



S A N D I A

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NASA's VIPER mission gets vital help from Sandia



TO THE MOON — The Sandia team discusses testing of VIPER at the Superfuge and works on sensors prior to the test.
Photo by Craig Fritz

By **Kim Vallez Quintana**

NASA's VIPER, a rover designed to map water on the moon, has reached another major milestone with help from Sandia and its one-of-a-kind testing capabilities.

"We've built a rover that is designed to go and prospect for water on the moon, but the vehicle must be certified for mission," said Dave Petri, NASA VIPER system integration and test lead. "We need to be sure its structure is properly designed and built to survive the mission, including the launch environment."

Sandia's Superfuge

That's where Sandia's Large Centrifuge, or Superfuge came in. A facility like none other in the world, the 29-foot underground

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Sandia's economic impact sets record for 17th consecutive year

By **Kim Vallez Quintana**

Sandia generated a record \$5.2 billion in economic impact in 2025, marking the 17th consecutive year Sandia has set a new high, according to its annual economic impact report released this month.

The total represents a \$40.5 million increase from 2024 and more than doubles Sandia's economic impact from 12 years ago, reinforcing its role as one of New Mexico's largest employers and economic engines.

"Sandia has been a strong part of New Mexico's economy for more than 75 years," Labs Director Laura McGill said. "We are extremely proud of our contributions, which extend beyond the economy and include giving back to our community through financial donations and volunteer time. We are

neighbors that are invested in making this an even greater place to live."

Investing in the workforce

Sandia's largest investment in 2025 was its workforce of approximately 16,000 people. Sandia spent nearly \$2.95 billion on labor costs last year, an increase of \$46 million from 2024. The increase reflects pay raises for the highly skilled scientists, engineers and professionals who fulfill Sandia's national security mission.

With an average salary of \$145,000, Sandia remains committed to keeping high-paying jobs in New Mexico.

"Our employees live here. They raise their families here. They volunteer in our schools, support local organizations and spend their

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Graphic by Brittney Flores

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Brain-inspired computers are shockingly good at math



MENTAL MATH — Brad Theilman, a computational neuroscientist at Sandia, helped discover that nature-inspired, neuromorphic computers, like the one shown here, are better at solving complex math problems than previously thought.

Photo by Craig Fritz

New research demonstrates potential for energy-efficient supercomputing

By **Troy Rummler**

Neuromorphic computers, inspired by the architecture of the human brain, are proving surprisingly adept at solving complex mathematical problems that underpin scientific and engineering challenges.

In a paper published in [Nature Machine Intelligence](#), Sandia computational neuroscientists Brad Theilman and Brad Aimone describe a novel algorithm that enables neuromorphic hardware to tackle partial differential equations, or PDEs — the mathematical foundation for modeling phenomena

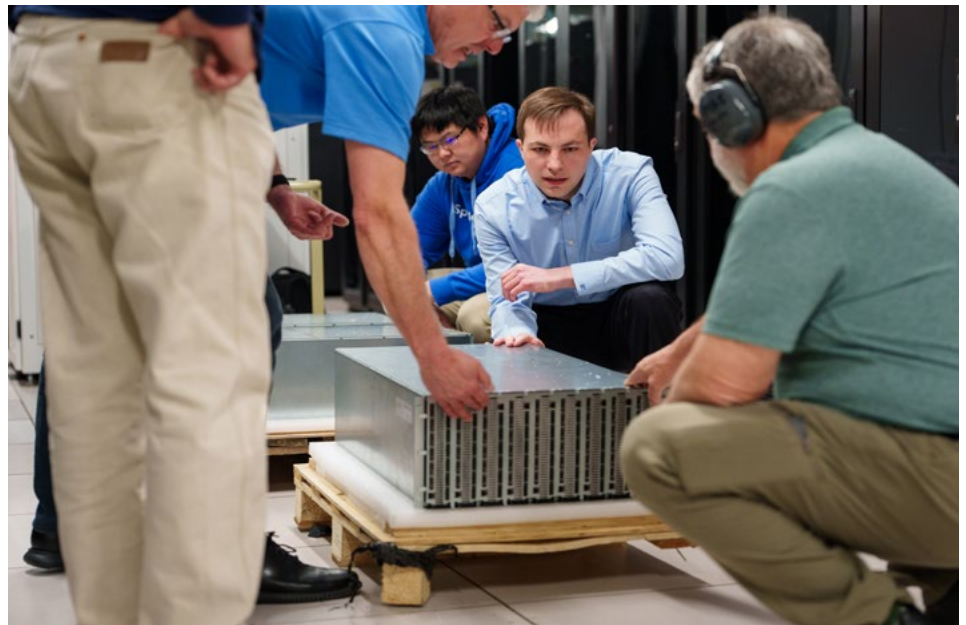
such as fluid dynamics, electromagnetic fields and structural mechanics.

The findings show that neuromorphic computing can not only handle these equations but do so with remarkable efficiency. The work could pave the way for the world's first neuromorphic supercomputer, potentially revolutionizing energy-efficient computing for national security applications and beyond.

Research was supported by the DOE's Office of Science through the Advanced Scientific Computing Research and Basic Energy Sciences programs, and by the NNSA's Advanced Simulation and Computing program.

A brain-inspired approach to scientific computing

Partial differential equations are essential for simulating real-world systems, from predicting weather patterns to modeling the behavior of materials under stress. Traditionally, solving PDEs requires vast computational resources. Neuromorphic computers, however, offer a fundamentally different approach that more closely resembles how the brain processes information.



NEUROMORPHIC HARDWARE — Researcher Brad Theilman unpacks a neuromorphic computing core at Sandia. While the hardware might look similar to a regular computer, the circuitry is radically different. It applies elements of neuroscience to operate more like a brain, which is extremely energy efficient. **Photo by Craig Fritz**

“We’re just starting to have computational systems that can exhibit intelligent-like behavior. But they look nothing like the brain, and the amount of resources that they require is ridiculous, frankly,” Theilman said.

For decades, experts have believed that neuromorphic computers were best suited for tasks like recognizing patterns or accelerating artificial neural networks. These systems weren’t expected to excel at solving rigorous mathematical problems like PDEs, which are typically tackled by traditional supercomputers.

But for Aimone and Theilman, the results weren’t surprising. The researchers believe the brain itself performs complex computations constantly, even if we don’t consciously realize it.

“Pick any sort of motor control task — like hitting a tennis ball or swinging a bat at a baseball,” Aimone said. “These are very sophisticated computations. They are exascale-level problems that our brains are capable of doing very cheaply.”

Energy efficiency for national security

The implications of this research are particularly significant for the NNSA, which oversees the nation’s nuclear deterrence mission. Supercomputers throughout the nuclear weapons complex require immense amounts of energy to simulate the physics of nuclear weapons and other critical systems.

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Neuromorphic computing offers a path to dramatically reduce energy consumption while maintaining computational power. By solving PDEs with brain-inspired efficiency, neuromorphic systems are showing they might handle large-scale simulations with far less power than conventional supercomputers.

"You can solve real physics problems with brain-like computation," Aimone said. "That's something you wouldn't expect because people's intuition goes the opposite way. And in fact, that intuition is often wrong."

The researchers said they envision a future where neuromorphic supercomputers play a central role in Sandia's mission to keep the world safe and secure.

A window into the brain's secrets

Their research also raises intriguing questions about the nature of intelligence and computation. The algorithm developed

by Theilman and Aimone retains strong similarities to the structure and dynamics of cortical networks in the brain.

"We based our circuit on a relatively well-known model in the computational neuroscience world," Theilman said. "We've shown the model has a natural but non-obvious link to PDEs, and that link hasn't been made until now — 12 years after the model was introduced."

The researchers believe that neuromorphic computing could help bridge the gap between neuroscience and applied mathematics, offering new insights into how the brain processes information.


"Diseases of the brain could be diseases of computation," Aimone said. "But we don't have a solid grasp on how the brain performs computations yet."

If their hunch is correct, neuromorphic computing could offer clues to better understand and treat neurological conditions like Alzheimer's and Parkinson's.

Building the future of computing

While neuromorphic computing is still in its early stages, Sandia's research is laying the groundwork for transformative advancements. The team hopes their work will inspire collaboration with applied mathematicians, neuroscientists and engineers to explore the full potential of this technology.

"If we've already shown that we can import this relatively basic but fundamental applied math algorithm into neuromorphic — is there a corresponding neuromorphic formulation for even more advanced applied math techniques?" Theilman said.

As Sandia continues to advance neuromorphic computing, the researchers are optimistic about its potential to address some of the world's most pressing challenges. "We have a foot in the door for understanding the scientific questions, but also we have something that solves a real problem," Theilman said. 

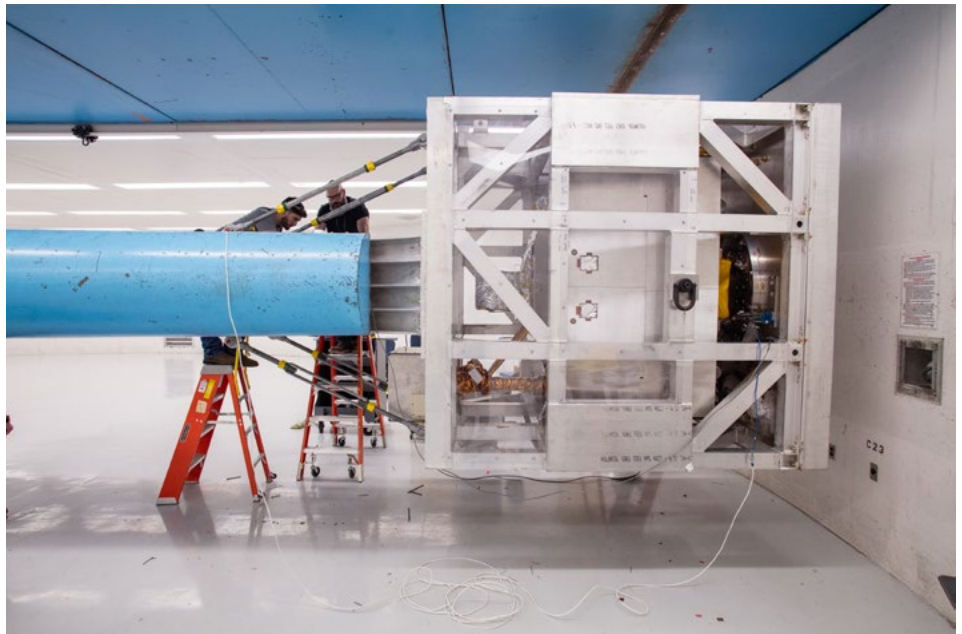
VIPER

CONTINUED FROM PAGE 1

centrifuge can subject test items to inertial forces up to 300 Gs — 300 times the force of the Earth's gravity — and can accommodate a 16,000-pound payload capacity while integrating vibration, spin, thermal and shock environments simultaneously, mimicking flight conditions from launch to reentry.

For NASA, the challenge with testing VIPER, the Volatiles Investigating Polar Exploration Rover, was its size and design. The VIPER team considered multiple test methods and facilities, including a drop tower or rocket sled, but Sandia's test abilities stood out.

"This is a 1,000-pound article and it has to be oriented in a number of ways throughout the testing process," said Ben Quasius, VIPER lead stress analyst at NASA. "In many cases we would do a static qualification test where we use pistons to push on certain locations of the article to test flex of the body, but there are sensitive things in the way. You have solar panels in prime



ROVER READY — An engineer and technologist work on sensor connections while VIPER is suspended in a cage at the end of the Superfuge arm at Sandia. **Photo by David Lienemann**

locations and a drill in the middle that can't be compromised during flight."

NASA's team spent three weeks testing the rover at Sandia's centrifuge facility.

"There is not another machine in the world that has the capabilities we do here,"

said Orlando Abeyta, Sandia operations engineer at the Superfuge. "We have tested weapons systems, components of weapons systems, aerospace tanks and even the Jupiter fuel tank for NASA."

What a team

Orlando said he takes pride in the work they do. “That is what I like about working here. Even though the centrifuge is just turning, each test is different. That is what keeps me interested in being here.”

The Superfuge team spent months preparing for the NASA tests. Their job goes far beyond running the centrifuge. They engineer each test, determine how to load the article, connect all the required instrumentation and what angles to test at. They also have to troubleshoot when things don’t go as planned. On VIPER, there were 48 different points of data to be collected and analyzed.

“You can model anything you want, but until you put it on that arm you don’t know what you are going to get,” Orlando said. “As a centrifuge operator, anyone can push a button, but you need to know what is happening when you push that button — if it doesn’t work, then what? That’s what I’ve learned to do here.”

Sandia test lead Leticia Mercado, who holds a master’s degree in mechanical engineering with a concentration in space systems, called the rover testing a dream come true.

A native of Farmington, New Mexico, she grew up planning to leave her home

state, but after an internship at Sandia, she found her passion.

“I worked at the Drop Towers and the Mechanical Shock Complex and then this became my home facility,” Leticia said. “Personally, I am just excited to be part of this test and to lead it. I have such a unique job.”

The VIPER mission

The Sandia team is eager to see VIPER head to the moon but will have to wait until late 2027.

NASA announced in September that it had chosen Blue Origin of Kent, Washington, to deliver the rover to the moon’s south pole using a Blue Moon MK1 lander, which is in production.

Once there, the rover will be charged with making a water concentration map of the moon.

“We know there is water on the moon,



WIRING THE MISSION — Operations engineer Orlando Abeyta works on wiring prior to placing a cage around and attaching VIPER to the arm of the Superfuge at Sandia. **Photo by Craig Fritz**


but we don’t know the concentrations of water,” Petri said. “It’s like prospecting for gold here on Earth. You need enough concentration for it to be worthwhile to mine. It’s the same with the moon.”

The rover is armed with three scientific instruments: a mass spectrometer, a near-infrared spectrometer and a neutron spectrometer. Those instruments can detect water volatiles, particles that evaporate, or boil off, when heated.

The rover also has a drill capable of reaching one meter beneath the surface to pull up samples of any existing water remnants.

The goal is for the rover to explore the moon’s south pole, where permanently shadowed craters don’t experience boil off and have a higher probability of containing large concentrations of water.

The science could be groundbreaking, and Sandia’s team said they are proud to have played a role in it, just as they are of every test they’ve played a role in.

“I got a compliment from a manager for the VIPER testing saying they had never had an experience like they did here,” Orlando said. “If something happens, we have an answer for it. We know how this equipment works. There are so many great people here, everybody helps each other and that’s what makes this place work so well. On Sunday nights I am excited to come to work on Monday to see what I get to do next.” 



POWER UP — Technologist Freddie Martinez figures out electrical connections for testing of VIPER at the Superfuge. **Photo by David Lienemann**

Economic impact

CONTINUED FROM PAGE 1

paychecks at local businesses,” Laura said. “When we talk about economic impact, that’s what we’re really talking about.”

Working with small businesses

Sandia’s second largest expenditure in 2025 was \$1.7 billion in subcontract-related payments, which were spent with businesses around the country that provide critical services to the Labs. Many of those are small businesses, a cornerstone to the nation’s economy.

“Sandia National Laboratories has a rich tradition of collaborating with a wide range of skilled small-business suppliers who play a vital role in supporting our national security initiatives,” said Krista Smith, Sandia’s supply chain director.

Sandia spent \$1.03 billion with small businesses in 2025, the third consecutive year it exceeded the billion-dollar mark. Of that amount, \$463 million went to small businesses in New Mexico. Sandia also worked with 335 new small businesses during the year.

“I want to highlight the importance of working with new small businesses,”

said Zach Mikelson, Sandia’s small-business program manager. “They bring fresh, innovative ideas to the table, which can help develop better solutions for the nation, all while contributing to the local economy by creating jobs and supporting economic growth.”

In 2025, Sandia increased spending with veteran owned, service-disabled veteran-owned and HUBZone businesses. HUBZone businesses, located in historically underutilized business zones, often facing higher unemployment and poverty rates.

Contributions to the public services

Sandia also contributed significantly to public services in New Mexico through tax payments.



FUNDING REPORT — Labs Director Laura McGill shares 2025 economic impact results with members of the media during a news conference on Jan. 9 at the Center for Global Security and Cooperation. **Photo by Craig Fritz**

In 2025, Sandia paid approximately \$144 million in gross receipts taxes to the state of New Mexico, an increase of \$11.3 million from the previous year. Overall, Sandia paid \$148 million in corporate taxes, up \$12.3 million, helping support programs and services that benefit New Mexicans statewide.

Investing in the future

One of the most important ways Sandia invests in future is through education.

In 2025, Sandia reached 14,000 students through STEM education programs, about 4,000 more than the year before. Sandia also engaged 700 teachers and community members, a 98.86% increase compared to 2024.

The community involvement team partnered with the National Museum of Nuclear Science & History to launch Mission Fission, a program that introduces nuclear science and energy concepts to eighth-grade students in Albuquerque Public Schools. The program aims to reach 4,500 students each year.

“These are students who may one day become engineers, scientists, technicians or small-business owners in New Mexico,” Laura said. “Behind every statistic is a student discovering a love for science.”



GIVING BACK — Sandia project manager Josie Gallegos, left, and financial specialist Denise Johnson work at a Seed2Need event in Corrales, New Mexico, on Nov. 1, along with 45 other volunteers.

Photo by Katrina Wagner

Giving back to the community

Sandia also continued its strong tradition of giving back to the community.

National Technology and Engineering Solutions of Sandia LLC donated \$1.6 million to local education, family stability and community leadership initiatives.

Employees also gave of their own time and money, donating more than \$4 million to nonprofits through the United Way of North Central New Mexico, \$15,000 for Shoes for Kids, \$8,000 for school supply drives and \$14,000 for Roadrunner Food Bank. Employees also donated 1,322 pints of blood in 2025 and volunteered at more than 50 volunteer events.

“As the nation’s premier engineering laboratory, Sandia’s mission is to address complex national security challenges,” Laura said. “But we don’t do that in isolation.

We pull from our community — one that includes local businesses, schools, nonprofits



INVESTING IN THE FUTURE — Students from Jefferson Middle School in Albuquerque, Pablo Sandoval, right, and Tomas Giron let their car loose under the watchful eye of Sandia volunteer Justin Teo during the New Mexico Electric Car Challenge on Nov. 15.

Photo by Craig Fritz

and tens of thousands of families across New Mexico and beyond.”

View the full 2025 [Economic Impact Brochure](#). 

Sandia-led team awarded \$10M by DOE to explore materials fatigue, self-healing with AI

By **Krystal Romero-Martinez**

The DOE Office of Science has awarded \$10 million to a Sandia-led team of scientists for a bold new initiative aimed at transforming how industry and research tackle one of the most persistent challenges in advanced technology: material fatigue, or the process of how materials wear out over time. This initiative is part of a broader national push to leverage AI for Science, a key pillar of the Genesis Mission to accelerate the productivity of American research and development and solve complex engineering problems that once seemed impossible.

The project titled, [Microstructure Insights through Reliable/Interpretable AI and Guided Experiments](#), or MIRAGE, aims to combine advanced AI, high performance scientific computing



MATERIAL SOLUTIONS — Combining AI, advanced computing, and experiments to explore, understand, and manipulate damage and fatigue mechanisms in metals. **Photo courtesy of Rémi Dingreville**

and experiments to understand how material fatigue originates and evolves, and how materials can heal themselves. The idea is to empower materials scientists with interpretable models that overcome the complexities of material behavior to formulate and validate new strategies for tougher, more resilient materials.

“Material fatigue has long been viewed as an irreversible countdown to failure, impacting everything from aircraft engines to the microelectronics in our pockets,” said Rémi Dingreville, Sandia scientist and MIRAGE principal investigator. “But we are at an inflection point. By fusing experimental data with multiscale simulations, we are creating a shared ‘fingerprint’ of how materials age.

“With MIRAGE, we are harnessing the predictive power of AI — combined with deep physical insights from those simulations and experiments — to explore entirely new pathways for materials to resist damage or even heal themselves.”

MIRAGE represents a new way of working together on a large scale across


different fields, which is essential for the modern era of discovery. The project brings together experts from multiple DOE national laboratories, including Sandia, Los Alamos, Lawrence Livermore, Argonne and Lawrence Berkeley, and universities such as University of Southern California.

This collaboration ensures that foundational research in the physical sciences can be rapidly translated into the resilient materials required for national security and energy dominance. The project is supported by DOE’s Office of Science, through the Scientific Discovery through Advanced Computing partnership program, co-funded by Advanced



PREDICTIVE POWER — Sandia principal investigator Rémi Dingreville leads the MIRAGE team. Photo by Craig Fritz

Scientific Computing Research and Basic Energy Sciences.

“This isn’t just an advance in materials science,” Rémi said. “It’s an opportunity to modernize how we practice science itself, moving beyond human trial-and-error to solve the most challenging problems found in so many scientific domains found across the nuclear security enterprise.” 

The road to El Capitan and El Dorado ran through the Tri-Lab Center of Excellence

How a social network proved to be the missing link in building the world's fastest supercomputer

By **Shelby Owens**

A lot of effort goes into building supercomputers and even more to make them come online. With many stakeholders working at different paces, getting everyone aligned is critical to success.

El Capitan, which would go on to be **the world’s fastest supercomputer in 2024**, was no exception. Sandia, Lawrence Livermore and Los Alamos national

laboratories were tasked with porting their modeling and simulation codes while Advanced Micro Devices supplied cutting edge accelerated processing units and Hewlett Packard Enterprise integrated the machine at Lawrence Livermore. Pulling it off required the right people together at the right time throughout the length of the procurement.

“The realization of Exascale Computing at the NNSA has been an agency priority for many years due to the incredible impact that the capabilities offer the nation’s stockpile stewardship program,” said Simon Hammond, program director for advanced computing in the NNSA Office of Advanced Simulation and Computing. “As with all large-scale and complex programs at the NNSA, we cannot do this alone and must partner

across our national laboratories, and with industry partners, to push the boundaries of what’s possible.”

A bumpy start on the road to success

In early 2020, a formal kickoff of the El Capitan Center of Excellence brought together Sandia, Lawrence Livermore, Los Alamos and industry partners Hewlett Packard Enterprise and Advanced Micro Devices. The intent was to get engineers and programmers on early access systems to assess Advanced Simulation and Computing Tri-lab application codes for a supercomputer that did not yet exist.

The ability to provide feedback on issues and guide the development of software so that required features could be road mapped for future release was critical.

At the heart of the Center of Excellence was an issue tracker in the form of a ticket file system, and message board. These tools were essential but not sufficient. Developers could work on problems independently, file tickets to document a bug or feature request, and post general messages where everyone could read them. The tools to steward new software and system research and development were present, but the burden still rested on developers to explain issues clearly enough so that unmet engineers at vendor sites could read and understand the laboratories complicated problems. Additionally, the teams could not share complete examples that mimic the problem due to security constraints.

The challenges now not only included state lines, but export-control rules and divergent software ecosystems.



BRINGING THE TEAM TOGETHER — Sandia project lead James Elliot, front left, stands with hackathon teams at Sandia's Computer Science Research Institute. Teams included engineers from Hewlett Packard Enterprise and Advanced Micro Devices and code teams from Sandia and Los Alamos National Laboratory.

Photo by Sandia



POWERING THE FUTURE — Lawrence Livermore's El Capitan was verified as the world's fastest supercomputer on the TOP500 list in 2024 and is the first exascale system dedicated to national security.

Photo by Garry McLeod, Lawrence Livermore National Laboratory

"This is a daunting problem," said James Elliott, principal member of technical staff and Sandia Center of Excellence lead. "How do you socialize complex problems with partners that have no prior experience with our code? Enter the COE. The main objective was to architect how to use the tools we had — expert personnel, ticket systems, message boards — while knowing the constraints present, such as security restrictions on our codes and personnel with diverse experience working from remote locations."

Success was built on connecting people

There was another barrier, one that was entirely unprecedented: the COVID-19 pandemic. After months of lockdowns, the Center of Excellence wanted to revive in-person hackathons, which had been useful on other projects. The idea was to host in-person events with vendors and pair targeted personnel to code teams. In November 2022, the idea became a reality.

Each year, four hackathons would take place, two at Sandia and two at Lawrence Livermore, providing dedicated

focus time for teams to nominally "hack" on their codes. The real effect was to build comradery and enable vendor and lab staff to work side by side. The hackathons hosted by Sandia included over 50 developers from Sandia, Los Alamos, Lawrence Livermore, Hewlett Packard Enterprise and Advanced Micro Devices.

"The hackathons have proven to be a force-multiplier. They are extremely popular with both the code teams and our vendor partners at Hewlett Packard Enterprise and Advanced Micro Devices," said Judy Hill, lead of the El Capitan Center of Excellence and computational scientist at Lawrence Livermore National Laboratory. "We can give the vendors real-time feedback on critical challenges and obstacles in the El Capitan software stack, and our code teams



SMALL BUT MIGHTY — Sandia's El Dorado is a smaller but architecturally identical system to Lawrence Livermore's El Capitan. It was number 20 on the TOP500 list in 2024.

Photo by Craig Fritz

have received similar real-time assistance from our COE engineers, yielding leaps forward in application readiness, all from one week of dedicated collaboration time.”

The collaborative spirit of the hackathons extended beyond the three-day events, maturing to four-day events due to popularity. Many teams began building in regular meetings outside of the hackathons with dedicated vendor personnel, often from three or four different employers, to continue the efforts.


This cohesive social network enabled deployment of El Capitan and, later, El Dorado. El Capitan, an exascale computing

system located at Lawrence Livermore, was ranked first on the TOP500 list announced at Supercomputing in November 2024. El Dorado, smaller in scale to El Capitan but architecturally identical, ranked at number 20.

With the complexity of getting the codes both functional and performant on computing systems, the hackathons showed that building a successful network of people might be as fundamental as building the machine itself.

“What really unlocked our progress wasn’t just cutting-edge hardware or code tweaks, but the simple act of bringing

people together,” said Jen Gaudio, director of the Advanced Simulation and Computing at Sandia. “Developers, vendors and lab scientists worked side by side to build trust, share insights and solve problems in real time.”

The development teams are now running at full scale on El Capitan, with some teams even completing Gordon Bell runs, the means to competing for the Gordon Bell Prize. Having just completed the sixth hackathon with incredible turnout, Sandia’s hackathons continue to be a key mechanism for enabling the team’s knowledge of and access to vendor experts. 

SandiaAI Chat: You asked, this team answered

Project leads give a sneak peek at new features that could arrive over the next year

By **Troy Rummler**

More than 1,500 feedback comments have been received about [SandiaAI Chat](#). Together, Erica Grong, Mike Vigil and their team have read every single one.

“We really rely on feedback,” Erica said.

Erica and Mike oversee the operation and upkeep of the flagship chat tool, which has garnered more than 15,200 unique users, an average of 5,600 weekly users and nearly 4 million inquiries since its introduction in May 2024.

But a big part of the job is planning future upgrades.

“Every reasonable suggestion gets reviewed by the team,” Mike said.

In collaboration with management, the pair of project managers and their team — comprising a solutions architect, three full-stack developers and one student intern — prioritize these ideas and then get to work implementing them.

Bringing on “Bring Your Own Data”

One of top requests, Erica said, was to be able to upload documents. This was

fully released to the Labs in August as the Bring Your Own Data function, which appears now as a paperclip icon at the bottom of the chat window.

This new capability saves users the hassle of copying and pasting data into the chat window, but some Sandians have gotten creative with it.

Stefan Domino, a fluid dynamics expert formerly supporting NNSA’s Advanced Simulation and Computing program, said Bring Your Own Data lets him use SandiaAI Chat as a testbed to try out ideas for a different large language model being [developed jointly](#) with Lawrence Livermore and Los Alamos national laboratories.

“I have crafted a set of prompts that we know an LLM can and cannot answer,” because it deals with specific information not included in the AI model’s training. Then he tests how well the model answers the prompts before and after he uploads the critical, missing data.

Stefan said the experience has pointed



CHATTY BUNCH — The SandiaAI Chat deployment and development teams equipped the workforce with a practical and evolving AI tool. Members shown, from left to right, are Nikki Nevitt, Daniel Garcia, Ben Ybarra, Phyllis Teague, Brian Sims, Valerie Silva, Andrew Beussink, Mike Vigil and Erica Grong.

Photo by **Lonnie Anderson**

him to better ways to evaluate the tri-labs model. It also has given him insights into how large language models can be corrupted with nefarious or misleading documents.

When Mike was asked what he’d most like to add to SandiaAI Chat, he pointed right back to Bring Your Own Data.

“I’m really happy with it,” he said.

Want to learn more about SandiaAI Chat and other AI tools to make your work life easier? Visit the [Artificial Intelligence at Sandia](#) website for training, resources and more.

A look at the wish list

But the chat team is far from done. Funding permitting, they have planned out several major improvements that could roll out over the next year.

“Hands down,” Mike said, “the most requested feature since day one has been the ability to use our API.”

Short for application programming interface, API is the connection between SandiaAI Chat and the OpenAI large language model that powers it. Many researchers have asked to bypass the chat interface and get direct access to the model.

It’s a versatile feature, Mike said, and the SandiaAI team is working on it.

API access could empower researchers’ projects when a general-use chat isn’t efficient, like with coding, or when it doesn’t return the data users need, Erica said.

Another new feature the team plans to test is vision, or the ability to use SandiaAI Chat to interpret images.

“I’d be excited to give it an image of a Gantt chart,” Erica said, “and have the tool analyze and interpret the data, and provide me recommendations for improvement.”

But Mike said it could be an even more powerful tool for engineers, too, saying that some large language models can calculate the yield of an explosion based on pictures of the blast damage.

Yet another feature Sandians may see in the future is the ability to search internal Sandia information, which is now being tested by some divisions.


The feature adds a new icon called Ask About Sandia Policy and HR Data. Toggle it on, and SandiaAI Chat will limit its knowledge to Sandia knowledge bases. This lets users, for example, ask a question about Sandia’s rules on social media and get back verifiable answers that link directly to the official policy.

“Most people believe what generative AI tells them, and that’s bad,” Mike said.

He added that a new feature could potentially be tailored to individual teams, letting

users query information from their specific process documents or shared data.

Erica cautioned that all these features are still only ideas being tested and subject to future funding. But in the meantime, Mike had a suggestion for the workforce.

Keep hitting that feedback button. 



FEEDBACK — Project managers Mike Vigil and Erica Grong, not shown, use feedback from the workforce to inform upgrades to SandiaAI Chat.

Photo by Craig Fritz

Enhancing my HR role with SandiaAI

By Ingrid Magoffe

As a human resources specialist, I have found SandiaAI a valuable tool in my workflow, supporting me in research, data analysis and presentation development. I have not only streamlined tasks but also elevated my work with its creative insights.

Recently, the Bring Your Own Data feature in particular played an essential role in data aggregation and thematic analysis for one of my projects. While working on the Fast Track Culture Challenge, a fiscal year 2025 milestone team project developing a process to knock down barriers to innovation across the Labs with input from the workforce, AI helped me manage and categorize vast amounts of qualitative data from design thinking sessions.

With over 400 data points from one session, it quickly identified themes and quantified feedback, easing my mental load. This enabled me to focus on interpreting the data rather than getting lost in the weeds of categorization.

However, I’ve found that AI’s outputs still require human oversight. For example, in one case, Sandia’s AI incorrectly duplicated several comments under a particular theme, which affected the accuracy of the analysis. This experience emphasized the importance of verifying AI-generated results through cross-checks and collaboration with team members.

One thing to keep in mind with this kind of data is to have the feedback somehow bulleted or separated with quotes to minimize

risk of the AI tool mistaking several comments as one or to avoid other errors. I look forward to when we might be able to use a tabular data feature that will help streamline this process and help to ensure accuracy a lot more effectively.

Another area where AI has been a huge help is in drafting and refining written content. I’ll start by throwing together my thoughts in a document draft. I tend to get deep into the details and sometimes struggle to keep things concise and focused. I use AI to review my initial drafts and offer specific guidance on how to improve my writing. Whether it’s for a report, email, presentation or this article, AI helps me trim unnecessary details and polish my ideas, making me more effective at conveying my thoughts and hitting the mark with my intended audience.

Finally, in presentation development, AI supports me by structuring PowerPoint slide content based on a draft outline I provide it in a Word document. It suggests effective sequencing, recommends visuals and even proposes speaking points if I prompt it to, which significantly enhances the clarity and flow of my presentations. With this creative support, I’ve been presenting information in a more engaging and organized way.

Sandia AI has proven to be an essential tool in my role, offering valuable assistance with research, data analysis, writing refinement and presentations. When I use it thoughtfully, AI helps me stay focused on high-value tasks, reduce cognitive load and improve the quality of my work.

Stopping the brain drain

Knowledge management rolls out practices for preserving essential expertise

By **Jennifer Jackson**
and **Theresa Montgomery**

When a seasoned employee walks out the door, what happens to the knowledge they have gained throughout their career? Often, that knowledge either leaves with them or is buried deep within the organization. According to the McKinsey Global Institute, the average worker then spends an average spends an estimated 25% of their workweek searching for hard-to-find information — that's 10 hours.

Sandians are well acquainted with this problem, and leadership wants to change it.

"When personnel announce they are leaving, it results in a mad rush to document their knowledge before it is lost," solid mechanics manager Jason Petti said. "Even when knowledge is retained, it can take up to six months for personnel to get access."

Sandia leadership identified a Labswide knowledge management capability that decreases time searching and increases time producing.

Knowledge management is the "how" behind capturing, organizing, sharing and reusing an organization's collective knowledge. It mitigates the risk of losing crucial organizational information by ensuring knowledge is documented and easily retrievable within the flow of work.

The challenge Sandia faced was how to develop a knowledge management methodology that works for the entire Labs while also accounting for various differences.

Senior manager Andrew Dowd leads Sandia's newly established Knowledge Management Office. With past business experience working with Fortune 50 companies, Andrew understands how knowledge management transforms organizations.

"Our goal is to adopt a program applied throughout the entire Labs with enough flexibility built in to capture the unique knowledge every Sandia organization possesses," Andrew said.

Andrew and his team developed an 18-month pilot program to make this goal a reality. They selected Structural Mechanics Research and Applications as a pilot. The team worked closely with the organization to identify opportunities for enhancing and testing knowledge management capabilities. A core part of their effort is helping personnel identify knowledge management practices they already use but may not recognize.

"Many Sandians have excellent knowledge management capabilities already, but it's very much ad hoc," Andrew said. "We've developed a methodology that will pull everything together so we can have that mindset at a tactical level."

The team identified mentoring as a strong knowledge management capability that many organizations already implement. Solid mechanics engineer Henry Duong borrowed from his Navy background, where mentorship was integral, to improve his experience with knowledge transfer at Sandia.

Drawing from his experience at sea, he recognized the importance of building trust with early-career engineers, meeting them where they are at and ensuring they felt comfortable reaching out to him. Through consistent meetings, Henry actively mentored his fellow Sandians, focusing on coding, design aspects and collaborative problem-solving. His approach not only filled the gaps that he experienced as a new hire 28 years ago, but also created a supportive learning culture where knowledge was shared openly in a two-way mentoring relationship.

As a result of his efforts, Henry realized that real-time knowledge transfer has decreases the time it takes to onboard new engineers.

"I have seen onboarding reduced from three years to as little as six months,"



KNOWLEDGE MANAGER — Senior manager Andrew Dowd leads Sandia's newly established Knowledge Management Office. Armed with experience working with Fortune 50 companies, Andrew and his team developed an 18-month pilot program to model how knowledge management could impact the entire Labs. **Photo by Craig Fritz**

Henry said. "As a result, our engineers are able to take on clients much faster."

The knowledge management team helped the Structural Mechanics Research and Applications group recognize how knowledge it already possesses can add value in unexpected ways. One program took advantage of previously documented calculations, models and lessons learned, then applied them to its experiments. Their work reduced the group's experimentation schedule by 12 days — saving \$500,000 per experiment and an estimated \$6 million during the year.

"What successful KM comes down to is finding out what works for the organization, capturing that information and making it findable," Andrew said. "Each organization is different."

He stressed that increasing findability does not always mean adopting new programs. It can be as simple as maximizing tools employees are already using and applying them to other areas.

For instance, the organizers of a 2017 Sandia Fracture Mechanics seminar series knew they wanted to preserve information

shared during the event. Event organizer and engineer David Reedy adopted simple digital tools to build on that knowledge.

“We developed a wiki for Sandians where they can access links and content in this area,” David said. “The wiki allows us to evolve content, creating a living document to share the latest knowledge.”

Although the pilot program is currently focused on a few organizations, knowledge management is already impacting other divisions through collaborative partnerships. For example, David shared his knowledge with colleague Jason Dugger, who used the


information to develop a new technique for neutron generator design work. Application of the technique increased part storage time from six to 14 days, reduced process time from 10 to eight hours and allowed for better data collection.

“Before, we were using an inferior technique that used qualitative data. We now have the ability to collect more quantitative data,” Jason said.

Still, despite all the opportunities it offers, Andrew and his partners know there is one key component that makes or breaks a successful knowledge management

program: employee engagement. Andrew emphasized that employee participation is paramount to the success of an effective program.

“By engaging employees, we seek to demystify KM and encourage them to become active participants,” Andrew said. “The ultimate goal is to embed these practices into workers’ everyday work so that it becomes automatic.”

For those who want to become knowledge management champions in their own areas of expertise, Sandians can contact knowledgemanagement@sandia.com. 

Shining bright during the season of giving

By Ariana Stern

Information and Security Engineering Executive Director John Zepper offered a way for his division, which includes IT, cyber security and mission computing, safeguards and security, to make a positive impact during the holidays.

On a recent visit to the Albuquerque Family Advocacy Center, John learned about a pressing need for support within

the community and was inspired to mobilize the division to take action.

Throughout November, the division collected food, clothing, diapers, jackets and other essential items under the theme “Help Us Help Others.” They delivered over a thousand pounds of goods, including much-needed non-perishable food, toiletries, suitcases and clothing for women and children. This outpouring demonstrates the division’s commitment to uplifting people in need during the holiday season.

In addition to the collection drive, several IT staff members volunteered their time to assist the Family Advocacy Center by repairing screens used for various purposes. Their efforts ensured that the center could continue to operate effectively and serve families who rely on its services.

Family Advocacy Center staff expressed gratitude for Sandians’ generosity and willingness to help those who need it most.

“I am proud of the division for stepping up and demonstrating such generosity to make this drive successful,” John said. “These are individuals who truly need these items, and the division was able to help immensely with their donations.




MAKING A DIFFERENCE — Managers Crystal Chavez, left, and Jeremy Pacheco unload boxes of donations at the Albuquerque Family Advocacy Center. **Photo by Amanda Armenta**



TEAM EFFORT — Managers, from left, Bernardo Diaz, Jeremy Pacheco and, right, Kent Hodges pose with the Family Advocacy Center Manager Bev McMillan.

Photo by Amanda Armenta

I want to thank the center representatives who contributed to the success of this donation drive and took the time to help deliver the items. I look forward to the impact we can make again in January when the Sandia Gives campaign officially kicks off.” 

Mileposts



Christopher Gibson

25



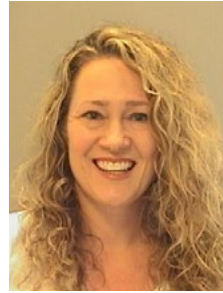
Roxane Mares

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Travis Anderson

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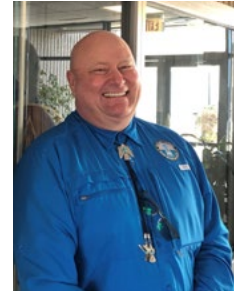
Shayla Benavidez

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Colin McConnell

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Mark Meyer

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John Sandusky

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