



S A N D I A

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# Propelling wind energy innovation



**RENEWABLE ENERGY INNOVATION** — Sandia's Twistact technology proves beneficial in lowering costs, improving sustainability and reducing maintenance for next-generation direct-drive wind turbines.

Photo by Zhang Fengsheng

*Novel rotary electrical contact eliminates reliance on rare-earth magnets for large-scale wind turbines*

By **Paul Rhien**

**M**otivated by the need to eliminate expensive rare-earth magnets in utility-scale direct-drive wind turbines, Sandia researchers developed a fundamentally new type of rotary electrical contact. Sandia is now ready to partner with the renewable energy industry to develop the next generation of direct-drive wind turbines.

Sandia's Twistact technology takes a novel approach to transmitting electrical current between a stationary and rotating frame, or between two rotating assemblies having different speeds or rotational direction, ideal for application in wind turbines.

"Twistact originated by asking ourselves some really challenging questions," said Jeff Koplow, Sandia research scientist and engineer. "We knew it could be game-changing if we could find a way to get around the limited service lifetime of conventional rotary electrical contacts."

— CONTINUED ON PAGE 8

# Labs leaders answer staff questions

*Workforce urged to fill gaps in nuclear programs, point out what slows Sandia down*

By **Katherine Beherec**

**F**ollowing an all hands meeting in June about **accelerating nuclear weapons modernization**, Labs Director James Peery and the Sandia leadership team hosted a Q&A town hall on July 18 to address questions from the workforce. The conversation centered on changes to the international nuclear landscape, the importance of prioritizing nuclear deterrence work at the Labs and answers to practical questions from staff about achieving the goals that James outlined last month.

James reported that other nations have advanced their nuclear efforts since the all hands meeting June 23. Russia is beginning mass production of its Sarmat missile, and China completed a hypersonics test on an air-breathing engine on July 4. North Korea is preparing for a test, and Iran announced it could produce nuclear weapons whenever it chooses.

— CONTINUED ON PAGE 7



**ANSWER THE CALL** — Last week, Sandia Labs Director James Peery followed up his June 23 presentation with a Q&A about how the Labs will achieve the goal of accelerating nuclear weapons modernization.

Photo by Craig Fritz

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## LABNEWS Notes

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

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# Sandian honored for disability inclusion, advocacy

*Labs also recognized as a top employer for equal opportunity*

By **Luke Frank**

**S**andia Advanced Microsystems business lead Heather Spalding was recently recognized as an **Employee of the Year** by CAREERS & the disABLED magazine for her advocacy efforts, professional accomplishments, community outreach initiatives and more. In its 30th year, the award spotlights the professional and personal achievements of outstanding individuals with disabilities.

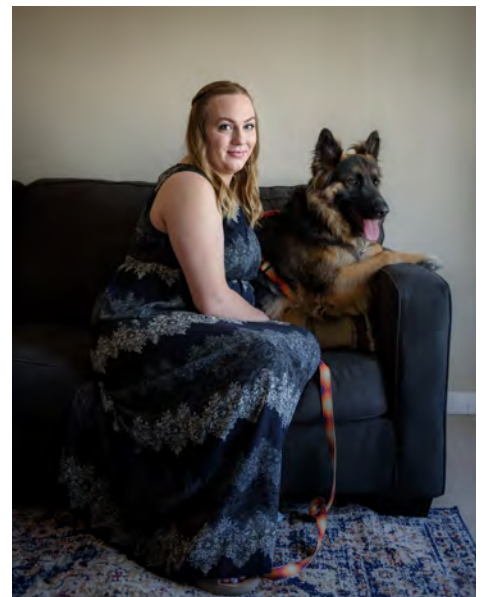
Heather works in Sandia's Integrated Business Management Center for the Advanced Microsystems and Quantum Sciences groups and recently was promoted to principal staff. By day, she

partners with leadership to provide project and financial management, as well as support for strategy, corporate policy, business needs and customer management. Heather also mentors several junior staff members and serves as an instructor for Sandia's business school, which helps train employees on financial management and systems.

In addition to her work duties, Heather advocates for diversity in Sandia's workforce, equality in corporate policy and how unique abilities help to create stronger, more effective teams.

"Heather actively serves as a member of her group's diversity and inclusion

— CONTINUED ON PAGE 9



**BOWIE KNOWS** — Outside of work and her community involvement, Sandia Advanced Microsystems business lead Heather Spalding enjoys working with Bowie, her service-dog-in-training, spending time with her husband, Cassidy, baking and reading.

**Photo by Craig Fritz**

# The moment is now

## Answering the call

### Sandians support national security mission

For this special section highlighting the Nuclear Deterrence Modernization Efforts Rally Cry, Lab News asked several of our fellow Sandians about their support of the mission and what it means to them. We got a lot of answers — many of which we highlight below and will continue to do so in future editions and online — that inspire thought, and hopefully action.

Featured are Sandians at different stages in their careers; there are those that have a history of military service, or family with service at Sandia; and many others from different backgrounds and doing various jobs.

They all have one thing in common: They are answering the call. As we all can. As we must.

Photos by **Craig Fritz**

#### Jose Villalva

*Functional Electrical Test Laboratory lead technologist  
12 years at Sandia*

Jose came to the U.S. shortly after graduating high school in Juarez, Mexico. He became a permanent resident in the 1980s, served in Iraq during Operation Desert Storm, then became a U.S. citizen.

Emphasizing his time in the Army 5th Battalion, 16th Infantry with the 1st Infantry Division, Jose said he has a deep appreciation of his Sandia job and its importance to national security.

“I love this country,” he said. “It has given me opportunities I never got in Mexico. I joined the Army, and I was even more proud to wear that uniform.”

His military service, Jose said, makes him aware of the need for Sandia’s work to be flawless.



“Out there in the field, I never thought twice about if the weapon or the system was going to work,” he said. “Now that I’m on the other side, I can see why I was able to have that confidence. I want to continue to keep up the rigor and do my work with excellence, so when the time comes when other people have to use these weapons, they are also 100% confident it will work.”

“I do my work with excellence because it matters to the nation.”

— Myles Copeland

#### Lauren Wilson

*Principal statistician  
7.5 years at Sandia*

Lauren admits it took several years to find a career that was both fascinating and that utilized her statistics background. That intersection began at Sandia in 2014. Ever since, Lauren has supported the nuclear deterrence mission, conducting analyses for nuclear weapon components, systems and specialized teams for the safety, security and reliability of the nuclear stockpile.

“Every day, I share my expertise in some element of the ND mission,” she said. “I’m part of a small fraction of humanity who will ever get to see and learn about these amazing things, and I am supporting national security. How awesome!”

Lauren’s passion for propagating statistical methods in ND led to her teaching several courses, including Quantification of Margins and Uncertainties and Data Analysis Techniques.

“These classes showcase real ND examples of how practical implementation of statistics improves modernization and stockpile programs,” she said. “These methods can help our scientists and engineers more efficiently achieve their program objectives.”

— Andrea Mackay



#### Joshua Leroy Smith

*Product realization team lead and mechanical engineer  
9 years at Sandia*

Josh began his Sandia career as an intern and went on to work as a design engineer and then as a production engineer before taking on his current role as a product realization team lead — all



within the same department in which he was originally hired. Sandia's environment provides a wide array of the types of work that he finds engaging and diverse.

It isn't just the dynamic nature of the work and the diversity of the job that drive Josh to continue providing exceptional service in the national interest.

"As an engineer interested in history and political science, it's always been a source of pride to work in a nuclear deterrence department," he said. "Our work at Sandia continues the great progress we've made in the last 77 years to reverse a previously ever-escalating level of warfare. The nuclear deterrent underpins our nation's defense in every way and makes me proud to contribute."

— Diane Mendiola

## Joyce Purley

*Emergency planner  
3 years at Sandia*

Joyce collaborates with multiple Sandia sites and partners with internal and external stakeholders, including military installations and first-responder agencies to identify national and global threats and hazards. She leads teams in preparing for these threats and developing solutions to risks in support of Emergency Management's mission to protect life, property and the environment.

"My remote site and leased space partners are my favorite customers to support," she said. "They conduct critical national security mission work, and I get to be a small part of keeping their staff and visitors safe through hazards analysis, emergency preparedness and planning, training on emergency procedures and



maintaining staff familiarity through drills."

Joyce's efforts prepare and protect our workforce and assets, supporting the Labs' nuclear deterrence mission. Her expertise from years in New Mexico local and state government allow her to mentor organizations in disaster simulation exercise preparation, conduct and evaluation, as well as training development and facilitation of key process improvement workshops.

— Dan Ware

## Kenneth Armijo

*Systems engineer  
10 years at Sandia*

Although climate and energy may seem to be only tangentially connected to Sandia's ND mission, the way Ken explained it, there is a deep connection between energy and national security. Since energy is a major component of a lot of challenges — supply chain issues, Russian oil, geopolitical issues — creating new solutions to address these energy-related challenges is more important than ever.

"In an ever-changing world where the security of our nation is strongly dependent on the climate and energy resources, with broader implications in our geopolitical climate and long-term sustainability for the human race, I believe that the fundamental research we're doing in climate and energy security is not just of importance now, but also ensures that we can have a healthy and productive society going forward," he said.

"Research we're doing in concentrating solar power directly impacts energy and aerospace research and development and has lasting implications far into the future," Ken said. "To me, that is what makes working at a national lab that much more special — we aren't here to profit, we're here to improve security, but also to improve many people's quality of life. To make the world a more sustainable, and safer, place."

— Antonia Cardella

## Shamina Hossain-McKenzie

*Cybersecurity researcher  
5 years at Sandia*

Shamina's electric grid cybersecurity research is crucial to national security; as recent events have shown, cyberattacks against critical infrastructure systems are on the rise. New

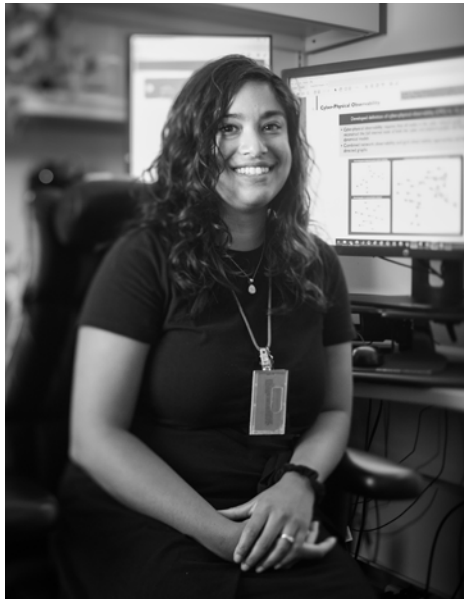


analytics and defenses are needed to make these systems more resilient.

Shamina researches the cyber-physical characteristics of the grid to inform development of intrusion detection systems for distributed energy systems, adaptive special protection schemes, improved interconnected system observability and emulation-based cybersecurity experiments.

Her interdisciplinary work allows Shamina to connect with Sandians across the Labs to solve challenging research problems, she said. "It is really important to me that my research has impact, so I'm proud to be working in an area that can immediately strengthen national security."

— Diane Mendiola



## William Tierney

*Corporate investment planner*  
20 years at Sandia

William works in Facilities leading the investments for the Recapitalization, Replacement, Revitalization and Sustainability program. The RS3 program has an average annual budget of \$25 million. Facilities uses to support the repair or replacement of existing real property assets, sustain existing assets within a facility or infrastructure system, renovate existing space, alter interiors of facilities and decontaminate and dispose of a building or structure.

"The RS3 program ensures there are funds for these urgent and high-risk types of projects to keep the lights on and the doors open at Sandia, so mission work isn't impacted," William said.

William comes from a legacy of Sandians. His



grandfather had a full career of 38 years at Sandia, and his mother worked for Sandia for 31 years. William said he is continuing that legacy because Sandia has provided for his family for three generations, and he values the mission work that occurs to protect our nation.

— Lyndsy Ortiz

## Marc Kniskern

*Engineering lead*  
32 years at Sandia

Helping develop the hypersonic weapon system for the U.S. Navy's Conventional Prompt Strike program and the U.S. Army's Long-Range Hypersonic Weapon program has reminded Marc of the national importance of his work.

"The design posed numerous engineering challenges related to the flight environment, including complex aerodynamic phenomena, severe surface heating with temperatures exceeding thousands of degrees and multi-disciplinary system design and analysis," Marc said.

As an expert in applied aerodynamics, flight mechanics and flight safety, Marc contributes to national security by developing new technologies for advanced and exploratory flight systems. He has been designing vehicles for robust

flight in this regime for more than 30 years and is world-renowned for his expertise. In 2019, Marc was named a fellow of the American Institute of Aeronautics and Astronautics.

"I'm proud to work on hypersonics because of the national impact of Sandia's work," Marc said. "I'm intrigued by the numerous challenges posed by the severity of the flight environments, and I enjoy how vehicle designs are highly coupled across multiple engineering disciplines."

— Troy Rummeler



## Alexander Tappan

*Distinguished member of technical staff*  
24 years at Sandia

Alex studies small-scale detonation and combustion, which includes making explosive samples through advanced manufacturing techniques.

On his 24th anniversary at Sandia, Alex said, "I get to blow stuff up. That's every boy's childhood dream. So, I have my

dream job. Not only is the work incredibly interesting and satisfying, but it is for an extremely important mission and purpose, and I love that aspect.”

Alex also loves working with the people and enjoys the day-to-day collaborations.

“For me, like many other Sandians who do fundamental research — scientific work, it’s often difficult to see where you fit into the mission. The work that I and other scientists do on fundamental questions enables the engineering staff to do their jobs — to provide components for national security,” Alex said. “I like being a piece in the national security puzzle. Everyone at Sandia has that role to some extent, even if it’s not immediately apparent. Getting to work with component engineers who are doing direct design on nuclear weapons — doing a little part whether it’s teaching or advising on certain materials or explosive performance questions, it’s very fulfilling.”

— Antonia Cardella

## Gary Hall

*Systems engineer  
20 years at Sandia*

“The work that Sandia is doing, and a way to serve our country” attracted Gary to the Labs. As a systems engineer, he answers the call by partnering with nuclear deterrence groups.

“I feel that by partnering with the systems engineers on different programs and product realization teams, I am providing a service that will help them complete their mission.”

Gary also highlights Sandia’s culture strengths. Gary said he had a midlife career change and went back to



Photo by Randy Wong

school for a bachelor’s degree in computer information systems. He then applied for a job at Sandia doing computer support.

“Once I got my clearance, there was a job open in the same department, so I got that. I spent at least 13 years in that position. Then a manager from my current team asked, ‘Do you have anyone in mind’ to take this position? I decided it would be a good career move. I’m still here, and I was recently promoted as systems engineer.

“Sandia gives great work life balance. It gives flexibility in career advancement, and I love working with the people here. The hundreds of people I have worked with here are fully dedicated to the mission.”

— David Hill

## Carlos Jerome Tafoya

*Desktop software developer  
15 years at Sandia*

Carlos recently witnessed how Sandia’s strong culture of innovation, teamwork and partnering resulted in a smooth transition of new technology developed for the U.S. Air Force.

“The systems needed to ensure our national security grow more complex as time progresses. These systems crosscut multiple disciplines and require seamless integration,” he said. “The diversity of skillsets and backgrounds of our team members not only helps to meet these needs, but it is also necessary to meet them.”

The team’s strength stems from a combination of depth and breadth of knowledge, he said. “This knowledge base alongside a passion and dedication to the mission makes the work our teams do engaging and exciting. Being around our nation’s best and brightest generates a positive feedback loop, elevating the capabilities of all involved.”

— Jill Janov-Kelly



## Keith Yehle

*Government relations officer  
11 years at Sandia*

Nearly 2,000 miles separate Albuquerque and Washington, D.C., yet Keith helps shorten the distance for Sandia’s nuclear deterrence leadership team. With more than 20 years of experience working in the capital, for a representative and a senator, he understands the dynamic political landscape and uses this knowledge to assist executives as they navigate government interactions.

“My job keeps me keenly interested in the world,” he said. “It’s a privilege to work in national security and to use my skillset to share



the critical work of our scientists and engineers.”

He closely follows what’s happening on The Hill and shares this information with ND senior leadership for their situational awareness. He coordinates briefings with key congressional committees and members of Congress, promoting consistent messaging, while maintaining compliance with all



appropriate legal and contractual obligations.

As a **Federally Funded Research and Development Center**, Sandia has a responsibility to interact with our government’s leaders, anticipating their needs, responding promptly to requests, and providing objective, accurate information they can use to make informed decisions in the national interest. Keith helps fulfill that duty on behalf of Sandia’s ND mission.

— Jennifer Awe

## How will you answer the call?

On June 23, Labs Director James Peery put **out a call** for all Sandians to support critical Nuclear Deterrence modernization efforts. The need to accelerate nuclear weapons modernization is a top national priority as China multiplies its arsenal and Russia threatens nuclear war.

Employees can go to the **Nuclear Deterrence Modernization Efforts Rally Cry** internal website to let Sandia know how they can answer the call or submit questions.

## Answer the call

CONTINUED FROM PAGE 1

“When I was up here before, I said this was feeling really real to me and that things are accelerating,” James said. “Well, they continued to do so in the last four weeks.”

The leadership team is confident that Sandia can meet expectations set by the NNSA and others by mobilizing experts in specific fields to fill gaps in the Nuclear Deterrence program. Specifically, the program needs staff with experience in design, testing and integration of systems.

“There’s a heavy need right now for electrical engineers. We also need help with fabrication and processing for MESA — people with test and integration experience,” Deputy Labs Director Laura McGill said. “People with LabVIEW experience and competency with these tools are on our critical path for a number of different activities,” including tester design.

Staff members do not need to take new positions in the nuclear deterrence program to lend their expertise. Depending on the specific scope of work, there will be opportunities and processes that allow researchers, engineers and others to spend part of their workweek supporting the nuclear program without leaving their current posts.

Sandia leadership has plans to rehire retirees to fill positions in the program. The human resources group has updated policies related to benefits eligibility after retirement,

calculating competitive salaries and more to incentivize former staff to come back from retirement to support the nuclear mission.

“We will be communicating to retirees to let them know what the process and options are if they want to come back,” Executive Director and Chief Human Resources Officer Brian Carter said. “Retirees are going to have a lot of questions, so we want to be able to have all the answers for them when they reach out.”

Other topics addressed by Labs leadership included maintaining safety and security while working on short deadlines, addressing bureaucracy and procedures that slow projects down, policy changes to encourage staff

members to lend their expertise to the nuclear program and how contributions to programs compare to publishing and other performance markers in annual reviews.

“If you want to be recognized as the best of the best in industry and nationally, your work has to have broad impact,” Laura said. “Publications and research alone will not get you there, and this is an opportunity to contribute significantly to capabilities that are absolutely critical to the country.”

Staff can view a recording of the Q&A on the Corporate Streaming Library and submit questions about this initiative on the Nuclear Deterrence Modernization Efforts Rally Cry internal website.



**LEADERSHIP Q&A** — Deputy Labs Director Laura McGill, standing, answered questions from staff during the Labswide town hall on July 18. “We want to make the best use of our talent and staff members’ willingness to volunteer,” she said. Labs leadership in attendance included, from left, NNSA Sandia Field Office Manager Daryl Hauck, Director of Information Technology Tom Trodden and Associate Labs Director Deborah Frincke.

Photo by Craig Fritz

## Energy innovation

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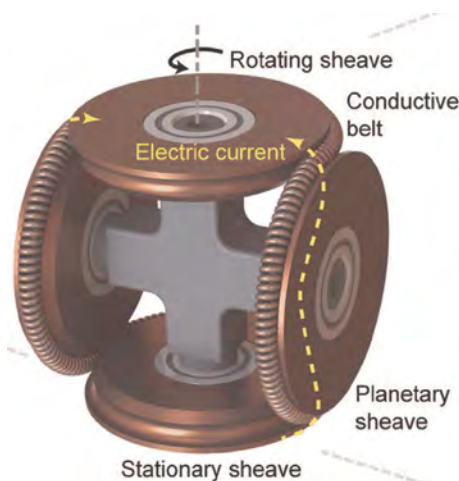
“I started thinking that maybe not every conceivable rotary electrical contact architecture has been thought of yet,” Jeff said. “We spent a lot of time considering if there was another plausible way.”

The resulting innovation, Twistact, uses a pure-rolling-contact device to transmit electrical current along an ultra-low-resistance path. The technology proves beneficial in lowering costs, improving sustainability and reducing maintenance.

### Eliminating reliance on rare-earth metals

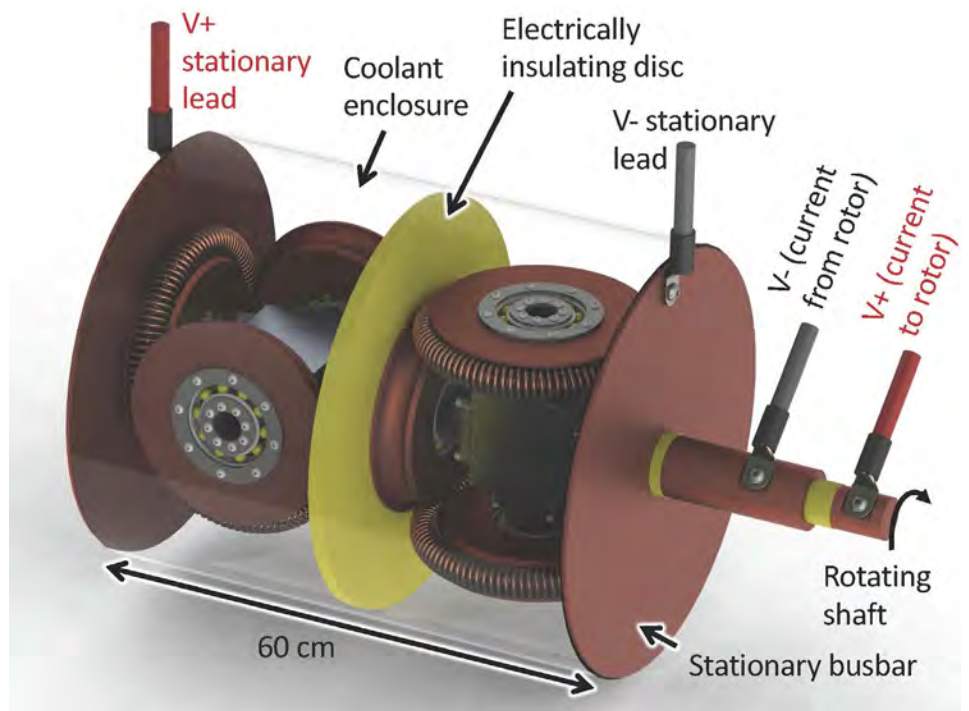
Most of the current utility-scale wind turbines are dependent on rare-earth magnets, Jeff said. These materials come at a high initial cost and are vulnerable to supply chain uncertainties.

In 2011, for example, there was a rare-earth materials supply chain crisis that caused the price of neodymium and dysprosium, the two rare-earth elements widely used for such magnets, to skyrocket. This had the potential to block growth of the wind industry. The Sandia team began developing Twistact at the time as a hedge to protect the growing wind industry from future disruptions.



**TECH TRANSFER READY** — Graphic illustration of the basic principle of the Twistact operation. Sandia is now ready to partner with the renewable energy industry to transfer the technology to develop the next generation of direct-drive wind turbines.

Graphic courtesy of Sandia Licensing and Technology Transfer



**NOVEL ELECTRICAL CONTACT** — A two-channel Twistact device for a multimewatt direct-drive wind turbine application. Graphic courtesy of Sandia Licensing and Technology Transfer

“When you weigh in the fact that rare-earth metals have always been in short supply, that their mining is notorious for its adverse environmental impact, and that competing applications such as electric vehicles are also placing demand on rare-earth metals, the value proposition of Twistact becomes clear,” Jeff said.

### No maintenance or replacement costs

Additionally, Sandia’s Twistact technology addresses two physical degradation processes common to high-maintenance brush or slip ring assemblies — sliding contact and electrical arcing. These limiting factors reduce the performance of traditional rotary electrical contacts and lead to short operating lifetimes and high maintenance or replacement costs.

Twistact, on the other hand, has been proven through laboratory testing to be capable of operating over the full 30-year service time of a multimewatt turbine without maintenance or replacement.

Other potential applications for the technology include synchronous motors and generators, electrified railways and radar towers. Twistact could also be used in replacing brush or slip rings in existing applications.

### Forward-thinking investment

Jeff credits the **Laboratory Directed Research and Development** program for their thinking toward the future in making an investment in Twistact.

“Twistact represents a pretty radically different idea,” Jeff said. “That takes courage to get behind and fund.”

Sandia is now exploring **opportunities to partner with generator manufacturers** and others in the renewable energy industry to assist with the transfer of Twistact technology into next-generation direct-drive wind turbines. Further, Sandia is open to partnering on the development of high-RPM Twistact technology for applications such as electric vehicles or doubly fed induction generators.

Last December, Twistact was selected as one of four NNSA technologies to be presented at the **Frontier Venture Summit**, a showcase event hosted by FedTech, a venture firm that helps transition technologies from labs to the market. Sandia researchers also presented **Retsynth**, comprehensive software that aids scientists in synthetic biology analysis, at the showcase.



## Disability inclusion, advocacy

CONTINUED FROM PAGE 2

team helping to pilot a corporate program and as co-chair for the Abilities Champions of Sandia, an employee resource group,” said nominator Victoria Newton on behalf of Sandia’s Abilities Champions Award Selection Committee. “She educates leadership and staff on the importance of diversity and disability inclusion through partnership with Labs leadership, presentations, speakers, events and community.”

Heather said she wants to help people with disabilities be successful at Sandia.

“I hope to make things easier for others with disabilities to get the support they need without having to seek it out themselves. I want to be their advocate,” she said. “Thankfully I’ve had fantastic support from every level of management in the division.”


After hours, Heather is a mentor for Big Brothers Big Sisters of Central New Mexico and works directly with Albuquerque’s homeless population in harm-reduction programs. She also is active in the community of autistic women and support groups for individuals with connective-tissue disorders.

“This award means a lot to me because it also recognizes that disabled professionals have an impact on their communities,” Heather said. “We’re a part of the communities that we live in.”

### Sandia among top 20 equal opportunity employers

Along with Heather’s award, Sandia was named as a 2022 readers’ choice **Top 20 Government Employers for Equal Opportunity**.

According to CAREERS & the disABLED magazine, the employers being recognized this year understand how tapping the talent of people with disabilities and bringing their diversity of thought and experience into the fold of their business pushes innovation and creates a competitive edge in the domestic and global marketplace.

“I’m really proud of the work that my management team and all of Sandia are doing to break down barriers that people in the disabled community and other minority groups have always faced,” Heather said. “Disability isn’t a dirty word. With support from our workplace colleagues and leadership, and our communities, we can own our disabilities and be successful with them.” 



**BEST FRIENDS** — Sandia Advanced Microsystems business lead Heather Spalding and Bowie, her service-dog-in-training, share a special moment of affection.

Photo by Craig Fritz

## Mileposts



Phil Bennett

35



Greg Haschke

35



John Klem

35



Tammy Eldred

30



Nancy Martinez

30



Dave Schoenwald

30



Erik Webb

30



Christopher Gallegos

25



James R. Stewart

25



Jen Gaudioso

20



John McClendon

20



Tom Mullen

20



Nicholas Pattengale

20



Jason Payne

20



Elizabeth Spindle

20



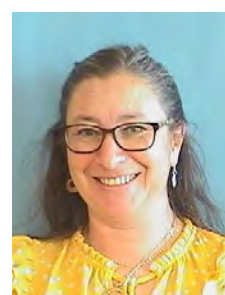
Ed Sams

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Tre Shelton

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Cassandra Trevino

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# Can an algorithm teach scientists to write better quantum computer programs?

*When it comes to programming, it's not what you say, it's how you say it that prevents errors*

By **Troy Rummler**

**W**hile quantum computers could someday revolutionize technology, a single slip of an atom can cause a malfunction. Scientists around the world are figuring out what causes these errors, and it turns out sometimes they stem from the way code in a program is arranged.

Timothy Proctor, a quantum physicist at Sandia, is leading a new research project to help quantum computer scientists write better programs that fail less often.

The DOE Office of Science recently selected Timothy for an **Early Career**

The DOE Office of Science has selected four Sandia researchers to receive Early Career Research Awards this year. **Krupa Ramasesha**, **Pete Bosler**, Timothy Proctor and Andrew Mounce will receive up to \$500,000 per year for five years to advance their research. This summer, Lab News will profile each researcher. Krupa's and Pete's profile have previously appeared in Lab News.

The program, now in its 13th year, is designed to provide support to researchers during their early career years, when many scientists do their formative work. This year, the DOE awarded 83 scientists nationwide, including 27 from national laboratories.

**Research Program Award**, which will support the project for the next five years.

Timothy said that in quantum circuits — the quantum equivalent of computer programs — how commands are arranged, or structured, can decide whether a computer can successfully run it.

"For example, repeating the same instructions again and again can cause certain kinds of errors to build up much more quickly than they would if you were doing some other pattern of instructions," he said.

In his new project, Timothy will be training an algorithm to discover other patterns and structures that can cause errors.

"We know that structure impacts how well the program is going to run, but we don't know exactly what structures are going to impact it, and it changes from device to device."

Initially, he wants to create a tool that will tell developers how likely their program is to run on a given quantum computer. In time, he hopes his work will change how programs are written, to reduce errors and make quantum computers more useful.

## Mentorship, love of math fuels work in quantum computing

Timothy came to Sandia six years ago after earning a doctoral degree in quantum physics from the University of Leeds in England. But in high school, he didn't love science. To him, science involved too much memorizing of facts and not enough understanding why. Then he learned about particle physics, which caught his interest, and later in college quantum physics, which he pursued his degrees in.

"Quantum physics just seemed exciting and actually easier than other subjects," Timothy said. Even though the



**CODE COACH** — Timothy Proctor, who recently received a DOE Early Career Research Program Award, will be training an algorithm to improve quantum computer programs.


Photo by Rebecca Caravan

field has a reputation for being difficult and unintuitive, he said the mathematical foundations are straightforward.

"It's very mathematical, and I enjoy that," he said.

Since joining Sandia, Timothy has worked in the **Quantum Performance Lab**, a research group that develops and deploys cutting-edge techniques for assessing quantum computers. Not only has the work been interesting, he said, but the mentorship has been extraordinary.

"Coming out of grad school, I was a competent scientist — I could tackle technical problems — but it's a long way from that to coming up with compelling research ideas and leading projects. The mentorship I've had since I joined Sandia is the reason that I can do that," Timothy said.

Now, the Early Career Research Award will allow him to expand his own team, and he's excited to onboard and mentor other early career scientists. 



# Community Involvement grant aids scientific discovery among young learners

*Sandia sponsors transformation of animal discovery exhibit at The Lawrence Hall of Science*


By **Michelle Walker-Wade**

What's one of the best ways to foster a deeper appreciation for how animals contribute to preserving our ecosystem? By getting close to them and gaining an understanding of animal behaviors.

Through a community grant from Sandia's [Corporate Contributions Program](#), the Labs sponsored the newly renovated [Animal Discovery Zone](#) at [The Lawrence Hall of Science](#) at the University of California, Berkeley. As one of the Bay Area's most popular learning experiences for people of all ages, the Animal Discovery Zone is particularly engaging for young learners to nurture their scientific and environment thinking muscles.

The Lawrence Hall of Science kicked off its transformation of the Animal Discovery Zone with an exhibit preview event called "Innovations & Inspiration" this spring. The event featured the work of National Geographic photographer Joel Sartore, who delivered a humorous and compelling keynote on animal conservation. Some of Sartore's most riveting animal photographs cover a wall in the Animal Discovery Zone, which also provides an opportunity for individuals, families and organizations to financially support the project by "claiming" a photo with a significant donation. In Sartore's words, his "hope is that people will look these creatures in the eyes and be inspired to care, while there is still time."

The new exhibit is now open to the public.

Learn more about the Animal Discovery Zone project, as well as Joel Sartore's full body of work, "[The Photo Ark](#)," by visiting the [exhibit website](#). 



**INSPIRING ANIMAL CONSERVATION** — National Geographic photographer Joel Sartore speaks on animal conservation at the "Innovations & Inspiration" event at The Lawrence Hall of Science.

Photo by Michelle Walker-Wade



**PROMOTING EDUCATIONAL SUCCESS** — Sandia/California's community relations specialist, Michelle Walker-Wade, attended the Innovations & Inspiration benefit event to further spread the message of Sandia's belief in the importance of animal science as a means of biosecurity.

Photo courtesy of Michelle Walker-Wade



**SANDIA SHOWS UP**

**STUFF THE BUS**

**VIRTUAL SCHOOL SUPPLY DRIVE**

**JULY 18 – 29**

School is about to start and our local students need supplies to succeed.

Sandia's long-standing back to school supply drive needs your support!

**Let's stuff the bus with cash!**

**CONTRIBUTION INFORMATION CAN BE FOUND ON THE COMMUNITY INVOLVEMENT WEBSITE**

# STEM in the Sun rooted in fun

*Sandians' passion for science grips Albuquerque youth*


By **Luke Frank**

**L**ike a well-oiled traveling show, the tents and tables went up, the props and materials came out and the kids cavorted from station to station to learn about science, technology, engineering and math at Sandia's third annual STEM in the Sun event.

Nearly 30 elementary and middle school-age students joined Sandia volunteers from the Hispanic Outreach for Leadership & Awareness and other employee resource groups at Mesa Verde Community Center making GlueP balls, lava lamps, catapults and marshmallow and dried pasta structures. They also learned about surface tension, the effects of ultraviolet light and optical illusions.

The Mesa Verde event was one of seven held throughout Albuquerque this June and July by Sandia Community Involvement for kids enrolled in city summer programs. "Growing up I had opportunities like this to interact with

professionals and it meant a lot to me," said Sandia volunteer and software engineer Elizabeth Lopez. "I love the outreach and the chance to do the same for these kids."

Seven-year-old Frankie said the event was really fun and called Sandia volunteers angels of slime and lava. "Anytime I see you guys are going to be here, I'm coming," he said. 



**LOOSEN UP** — Estrella Gabriel lets it be known that a necklace she made is too tight while Sandia volunteer Laritza Saenz helps her during Sandia Labs STEM in the Sun summer event held July 20 at Mesa Verde Community Center.

**Photo by Craig Fritz**



**CENT OF WATER** — Emma Mae Yazzie places as many drops of water on a penny as she can during Sandia Labs STEM in the Sun summer event held for elementary and middle school-age students attending the City of Albuquerque's summer program at Mesa Verde Community Center.

**Photo by Craig Fritz**



**MIXED UP** — Destiny Rodriguez mixes up a small lava lamp she made during Sandia Labs' STEM in the Sun event held for elementary and middle school-age students attending the City of Albuquerque's summer program.

**Photo by Craig Fritz**