



## Mission Enzo-possible: Sandia's demonstrator soars to success

By **Kenny Vigil**



**S**andia answered the nation's call with an impressive feat: developing an experimental reentry vehicle within a tight 24-month deadline for a critical test. A reentry vehicle is designed to safeguard a warhead during atmospheric reentry. Sandia completed the Enzo demonstrator and had it ready to ship in time to meet the test's deadline.

"For Enzo, the team had a very clear focus that we had to deliver in 24 months," said Kelsey Forsberg, the lead for the Enzo flight demonstrator project. "We had a team that already had flight test experience."

The team responsible for Enzo also concurrently worked on NNSA's High Operational Tempo Shot sounding rocket program. HOT Shot collects data for aerospace research and future weapon designs for the stockpile. Kelsey said the experience gained from the program helped the team rise to the challenge for Enzo.

**TIGHT TIMELINE** — About 10 Sandians made up the core team that completed the Enzo flight demonstrator in a 24-month deadline. **Photo by Craig Fritz**

— CONTINUED ON PAGE 4

## Sandia honors veterans in annual ceremonies

By **Valerie Alba and Trina West**

**S**andia commemorated Veterans Day in New Mexico and California with in-person and virtual events Nov. 9. Labs leaders thanked those who have donned the uniforms of the U.S. armed services for their dedication, courage and sacrifice. Celebrating the diversity of veterans and their contributions featured prominently in this year's celebrations.

### In New Mexico

Brian Carter, chief human resources officer and Military Support Committee executive champion, emceed the New Mexico event at the Steve Schiff Auditorium and introduced the Sandia Singers, who performed "The Star-Spangled Banner."

"Today, our veteran community reflects the strides that we as a nation have made

to embrace patriots from diverse backgrounds and to recognize their commitment and sacrifice to protect our homeland and advance freedom throughout the world," said Brian, a U.S. Air Force retiree.

These strides, Brian said, are reflected in the Labs' commitment to employing and retaining veterans and have resulted in Sandia earning its third **HIRE Vets Medallion** from the Department of Labor.

David Gibson, deputy Laboratories director and chief operating officer, introduced keynote speaker Brig. Gen. Michele LaMontagne, who recently retired from the New Mexico Air National Guard, where she served as Assistant Adjutant General. She was the first woman in over 75 years to serve as the commander of the New Mexico Air National Guard. Michele, manager of Sandia's Leadership and



**HONORING THEIR SERVICE** — Recently retired U.S. Air Force Brig. Gen. Michele LaMontagne, left, with Deputy Labs Director David Gibson, center, presents a coin to co-worker Dolores Black, who served in the Air Force, during the annual Veterans Day celebration hosted by the Military Support Committee at the Steve Schiff Auditorium in New Mexico on Nov. 9. Michele gave the event's keynote address. **Photo by Craig Fritz**

Organizational Development department, also served as senior military adviser to New Mexico's governor.

— CONTINUED ON PAGE 5

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**TABLE of CONTENTS**

- 1 | Mission Enzo-possible: Sandia's demonstrator soars to success *continued on page 4*
- 1 | Sandia honors veterans in annual ceremonies *continued on page 5*
- 2 | Sandians elected AIAA associate fellows for aerospace contributions
- 4 | Modeling geothermal systems' viability
- 6 | International partnership focuses on insider threats
- 7 | Fueled by ice cream and imagination
- 8 | Sandia volunteers mentor local students to improve academic, lifelong outcomes
- 9 | Behind the scenes of a scientific conference in Albuquerque
- 11 | Sandia internships prove transformational for Prairie View A&M students
- 13 | Mileposts
- 14 | Take a Frozen Turkey to Work Day
- 15 | Directors give back during Fall Leadership Forum

**EDITOR'S NOTE:** Lab News will not be published Nov. 30. The last edition of the year will be published in December. Please send your comments and suggestions for stories or for improving the paper. If you have a column (500-800 words) or an idea to submit, contact the Lab News editor at [labnews@sandia.gov](mailto:labnews@sandia.gov).

# Sandians elected AIAA associate fellows for aerospace contributions



**SERVING THE NATION** — A sense of patriotism instilled in him during childhood inspired Brian Freno to serve his country. He was honored for his contributions in the field of computational science, ensuring physics simulations are credible.

Photo by Lonnie Anderson



**COMMUNITY IMPACT** — Honored for his contributions in structural dynamics, Michael Ross began his Sandia career in code development. He is also active in local outreach, talking to students about what it's like to be an aerospace engineer.

Photo by Lonnie Anderson

By **Kim Vallez Quintana**

**T**wo Sandians will soon join the American Institute of Aeronautics and Astronautics Class of 2024 as associate fellows.

“This distinguished group of professionals has made significant and lasting contributions to the aerospace profession,” said AIAA President and Sandia Deputy Labs Director Laura McGill. “They exemplify expertise and dedication to excellence in advancing their specific technical disciplines. They are truly shaping the future of aerospace and we are proud of their achievements.”

## Michael Ross

Michael Ross was recognized for his work in structural dynamics with an emphasis on fluid-structure interaction. During his 15 years at Sandia, he has worked on everything from satellites and rockets to airplanes and wind turbines.

“I conduct structural analysis. I figure out what the loads are when we put these objects into space or the atmosphere. Is the structure sound? I figure out what it will take to ensure it remains structurally sound and doesn’t fall apart,” Michael said.

The institute points out that Michael’s work has had a significant impact on systems and components at Sandia, with him contributing more than 100 design analyses in one system. Michael’s work has been instrumental in obtaining flight certifications and providing qualification evidence for numerous systems at Sandia.

Michael is especially proud of his work on the B61-12 and with wind energy projects. “There was this analysis we helped with where they had water turbines generating energy in currents, and we assisted with the structural aspects and redesigning them,” he said.

Michael began his work at Sandia in code development, where he was a key

member in coupling the Navy Gemini code with in-house structural analysis codes. This code is now used by the Navy to predict underwater ship explosions.

When asked what this honor means to him, Michael said, “It’s really nice, but what’s even better are the congratulatory emails I’m receiving. These are coming from AIAA fellows at Lockheed Martin and Skunk Works. I have even heard from an astronaut and others at NASA. It’s more about the community I’m impacting. That means a lot.”

Michael said the rewards of his work also come from the outreach he does at local schools. “I go and talk to students about what it means to be an aerospace engineer. Those are the things that really touch me. Sometimes I appear with astronaut Stephanie Wilson, so the kids are all hyped up and want my autograph. I’m a space engineer; they think it’s so cool. It’s pretty touching,” he said.

## Brian Freno

Brian Freno has been working at Sandia for eight years. His childhood helped pave his career path. “My father was an Army dentist, so growing up on military bases instilled a sense of patriotism in me. I wanted to figure out how to serve our

country,” Brian said. “When I graduated from high school, I wasn’t sure whether I wanted to be a pilot or a mathematician. Some people mentioned engineering. So, when it was time to declare a major, I saw aerospace engineering alphabetically listed after accounting. I said, ‘Let’s see how this goes,’ and I eventually earned three degrees in it.”

Brian is a principal member of the technical staff at Sandia, specializing in research and development, science, engineering and computer science.

“We ensure that simulations are credible. I devise approaches to verify that numerical methods are correctly implemented in physics codes; this is known as code verification. These codes are used to model a variety of physics phenomena and are used

to simulate various weapons and other applications.”

The institute credits Brian with making contributions to the fields of fluid dynamics, ablation and heat transfer, structural dynamics, electromagnetics, reduced-order modeling, code verification, numerical integration and machine learning. Especially noteworthy is that the code-verification techniques Brian recently developed for integral equations to isolate and measure the different sources of numerical error. This work filled a major credibility gap for integral equations and added to the credibility evidence in computational electromagnetics codes.

Brian said being named an associate fellow is humbling. “I am grateful for it. I am extremely honored because this is a very selective process. I am thankful for those who took the time to put together a nomination package that convinced an anonymous review committee that I was worthy of this honor.”


## A new chapter

The pair will be inducted Jan. 10 during the 2024 AIAA SciTech Forum in Orlando, Florida.

To be selected as an associate fellow an individual must be a senior member of the institute in good standing, with at least 12 years of professional experience and be recommended by three associate fellows.

This marks a new chapter in their careers.

“The AIAA associate fellows personify the innovation that drives our industry forward. They embody the ingenuity and commitment that are crucial for developing solutions to the complex questions raised across the aerospace community,” said Dan Dumbacher, AIAA executive director.

Michael said he has some advice for those who are just starting out. “One thing I would recommend to any young staffer is to get involved in a professional society. It’s something to have that community and realize people have similar problems. We work with NASA and Lockheed Martin and other companies like it. Getting to know some of those professionals is wonderful. I’ve also had some wonderful interns through this partnership.” 



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## Enzo demonstrator

CONTINUED FROM PAGE 1

“We had capability in terms of people, technical experience and lab space. We were starting in a good place from experience and the team was really clicking. It was very challenging for the first seven months or so because we also had a HOT Shot flight while we were in the initial design stages for Enzo,” Kelsey said.

Enzo is crucial in providing weapons technology for a flight test. Kelsey said a priority was having the test unit completed on time, without sacrificing safety. “We’re confident, based on the analysis and test results, it’s going to be safe,” Kelsey said, adding that the bulk of the verification focused on the unit’s safety. About 10 Sandians were part of the core team working on Enzo, with an estimated 100 to 150 additional Sandians contributing to

the success of the two-year project. “The core team was small, but it took the Sandia village to make the project successful,” Kelsey said.

In addition to safety considerations, other objectives included documenting valuable lessons learned and establishing strong relationships with key stakeholders.

Originally starting as a white paper without any models or hardware, the project comprised nine experiments that involved collaboration with others, such as NNSA and Los Alamos National Laboratory.

“There are relationships built on having executed something, having gone through this process together. I’m excited to see how that leads to tangible action in the future,” Kelsey said.

Those relationships continued even after project completion. In June, Sandia hosted a poster session with Los Alamos, which allowed employees from both labs to share


### What is a demonstrator?

Sandia has several demonstrator programs that help test technology components early, in as close to a real environment as possible.

“Demonstrators are important because they provide system context and environmental testing to help understand risks early in a program,” said Hae-Jung Murphy, a senior manager in Sandia’s nuclear deterrence modernization and future systems program. Identifying risks early can help reduce uncertainties and costly delays.

Demonstrator programs also provide employees with specialized training opportunities to adapt and deliver quickly. “We need demonstrators to advance component design and reduce risk for actual weapons systems,” Hae-Jung said.

and explain their contributions to Enzo with Sandia’s workforce.

“Enzo has been a highlight of my career. To see the team rise to the challenge and endure, and to see Enzo come to fruition is amazing,” Kelsey said. 

# Modeling geothermal systems' viability

Web tool looks belowground for an economically viable renewable energy source

By Mollie Rappe

Geothermal power has a lot of promise as a renewable energy source that is not dependent on the sun shining or the wind blowing, but it has some obstacles to wide adoption. One challenge is that a limited number of locations in the U.S. naturally have the right conditions: hot rock relatively close to the surface and with plentiful groundwater to heat up.

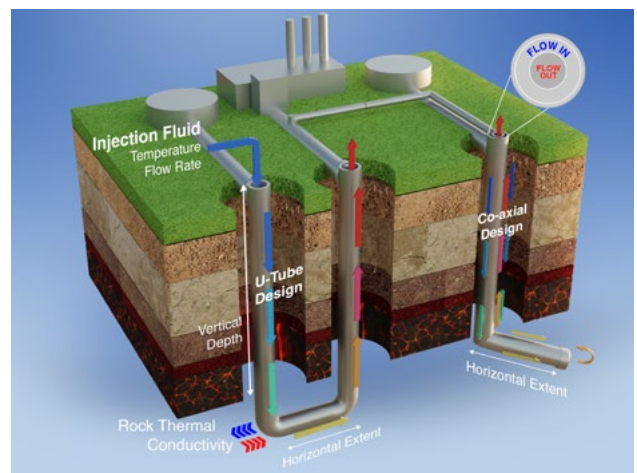
Closed-loop geothermal is one way to use hot, dry rock to heat circulating fluids to generate electricity or to directly heat buildings, a way that is being reexamined after being dismissed in the '80s for being too inefficient. A team composed of experts at several national laboratories recently finished a two-year effort to computationally model closed-loop geothermal systems.

With closed-loop geothermal, building

a system that can extract enough heat from the deep earth to be cost-effective is difficult, said Mario Martinez, a mechanical engineer and the principal investigator for the project at Sandia.

“The subsurface, the rock, becomes hotter the deeper you go, so it is beneficial to go deep,” said Martinez, who recently retired. “That hot water can be used for district heating, so you can use it to heat houses and buildings, or you can use it to generate electricity.”

Sandia led the computational modeling of the belowground system, while the National Renewable Energy Laboratory used the numerical results to estimate the economic viability of the system through their aboveground power plant and economic model. The overall project was led by Pacific Northwest National Laboratory and mechanical engineer Mark White.



**CLOSING THE LOOP** — Sandia researchers have used computer models of closed-loop geothermal systems to determine if they would be economically viable sources of renewable energy. The researchers found that the cost of drilling would need to decrease significantly to hit cost targets. **Illustration by Ray Johnson**

Anastasia Bernat, a PNNL data scientist, integrated the Sandia and NREL models into a [publicly available web tool](#) to allow startup developers and venture capitalists to explore the economic viability of various closed-loop geothermal system designs. Idaho National Laboratory shared variables from a prototype geothermal system at the

lab and studied various possible enhancements to closed-loop geothermal systems to improve their economic viability.

The researchers shared their results in a paper published recently in the scientific journal *Geothermics*. The DOE [Geothermal Technologies Office](#) supported the research.

### Probing potent parameters

The Sandia team looked at two basic setups for closed-loop geothermal systems. One, called a U-tube, is where cool water is pumped down one deep vertical pipe, which then extends horizontally for a certain distance at a depth where the rock is hot and then comes up in a different location, Martinez said. The other, called a tube-in-a-tube, is where the cool water is pumped down along the outer layer of a pipe to a certain depth, and then the pipe takes a 90-degree turn and extends a horizontal distance at that depth. Then the hot water hits the end of the pipe and is pushed into the inner pipe, back up the way it came.

The Sandia team looked at depths ranging from 0.6 miles to slightly over 3 miles, as well as the distance traveled at that depth from 0.6 miles to almost 12.5 miles. They looked at several different factors, one of which was whether to circulate water or supercritical carbon dioxide, a gas that is under so much pressure it acts more like a liquid and can absorb more

heat, Martinez said.

They also looked at the temperature of the fluid going down the well and how fast the fluid was being pumped down. Other parameters they studied included how quickly the rock heated up with depth, how well the rock transferred heat to the circulating fluid in the pipe and how large the pipe diameter is.

The Sandia team used an engineering mechanics simulation software package called *Sierra* and parametric analysis software *Dakota* to look at all the different parameters, said Yaro Vasylyv, a Sandia computer scientist who develops Sierra codes and was involved in this project.

“We varied seven parameters and computed corresponding outlet temperatures and pressures,” Yaro said. “You can feed that into an aboveground model that computes the levelized cost of heat and the levelized cost of electricity, which is what NREL worked on.”

### Simplified model simulates scores of systems

Using a simplified numerical model instead of a full 3D representation, and running the computations on Sandia’s high-performance computing clusters, allowed the researchers to model several million sets of parameters, Martinez said.


“Part of the novelty of this work is that we could analyze so many different cases, so many different parameters for those two

fluids and those two designs — the U-tube and the tube-in-a-tube,” he said.

The Sandia researchers also did more time-intensive models of geothermal systems in permeable rock with groundwater, where the additional convective heat transfer would produce a more rapid and sustained transfer of heat from the rock to the circulating fluid. They found that this increased heat transfer also improved the economic viability of a closed-loop geothermal system.

“Wet rock is better, and it can be quite a bit better, but there aren’t many places that naturally have those conditions,” Martinez said.

The Sandia researchers looked at several possible enhancements to the system, such as coating the well with high-thermal-conductivity cement. They found that it would be better to just make the pipe larger, Martinez said. They also found that their model could approximate the efficiency of a multi-pronged or “spider” geothermal configuration by merely setting the horizontal extent in the tool to the total extent of all the legs, Martinez said.

“We asked the question, ‘What is the drilling cost required to meet DOE’s 2035 target for the levelized cost of electricity for enhanced geothermal systems?’” Yaro said. “This target is \$45 per megawatt-hour. We found that to achieve this goal using closed-loop systems in hot, dry rock, there would need to be a very aggressive reduction in the cost of drilling.” 

## Veterans

CONTINUED FROM PAGE 1

Michele recounted the contributions of women in the U.S. military.

“Today we not only celebrate the valor and sacrifices of all veterans, but today I also want to shine a light on the remarkable contributions of women throughout the history of our nation’s military,” she said.

“There are twice as many women serving from when I entered the Air Force Academy about 35 years ago,” she said. “Many times throughout my career I was hard-pressed to find a female mentor. They were few and far between if they were to be found at all. Today, I’d like to honor the women who opened the doors and paved the way for people like me.”

Michele spoke about some of the women who have answered the call to military

service in U.S. history. To hear her full talk, employees can visit Sandia’s Digital Media Library.

### In California

The California ceremony opened with Chair of the Military Support Committee David Colón introducing the master of ceremonies, Brooks McCall from the Sandia Field Office.

The University of California, Berkeley, ROTC presented the colors as Sandia’s volunteer choir, the Thundertones, sang the national anthem.

McCall highlighted the role that Latino veterans have played in U.S. military history. “Hispanic and Latino Americans have been pivotal participants in U.S. military history, dating back to the Revolutionary War,” McCall said. “There have been more than 60 Hispanic recipients of the Congressional




**CHALLENGE COINS** — Lt. Col. Ezekiel Moreno of the University of California, Berkeley, Army ROTC hands out challenge coins to veterans of the armed forces. Veterans at both ceremonies received a coin as a token of appreciation. **Photo by Randy Wong**

Medal of Honor — the nation’s highest award for bravery and valor against an enemy.”

Trish Benguerel, deputy associate labs director for Sandia’s Integrated Security Solutions division, introduced keynote speaker Lt. Col. Marisol Chalas, garrison commander of the U.S. Army Parks Reserve Forces Training Area at Camp Parks in Dublin, California.

Chalas was the first Latina in the National Guard to pilot a Black Hawk helicopter.

“Sandia has a proud history of recruiting, hiring and retaining veterans because of the unique values and skills we bring to the workplace,” Chalas said. “A common commitment to the defense of and love of our county is what binds us.” 



**CELEBRATING COMMITMENT** — Lt. Col. Marisol Chalas, garrison commander of the U.S. Army Parks Reserve Forces Training Area at Camp Parks, delivered the keynote address during the Veterans Day celebration at Sandia’s California site Nov. 9.

Photo by Randy Wong



**HONOR GUARD** — Devan Hudson with the Kirtland Air Force Base Honor Guard waits for the start of the annual Veterans Day celebration hosted by the Military Support Committee at the Steve Schiff Auditorium Nov. 9.

Photo by Craig Fritz

# International partnership focuses on insider threats

*Weeklong workshop at Sandia equips team to mitigate risk*

By **Kenny Vigil**

Insider threats can take many forms.

They are real, and if not identified, they can be costly and damaging.

In an event aimed at counteracting such threats, in September Sandia hosted about 45 individuals who work at nuclear and radiological sites around the world, as well as industry regulators, for a weeklong workshop. The participants represented more than 20 countries.

As part of the workshop, participants toured the Nuclear Security Technology Complex, a mock nuclear reactor site. They observed scenarios representing risks of insider threats, including situations where proper procedures and protocols were not followed. Participants then held small group discussions to identify what went wrong.

They discussed areas of improvement for the scenarios and how they might apply better practices in their own facilities.

The workshop was part of the International Atomic Energy Agency Information Circular 908 Working Group, which comprises various organizations

from around the world. The U.S. and Belgium, the co-chairs of the working group, teamed up to host the event at Sandia ahead of the **2024 International Symposium on Mitigating Insider Threats**, which will be held in Brussels, Belgium, March 5-7, 2024.

“This is the first Information Circular 908 workshop focused on creating a community of practice for insider threat mitigation practitioners,” said Lauren Lockett, who works in global security at Sandia. “Sandia is uniquely positioned to host events like this due to the wide variety of expertise internally and externally through partnerships and the testing and training facilities that mimic real-world nuclear facility environments.”

Before the walkthrough of the Nuclear Security Technology Complex, participants attended a series of seminars. Topics included trustworthiness and reliability of employees working in nuclear and radiological facilities, physical protection and cybersecurity. Presenters represented NNSA, Sandia, other U.S. national labs and government organizations, Belgium, Canada, Hungary and Japan.

The workshop was held to coincide with **Insider Threat Awareness Month**. According to the International Atomic Energy Agency, insiders can pose a




**DETECTING THREATS** — Participants in an insider threat workshop watch as a member of Sandia’s Protective Force scans a Sandia employee, playing an intruder, during one of the mock scenarios. About 45 participants representing more than 20 countries attended the weeklong workshop.

Photo by Bret Latter

significant threat to nuclear or radiological security because they have more access, authority and knowledge than outsiders to bypass dedicated nuclear and radiological security elements.

“Participants have access to the tools, exercises and demonstrations presented at this workshop to facilitate discussions in their own facilities around insider threats and best practices, make assessments, and address the unique issues they may face,” Lauren said.

In an effort to boost awareness about insider threats, the **Center for Development of Security Excellence** has published case studies about real-life security events. 

# Fueled by ice cream and imagination

## Roosevelt Middle School sweeps NM Electric Car Challenge

By **Kim Vallez Quintana**

“My secret, if you can believe it, is ice cream,” explained Steve McGuinness, the Roosevelt Middle School teacher who helped lead his three teams to the top three spots at the NM Electric Car Challenge.

“I take enthusiastic middle schoolers, and we have ice cream, snacks and fun,” McGuinness said. “These are very challenging events, so we challenge ourselves. But as we work hard, we also play hard — you have to remember to let them be 12.”

It’s clearly the recipe for success for this rural New Mexico school located in the east mountains.

The teams from Roosevelt Middle School dominated this year’s competition. Roosevelt Team 3 had the fastest car, zooming across the 10-meter track in just 3.4 seconds, followed closely by Roosevelt Team 1 at 3.71 seconds and Roosevelt Team 2 at 3.83 seconds. The three teams were also the overall winners.

Referred to as the “mountain kids” by their competitors, the Roosevelt middle schoolers said they are accustomed to using ingenuity in their daily lives and love channeling it into this challenge. Just earning a

spot on the Roosevelt teams is a big deal.

“We all like engineering class with Mr. McGuinness,” said Emma Findell, a sixth-grader from Roosevelt Team 2, nicknamed the Willy Nilly’s. “When we heard about this challenge, we were like, ‘Can we get in? Can we do it?’”

“So many kids wanted to do it, I had to turn away about 30 kids. That’s the hard part,” said McGuinness, who considered not coaching this year. “They begged me to do it. They inspire me.”

Inspiration is the mission of the NM Electric Car Challenge. Inspiring students to use their imaginations. Inspiring them to delve into the world of STEM. And, hopefully, inspiring the next generation of Sandia scientists and engineers.

“I like the electronics and how you can really learn how to use them,” said Leif Fincher, a sixth-grade competitor from Intermediate Preparatory Academy at the New Mexico Military Institute. This was his first time competing at the event organized by Sandia.

In all, 43 teams from 21 schools across the state took part in the competition Nov. 4 at Kennedy Middle School. Some traveled more than three hours just to participate.

“We had some good naps,” joked Fincher’s teammate Miriam Yehl. “We had to wake up at four in the morning to get here but it was fun.”

The event is the culmination of weeks of diligent work by the students.

The students’ primary objective is to construct an electric car that can travel the 10-meter track the fastest while carrying a 737-gram cylindrical container of table salt as a payload. Students must



**VICTORY!** — Roosevelt Middle School’s Team 1 Olivia Oldfield, Katelyn Rostowfske, Tessa Knight and Brook Meisner, left to right, accept the honor of second-fastest car. Their team, which also includes Katy Smutz, won the overall competition at 2023 NM Electric Car Challenge held in Albuquerque Nov. 4.

Photo by **Craig Fritz**

also deliver an oral presentation on their design and complete a research project.

This year’s topic challenged the students to explore “the most effective ways to reduce carbon emissions throughout a vehicle’s lifetime.”

Roosevelt Team 3, named “The Felonious Rabbits,” proposed the use of more sodium ion batteries for electric vehicles. Team member Jack Henley said, “They are not a rare earth metal. They are not hard to find, so we don’t spend fossil fuels mining them. Also, they can’t explode like lithium can.”

The annual NM Electric Car Challenge wouldn’t be possible without the dedication of volunteers from Sandia. This year that group included electrical engineer Dan Riley and Fleet Manager Justin Teo, who served in the roles of racetrack timers.

“I really liked seeing when the teams are at the track, and they are having a rough day. They make some small changes to their car and then all of a sudden, everything clicks for them, and their car goes down the track,” Riley said.

“I think it’s a great competition for kids,” Teo added. “It’s great to see them get so creative and to see their energy. They get so excited over getting across the finish line.”

Although every team hoped to secure



**FASTEST FOURSOME** — The “Felonious Rabbits” of Roosevelt Middle School created the fastest car at the 2023 NM Electric Car Challenge, which traveled 10 meters in 3.4 seconds. They credit their lightweight and aerodynamic design.

Photo by **Kim Quintana**

the title of the fastest car and take home the giant trophy, it was clear that winning wasn't everything.


As one moved through the crowds of kids in the classrooms, the cafeteria, library, halls, and gym, it was apparent that young minds were buzzing with inspiration. Their faces would light up when they came up with a new way to make their cars go faster. Their worry was apparent when things didn't go as planned, and there were smiles when they did.

There was also laughter, a lot of laughter — the exuberant sound of kids being kids.

"We named our car 'Ol' Bill's Tractor,'" giggled Marcus Smith, as he explained how his team from NMMI came up with

their car design and name. "We saw a guy on a tractor one day and started laughing. We called him Ol' Bill. When we started working on our car, we painted it green said together: 'Let's call it Ol' Bill's tractor,'" prompting his team to break out in even more giggles.

In the end, "Ol' Bill" didn't perform as well as they had hoped, but the sixth graders still walked away with smiles and a sense of pride.

"This is our first year doing this, so we did pretty good," Smith said. "We will be back next year. We will definitely be back." 



**THE RACE IS ON** — In the head-to-head competition, Gray Stanburry, left, from Jefferson Middle School Team 2 and Gabe Aiken from Roosevelt Middle School Team 3, race their cars in the 2023 NM Electric Car Challenge held in Albuquerque on Nov. 4, 2023. Roosevelt's Team 3 went on to win the fastest car portion of the design challenge.

Photo by Craig Fritz

## Sandia volunteers mentor local students to improve academic, lifelong outcomes

By **Sofia Wolinski**

**B**ig Brothers Big Sisters is calling upon the Labs' talented professionals to join hands in making a significant impact on the lives of young people in need by mentoring through its newest program, mentor2.0.

With a history spanning over 100 years, Big Brothers Big Sisters believes that every child harbors the innate potential to succeed and thrive in life. Aimed at fostering mentorship and guidance for young individuals, Big Brothers Big Sisters facilitates meaningful matches between adult volunteers, known as "bigs," and children between the ages of 6 and 18, referred to as "littles."

Recently, Big Brothers Big Sisters launched a new program called mentor2.0, which matches high school students with college-educated mentors. The program provides support and guidance for mentees to graduate high school and succeed in college and the workforce. Mentors and mentees interact through weekly messages and monthly group events held at the high school

hosted and organized by mentor2.0 staff.

Students in mentor2.0 actively participate in a weekly class where they engage with a curriculum which focuses on developing abilities crucial for collegiate success. These skills include determination, analytical thinking, seeking assistance and advocating for oneself as well as fostering a positive and enthusiastic outlook on the future. Additionally, the curriculum addresses important aspects of college readiness such as selecting a college, completing applications, and understanding financial aid.

According to Big Brothers Big Sisters of Central New Mexico, "littles" who participate in the program are more confident in their schoolwork performance, able to get along better with their families, 46% less likely to begin using illegal drugs, 27% less likely to begin using alcohol and 52% less likely to skip school.

### Calling Sandia mentors

Sandia contractor Carla Busick has mentored through Big Brothers Big Sisters since 1996. Carla's most recent little, with whom she connected through mentor2.0, is in her freshman year at



**MAKING BIG PLANS** — Tess Hogancamp, left, Big Sister to Vianey Ibarra, 17, in Big Brothers Big Sisters' mentor2.0 program, work together on preparing for college applications during a monthly meeting at South Valley Academy.

Photo by Craig Fritz

the University of New Mexico. Carla enjoyed the program so much that she is continuing communication with the little as she enters college and starting a new match for the upcoming school year.

While the program is geared toward promoting the well-being of the mentees, they are not the only ones who benefit. "Bigs benefit as well! Learning what it's like to be going through life today as a young person and helping navigate through some of the good and bad is a very rewarding experience," Carla said.






**MENTOR, MENTEE** — Tess Hogancamp, left, is Big Sister to Vianey Ibarra, 17, in Big Brothers Big Sisters' mentor2.0 program at South Valley Academy in Albuquerque.

Photo by Craig Fritz

Similarly, engineering program and project lead Tess Hogancamp began the mentor 2.0 program at South Valley Academy last year where she was paired with then-junior Gisselle. At the end of the spring semester, Tess began mentoring Gisselle's best friend Vianey, too. According to Tess, both of her mentees "are incredible young women" and "it has been rewarding being their cheerleader on the sidelines."

During their meetings, Tess both offers valuable guidance on Gisselle and Vianey's options after graduation and assists them with college applications and scholarships. Growing up, Tess was mentored informally by her teachers, which she said was incredibly valuable to her. As a result, she joined Big Brothers Big Sisters as a mentor "to pay it forward and encourage the young people to pursue their passions and to build a life that brings them joy."

Currently, mentor2.0 only partners with **Amy Biehl High School** and **South Valley Academy**. They accept applications year-round for volunteers in both locations. To volunteer, first complete the **mentor 2.0 online application**. A Big Brothers Big Sisters customer relations specialist will reach out with more information including training dates. Big Brothers Big Sisters will complete a background check and interview with each volunteer mentor. To further inquire about the program, please contact Jessica Sosa at [Jessica.Sosa@bbbs-cnm.org](mailto:Jessica.Sosa@bbbs-cnm.org) or 505-319-6757. 

## Mentor requirements

- Mentors must be at least 21 years old and hold a college degree (two-plus-year degree) or have significant life experience.
- Commit to mentoring for at least one year. Organizers hope that volunteers will continue with their mentee until they graduate from high school.
- Commit to sending one weekly message on a topic that mentor2.0 provides through its online platform.
- Commit to seeing the mentee once every four to six weeks for two hours at a mentor2.0-facilitated after-school event at their school from 5:30-7:30 p.m.
- Agree to only communicate and meet within the above framework (for curriculum focus and program fidelity). After junior year and a strong relationship foundation has been established, opportunities for outside communication and meetings between the mentor and mentee may be possible.

# Behind the scenes of a scientific conference in Albuquerque

*Gathering promotes mentorship, diversity and recruiting*

By Neal Singer

Ideally, researchers who attend scientific conferences experience the challenge of meeting colleagues both old and new to discuss the latest work in their field. That experience is quite different from organizing an entire conference and helping it roll along, with occasional prodding, from start to finish.

That's what senior manager Jim Stewart and researcher Joe Bishop

found when they successfully proposed to the U.S. Association of Computational Mechanics that its 2023 national congress, which attracted more than 1,200 attendees, be held in Albuquerque for the first time in two decades. They convinced Sandia researcher Rekha Rao, a vice president of the



**REACHING OUT** — Sandia researchers Jeff Horner, left, and David Littlewood provide information to a possible Laboratories recruit.

Photo courtesy of U.S. Association of Computational Mechanics



**CONGRESS CHAMPION** — Sandia manager Jim Stewart, center, offers his views in an informal discussion. Jim championed the idea of bringing the convention to Albuquerque.

Photo courtesy of U.S. Association of Computational Mechanics

organization who was slated to assume a higher position next year — the association's first woman president — to serve as the technical program chair, while Jim and Joe assumed the roles of congress co-chairs.

“The technical talks were of very high quality and represented a wide variety of technical areas within the broad field of computational mechanics,” Jim said. “The congress was well-organized and well-run. No major issues



**FULL CIRCLE** — Sandian Joe Bishop gathers his thoughts and enjoys a quiet moment at the convention he helped organize, 20 years after a similar convention brought him to Sandia.

Photo courtesy of U.S. Association of Computational Mechanics

arose that couldn't be addressed, and we received very positive feedback from many attendees.”

Albuquerque Mayor Tim Keller provided pre-recorded welcome remarks and Associate Labs Director Doug Kothe delivered an in-person welcome for the congress, which took place in July.

One impressive achievement was the number of Sandia

attendees doubled those at previous biannual conferences — 200 instead of the usual 100. Jim speculated that because the locally held conference significantly reduced expenses related to airfare, hotels and travel time, it made attendance possible for a larger number of area researchers.

“A locally held national conference is also a great recruiting opportunity,” Joe said, “and a medium for generating research ideas. It helps more Sandia researchers connect with professors working in compatible areas, identify promising students, and network.”

As program chair, Rekha designed and coordinated the overall conference program and scheduled 85 technical minisymposia— a complex undertaking.

“It's unfunded work, carried out during nights and weekends,” she said. “Given the size of the conference, it's a significant commitment.” However, it provided her with an opportunity to promote gender diversity, a key goal of the convention. “Half of the four plenary speakers were women, and two out of six semiplenary speakers were women.”

“We're also supporting the local community. The downtown hotels and restaurants were full,” she said, noting that food trucks also assisted local restaurants in serving 1,200 people in downtown Albuquerque.

Rekha coordinated many of the details




**WELCOMING WORDS** — Sandia researcher and association vice-president Rekha Rao addresses the 2023 national congress of the U.S. Association of Computational Mechanics. Next year, she will be the organization's first woman president.

Photo courtesy of U.S. Association of Computational Mechanics

for the meeting. “We assessed available rooms, facilitated mentoring, arranged for replacement speakers when necessary, organized student meetings and contests and recruited judges,” she said.

For Joe, the local conference held a personal significance: He was recruited 20 years ago, at the previous Albuquerque USNCCM7.

“I vividly remember attending the conference while I was working at General Motors. Seeing leaders in the field from all the national laboratories coming together was an electrifying experience; you could see the energy,” Joe said. The conference was led by former Sandia executive Tom Bickel, a former USACM president, who left a strong impression.

“I couldn't help but think about how wonderful it would be to work at Sandia,” Joe said. So he applied, went through the interview process, and a year later, became a Sandian. “I was right,” he said. 

# Sandia internships prove transformational for Prairie View A&M students

By Amy Treece and  
Breanna Gallegos-Schnedar

**T**hirteen internships at two Sandia sites resulted in transformative experiences for Prairie View A&M University students in 2023. The opportunities delivered firsthand experience on how the research and development and business students could directly benefit the nation through their chosen career fields.

Prairie View A&M interns worked at one of the Sandia locations in Albuquerque, New Mexico, or Livermore, California, in jobs aligning with their degrees, backgrounds and interest areas. While the students were embedded in diverse areas such as supply chain, electrical design, generation systems, cybersecurity, nuclear



**ACCELERATED LEARNING** — Space Jam, the winning team composed of mechanical, chemical and civil engineering students, focused on the tracking of acceleration and elevation of a switch, which is important in detecting malfunctions during flight missions. Space Jam team members, from left, included Kaleb Crawford, Kendall Seveor, Donald Okonkwo, Trinity Wiley and Chelsea Guidry.

Photo courtesy of Breanna Gallegos-Schnedar

deterrence project management and systems surety engineering, they each gained an appreciation for how effective communications, teamwork and problem-solving skills impact success.

Seven of the 13 Prairie View interns

are now year-round interns, and one of the summer interns serves as a student ambassador for Sandia.

Toya Acharya is one of Prairie View's doctoral students who is contributing full time to Sandia's mission of reducing national security risks. As a year-round graduate intern in Strategic Cyber Initiatives, Acharya partners with a team of computer scientists seeking to mitigate attacks on U.S. enterprise security and critical infrastructure. Through his work on the TreeClock project, he develops statistical models helping detect host attacks earlier in what cyber professionals call "the kill chain."

"Combining the knowledge I gained from school with the skills I obtained during my internship helped to broaden my understanding of national security needs. The intern program at Sandia also allowed me to tour different Labs across the [DOE] complex, attend talks pertaining to my field and receive invaluable mentoring from staff," Toya said.

Toya's contributions provide threat-informed national cybersecurity solutions using timing information in process execution logs. This type of impact directly fulfills Prairie View's Electrical and Computer Engineering department

**19<sup>TH</sup> ANNUAL  
HOLIDAY  
GIFT  
DRIVE**

**NOVEMBER 15 - DECEMBER 6**

[tiny.sandia.gov/holidaygiftdrive](https://tiny.sandia.gov/holidaygiftdrive)



**STRATEGIC CONTRIBUTIONS** — Year-round graduate intern Toya Acharya from Prairie View A&M working in Sandia's Strategic Cyber Initiatives department uses his technical skills to detect host attacks earlier in the cybersecurity "kill chain." **Photo courtesy of Toya Acharya**



**PANTHERS INVENT** — Prairie View A&M student Josiah Moore prevents defects and reduces risks in high-consequence systems in Sandia Subsystems/Components Surety Engineering department. Moore participated on the team that took second place in Panthers Invent.

**Photo courtesy of Josiah Moore**

objective to produce researchers who can innovate and contribute to evolving technological challenges.

"The Sandia-Prairie View partnership has opened up a tremendous opportunity for our students to work on projects of national and global importance with the top-notch experts in the field,

including our faculty members, using cutting-edge technologies and state-of-the-art instruments. The mentorship they receive prepares them to join elite research corps/workforce in industry and academia," Ramaswamy Krishnamoorthi, Prairie View A&M executive director of **Research and Innovation Administration**, said.

Prairie View A&M is one of Sandia's five academic partners in the **Securing Top Academic Research and Talent at Historically Black Colleges & Universities, or START HBCU, program**. With Sandia, the partners inspire and develop a diverse workforce through research partnerships on critical missions.

Josiah Moore, an intern who joined Sandia as a full-time employee, solves technical challenges in Sandia's Subsystems/Components Surety Engineering department. In his role, he prevents defects and reduces risks in high-consequence systems, allowing him to develop advanced skills and learn new tools, such as statistical software JMP, which he uses to evaluate, analyze and visualize data, and the programming language Python. Josiah said his internship presented him with networking opportunities he hadn't imagined.

Anthony Sanders, Sandia's Diversity Partnerships Campus Partnership manager, agreed that networking is invaluable. "The networking opportunities provided to START HBCU interns is one of the greatest nontangible benefits. Collaborating with others in your field who have different expertise or additional experience tackling certain types of technological challenges is truly life changing."

Meetup opportunities hosted by Black/African American employee resource groups provide interns with opportunities to learn about career development programs and engage directly with members who can answer questions and offer support as they navigate their internship. In 2023, Prairie View students joined fellow START

## Creating the future through Panthers Invent

Prairie View A&M University students participating in a 48-hour, multidisciplinary, intensive design experience known as **Panthers Invent** know the pressure of the clock. In this annual event, student teams are presented with an engineering challenge and given a very tight deadline. In other words, it's realistic and relatable.

Sandia sponsored the design experience, along with other industry leaders. Victoria Miles, David Baker, Jamesetta Seals, Tanzie Judge and Suzanne Moore from Sandia either mentored or supported a Panthers Invent team during the Sept. 22-24 event as they designed products to win the coveted title of "Best Innovation."


Breanna Gallegos-Schnedar, a technical business development specialist for Sandia, said, "If teams want to design an application that outshines and outperforms the others, then critical thinking skills are essential."

Through this methodical and "Sandialike" process, the 38 students experienced a miniaturized and accelerated version of the product realization process and gained experience using rapid prototyping tools at the university's Fabrication Design Center. They also learned how to craft pitchlike presentations that highlight how their application meets the specifications and provides the desired outcome.

Sandia employees Chrisma Jackson, Anthony Sanders, Karen McDaniel, Mark Martin and Arnold Muyshondt — a former Sandia employee, now part of the Texas A&M system — participated as judges.

The Panthers Invent challenge serves as one of the critical pillars for the university's Engineering School.

The **START HBCU Institute** webpage and Sandia **START HBCU recruiter Sheila Lewis** provide more information about employment and internship opportunities. Sandia Deputy Campus Partnership Manager and Prairie View alumni **Suzanne Moore** is also on the Prairie View A&M campus once a month to engage with students and provide additional insight through career readiness workshops and graduate school informational talks.

HBCU interns at poster sessions, allowing them to showcase their internship accomplishments to Sandia leadership, learn about other research opportunities at Sandia and gain feedback from industry professionals. 

# Mileposts



Patrick Griffin 35



Natasha Genson 25



Joe Kieltyka 25



Darick Lewis 25



Steve Lindsay 25



Johnny Montano 25



Michael Spoerner 25



Cap Fritz 20



Christy Gilbert 20



Kirt Hickman 20



Charles Hill 20



Mike Lopez 20



Erik Sperke 20



Trish Taylor 20



Joshua Usher 20



Richard Apodaca 15



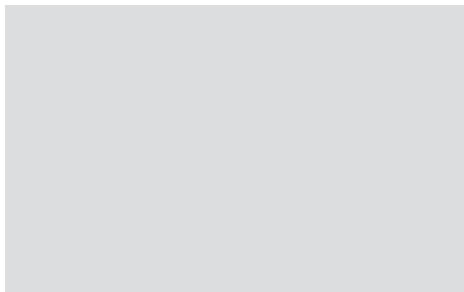
Robert Goodwin 15



Eric Harstad 15



B. Liddle 15



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# Take a Frozen Turkey to Work Day

*Sandia donations benefit New Mexico, California neighbors in need*

By **Katrina Wagner**


In partnership with Sandia Laboratory Federal Credit Union, the Labs hosted its annual Take a Frozen Turkey to Work Day Nov. 14 to collect food and monetary donations for those less fortunate. For the first time, Sandia's California site also participated.

Turkeys were donated at Sandia by employees, and multiple Sandia Laboratory Federal Credit Union locations accepted turkeys from credit union members and the public.

The turkeys were transported to Roadrunner Food Bank and other food pantries in New Mexico and to Tri-Valley Haven in Livermore, California. Roadrunner Food Bank is the largest

nonprofit dedicated to solving food insecurity in New Mexico. Tri-Valley Haven is a community organization that serves adults and children who have experienced domestic violence, sexual assault or homelessness in the Tri-Valley area.

Donations included 270 turkeys and about \$5,000 to support the work of Roadrunner Food Bank.

"In New Mexico, one in five kids and one in seven overall are experiencing food insecurity throughout the year and, during the holiday season, this number only continues to rise. Protein is a critical nutritional resource and, unfortunately, regrettably scarce in our state," said Will Tapia, corporate engagement officer from Roadrunner Food Bank. "These donations from Sandia National Laboratories and Sandia National Laboratory Federal Credit Union are a beacon of hope this holiday season, providing meals for families in need during this pivotal time of the year." 



**COOL DONATIONS** — Information Technology Services Director Thomas Trodden unloads frozen turkeys that will be distributed in time for Thanksgiving. **Photo by Kim Vallez Quintana**



**TALK TURKEY** — An employee drops off a turkey near the Steve Schiff Auditorium Nov. 14. **Photo by Craig Fritz**



**TURKEY TROT** — Florenca Prada, senior manager of Business Operations and Human Resources, drops off a frozen turkey in Livermore, California, on Tuesday. This is the first year Sandia's California site participated in Take a Frozen Turkey to Work Day. **Photo by Michael Skaikh**



**PILED HIGH** — Community Relations Specialist Debra Menke supervises turkeys as they are dropped off near the Steve Schiff Auditorium during Sandia's Take a Frozen Turkey to Work Day. **Photo by Craig Fritz**

# Directors give back during Fall Leadership Forum

By [Katrina Wagner](#)

The Fall Leadership Forum is an annual opportunity to connect Sandia's leaders through engaging discussion and networking. This year's forum Nov. 14 featured six service projects where center directors gave back to the community and learned about the work of multiple Albuquerque nonprofits. [@](#)



**INSPECTION, PLEASE** — Sandia Fellows Bill Miller, left and Cindy Phillips work together to weed out bad potatoes at Roadrunner Food Bank. The nonprofit distributes an estimated 60 million pounds of food each year.

Photo by [Kim Vallez Quintana](#)



**PREPARING FOR SPRING** — Directors Lani Sanders, left, and Chrisma Jackson work in the urban garden at the Rio Grande Food Project, a nonprofit that provides nutritious food to the community. The team winterized the garden to prepare for spring by cutting back sunflowers.

Photo by [Amy Tapi](#)



**MEETING LOCAL NEED** — Lisa Ramirez, left, and Justin Poore sort food at Storehouse New Mexico. Storehouse provides free groceries to help people in need and serves up to 35,000 people each year.

Photo by [Daniel Roth](#)



**NO BAD APPLES** — Director Samantha Flores sorts apples at Roadrunner Food Bank as part of the Fall Leadership Forum.

Photo by Kim Vallez Quintana



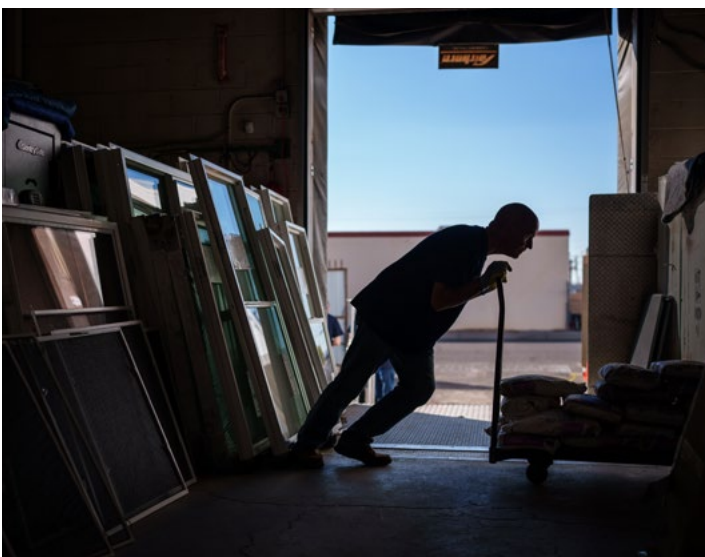
**COMFORT FOOD** — At the Ronald McDonald House, Josh Parsons, Brad Boswell and Rob Nelson, left to right, prepare casseroles for families whose children are receiving treatment at local hospitals.

Photo by Daniel Roth



**FASHION FORWARD** — Basil Hassan sorts clothing at Locker 505, a clothing bank for kids in grades K-12 as other Sandia leaders tackle the piles of clothes around them. Locker 505 is a student-focused facility where children can try on and choose outfits that they feel good about wearing.

Photo by Craig Fritz



**HOME IMPROVEMENT** — Craig Taylor organizes supplies at the Greater Albuquerque Habitat for Humanity ReStore, which provides the community with an affordable place to find home improvement items.

Photo by Craig Fritz