

PHYSICAL SCIENCES

# VISTAS

PERSPECTIVES ON SIMULTANEOUS EXCELLENCE | ISSUE 1 2024

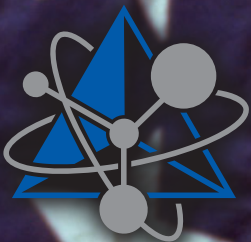
AWARDS ISSUE



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On October 16, 1945, in a ceremony at Fuller Lodge in Los Alamos, General Leslie Groves (center), head of the Manhattan Project, presented the Army-Navy "E" Flag Production Award to the team of scientists, engineers, military personnel, academics, and others who worked at the secret Project Y site in northern New Mexico, helping end World War II. The award recognized exceptional performance in the production of war equipment. Here, Groves is flanked by Lab Director J. Robert Oppenheimer (left) and University of California President Robert Sproul (right).



## Physical Sciences Directorate

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# FROM ELLEN'S DESK

Ellen Cerreta, Associate Laboratory Director for Physical Sciences



Dear ALDPS,

I am proud to kick off calendar year 2024 with our first *Physical Sciences Vistas* awards edition, which celebrates the remarkable achievements by staff across our directorate over the past year.

As I read through the issue, I am impressed by the scientific and engineering excellence, passion, creativity, and integrity reflected in these accomplishments. Congratulations to all of these recipients! The awards bestowed on our colleagues recognize scientific, technical, and operational excellence that is critical to our success in fulfilling the Lab's national security mission. These varied awards reflect the strength of our commitment to the Lab's goal of simultaneous excellence. They also enhance the Lab's standing in the scientific, academic, and national security complex communities, reinforcing Los Alamos's reputation as a premier institution in which to both build a career and make a difference.

I also want to take a moment and thank the individuals who contributed to the nomination packages that preceded these awards. Without their thoughtful input and selfless dedication in what can be a time-consuming effort, the recognition bestowed on their colleagues would not have been possible.

In closing, I encourage you to take a moment and peruse the amazing accomplishments reflected here—and think about what you want to achieve in the coming months. I also encourage you to share news of your accomplishments and awards with your group management so the information may be captured by the institution—and celebrated in future *Vistas* issues.

Ellen

# External Individual Awards



**American Nuclear Society  
Mishima Award**  
David Andersson

David Andersson is the recipient of the 2023 American Nuclear Society Mishima Award, given for outstanding contributions in research and development on nuclear fuels and materials. Andersson was specifically recognized “for advancing our understanding of nuclear fuel performance through fundamental studies of defect properties and their integration in performance models.”

### Advancing nuclear fuel models

Andersson (Materials Science and Technology) is an expert in atomistic modeling of nuclear fuels—both traditional  $UO_2$  light water reactor fuel and advanced accident-tolerant fuel concepts. He has been involved in numerous international and national multiscale simulation efforts to develop models for use in nuclear fuel performance simulations.

Andersson is the deputy lead for the materials and fuel technical area of the DOE’s Nuclear Energy Advanced Modeling and Simulations Program, which aims to develop simulation tools for nuclear reactors. He is also the deputy national technical director for DOE’s Advanced Materials and Manufacturing Technologies Program. He is the author of more than 110 published papers, which have been cited more than 5,000 times.

Andersson, who received his doctoral degree in materials science and engineering from Sweden’s Royal Institute of Technology, joined the Laboratory in 2007 as a Glenn T. Seaborg Postdoctoral Fellow. ■



**American Society of  
Mechanical Engineers  
Fellow**  
Michael Pettes

Michael Pettes has been named a fellow of the American Society of Mechanical Engineers (ASME). He was recognized for his contributions to strain and defect engineering as well as service and leadership in mechanical engineering.

Pettes’s contributions focus on engineering materials to impart new functionalities relevant to applications in energy, optical communications, and mechanical performance. He has received numerous awards recognizing both his impact on and service to the engineering profession. He has published 75 peer-reviewed journal articles, served as chair of the ASME Materials Division’s Nanomaterials for Energy Technical Committee, and organized 20 symposia on nanomaterials.

### Career highlights

Pettes, who joined the Lab in 2018, is a scientist and deputy group leader at the Center for Integrated Nanotechnologies, where he co-leads its in situ characterization and nanomechanics thrust.

Before joining Los Alamos, Pettes (Materials Physics and Applications) was an assistant professor of mechanical engineering at the University of Connecticut and a postdoctoral fellow at the University of Texas at Austin. He served as an infantry officer in the US Marine Corps from 2001 to 2005. Pettes received his doctoral and master’s degrees in mechanical engineering from the University of Texas at Austin and a bachelor’s degree in mechanical engineering from Duke University. ■



**American Welding Society  
Fellow**  
Patrick Hochanadel

For his sustained contributions to the field of welding science and technology Patrick Hochanadel has been named a fellow of the American Welding Society (AWS). He was recognized for “a career of significant achievements in the technical and research arenas that has enhanced the image and impact of the welding industry.”

Hochanadel (Sigma) is an R&D engineer and the Lab's Secondary Stage Modernization Program manager, responsible for continuing the later stages of technology maturation with the production agencies and interfacing them throughout the technology maturation process.

### Service to the scientific community

Hochanadel was chair of the AWS Committee on High Energy Beam Welding and Cutting and its subcommittees for electron beam welding and laser hybrid welding. He is a member of the AWS Technical Papers Committee, has co-authored numerous publications, and contributed to the *AWS Welding Handbook* and *ASM Metals Handbook*, Volume 6A. He is an associate editor for the International Institute of Welding (IIW) journal *Welding in the World* and a principal reviewer for the *Welding Journal*. He is vice chair of the American Council of IIW and vice chair of its Commission on Power Beam Processes. Hochanadel is the recipient of the AWS 2021 McKay-Helm Award, its 2019 International Meritorious Certificate Award, and its 2018 R.D. Thomas Memorial Award.

Hochanadel, who has a doctorate in metallurgical and materials engineering from the Colorado School of Mines, joined the Lab in 1997 as a scientist. ■



### ASM Silver Medal Award Clarissa Yablinsky

Clarissa Yablinsky has earned the Silver Medal Award from ASM International, the world's largest materials science and engineering society. Yablinsky was recognized for "excellence in materials research and development supporting the nuclear deterrent and advanced nuclear energy and tireless volunteerism for the profession and STEM outreach." Given to mid-career members, the award seeks "to recognize leadership at an early stage and encourage individuals to grow, nurture, and further contribute to the growth of the profession, as well as the society."

### Plutonium foundations

Yablinsky's research focuses on understanding structure-property relations, specifically mechanical behavior, of plutonium and plutonium alloys across multiple strain rates and temperature regimes. A scientist and team leader, Yablinsky (Materials Science and

Technology) has made many impactful contributions to both basic and applied plutonium science at the Laboratory, leading Level 2 milestones reporting on mission-critical work and producing more than 50 publications. She has been part of a Laboratory Distinguished Performance Team Award and has received three NNSA Defense Programs Awards of Excellence.

Throughout her career, she has mentored staff members, postdoctoral fellows, and students. She has been an active member of ASM International, participating in numerous national-level committees and serving in various positions within the local ASM chapter.

Yablinsky, who received her doctoral degree in materials science and engineering from Ohio State University, performed postdoctoral research at the University of Wisconsin before joining Los Alamos in 2013. She received a master's degree from Ohio State University and a bachelor's degree from Carnegie Mellon University, both in materials science and engineering. ■



### Battelle Inventor of the Year Yu Seung Kim

Yu Seung Kim was honored as Battelle's Inventor of the Year for Los Alamos. The award is given by Battelle to recognize inventors from Battelle and the nine national laboratories it manages. Kim (Materials Physics and Applications) was recognized for innovative research "to design fuel cells with an ion-pair coordinated polymer membrane, which increases the temperature range a fuel cell can reliably function in and increases the power of the vehicles."

### From benchtop to factory

Kim's projects include an Advanced Research Projects Agency-Energy funded-proposal to develop fuel cells that function above 100°C, and up to 230°C, without using water. That project resulted in fuel cells made of an ion-pair coordinator polymer membrane designed to provide a higher rate of proton conductivity across a range of temperatures.

His work was commercialized with support from DOE's Energy Efficiency and Renewable Energy Hydrogen and Fuel Cell Technologies Office "LInnovator" Program, which helped Advent Technologies verify the manufacturability of the technology for its high-temperature

proton-exchange membrane fuel cells. The program helps speed national lab intellectual property to commercialization. Advent recently opened a factory in Massachusetts to manufacture the fuel cell's membrane electrode assemblies.

Kim, who received a 2023 Laboratory Fellows' Prize for research, is the author of approximately 200 peer-reviewed papers and holds 25 patents/patent applications. Kim, who earned a doctoral degree in polymer engineering from the Korea Advanced Institute of Science and Technology, joined the Lab in 2003 after a postdoctoral fellowship at Virginia Tech. ■



**DOE Early Career Research Award**  
**Kun Liu**

Nuclear physicist Kun Liu is the recipient of a DOE Early Career Research Award. Researchers in universities and DOE national laboratories compete for awards under the DOE Office of Science Early Career Research Program. The funds support outstanding early career scientists, stimulating their careers in the disciplines funded through Office of Science programs.

Liu (Physics) aims to probe the emergent hadron mass through pion structure measurement at the AMBER experiment at CERN. Understanding the origin of the hadron mass, which constitutes 99% of the visible universe, is one of the central goals of nuclear physics.

Liu joined Los Alamos as a graduate research assistant, received his doctorate from Peking University in China, became a Laboratory postdoctoral researcher, and then converted to a staff scientist. ■



**IAGE Outstanding Researcher Award**  
**Piotr Zelenay**

Piotr Zelenay is the recipient of the International Association for Green Energy's (IAGE) Outstanding Research Award. The award recognizes "outstanding research and advancement of knowledge in fuel cells, electrochemical energy, and green energy systems" and is given to researchers who have "demonstrated exceptional contribution to the green energy research community."

### Green leader

Zelenay (Materials Physics and Applications) concentrates on fundamental and applied aspects of polymer electrolyte fuel cell science and technology, electrocatalysis, and electrode kinetics. He has taken a leading role in the development of non-precious metal oxygen reduction reaction catalysts worldwide, the discovery of ruthenium crossover in the direct methanol fuel cell, and the advancement of the direct dimethyl ether fuel cell performance to the level that now matches that of the state-of-the-art direct methanol fuel cells.

Zelenay has more than 200 research publications to his credit and has co-authored 26 patents and patent applications. He is a fellow of The Electrochemical Society, the International Society of Electrochemistry, and Los Alamos National Laboratory. Zelenay, who received his doctoral and doctor of science degrees in chemistry from the University of Warsaw, Poland, joined the Lab in 1997. ■



**Microscopy Society of America**  
**Chuck Fiori Award**  
**Matthew Schneider**

Matthew Schneider is the recipient of the Microscopy Society of America's Chuck Fiori Award. The award "honors a technologist from the physical sciences who has made significant contributions, such as the development of new techniques that have contributed to the advancement of microscopy and microanalysis."

Schneider (Materials Science and Technology) is a materials scientist and electron microscopist focused on the characterization of materials from the micro- to the Ångstrom-scale.

### Research interests

Schneider's professional interests include measuring and understanding dynamical material responses to applied stimuli, including changes in elemental distribution, crystal structure, strain state, electronic structure, and more. He is working toward the application of machine-learning-based inferences to augment in situ experimentation and characterization efforts in the transmission electron microscopes in the Electron Microscopy Lab at Los Alamos. He is also contributing to the development, implementation, and analysis of highly data-rich 4D-STEM datasets.

At the Electron Microscopy Lab, he is primarily responsible for the capability development, operation, and maintenance of its transmission electron microscopes. He is also leading the procurement, installation, and commissioning of the Laboratory's new \$6 million probe-corrected Spectra Ultra S/TEM—a scanning transmission electron microscope.

Schneider, who joined the Lab in 2017, received his bachelor's degree in materials science and engineering from Purdue University and his master's in materials science and engineering from the University of Virginia. ■



**Nanomaterials  
Young Investigator Award  
Aiping Chen**

Aiping Chen is a recipient of the *Nanomaterials* Young Investigator Award. He joined two other researchers in receiving the honor from the international, peer-reviewed journal.

At the Center for Integrated Nanotechnologies, Chen (Materials Physics and Applications) leads efforts in synthesizing and characterizing complex oxide heterostructures and nanocomposites. *Nanomaterials* noted, his work “has impacted the epitaxial growth of complex metal oxide thin films and nanostructured materials using pulsed laser deposition and laser molecular beam epitaxy.”

Chen, who received his doctoral degree in electrical engineering from Texas A&M University, joined the Lab in 2013 as a postdoctoral research associate. He received a Director's Postdoctoral Fellowship in 2014 and was converted to a scientist in 2016. ■



**Physical Review B  
Editorial Board  
Marcelo Jaime**

Marcelo Jaime has been appointed to the editorial board of *Physical Review B*, the world's largest dedicated physics journal. The most highly cited journal in condensed matter physics, the publication is part of the *Physical Review* family of journals published by the American

Physical Society (APS). As a board member, Jaime (Materials Physics and Applications) joins a diverse, international team of active, distinguished scientists selected by the journal editors to provide advice during the peer-review process.

At the National High Magnetic Field Laboratory-Pulsed Field Facility, Jaime has developed techniques to better understand emergent behavior of quantum materials by measuring their thermal and lattice properties in high magnetic fields, both pulsed and continuous, at low temperatures.

Jaime joined the Lab in 1997 as a postdoctoral researcher, performing the first-ever specific heat measurement in pulsed magnetic fields up to 60 T. Jaime, who has a doctorate in physics from Instituto Balseiro, Argentina, is a fellow of the APS and the American Association for the Advancement of Science. ■



**University of Illinois  
Urbana-Champaign  
Alumni Award  
Eric Brown**

Eric Brown (Physical Sciences) has received an Alumni Award for Distinguished Service from the University of Illinois Urbana-Champaign's Grainger College of Engineering. The award honors recipients for their leadership, contributions to the field of engineering, creativity, and entrepreneurship, and service to society, the professional community, and to the department, college, or university.

Brown is user facility director of the Los Alamos Neutron Science Center and senior director for the Physical Sciences Directorate. During his 20 years at the Lab he has been a scientist in the Office of Experimental Sciences and served as technical advisor for the Joint DoD/DOE Munitions Technology Program in the Office of the Under Secretary of Defense. He was division leader for Explosive Science and Shock Physics and a group leader for Neutron Science and Technology in Physics Division.

Brown, who joined the Lab as a Director's postdoctoral fellow in the Materials Science and Technology Division, has a doctorate in theoretical and applied mechanics from the University of Illinois Urbana-Champaign. He is a fellow of the American Physical Society and the Society for Experimental Mechanics. ■

# External Team Awards

## Defense Program Awards of Excellence

Presented annually by the NNSA Deputy Administrator for Defense Programs, the Awards of Excellence recognize significant and exceptional achievements in quality, productivity, cost savings, safety, or creativity in support of NNSA's Stockpile Stewardship Program. Physical Sciences Directorate researchers were members of the following award-winning teams.

### Elevating RLUOB to a Hazard Category-3 Nuclear Facility

*David Arellano, Adam Phelan, Mike Ramos, Paul Tobash (Materials Science and Technology)*

The team was responsible for expanding the capabilities of the Radiological Laboratory Utility and Office Building (RLUOB) in support of current and future Weapons Program missions. Upgrading the facility hazard category and ensuring safety, security, and environmental compliances were a large team effort with cross-functional groups across the Lab and NNSA working toward the common goal. The team's ability to work together

## Secretary of Energy Achievement Awards

Presented by the Secretary of Energy, the Achievement Awards are given to groups or teams of DOE employees and/or contractors in recognition of achievements that go above and beyond in supporting the department's mission and serving the nation. Physical Sciences Directorate researchers were members of the following award-winning teams. ■

### Capsule Gain Team

*Valerie Fatherley, Hermann Geppert-Kleinrath Yongho Kim, Kevin Meaney, Tom Murphy, Petr Volegov (Physics)*

### STPSat-6 Satellite Payloads Early On-Orbit Test Team

*David Oro (Physics)*

### Ukraine Detection Assistance Team

*Gregory Orlicz (Physics)*

### W93 Phase 1 Concept Assessment Team

*Kimberly DeFriend, Gary Gladysz (Materials Science and Technology); Morgan White (Physics)*

and communicate as well as its unwavering dedication were critical to the success of elevating RLUOB to a Hazard Category-3 nuclear facility.

### Small Pit Tube Non-Nuclear Components Team

*David Alexander, Andrew Duffield, Cheryl Hawk (Sigma)*

Pit manufacturing development always involves overcoming various challenges. To address a change in mission scope, the team worked quickly to both modify existing and make new non-nuclear hardware from materials already at Los Alamos. All personnel involved in this effort had to develop techniques to overcome unexpected challenges. The work involved manufacturing additional tooling and fixtures to support the various manufacturing and testing operations. The team's efforts allowed the Lab to continue pit manufacturing operations.

### TA-55 Dynamic Pyrometry Team

*Meghan Gibbs, Austin Goodbody, Benjamin Hollowell, Robert Smalley, Olivia Weir, Clarissa Yablinsky (Materials Science and Technology); Thomas Hartsfield (Physics)*

The team established pyrometric temperature measurements on shocked plutonium as an enduring experimental capability for improving equation of state for legacy, current, and future materials. This work puts tight constraints on predictive models essential to the Lab's stockpile stewardship mission. The success of the team was the culmination of many years of effort and the award recognizes the many hurdles that were overcome and critical impact of the work on NNSA's weapons mission. ■



**R&D 100 Awards**

The R&D 100 Awards, selected by a group of *R&D Magazine's* judges, honor the top 100 proven technological advances of the year. Spanning industry, academia, and government-sponsored research organizations, the awards demonstrate the continued success of our researchers in defining the frontiers of technical innovation in national security science.



Physical Sciences Directorate researchers were members of the following R&D 100 Award-winning teams.

**HXI: Hyperspectral X-ray Imaging Detector**

*Eric Bowes, Michael Rabin, Gregory Wagner (Materials Physics and Applications)*

The new capability in energy resolution and efficiency for material analysis in scanning electron microscopes allows researchers to measure material signatures at the nanoscale. Such analytical capabilities are especially important for samples that vary in composition on very small length scales and where macroscopic material properties depend on microscopic features. Nanoscale mapping could benefit the semiconductor fabrication industry and forensics, materials science, environmental science, biological science, and geological science fields.

**NACHOS: Nano-satellite Atmospheric Chemistry Hyperspectral Observation System**

*Nick Dallmann (Materials Physics and Applications)*

The novel instrument delivers trace gas detection capabilities in a small, lightweight package for space. It analyzes the spectral fingerprint of each toxic gas, processes raw data, and supports attribution of harmful gas emission sources on Earth. NACHOS supports space-based, airborne, and ground-based mission deployment, including trace gas detection from CubeSats, deep-space planetary missions, remote monitoring ground stations, and airborne monitoring from drones. Two NACHOS CubeSats have flown in space.

**Rapid Response Steel Tooling Using Additive Manufacturing**

*Michael Brand, Kevin Le, Ryan Mier, Colt Montgomery, Robin Montoya (Sigma)*

Metal powder additive manufacturing reduces the total number of steps to create tooling, saves time, minimizes wasted energy and material, and improves recyclability of material. Material addition, densification, and hardening take place in a single process. Tools with complex geometric designs, interior features, and material characteristics can be tailored for weight, thermal properties, strength, and wear resistance.

**SPeC: Solution-processed Perovskite Crystalline Films**

*Wanyi Nie (Materials Physics and Applications)*

The technology combines molecular engineering of earth-abundant materials with a thin film coating method that can be adapted to mass production and scaled for size. Processing costs less and uses much less energy compared with current approaches. The near-single crystal layer films create many fewer crystal-grain boundaries and defects than other semiconductor fabrication methods. Benefits include more efficient solar cells, brighter and fully color-tunable light-emitting diodes, and more sensitive x-ray detectors.

**R&D 100 Finalist****Acoustic Resonance Spectroscopy Mechanical Condition Monitoring**

*John Greenhall, Cristian Pantea (Materials Physics and Applications)*

The technology provides in situ, real-time wear and damage measurements of inaccessible rotating machinery during operation. This contrasts with current methods that require costly downtime to disassemble, visually inspect, and reassemble the machinery. The technology also provides critical data to enable preventive maintenance and boost operational performance to improve safety, save time, and reduce costs. ■

# Internal Awards



**Operations Excellence Medal**  
**Ricardo Martí-Arbona**

Ricardo Martí-Arbona is the recipient of the Laboratory’s Operations Excellence Medal, which recognizes exceptional work in the operations area of the Laboratory Agenda. Martí-Arbona is a research and development manager in the Center for Integrated Nanotechnologies (CINT), however, his contributions extend far beyond the walls of his lab.

Throughout his 15-year career at Los Alamos, Martí-Arbona (Materials Physics and Applications) has lent his operational acumen to numerous Laboratory groups, divisions, and directorates—all in the name of safety, security, efficiency, and mission delivery. He serves in several leadership roles, including CINT deputy group leader and the safety and process coordinator for the Materials Physics and Applications Division, where he oversees work at the National High Magnetic Field Laboratory. He is also strongly committed to supporting the Lab’s initiative to reach net-zero carbon output and changing how the Lab operates to accomplish this goal.

Materials Physics and Applications Deputy Division Leader Jen Martinez summarized Martí-Arbona when she nominated him for the award, writing, “I want to state that LANL is very fortunate to have Ricardo Martí-Arbona as a skilled scientist who passionately cares about operational success.” ■

## Laboratory Fellows

The Laboratory Fellows organization is made up of technical staff members who have been appointed by the Director to the rank of fellow in recognition of sustained outstanding contributions and exceptional promise for continued professional achievement. These researchers, recognized for their extraordinary career contributions, serve as advisors and mentors at all levels of the Laboratory.



**Rod Borup**

Rod Borup (Materials Physics and Applications) is internationally recognized for his scientific excellence and exceptional leadership in the area of fuel cell technologies and is the face of Los Alamos’s flagship fuel cell program. He has made significant advances in fuel cell technology for clean energy applications and has an outstanding record of professional service and internal service to the Laboratory. Additionally, he is now engaged in a new application of fuel cell technology that will support the modernization and management of the future stockpile.



**Richard Van de Water**

Richard Van de Water (Physics) is an internationally recognized expert in particle physics, playing key leadership roles in several impactful experiments that have improved the knowledge of the nature of the neutrino and the dark sector. He continues to lead the particle physics community in the development of theory and experimental techniques to advance the search for dark sector physics using accelerators. His efforts in numerous neutrino experiments have established him as one of the worldwide leaders in particle and neutrino physics. ■

## Distinguished Performance Awards

Each year the Lab recognizes individual employees or groups of employees who have distinguished themselves through their outstanding scientific, technical, operational, and/or administrative contributions in support of the Laboratory's mission. The following Physical Sciences members were award recipients.

### Individual Awards



**Saryu Fensin**

Saryu Fensin (Materials Physics and Applications) played a critical role in several projects related to the Lab's plutonium research and development. Fensin showed exceptional technical and project leadership in executing experimental work and leading large teams to enable Laboratory success. Her dedication led to the completion of three NNSA Level 2 milestones in the same year, with one milestone contributing directly to a fiscal year 2023 pegpost/Level 1 milestone. Fensin's work involved collaboration across multiple Lab divisions and with stakeholders at Sandia and Lawrence Livermore national laboratories. She not only coordinated team activities in each of the projects, but also helped determine the projects' technical directions and the execution of complex concepts through creative and novel experiments.



**Sowjanya Gollapinni**

The Short-Baseline Neutrino Experiment and the Deep Underground Neutrino Experiment (DUNE) address some of the nation's highest-priority physics endeavors. Sowjanya Gollapinni (Physics) was at the forefront of several efforts related to these two projects. She showed tremendous leadership and creativity in developing novel calibration strategies for DUNE, including an advanced laser system to transform DUNE into a precision detector. Her team successfully installed two full-scale laser systems in ProtoDUNE, an 800-ton DUNE prototype detector. This achievement marks a significant milestone toward enabling the future multikiloton US liquid argon neutrino program. She also played a critical

role in bringing to publication novel research into the existence of a fourth type of neutrino. As a part of these efforts, she built an exceptional team of postdoctoral researchers, students, and engineers; leveraged multi-laboratory capabilities; and established Los Alamos as a leader in the international neutrino community.



**Eric Loomis**

The achievement of self-sustained thermonuclear fusion in a laboratory setting is a key component of NNSA's Stockpile Stewardship Program and DOE's energy security initiatives. Los Alamos has been a key player in this pursuit, thanks in part to its leadership of two projects in the field of inertial confinement fusion: the development of advanced burn diagnostics and the double-shell volumetric burn platform. In 2022, these projects made seminal breakthroughs under the leadership of Eric Loomis (Physics). These breakthroughs helped confirm and analyze the achievement of fusion ignition at the National Ignition Facility, earning Los Alamos international recognition for its contributions. The tools developed under his leadership will allow for the analysis of higher, "post-ignition" energies, facilitating the validation of design simulations relevant to the stockpile stewardship mission.

### Small Team Awards

#### **LANSCCE 805 MHz HPRF Adaptation and In Situ Repair of Failed Transformer Rectifier Units Team**

*Joseph Bradley, William Haynes, Manuelita Rodriguez (Accelerator Operations and Technology)*

The Los Alamos Neutron Science Center (LANSCCE) requires seven high-power transformer/rectifier units (T/Rs) to bring the proton beam power up to 800 million electrovolts. In 2021, COVID-related supply chain issues delayed T/R rebuilds and left the facility without a spare. Just before the start of the scheduled 2022 run cycle, a T/R failed in one of the facility's highest power sectors. No spare would be available until October,

which put most of the run cycle at risk. The team shuffled the T/Rs and adapted an older, lower-power-rated T/R from a test stand for work in the linear accelerator's lowest power sector. The team's efforts saved LANSCE from more than four months of downtime. When a second failure occurred in late June, the team developed a way to safely repair the T/R themselves, reducing downtime from four months to less than two weeks.

### Neutron Imaging Engineering Team

*Valerie Fatherley, Justin Jorgenson (Physics); Nikolaus Christiansen, John Martinez, Derek Schmidt (Materials Science and Technology)*

On Dec. 5, 2022, the National Ignition Facility (NIF) at Lawrence Livermore National Laboratory achieved fusion ignition for the first time. One key diagnostic tool at NIF is the Neutron Imaging System (NIS), which was developed at Los Alamos. Los Alamos's NIS engineering team worked alongside NIF engineers and personnel to complete a major upgrade to NIS. The team's efforts ensured that NIS was able to help capture NIF's historic fusion achievement.

### Targets Team

*Rose Bloom, Randall Burson, Carl Osborn Jr., Sean Raybon, Jeffrey Robison, Stephen Wiest (Sigma)*

The Targets Team greatly increased the efficiency of thorium target fabrication efforts, which are essential to advancing the Actinium-225 Production Program. Rather than scale up inefficient processes with more people to meet growing demand, the team replaced and redesigned several production steps to increase throughput by more than 20 times. As thorium target requests have roughly doubled each year since 2019, these improvements and innovations were essential to meeting isotope production goals.

### Large Team Awards

#### Carbonara Team

*Christopher Chadwick, Brianna Musico (Sigma); Matthew Freeman, Matthew Fresquez, Fesseha Mariam, Erin Mavis, Jason Medina, William Meijer, Christopher Morris, Levi Neukirch, Lauren O'Brien, Jeremy Payton, Steven Sandoval, Mary Sandstrom, John Schmidt, Erick Smith, Zhaowen Tang, Carl Trujillo, Dale Tupa (Physics)*

The Carbonara experiments were intended to provide experimental data for the validation of constitutive and damage models of boron carbide, a high-strength

ceramic material with a variety of uses. The initial experiment, conducted at the Proton Radiography Facility, revealed serious issues. In just three weeks, the team assembled a second experiment, largely using spare parts from previous experiments. The team showcased agility and responsiveness to not only assemble and execute a second experiment in a short time frame but also resolve a complex problem.

### Climate Change Vulnerability Assessment and Resilience Plan Team

*Andrew Dattelbaum (Materials Physics and Applications)*

In addition to outlining possible threats that climate change poses to the Lab, the team's assessment highlights creative strategies to build up the Lab's resistance and complete a plan for long-term preparedness. The final document has been praised throughout the Laboratory, the NNSA, and DOE for its scope and thoroughness, and it will serve as the benchmark for future climate assessments conducted by the Lab.

### Coherent Captain Mills Experiment Team

*Jan Boissevain, Melvin Borrego, Marisol Chavez Estrada, Andrew Chavez Jr., Edward Dunton, Jason Gochanour, Kelly Knickerbocker, Bill Louis, Jacqueline Mirabal, Michael Mocko, Darcy Newmark, Eric Renner, Terrance Schaub, Austin Schneider, Walter Sondheim, William Thompson, Mayank Tripathi, Richard Van de Water (Physics); En-Chuan Huang, Charles Taylor, Tyler Thornton (Accelerator Operations and Technology); Daniel Evans, Charles Kelsey (LANSCE Facility Operations)*

Sterile neutrinos, dark matter, axions, and dark sector particles make up 95% of the universe's energy density, and for years scientists have searched for these particles. Using 800-MeV protons impacting a tungsten target at LANSCE, the Coherent Captain Mills Experiment Team is using a 10-ton liquid argon detector to try to detect these dark particles. In just three years, the team designed and conducted a functioning particle physics experiment that could lead to dark sector discoveries for years to come.

### **Elevating RLUOB to a Hazard Category-3 Nuclear Facility Team**

*David Arellano, Adam Phelan, Paul Tobash (Materials Science and Technology)*

The 2014 NNSA Plutonium Strategy called for maximizing capabilities to support enduring program missions. To aid in this, Los Alamos undertook the process of elevating the Radiological Laboratory Utility and Office Building (RLUOB) to a Hazard Category-3 nuclear facility. The team navigated a range of challenges and successfully achieved multiple milestones in the review process. Due to the team's swift, collaborative, and safe operations, RLUOB will now be able to support the Lab's current and future Weapons Program missions.

### **Epic Shadow 23-01 Team**

*Rose Bloom, Eric Tegtmeier, William Winter (Sigma); Alexa Hanson, Brian Scott (Materials Physics and Applications)*

To test the operational readiness of nuclear forensic examinations at DOE and NNSA sites, the Office of Nuclear Forensics developed a series of exercises to assess each site's capabilities under varying circumstances. The most recent exercise was Epic Shadow 23-01. The significant improvement on previous approaches reaffirmed Los Alamos's position as a leader in nuclear forensics, and the strategies will be incorporated into future exercises and operational work.

### **Gryphon Team**

*Gerd Kunde (Physics)*

Typically space programs dedicate time and resources toward producing a single-purpose satellite that is extremely costly. The Gryphon Program aims to field and operate a large number of smaller satellites, typically with lower quality sensors. To compensate, these sensors are cheaper and quicker to build, allowing them to be produced and fielded on a quicker schedule. The satellites can then be connected to share information in a way that will outperform a single high-value satellite. 2022 was a significant year for the Gryphon Program with the team achieving several critical milestones.

### **Hydride Moderator Development Team**

*Robert Forsyth, Michael Hahn, Donald Johnson, Erik Luther, Thomas Nizolek, Michal Pate, Gregorio Poling, Tyler Smith, Michael Strohmeyer, Anthony Trejo, Stephen Wiest (Sigma); DV Rao (Civilian Nuclear Programs); Casey Blough, Travis Carver, Michael Cooper, Caitlin*

*Kohnert, Alexander Long, Topher Matthews, Tarik Saleh, Aditya Shivprasad, Sven Vogel, Joshua White (Materials Science and Technology)*

The Hydride Moderator Development Team developed innovative ways to fabricate hydride moderator material for use in small reactors that reduced overall fuel mass and costs. The developments mark a significant advancement in hydride moderator technology and establish a benchmark that can be used throughout industry for years to come. Advanced nuclear energy solutions are now more economical and competitive because of the team's work.

### **IPF: Unexpected Target Window/ Collimator Replacement Team**

*Joshua Brito, Jason Burkhart, Steven Dryja, Esteban Figueroa, Jordon Marquis, Derwin (Moose) Martinez, Jason Martinez, David Newman, James O'Hara, Mario Pacheco, Brandon Roller, Harry Salazar, Ryan Smeltzer, Manuel Soliz, Tsuyoshi Tajima, Heath Watkins (Accelerator Operations and Technology)*

A catastrophic failure resulted in the proton particle beam at the Isotope Production Facility (IPF) burning a hole in the target window. The team was given a tight schedule to replace the window to get the beam ready for its next run cycle. Through efficient and collaborative efforts, the team completed the project in time to get the beam up and running again, a critical factor in funding considerations. The project's careful planning minimized beam downtime and ensured the replacement occurred without incident.

### **LANSCE Lujan Center Target Design, Assembly, and Replacement Team**

*Melvin Borrego, Paul Koehler, Michael Mocko, Lukas Zavorka (Physics); Joshua Brito, Jason Burkhart, Christopher Carlisle, Steven Dryja, Simon Johnson, Connel Lane, Stephen Mano, Jordon Marquis, Jason Martinez, Jacob Medina, David Newman, Eric Olivas, Mario Pacheco, Brandon Roller, Ryan Smeltzer, Ray Valicenti, Aaron Walker, Laura Walker, Keith Woloshun (Accelerator Operations and Technology)*

The LANSCE target assembly is a complex design of targets, moderators, and reflectors (TMRS) that give neutrons 16 unique flight paths. Because of the radiation-induced damage it endured, the TMRS MKIII was nearing the end of its life. The TMRS MKIV not only replaced the MKIII, but also improved on the design by adding a third unmoderated target, which provides

high-energy neutrons to three flight paths, two more than the MKIII allowed.

### **Minikin Echo Radio Frequency Prompt Sensor Team**

*William Haynes (Accelerator Operations and Technology)*

Within weeks of the Russian invasion of Ukraine in 2022, as Russian forces gathered at the country's border with Ukraine, NNSA's Office of Nuclear Forensics contacted radio frequency (RF) diagnostics subject matter experts at Los Alamos. The team was rapidly assembled to deliver operational, ground-based RF sensors to locations around Eastern Europe as well as standing up a 24/7 response capability.

### **Neutron Beamline Shutter Upgrades at Lujan Center Team**

*Melvin Borrego, Andrew Chavez, Christopher Fairbanks, Kelly Knickerbocker, Eric Larson, Jason Medina, Tim Medina, Joan Siewenie, Walter Sondheim (Physics); Jason Burkhart, Mario Pacheco, Stephen Rivas, Brandon Roller, Keith Woloshun (Accelerator Operations and Technology)*

Two of the Lujan Center's flight paths had been equipped with external mechanical shutters that needed upgrading to mercury shutters. The upgrade will help ensure worker safety and advance cutting-edge science at the neutron scattering facility. Because a mercury shutter had not been installed at the Lujan Center in more than two decades, the vast majority of the project team had no experience with navigating the complex rules and procedures for materials with significant potential hazards. The team exhibited flexibility and creativity in addressing many unexpected situations during the long and complex process of installing the shutters.

### **Pegpost Team**

*Amber Black, Rose Bloom, Randall Burson, Hannah Cross, Michael Finch, Paul Gibbs, Alexandra Glover, Seth Imhoff, Donald Johnson, Samantha Lawrence, Michaela McKamey, Ryan Mier, Kayla Molnar, Joel Montalvo, Robin Montoya, Mary O'Brien, Carl Osborn Jr., Gregorio Poling, Jeffrey Robison, Mark Sandoval, Eunice Solis, Jamie Stull, William Winter, Jonathan Zambrano (Sigma); Carl Cady, Saryu Fensin, Daniel Martinez (Materials Physics and Applications); Donald Brown, Dale Carver, Bjorn Clausen, James Tata (Materials Science and Technology)*

Between 2019 and 2022, in pursuit of the Assess Lifetimes and Mitigate Aging pegpost, the Pegpost Team contributed to the advancement of both electron beam additive manufacturing and electroforming technologies, establishing these techniques as viable manufacturing alternatives for future systems. These efforts resulted in potential new manufacturing solutions for difficult-to-process materials, yielding novel perspectives on manufacturing development, physics qualification, and component lifetime.

### **SPECTRE Experiment Team**

*Dustin Cummins, Andrew Duffield, Donald Johnson, Ryan Mier, Carl Osborn Jr., Michael Strohmeyer, Stephen Wiest (Sigma); Paul DeBurgomaster, Ariana Foley, Meghan Gibbs, Georgette Maestas, Shane Mann, Joseph Martz, Michael Middlemas, Jeremy Mitchell, David Moore, Daniel Olive, Mark Ortega, Brett Robinson, Fitzgerald Sandoval (Materials Science and Technology)*

SPECTRE (Series of Plutonium Experiments Collecting Thermal and Radiochemical Evidence) was a five-year project that culminated with a successful test of plutonium's response to a high-radiation environment. The experiment reintroduced plutonium testing to Sandia's Annular Core Research Reactor after a 20-year hiatus. The team's work provided new information about plutonium and the poorly understood state of high radiation damage—discoveries that confirmed existing theories and models while also extending understanding of the material properties of plutonium and improving predictive capabilities. ■

**Patricia E. Gallagher Environmental Gold Awards**

These awards, of which gold is the highest level, recognize individuals or teams for exemplary achievement in waste reduction, improved waste management, innovation that leads to environmental improvement, and environmental education. The following Physical Sciences staff were members of these award-winning teams.

**A Bacterial Substitute For Nitric Acid Leaching**

*Thomas Day, Patrick Donovan, Alex Edgar, Lynne Goodwin, Bryan Hunter, Cassidy Mazelin, Brian Patterson, Derek Schmidt, Ethan Walker, Christopher Wilson (Materials Science and Technology); Alexandria Strickland (LANSCE Facility Operations)* for working to replace nitric acid by using bacteria to remove copper in target component preparation.

**Process Optimization For Reduced Hazardous Waste Generation**

*Erika Guaba-Roldan (Materials Science and Technology)* for reducing a Resource Conservation and Recovery Act waste.

**Recycle Of Export Controlled SS Material**

*Connel Lane, Brandon Roller, Billy Vigil, Alexander Wass (Accelerator Operations and Technology); Alexandria Strickland (LANSCE Facility Operations)* for managing export-controlled accelerator prototype material.

**Shields Up!**

*Melvin Borrego, Kelly Knickerbocker, Michael Mocko, Christopher Varela (Physics)* for reusing radioactive shielding used in weapons testing to replace mercury shutters in use at the Los Alamos Neutron Science Center. ■

**Postdoctoral, Student Distinguished Performance and Mentor Awards**

The Lab's Partnership and Pipeline Office's Postdoc Program honors outstanding efforts made by postdoctoral researchers and mentors that have led to a positive impact on the Lab and its mission. The Student Programs Office recognizes outstanding students and mentors with awards honoring positive impacts they have made to the Lab's research, mission, and goals. ■

**Postdoctoral Distinguished Mentor Award** .....

*Malcolm Boshier (Materials Physics and Applications)*  
*Michael Cooper (Materials Science and Technology)*  
*Michael Martin (Materials Physics and Applications)*  
*Yu Seung Kim (Materials Physics and Applications)*



Boshier Cooper Martin Kim

**Postdoctoral Distinguished Performance Award** .....

*Emily Luteran (Materials Science and Technology)*  
 Honorable mention: *Prashant Sharan (Materials Physics and Applications)*



Luteran Sharan

**Distinguished Performance Student Mentor Award** .....

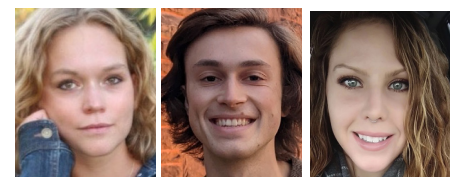
*Cesar da Silva (Physics)*  
*Jennifer Hollingsworth (Materials Physics and Applications)*



da Silva Hollingsworth

**Distinguished Performance Student Award** .....

*Nadezda Draganic (Accelerator Operations and Technology)*  
*Phillip Martin (Materials Physics and Applications)*  
*Julie Napora (Physics)*



Draganic Martin Napora

# CONGRATULATIONS!



Associate Laboratory Director for Physical Sciences: Ellen Cerreta  
*Physical Sciences Vistas*, produced by Karen Kippen, Jim Cruz, and Sam Burleigh,  
is published by the Physical Sciences Directorate at Los Alamos National Laboratory.

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LA-UR-24-20212

Los Alamos National Laboratory, an affirmative action/equal opportunity employer, is managed by Triad National Security, LLC, for the National Nuclear Security Administration of the U.S. Department of Energy under contract 89233218CNA000001.

