University of Arizona	Department of Physics Physics Physics Physics Laboratory of Atomic and Solid State Physics Department of Physics Physics Physics Physics Physics Physics MIPA-MACLAB Net/ton scattering Physics Department of Physics MIPA-MACS					UTe2 High field studies of a new Shastry-Sutherland lattice			1
Akash Khansili (G) Ross McDorad (S) Kimberly Modic (S) Amit Nathwani (U) Brad Ramshaw (S) Andreas Rydr (S) Shang Ran (S) Christopher Broyles (G) Martin Nikolo (S) John Singleton (S) Sangyun Lee (P) Huibo Cao (S) Marcolo Jaime (S)	C C C C C C C C C C C C C C C C C C C	National High Magnetic Field Laboratory Stockhom University National High Magnetic Field Laboratory Institute of Science and Technology Austria Cornell University Stockhom University Washington University NSL Louis Saint Louis University NSL Louis Saint Louis University National High Magnetic Field Laboratory National High Magnetic Field Laboratory	Department of Physics Physics Physics Physics Laboratory of Atomic and Solid State Physics Department of Physics Physics Physics Physics Physics MPA-MAGLAB Meator acattering Physics Department of Ph	DOE			P20151	UTe2 High field studies of a new Shastry-Sutherland lattice	Condensed Matter Physics		1
Akash Khansili (G) Ross McDorad (S) Kimberly Modic (S) Anit Nathwani (U) Brad Ramshaw (S) Andreas Rydr (S) Sheng Ran (S) Christopher Broyles (G) Martin Nikolo (S) John Singleton (S) Sangyun Lee (P) Huibo Cao (S) Marcelo Jaime (S) Tai Kong (S) Minesong Lee (S) Viene Zapf (S) Swee Gn (S) Fodor Balakrev (S)	C C C C C C C C C C C C C C C C C C C	National High Magnetic Field Laboratory Stockhom University National High Magnetic Field Laboratory Institute of Science and Technology Austria Cornell University Stockhom University Washington University NSL Louis Saint Louis University NSL Louis Saint Louis University National High Magnetic Field Laboratory National High Magnetic Field Laboratory Chinese University of Hong Kong National High Magnetic Field Laboratory	Department of Physics Physics Physics Physics Laboratory of Atomic and Solid State Physics Department of Physics Physics Physics Physics Physics MPA-MAGLAB Neutron scattering Physics Department of Physics MPA-MAG Physics Department of Physics		BES – Basic Energy Sciences			UTe2 High field studies of a new Shastry-Sutherland lattice compound.			1
Akash Khansili (G) Ross McDonad (G) Kimberly Motic (S) Amit Nathwari (U) Brad Ramshaw (S) Andreas Rydr (S) Sheng Ran (S) Christopher Broyles (G) Martin Nikolo (S) John Singlekon (S) Martin Nikolo (S) John Singlekon (S) Miniscon La (S) Wines Zapt (S) Swee Sch (S) Fedor Balakrev (S) Fedor Balakrev (S)	С СССС ССС Р Р СССС Р Р СССС С Р Р СССС С Р Р СССС С С С С С С С С С С С С С С С С С	National High Magnetic Field Laboratory Stockholm University National High Magnetic Field Laboratory Institute of Science and Technology Austria Cornell University Stockholm University Stockholm Washington University in St Louis Washington University in St Louis Sant Louis University in St Louis Sant Louis University in St Louis Sant Louis University in St Louis Machine High Magnetic Field Laboratory Austronal High Magnetic Field Laboratory University of Anzona National High Magnetic Field Laboratory National High Magnetic Field Laboratory	Department of Physics Physics Physics Physics Laboratory of Atomic and Solid State Physics Department of Physics Physics Physics Physics StPA-MACLAB Neutron scattering Physics Department of Physics Physics Department of Physics Physics Department of Physics PFF Physics	DOE	BES – Basic Energy Sciences		P20151	UTe2 High field studies of a new Shastry-Sutherland lattice compound.	Condensed Matter Physics		1
Akash Khansili (G) Ross McDorad (S) Kimberly Modic (S) Anit Natiwani (U) Brad Ramshaw (S) Andreas Rydr (S) Sheng Ran (S) Christopher Broyles (G) Martin Nikolo (S) John Singleton (S) Sangyun Lee (P) Huibo Cao (S) Marcelo Jaime (S) Tai Kong (S) Mineseng Lee (S) Vieine Zapf (S) Swee Gn (S) Fedor Balakrev (S) Kwing To Lai (S) Lingfel Wang (G)		National High Magnetic Field Laboratory Slockholm University National High Magnetic Field Laboratory Institute of Science and Technology Austria Institute of Science and Technology Austria Slockholm University Slockholm University Slockholm University NSL Louis Washington University NSL Louis Saint Louis University NSL Louis Saint Louis University NSL Louis National High Magnetic Field Laboratory National High Magnetic Field Laboratory Oak Ridge National Repetier Field Laboratory University of Anzona National High Magnetic Field Laboratory University of Anzona National High Magnetic Field Laboratory University of Anzona National High Magnetic Field Laboratory National High Magnetic Field Laboratory Chinese University of Hong Kong	Department of Physics Physics Physics Physics Laboratory of Atomic and Solid State Physics Department of Physics Physics Physics Physics Physics Physics MPA-MAGLAB Meuton scattering Physics Department of Physics MPA-MAG Physics Department of Physics PFF Physics Physics PfF Physics PfF Physics Physics PfF Physics Physics Physics Physics PfF Physics Physics Physics Physics PfF Physics Phys	DOE	BES – Basic Energy Sciences		P20151	UTe2 High field studies of a new Shastry-Sutherland lattice compound.	Condensed Matter Physics		1
Akash Khansii (G) Kimberly Motic (S) Kimberly Motic (S) Anti Nathwani (U) Brad Ramshaw (S) Anta Kydy (S) Sheng Ran (S) Christopher Broyles (G) Martin Nikola (S) John Singleton (S) Sangyun Lee (P) Hatoco (S) Marcola Jame (G) Marcola Jame (G) Yiein Zapf (S) Swee Goh (S) Fedor Balakrev (S) Fedor Balakrev (S) Lingfel Wang (G)		National High Magnetic Field Laboratory Stockholm University National High Magnetic Field Laboratory Institute of Science and Technology Austria Cornell University Stockholm University Washington University in St. Louis Washington University in St. Louis Saint Louis University in St. Louis Saint Louis University in St. Louis Mational High Magnetic Field Laboratory National High Magnetic Field Laboratory University of Altorna National High Magnetic Field Laboratory National High Magnetic Field Laboratory Chinese University of Hong Kong	Department of Physics Physics Physics Physics Laboratory of Atomic and Solid State Physics Department of Physics Physics Physics Physics StPA-MACLAB Neutron scattering Physics Department of Physics Physics Department of Physics Physics Department of Physics PFF Physics PFF Physics Phys	DOE	BES – Basic Energy Sciences		P20151	UTe2 High field studies of a new Shastry-Sutherland lattice compound.	Condensed Matter Physics		1
Akash Khansili (G) Ross McDonad (S) Kimberly Modic (S) Amit Nathwani (U) Brad Ramshaw (S) Andreas Rydh (S) Shang Ran (S) Christophe Broyles (G) Martin Nikolo (S) John Singleton (S) Sangyun Lee (P) Huibo Cao (S) Marcelo Jaime (S) Tai Kong (S) Minesong Lee (S) Vieine Zapf (S) Swee Gn (S) Fedor Stalakrev (S) Kwing To Lui (S) Lingfel Wang (G)	С ССССС СССС Р СССС Р ССССС Р ССССС Р ССССС Р ССССС С С С С С С С С С С С С С С С С С	National High Magnetic Field Laboratory Slockholm University National High Magnetic Field Laboratory Institute of Science and Technology Austria Institute of Science and Technology Austria Slockholm University Slockholm University Slockholm University NSL Louis Washington University NSL Louis Saint Louis University NSL Louis Saint Louis University NSL Louis National High Magnetic Field Laboratory National High Magnetic Field Laboratory Oak Ridge National Laboratory National High Magnetic Field Laboratory University of Anzona National High Magnetic Field Laboratory University of Anzona National High Magnetic Field Laboratory National High Magnetic Field Laboratory Chinese University of Hong Kong	Department of Physics Physics Physics Physics Department of Physics Department of Physics Phys	DOE	BES – Basic Energy Sciences		P20151	UTe2 High field studies of a new Shashry-Sutherland lattice compound. Tuning thin quantum materials using blackal strain	Condensed Matter Physics		1
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		Participants (Name, Role, Org., Dept.)		(Funding Sources Funding Agency, Division, Award #)		Proposal #	Proposal Title	Discipline	Exp. #	Days Used
Rongying Jin (S)	PI	University of South Carolina	Department of Physics and Astronomy	No other support			P20246	Quantum-limit behavior in a topological superconductor	Condensed Matter Physics	1	1
oanna Blawat (P)	С	National High Magnetic Field Laboratory	NHMFL					candidate			
aniel Duong (G)	C	University of South Carolina	Department of physics and astronomy								_
lamie Manson (S) Paul Goddard (S)	PI	Eastern Washington University University of Warwick	Chemistry and Biochemistry Department of Physics	NSF	DMR - Division of Materials Research	DMR2104167	P20250	Magnetism and transport in molecule-based materials	Condensed Matter Physics	1	1
Paul Goddard (S) Iohn Singleton (S)	C C	National High Magnetic Field Laboratory	Physics								
Sunil Karna (S)	DI *	Prairie View A&M University	Physics Physics Department	Prairie View A&M University	US College and University		P20264	Investigation of angular dependence of dHvA oscillations	Condensed Matter Rhysics	1	-
_auren Allen (G)	c	Prairie View A&M University	Physics	Fiame view Adam University	US college and onliverality		1 20204	of chiral topological semimetal PdGa	Condenaed Matter Privatca		1
Drrin Clarke Delgado (G)	c	Norfolk State University	Physics Department								
John Singleton (S)	С	National High Magnetic Field Laboratory	Physics								
Kevin Storr (S)	С	Prairie View A&M University	Physics								
Doyle Temple (S)	С	Norfolk State University	Physics Department								
Mijkhail Eremets (S)	PI	Max Planck Institute for Chemistry, Mainz	Chemistry and Physics at High Pressures Group	Max Plank Institute for Chemistry	Non US Government Lab		P20272	Hydrogen-Rich High Temperature Superconductors	Condensed Matter Physics	1	(
Fedor Balakirev (S)	С	National High Magnetic Field Laboratory	PFF								
uis Balicas (S)	С	National High Magnetic Field Laboratory	Condensed Matter Experiment								
/asily Minkov (S)	С	Max Planck Institute for Chemistry, Mainz	Chemistry and Physics at High Pressures Group								
Charles Agosta (S)	PI	Clark University	Department of Physics	No other support			P20274	The TDO in pulsed fields, a study of ?-(BETS)2GaCl4	Condensed Matter Physics	1	4
Akiko Kobyashi (S)	C	University of Tokyo	Research Centre for Spectrochemistry								
Brett Laramee (G)	C	Clark University	Physics								
aurel Winter (S)	C	National High Magnetic Field Laboratory	Physics	N					0		_
_aurel Winter (S) Joanna Blawat (P)	PI	National High Magnetic Field Laboratory	Physics NHMEL	No other support DOE	LDRD - Laboratory Directed R&D	DE-XX00-00XX00000	P20290	Testing of probes and instrumentation in pulsed fields	Condensed Matter Physics	2	4 1
Joanna Biawat (P)	C	National High Magnetic Field Laboratory	NHMFL	DOF	LUKU - Laboratory Directed R&D	DE-XX00-00XX00000	1			1	
Greta Chappell (P)	C	Los Alamos National Laboratory	MPA-MAGLAB				1			1	1
Ross McDonald (S)	c	National High Magnetic Field Laboratory	Physics								
Sary Noe (T)	c	National High Magnetic Field Laboratory	National High Magnetic Field Laboratory - Pulsed Field Facility								
Saly NOE (1)	C	National High Magnetic Field Laboratory	National High Magnetic Field Laboratory - Pulsed Field Facility								
John Singleton (S)	c	National High Magnetic Field Laboratory	Physics								
Janice Musfeldt (S)	PI	University of Tennessee, Knoxville	Department of Chemistry	VSP		12345	P20344	High field spectroscopy of materials with broken	Chemistry	1	1
dirico musiciar (o)		children y or remeased, relaxing	Separation of one many	101		12010	1 20344	symmetries and strong spin-orbit coupling	Chambury		
Avery Blockmon (G)	c	University of Tennessee, Knoxville	Chemistry					, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			
Robert McQueeney (S)	PI	Ames Laboratory	physics & astronomy	DOE	BES – Basic Energy Sciences	DE-AC02-07CH11358	P20362	Pulsed magnetic field studies of topological magnetic	Condensed Matter Physics	4	4
					55			Kagome compounds			
Joanna Blawat (P)	С	National High Magnetic Field Laboratory	NHMFL								
Paul Canfield (S)	С	Ames Laboratory	Physics & Astronomy								
Ross McDonald (S)	С	National High Magnetic Field Laboratory	Physics								
John Singleton (S)	С	National High Magnetic Field Laboratory	Physics								
Tyler Slade (S)	С	Ames Laboratory	Physics								
Benjamin Ueland (S)	С	Ames Laboratory	Division of Materials Sciences and Engineering								
Omitri Yakovlev (S)	PI	University of Dortmund	Dept. of Physics	Deutsche Forschungsgemeinschaft throug the Collaborative Research Center TRR14			P20376	Energy and spin structure of dark and bright excitons in two-dimensional perovskite semiconductors	Condensed Matter Physics	1	1
Scott Crooker (S)	~	National High Magnetic Field Laboratory	Nat High Magnetic Field Lab								
Scott Grooker (S) Christopher Mizzi (S)		National High Magnetic Field Laboratory National High Magnetic Field Laboratory	MPA-MAGLAB: MPA-MAG LAB NHMFL GROUP	NSF	DMR - Division of Materials Research	DMR2128556	000000	Expanding Non-Linear Transport Capabilities in Pulsed	Condensed Matter Division		
Fedor Balakirev (S)	ri C	National High Magnetic Field Laboratory	NFA-MAGLAB. MFA-MAG LAB NHMFL GROUP	Nor	DWR - DWSION OF Waterials Research	DMR2128336	P20302	Fields with Dynamic Range and in situ Voltage	Condensed Matter Physics		1
Vinseong Lee (S)	č	National High Magnetic Field Laboratory	MPA-MAG					Compensation			
Boris Maiorov (S)	č	National High Magnetic Field Laboratory	MPA-MAGLAB								
Sujit Das (S)	PI *	Indian Institute of Science, Bengaluru	Materials Research Centre	DOE	BES – Basic Energy Sciences	F10100	P20391	Investigating emergent phenomena in	Condensed Matter Physics	1	1
Jayjit Dey (P)	c	Indian Institute of Science Materials Research Centre, Bengaluru		502	beo basis energy colonidos	110100	. 20001	SrRuO3/SrTiO3/SrRuO3 heterostructures with non-	Condended Maler F Hybros		
ayja boy (i')	°	indian indiate of coloride Materials Rescaren Centre, Bengalara						collinear spin texture			
Neil Harrison (S)	c	National High Magnetic Field Laboratory	Physics								
Rubi Km (P)	č	Los Alamos National Laboratory	MPA-MAGLAB								
Doan Nguyen (S)	PI	National High Magnetic Field Laboratory	Pulsed Field Facility	DOE	Other	WC3N.23TPHMAG	P20392	Determining Jc(B) of HTS Tapes via Magnetization	Material Science	1	1
Shengzhi Zhang (P)	с	National High Magnetic Field Laboratory	MPA-MAGLAB: MPA-MAG LAB NHMFL GROUP				1	Measurements in 60T Mid-pulsed Magnet		1	1
Christopher Mizzi (S)	PI *	National High Magnetic Field Laboratory	MPA-MAGLAB: MPA-MAG LAB NHMFL GROUP	No other support			P20401	Symmetry-Sensitive Detection of a Novel Magnetic Phase	Condensed Matter Physics	1	1
Winseong Lee (S)	С	National High Magnetic Field Laboratory	MPA-MAG				1			1	
Boris Maiorov (S)	С	National High Magnetic Field Laboratory	MPA-MAGLAB								
Haidong Zhou (S)	С	University of Tennessee, Knoxville	Physics and Astronomy						L		
James Analytis (S)	PI	University of California, Berkeley	Physics	DOD	US Air Force		P20412	High Magnetic field Investigations of the Eu122 candidate	Biology, Biochemistry, Biophysics	1	4
Yuanqi Lyu (G)	С	University of California, Berkeley	Physics					Axionic Insulators			
uke Pritchard Cairns (P)	С	University of California, Berkeley	Physics				1			1	1
Kohtaro Yamakawa (G)	С	University of California, Berkeley	Physics				1				
Johanna Palmstrom (P)	PI *	National High Magnetic Field Laboratory	MPA-MAG	DOE	BES – Basic Energy Sciences	LANLF101	P20419	In-situ strain measurements of quantum materials in	Condensed Matter Physics	1	1 1
	С	Los Alamos National Laboratory	Center for Integrated Nanotechnologies (MPA-CINT)	DOE	BES – Basic Energy Sciences	DE-AC02- 06CH11357	1	extreme magnetic fields		1	1
Aiping Chen (P)			Diamina di Anglia	DOE	LDRD - Laboratory Directed R&D	DE-AA00-00AA00000					
Aiping Chen (P) Jiun-Haw Chu (S)	с	University of Washington	Physics								
iun-Haw Chu (S)	с			DOL	EDITO - Edubricary Directed Hab						
iun-Haw Chu (S) iaue Kaufmann Ribeiro (G)	c c	Los Alamos National Laboratory	MAGLAB	DOL	Ebrid - Educatory Directed Had						
un-Haw Chu (S)	c c c			DOL	Lord - Laboratory Directed Hab			Total Proposals		Experiments:	: Day



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