SANDIA LABNEWS
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Sandia leaders honored for diversity efforts
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Developing energy projects for global tropics

Labs' 10-year agreement extends work with University of Puerto Rico, Mayagüez

ENERGY ALLIANCE — Efrain O'Neill, left, an electrical engineering professor at the University of Puerto Rico, Mayagüez, who is spending a year working at Sandia, talks energy research with senior manager Tito Bonano.

Photo by Randy Montoya

By ***Melissae Fellet***

A new 10-year agreement between Sandia and the University of Puerto Rico, Mayagüez, has the potential to bring more reliable electricity to remote communities and the latest in electrical grid technology to rural areas in the world's tropics.

Sandia senior manager Tito Bonano, who was born and grew up in Puerto Rico, said the agreement will continue a decades-long relationship with the university he attended.

"Collaborative projects undertaken as part of this agreement will leverage the university's academic and research expertise in addressing problems relevant to energy resiliency, critical infrastructure and energy-efficient process development aiming to treat, clean and reuse water and soils, along with Sandia's expertise in materials science, grid modernization and resilience, multiple energy sources and systems engineering," he said.

Tito helped forge the partnership with UPRM and is a member of the engineering school's industrial advisory board.

The Cooperative Research and Development Agreement, presented at a Feb. 25 ceremony in Puerto Rico, will enable the two institutions to continue their partnership to develop safe, secure energy and environment projects for resiliency and reliability.

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Patient-friendly brain imager gets green light

Quantum sensor enables flexible, wearable design

By ***Troy Rummler***

It might not start a fashion trend, but Sandia researchers are designing a wearable brain imager.

The National Institutes of Health has granted Sandia $6 million to build the prototype medical device that would make magnetoencephalography — a type of noninvasive brain scan — more comfortable, more accessible and potentially more accurate.

"This is the future of MEG," said Sandia scientist Amir Borna, lead author on a paper describing the proposed system recently published in the journal PLOS ONE.

Physicians use MEG to locate the sources of epilepsy, and researchers use it to study brain development, Alzheimer's disease and stroke. But the procedure requires a person to hold still for long periods under a rigid, helmet-like dome, which can be difficult for children, people with chronic pain and people with motor disorders such as Parkinson's disease.

"The goal is to expand the number of clinical indications for which MEG may inform clinical care," said Julia Stephen, director of the MEG core lab at the Albuquerque-based Mind Research Network, a division of Lovelace Biomedical Research Institute, and an advisor on the project.

HEAD GEAR — Sandia scientists Amir Borna, standing, and Peter Schwindt have been awarded $6 million to convert the quantum-sensor-based magnetoencephalography system shown here into an adjustable, wearable unit.

Photo by Randy Montoya

According to Stephen, who is also a professor of translational neuroscience, a wearable device would give patients freedom to relax and move into comfortable positions during the procedure, enabling more people to be tested and eliminating differences in data among patient groups. Because the signal measured from the brain decreases with distance and the new system would fit closer than a one-size-fits-all helmet, measurements are expected to be more accurate for children.

Sandia's Peter Schwindt, the project's principal investigator, said what prevented this in the past was that superconducting sensors were used, requiring containers of liquid helium. The cryogenic hardware forces designers of these systems to fix the sensors into place.

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LABNEWS Notes

Drive, determination and relationships

Reflecting on important lessons during Women's History Month

By ***Marcy Hoover, Energy and Homeland Security Program Management Director***

When I left my small hometown in rural Michigan, I was the exception — a young woman who loved science and math. I was also the first in my family to seek and earn a college degree.

Even though I lacked education role models as a child, I successfully graduated from Michigan State University with a bachelor's degree in mathematics. Moving on to Purdue University, I earned a master's degree in mathematical statistics and became the first American woman at the university to achieve a doctorate in statistics.

In a life and career of firsts — including becoming the first female manager of a nuclear weapons surveillance organization and first female senior manager of weapons quality at Sandia — I have never wanted to leave others behind. So as we celebrate Women's History Month, I want to stress the importance of drive, determination and relationships in everything you do.

Plan with intention

It's important to say upfront that having a successful career and life is no accident. The surest way to achieve your goals begins with knowing what they are and strategizing how to attain them.

A big part of that at Sandia is understanding how your work fits into the Labs' missions and strategies — and, believe me, it does. Regardless of your exact organizational role, whether in nuclear deterrence or facilities and logistics, each of you directly supports Sandia's missions.

One of my greatest joys is helping the women and men I mentor to identify their contributions to the Labs' overall picture. I discuss with them how to "think up" a level or two so they can prepare themselves and their work to intertwine with other pieces at Sandia. Understanding your role in this vital national laboratory is the first step to a long and fulfilling career at Sandia.

Act with bravery

Another key to a successful career and life lies in your ability to see opportunities beyond tough choices and summon the bravery to make them.

When I arrived at Sandia in 1995, I found the Labs to be male-dominated, reflecting much of the industry at the time. As I grew in responsibility, I summoned the courage to lead organizations mostly staffed by men.

At Sandia, we are asked to think big and then make it happen. We are also called to be courageous. Lasting, positive change comes through action, determination and working with those around you, teaming with them for success. Step out in courage, and help change Sandia — and the world — for the better.

LEADING LADY — Marcey Hoover has forged her own path in life and in her career, including becoming the first female manager of a nuclear weapons surveillance organization and first female senior manager of weapons quality at Sandia.

Photo by Randy Wong

Pass on what you know

Starting with my first project, Dori Ellis took me under her wing. Dori is now Sandia's Deputy Labs Director and remains a positive influence in my life. I have followed her example by mentoring men and women throughout my career.

Both at work and outside of work, I try to pass on the lessons I have learned in my career doing what no woman had ever done at Sandia. I devote one-on-one personal time to my mentees, realizing that I can often help people more when I understand who they are and what they bring to the table. I am especially committed to empowering young women to fulfill their potential, and I have enjoyed my involvement in the Sandia Women's Action Network, Purdue Alumni Women Peer Mentoring Group and Big Brothers Big Sisters of Central New Mexico.

I find mentoring fulfilling, energizing and rewarding. I encourage everyone to mentor and use what they have learned to help others understand their value and place at Sandia. Giving of yourself is the most valuable thing you can do. It enhances your career, your co-workers and your life.

Exceptional service

Growing up in a small Midwest farming community, I always knew I wanted to do something bigger, and I am happy that I took my path. Every day at Sandia, I have an opportunity to contribute something valuable to our nation.

We all share in this exciting mission. We are also fortunate to work in a place that continues to celebrate and illuminate the roles of the women who came before us and the women we work alongside now.

Sandia is filled with incredible people conducting amazing work. We all have compelling stories and see the world in unique ways that spur innovation.

I was the exception, and now I get to work with the exceptional.

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LABNEWS Notes

EDITOR'S NOTE: Lab News welcomes guest columnists who wish to tell their own "Sandia story" or offer their observations on life at the Labs or on science and technology in the news. If you have a column (500-800 words) or an idea to submit, contact Lab News editor Tim Deshler at tadeshl@sandia.gov.

Sen. Heinrich visits Sandia

U.S. Sen. Martin Heinrich visited Sandia in February to meet with Jill Hruby Fellow Mercedes Taylor and learn about her independent research into materials for water purification. Mercedes is one of the first researchers to earn a Hruby Fellowship.

Heinrich currently serves on the Senate Energy Natural Resources committee and has a strong interest in Laboratory Directed Research and Development. During his visit, he also received a briefing on the Labs' Resilient Energy Systems mission campaign.

NATURAL RESOURCES — Jill Hruby Fellow Mercedes Taylor, left, discusses water purification research with U.S. Sen. Martin Heinrich.

Photo by Bret Latter

Woman of Influence

Sylvia Saltzstein honored at Albuquerque Business First annual awards

By ***Stephanie Holinka***

Sylvia Saltzstein recently earned an Albuquerque Business First Women of Influence award for her leadership in Sandia's nuclear energy groups and in the community.

Sylvia has been at Sandia for 26 years and currently serves as acting senior manager for nuclear energy safety and security. She spent the past seven years setting and implementing the national research agenda for the safe and secure storage, transportation and potential reprocessing of spent nuclear fuel.

"While this is not a topic many people in the world think about, I think about it every day and help influence the research path and engineering solutions the United States and other countries put in place to develop permanent solutions for the disposition of radioactive and toxic material and to help provide tools that do their part to ensure that our nuclear energy is always produced in a safe manner," Sylvia said.

Prior to her work at Sandia, Sylvia was an Earth science and biology high school teacher. She retains her passion for middle and high school science education and communication.

"I view my role as communicating the big picture and connecting people of different backgrounds to create high-performing teams," she said.

After undergraduate school, Sylvia worked at Lawrence Berkeley National Laboratory on the Superconducting Supercollider, and then was a graduate intern at Lawrence Livermore National Laboratory. Sylvia said this was a wonderful introduction into the national laboratories.

One skill Sylvia brings to her Sandia work, as well as her volunteer actions, is her strong communication skills, especially around difficult or sensitive subjects such as those in the area of nuclear energy and safety.

"It's a difficult topic. There's a huge amount of emotion around it, even in professional conversations."

Recognized expert and leader

In her role as an expert on nuclear energy transportation safety, Sylvia has shared her expertise with critical stakeholders all over the world, including DOE, the U.S. Nuclear Regulatory Commission, the U.S. Electric Power Research Institute, the United Nations International Atomic Energy Agency, the German Federation of Materials Science, the Korean Atomic Energy Research Institute and the Korean Radioactive Waste Association.

"Because America has the largest inventory of used nuclear fuel in the world, understanding our risk in this area is important for the nation, as well as all the other countries who have nuclear power," she said.

Sylvia led two DOE teams that earned Secretary of Energy Achievement Awards in 2017 and 2018.

The first team collected and analyzed data on the shocks and vibrations that fuel assemblies from nuclear reactors experience during transportation, revealing that the fuel moved so little during shipping that it could be transported across the nation millions of times before any risk of breakage.

The second award was for data collection work on the mechanical strength of spent nuclear fuel once it goes into storage after being used in a nuclear reactor. Both projects involved teams spread across at least four different national laboratories. The teams included crucial international collaborators as well.

In her free time, Sylvia volunteers for the New Mexico Future Cities Competition and Albuquerque Public Schools elementary and middle school science activities.

SAFETY LEADER — Sylvia Saltzstein has been named a 2020 Woman of Influence by Albuquerque Business First. She was recognized for her work on nuclear transportation safety and her leadership in the community.

Photo courtesy of Brian's Photography for Albuquerque Business First

Sylvia was nominated by previous awardee Shari O'Laughlin, head of Children's Grief Center of New Mexico.

For the past 16 years, Albuquerque Business First has honored women who have made a positive and influential impact in the New Mexico business community. The awards were presented in a Feb. 24 ceremony at Sandia Resort and Casino.

Shake, rattle and roll

Students tour Labs' environmental test and evaluation facilities, get high-impact STEM experience

By ***Luke Frank***

About 45 Gallup, New Mexico, high school juniors and seniors took in a little shake, rattle and roll at Sandia's Environmental Test and Evaluation Complex during a special March 4 STEM Day event organized just for them.

After a morning of high-impact experiences showcasing arms control and terrorism monitoring equipment at Sandia's Training and Technology Demonstration Area, an animated cluster of students filed into the testing complex to witness how materials perform in a vibration lab, shock lab, climate lab and more.

"STEM Day at the Labs introduces high school students to the work at Sandia as they consider career paths," said Amy Tapia, manager of the Labs' Community Involvement team. "This unique partnership between Sandia Community Involvement, recruiting and our American Indian Outreach Committee did more than 'wow' them with demonstrations. Our employees at every level from engineer to technician related personal stories of how they became a part of Sandia."

Carrie Lovato, director of College and Career Readiness for Gallup McKinley County School District, described the day as "super impactful."

"The kids got to see and hear about an exciting variety of STEM jobs at the Labs, including many that don't require an engineering degree," she said. "Most think a job at Sandia is out of reach. They learned today firsthand that people just like them, from communities just like theirs, have great careers at the Labs."

SHAKING THINGS UP — Structural dynamics engineer Mike Arviso gives a demonstration using a simulated model aircraft frame used to capture resonances, shapes and damping for Gallup, New Mexico, high school students during their March 4 STEM DAY visit to Sandia.

Photo by Randy Montoya

Mariana Vega, a Gallup High School senior, has been accepted to New Mexico State University and is considering a career in civil engineering. "Everything we're seeing today at the Labs is really fascinating," she said. "What's my dream job? I'm not sure, and that's why today has been so great for me. I feel one step closer to knowing what I really want to do."

Agile workspaces promote code development

COLLABORATION SPACE — Sandia's new Agile workspaces encourage collaboration and offer sit-stand workstations, chairs varying in height and situated depending on the group's needs, whiteboards and Skype equipment and other electronic touches. **Photo by Alicia Bustillos**

By ***Neal Singer***

Someone not familiar with the Agile movement might imagine an "agile workspace" as a space moving deceptively around them.

But, as it turns out, Sandia's latest adventure in Agile workspaces — two 20-by-50-foot rooms in Bldg. 962, under the supervision of manager Steve Wix — are not agile in terms of their own mobility, but in presenting an unusual variety of workspace and electronic choices.

In an Agile workspace, the architecture of a room should promote, rather than suppress, the individuality of its users. So, the two large rooms were not subdivided into a series of small offices all the same size, nor was a large common work area set up like an insurance company headquarters, with wall-to-wall desks facing the same direction.

Instead, the rooms were subdivided into sizes and shapes that promote a variety of collaborations, with sit-stand workstations, chairs varying in height and situated depending on the group's needs, whiteboards and Skype equipment where appropriate and other modern electronic touches. This change from isolated workstations to more sensitive arrangements is intended to produce more and better output.

That's because the availability of such spaces prompts engineers to leave their solitary studies to enjoy unplanned interactions that can pollinate ideas, as well as self-assemble collaborations for future growth.

Productivity from the start

While some might interpret this positive description as pie-in-the-sky, past Sandia results show otherwise.

Alfred Lorber, project manager of an earlier Sandia Agile workspace, said, "When new-hire software developers cannot sit with their teams and are isolated — usually outside the limited area in a temporary office — it takes up to six months, or at least one or two months, for them to become productive."

Being productive is defined as submitting working, tested code into the software repository.

"When they hire in and, on day one, can sit with their team, it takes at most two weeks for them to be productive, and we have seen as short as four days," he said.

Currently, two software code development teams sponsored by DOE's Advanced Simulation and Computing program make use of one of the new Agile facilities, manager Richard Kramer said. The teams, developing codes named Empire and Gemma, share the space, one on each side of the large room; the codes are part of the RAMSES suite of software tools particularly related to radiation and electrical simulation.

"To be clear, there's no competition between teams, but rather, enhanced collaboration" he said.

"Both teams already have seen benefits to their software development from the new space, which has facilitated faster knowledge transfer and better development practices, like pair programming rather than programming done in solitary," he said.

"Daily stand-up meetings help manage software development with maximum flexibility, enabling a development process that follows the core principles of smooth workflow, but adapted to the amount of time, number of participants and available information."

Multiple work modes

"We built a software lab to encourage teaming and collaboration. But our lab is not just one big room with monitors and chairs. That's an open office. Everyone hates an open office," Steve said.

"Instead, we have an area for socialization, very configurable, with desks open for changing ownership and position. You can sit or stand. No one is more than four feet away from a network or power drop. We have small breakout rooms for impromptu conversations and meetings, and noise-cancelling headphones for people who don't want to be part of that," he said.

"Our Agile-space vision supports multiple work modes: collaborations with shortened communication pathways, smaller 'huddle' rooms, conference rooms, respite room, a place to eat, visuals and sound to rejuvenate and recharge."

A good Agile workspace doesn't come about from executive fiat, but with participation by those intended to work in those spaces, Steve said.

"In the design phase, occupants partner with designers on how the room will be used," he said. "We took them on fieldtrips inside and outside Sandia and looked at team rooms great and horrible. Horrible ones are designed by committee with no user input. There's no infrastructure, they don't serve (employee) needs."

Agile workspaces are based on the principles of the Agile movement that began in 2001. Two movement principles that seem to fit the Sandia experience: "The most efficient and effective method of conveying information to and within a development team is face-to-face conversation." And, "The best architectures, requirements, and designs emerge from self-organizing teams."

A small Sandia team was responsible for the design and construction of the space using Agile principles. Steve credits his management chain for their support. The rooms were officially dedicated by Advanced Science and Technology Associate Labs Director and Chief Research Officer Susan Seestrom in late December.

Leadership Roundtable

Sandia research in spotlight at 2020 California Council on Science and Technology Week

By ***Paul Rhien***

Integrated Security Solutions Associate Labs Director Andy McIlroy participated in the 2020 California Council on Science and Technology Week in Sacramento in February.

Andy took part in the CCST Leadership Roundtable, where leaders from California laboratories and academic research institutions met with high-level California officials to discuss how science and research can help inform state policy. State leaders participating in the meeting included Natural Resources Secretary Wade Crowfoot and Governor's Office of Planning and Research Director Kate Gordon.

Discussion at the meeting focused on the collective impact science and technology have in California. The event provided an opportunity to highlight the broad technological capabilities of Sandia and the other California labs and share how they can help the state address its many energy, environmental and homeland security challenges.

SPOTLIGHT ON SCIENCE — Associate Labs Director Andy McIlroy joined leaders from other California laboratories and academic research institutions at a roundtable with high-level California officials to discuss how science and technology can help inform state policy. **Photo by Will Bucquoy**

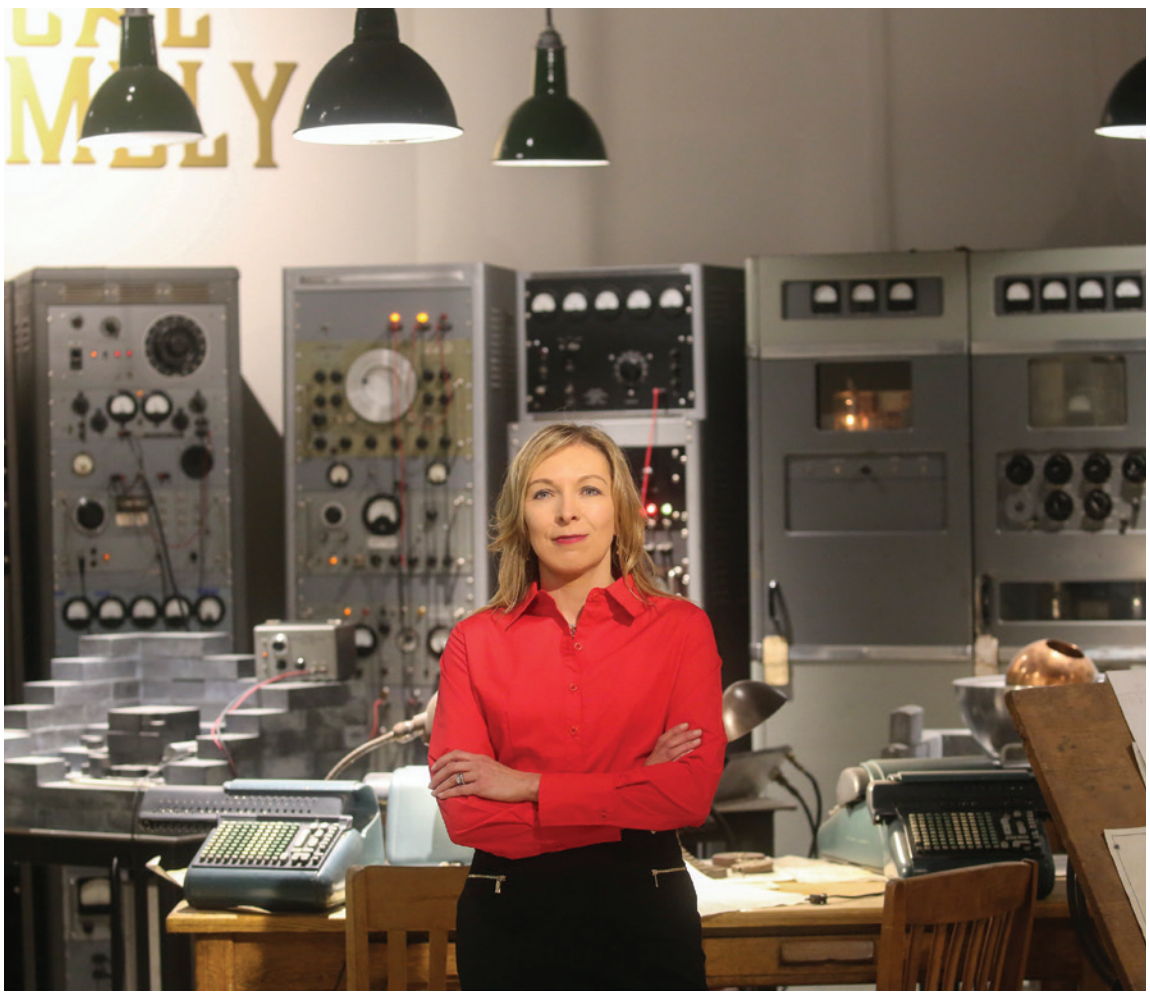
Topics discussed at the roundtable included:

- California's vision for carbon neutrality
- Workforce development that supports an innovation economy in the Central Valley and other regions
- Health and socioeconomic impacts of the state's vision
- Science and technology support for the ideas and goals discussed at the meeting

CCST is a nonpartisan, nonprofit organization established by the California State Legislature in 1988. The council engages leading experts in science and technology to advise state policymakers, ensuring that California policy is strengthened and informed by scientific knowledge, research and innovation.

Sandia leaders honored for diversity efforts

Marcey Hoover and Ireena Erteza named Women Worth Watching



MENTORING LEADERS — Marcey Hoover, Sandia's energy and homeland security program management director, has been named a Woman Worth Watching by Profiles in Diversity Journal. **Photo by Lonnie Anderson**

By ***Valerie Alba***

Two Sandia leaders have been recognized as Women Worth Watching by Profiles in Diversity Journal for their leadership in advancing diversity and inclusion in the workplace. The award recognizes "dynamic professional women who are using their talents and influence to change our workplaces and our world."

Marcey Hoover, Sandia's energy and homeland security program management director, and Ireena Erteza, distinguished electrical engineer in advanced exploitation and human-systems integration, were among the 166 women selected in 2019. For nearly two decades, the publication annually has honored women around the world in all areas of employment for their career performance, character and integrity.

Dedicated to mentoring

Marcey was a first-generation college attendee. "I was wickedly good at math, and it was easy for me, but as a young child I had a family that entertained my interest in books and math and solving puzzles and doing things that maybe they weren't familiar with," she said. "They fostered it, but, to be honest, up until I got into college and progressed, I did not have strong mentors that were saying 'Marcey, you're good at math; how about a career in math?'"

During an undergraduate internship in General Motors' statistics group, she worked with a University of Tennessee professor who opened her eyes to new possibilities.

"My family would have defaulted to me being a math teacher, which is a fine profession, but they didn't know you could be an engineer or a statistician or something else," she said. "I was fortunate that I had this set of mentors at General Motors that got me excited about applying math and statistics to engineering problems, and that was how I got interested in the application to engineering, like we do here at Sandia."

Inspired by that experience, Marcey has dedicated much of her time to mentoring young women in the community. She has volunteered with the Big Brothers Big Sisters Mentor 2.0 program for seven years, mentoring a student through high school and college. She also is supporting a "live-and-learn" initiative at Purdue University, where data science students live together in a dorm, take classes together and collaborate on Sandia projects.

Marcey also mentors colleagues at Sandia. "I invest a fair amount of my time mentoring, especially female leaders at Sandia, so I have typically maintained about a dozen mentees who are women looking to move up, primarily within some of the technical tracks in Sandia. I try to devote a lot of my personal time to mentoring leaders here at Sandia, but also mentor the next generation moving up."

Marcey sees the Women Worth Watching recognition as a way to further her mentoring efforts at Sandia. "What this award means to me is support from Sandia — that Sandia and the other national labs want myself and other women to be out there and be visible and seen to internal and external audiences.

"It also gives me a way to talk to my mentees. I forwarded them the booklet that's online with the stories about women who are everything from CEOs to deep researchers and people who are working in public service. It's a highlight of the different tracks women have taken and their successes."

As energy and homeland security program management director, Marcey divides her time supporting the energy and homeland security portfolio and serving as the deputy director of Sandia's California site. She has held management and staff positions across the Labs.

She earned her bachelor's degree in mathematics from Michigan State University and her master's degree and doctorate in mathematical statistics from Purdue University. She was the first American woman to earn a doctorate in statistics from Purdue.

Advocating for young engineers

Ireena also has made mentoring and outreach a priority throughout her career. She mentors young engineers at Sandia, along with professionals and many students at all levels (high school through graduate students) in the Albuquerque community. Passionate about promoting diversity and inclusion in STEM, and also promoting engineering as a creative, fulfilling career, Ireena frequently gives inspirational technical and career talks while recruiting new talent at various universities.

"I definitely want to be available for younger women engineers, so I go out and actively seek to mentor there, but I also offer mentorship regardless of gender and ethnicity, just because I feel very passionate about helping young folks navigate what it means to be an engineer and what it is to have a research career and be at Sandia," she said.

"I'm heavily involved in mentoring, but I am also involved in and emphasize 'being an advocate.' It's different than being a mentor. An advocate will advocate for the particular person they're sponsoring and help other people take chances on that person."

Ireena is a distinguished member of the technical staff focused on research in synthetic aperture radar. In just the past three years, her groundbreaking work has earned her the Technology All-Star Women of Color STEM Outstanding Achievement Award and a University of New Mexico Distinguished Alumni award, and in 2017, she was named Asian American Engineer of the Year.

The Women Worth Watching award, however, holds a different meaning for her.

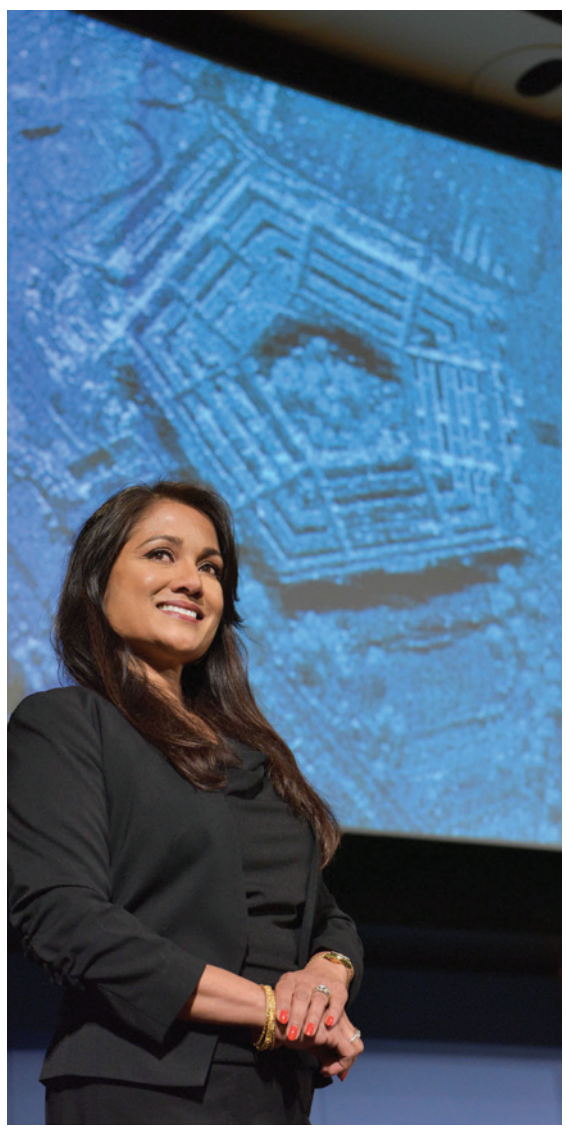
"This award gives me a platform to champion a cause I am very passionate about, and that will help spread the word so we can improve the workplace for the new crop of engineers and scientists," she said.

"My other awards were based on my technical expertise/legacy, and several of them were akin to career or lifetime achievement awards. This award, however, recognizes my leadership role and impact in addressing serious and important issues in the workforce, not just making an impact on tough technical problems. It is exciting to be recognized for my role and leadership in this area that is not part of my main research efforts."

Ireena was nominated for the Women Worth Watching award by former Deputy Labs Director Dave Douglass after she initiated a project to increase career growth opportunities for women and minorities in technical fields at Sandia.

Ireena earned her bachelor's degree summa cum laude in electrical engineering from UNM and her master's degree and doctorate from Stanford University.

Each honoree was invited to write an essay about a topic important to them. Ireena described a data-driven approach to increasing diversity and inclusion representation in the technical career pipeline, and Marcey shared the importance of mentoring in empowering and encouraging women to pursue careers in STEM. Their essays are available at diversityjournal.com.



STEM DIVERSITY CHAMPION — Distinguished electrical engineer Ireena Erteza has been named a Woman Worth Watching by Profiles in Diversity Journal. **Photo by Randy Montoya**

Can the U.S. make bioweapons obsolete?

Sandia experts help set vision to reach ambitious goal

By ***Paul Rhien***

As the threats posed by bioterrorism and naturally occurring infectious disease grow and evolve in the modern era, there is a rising potential for broad negative impacts on human health, economic stability and global security. To protect the nation from these dangers, Sandia has partnered with the Council on Strategic Risks to take on the ambitious goal of making bioweapons obsolete.

In August 2019, Sandia hosted Making Bioweapons Obsolete, the first in a planned series of workshops designed to bring together government, national laboratories, academia, industry, policy and entrepreneur communities to address the challenges of mitigating and eliminating the risks of bioweapons.

Sandia and the CSR recently released a report, Making Bioweapons Obsolete: A Summary of Workshop Discussions, outlining the discussions and recommendations that came out of the first workshop. The report captures the strategic vision the working group laid out to achieve its ambitious goal.

Anup Singh, Sandia director of biological and engineering sciences, said addressing the rising threats bioweapons present across the U.S. and around the world will require using strategy, technological advances, policy and other tools.

"This is an extremely interesting time in biotechnology, with the revolutionary advances in genome editing, synthetic biology and convergent technologies such as artificial intelligence and robotics," Anup said. "Academia and the private sector are driving a variety of biotechnology innovations, and it is imperative that we engage them in solving the problem together with the traditional national security partners."

BUSTING BIOWEAPONS — Leaders from government, national laboratories, academia, industry, policy and entrepreneur communities participated in Making Bioweapons Obsolete, the first in a series of workshops planned by Sandia and the Council on Strategic Risks.
Photo by Dino Vournas

Drawing on the cross-discipline expertise of the working group, organizers aim to better understand the threat and how technology can both increase and mitigate the risk. The report focuses on identifying solutions that offer the biggest return and influencing national leadership to engage with academia and industry and provide attention and resources to the issue.

Biothreat moonshot

"We need a moonshot-level, inspirational goal regarding biological threats," said Andy Weber, CSR senior fellow. "When we convene top experts to explore the concept of making bioweapons obsolete, we are usually met with great enthusiasm and a feeling that the United States can really achieve this vision.

"Indeed, it is largely an expansion on the work the U.S. government has accomplished to date in addressing smallpox threats to America with an extensive vaccine stockpiling system and its development of vaccines for viruses such as Ebola."

Covering a wide range of considerations that must be addressed, the report:

- Provides insights on key technological trends.
- Raises questions about the data and information access required to rapidly characterize and respond to biological attacks and outbreaks.
- Explores in-depth market and supply-chain dynamics.
- Points to significant U.S. government capacities that can be used and expanded, including the country's vast testing and evaluation infrastructure.
- Highlights the need for academic and private-sector experts to coordinate outreach and education for policymakers.
- Drives home the critical importance of U.S. leadership.

Sandia Associate Labs Director for Integrated Security Solutions Andy McIlroy said the workshop is the beginning of an important conversation in tackling the ambitious issue of eliminating or significantly reducing biothreats.

"With increased commitment, time, resources and leadership, we can make further strides in meeting this bold target," he said. "I hope that we can continue this discussion to create a united, national vision that meets the urgency of the moment."

Future workshops will continue the wide-ranging discussion focused on engaging in a national dialogue and promoting better public-private collaboration on this grand mission. Sessions will focus on man-made threats from weapons of mass destruction, as well as the risks posed by advances in technology.

The CSR is a nonprofit, nonpartisan security policy institute devoted to anticipating, analyzing and addressing core systemic risks to security in the 21st century, with special examination of the ways in which these risks intersect and exacerbate one another. Visit the Janne E. Nolan Center on Strategic Weapons to learn more about the CSR's program to make bioweapons obsolete.

SANDIA CLASSIFIED ADS

The March 27 Lab News will be the special Labs Accomplishments issue, and will not include classified ads.
The classified ad submission deadline for the April 10 issue is noon Friday, April 3.

AD SUBMISSION GUIDELINES

AD SUBMISSION DEADLINE: Friday noon before the week of publication unless changed by holiday.

Questions to Michelle Fleming at 505-844-4902.

Submit by one of the following methods:

- **EMAIL:** Michelle Fleming (classads@sandia.gov)
- **FAX:** 505-844-0645
- **MAIL:** MS1468 (Dept. 3651)
- **INTERNAL WEB:** Click on the News Tab at the top of the Techweb homepage. At the bottom of the NewsCenter page, click the **"Submit a Classified Ad"** button and complete the form.

Due to space constraints, ads will be printed on a first-come, first-served basis.

MISCELLANEOUS

SNOW THROWER TRACTOR ATTACHMENT, 42-in., 2-stage, new, $650; inverter generator, Champion, portable, 3100-W, $650; in East Mountains. Willmas, djwillmas@gmail.com.

SECURITY DOOR, w/custom profile of Sandias, 35" x 80", $699; La-Z-Boy couch, perfectly kept, $750; 2 360-swivel rockers, $350 ea. both green microfiber. Roesler, 734-474-9330.

TIMESHARE, 2 miles outside Winter Park, CO, July 24-31, sleeps 6, $650/wk. Buck, 505-353-2667.

ROCKER/RECLINER, La-Z-Boy Astor, power leg lift, light blue, new $1,600, asking $600; Kennedy club chair & ottoman, $675 new, asking $300; Morrison, 505-850-0401.

TEAC REEL-TO-REEL (needs belt), turntable, tuner amp, tapes, instructions, electric typewriter, make offer. Williams, 505-271-4902.

JOGGING STROLLER, Double Bob Revolution, navy, $375; cloth diaper bundle (BumGenius, FuzziBuns), $100. Carlson, 505-259-4070, ask for Rachel.

WHEELS, '20 Toyota 4Runner, OEM, aluminum/black, set of 4, $450. Hennessey, 505-506-7936.

PITCH FORK & SICKLE, full size, antique, rustic farm equipment, used for home décor, photos available, $150. O'Grady, 720-587-9857.

EXTERIOR SLIDING GLASS DOOR, glides horizontally, w/1 operating panel & 1 stationary panel, $125 OBO. Montoya, 505-342-0043.

SPRING CONCERTS, Young At Heart, Bar-D Wranglers, 2 & 7 p.m., March 27, Del Norte Church. Martin, 505-858-3009.

NIKON CAMERAS: Coolpix P510, P7000, w/batteries, charger, $120 ea.; others available, digital p/s, Nikon F5, large format. Wolfgang, 505-414-1483.

CINDERBLOCK PAVERS, 16" x 8" x 2", gray or rust-colored, 4 pallets, free. Hamilton, 505-379-0339.

TRANSPORTATION

'18 NISSAN NV HIGH-ROOF CAMPER VAN, small fresh water system, solar power system w/2K inverter, bed-over storage. Breden, 505-604-0063.

'20 NISSAN ALTIMA SR, AT, dark blue, black leather, only 302 miles, 36 mo./36K miles warranty, $20,000. Dwyer, 505-249-6935.

'06 PORSCHE CAYENNE TURBO SUV, AT, AWD, navigation, multi-CD Bose stereo, sunroof, adj. suspension, stunning. Embry, 505-205-2618.

'15 VW GOLF GTI, Autobahn, DSG AT, 4-dr. hatchback, white, 1 owner, 52K miles, excellent condition, $14,900. Baca, 505-322-8999.

'78 OLDSMOBILE DELTA 88, 5.7L diesel, <60K miles, original, very clean, 30-mpg, $4,500. Wilson, 206-240-2402.

'05 HYUNDAI SONATA, V6, blue, low mileage, 44K miles, good condition, some work needed, paperwork available, $2,785. Cantrell, 505-688-0343.

RECREATION

'07 TRIUMPH BONNEVILLE, black, Epco pipes, K&N air filter & jet kit, Racetech gold valve kit & springs in forks. Citrin, 505-235-9858.

'10 HONDA SABRE 1300, 14K miles, excellent condition, $4,500 OBO. Meyer, 505-263-2766, ask for Todd.

'01 MACGREGOR 26X SAILBOAT, well-equipped for lake or coastal cruising, tandem-axle trailer, electric trailer dolly. Kercheval, 505-266-5833.

REAL ESTATE

3-BDR. HOME, 2 baths, ~1,550 sq. ft., in Volterra, bigger corner lot, stainless appliances, grass, available April 6, $250,000. Martin, 623-687-7673.

3-BDR. HOME, 1 bath, new throughout, NE schools, to-code plumbing, electrical, new appliances, no asbestos, no lead paint. Keliiaa, 505-363-5461.

4/5-BDR. HOME, 2-1/2 baths, ~2,875 sq. ft., active/passive solar, updates, near base, off Ridgecrest, FSBO, owner will show. Dinge, 505-818-8933.

WANTED

VOLUNTEERS, help rescued cats, Fabulous Felines charity, fabulousfelines.org. Stubblefield, 505-263-3468.

ROOMMATE, non-smoking, close to base, Mirabella, available April 1, private bath. Rader, 505-821-1375, no texts, just voicemail.

HOST INTERNATIONAL HIGH SCHOOL STUDENT, w/AFS. Hiebert-Dodd, 505-296-1158.

AD RULES

1. Limit 18 words, including last name and home phone (web or email address counts as two or three words, depending on length).
2. Include organization and full name with ad submission.
3. Submit ad in writing. No phone-ins.
4. Type or print ad legibly; use accepted abbreviations.
5. One ad per issue.
6. The same ad may not run more than twice.
7. No "for rent" ads except for employees on temporary assignment.
8. No commercial ads.
9. For active Sandia members of the workforce and retired Sandians only.
10. Housing listed for sale is available without regard to race, creed, color or national origin.
11. Work wanted ads are limited to student-aged children of employees.
12. We reserve the right not to publish any ad that may be considered offensive or in poor taste.

Mileposts

New Mexico photos by Michelle Fleming
California photos by Randy Wong

Tad Ashlock 30

Mark Harris 30

Victoria Getts 20

Lisa Kreiner 20

Kristy Martinez 15

Jennifer Perea 15

Monica Price 15

Recent Retirees

New Mexico photos by Michelle Fleming
California photos by Randy Wong

Jim Daniels 39

Cliff Renschler 38

Aaron Hillhouse 35

Tom Laub 34

Gina Deola 26

Woody Woodstra 21

Revee Bailey 15

Brain imager

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But Sandia is using alternative sensor technology that works at room temperature, eliminating liquid helium and the rigid design requirements it imposes.

Accurate, reliable sensors

In the recent paper, the Sandia team showed that its system, based on a kind of quantum sensor called an optically pumped magnetometer, or OPM, pinpoints brain signals with the same accuracy as a commercial, superconductor-based machine. Measurements made by each system were less than a centimeter apart. This research was also funded by the National Institutes of Health.

"We have demonstrated a functional brain-imaging system, using our quantum sensors, that is as reliable as a commercial superconductor-based system," Amir said.

He credits the cross-disciplinary resources of a national laboratory to achieve the sensor's high accuracy. The Sandia team designed, built and calibrated their sensors in-house, rather than buying commercial ones.

Information travels through the brain by electrical currents. Sandia's sensor uses a laser to turn rubidium gas into a tiny cloud of atomic magnets that, when in a magnetic field, spin like tops.

With Sandia's current apparatus, a patch of these sensors is placed directly against the person's head, inside a magnetically shielded tube resembling an MRI scanner. A second laser measures changes in the cloud to infer a naturally occurring but barely perceptible magnetic field immediately outside the person's head, created by the electrical currents in the brain. Finally, the magnetic field map is inverted to give the location of brain activity.

In the future, wearable version, more than 20 sensors will map the magnetic field over a portion of the brain, and the array will be housed inside a magnetically shielded room instead of a tube to allow the subject to move.

"We are working to redesign our sensors and then scale up from six sensors to 27 sensors to give 108 OPM channels around the head," Peter said. "We will essentially remake the whole system."

SIGNING CEREMONY — From left, Sandians Janette Meacham and Abraham Ellis; University of Puerto Rico, Mayagüez, Chancellor Agustín Rullán Toro; and Sandians Carol Adkins and Tito Bonano met to sign a 10-year Cooperative Research and Development Agreement between Sandia and UPRM at a Feb. 25 ceremony in Puerto Rico.
Photo courtesy of University of Puerto Rico, Mayagüez

Puerto Rico CRADA

CONTINUED FROM PAGE 1

"We are honored to consolidate our efforts with Sandia National Labs through this collaborative alliance that represents the first CRADA-type agreement signed at a Puerto Rican university. It is a validation of the capacity and talent of our professors and students to find solutions on such an important issue in our country, such as renewable energy," UPRM Chancellor Agustín Rullán Toro said.

Specific areas of interest for this collaboration include re-electrification of remote communities and development of next generation microgrids for rural communities, industrial parks and critical loads. The work also will advance computer simulations of energy technologies on grid-scale before integrating them into a physical system.

An additional research focus will examine the life cycle of energy components and systems from production to use and final disposition. The goals are to develop innovative materials, fabrication methods and recycling strategies to reduce the total waste from energy systems and increase their long-term sustainability.

This agreement continues a decades-long series of relationships between Sandia and the university. Efrain O'Neill, an electrical engineering professor at UPRM, is the latest researcher from the university to spend a year at Sandia working with colleagues.

The university also is a strong source for well-educated students and Hispanic engineers, Tito said. A summer internship program, started in 2017 to brings students and professors to Sandia from primarily Hispanic-serving institutions, including UPRM, was recently extended through next summer.

Engineering students visit CRF

Story by ***Michael Ellis Langley***
Photos by ***Dino Vournas***

Livermore High School science teacher Karen Fletcher and 12 sophomore students from the Green Engineering Academy got to see applied science in action during a Feb. 19 visit to Sandia's California campus.

The students received a briefing from engineer James Siacunco, who talked about Sandia and his career path to the Livermore site, followed by a tour of two labs at the Combustion Research Facility.

Engineer Ethan Hecht explained how he uses lasers to perform hydrogen safety tests to design safe storage options so companies can expand hydrogen-fuel-cell filling stations throughout the state.

Researcher Chuck Mueller gave the students a tour of the optical engine lab used to test conditions inside cylinders during combustion.

"My students and I were pleasantly surprised to see the researchers working on clean energy for cars and trucks," Fletcher said. "In the Green Engineering Academy at Livermore High School, students learn about clean and renewable energy and how engineering can improve our world."

Fletcher said her students enjoyed hearing about Chuck's tests of ducted fuel injection, which promises to all but eliminate soot in diesel engines.

"Seeing the real-life applications of the science in products that could shape our world is really important," she said.

Kayla Norris from Sandia's Community Relations team coordinated the event to expose local students to the work being done at the Labs.

"It is so important that we connect with our communities," Kayla said. "These students represent not only the scientists and engineers who will shape tomorrow through their achievements, but the adults with whom we will collaborate to make our community better."

Fletcher said she was grateful for Sandia's partnership, and added that her students had expressed interest in an internship with Sandia when they get older.

"The tour of Sandia is really important for my sophomores because they are just starting to consider what to study in college," she said. "Now they can begin to process this before they apply for college."

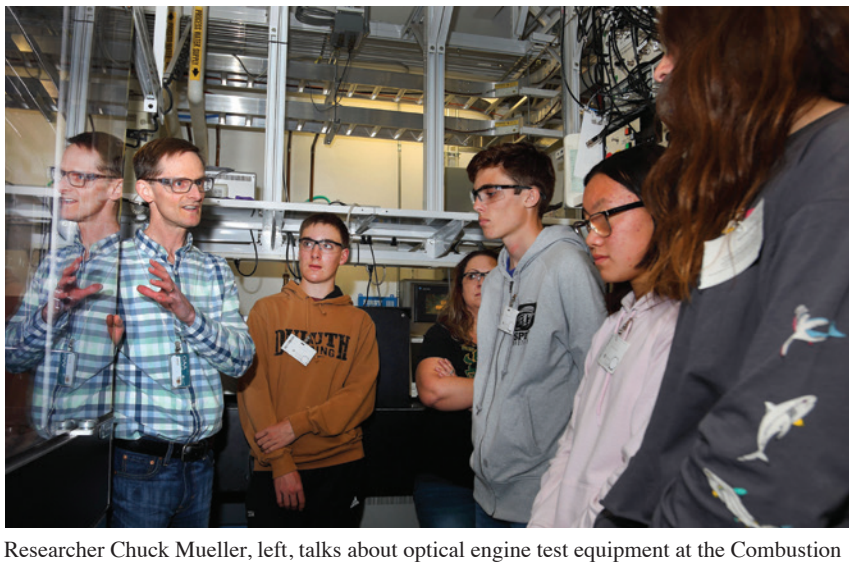
Researcher Chuck Mueller, center left, describes how he uses the optical engine in Sandia's Combustion Research Facility during a visit by teacher Karen Fletcher, right, and her students from Livermore High School's Green Engineering Academy.

Students from Livermore High School's Green Engineering Academy listen to Sandia engineer James Siacunco talk about his career at the Labs.

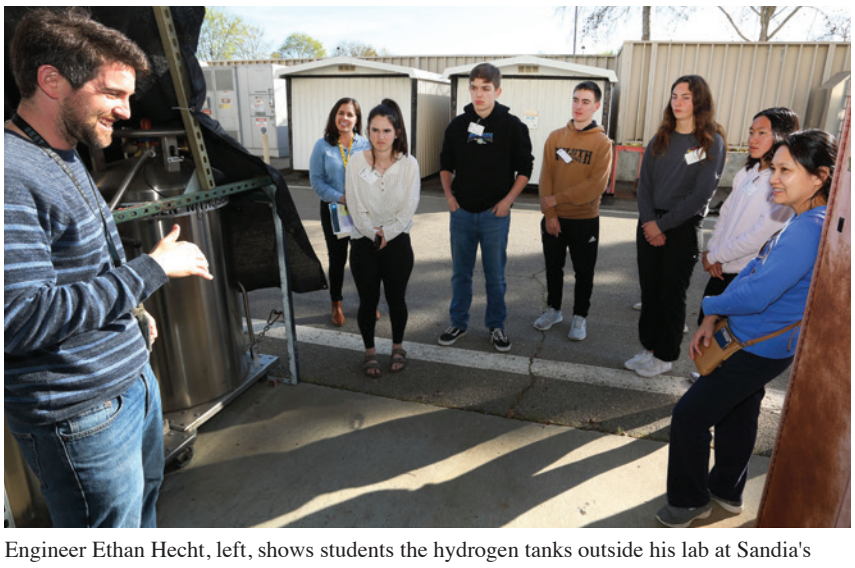
Students from Livermore High School's Green Engineering Academy enter Sandia's Combustion Research Facility during their Feb. 19 tour of the California campus.

Engineer Ethan Hecht, left, smiles at a question from a student during a hydrogen lab tour.

Engineer James Siacunco talks with students from Livermore High School's Green Engineering Academy about what it takes to become a Sandian.



Researcher Chuck Mueller, left, talks about optical engine test equipment at the Combustion Research Facility.



Engineer Ethan Hecht, left, shows students the hydrogen tanks outside his lab at Sandia's Combustion Research Facility.