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Laboratory Update for Alumni

Summer 2025

Featured Stories

Winners of 2025 FRIB Achievement Award for Early Career Researchers named

The FRIB Users Organization Executive Committee and the FRIB Theory Alliance Executive Board have announced the winners of the 2025 FRIB Achievement Award for Early Career Researchers. The award recipients are:

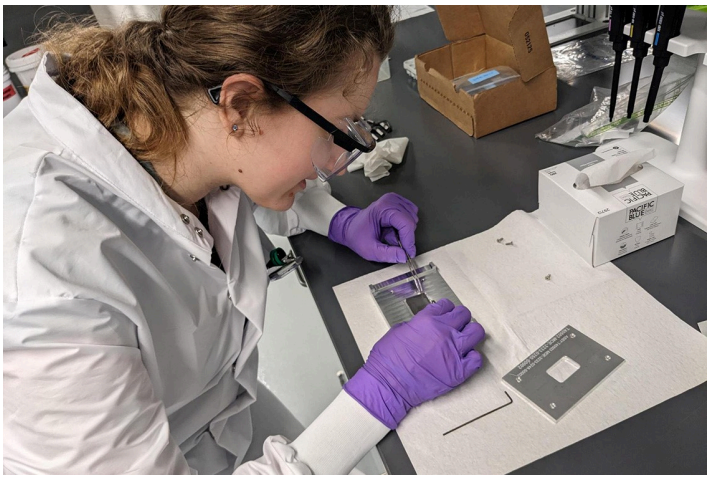
Erich Leistenschneider and Cole Pruitt

- Erich Leistenschneider from Lawrence Berkeley National Laboratory for the experimental award, and
- Cole Pruitt from Lawrence Livermore National Laboratory for the theory award.

The FRIB Achievement Award for Early Career Researchers recognizes outstanding original contributions to the field of nuclear physics through work at or relating to FRIB, performed by scientists early in their careers.

Read more

Isotope harvesting in a solid overcomes limitations of water-based extraction



Rare isotope harvesting provides additional discovery opportunity. Rare isotopes have a role in multiple fields of study, such as medicine, biochemistry, materials science, horticulture, and astrophysics.

Thus far, efforts toward isotope harvesting at FRIB have primarily centered on collecting isotopes from the water used to absorb unused beam particles; however, there is also significant potential for harvesting isotopes from a solid matrix.

The isotope harvesting group of Katharina Domnanich, assistant professor of chemistry at FRIB and in the MSU Department of Chemistry, explored this approach through the development of a solid harvesting collector, which encompasses multiple foils mounted within an aluminum frame. In a recent experiment, a secondary calcium-47 beam was directed onto these collector foils, where it was successfully stopped. The collector, after being exposed to the beam, was then transported to the Radiochemistry Labs in the Chemistry building, where the team chemically extracted the produced calcium-47. The calcium-47 was utilized to establish a radionuclide generator and isolate its radioactive daughter scandium-47 at high purity – a novel and highly promising isotope for nuclear medicine applications.

This first test successfully demonstrated the feasibility of the solid harvesting approach; however, further optimization is underway, with current efforts focused on fine-tuning the beam's stopping within the collector foils. Solid-phase isotope harvesting offers a particularly promising solution for isotopes that are challenging to extract from water.

Completions of S1 and S2 experimental vaults enhance scientific capabilities for users

Significant milestones have been reached in both the S1 and S2 vaults, marking continued progress in experimental readiness and scientific output.

The S2 vault is now ready for operation following the successful installation of key technical components within the focal plane detector, located downstream

of the sweeper magnet. These include a pair of micro-pattern drift chambers, a Frisch-grid ionization chamber, and the timing stop detector. An Instrument Readiness Review (IRR) was conducted on 18 April, granting approval to move forward with beam commissioning.

Commissioning proceeded in two phases. Phase 1, completed on 25 April, served as a system validation with beam and helped identify and address areas for improvement. Phase 2, conducted from 19 to 21 May, successfully demonstrated the integration of the sweeper magnet with the Modular Neutron Array (MoNA) and the focal plane detectors. With commissioning now complete, the first experiment utilizing the sweeper magnet in the S2 vault is scheduled to begin in June 2025.

Meanwhile, the S1 vault concluded its first experimental period following its launch earlier this year. During this period, S1 supported five experiments and a commissioning run, signaling a strong start to scientific operations. Key highlights included the first delivery of uranium-238 fission fragments to the FRIB Decay Station initiator (FDSi) and the debut use of the SuN++ Detector Array, which required a custom beam line extension. The campaign wrapped up in June, ahead of the planned summer 2025 shutdown.

Together, these developments mark significant forward momentum across the experimental program and lay the foundation for a robust scientific schedule moving forward.

Honors and Awards

Faculty Awards

Alexandra Gade named University Distinguished Professor at MSU

FRIB Scientific Director Alexandra Gade has been selected to receive one of Michigan State University's highest honors: the title of University Distinguished Professor.

Only 153 faculty members have received this honor since it was first awarded in 1990. Read more

FRIB's Witek Nazarewicz awarded 2025 Marian Smoluchowski Medal

Witek Nazarewicz, John A. Hannah Distinguished Professor at MSU, has received the 2025 Marian Smoluchowski Medal from the Polish Physical Society.

Nazarewicz has faculty appointments at FRIB and in the MSU College of Natural Science's Department of Physics and Astronomy, and is chief scientist at FRIB. Read more

Student Awards

FRIB students are being recognized by the U.S. Department of Energy for their research contributions and potential:

- FRIB graduate assistant Brandon Lem earns DOE NNSA fellowship
- FRIB graduate student Jacob Brown earns DOE-SC research program award
- FRIB undergraduate students earn DOE-SC internships

Alumni Spotlight

Andrew Sanchez earned a PhD in physics from Michigan State University and was at the National Superconducting Cyclotron Laboratory (NSCL) from 2019–2024.

He is currently a physicist for Pajarito Scientific Corporation (PSC) in Santa Fe, New Mexico.

Read more

News

Here are a few recent highlights from the FRIB News Center. For additional stories, visit the FRIB website.

FRIB researchers use SuN to shine light on exotic nuclear shapes

Using the Summing NaI Detector (SuN), a team of experimental and theoretical scientists took another step in understanding how an atomic nucleus can coexist in two different shapes corresponding to only slightly different energy levels. Read more

Scientists use new method to study rare isotopes with 'halo' structures

Scientists from institutions including Texas A&M University, Brookhaven National Laboratory, Johannes Gutenberg University Mainz in Germany, the University of Surrey in the United Kingdom, and FRIB measured reactions resulting from the collision of the radioactive isotope beryllium-11 and the stable nucleus carbon-12. The goal of that experiment is to test the ratio method, a new technique for extracting properties of halo nuclei. The team published its results ("Experimental test of the ratio method for nuclear-reaction analysis") in *Physical Review Letters*. Read more

Researchers review methods for deriving low-energy nuclear reactions in stars

A team of researchers, including scientists from FRIB and led by the University of Notre Dame, recently collaborated to review techniques used to determine nuclear reaction rates in cold stellar environments. The team's analysis ("Quantum physics of stars") was published in *Reviews of Modern Physics*. Read more

Visit news page

In the News

Below are some recent FRIB-focused articles from selected outlets. For more, visit the FRIB website.

- **Competing nuclear shapes found in chromium-62**
  DOE-SC science highlight: Experiment reveals competing nuclear shapes

in the rare isotope chromium-62

- **New insights into fusion**
  DOE-SC science highlight: Predictive theory revises understanding of alpha processes

- **Heavy atoms origins probed**
  Quanta: Physicists start to pin down how stars forge heavy atoms

Visit in the news page

Upcoming Events

Below is a list of upcoming events. For more, visit the FRIB website.

- 8-19 September 2025 - FRIB Theory Alliance Topical Program - Future Directions in Nuclear Beta Decay at FRIB
- 29 September-3 October 2025 - First Workshop on New Generations of Detectors and Data Acquisition Systems

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Update your information in FRIB Alumni Directory

The FRIB Laboratory has an alumni directory form to communicate with laboratory alumni and to track their career paths. Please take a couple of minutes to fill out or update the form by answering a few simple questions. This will ensure our records are accurate and build a more reliable network we hope you find useful. Visit the online alumni directory form to enter and update information.

We want to hear from you

Send us your story ideas! Let us know what you are up to! We want to feature at least one story each issue about you—our alumni, so please email us story tips about you and/or your fellow alumni to alumni@frib.msu.edu. Tell us about discoveries, business ventures, partnerships, awards, and other professional developments, and we may feature them in a future issue. Also let us know if

there are other types of laboratory updates you'd like to see in future alumni issues.

Michigan State University operates FRIB as a user facility for the U.S. Department of Energy Office of Science (DOE-SC), with financial support from and furthering the mission of the DOE-SC Office of Nuclear Physics.

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