SANDIA — Vol. 74, No. 4, Feb. 25, 2022 **BEYA** winners 2 Family-Double fellow 6 friendly Mileposts 8 recognition Page 10 R&D misconduct 11 PUBLISHED SINCE 1949

Atomic-scale manufacturing might not just be for qubits anymore



PRECISELY --- Sandia's Conrad James, left, Shashank Misra, center, and Paul Sharps present the first silicon wafer with circuits that combine devices made using atomic precision advanced manufacturing with industry-standard complimentary metal-oxide semiconductors. The wafer was produced at Sandia's Microsystems Engineering, Science and Applications Complex. Photo by Bret Latter

LDRD Grand Challenge project could transform electronics, solve energy challenges By Troy Rummler

ike so many projects before it, this one started with some good questions. Arguably, too many.

The first question seemed simple enough: Could certain specialized fabrication techniques impact fields outside of quantum information science? But as soon as Sandia physicist Shashank Misra started to unpack it, he discovered a monster of a problem that was difficult to solve with a conventional research project.

- CONTINUED ON PAGE 5

A virtual success In Sandia's first distinguished visit done virtually, DOE secretary connects with staff, programs and the workforce

By Nancy Salem

OE Secretary Jennifer M. Granholm says a highlight of her job has been meeting the nation's brightest scientific minds and learning about projects at Sandia and other national labs.

"Since its founding nearly 75 years ago, Sandia has made innumerable, immeasurable contributions, not only to America's

physical safety, but our economic security, too," Granholm told the workforce during a Feb. 16 virtual visit to the Labs.

"Your tech transfer activity alone created over \$95 billion in value since the year 2000 — including an all-time high of \$3.9 billion last year," she said at the Town Hall. "Those are simply astounding numbers. And it's all possible thanks to the people behind the science and engineering."

Granholm said Sandians as a team have earned her trust and support and that of President Joe Biden. "We - and everyone in our leadership ranks — are fully invested in your success," she said. - CONTINUED ON PAGE 6



FULLY INVESTED — Labs Director James Peery addressed the workforce during DOE Secretary Jennifer Granholm's virtual visit to Sandia on Feb. 16. During her visit, Granholm received briefings on key Labs programs and applauded Sandia employees for their work. Photo by Lonnie Anderson



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Sandia National Laboratories

Albuquerque, New Mexico 87185-1468 Livermore, California 94550-0969 Tonopah, Nevada | Nevada National Security Site Amarillo, Texas | Carlsbad, New Mexico | Washington, D.C.

Katherine Beherec, Editor	kgbeher@sandia.go
Alicia Bustillos, Production	abustil@sandia.go
Paul Rhien, California Site Contact	prhien@sandia.go

CONTRIBUTORS

Michelle Fleming (milepost photos, 505-844-4902), Neal Singer (505-846-7078), Stephanie Holinka (505-284-9227), Kristen Meub (505-845-7215), Michael Baker (505-284-1085), Troy Rummler (505-284-1056), Manette Fisher (505-844-1742), Valerie Alba (505-284-7879), Luke Frank (505-844-2020), Michael Langley (925-294-1482), Meagan Brace (505-844-0499), Mollie Rappe (505-288-6123), Darrick Hurst (505-844-8009) Jim Danneskiold (jddanne@sandia.gov), Heather Clark, manager (505-844-3511)

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LABNEWS Notes

Lab News may contain photos shot prior to current COVID-19 policies. Individuals in photos followed all social distancing and masking guidelines that were in place when photos were taken.

EDITOR'S NOTE: Please send your comments and suggestions for stories or for improving the paper. If you have a column (500-800 words) or an idea to submit, contact Lab News editor Katherine Beherec at kgbeher@sandia.gov.



Graphic by Laura Hatfield

Black engineer awards distinguish Sandia Labs

Expertise in advanced modeling and performance shines through

By Luke Frank

en Sandia engineers received Black Engineer of the Year Awards, including Most Promising Scientist in Government, Science Spectrum Trailblazers and Modern-Day Technology Leaders.

Honorees include Sandia mechanical, electrical, civil, aerospace and aeronautical engineers who excel in their

respective fields. From the abstract to the technical, each has demonstrated exceptional talent and dedication to their work and communities in advancing research and science.

The recipients, all with advanced engineering degrees, hold patents, have published extensively and have received numerous professional and community awards. They perform several roles at Sandia and with research and academic partners across the country.

In addition to their professional pursuits, they are active within their communities as local youth sports coaches; science, technology, engineering and math student program and event mentors; science program instructors and active members in the National Society of Black Engineers and its local chapters.

Most Promising Scientist in Government



Karla Morris, mechanical engineer and computer scientist, Digital Foundations and Mathematics Department.

Karla is the formal-verification software lead for national defense systems, developing methodology and workflow for software verification of high-reliability and high-consequence electrical systems. She has developed tools and computational models used Photo by Randy Wong to verify digital systems for safety, security and reliability. Karla was the co-inventor of

a Fortran short course taught in the U.S. and Europe. She is a mentor dedicated to diversity in science and math for students and colleagues in her community and beyond.



Tyler Garrett, civil engineer, senior R&D systems engineer, Component & Tester Surety Engineering.

Tyler works across multiple enterprises, integrating team members in multidisciplinary technology areas. He identifies, assesses and mitigates risks using defect-prevention methodologies throughout the product lifecycle from conceptual design through product

Photo by Lonnie retirement — to ensure safe, reliable and Anderson robust performance. Tyler owns and manages a franchise fitness facility outside of his role

at Sandia. He also has been an instructor and coordinator for a Sandiasponsored, local summer science program.



Patrice Gregory, mechanical engineer, principal R&D systems engineer, System & Component Surety.

Patrice implements strategies that lead teams to successful product qualification and delivery. She aids in developing safe, reliable and robust products by managing requirements and qualification efforts for various electrical and mechanical components. Her Photo by Lonnie previous roles include collaborating across Anderson multiple organizations to develop tooling and failure modeling of electronic components.

Patrice is also active in the community as a volunteer for public health and youth STEM endeavors.

"This year's Sandia BEYA winners spotlight not only their extraordinary service to the Labs and the nation, but to the diverse communities in which we all live, work and play," said Tobie Webb, senior manager and acting chief diversity officer at Sandia.

The Black Engineer of the Year Awards is a program by the national Career Communications Group, an advocate for corporate diversity, and is part of its STEM achievement program. The awards annually recognize the nation's best and brightest engineers, scientists and technology experts. This year's conference was held Feb. 17-19, when the awards were announced.

This year's Sandia Black Engineer of the Year awardees are:

Science Spectrum Trailblazers



Muhammad El, electrical engineer, manager, Component Science, Engineering & Production.

Muhammad is responsible for developing, qualifying and integrating state-of-the-art technologies for a broad range of components and assemblies used in the design, development and production of neutron generators. His work in technology solutions crosses Photo by Lonnie disciplines in mechanical, materials science,

Anderson industrial, chemical and electrical engineering. He is a manager and mentor for his staff and a role model for minorities in technology. Outside of work, Muhammad enjoys time with his family and performing community service.



Joshua James, electrical engineer, senior R&D systems engineer, Tester and

Component Surety Engineering Department. Joshua is responsible for the evaluation and qualification of product and test equipment used to assure suitability of Sandia's highfidelity, high-consequence products. Joshua works with product and tester development teams from multiple production agencies

Photo by Lonnie qualifying test equipment to ensure systems Anderson perform as intended. Away from the Labs,

Joshua is a STEM advocate at local high schools, volunteers for STEM programs and attends regional conferences to support students considering STEM careers.



La Tonya Jenkins, civil engineer, independent surveillance assessment engineer, R&D Science and Engineering Research Systems Analyst for Energy Water System Integration.

La Tonya's work focuses on systems dynamic modeling supporting projects in Sandia's Energy Water Systems Integration department. Her modeling capability supports the department's work with human-engineered Photo by Lonnie and natural systems to support the secu-

Anderson rity of the nation's energy water systems. La

Tonya's expertise in modeling is also used by multiple organizations across the Laboratories. As a mentor, she works to develop and advance youth STEM programs, has coached various teams participating in national and local STEM competitions and has mentored local students.

Research Leadership Award



Chris Jenkins, electrical engineer and computer scientist, Information Operations Center.

Chris is a principal cybersecurity research and development staff member in Sandia's Information Operations Center. He leads a team researching innovative ways to protect critical infrastructure and other high-consequence operational technology. His work focuses on three key areas: cyber-physical Photo by Lonnie cybersecurity research; high-performance

Anderson computing; and cybersecurity expertise outside the Labs. Chris also has been a local math tutor and previous officer in the National Society of Black Engineers.

Modern Day Technology Leaders



Gerard Bennett, aeronautical engineer, R&D technical staff, Navigation, Guidance and Control department.

Gerard develops navigation, guidance and control solutions for aerospace systems. His work focuses on developing aerospace applications and validating them through simulation. He is responsible for developing the technical applications for modeling and simulation of these

Photo by Lonnie systems and creating a model for developing Anderson algorithms and optimizing trajectories. Gerard

is active in teaching middle and high school students on STEM subjects, leading science classes and facilitating class experiments through the Hands-On Minds-On Technology program.



Mark Onuigbo, aerospace engineer, principal member of technical staff, R&D Science and Engineering, Systems Engineering. Mark leads a team of 25 subject matter experts spanning 20 organizations and disci-

plines ranging from materials science to system engineering. Team success depends on close collaboration with science and technology partners within Sandia, as well as technical peers at Photo by Lonnie partner institutions, commercial vendors and a Anderson myriad of internal stakeholders, from enhanced

surety to advanced and exploratory systems. Mark enjoys mentoring junior staff and colleagues through career advisement, issue resolution and personal growth.



James Taylor, electrical engineering, engineering support technologist, R&D Science and Engineering.

James supports engineering activities on projects, collecting, maintaining, organizing and compiling technical data. He works on engineering activities in design, test, check-out, modification, fabrication and assembly of prototype electromechanical systems, experimental Photo by Lonnie design circuitry and specialized test equipment

Anderson through engineering documentation, reports

and drawings. James has mentored summer interns over the last two years, sharing his skills and experience in problem-solving. He is a youth mentor and coaches his sons' baseball teams.

Town Hall highlights achievements, engagement survey results



INFORMED AND ENGAGED — Labs Director James Peery, left, led a virtual Labs Town Hall on Feb. 17, discussing leadership changes, the hybrid work model, awards, program accomplishments, the federal budget process and Sandia's "very good" rating on the annual Performance Evaluation Report from NNSA.

"The amount of work we're getting done, the impact it's having on the nation is unprecedented," James said. "This is an outstanding time to do world-class engineering and research in support of our national security."

Executive Director and Chief Human Resources Officer Brian Carter, center, shared results of the Employee Engagement Survey and spoke about upcoming initiatives.

"It really is about this connectiveness between the employee and an organization," Brian said about employee engagement. "Another way of thinking of it is, what is the extent to which an employee is willing to give discretionary effort because of that level of connectiveness they have with the organization."

Communications Director Frederick Bermudez, right, moderated Town Hall the

A video of the Labs Town Hall can be found on the Digital Photo by Lonnie Anderson Media Library.

Atomic-scale

CONTINUED FROM PAGE 1

"There were so many interwoven science questions that any regular Laboratory Directed Research and

Development project might answer one or a few but wouldn't reduce the overall risk because there wouldn't be time to address the others," Shashank said.

His idea was to take qubit fabrication methods originally developed by researchers in Australia, and later adopted by Sandia, for quantum computing and use these methods to make microelectronics.

The payoff could be huge — a fundamentally new way to build integrated circuits, power electronics and other semiconductor devices. New quantum microelectronics could potentially be as transformative as quantum computers and quantum sensors, and they could be a key to solving looming energy challenges.

"The power demand for electronics is going to outstrip the world's capability for generating power, based on current trends," said Paul Sharps, manager over Sandia advanced electronic and optoelectronic materials. "I think it's very critical that we invest now in other sorts of electronic devices that significantly reduce power consumption."

A Grand Challenge emerges

The toolkit Shashank wanted to use is called atomic precision advanced manufacturing, which he and others simply call APAM. It's a collective term for technologies that let researchers control where individual atoms go in a device.

"The transistors involved in microelectronics for the last 40 years have used one form of physics," said Conrad James, one of the Grand Challenge's strategists and a former Grand Challenge principal investigator in his own right. "What APAM does is open up different physics to perform the switching in microelectronics, and that provides a wide range of opportunities for improvements in microelectronics, including reduced power consumption and new types of sensors."

But Shashank said there were too many

open questions to get the idea off the ground. Nobody was willing to fund their project ideas.

"The place where we ran into it headlong was when we would pitch application ideas where having atomic-scale control was really important. The push back was there were too many open science questions that could prevent having a significant impact. It was either that, or if we were to show in principle that having atomic-scale control opens up this opportunity space, there is no path to implement it in a way that works alongside current technologies. Up to that time nobody had shown that devices could work outside of a cryostat," a machine that maintains ultra-low temperatures, Shashank said.

So, he changed his tack. Instead of jumping to applications, he decided to tackle some of the open science questions by pulling together a cross-disciplinary team — an approach perfectly suited for a Grand Challenge LDRD.

The FAIR DEAL Grand Challenge, short for Far-reaching Application, Implication and Realization of Digital Electronics at the Atomic Limit, ran from fiscal years 2019 through 2021.

With a team of 36 people over three years, Shashank aimed to answer three main questions: Can Sandia-developed atomic precision advanced manufacturing build a device that is compatible with CMOS, the industry-standard method of semiconductor manufacturing? Can it be accomplished in a practical environment (i.e., not at cryogenic temperatures)? Does the final product do anything special that a conventional device can't?

Shashank never expected the answers would be yes, yes and yes.

"If somehow I had a genie grant me a wish at the beginning of the project, the truth is I would have wished for less," he said.

"In any project this ambitious, you think about it in terms of triage," he said. "What's the off-ramp when A works, and B doesn't work? What's the off-ramp when it's vice versa? I think the most surprising thing was, in general, there may be a lot of engineering difficulty, but there is no basic obstacle holding you back. The fact that all of those things were true was very surprising to me."

Creating new engineering opportunities

The FAIR DEAL team successfully built a microchip in which an APAM nanodevice worked directly in concert with a CMOS circuit built at the **Microsystems Engineering, Science and Applications Complex**. Not only did the combined circuit work as planned, and at room temperature, but the team also demonstrated that APAM devices shouldn't compromise the robustness of the microchip.

As FAIR DEAL began answering scientific questions, Shashank and his team were able to restart conversations about applying the manufacturing methods to specific uses. In 2021, a spin-off project began with DOE's Advanced Manufacturing Office, aiming at developing what FAIR DEAL began for energy-efficient microelectronics.

Paul, who was a member of the Grand Challenge, said, "I saw that as a major step forward because I saw that as being recognition from an outside agency, not just Sandia, that's willing to put money into something — that this is really key, that this is really a breakthrough. All the parts need to get put together, but enough things have been done to really tee that up for outside recognition and funding."

Sandia has also begun several collaborations with university partners, and the team is in talks with potential sponsors about whether this new way of processing silicon could create opportunities to implement new kinds of hardware trust and security measures.

Shashank says that his team's success has opened even more scientific questions that need to be studied.

"We have atomic-scale control over some elements in silicon," he said. "And I think the science opportunities that other people are pursuing on the project at this point are looking at whether we can have atomic-scale control in every material. There's a lot of thought that has to go into how you do that, but I do think that's where the science is headed."

Virtual success

CONTINUED FROM PAGE 1

During the virtual visit, Granholm was introduced to the Senior Leadership Team and received briefings on key Labs programs including the Microsystems Engineering, Science and Applications Complex, climate initiatives focusing on concentrating solar power, the Combustion Research Facility and ducted-fuel injection, quantum computing, Z machine, nuclear deterrence innovations, the Hypersonic Control Testbed and space technologies.

"I know this is just a small slice of Sandia's sprawling portfolio," Granholm said.

She said the president's proposed 2022 budget requested a significant increase in funding for science programs and national labs. She said the administration's plan for Building a Better America calls for substantial investment in the labs to support critical research and development to cement America's role as a global leader in science and innovation. Science, she said, holds the key to making the country more competitive and the world more safe and secure.

"We're betting big on R&D. We're betting big on the power of American ingenuity," she said. "That means we're betting big on each and every one of you."

Granholm said the work being done across DOE every day will help the country address current and future challenges. "Your efforts give me all the confidence in the world that we can, and we will, overcome the challenges ahead," she said.

She complimented Sandia on its response to the COVID-19 pandemic saying the Labs never lost focus on health and safety. "Whether you have had to find ways to accomplish your mission from home or to fulfill your duties on-site due to the nature of our national security needs, the circumstances around the last two years haven't been easy," she said.

Granholm also praised Sandians' gener-osity. "I was blown away hearing

you have contributed nearly \$5 million to nonprofits in Albuquerque and Livermore. Simply incredible," she said. "So, I thank you for acting to protect yourself, your family and your coworkers, for stepping up to serve your communities and for all you continue to do to keep America safe. You've set a high bar for service to this country and, believe me, that hasn't gone unnoticed."

Labs Director James Peery thanked Granholm on behalf of the Labs and invited her back for an in-person visit. "You're looking at the largest and most diverse lab you have in terms of mission and people," he said. "Our work spans not only DOE and NNSA but the Department of Homeland Security, Department of Defense, intelligence community and other federal agencies. You're seeing just one-tenth of what you would see on a live visit. We have much more to show you in the future."

DOE Secretary Jennifer Granholm's address to the Sandia workforce can be viewed online in the Digital Media Library.

Sandia engineer elected fellow of two prestigious national societies

By Mollie Rappe

B abu Chalamala, an engineer and manager of Sandia's energy storage group, was recently elected fellow of two prestigious national societies. On Jan. 26, he became a fellow of the American Association for the Advancement of Science. On Dec. 7, he became a fellow of the National Academy of Inventors.

According to AAAS, Babu was selected to be a fellow "for technical contributions and leadership in grid energy storage technology, his research contributions to electronic materials and devices, and committed service to the global science and engineering community."

Energy storage systems are important for capturing renewable energy when it is produced and saving it for when it is needed. Energy storage systems, including lithium-ion battery storage, can increase the stability, reliability and resiliency of the power grid.

"I believe that I've had an impact in grid storage as a thought leader, providing the vision for where we need to go in R&D, engineering and what are the big things we need to focus on as we



ENERGY EXCELLENCE — Babu Chalamala, an engineer and manager of Sandia's energy storage group, was recently elected fellow of two prestigious national societies, the American Association for the Advancement of Science and the National Academy of Inventors.

Photo by Lonnie Anderson

consider the future of the electric grid," Babu said. "Being elected fellow of these two societies means I've made enough of an impact over my career to be recognized by my peers."

AAAS is the world's largest general scientific society and publisher of the Science family of journals. Since 1874, AAAS Fellows have been a distinguished group of scientists, engineers and innovators recognized for their achievements across disciplines ranging from research, teaching and technology; administration in academia, industry and government; and excellence in communicating and interpreting science to the public.

Among these AAAS Fellows are 29 current and former Sandia researchers and executives including Susan Seestrom, Tina Nenoff, Jerry Simmons and the late Nancy Jackson. While typically inducted at the annual AAAS meeting in February, the 2021 fellows will be celebrated later this year when an in-person gathering is feasible from a public health and safety perspective, the association announced.

The National Academy of Inventors is an organization of universities and governmental and nonprofit research institutes, with over 4,000 individual inventor members and fellows. It was founded in 2010 to recognize and encourage inventors with patents issued from the Patent and Trademark Office, enhance the visibility of academic technology and innovation and translate the inventions of its members to benefit society. Election as an NAI Fellow is the highest professional distinction accorded solely to academic inventors, according to the academy.

Former Sandia Fellow Jeff Brinker was the first Sandia researcher to be elected a fellow of NAI. The 2021 NAI fellows will be inducted in June into the academy at the annual meeting of the National Academy of Inventors in Phoenix.

From microelectronics to massive batteries

Babu came to Sandia in 2015 after spending about a decade in batteries and grid-scale energy storage research and development. He was the founder of a lithium-ion battery startup company and then was part of an established silicon materials and renewable energy company where he led the development of an energy storage business unit. During the first part of his career, Babu focused on flat-panel display technology and microelectronics. Most of his patents are from this early work.

While at Sandia, he has focused on steering Sandia's and the DOE's energy storage research and development efforts in new low-cost battery technologies, understanding safety and reliability and improving power conversion systems. His group also develops open-source software tools to assist electric utilities in assessing the value of energy storage systems.

Another important part of Babu's work at Sandia has been reaching out to state regulatory bodies across the country to improve their understanding of energy storage and operational and performance aspects they need to be aware of as they develop their policies. When not working, Babu is very involved in a number of professional societies. He has been a member of the **Institute** of **Electrical and Electronics Engineers** for 38 years and is currently the chair of its energy storage and stationary battery committee. He was also elected as an IEEE Fellow in 2014. He has also been an active member of the **Materials Research** Society and the New Mexico Academy of Science, where he helps with outreach programs for high school students and teachers interested in science. Babu also mentors students and guest lectures at a number of universities including Washington University in St. Louis, Texas Tech University and The City College of New York.

In regards to his election to two national societies, Babu said, "These recognitions are a reflection of the outstanding work of the energy storage team. It is also an indication of the prominent role of Sandia in grid storage."

Sandia mechanical engineer receives Big Brothers Big Sisters award



BIG BANG — On behalf of Sandia and Advancing the Next Generation of Leadership Excellence, mechanical engineer Austin Hamlett, left, received the Big Brothers Big Sisters Discovery Festival Big Bang Award. He was recognized for his demonstration of a dynamic density-based lava lamp. The festival introduces students to science, technology, engineering and math careers through fun demonstrations and activities. Sebastian Martinez, chief development officer for Big Brothers Big Sisters of Central New Mexico, right, presented the award. **Photo by Amy Tapia**

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Mileposts





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Sandia scientist to lead Minerals, Metals and Materials Society

By Mollie Rappe

Brad Boyce, a Sandia materials scientist, was elected president of The Minerals, Metals and Materials Society.

Brad will become vice president of the society on March 3 at its annual meeting, and then serve three consecutive one-year terms as vice president, president and past president. He is the second Sandian to be elected to lead the professional society. The first was Elizabeth Holm, now a professor at Carnegie Mellon University.

The professional society includes 11,000 materials scientists and engineers from around the world. It fosters the exchange of knowledge and ideas in topics ranging from producing metals from mined ores to advanced applications of materials.

"It's really an honor to assume this responsibility," Brad said. "The society has been a professional family to me since I was a student. I really came into my own through my engagement with the society, and it provided me a platform to present my ideas and to hear the ideas of others. We have this shared passion and challenge with the materials we work with. Through the society, I've been able to not only discuss my technical work with the professionals who I highly respect but become friends with them."

During his leadership tenure, Brad will preside over portions of the society's numerous technical and administrative committees. As president, Brad plans to build off lessons learned from the COVID-19 pandemic to provide innovative virtual events, especially for international members, members with young children and others for whom travel is challenging, while sustaining the core competencies of the society, such as the technical sessions at in-person annual meetings.

Brad has been involved in the society for more than two decades, starting as



MATERIALS LEADER — In a 2018 photo, Sandia materials scientist Brad Boyce watches as the Alinstante robotic work cell scans a 3D-printed part to compare what was made to the original design. Brad was elected president of The Minerals, Metals and Materials Society and will begin the three one-year terms of vice president, president and past president on March 3. Photo by Randy Montoya

a doctoral student at the **University of California, Berkeley**. Sharing his research at the society's conferences were his first opportunities to present to a group of practicing professionals, he said.

Once he began his career, he progressed from attending meetings to participating in committees. He became the chairman of the mechanical behavior committee the society's largest technical committee — in 2010. From there, he became more involved in planning the conference programs and eventually joined the society's board of directors in 2018.

Over the course of his career, Brad has studied the mechanical behavior of many different kinds of materials, from **biological materials** to **3D-printed parts**. He is pleased that his Sandia career has allowed him to study a diverse array of materials. The technical breadth of the society has also supported his interest in varied materials, he added.

Brad is honored that he will get to put his own stamp on The Minerals, Metals and Materials Society, impacting how it evolves in a post-pandemic world. He added that the society's heritage traces back more than 150 years ago to the American Institute of Mining, Metallurgical, and Petroleum Engineers, one of the five original professional engineering societies in the nation. Over the century and a half, the society played a significant role in the advancement of engineering, particularly for certification of professional engineers and developing standards.

Brad recommended early-career scientists and engineers, whether they study materials or a different subject, become involved in their relevant professional society.

"Being involved in a professional society, in general, has a number of benefits," he said. "It helps with networking outside of your own institution and to see what is happening at other institutions. It helps you learn how other professionals approach problems similar to the ones you have. It can also be a great place to help you develop your leadership skills."

Family-friendly policies earn Sandia top-level recognition

By Meagan Brace

or the third consecutive year, the nonprofit initiative Family Friendly New Mexico has awarded Sandia a New Mexico Family Friendly Business Award, Platinum Level (Distinguished Leader). This is the highest level of recognition for businesses that have policies in the categories of paid leave, health support, work schedules and economic support. Platinum recipients must also offer a minimum leave benefit, comply with the New Mexico Fair Pay for Women Act and have at least one policy in each of the new categories: pay equity, diversity and inclusion, and community investment.

"We are honored to receive this top-level recognition from Family Friendly New Mexico for our workplace policies," Mary Romero Hart, senior manager of Benefits, said. "This award highlights Sandia's ongoing and renewed

commitment to these principles with our focus on expanded work-from-home and paid-leave options offered to employees during the COVID-19 pandemic."

Sandia offers competitive and generous paid-leave options that employees can use for their own health, to care for family members, enjoy vacations and holidays — including a weeklong energy-saving shutdown at the end of the year - and give back to the community. During the pandemic, Sandia temporarily expanded paid leave ordinarily taken to care for ill family members to also include taking care of children when schools or day cares closed. Later, Sandia implemented a special vacation donation program to provide financial relief for those who needed additional time off to care for dependents, military members with extended obligations or employees who exhausted their sickness absence due to COVID-19.



FLEXIBILITY — As part of Sandia's flexible work options that support a work-life balance, eligible employees can work a 9/80 schedule with the opportunity to take every other Friday off or a 4/10 schedule to take a chosen day off each week. Employees may also be eligible to telecommute from home or work virtually from a remote location. Photo courtesy of Joel Ortiz



PLATINUM AWARD — Sandia is among 45 platinum-level employers recognized for having family-friendly policies that help employees be

Sandia also has on-site and virtual health services that support physical and emotional well-being through coaching, incentive programs, fitness classes and health care benefits. Flexible work options, such as the 9/80 or 4/10 work schedules, telecommuting and virtual work, provide employees the flexibility to balance life outside of work. Financial wellness resources include retirement benefits, pretax spending accounts and a month-long financial wellness fair to help with financial planning. Sandia also has a strong commitment to diversity and inclusion and offers a variety of employee resource groups for the workforce to participate in, such as the Sandia Parents Group that aims to foster a culture of work-life balance, build personal and professional relationships and give back to Sandia and local communities.

The New Mexico Family Friendly Business Award was formed by the Task Force on Work-Life Balance. The program recognizes New Mexico employers that offer family-friendly employee benefits and works to increase the number of businesses with family centered policies available to the workforce.

Ethics Corner Spotlight on research and development misconduct

By Aimee Richardson-Zadra

andia partners, colleagues, stakeholders and the nation depend on the integrity of Labs research and development. Research misconduct can have a devastating impact, both internally and externally.

This month, Ethics/Equal Employment Opportunity Advisory and Investigative Services partners with the Office of Research and Development Excellence to highlight the importance of recognizing and reporting R&D misconduct.

Recognizing R&D misconduct

R&D misconduct is fabrication, falsification, or plagiarism in proposing, performing or reviewing research, or in reporting research results. This does not include honest errors or differences of opinion. Three conditions must be met to identify R&D misconduct: a conclusion that there has been a significant departure from accepted practices of the relevant research community, evidence that the departure was knowingly, intentionally or recklessly committed and a determination based on the majority of the evidence that misconduct has occurred.

How to report suspected R&D misconduct

If a staff member is unsure whether a suspected incident meets the criteria of R&D misconduct, they should contact the Office of Research and Development Excellence to discuss the suspected misconduct informally.

Employees have a responsibility to report suspected R&D misconduct to the Office of Research and Development Excellence at 505-844-8400, or Ethics/ Equal Employment Opportunity Advisory and Investigative Services at 505-845-9900 or ethicsteam@sandia.gov. If a staff member believes that there is a conflict of interest that cannot be resolved internally at Sandia, they may contact the DOE Scientific Integrity Official in the DOE Office of the Deputy Secretary. Retaliation against an employee who reports possible R&D misconduct is prohibited.

Reporting tips

When reporting suspected R&D misconduct, it is important to provide as much detail surrounding the misconduct as possible, such as:

- Who allegedly committed the R&D misconduct, including the person's name, organization and position?
- What is the R&D misconduct that occurred, such as falsifying or fabricating test results or plagiarizing an article?
- When did the R&D misconduct occur? What was the date, time and how frequently?
- Where did the R&D misconduct occur, such as in a research report or article?
- Why does the person believe the R&D misconduct occurred? Was the researcher under time pressure, was there not enough supporting data or other reason?

After a report is made, an initial inquiry

determines whether a Research Integrity Officer and Ethics Officer will perform an investigation. These officers are neutral and guided by fairness and objectivity. The time frame for conducting an inquiry varies based on the complexity of the issue, evidence provided and need for engaging subject matter experts. Once the inquiry is complete, the Research Integrity Officer and the Ethics Officer will determine if there is enough evidence of misconduct to pursue an investigation. Investigation follows the process outlined in RD001, Research and Development Integrity Policy.

Ethics accomplishments

In the first quarter of fiscal year 2022, from October to December, the Ethics/Equal Employment Opportunity office received 180 calls on its anonymous helpline. Most of those calls were resolved informally by Ethics officers providing guidance to callers or conducting a brief inquiry into complaints to determine if a policy or code violation occurred.

During this time, Ethics officers opened 15 investigations into 25 allegations. Investigations sometimes include more than one allegation, and decisions are reached on each allegation investigated. See the graphic below for the outcome of the 25 allegations investigated. Corrective actions were taken for all substantiated allegations.



Graphic by Stephanie Blackwell

Women @ Energy blog features Sandia director

Amy Halloran featured on DOE STEM Rising website

By Sarah Jewel Johnson

my Halloran became the director of nuclear fuel cycle and grid modernization for Sandia in 2021. Her team works in diverse areas of research, from ensuring the electric grid can handle renewable energy sources to enhancing the safety of nuclear energy to advancing the science of nuclear waste management. She was previously the senior manager for Sandia's work in **renewable energy** and led research programs in wind energy, solar energy, water power, geothermal energy and the water and energy nexus.

Amy's Sandia career started in 2011

when she was hired to be the manager of the Geophysics and Atmospheric Science Department. Her team worked in the areas of nuclear threat detection, climate measurement and oil and gas extraction. She also oversaw Sandia's work on the North Slope of Alaska for DOE's climate program. Prior to her work at the Labs, Amy worked as an environmental engineer in the areas of contaminated soil and groundwater investigation and remediation, industrial waste treatment and energy efficiency. Amy has a bachelor's degree in chemical engineering from Virginia Tech and a master's degree in environmental engineering from the University of Illinois.





STEM STAR — Director Amy Halloran leads a team doing work in nuclear energy, energy storage and energy delivery. In this 2019 photo, Amy tours the Waste Isolation Pilot Plant.

Photo courtesy of Amy Halloran

Amy recently answered questions for the Women @ Energy blog.

What inspired you to work in science, technology, engineering and math?

Like most folks who go into STEM, it probably started with being good in math and science. I am also a problem solver — I love puzzles and games and putting together IKEA furniture — so engineering seemed to be a great place to develop my problem-solving skills and apply them to real world problems. No one in my family was an engineer, so it was kind of an unknown for me, but my parents were always very supportive of me going into STEM. I had a very inspiring 10th grade chemistry teacher, and she is probably the reason I ended up going into chemical engineering. I knew I wanted to make a positive difference in the work that I do, so I moved into environmental engineering to work in hazardous waste site investigation and cleanup — a fairly new field of research at the time.

What excites you about your work at the Labs?

I am very excited to be leading a team who is doing research and development that will help the nation meet the challenges of climate change. We need to have a safe, reliable energy system that moves us to a cleaner energy future. My team is doing impactful work in nuclear energy, energy storage and energy delivery. There are so many challenges that need to be overcome and the researchers I work with at Sandia and other national laboratories are helping to address those challenges.

At Sandia, we don't make new nuclear reactors or batteries or waste disposal sites, but the research we do makes sure that they can all be deployed safely and that the grid will be ready to accept those and other distributed energy resources.

How can our country engage more women, girls and other underrepresented groups in STEM?

This is one I struggle with. I am so very proud that both my daughter and my son graduated with engineering degrees, and I like to think that I helped to inspire them on their STEM path. Somehow those of us in STEM fields need to make those personal connections and show young women and others from



Do you have advice for someone looking to enter your field of work?

Be curious! Take the classes you need, like math and science, but also take other classes that you are interested in, even if you don't see how you will use them. I got a minor in English and took classes in Russian history, biochemistry, meteorology, French and so many other disciplines, and I think those classes have helped me to bring a broader perspective to my work. If you're in college, get to know your professors. Volunteer to help them with some of their projects so you can see applications of what you are learning and make it more real than the theory you are studying. That work will look great on a resume, and they can be valuable references.

Also, this may sound obvious, but proofread your resume and cover letter — we get so many applications for our job postings, and one way they get screened is by mistakes in the resume. If you don't take the time to make your resume right, how can we expect you to do accurate work when you join our team?

When you have free time, what are your hobbies?



I love to ski, hike and camp and just be outdoors -Albuquerque and New Mexico offer so many opportunities for outside activities! I played soccer for decades and we go to all the home games for our local professional team. I'm a big reader and love to cook for my friends and family. And then, like so many others, we adopted a pandemic puppy, a standard poodle who just turned two, to join our other dog, a terrier, so my husband and I spend a lot of time on dog walks. 🖻