SANDIA LABNEWS
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Society of Women Engineers honors three Sandians
Pages 4-5

Flight test succeeds despite pandemic limitations

Virtual support from Sandia enabled B61-12 flight test on F-35A jet fighter

CHALLENGE MET — This F-35A jet fighter carried a non-weaponized test unit as part of a B61-12 Life Extension Program test flight successfully completed through virtual means established by Sandia to confront COVID-19 pandemic challenges. (Photo from previous flight.)

SUCCESSFUL FLIGHT — Sandia developed virtual means to pull off a B61-12 Life Extension Program test flight completed by this F-35A jet fighter. The test took place earlier this year at Edwards Air Force Base. (Photo from previous flight.)

Photos courtesy of Lockheed Martin Corp.

*By **Michael J. Baker** and **Whitney Lacy***

Overcoming COVID-19 pandemic challenges through virtual means, teams from Sandia and the U.S. Air Force under the guidance of NNSA performed a critical B61-12 flight test aboard the F-35A Lightning II jet fighter.

The flight test at Edwards Air Force Base in the California desert took place in April and was needed to validate software and firmware changes in preparation for future development and flight tests, said Sandia manager Dan Brown. Attached to the F-35A was a non-weaponized Compatibility Test Unit, which simulates a weapon's functionality before release and captures data for later analysis without being dropped from the plane.

Sandia is the design and engineering lab for non-nuclear components of the nation's nuclear stockpile and has weapon system integration responsibility. Flight tests, like with the Air Force's F-35A Lightning II, are an essential part of the B61-12 Life Extension Program to refurbish, reuse or replace all components; extend the bomb's service life by at least 20 years; and improve its safety, security and effectiveness.

Because of the COVID-19 pandemic, the flight test almost didn't happen. Sandia developed virtual methods to keep things on track at the request of the Air Force's F-35 Program Office, Dan said.

"Given the travel limits at the beginning of the pandemic, we had to come up with nontraditional, out-of-the-box ways to fulfill our mission," he said. "We were able to come up with a way to mitigate the risk of COVID-19 to the health and wellbeing of our team and others involved in the test. With the virtual setup, there was less of an opportunity for anybody to get sick and a greater opportunity for success."

Cancellation concerns

As the COVID-19 pandemic grew, the F-35A teams were concerned the flight test might be postponed. Delays to the test could push back other schedules and possibly have budgetary impacts and other ramifications across the Nuclear Security Enterprise. With NNSA's approval, the teams immediately got to work on finding a solution.

— CONTINUED ON PAGE 3

R&D 100

— Pages 6-7

Meet Harold Yeldell

Sandia welcomes new infrastructure operations associate labs director

*By **Tim Deshler***

Harold Yeldell has made a career in nuclear power that started when he enlisted in the U.S. Navy right out of high school. Born in South Carolina, he has lived and worked in many places, and has accrued an impressive list of achievements. Now, to cap off his career, he's making his home in Albuquerque as Sandia's new associate labs director for infrastructure operations.

Harold didn't have the resources for college after high school, so he joined the Navy, but at the end of his first year, he was offered a chance to apply to the U.S. Naval Academy. Few people go from the enlisted ranks to the academy, but he was determined to go into submarines and knew getting into the academy was his best shot. He was accepted and chose marine engineering as his major because it was the closest thing to nuclear power they offered.

Harold worked hard at the academy, attending summer school every year to lighten the load during the school year. "I believe in laying out a plan — sticking to the plan and executing it in order to get the things that you want," he said. "There wasn't 10% of my class that got selected to go into submarines, and I wanted to be part of it so I worked and set my plan so I could do that."

His planning paid off. After graduating and completing the Navy's nuclear power school, Harold was assigned to a submarine. "You can't just sign up to volunteer and go into submarines," he said. "You have to go through a series of interviews and be selected by the Admiral himself. The brightest and best went into submarines, and I wanted to be part of that."

— CONTINUED ON PAGE 10

NEW LEADERSHIP — Harold Yeldell joined Sandia in late September as the new associate labs director for infrastructure operations. **Photo by Lonnie Anderson**

LABNEWS Notes

LaFleur featured on DOE Women in STEM site

Six burning questions for internationally recognized Sandia fire expert

By ***Sarah Jewel Johnson***

Sandia engineer Chris LaFleur is an internationally recognized expert in fire risk and is responsible for the Labs' fire risk program. She leads a team of experts that evaluates fire risks associated with hydrogen, nuclear and other emerging technologies. She has been recognized for her achievements by DOE's **Women @ Energy: STEM Rising** website, which honors women in STEM fields throughout the DOE complex.

In 2017, Chris was one of 10 recipients who earned a **Clean Energy Education & Empowerment Award** from the Women in Clean Energy Symposium, in partnership with the MIT Energy Initiative and Stanford University's Precourt Institute for Energy.

Chris has a bachelor's degree in geology and mechanical engineering from the University of Rochester, a master's degree in fire protection engineering from the University of Maryland, and a doctorate in manufacturing engineering from the University of Michigan. She is a licensed professional engineer and serves as chair of the National Fire Protection Association 2, Hydrogen Technologies Code, and as a principal member of the sprinkler discharge criteria committee of NFPA 13, Standard for the Installation of Sprinkler Systems. She also serves on the Hydrogen Safety Panel under the American Institute of Chemical Engineers Center for Hydrogen Safety.

Chris recently was interviewed for her feature spot on the DOE Women @ Energy website.

FIGHTING FIRE WITH SCIENCE — Sandia engineer and internationally recognized fire risk expert Chris LaFleur stands in front of a liquid hydrogen tank at the NASA engine test facility in Mississippi. She has been recognized by DOE's Women @ Energy: STEM Rising website. **Photo courtesy of Chris LaFleur**

Q Describe your current role at Sandia. What is the main purpose and mission of your work?

I lead a team of engineers who conduct fire risk analyses for emerging technologies. This work allows us to examine new technologies like hydrogen-fuel-cell vehicles, airplane and trains to identify risks and hazards so they can be engineered to be as safe as possible. This enables these new technologies to be developed and reduce carbon emissions, as well as reduce our reliance on fossil energy.

Q What inspired you to work in STEM?

I have always wanted to be an engineer because I love solving problems, and I wanted to work on problems that are important, like enabling energy solutions.

Q What excites you about your work at DOE?

Hydrogen-fuel-cell vehicles are really exciting to me because they eliminate the pollutants from combustion-based transportation modes.

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

Make women doing this work more visible. If younger kids don't know that this work exists and that women are succeeding at it, they won't do it.

Q What tips do you have for someone looking to enter your field of work?

Find your niche. Mine is fire protection engineering. Become an expert in it, then branch out to get some breadth of knowledge. That makes you more successful, no matter what topic you study.

Q When you have free time, what are your hobbies?

I am a woodworker. I make furniture, turn bowls and pens and have recently started hand-carving wooden spoons. I also have a new puppy that I am training.

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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.

Advancing nuclear security education

Sandia and UNM partner to help students develop practical skills

NUCLEAR NUMBER-CRUNCHERS — Attendees at Sandia's **2018 International Training Course** practiced accounting for nuclear materials. Sandia is building a new graduate-level program with the University of New Mexico to extend similar resources to students and working professionals. **Photo by Randy Montoya**

By ***Troy Rummler***

Radioactive materials are attractive targets to thieves and other bad actors. These are rare finds, valuable on the black market and easy to weaponize. New security professionals rarely learn practical skills for protecting these targets until they are on the job at nuclear power plants, research reactors, processing plants and other nuclear facilities.

"There is a need to have students who are technically trained in nuclear security before they work at a laboratory, a government agency, or at a commercial nuclear facility," said Alan Evans, a Sandia nuclear engineer.

Alan and his Sandia colleagues are teaming up with their counterparts at the University of New Mexico to create a new approach to teaching nuclear security. Their goal: create a one-of-a-kind graduate-level program — one that has access to two national laboratories — that focuses on technical skills in education, research and professional development.

Sandia and UNM signed a memorandum of understanding in September that outlines the creation of such a program over the next five years. They have financial support from NNSA's Office of International Nuclear Security.

Hyoung K. Lee, professor and chair of the UNM Department of Nuclear Engineering, said his hope with the new agreement is to create more robust opportunities for current and future nuclear engineering students at UNM.

"UNM has such a phenomenal resource right in its backyard with Sandia, so it makes sense to maximize that proximity by creating a partnership that will truly enhance students' education," he said. "We are very excited to be developing this program that we feel, with Sandia's collaboration, will offer UNM students an incredible advantage in the nuclear security field."

Nontraditional challenges

At the core of the team's vision is a pedagogical shift toward engineering.

"There are other university programs in nonproliferation and nuclear security — some of which Sandia already works with — but a lot of these classes focus on policy and concepts," Alan said. "So, we had to ask ourselves: How can we better prepare the next generation of experts to apply traditional engineering capabilities to nontraditional challenges facing nuclear security for tomorrow?"

Adam Williams, a Sandia systems engineer who has supported several educational initiatives, says the answer lies in forming the right team. He helped create the education program at the Gulf Nuclear Energy Infrastructure Institute at Khalifa University of Science and Technology in Abu Dhabi, has served as a technical consultant on a nuclear security graduate program being piloted at Ukraine's Kiev Polytechnic Institute, and has lectured at multiple universities on security topics.

"We have a rare opportunity with UNM to create a robust, technical education program to bolster nuclear security around the world," Adam said.

Nuclear security is one of Sandia's core research missions. For more than 70 years, the Labs' primary work has been engineering the **non-nuclear components of nuclear weapons**. But corollary to this work, Sandia has had to keep these weapons and components secure. Through generations of research and practice, Sandia has grown into one of the world's **foremost authorities** on securing nuclear and radiological materials against would-be thieves or saboteurs.

"We are building on decades of expertise at both institutions to transform nuclear security from an art to a science," Adam said.

If successful, the new program will create a pipeline of professionals with knowledge, skills and abilities that shortcut years of on-the-job training — making their positive impact at nuclear facilities more immediate and long-lasting, and broadening their employment opportunities. Coursework also will better prepare nuclear engineering students to consider security when they design new energy, defense and medical technologies.

Additionally, Sandia will provide resources for the future Advanced Nuclear Security Summer School, a three-week, intensive professional development course to be hosted at UNM. The summer school will concentrate course materials for global industry executives and university professors, and will be taught at a level appropriate for mid-career professionals.

"UNM is helping us create a new mechanism to enhance nuclear security capacity across the globe," Adam said.

Flight test succeeds

CONTINUED FROM PAGE 1

Travel restrictions due to COVID-19 and a 14-day quarantine requirement before visitors could enter Edwards Air Force Base complicated Sandia's need to be onsite during the flight test. Typically, Sandia personnel prepare and oversee the use of the Compatibility Test Unit while on-site. The team also conducts post-flight information downloads and reviews at the base.

Two alternatives were considered. The first option involved quarantining a Sandia team member at home and securing a direct flight from Kirtland Air Force Base to Edwards. However, traveling between states could still increase the risk of COVID-19 exposure and would have been extremely costly in terms of the dedicated flight between the bases.

The teams went with the second option: asking for an exception to onsite requirements, conducting virtual training of the Edwards F-35 team and allowing Sandia participation through virtual means. This option left the possibility that damage to equipment or the ability to conduct troubleshooting of the B61-12 test unit would be unaddressed.

Virtual training by Sandia engineers enabled the Edwards team to prepare and validate the safety and readiness for flight of Sandia's B61-12 test unit, Dan said.

"It's a solid relationship we've built over several years. The team at Edwards has a lot of experience, which greatly facilitated our ability to pull off the test."

Virtual training, successful test

Sandia developed new electronic training materials, and training activities were completed on April 20. The Edwards team said it was ready for the mission. Three days later — the day of the originally scheduled flight test — Sandia had created and delivered electronic procedures and a video demonstration to enable post-flight data download and delivery to the Labs.

"We virtually walked the team at Edwards through how to power on the data recorder in the Compatibility Test Unit and then how to download the data and send it to Sandia for analysis," Dan said. "We were able to show them how our specific hardware worked."

On April 24, with Sandia personnel on virtual standby to assist, the F-35 Captive Carry Flight Test No. 6 with a B61-12 Compatibility Test Unit onboard successfully completed its mission without issues.

The success of this flight test, despite the constraints associated with the COVID-19 pandemic, demonstrated Sandia's clear passion for mission success, Dan said. "Successfully completing the flight test shows how we were able to balance the health and safety needs of team members with meeting the needs of our nuclear deterrence mission, in this case by keeping the F-35 program moving forward."

Society of Women Engineers honors three Sandians

By **Laura Sowko**

Sandia researchers Christina Beppler, Ireena Erteza and Anne Grillet have earned 2020 Society of Women Engineers awards honoring "the successes of individuals who enhance the engineering profession and advocate for women in engineering through contributions to industry, education and the community."

Christina Beppler

Christina Beppler, an analytical chemist in explosives technologies, is Sandia's first recipient of SWE's Work/Life Integration Award, recognizing her "leadership and initiative in establishing a program of forward-looking benefits that demonstrate an understanding of work and life integration."

In 2015, Christina's work/life balance changed profoundly with the birth of her first child. That year, she co-founded what is now the Sandia Parents Group. Born out of the New and Expectant Parents group and starting from emails and informal meetings at lunch where new parents shared their experiences, SPG has grown into a formally recognized Employee Resource Group with more than 430 members.

"Many new parents tend to be early-career at the same time," Christina said. "Parents realize they need more support, especially those without extended family nearby. Going to work, picking up their kids, going home and putting the kids to bed can be isolating, leaving little time for social connections."

SPG advocates for working parents in four main areas: benefits and leave, workplace lactation accommodation, flexible work policies and childcare. The group offers parents a place to discuss ideas and issues, find resources and be reminded that they are not alone.

"The overall goal for SPG is to engage and retain working parents at Sandia across the workforce," Christina said, adding that "parents can be the least engaged group of employees." Flexible and remote work options are critical to keeping people at Sandia, and in turn, reducing the cost of attrition.

Until 2019, Sandia did not have paid family leave, so Christina analyzed data from a 2018 SPG membership survey and co-authored a white paper on the benefits of paid family leave for employees and the business case for Sandia. The white paper was shared with Sandia Women's Action Network, Sandia Women's Connection in California, other resource group members and Sandia leadership.

Sandia began offering paid family leave in January of 2019, and thanks to SPG's role in socializing the benefit, 400 employees had used it within the first six months. The program benefits those who use it, and it also is a valuable employee recruiting and retention tool.

Christina and SPG also sought lactation accommodation for mothers returning to work. Sandia now has a corporate lactation working group and the first lactation accommodation policy. Sandia also has created private lactation rooms for nursing mothers across its campuses.

Most recently, SPG has been at the forefront for many parents with the onset of the pandemic. Christina said so many of the issues new parents face have been exacerbated by COVID-19.

"Sandia tends to hire people who do everything with exacting precision — they have to — and they carry that into the rest of their lives. We try to run life efficiently and COVID has toppled that," she said. "As engineers and knowledge workers, thinking is a lot of our output, and doing an analysis requires time. Time is now fragmented."

Christina said parents are stressed having schooling and work, creating two full-time jobs. Kids are stressed and having issues. They are routine-oriented, and this has been disrupted. There are no off hours anymore. SPG can't necessarily solve some of these issues, she said, but SPG has been supportive in providing a place for parents to commiserate, share ideas for coping and locate resources.

WORK/LIFE INTEGRATION — Sandia analytical chemist Christina Beppler has been recognized by the Society of Women Engineers for her "leadership and initiative in establishing a program of forward-looking benefits that demonstrate an understanding of work and life integration." **Photo by Brett Latter**

Christina said she is grateful for this award and feels privileged to have Sandia nominate her and for SWE to recognize her efforts.

"None of this would have happened without the support of the group and it has succeeded beyond my dreams," she said.

Ireena Erteza

Ireena Erteza has earned SWE's 2020 Advocating for Women in Engineering Award "for executing technical innovation and leadership, and for steadfast advocacy to empower women and promote diversity and inclusion in engineering and STEM."

In her 27 years at Sandia, Ireena has built a highly successful engineering career while being a devoted advocate for women in STEM. A distinguished member of technical staff, Ireena is a national expert in synthetic aperture radar algorithms and a processing systems architect. She uses her expertise and strong technical leadership to develop and execute projects with national impact.

"I have been so fortunate in my career to work in a number of intriguing, cutting-edge fields, from integrated optics, optical interconnects, high performance computing, ground sensor signal processing and SAR," Ireena said. "One thing that I have always loved is when you can bring together different research areas to achieve breakthroughs at the intersections.

"I have worked many years in the SAR field to gather and process information effectively in a different part of the spectrum than we see with our human eyes," she said. "Lately, I've been merging the areas of artificial intelligence and machine learning with my SAR expertise to make advancements toward intelligently incorporating vast amounts of unfamiliar information and distilling it into essential information for humans."

Ireena pays that love of engineering forward as she pursues her role as both advocate and mentor. "I am passionate about the need for both advocacy and mentorship. Mentorship is more about providing career advice, whereas an advocate knows you and your work, so that they can publicly support you and create opportunities or open doors for you," she said.

Mentors can be at any level, whereas an advocate has to be in a position of power to be able to provide advocacy. "It is important for people in more senior and leadership positions to aspire to advocate for diverse candidates. We will not make needed progress without advocacy from everyone," she said.

"I am passionate about diversity AND inclusion," Ireena said. Throughout her career, Ireena has endeavored to create inclusive environments in which everyone can be safe and be encouraged to bring their authentic self to work. "Without this, you can't have happy and comfortable teams, and without that, you won't have productive teams. We all need to be able to look forward to going to work."

While advocating for women and Black, Indigenous and other people of color is important to Ireena, she also is devoted to advocating for younger engineers, regardless of gender or ethnicity. "It has been so rewarding to make a palpable difference in the lives and careers of young students and people in our workforce and community. I take my role as a mentor and a de facto role model very seriously. I'd like to encourage others to take on these roles as it can be very gratifying."

Ireena also uses public platforms to highlight engineering and STEM as imaginative, philanthropic career paths. "I personally can't think of a better career — engineering is highly creative

ADVOCATING FOR WOMEN — Sandia electrical engineer Ireena Erteza has been recognized by the Society of Women Engineers "for executing technical innovation and leadership, and for steadfast advocacy to empower women and promote diversity and inclusion in engineering and STEM." **Photo by Lonnie Anderson**

PRISM AWARD — Sandia chemical engineer Anne Grillet has been recognized by the Society of Women Engineers for charting "her own path in the STEM fields by demonstrating a variety of outstanding career leadership activities in a technical field." **Photo by Lonnie Anderson**

and challenging, but it gives you the opportunity to build teams and work with others to make big differences in the world."

For the past two years, Ireena has been dedicated to improving opportunities for career growth at Sandia in both management and technical positions. "Leadership occurs in both the management and technical lines," she said. "In particular, distinguished members of the technical staff, senior scientists and fellows help set technical leadership direction for the Labs, our customers and our communities.

"We have development programs and growth opportunities for management, but we need similar programs and opportunities for technical leadership along the technical line. It's important for Sandia's future to give our young, strong technical staff the choice and opportunity for leadership development and growth in either the technical or management lines."

Anne Grillet

Anne Grillet, a distinguished member of technical staff, has earned SWE's 2020 Prism Award recognizing a woman "who has charted her own path in the STEM fields by demonstrating a variety of outstanding career leadership activities in a technical field."

The Prism Award is fitting for Anne, whose technical collaborations span Sandia's mission space from materials science, geosciences and energy to explosives and nuclear deterrence. She applies her agility in diverse technical disciplines and provides significant technical and programmatic leadership.

From 2014 to 2019, Anne assumed the role of program owner for the Aleph plasma physics code. An expert in chemical engineering, Anne partnered with Jeremiah Boerner and used her strong leadership skills in team building and technical versatility to rebuild the Aleph team after several key people left the project. Coming from a diverse background and having a fundamental understanding of physical processes allowed her to jump in.

"Engineering is, by definition, broad, and within chemical engineering, I took a lot of math and chemistry but also studied across other engineering fields like electrical and mechanical," she said.

Most recently, Anne has been working with Rekha Rao and Christine Roberts on a Laboratory Directed Research and Development project looking at how stress is formed in materials during phase changes. This fundamental research will impact new physical models.

"If you have epoxy curing, current computational models don't capture the transition from liquid to solid gracefully. You have to stop the simulation and say, 'fluid, you are now a solid.' We are trying to develop an understanding of phase changes, and on the experimental side, I am developing diagnostics to gather details for validation for computational models that can be used for applications in the future."

For Anne, transitions of another type have not slowed her down: those required by COVID-19 have kept her busy. As an experimentalist, she has spent more time on site while her husband, also a Sandia employee, works more from home. Her two kids doing school remotely can handle technology and work independently.

Anne said she spent the first part of the summer working with Martin Nemer on a Rapid Response Laboratory Directed Research and Development project decontaminating N95 respirators — looking at decon processes and how they affect mask fit and function — in partnership with the University of New Mexico Hospital. She said the work has been very satisfying but demanding, and she recognizes how different the impact of COVID-19 would be if she were in another phase in her parenting; if her kids weren't independent.

While Anne has worked across technical disciplines, she also has contributed to Sandia's strategic goals for diversity and inclusion. She chairs the Sandia Women's Action Network's Professional Development committee, helping connect Sandia's diverse workforce with internal and external resources for career advancement. She also has contributed her leadership skills to the Women in Chemical Engineering committee and Societal Impact operating council of the American Institute of Chemical Engineers.

Anne thinks the future for women at Sandia is a positive one. "Opportunities continue to be brighter and brighter for women, and having flexible work environments and the ability to be valued while you are taking advantage of a flexible schedule will contribute to gaining and retaining women in engineering."

Pandemic challenges, Anne believes, will likely be temporary, and the opportunities afforded women will continue to look more and more equal over time.

Although she has been in the same job for 19 years, Anne said the variety of her work gives her a wonderful sense of fulfillment. "There's the challenge of seemingly intractable problems, and you get to solve them. You help people accomplish goals and get where they need to be, and that is very satisfying," she said. "Science lets you appreciate the beauty of how everything is put together."

Sandia takes home six 2020 R&D 100 Awards

By **Neal Singer**

Physicists keep an eye on Nobel prizes; mathematicians, the Fields Medal. Inventors of useful programs and devices get their own moments of recognition when the **R&D 100 Awards** are announced each fall.

The contest — held and published annually since 1963 — is sometimes referred to as "the Oscars of invention." The winning lists are created by teams of examiners identifying the 100 most technologically significant products each year from an international pool of submissions sent in from government labs, universities and private corporations. The contest is sponsored by R&D World Magazine, the successor to R&D Magazine.

This year, Sandia researchers earned six awards — three as sole winners and three with partner organizations — bringing Sandia's total to **140 awards since 1976**.

Individual awards

HECATE: High-density Evaluator of Commercial-off-the-shelf Applications for Trust and Eff cacy

Principal Investigator: Vince Urias

The number of software supply-chain attacks has grown to an unprecedented degree over the past decade. HECATE, a software supply chain and assurance platform, reduces risks for commercial and open-source software users. The platform addresses these threats by creating virtual machinery modified to resemble physical devices. Selected software, along with patches and updates, are then installed and automatically observed in performance from the virtual machine.

The platform distinguishes between benign, anomalous and suspicious behaviors. Intruders set off an alarm if they include an unrequested update that changes a program's behavior or requests access to privileged features in the user's system. HECATE provides a testing ground that attackers can't detect and therefore can't lie to, offering a yardstick to determine how much trust to accord a new addition.

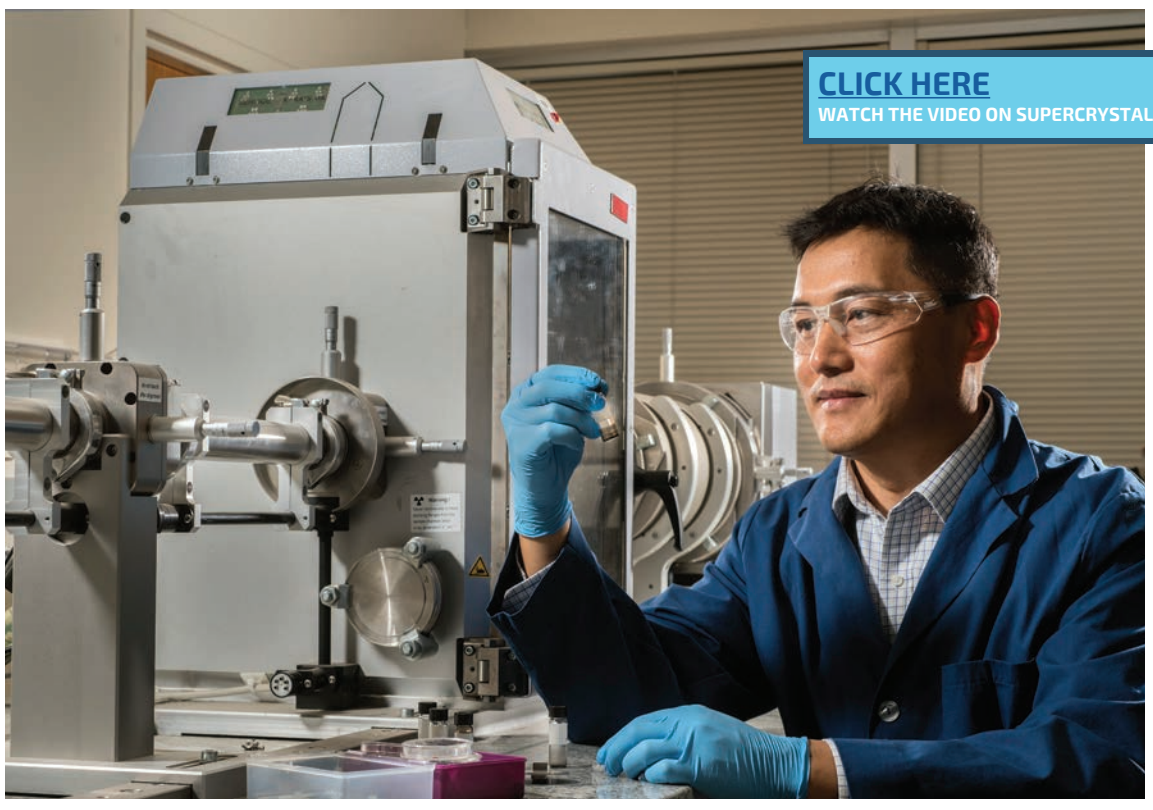
REDUCING RISKS — Sandia computer scientist Vince Urias and his team earned a 2020 R&D 100 Award for developing HECATE, a software supply chain and assurance platform. **Photo by Randy Montoya**

Binary Solvent Diffusion for Fabrication of Large Nanoparticle Supercrystals

Principal Investigator: Hongyou Fan

Researchers used nanotechnology and chemistry to self-assemble gold nanoparticles into millimeter-sized supercrystals that are very sensitive to chemical traces. Electromagnetic fields within the supercrystals produce superior sensing that correlates to the shape, size and density of packing.

An inexpensive, large-scale production method uses a simple solvent diffusion process for seeding and growth. The supercrystals obtained through this process also proved to have superior qualities in optoelectronics, photovoltaics and surface catalysis.



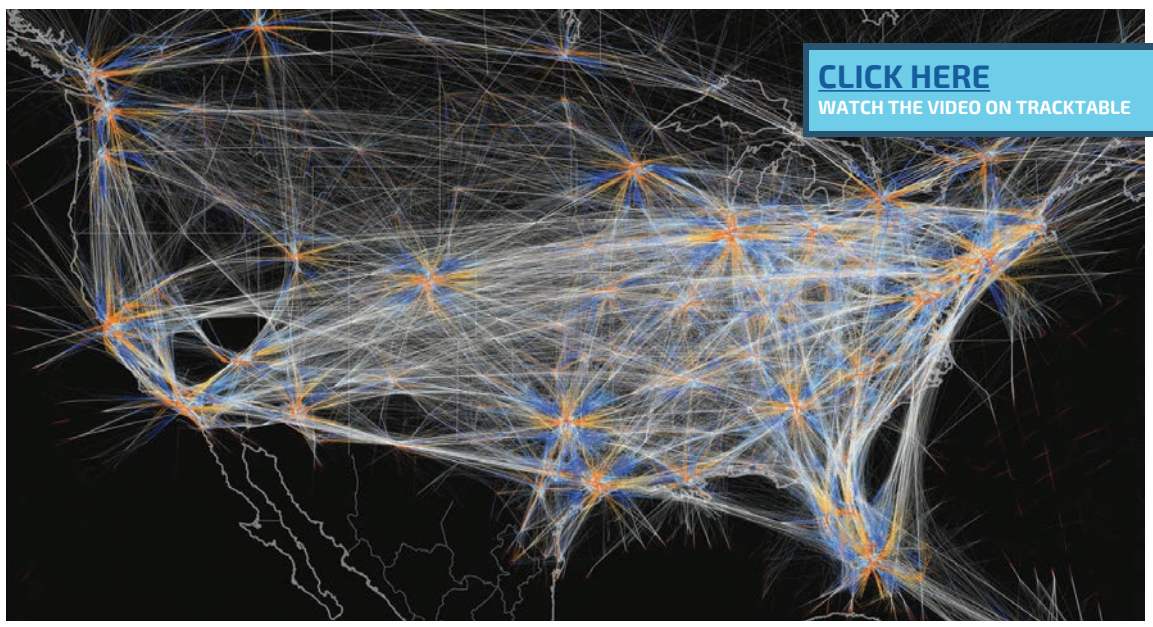
SUPERCRYSTALS — Sandia materials scientist Hongyou Fan and his team earned a 2020 R&D 100 Award for using nanotechnology and chemistry to turn gold nanoparticles into supercrystals for optoelectronics, photovoltaics and surface catalysis. **Photo by Randy Montoya**

Tracktable

Principal Investigators: Danny Rintoul, Andy Wilson, Chris Valicka

Tracktable applies advanced machine-learning techniques to large trajectory data sets, searching for shapes and patterns in space and time by providing a mathematical framework. The method organizes, searches and quickly analyzes millions of patterns, grouping similar shapes and extracting unusual trajectories without first requiring a definition of the term "normal," which might eliminate from consideration shapes worth studying.

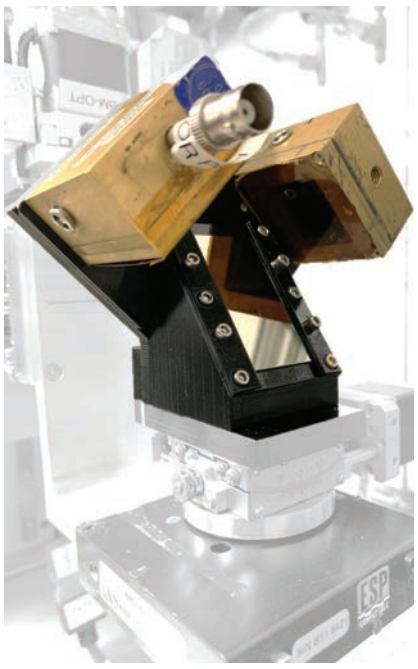
By treating time as a variable similar to space, Tracktable enables searches for collective behavior and patterns over long periods of time. Fast search techniques predict paths and destinations of moving objects by comparing observed paths to historical databases of trajectories.

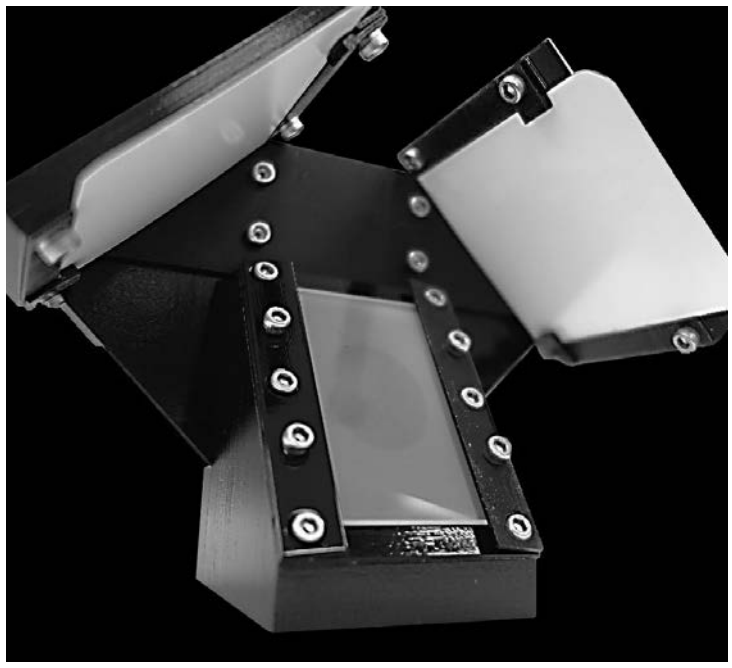


FINDING PATTERNS IN BIG DATA — This color map shows take-offs (red ends) and landings (blue ends) for all the flights in the U.S. from a single day. A Sandia team has earned a 2020 R&D 100 Award for creating Tracktable, a technology that uses machine learning to analyze large data sets. **Image courtesy of Andy Wilson**

PERFORMANCE BOOST — Sandia partnered with other organizations on the 2020 R&D 100 award-winning Legion programming system. Mechanical engineer Jackie Chen was Sandia's lead researcher on the project.

Photo courtesy of Sandia National Laboratories





BEAM SPLITTER — XRPBS, a joint effort led by the Nevada National Security Site, has won a 2020 R&D 100 Award. Shown here, the XRPBS with image plate detectors is prepared for measurements at Sandia.

Images courtesy of Matthew S. Wallace, Nevada National Security Site

Joint awards

Legion: A Data-centric Programming System
Lead organization: Los Alamos National Laboratory
Partner organizations: NVIDIA, University of California, Davis, Sandia National Laboratories, Stanford University, SLAC National Accelerator Laboratory
Sandia lead researcher: Jackie Chen

Legion is a supercomputing programming system that boosts application performance and speed by automating task scheduling and data movement. This type of automation is a basic need for computing at the exascale — performing a billion billion operations per second.

At Sandia, scientists used Legion to boost the performance of a complex multi-scale physics simulation known as S3D, a turbulence-reacting flow solver used to develop predictive models of better internal combustion engines. Legion enabled calculations capturing turbulence-chemistry interactions that were previously out of reach for S3D as well as scaling to over 10,000 nodes on the Titan supercomputer at the Oak Ridge Leadership Computing Facility, reducing the time to achieve results.

XRPBS: X-ray Polarizing Beam Splitter
Lead organization: Nevada National Security Site
Partner organizations: Sandia National Laboratories, Argonne National Laboratory, EcoPulse
Sandia lead researcher: Ming Wu

XRPBS is the first X-ray polarizing beam splitter. It separates an X-ray beam in two in order to measure each polarized beam simultaneously, a unique feature because it eliminates reliance upon source stability or repeatability. This diagnostic can be used for high-energy-density plasma investigations in addition to weapons-related work. It also can be used for material studies and X-ray beam manipulation on synchrotrons.

Measuring the polarization of X-rays provides information about electron beams and magnetic fields in X-ray emitting plasmas. The same process can analyze the magnetic properties of materials probed with radiation from advanced X-ray sources. XRPBS does this in a simple and accurate way by taking advantage of the simultaneous diffraction of an X-ray beam on pairs of internal planes in crystals with three-fold symmetry — a condition where rotating the crystal by 120 degrees around an axis produces an atomic arrangement indistinguishable from the original one.

When the X-ray beam is incident at the correct angle on two internal crystal planes, the diffraction process produces two beams perpendicular to the incoming one and to each other, and which have mutually orthogonal linear polarizations. XRPBS was developed by Radu Presura at the Nevada National Security Site in collaboration with Sandia, and its development was supported by Argonne National Laboratory. Sandia collaborators led by Ming Wu participated in the discussion of applications and in the crystals' characterization.

IDAES: Institute for the Design of Advanced Energy Systems Process Systems Engineering Computational Framework
Sandia Principal Investigator: John Siirola
Partner organizations: U.S. Department of Energy, National Energy Technology Laboratory, Carnegie Mellon University, Lawrence Berkeley National Laboratory, University of Notre Dame

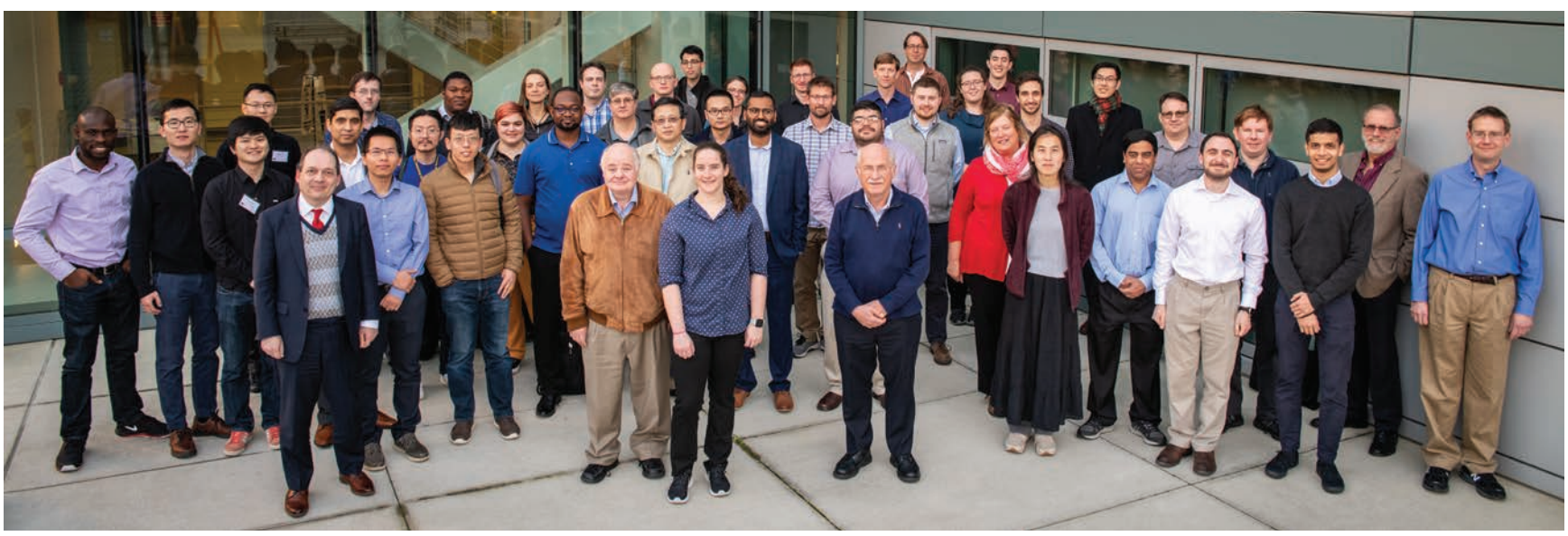
This framework is a comprehensive set of Process Systems Engineering tools supporting the design, modeling and optimization of advanced energy systems. By providing rigorous modeling capabilities, the IDAES Modeling & Optimization Platform helps energy and process companies, technology developers, academic researchers and DOE to design, develop, scale up and analyze new and potential PSE technologies and processes to accelerate advances and apply them to address the nation's energy needs.

John Siirola, Sandia project lead, said the IDAES Integrated Framework is based on and extends a Sandia-developed open-source modeling environment called **Pyomo**. IDAES has taken the core optimization capabilities in Pyomo and not only built a domain-specific process modeling environment, but also expanded the core environment into new areas, including logic-based modeling, custom decomposition procedures and optimization algorithms, model predictive control and machine learning methods.

"Perhaps the most exciting aspect of working on IDAES is how tightly integrated our team is," John said. "We have the privilege of working with some of the leading researchers in the field and have experts from all member institutions each engaged in virtually all aspects of the program."

ADVANCING ENERGY — Computer scientist John Siirola was Sandia's Principal Investigator on the 2020 R&D 100 award-winning IDAES project.

Photo courtesy of Sandia National Laboratories



INTEGRATED FRAMEWORK — A Sandia-led partnership has earned a 2020 R&D 100 Award for the IDAES computational framework. Members of the team from several organizations gathered in February for a group photo.

Photo courtesy of Lawrence Berkeley National Laboratory

Bo Song named Asian American Engineer of the Year

Mechanical engineer drives innovations at Sandia

ENGINEER OF THE YEAR — Sandia mechanical engineer Bo Song has been recognized as a 2020 Asian American Engineer of the Year by the DiscoverE Engineering Program.
Photo by Lonnie Anderson

By ***Luke Frank***

Sandia mechanical engineer Bo Song has been recognized as a 2020 Asian American Engineer of the Year by the DiscoverE Engineering Program, which honors outstanding Asian American professionals in science and engineering for their technical achievements, leadership and public service.

"This is a big honor for me," Bo said. "It's highly competitive within Sandia and nationally, so it's incredibly meaningful to me."

Bo was recognized for making outstanding contributions in impact mechanics, advancing experimental and diagnostic techniques in support of Sandia's missions, defense and national security programs. His groundbreaking work in experimental impact mechanics and the dynamic response of materials and structures recently led to the development of Sandia's Experimental Impact Mechanics Lab, which Bo manages.

"There are not many labs around the world that can do what we do," he said. "We're the world's leading facility in experimental impact mechanics. We developed the impact mechanics lab from a storage room and spent about a year to make it fully operational, and we continue developing new capabilities. We now cover most of the impact testing for all of Sandia."

Experimental impact mechanics

Bo has developed multiple new experimental capabilities for characterizing materials' response under extreme environments, including high-strain-rate, high-temperature complex stress states. Bo and his team also were recently awarded a patent for successfully developing an intermediate-strain-rate test apparatus that fills a critical mechanical test gap between conventional low- and high-strain rates. Bo's contributions have dramatically advanced experimental impact mechanics.

"Bo Song has consistently demonstrated the ability to develop innovative R&D solutions to solve some of the most challenging problems facing the nation's nuclear deterrence and defense missions," said Joel Lash, director of Sandia's Engineering Sciences Center. "In doing so, he has become a world-recognized leader in the areas of impact mechanics and dynamic response of materials and structures."

Over the course of this career, Bo has published a book, chapters for six other books, and more than 130 international peer-reviewed journal articles and conference papers. He also has submitted seven DOE technical advances.

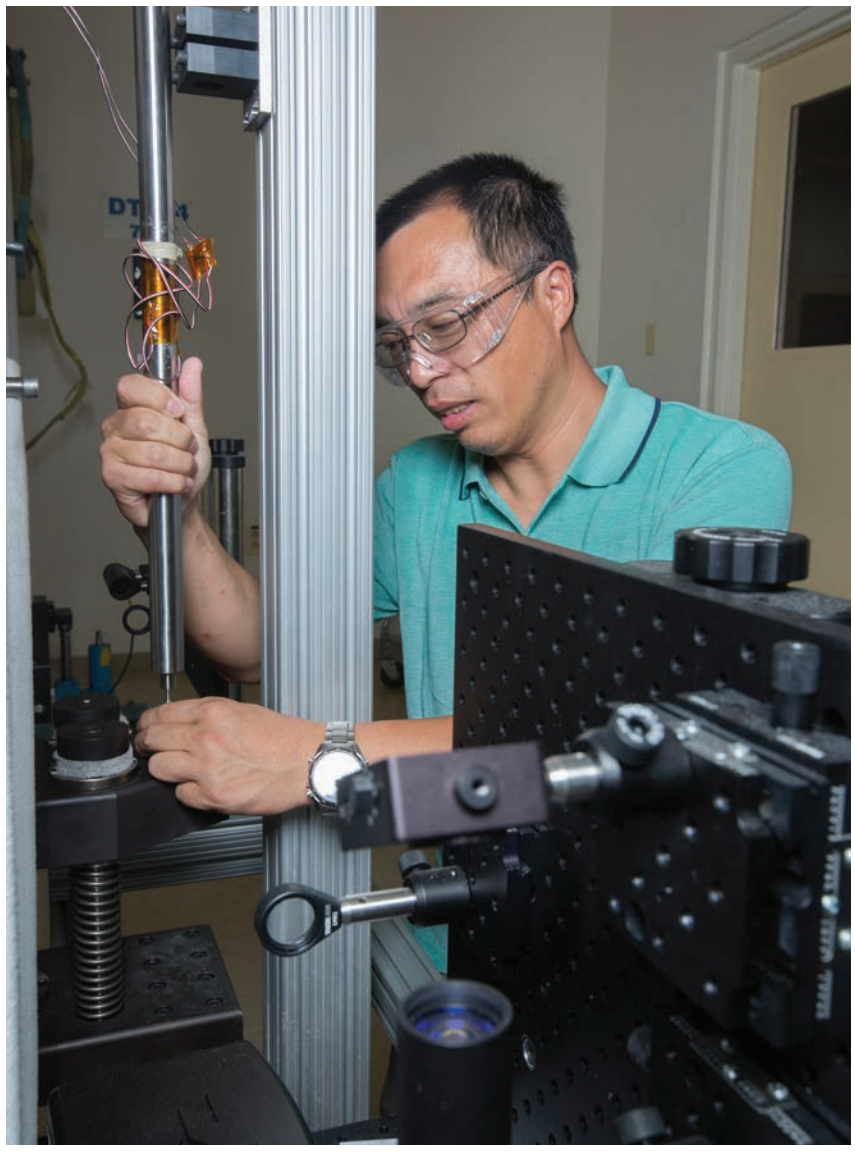
Leader, mentor, volunteer

Bo's activities stretch beyond his impact mechanics lab. He is a Fellow of the American Society of Mechanical Engineers, a founding senior member of the International Ballistics Society and a member of both the Society for Experimental Mechanics and National Defense Industrial Association.

He also has mentored numerous graduate and undergraduate student interns, postdocs, junior staff members and technologists to produce work that is well regarded nationally.

Bo is enthusiastic about volunteering in community service, particularly in support of youth in STEM activities. "I truly love engineering and want to share my passion for STEM with students," he said. Bo works with New Mexico students of all ages in regional and national Future City competitions, awards and STEM academic pursuits.

Since 2002, Asian American professionals from leading U.S. corporations, prestigious research institutions and the U.S. Armed Forces have been selected as recipients of this prestigious award.



DYNAMIC LEADERSHIP — Bo Song helped develop and now manages Sandia's Experimental Impact Mechanics Lab. **Photo courtesy of Bo Song**

SANDIA CLASSIFIED ADS

Note: The classified ad deadline for the Nov. 20 Lab News is noon Friday, Nov. 13.

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 to visit the News Center, then select Announcements >> Submit Announcement.

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

MISCELLANEOUS

STEAMER WARDROBE TRUNK, antique, DE Rose, original hangers, 4 drawers, shoebox, silver w/ blue interior, $125 OBO; Kennedy kits 520 machinist box, vintage, felt-lined, no key, missing front plate, $100 OBO. Morning, jelisea@aol.com.

COUCH, green, $100; glass-top coffee table; bdr. set w/mirror, call for details & photos. Dennett, 505-379-9971.

OLDER WOOD, well-preserved, various sizes, you load, come prepared, $40/truckload. Zelnio, 505-877-1465.

RECREATION

MOUNTAIN BIKE, 2015 Breezer Storm Expert hardtail 29er, size large frame, $325. Rodgers, 573-356-8914.

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.

Think 2 Up, Act 2 Over

Former Special Forces officer deploys Integrated Service Delivery to help Sandia deliver on the mission

By ***Ed Williams***

As a former Special Forces officer with more than 22 years of active duty, I had the honor and privilege of working with some of the most dynamic and high performing teams in the world. These teams are uniquely trained and organized to deliver on mission in unstructured environments, often with undefined problems and objectives. They realize success by rapidly organizing and taking responsibility to understand and shape the environment.

New to Sandia, not new to ISD

I joined Sandia's California Site Operations Center as a strategic planner almost a year ago, and **Integrated Service Delivery** was part of the conversation from the beginning. ISD felt very natural to me. In military service, we relied not only on the members of our immediate team, but also the support, planning and logistics teams that backed us up. Taking personal responsibility and teaming for mission success is a big part of why America is protected and represented by the most professional and effective military in history.

So when I got here, I was initially surprised to learn that some of my colleagues did not know where to begin with ISD. As time passed, I began to have an appreciation for the highly technical and specialized work many on our team perform daily, and it began to make more sense.

Think 2 Up: See the bigger picture

There's an approach that has worked for me in the military and at Sandia to see the bigger picture for mission delivery: Think 2 Up.

Simply put, Think 2 Up is viewing the project or task from a more strategic perspective. What would your leadership two levels up be asking?

Some of those question might be: What is the overall organizational objective? What is this project or task supporting? How would actions or decisions we make on this project support the objective and affect other parts of the organization?

The Think 2 Up approach is an empowering call to action. Two levels up is just far enough removed that it reveals the bigger picture without losing sight of the task at hand. It uncovers potential gaps, seams and collaboration and friction points. This contributes to a holistic understanding of the overall intent of the task. Understanding higher level intent gives integrators at all levels freedom of action to achieve larger organizational goals and objectives.

In an operations-and-services heavy environment, it is easy to get caught up in the day-to-day grind. Communicating and understanding the bigger picture encourages alignment across the organization and provides purpose in daily work.

Act 2 Over: Break down barriers

Simply put, Act 2 Over is following an operation, activity or action two steps beyond your direct responsibilities for the task. In a matrixed organization with multi-step processes that cross boundaries, this can be a challenge. This is the space where we break down barriers and team for mission success.

Communication and transparency are the critical components of Act 2 Over. Consider others involved in the project before and after. Where are the interfaces and handoffs? Ask, "How can I help set up the next team member for success, or take the burden off my customer?"

For example, when providing a service, activity or action, don't stop collaborating when your specific portion is complete. Rather, Act 2 Over, by following the process two more steps. So, not only are you focused on your portion of delivery, but also focused on the next integrators or customers down the line. Was the delivery made? Did it get to the right people? Did it achieve their desired outcome?

ISD IN ACTION — Sandia strategic planner Ed Williams, second from right, was deployed to Afghanistan while serving as a Special Operations officer. Ed attributes part of his success at Sandia to lessons he and his team applied while on active duty. **Photo courtesy of Ed Williams**

Generally, Act 2 Over is expressed by keeping continuous communication with the customer or team member to guarantee the product or service met the need and the expected results were realized. As you continue to Act 2 Over, you may identify a process flow that can sometimes involve reassuming a lead role in the process or even moving back a step.

Integrators must be sensitive to teammate's space and work to avoid the perception that they are taking over or don't trust the next person to get the job done. This friction is usually avoided through good communication. Colleagues may even embrace the Think 2 Up, Act 2 Over approach. Ultimately, the successful integrator strives for effective end-to-end delivery.

Putting it all together

I can think of a particularly painful administrative example where the "Think 2 Up, Act 2 Over" mindset would have helped. The IT department of our organization was replacing all computer systems. Our logistics department had to track and account for all the systems. The IT department was aware that the computers had been purchased, shipped and delivered with program money, but they were not aware of the logistics.

Under pressure to have the systems up and running, the IT department dove into replacing the old systems. Like Sandia, individual users were responsible to account for their computers. When the property accountability finally caught up with the IT installation, it was a mess. The new computer systems were spread out from central Europe to the Sahara without formal accountability protocols, and the old systems were equally as hard to find.

Ultimately, the computers were all accounted for, but it took about two months and a lot of work. Working closely, the IT and logistics departments established systems to prevent similar situations from happening in the future. If the team had taken a moment to Think 2 Up and understand the bigger picture of mission success, and then Acted 2 Over to ensure the computers weren't just installed, but accounted for, a true end-to-end solution could have been delivered.

The power to succeed

Bottom line, the principles of ISD executed by Think 2 Up, Act 2 Over are a proven path to success whether you are trying to accomplish a military objective, install a digital infrastructure that allows employees to work from home or supply labs and offices with needed equipment.

In my short time at Sandia, I've seen great examples of personal accountability and teaming for mission success. Sandians have been doing the most important work for our nation for more than 75 years, and it takes strong teams to get it done. In your day-to-day work, you're most likely already demonstrating these behaviors, which is important because ISD will be practiced across Sandia beginning in fiscal year 2021.

This means that many of us will be formally evaluated for demonstrating ISD values and behaviors and acting as integrators. While there are plenty of materials available to understand what an integrator is, I thought we all might benefit from understanding the Think 2 Up, Act 2 Over mindset that was so effective in my military career.

I hope this article has given you another tool for your integrator's kitbag to communicate to your teammates and leadership how you contribute to ISD and exceptional service in the national interest.

Sandia brings the magic to Science Fiesta

Annual fair for school children goes online

By ***Whitney Lacy***

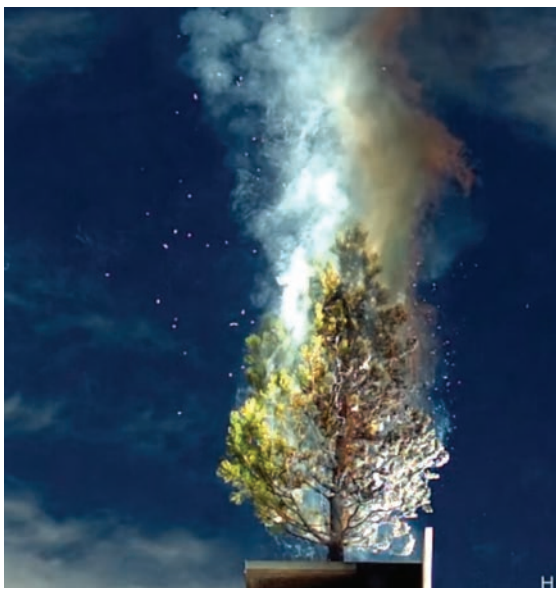
Last month, Sandia participated in the New Mexico Science Fiesta Expo, a weeklong STEM celebration hosted by Albuquerque's Explora Museum. This year, the event was held online because of the pandemic, but children of all ages from across the state were treated to live-streamed events from more than 80 contributors, including Sandia, the Albuquerque Public Library, Science Girl's Lab, and the University of New Mexico School of Engineering, among others.

The scheduled talks, demonstrations, tours and workshops were all held via Zoom meetings, and registered viewers were able to participate by asking questions during each live virtual event. The sessions were recorded so those who weren't able to attend a live event can watch the videos on the New Mexico Science Fiesta YouTube channel.

In one event, Sandia solar systems engineer Ken Armijo took participants on a virtual tour of the Labs' Solar Tower using Zoom technology and Google maps. When Ken showed a pre-recorded video of a pine tree being set afire by solar power, the Zoom board lit up with children excited to ask questions, which Ken happily accommodated.

Several Sandians, including chemist LaRico Treadwell, in the Advanced Materials Laboratory hosted The Magic of Chemistry, performing multiple live-streamed experiments, including fan favorites such as Fun with Luminescence, the Importance of the Catalyst, and the ever popular Mentos in Soda Explosion. The faces of wowed children on the Zoom screens was enough to make LaRico laugh out loud.

Participation in the Science Fiesta is yet another important link in Sandia's involvement with community events. For more information on upcoming educational events and volunteer opportunities, visit Sandia's Community Involvement website.



SOLAR POWER — Sandia systems engineer Ken Armijo shared a video with New Mexico Science Fiesta participants, showing a Christmas tree being set afire by solar power on top of the Labs' Solar Tower.

Image courtesy of the New Mexico Science Fiesta

Harold Yeldell

CONTINUED FROM PAGE 1

Service is a core value for Harold. "I believed in the mission," he said. "I believe all good sailors belong on a ship and all good ships belong at sea, so I went to sea. When I came back from my first deployment — I had been at sea for 120 days — a sailor getting ready to deploy had broken his leg, so they asked for volunteers and I went. I was home for six days and turned right back around and went out again."

Career in nuclear power

That focus on the mission has served Harold well throughout his career. After six years in the Navy, he went to work as an engineer in commercial nuclear power, where his determination and planning helped him rise through the ranks, landing positions with increasing leadership responsibilities.

Harold's first job after the Navy was the result of a chance encounter when his resume was left on a conference table and the vice president of the company happened by and picked it up. He had been the head of the Naval Academy when Harold was a freshman, and he remembered him. Harold was brought in for an interview two days later and was offered the job that day. He went to work at a struggling power plant, setting a plan in motion to turn it around and make it better.

Another opportunity arose when Harold went to work for Entergy, headquartered in New Orleans. The company's chief nuclear officer offered him the chance to get an MBA. Harold said he wasn't eager to go back to school, so it took some convincing, but he finally agreed. With no time to study, he took the MCAT the following week, applied to Tulane University and started classes two months later. His planning and hard work paid off once again when he earned his MBA.

One of Harold's career opportunities led him to Georgia, where he worked for Savannah River Nuclear Solutions, on the same site as Savannah River National Laboratory. "I worked on the operations and maintenance side for the Savannah River site. They're not set up the same as here," he said. "I didn't work for the lab, but I have experience working on all of the lab's projects in facilities, all of their renovations and set-up."

Other career highlights for Harold include consulting with Duke Energy in North Carolina, where he managed projects associated with power generation activities and supply infrastructure, and holding a leadership position at Exelon Nuclear in Pennsylvania.

Passion for service includes family, community

One of Harold's proudest career achievements came while he was working at the Savannah River site. The company made the decision to close down the Mox facility, laying off more than 1,000 people. The decision was announced in October, just before the holidays, so Harold made a plan and started expanding the scope of work for his team.

"With my little section — I only had 335 people in my organization at the time — I was able to hire 265 of the people who were laid off. I took on a lot more work and was able to increase the portfolio of my organization and procure more government contracts and DOE funding to bring on a lot of those people and minimize the economic impact for them and for the local economy," he said.

Harold is the proud father of two sons, Zachary and Matthew. Zachary just finished school and is a barber, and Matthew is studying accounting at Westchester University. Matthew was diagnosed with Asperger's Syndrome and when the family moved to Pennsylvania, he was not comfortable with change, so Harold maintains a home there so Matthew can stay in a stable environment while he finishes school.

Harold's passion for helping people extends to his community as well. He volunteers with organizations supporting Autism and Asperger's Syndrome, the American Heart Association and others. One of his most significant volunteer experiences is with the Domestic Violence Center of Chester County in Pennsylvania.

"I started volunteering at the center, and I worked my way up to the Board of Directors," he said. "We took people from emergency care and worked with them over the course of years to help them to be independent, get jobs and even go on to home ownership. I'm very proud of my work at the center."

Another of his volunteer efforts is teaching a Sunday School class for seniors. "I had a group of 17 people in Sunday School. I taught a class in Christian Life Development for mature adults (over 65), and that's one of the things I miss most in having moved away."

Looking ahead

Harold said the thing that surprised him most about Sandia is the openness of the people and their willingness to accept him. "Most of the places that I've gone to work, people have viewed me as an outsider," he said. "But the people at Sandia have been especially friendly and helpful. They have attempted to integrate me into the organization and make me feel comfortable."

Harold said he plans to continue the good work already in progress at Sandia, and to integrate himself and be part of the team. "There's good work here, there's good people here, and I hope I can come in and provide the direction and leadership to help the organization move forward," he said. "This isn't some tagline. I believe in the mission. I believe that people come to work every day to do a good job, and I want to be able to help the organization continue to do a good job and meet its mission and goals."

Q&A with Harold Yeldell

What's your favorite thing about New Mexico so far?

"The people and the climate. Fortunately, I've only run into people who have been willing to help. You can imagine coming to a new city, even with GPS, I can get lost and get turned around, so people have been very helpful in steering me in the right direction."

Red, green, both or neither?

"I am not a chile person, but I was given some green and red chile my first day on the job. That came from Security. My Security group let me know that if you're going to be here, you better learn to like green and red chile. It's an acquired taste, but I'm working on it."

What might people be surprised to learn about you?

"I'm actually shy, and it's hard for me to get to know people. I'm trying to get involved because I don't know anybody here. The openness of the land, the mountains that look like you could reach out and touch them — everything about this place is new to me, and I'm determined to make this work. This is the last job of my career, and I want to do well here."

What sports do you follow, and do you have a favorite team?

"My sons and I, we love to attend football and basketball games. Basketball is their favorite. We follow the Eagles and the 76ers because my sons still live in Pennsylvania. We love the local teams — we read about them, we keep up with them and we support them. So whenever the University of New Mexico gets back to it, I'll be cheering for them and going to games."

Who is your favorite author?

"Tom Clancy. Everything is personal for me — I like to have a personal connection, so I got a chance to meet him, and he signed some books for me. I like all the Tom Clancy books."

What's your favorite food?

"I'm a picky eater. I generally don't like things mixed together, so my favorite food, if I had to pick one, would be a pizza. I like pepperoni pizza."

Since pizza is your favorite, where do you stand on the pineapple question?

"No fruit on pizza!"

Final thoughts?

"I hope that people will give me an opportunity and get a chance to work with me and get to know me before casting any type of judgment one way or the other because I'm not from Sandia. I believe in treating people with respect, being fair, and giving them an opportunity, so I would hope that people would do the same for me."

Recent Retirees

Nick J. DeReu 38

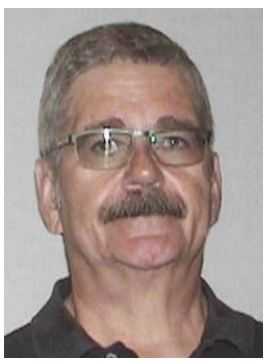
Mitch McCrory 34

Hans Oldewage 32

Glenn Jensen 30

Tina Stetson 15

Mileposts



Lonnie Martin 30

Curt Nelson 30

Elizabeth Sanchez 30

Sheila Pounds 25

Amalie Frischknecht 20

Ryan Halle 20

Holly Mendonca 20

Tony Silva 20

Steven Woodall 20

Michael K. Black 15

Nathan Glenn 15

Jacob Martinez 15

Rob Nelson 15

Lisa Ramirez 15

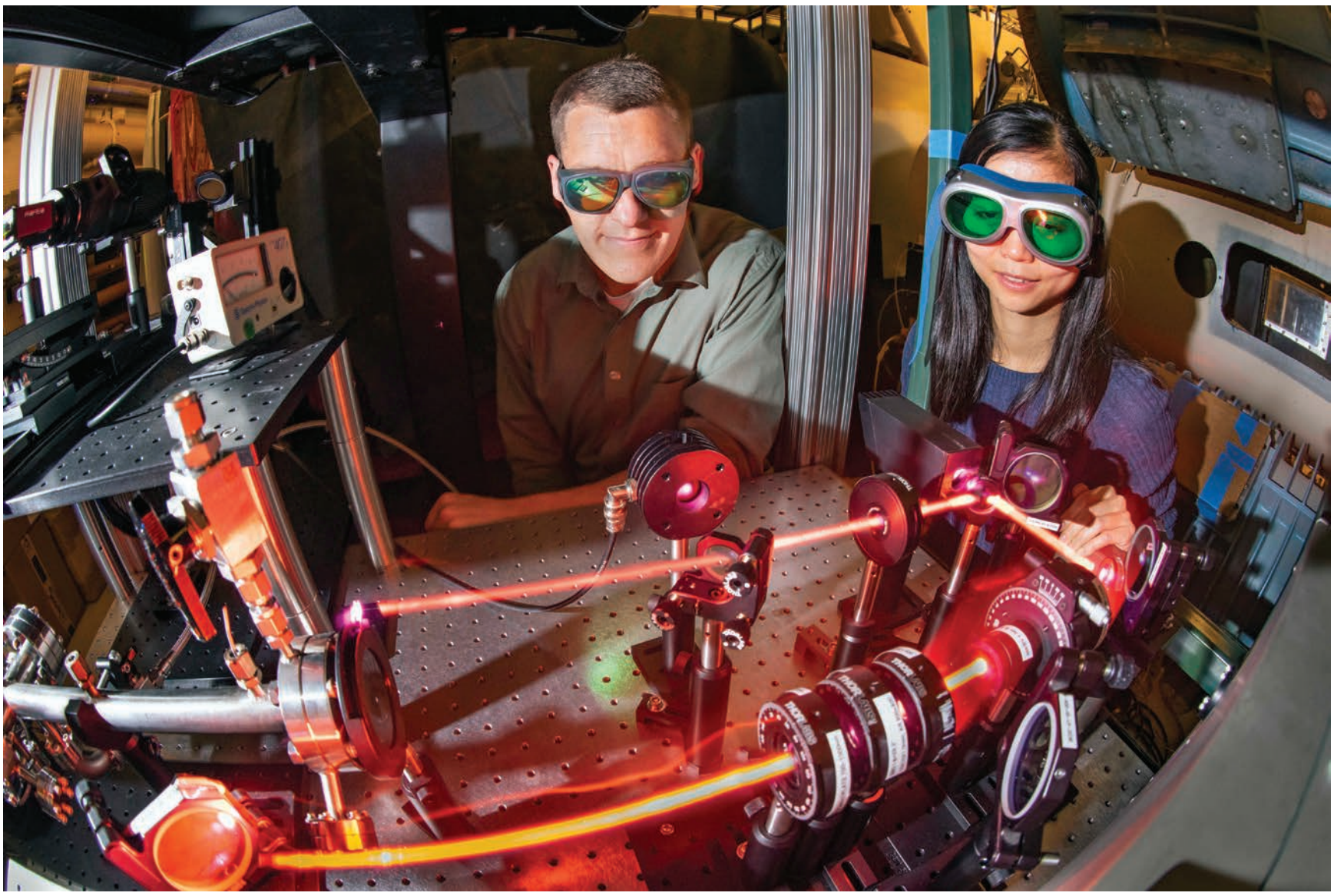
Assistant Secretary of Defense Hon. Vic Mercado visits Sandia

COMPLEX SYSTEMS — Assistant Secretary of Defense for Strategy, Plans, and Capabilities Hon. Vic Mercado visited Sandia's Albuquerque campus on Oct. 28 to receive an overview of the Nuclear Security Enterprise and gain an understanding of the complexity of nuclear weapons design and development. In addition to the briefings, Mercado and his delegation toured Sandia's MESA facilities and Weapons Modernization Lab.

Photos by Lonnie Anderson

MISSION PERSPECTIVE — Military Assistant to the Assistant Secretary of Defense CAPT. Jacob Foret, left, spoke with Labs Director James S. Peery during a visit to Sandia's Albuquerque campus on Oct. 28.

SASE honors Sandia and Tian Ma at annual awards



COMMITMENT TO DIVERSITY — Sandia has been named 2020 Organization of the Year by the Society of Asian Scientists and Engineers. Shown here, mechanical engineer Daniel Richardson and postdoctoral fellow Yibin Zhang observe a laser that records measurements in Sandia's hypersonic wind tunnel. **Photos by Randy Montoya**

Sandia named Organization of the Year, computer scientist earns professional recognition

By ***Luke Frank***

Sandia was named 2020 Organization of the Year in the government category by the Society of Asian Scientists and Engineers at its virtual national conference in October.

The award recognizes organizations with a longstanding commitment to cultural diversity and inclusion in the workplace. Nominees must demonstrate support, advocacy and services addressing the development and advancement of diverse populations with a focus on the Asian American/Pacific Islander community.

"It is evident that Sandia National Laboratories embodies the very reason SASE created this award category, and we are proud to bestow upon the organization this high honor," said Khánh Vũ, SASE executive director, in a congratulatory award letter from the society. "On behalf of SASE and all of its constituents, thank you for all that you and your team do to make a difference."

SASE told Labs Director James S. Peery that Sandia's passion for diversity stood out to the judges. "Being recognized for cultural diversity has special meaning to me and to the thousands of people who work at Sandia Labs," James said. "A diverse workforce helps us achieve our missions by bringing a variety of backgrounds and perspectives to the national security problems we solve. We strive to assure that every member of our workforce feels appreciated and that every voice is heard."

Sandia Chief Diversity Officer Esther Hernandez said, "We have a longstanding commitment to inclusion and diversity and believe that differences between people are a valued asset and, in fact, a business imperative in recruiting, hiring and retaining an exceptional workforce. Thanks to the great leadership and staff at Sandia for supporting an environment of inclusion for all of our employees."

Professional Achievement Award

At the same time, Sandia computer scientist and engineer Tian J. Ma was honored with SASE's 2020 Professional Achievement Award, given to mid-career professionals who have made significant discoveries and important advances in their chosen career paths and are acknowledged as leaders of large initiatives. James nominated Tian for the award.

"For more than 17 years, Tian has been a nationally recognized leader in remote-sensing systems. The capability of detecting objects of interest and tracking them as they move is vital to many critical and challenging national missions," James said.

Tian is a pioneer in the field of detection and tracking, delivering state-of-the-art algorithms to operational systems that have solved U.S. government technical challenges and provided new, needed capabilities that are critical to U.S. security. His work has resulted in numerous advancements in mission-critical capabilities and is being used within challenging, vital and lifesaving national security programs, James said.

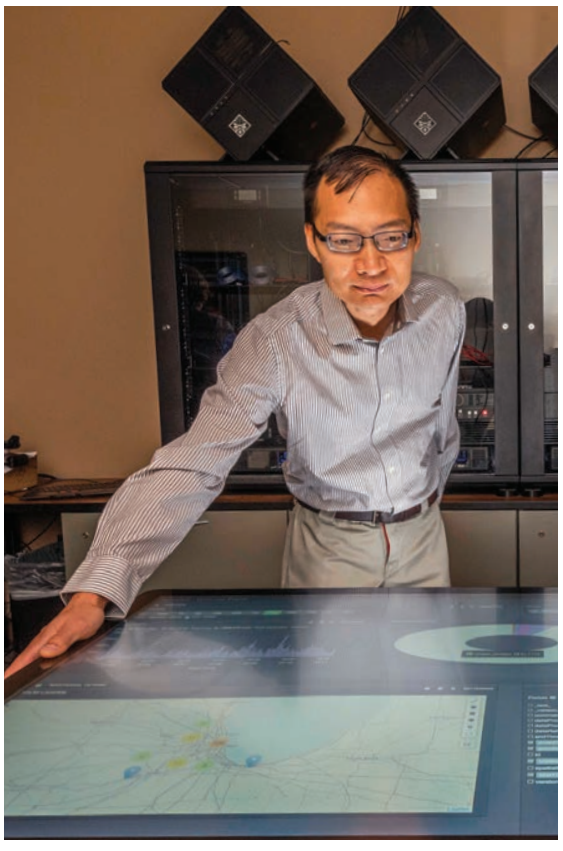
In addition to his high-level detection and tracking work, Tian has served as the co-chair and chair of the Asian Leadership Outreach Committee at Sandia for the past 10 years, and he has dedicated many volunteer hours to the Asian American/Pacific Islander community. Tian also has led the annual Asian Pacific Islander American Heritage Festival in Albuquerque.

Tian is a founding member of the New Mexico Future City Competition, started in 2014 and now serving more than 400 participants. This STEM event provides a national project-based learning experience for middle-school students to imagine, design and build cities of the future.

He also regularly volunteers as a science fair judge in local STEM competitions, and on weekends to support the Bernalillo County District Attorney's office with crime prevention by applying his scientific and technical knowledge in data processing.

"I am deeply honored to receive this award," Tian said. "I give much of the credit to my colleagues and leadership for encouraging my work at Sandia and supporting my efforts to be involved in my community."

SASE's mission is to prepare scientists and engineers of Asian heritage for success in the global business world, to celebrate diversity on campuses and in the workplace, and to provide opportunities for members to make contributions to their local communities.



REMOTE SENSING PIONEER — Sandia computer scientist Tian Ma has earned a SASE 2020 Professional Achievement Award, in part for his work in remote sensing systems.