LABORATORY UPDATE for ALUMNI

NSCL FRIB

January 2018

Laboratory celebrates 2017 successes while preparing for another great year

by FRIB Laboratory Director Thomas Glasmacher and NSCL Director Brad Sherrill

Happy New Year! The arrival of 2018 provides an opportunity to look back with pride and appreciate all that was accomplished in 2017. FRIB remains ahead of schedule. We completed civil construction, accelerated the first ion beam, installed the large vacuum vessels, and commissioned the FRIB cryoplant. At NSCL, nearly 800 scientists from around the world conducted 32 experiments. The Department of Energy Office of Science and the National Science Foundation continue to view us as good stewards of the nation's precious research dollars and we strive daily to maintain our standing. While the work we do will leads to new scientific discoveries, it is more evident that our work will also address important societal problems in health, security, and energy.

As a laboratory, we strive for many things. One important objective is providing and sustaining a safe and inclusive work environment. Achieving this goal, like keeping the FRIB Project on schedule and operating the coupled cyclotron facility and the ReAccelerator facility, requires effort and attention from everyone. This year we put in place a new laboratory work control process and technical staff are now using it. It is a good method of protecting each other by properly planning, preparing for, and safely conducting work.

We continued our leading role in nuclear and accelerator science by hosting a number of major conferences and important workshops. To mention a few: JINA-CEE LIGO VIRGO Livestream (the Joint Institute for Nuclear Astrophysics – Center for the Evolution of the Elements, Laser Interferometer Gravitational-Wave Observatory, and the Advanced Virgo Detector), IBIC – International Beam Instrumentation Conference, Advances in Rare Isotope Science (ARIS 2017), The 5th International Conference on Mesoscopic Physics, the Modular Neutron Array (MoNA) Collaboration Meeting at Gull Lake, 2017 Low Energy Community Meeting at Argonne National Laboratory (ANL), a Radiation Transport Workshop, and an International Collaborations in Nuclear Theory (ICNT) Program on Equation of State.

Additionally, the laboratory was awarded a number of important grants, including one that will make us a leading educational institution in accelerator science. We launched a new cryogenic studies initiative. More than 130 undergraduates and 100 graduate students are learning for their future at the laboratory. We had more than 5,000 visitors tour the lab and our outreach programs engaged over 10,000 people from across the U.S.

Thank you for your support in 2017, and we look forward to sharing more laboratory successes with you this year.

Technical installation progress advances

Technical installation progress continues to advance at FRIB, with the project meeting new milestones on a regular basis. This article highlights significant progress since what was featured in our last issue in August.

FRIB cryogenic plant makes first liquid helium; plant on track to operate in 2018

The FRIB cryogenic plant made its first liquid helium at 4.5 kelvin (K) on 16 November 2017.

The FRIB cryogenic plant made its first liquid helium at 4.5 kelvin (K) on 16 November. Making cold helium is critical to operating FRIB's linear accelerator. FRIB's beam-accelerating cryomodules contain superconducting radiofrequency cavities that must operate at temperatures hundreds of degrees below zero to be superconducting. The cold helium makes the cavities superconducting.

FRIB's two cryogenic cold boxes (the upper and lower cold boxes) work in tandem to cool helium to extremely low temperatures. The upper cold box lowers the temperature from 300 degrees K to 60 K. The lower cold box serves as the second step in the helium-cooling process, dropping the temperature from 60 K to 4.5 K.

Due to the focused efforts of its staff, the FRIB cryoplant was completed in December 2017 is on track to operate in 2018. The system utilities are in place, the oxygen-deficient hazard (ODH) system is complete, and the commissioning and performance testing of the warm compressor is finished.

FRIB staff have collaborated and used work-for-others (WFO) contracts with the Thomas Jefferson National Accelerator Facility (JLab), which have allowed the staff to benefit from the experience and lessons learned at JLab. FRIB also established the MSU Cryogenic Initiative, one of the four focus areas of the Department of Energy's 2017 traineeship grant solely awarded to MSU.

FRIB achieves accelerator milestones with acceleration of argon, krypton

FRIB marked significant accelerator progress this past fall, with the successful commissioning of the front end. FRIB's front end – where the ion beam will start – was completed in May, 16 months ahead of schedule.

Following completion of the front end technical construction, in August a beam of argon ions was extracted from the Advanced Room-TEMperature Ion Source (ARTEMIS) room temperature electron cyclotron resonance source with intensity necessary to achieve Key Performance Parameters.

Commissioning of the front-end system was authorized by MSU in September, culminating in the acceleration of an argon-40 beam by the radio frequency quadrupole (RFQ) to an energy of 500 kiloelectron-volt/nucleon and transported through the Medium Energy Beam Transport (MEBT) line at the end of September. In early October, a test beam of krypton-86 was accelerated successfully by the RFQ to the end of the MEBT to the same energy.

Read about more technical installation progress online

- FRIB installs warm diagnostic chambers in linear accelerator tunnel
- First β=0.085 cryomodule moved into final position
- FRIB places first β=0.29 cryomodule
- FRIB places first matching cryomodule

DOE-SC Office of Project Assessment review held 5-7 December

The DOE-SC Office of Project Assessment's (OPA) review of FRIB was held 5-7 December. Reviewers are pictured above.

The DOE-SC Office of Project Assessment's (OPA) review of FRIB was held 5-7 December. The main focus of the review was to assess overall FRIB Project progress since the last review in June 2017, with a focus on technical progress.

The review committee was organized into four subcommittees, and FRIB staff gave 51 presentations.

The OPA assessed all aspects of the FRIB Project – technical, cost, schedule, management, and environmental safety and health – and found that FRIB is making appropriate progress toward completion and is well-managed. The review committee answered all charge questions affirmatively.

DOE has tentatively scheduled the next FRIB Project progress review for 22-24 May 2018.

FRIB part of new training program to address national shortage in accelerator scientists, engineers

MSU is establishing an Accelerator Science and Engineering Traineeship program to address a national shortage in accelerator scientists and engineers.

FRIB is partnering with several MSU units and other national laboratories to establish an Accelerator Science and Engineering Traineeship (AS&E) program to address a national shortage in accelerator scientists and engineers.

The program will be a collaboration between FRIB and faculty in the Department of Physics and Astronomy in the College of Natural Science, the College of Engineering. It will be augmented with two adjunct faculty appointments at other DOE-SC national laboratories, Stanford National Accelerator Laboratory and Argonne National Laboratory. Additionally, a national advisory committee has been established to help guide the program and its outcomes. Students who complete the curriculum will be certified, well-trained, and ready for productive AS&E careers in DOE laboratory facilities, discovery science, and technology/industry. Fulfilling these needs is critical to maintaining U.S. leadership in accelerator technology and enhancing economic growth.

The program will address four major areas where there are critical workforce needs:

- Physics and engineering of large accelerators
- Superconducting radio frequency accelerator physics and engineering
- Radio frequency power engineering
- Large-scale cryogenic systems

The DOE-SC Office of High Energy Physics (OHEP) has awarded MSU a $990,000 accelerator science and engineering traineeship grant to develop the program.

“The collocation of a world-class accelerator and strong academic programs provides particular educational opportunities and value to the nation,” said Thomas Glasmacher, FRIB Laboratory director. “Collaborating with faculty from three colleges to solve a national issue underscores the uniqueness and significant positive impact of establishing FRIB at MSU for the U.S. Department of Energy Office of Science.”

For more information, read the online article.

MSU Board of Trustees authorizes FRIB to plan for two additions

On 15 December, the MSU Board of Trustees (BOT) authorized FRIB to begin planning for new additions to the facility.

- A 12,000-square-foot Cryogenic Assembly Building adjacent to the existing Superconducting Radio Frequency Highbay for the maintenance of cryomodules and to perform research pertaining to cryogenic engineering. The current cryomodule assembly space in the east highbay will become research space for the reaccelerated beam program when the FRIB cryomodule production completes in 2019.
- A 31,000-square-foot High Rigidity Spectrometer and Isotope Harvesting Vault to house research equipment for isotope harvesting and to provide experimental space for the FRIB science program.

The board's planning approval allows FRIB to engage an architectural/engineering firm through final design. FRIB will seek MSU BOT authorization to proceed with the projects in early 2018.

FRIB users Kelly Chipps and Heiko Hergert awarded U.S. Department of Energy awards

Kelly Chipps (Photo courtesy of Oak Ridge National Laboratory/U.S. Department of Energy)

Two scientists who perform research at FRIB and NSCL have received DOE-SC Early Career Research Program awards.

The program, in its eighth year, awards financial support to scientists from universities and DOE national labs to help advance their research. Research proposals are peer-reviewed and selected by one of the following six offices: Advanced Scientific Computing, Biological and Environmental Research, Basic Energy Sciences, Fusion Energy Sciences, High Energy Physics, and Nuclear Physics. Out of about 700 proposals, fifty-nine were selected for the

"I'm excited because the Early Career Research award allows me to pursue the combination of two techniques," said Kelly. With the award, she will be able to build a prototype with the Helical Orbit Spectrometer (HELIOS) at Argonne National Laboratory.

Check out the video ORNL produced about Kelly's research.

Heiko Hergert, an MSU assistant professor of physics with a joint appointment in NSCL and FRIB, was also selected by the Office of Nuclear Physics for his proposal, "Advanced Ab Initio Methods for Nuclear Structure." Heiko's research focuses on using novel theoretical methods and large-scale computer simulations to model nuclei based on the fundamental interactions between the protons and neutrons they are made of.

"The exotic nuclei that FRIB will be able to produce are excellent laboratories for teasing out the fine details of these fundamental interactions," said Heiko. "By confronting our calculations with new experimental

2017 fiscal year.

FRIB user Kelly Chipps, a Liane B. Russell Fellow working in the Oak Ridge National Laboratory (ORNL) Physics Division, will receive funding for her proposal, "Next-Generation Particle Spectroscopy at FRIB: A Gas Jet Target for Solenoidal Spectrometers," selected by the Office of Nuclear Physics.

Kelly is the leader of the Jet Experiments in Nuclear Structure and Astrophysics (JENSA) collaboration at FRIB. The collaboration developed and installed a pure, recirculating gas jet target system on a dedicated beamline at the National Superconducting Cyclotron Laboratory (NSCL) in anticipation of reaccelerated beams from NSCL and, in the future, FRIB. Her research seeks to study exotic, unstable nuclei and nuclear reactions that power the stars by combining the benefits of the sophisticated state-of-the-art solenoidal spectrometer at Argonne National Laboratory and the JENSA system developed at ORNL. The project promises to resolve challenges to achieving high-resolution and low-background particle spectroscopy when applied to FRIB. The Early Career Research award will help her determine if the gas jet target system can work with a solenoidal spectrometer. This would allow researchers to understand the limitations in charged-particle spectroscopy.

data, we will be able to close important gaps in our understanding." Reliable simulations of such nuclei require theoretical and computational advances whose development are a central goal of his Early Career Research proposal.

Heiko said he is honored to be a recipient of this highly competitive award.

Heiko earned both his master's degree and PhD from Technische Universität Darmstadt in Germany. In 2009, he began his postdoctoral research at NSCL before transitioning to Ohio State University to continue his postdoctoral research. From 2014 to 2015, he worked as a theory fellow at NSCL/FRIB and in 2015 he became an assistant professor of physics.

Congratulations to Kelly and Heiko on receiving Early Career Research awards!

Heiko Hergert

MSU's Contreras-Martinez, Ready selected for DOE Office of Science Graduate Student Research Program

Crispin Contreras-Martinez was selected by the U.S. Department of Energy for its 2017 Office of Science Graduate Student Research Program. (Photo courtesy of Derrick L. Turner, Communications and Brand Strategy)

"With this award," Contreras-Martinez explained, "I will be able to study the properties of the piezo to improve its lifetime in state-of-the-art facilities, network with other scientists and engineers to learn about different tuning techniques and learn how to drive the piezo actuator for efficient tuning. These projects are of key importance to high energy and nuclear physics."

Ready, a doctoral student working in Spinlab at NSCL, works with his advisor, Jaideep Singh, and other scientists to improve the sensitivity of the measurement of the permanent Electric Dipole Moment (EDM) of the isotope Radium-225. By upgrading the Ra EDM experimental apparatus at the Argonne National Laboratory (ANL) to achieve a higher electric field and better atomic trapping

Two Michigan State University physics and astronomy graduate students—Crispin Contreras-Martinez and Roy Ready—were among 52 graduate students from across the nation selected by the U.S. Department of Energy (DOE) for its 2017 Office of Science Graduate Student Research (SCGSR) Program.

The DOE SCGSR Program was established to advance a graduate student's doctoral thesis while providing access to the expertise, resources and capabilities available at DOE laboratories. The award will support Contreras-Martinez and Ready for up to one year of research under the supervision of a DOE laboratory scientist.

"This award is of high importance to me since I will be able to advance my research and get hands-on experience with the equipment currently being built at MSU. It will also give me an opportunity to explore post-doctoral research opportunities," said Contreras-Martinez, a doctoral student who is currently working at MSU's National Superconducting Cyclotron Laboratory (NSCL) with Peter Ostroumov, professor of physics. "I'm honored to receive this award and excited to start working at Fermilab."

For the next six months, Contreras-Martinez will study the electromagnetic and mechanical properties of superconducting radiofrequency cavities used to accelerate protons, electrons and ions at the Fermi National Accelerator Laboratory in Illinois. These cavities can be "de-tuned" by external noise, but Contreras-Martinez is working to improve the life span of dynamic tuners that can keep the resonant frequency intact by elastically deforming the cavity with piezo actuators.

efficiency, Ready and his collaborators hope to move closer to observing a non-zero permanent EDM for the first time.

"From a professional standpoint, I'm thrilled to be working with and learning from world experts in atomic and nuclear physics," Ready said. "With the SCGSR award, I'll work on-site at the ANL apparatus in Chicago with a research group known as the Cold Atom Trappers using upgrade components I've developed for the past two years at the NSCL here at MSU."

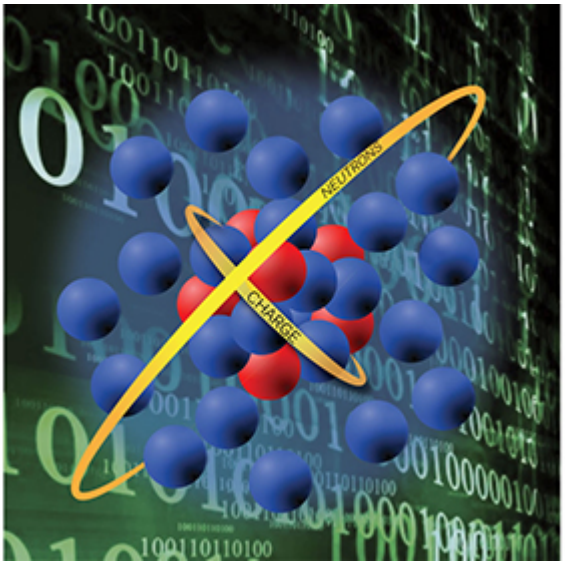
"Receiving the SCGSR award is a milestone for me," Ready continued. "I'm extremely grateful for the opportunity it provides. I've received a lot of guidance from Dr. Singh and could not have done it without him. I'm a little sad to leave my peers, friends and research group at MSU for six months, but I'm also thrilled to work at ANL!"

Roy Ready was selected by the U.S. Department of Energy for its 2017 Office of Science Graduate Student Research Program.

DOE-SC awards grants for nuclear physics computing

investigator on the NUCLEI project is Joseph Carlson from Los Alamos National Laboratory.

The NUCLEI project builds on recent successes in large-scale computations of atomic nuclei to provide results critical to nuclear science and astrophysics,



Conceptual art illustrates different sizes of proton (charge) and neutron distributions in calcium 48 calculated by nuclear physicists with the help of fastest supercomputers available for public research. Image credit: Erin O'Donnell, Facility for Rare Isotope Beams

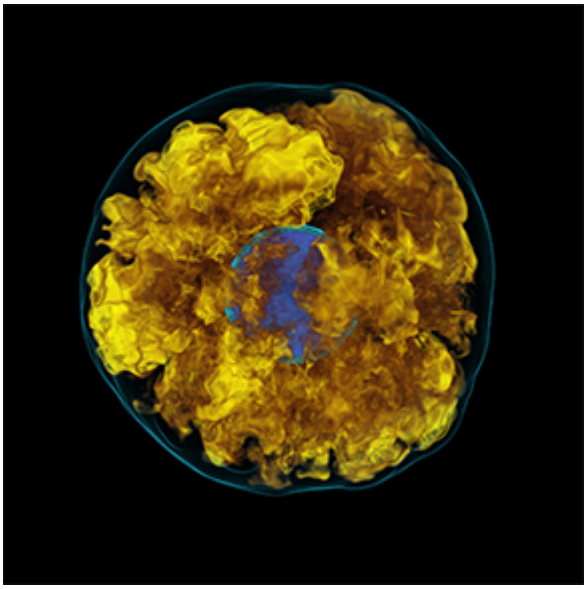
Two nuclear physics computational research projects supporting forefront research at FRIB have won grants from DOE-SC.

The five-year awards are part of the Scientific Discovery through Advanced Computing (SciDAC-4) program supported by the DOE-SC Offices of Nuclear Physics and Advanced Scientific Computing Research. Each of these SciDAC projects is a collaboration between scientists and computational experts at multiple national laboratories and universities, who combine their talents in science and computing to address a selected set of high-priority problems at the leading edge of research in nuclear physics, using the powerful Leadership Class High Performance Computing (HPC) facilities available now and anticipated in the near future.

One awarded project is NUCLEI, or the NUclear Computational Low-Energy Initiative project. The goal of NUCLEI is to use advanced applied mathematics, computer science, and physics to accurately describe the atomic nucleus in its entirety, one of FRIB's key research areas. The principal and to nuclear applications in energy and national security.

A second grant will fund the Towards Exascale Astrophysics of Mergers and Supernovae (TEAMS) research project. Improved simulations of neutron star mergers and supernovae carried out by TEAMS researchers will advance our understanding of the creation of the heaviest elements, like gold, silver, and many others, a second key research area of FRIB. How the heavy elements formed following the Big Bang is a longstanding mystery in astrophysics and cosmology (see the LIGO blurb below). The principal investigator on the TEAMS project is William Raphael Hix from Oak Ridge National Laboratory.

For more information, read the online article.



A 3D simulation of a supernovae carried out on one of the largest supercomputers in the world. Image credit: Sean Couch, MSU

Researcher joins FRIB as part of new collaboration between nuclear physics and the statistical sciences

Witek Nazarewicz (FRIB Chief Scientist) and Léo Neufcourt (Research Associate)

A new collaboration between nuclear physics and the statistical sciences at Michigan State University (MSU) is bringing together FRIB and the Department of Statistics and Probability (STT).

As part of that collaboration, Léo Neufcourt, an expert in statistics, probability theory, and applied mathematics, has accepted an appointment as a research associate at MSU. It will be a joint position shared between FRIB and STT.

“I am excited to be part of the FRIB project through this partnership,” Léo said. “FRIB experiments could answer several questions that not only are fundamental to science, but would also directly impact people’s lives. I look forward to contributing to this impressive work.”

“I am very excited to be part of the FRIB project through this partnership,” Léo said. “Uncertainty quantification has become decisive in nuclear physics to compare experiments and theories, and our Bayesian methods should provide a new perspective on several challenging FRIB problems such as mass models or beam tuning, with an honest and tractable estimation of error bars.”

Léo obtained a PhD in statistics at Columbia University after graduating from a cross-disciplinary program at Ecole Polytechnique in France. He worked in the stochastic modeling group, creating mathematical models of systems which appear to behave randomly but follow precise probabilistic laws. He’s also worked as a quantitative analyst and a consultant in the financial industry, where he focused on building quantitative models for financial markets.

“Léo and our team will develop new statistical techniques for estimating parameters for unstable nuclei and other nuclear physics problems,” said Frederi Viens, professor and STT chairperson. “Together with my colleague, Professor Taps Maiti, and his group, we are discussing the development and use of cutting-edge Bayesian methodology. It will be designed to provide estimates of uncertainty in nuclear physics models, estimates which are as sharp and as honest as possible. We expect that our methodology will extract and quantify information from our colleagues’ deep knowledge of physical systems. We are delighted Léo is joining us to expand our horizons in this research area.”

Léo will engage in diverse research efforts within FRIB, including uncertainty quantification for models in theoretical and experimental nuclear physics, as well as in modeling related to facility development and isotope beam production. Uncertainty quantification is a way to estimate an outcome or a model when no model can be made to match experimental data exactly.

“This collaboration will serve to enhance the experiments at FRIB and the real-world applications of our research,” said Thomas Glasmacher, FRIB laboratory director.

Léo will have opportunities to explore other collaborations on campus and is already in discussions with teams interested in high-frequency quantitative finance, development economics and ecosystem services, and healthcare outcomes in human medicine. His appointment is supported by FRIB, STT, the College of Natural Science, and the Department of Family Medicine.

Bradley Sherrill receives Tom W. Bonner Prize in Nuclear Physics

instruments and techniques for discovery and exploration of exotic nuclei, and for his community

Bradley M. Sherrill

Bradley M. Sherrill, director of the National Superconducting Cyclotron Laboratory (NSCL) and scientific director at FRIB at MSU, was awarded the 2018 Tom W. Bonner Prize in Nuclear Physics from the American Physical Society (APS).

APS is a nonprofit organization with 54,000 members that works to advance and spread knowledge of physics via publications, scientific meetings, education, and public outreach. The Tom W. Bonner Prize is awarded annually to recognize and encourage outstanding experimental research in nuclear physics, including the development of a method, technique, or device that significantly contributes in a general way to nuclear physics research.

Brad received the award due to his scientific leadership in the development and utilization of leadership in explaining the physics of rare isotope beams and advancing the realization of FRIB.

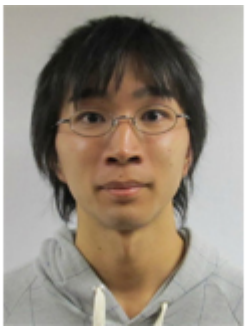
“I am very grateful to the APS for the recognition of the work we do,” said Brad. “Being a part of NSCL and FRIB has allowed me to produce and study rare isotopes that have revolutionized our understanding of atomic nuclei and their role in stars.”

Brad received his undergraduate degree from Coe College in Iowa and PhD in physics from MSU. Following his PhD, he did postdoctoral work at GSI in Germany. He joined NSCL in 1986, and is now the NSCL director, the scientific director for FRIB, and a University Distinguished Professor at MSU. His research addresses the production and study of rare isotopes and their role in the universe. He has been a member of the MSU Department of Physics since 1991 and has taught introductory physics and astronomy to science and non-science students.

”Brad has been a visionary for the nation’s rare isotope efforts for many years, and NSCL and FRIB greatly benefit from his scientific expertise,” said FRIB Laboratory Director Thomas Glasmacher. “He truly deserves this recognition for his leadership and commitment to our field.”

Brad will be presented with the award at a special APS ceremony on 15 April 2018.

Kei Fukushima receives Young Scientist Award from the Physical Society of Japan



Kei Fukushima

Kei Fukushima, a postdoctoral research associate in physics at FRIB, was awarded the Young Scientist Award of the Physical Society of Japan (JPS). According to the organization, JPS established the annual award “to encourage young researchers in their work and to further enliven the physics community.”

The main objectives of JPS are to publish the research output of latest achievement of physics and to hold annual meetings to promote members' research activities. JPS has about 17,000 members, both inside and outside of Japan. Kei is being recognized for his PhD thesis, titled “Multiparticle simulation study of collective beam resonances in periodic strong-focusing lattices.”

He will receive the award and give a presentation on

his research at the organization's bi-annual meeting in March 2018.

Please update your information via the alumni directory form

In an effort to improve the communication with FRIB Laboratory alumni and to better track their career paths, the laboratory has created a new alumni directory form.

Please take a couple of minutes to fill out this new form by answering a few simple questions.

Going forward, the lab will ask you to update your information once a year, to ensure our records are accurate. Visit the online alumni directory form to enter and update information.

Alumni spotlight: Bruce Remington

Bruce Remington

Bruce Remington worked at NSCL from 1980 to 1986. During his time at NSCL, he built a sizeable number of neutron scintillator detectors for experiments on the cyclotron. He calibrated the detectors, then helped set up the first experiments on the cyclotron, where they measured neutron energy spectra as a function of coincident-charged particles (projectile-like fragments).

While working at NSCL, Bruce learned how to do rigorous, careful, and forefront experimental science. He also met scientists from Lawrence Livermore National Laboratory (LLNL) who were visiting NSCL, which led to him joining LLNL as a postdoc in 1986.

Bruce also learned how to function effectively in an international research team, since it took a team effort to build, prepare, execute, analyze, and publish frontier nuclear physics experiments at NSCL. Having started from the ground up, machining and

science, and laboratory astrophysics on Nova, and became a group leader in 1995. From 1999 to 2009, when the National Ignition Facility (NIF) laser was being built and commissioned, Bruce oversaw HED experiments being done by his group at the Omega laser in Rochester, New York. Then in ~2009, when NIF became operational as a user facility, he oversaw experiments done by his group on HED materials science, hydrodynamic instabilities, and laboratory astrophysics. He also started up a HED laboratory astrophysics conference series, HEDLA, that continues to the present.

In ~2015, the NIF Discovery Science (basic science) program was created. In this program, ~10 percent of the NIF shots are reserved for basic science. An international call for proposals is issued each year, and scientists from outside the Lab and inside LLNL can propose basic science experiments for NIF. Bruce became the NIF Discovery Science program leader in 2015 and continues in this role to the present. Topics in his program include nuclear science, plasma physics, materials science, equations of state, opacities, plasma particle acceleration, and magnetic field generation and effects in HED plasmas.

Bruce's daughter, Tane, received her PhD in materials science from the University of California San Diego, and is now a postdoc at LLNL. She studies how to

assembling experimental components (detectors, targets, etc.), and seeing the project through to the final publications, Bruce came out of NSCL very well prepared for whatever new challenges his career would encounter.

After his time at NSCL, Bruce spent one year as an assistant professor in the Physics Department at Rose Hulman Institute of Technology (1986 to 1987) before going to LLNL to work as a postdoc with Marshall Blann. Bruce had previously met Blann when he visited NSCL to give a nuclear physics seminar.

After his two-year postdoctoral appointment in the Physics Department at LLNL, Bruce worked in the inertial confinement fusion (ICF) program on the Nova laser from 1988 to 1995. From 1995 to 1999, he switched his focus to high-energy-density (HED) material

deflect an asteroid that otherwise would be on a collision trajectory with the Earth. His wife, Guzide, is a corporate lawyer. They met and married in Istanbul in 1978. “She has enriched my life beyond measure, with Turkish language, Turkish culture, an indefatigable spirit, and a keen enthusiasm for international travel,” he said.

Bruce is deeply thankful for the beneficial effect his mentor at MSU, Aaron Galonsky, has had on his career. “He accepted me into his research group when I arrived to MSU from Turkey, where I had been teaching high school physics,” said Bruce. “Through his mentorship and guidance, I learned how to do rigorous experimental science, and how to rely on paper and pencil, literally, to test one’s thinking. These basic fundamentals have followed me through the years to the present.”

FRIB science and scientists in the news

Science published an article about how FRIB will be key to understanding how neutron-star mergers make heavy elements. FRIB’s Thomas Glasmacher, Witek Nazarewicz, and Hendrik Schatz are quoted in the article.

- An earthly search for gold’s cosmic origins

Several news outlets published articles about the Gravitational Wave Laboratories LIGO and VIRGO announcing the first observation of gravitational waves from the merger of two neutron stars. FRIB’s Witek Nazarewicz is quoted in the Science magazine article.

- Merging neutron stars generate gravitational waves and a celestial light show (Science)
- Scientists decode the origin of universe’s heavy elements in the light from a neutron star merger (Lab Manager)

MSU Today published an article about FRIB’s Bradley Sherrill being awarded the 2018 Tom W. Bonner Prize in Nuclear Physics.

- Bradley Sherrill receives 2018 Tom W. Bonner Prize in Nuclear Physics

FRIB Chief Scientist Witek Nazarewicz and Peter Schwerdtfeger of Massey University in New Zealand

FRIB in the news

Michigan Radio published an article about FRIB accelerating its first particles. FRIB’s Thomas Glasmacher is quoted in the article.

- MSU’s FRIB project reaching a milestone

Newswise published an article about the development of next-generation software to benefit nuclear physics computation. The calculations will help scientists at facilities such as FRIB.

- Exploring the exotic world of quarks and gluons at the dawn of the exascale

The Big 10 Network published an article about former NSCL Director Sam Austin’s book, Up From Nothing: The Michigan State University Cyclotron Laboratory.

- Michigan State book recounts 50 years of cyclotron studies: BTN LiveBIG Book Club

The University of Tennessee (UT), Knoxville Physics and Astronomy Department featured a story about FRIB in its summer 2017 newsletter for alumni and friends. The article highlighted the role several UT physicists have in the science driving FRIB, and in shaping FRIB’s direction, and explained why physicists want to study rare isotopes, their applications, and more.

- Cross Sections: The Newsletter for UT Physics

are two researchers whose recent work suggests that electrons are no longer confined to distinct orbitals in oganesson and are distributed evenly. For more information, read the article ("Immense oganesson projected to have no electron shells") on the "Chemistry World" website.

A recent research paper in Physical Review Letters explains that mirror nuclei provide an alternative way to measure the physics related to the neutron skin. The paper points out several possibilities for new measurements at NSCL and FRIB. For more information, read the "Mirror Charge Radii and the Neutron Equation of State" article on the NSCL website. Also, a recent paper explaining cluster formation in heavy-ion reactions was featured by Physics.aps.org as a Focus story "Video—Nuclear Fusion in Hi-Def."

Alumni & Friends (PDF) (pages 1 and 4)

Several news outlets published articles about MSU's new Accelerator Science and Engineering Traineeship program, which is led by FRIB, NSCL, the MSU Department of Physics and Astronomy, and the MSU College of Engineering. Among the articles:

- MSU to establish training program to address national shortage in accelerator scientists, engineers (Fox 47 TV)
- MSU establishing training program for nuclear accelerator scientists, engineers (TechCentury)

A recent article in Physics Today describes new astronomical data and how it is changing our understanding of how heavy elements are made in nature. The article mentions the importance of FRIB developing reliable r-process models, and points out the need to know properties of heavy, unstable nuclei; such as their masses, neutron capture cross sections, and decay rates. To do this, researchers will need facilities such as FRIB to make it a reality.

- The formation of the heaviest elements

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 FRIB/NSCL 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.

Contributors this issue

- Thomas Glasmacher
- Witek Nazarewicz
- Bruce Remington
- Brad Sherrill

LOOKING AHEAD

26-27 March	Science Advisory Committee Meeting at FRIB
4-6 April	Experimental Systems Advisory Committee Review of FRIB
10-12 April	Accelerator Systems Advisory Committee Review of FRIB
17-14 May	DOE-SC Office of Project Assessment (DOE OPA) Review of FRIB
5-10 August	Nuclear Structure 2018 (NS2018) Conference in East Lansing, Michigan
10-11 August	Low Energy Community Meeting (LECM) at FRIB/NSCL in East Lansing, Michigan

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