SANDIA LABNEWS
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Boosting battery research

Partnership speeds up development of flow batteries for green grid, water

By **Mollie Rappe**

Most Americans don't leave home without at least one lithium battery-powered device, and someday, the house itself may have a battery backup.

Scientists at Sandia are working to make these large backup batteries less expensive, hold more energy and be less prone to bursting into flame. One way to tackle all three challenges is by changing up the battery chemistry with the addition of sulfur, according to Sandia battery expert Melissa Meyerson.

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BETTER BATTERIES — Sandia battery expert Melissa Meyerson works in a glovebox to set up a lithium-sulfur flow battery. These kind of batteries have huge potential for being large, safe and inexpensive backups for a high-renewables grid. **Photo by Craig Fritz**

Transformational capabilities demonstrated by Sandia at AI Expo

VIRTUAL ADVENTURE — Sen. Martin Heinrich interacted with Sandia's JARVIS demo at the AI Expo on May 7. **Photo courtesy of Carol Young**

DOE laboratories showcase deep bench in artificial intelligence tech

By **Amy Treece**

Ten national laboratories, including Sandia, shared one of the largest booths at the AI Expo for National Competitiveness from May 7-8 in Washington, D.C. The new conference provided the DOE with an opportunity to demonstrate how the nation's scientists, researchers and engineers are working together to advance and apply the power of artificial intelligence.

Because of recent advances such as ChatGPT, the greater popu-lation can now easily interact with and use AI, but AI is not new to Sandia. Scientists and engineers at the Labs have been creating and employing AI and machine learning algorithms for

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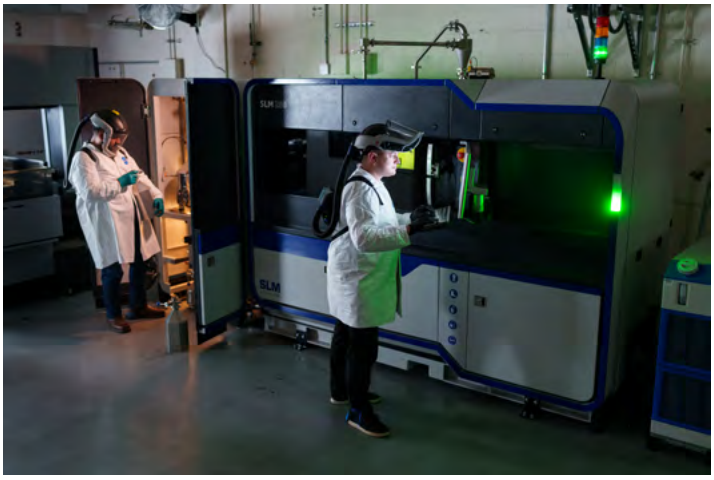
3D printing team adds value to any research project

By **Michael Ellis Langley**



VALUE ADDED — Electromechanical technologists Joe Olguin, left, and Brandon Langdon work on a new selective laser melting 3D printer at the Sandia California Additive Manufacturing Lab. **Photo by Craig Fritz**

Brandon Langdon and his team know they can add something to your project — something you may not be able to get through traditional methods of creating parts.

Brandon is one of Sandia California's electromechanical technologists, which is to say he knows how to 3D print very complex items — items that can be really small, created for a specific use and even made out of metals like titanium.

"We're doing things that are research-oriented, providing parts in materials that need to be tested, as well as internal parts for complex systems," Brandon said. "We are characterizing materials and evolving standards for international standards communities like American Society for Testing and Materials International and SAE International."

A 3D-metal printer works by adding layers of metal powder in a pattern then using one or two lasers to shape the emerging part. Brandon programs laser parameters, designs parts with varying geometry and then figures out how to bring it all together in the

machine with the right powder composition. It's work that requires extensive collaboration with researchers who want to create and test a shape or part.

"There is currently a push from NNSA and Sandia management to use the additive processes in future component designs," said nanomaterials scientist Josh Sugar, who worked with Brandon and his team on a project. "It is essential that the research and development community partner with the additive materials lab to produce materials and components that can be studied and tested."

Brandon said the lab has a deep set of applications they can manufacture.

"We can work on materials characterization for chemists," he said. "There are some materials that we can print that are bio-safe for implanting in bodies, and that's really interesting. We make connector brackets or things that might be challenging to manufacture. We did a part for researchers who needed a certain texturing on a small area, but it was just too small to machine. We 3D printed the whole part, adding threads and texture where needed."

Brandon and the additive manufacturing team have helped develop pieces to test hydrogen penetration and degradation of various materials and a host of other work that enables other research teams to move forward quickly, without waiting for a commercial part or having to buy many types of materials. The lab can even produce a thin layer, or coat, of a material for testing.

"One advantage of doing spray coating or electroplating, is that if you have an expensive material or a rare material, you don't have to get a billet of it and machine it out," Brandon said. "We can just do a surface coating a few microns thick and then have the rest of it just be some inexpensive steel or titanium that you know is much easier to work with."

With a new piece of equipment in Sandia California's additive manufacturing lab — a selective laser melting printer — the team can create intricate designs in titanium. The additive manufacturing process allows the team to produce objects that have open internal channels or optimize an existing design.

"If there was something we're trying to improve on, like maybe it was just too heavy, I can help take that existing design and very quickly make it lighter," Brandon said.

Working closely with Sandian colleagues gives the additive manufacturing team better insight into how to solve their modeling and manufacturing issues, resulting in products that are fit specifically for their needs. Josh said part of that collaboration involves learning what is possible.

"We need to understand additive processes at a fundamental level so that we can design and build parts with reliable and predictable properties over their lifetime," he said. "We also need to be able to write specifications so that our partner production sites are successful at manufacturing parts that meet these requirements."

Brandon said that they are able to work with groups that aren't sure exactly what they need.

"If people want to play around with some ideas, we can print 12 small things on the plate at the same time rather than having to machine each one, one at a time," he said. "We might be able to offer you a quicker and faster way to get closer to a prototype."

"If everything's letting you down on the traditional ways of doing things, then additive can pick up a lot sometimes because maybe there's a reason it's not working for you in the design space," Brandon added. "You're maybe outside of the envelope for traditional manufacturing or maybe your constraints are in such a way that you need to simplify the part."

Brandon said his team wants to help anyone they can with their research.

"A successful partnership between the additive manufacturing lab and the R&D community enables success in these endeavors," Josh said.

FUTURE MAKERS — A 3D-printed, metal version of Sandia's 75th Anniversary logo is manufactured in the Sandia California Additive Manufacturing Lab to demonstrate the small, latticed, multilayered constructs that the team can create.

Video by Craig Fritz

Boosting batteries

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"One of the biggest benefits compared to what is on the market today is the energy density," Melissa said. "Lithium and sulfur are two of the most energy-dense materials for batteries, and sulfur is incredibly cheap."

A partnership between technical experts at Sandia and local entrepreneurs facilitated by DOE's **Boost program** aims to get big, safe, stationary lithium-sulfur flow batteries to market faster.

The flow battery design allows for a physical separation of the portions of a household battery labeled with a minus and plus sign. This separation should make the battery safer and less likely to lose charge when just sitting idle, said Leo Small, a Sandia materials scientist who is also part of the collaboration.

"One goal is to make grid-scale batteries: really, really big batteries," Leo said. "One of the objectives we were trying to go after by putting the lithium sulfur chemistry into a flow battery architecture was to physically separate the anode and the cathode to potentially make it safer when dealing with thousands or millions of kilowatt-hours of energy storage."

One thousand kilowatt-hours are enough to power approximately 33 U.S. households for a day.

Building better battery technology

The team's largest technical hurdle was adapting lithium-sulfur chemistry into a flow battery design, Melissa said.

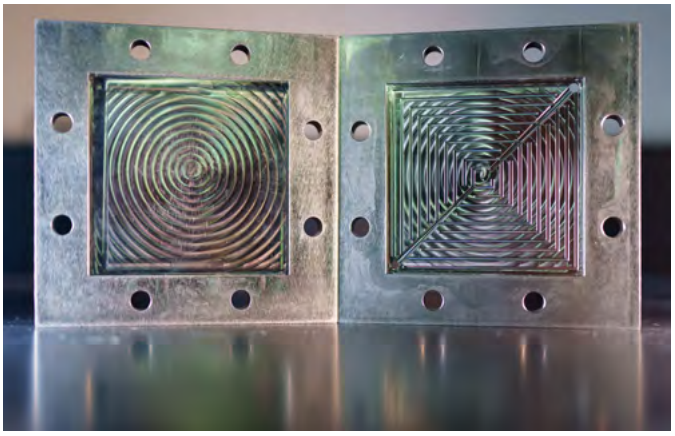
The current lab-scale battery, about three inches wide, consists of a solid lithium

metal anode, representing the minus sign side of a household battery, and a liquid cathode, representing the plus sign side. When the battery provides electricity, the lithium metal becomes lithium ions. The other side of the battery comprises a complex cathode-organic electrolyte with lithium salt and sulfur bits mixed in, Melissa said. On that side, the lithium salt and sulfur become lithium sulfide when the battery provides electricity. Both sides of the battery contain other chemicals that help charging and discharging reactions take place. A pump moves around the electrolyte and these helper-chemicals to restore them to their active form.

As part of the research project, the team developed a new design for the lithium metal anode, allowing the battery to recharge faster, Melissa added. There is still more work to be done to refine the complex cathode-organic electrolyte mixture to improve performance while possibly reducing costs, she said.

The team also wants to increase the battery's capacity to store energy by increasing the amount of lithium or sulfur it contains, Leo said. Additionally, the team's entrepreneur-partner is interested in a lab-scale prototype with several cells in series to make a 12-volt battery, he added.

"The things that we're focused on as scientists aren't necessarily the priorities of entrepreneurs," Leo said. "They might say, 'Actually, this thing is driving the cost, so if you could get rid of it, that would be helpful.' This perspective can help reframe our research and what we should be looking at for increasing the technology readiness level."



SULFUROUS SOLUTION — The interior of a lithium-sulfur flow battery being designed at Sandia. A partnership between technical experts at Sandia and local entrepreneurs aims to get these batteries to market faster. **Photo by Craig Fritz**

Boosting local entrepreneurship

New Mexico entrepreneur Charles Call was working on a startup company to develop a solar-powered device for producing water from air. He realized that the company needed a reliable battery, capable of storing energy for long periods, allowing continuous water production when the sun wasn't shining.

Enter the brand-new DOE Boost program.

The DOE Boost program, a collaboration between FedTech, a startup accelerator company, and Sandia, consists of a 16-week boot camp with weekly seminars and coaching sessions by FedTech to help entrepreneurs with their startup companies.

"I have 25 years of experience building startup companies," Call said. "I went into the program thinking I could probably teach all of these classes, but I learned something new every week. I give a lot of credit to the DOE Boost program for the quality of the sessions and mentors."

Selected entrepreneurs are paired with Sandia technical experts for technical guidance and discussions during weekly calls. Call's interest in advanced battery technology led to his pairing with Leo and Melissa.

Midway through the program, there is a practice pitching session, and the program culminates in a pitch session where the winning entrepreneur receives $2,000 toward launching their company and additional technical guidance. Call described the pitching contest as a fun way to encourage entrepreneurs to focus their efforts on preparing their business plan in the face of a hard deadline.

Forging ahead together

Currently, Call is applying for grants and other funding opportunities to continue the partnership, frame the research and advance the technology's transition from the research and development stage to the field-demonstration stage as quickly as possible, he said. GridFlow, the startup company, is working on licensing Sandia's provisional patent to aid them in the funding applications, Leo said.

By this fall, Call aims to show the commercial viability of the technology and have a 100-watt or a kilowatt prototype ready for field or home testing.

"I feel we have an almost too-good-to-be-true partnership here," Call said. "No one on my team is a battery expert, and we're not ever going to be great chemists like they are, but we have experience in startups, finance, technology and product development. We especially have a lot of experience building products that have fluidics, and the flow aspect of this technology was the part of the system the scientists were least familiar with."

The battery research is funded by DOE's Office of Electricity, while the collaboration was supported by DOE Boost, funded by DOE's Technology Commercialization Fund and administered by the Office of Technology Transitions.

AI Expo

CONTINUED FROM PAGE 1

many years. Adoption of AI is rapidly accelerating due to the availability of user-centered large language models and commercial tools that can be leveraged across all fields to expedite projects and results.

More than 13,000 people registered for the AI Expo, including government stakeholders, academia and industry partners in attendance.

Jen Gaudioso, Sandia director for computing research, understood the criticality of the event. "The AI Expo provided a forum for us to exhibit some of the latest technological breakthroughs being developed for science, security and energy applications and also discuss their implications for the U.S. and allied competitiveness."

Fifteen Sandians from six divisions attended the expo and presented state-of-the-art advancements in applied machine intelligence and virtual reality, including two demos led by Danny Gomez, Demitri Maestas, Kevin Potter and Aniket Pant.

One AI-powered demo featured in the booth has virtual reality understanding. JARVIS is an immersive extended reality environment that encouraged conference attendees to engage in a dialogue with the system. Participants were able to ask questions about the visual items they encountered within the virtual environment, and JARVIS responded with real-time, audible answers in natural language. This interactive experience showcased JARVIS' ability to communicate in natural language and provide timely responses relevant to the virtual environment, creating a better and more enriched virtual experience.

DEMO DAY — DOE Deputy Secretary David Turk discusses the JARVIS demo with Sandia applied machine intelligence expert Danny Gomez. **Photo courtesy of John Feddema**

AI FOR SAFETY — AI security expert Erin Acquesta presented on Sandia's framework for the credible use of scientific machine learned models for mission critical applications.

Photos courtesy of Carol Young

The Machine-Assisted Anomaly Detection System demo applied machine learning to identify visual anomalies. In short, it helped users to answer more than the question, "Which one of these things is not like the others?" The detection system can locate defects among parts without having previously seen a defect example.

New Mexico Sen. Martin Heinrich, who has a background in engineering, attended the conference and stopped by the DOE booth to experience Sandia's demos. He saw firsthand how powerful the tools could be in expediting processes that would otherwise take staff numerous hours to complete.

"New Mexico's national labs are leading the nation in capitalizing on AI's potential, and I was thrilled to see Sandia Labs display this up close with an immersive virtual reality experience that will be a key tool for the next generation of the engineering workforce. I will continue doing everything in my power to put our state's national labs front and center in the development and deployment of this technology," said Heinrich, co-founder and co-chair of the Senate AI Caucus. "The actions we take now in Congress will determine how rapid advancements in AI impact our society and country. For our national security, for our democracy and for the safety and well-being of the American people, it's vital we get it right."

"By utilizing AI to exploit our extensive knowledgebase of information and models, we are accelerating the rapid deployment of mission applications for national security," said Dan Turner, who leads the AI for Nuclear Deterrence initiative at Sandia.

Informing high-consequence decisions through machine learning

Trust is everything, according to Erin C.S. Acquesta. Her work on the Predictive Capability Maturity Model framework helps Sandia gather credibility evidence, identify gaps in modeling and simulation capabilities, and then communicate those to decision-makers so they can do a thorough evaluation before making decisions.

Erin presented on the topic of AI security at the expo. "Credibility is essential when using computational simulation models to inform high-consequence decisions," she said, noting that those predictions ultimately inform engineering designs and modifications on national security applications.

"The NNSA labs have prioritized credibility of computational simulation modeling for the last 30 years, and Sandia has been leading the prioritization of defining credibility of machine learning tools used for high-consequence applications.

"With so much emphasis on AI, we need to make sure we keep the conversation going about how we strike a balance between leveraging the advantages of machine learning while ensuring its responsible use for national security purposes."

DOE agrees. AI is a central tenet of Frontiers of AI for Science, Security and Technology, a DOE vision seeking to dramatically accelerate the pace of research and development and enable scientific capabilities previously thought to be impossible. It also pinpoints AI as a strategically essential technology intimately tied to the nation's future.

The national labs are aligned with the Frontiers of AI for Science, Security and Technology vision. They are jointly creating hubs utilizing exascale computers to address DOE mission grand challenges, putting together teams to organize data for AI training and evaluation, creating tools and approaches to understand and manage AI risks, and developing a common AI platform and dedicated AI hardware resources.

Sandia's John Feddema, senior manager for enhanced decision-making, said, "Sandia is one of the national labs involved in compiling 'AI Killer Apps.'" According to him, these apps assist the country in monitoring for threats and facilitating deterrence, revolutionizing energy applications, augmenting next generation systems, enhancing decision making through assimilated data and making bioweapons obsolete. "AI is a powerful tool that will help solve the complex challenges we face and unlock new opportunities," he said.

DOE headquarters noted other positive outcomes in an AI Expo event recap stating, "We have heard from many people (including DOE Deputy Secretary David Turk, DOE Under Secretary for Science and Innovation Secretary Geri Richmond and NNSA Administrator Jill Hruby) that DOE made quite the statement, and now, it's on us to capitalize on the momentum."

Sandia Labs Director James Peery said, "In the past 100 years, the world has realized breakthroughs in game-changing technology that have transformed civilization as we know it. The advent and global availability of AI is one of these. Wielding it with integrity for the good of our country is paramount, and there is no time to waste."

EMPLOYEE RECOGNITION AWARDS 2024

Employee Recognition Award ceremonies spotlight unsung heroes

By **Kerri Dufault**

Often, human resources is perceived as merely policies, processes and to-do items, but Sharron Harris and her team, who won one of five Labs Director Awards on May 15, are on a mission to transform Sandia's benefits, the people-side of human resources.

Sharron and her team tackled the monumental task of modernizing and implementing new and enhanced benefits for Labs staff. From adding floating holidays to better vacation accrual and new programs to help with student loan debt and childcare expenses, the team explored benefits that organizations outside of Sandia are offering and gathered feedback from employees to design benefits that meet the needs of Sandia's evolving workforce.

Sharron was one of nearly 800 Sandians recognized in New Mexico on May 15 and in California on May 22 as part of Sandia's annual Employee Recognition Awards. These awards celebrate individuals and teams across the Labs who go above and beyond expectations.

UNEXPECTED WIN — Sharron Harris accepts the Labs Director Award on behalf of the New and Enhanced Benefits Implementation Team during the 2024 Employee Recognition Awards on May 15. **Photos by Craig Fritz**

"The winners embody the innovation, excellence and extraordinary spirit that define our laboratory," said Labs Director James Peery at the New Mexico ceremony. "The people in this room are critical to our national security and mission success."

Every year, James reviews the award

winners and selects his picks for the prestigious Labs Director Award. This year, he announced the following five winners:

Julie Kelly-Smith won an individual award for her exceptional leadership building the Integrated Space Solutions organization to address a variety of challenging space issues.

The **2024 New and Enhanced Benefits Implementation Team** was selected for innovation and modernizing and offering new benefits to meet the workforce's evolving needs.

The **Advanced Engagement System Team** was chosen for developing and deploying critical advanced nonkinetic effects capabilities that will have a daily impact on Integrated Deterrence and Defense in operational theaters. This team's effort led to the approval of an urgent operational need issued by the warfighter for more of this capability.

The **Global Burst Detector IIIF Prompt Flash-X-ray Radiation Testing Qualifying** Mission Performance Team won for extraordinary collaboration in executing a prompt radiation test on the Global Burst Detector IIIF payload at the High-Energy Radiation Megavolt Electron Source, known as the HERMES facility, which successfully supported system design review in January.

The **Supply Chain Disruption Tiger Team** received a Labs Director Award for managing disruptions and building resiliency in Sandia's supply chain. This team mitigated risk in programs that face challenges related to unstable supply chain activity, threatening national security deliverables.

"I feel so honored," Julie said. "It's been putting together so many skills that I have gained throughout my career so far, and I feel like I've really been able to let them shine."

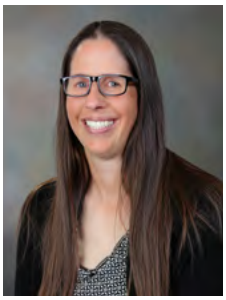
"The award highlights the work that the team did and also shows that HR, as an organization, is equally important all the way up to our Labs Director," Sharron said.

"We do a lot of really good work here and it can go under the radar as part of the big cog in the machine for national security and for the mission," said Elliott Leonard, team representative for the Global Burst Detector IIIF Prompt Flash-X-ray Radiation Testing Qualifying Mission Performance Team. "Seeing your cog highlighted every so often feels really good."

BIG WIN — Associate Labs Director Andy McIlroy, left, presents an Employee Recognition Award to strategic planner Joel Stauber, who represented the California Site Improvement Project Team at the Sandia California ceremony on May 22. **Photo by Randy Wong**

INDIVIDUAL HONOREES

Brad Aimone 1000



Leah Appelhans 1000

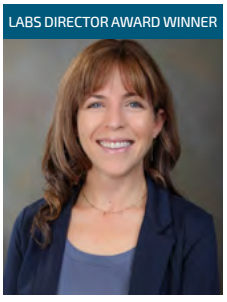
Andrew Bradley 1000

Remi Dingreville 1000

Jeremy Guthrie 1000

Elaine Rhoades 1000

LABS DIRECTOR AWARD WINNER

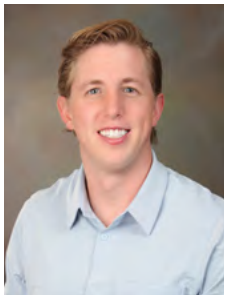


Julie Kelly-Smith 4000

Nicole Rinaldi 4000

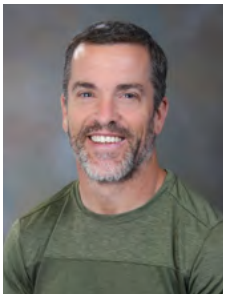
Jessica Bentley 4000

Tyler Ganter 5000



Mark Noel 5000

Brandon Simmons 5000



Clinton Hobart 6000

Allen Parish 6000

Francine Barker 7000

Jacob Chavez 7000

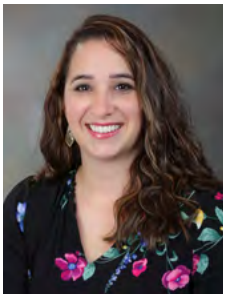
Daniel Martinez 7000

Norman Bartelt 8000

Stephanie Kuzio 8000

Joe Stayton 8000

Lisa Pritchett 9000



Victoria Stanley 10000

Randolph Castillo EXEC

TEAM HONOREES

NUCLEAR DETERRENCE

ISL/ECSL Production Anomaly Team

By collaborating with partners across the enterprise, the team identified the need for processing changes for failure prevention and implemented those changes, mitigating potential production and fielding risks associated with two weapon systems.

Alt 940 First Production Unit Team

The team achieved first production unit on the Integrated Surety Architecture Pathfinder Program in August. The team partnered across the national security enterprise over the past decade to develop, qualify and deliver Alt 940 for application to the W88 Alt 370 reentry body assembly.

Mk 21 Arming and Fuzing Assembly Requirements Verification Team

The team successfully completed an extensive multiyear customer review of qualification evidence to ensure programs requirements were verified, met and documented appropriately. The customer review team included experts from the Air Force and their contractor team.

W80-4 Functional Electrical Testing Team

The team planned and implemented more than 24 system-level functional test series in 2023, including six test series in parallel. These tests were critical to the development and qualification of the W80-4 warhead by generating evaluation data for the baseline and final designs.

Design Engineering Design for Manufacture and Assembly Team

The team implemented Design for Manufacture and Assembly tools for electrical and mechanical design staff by partnering extensively with Kansas City National Security Campus to refine and implement rules based on their manufacturing guides.

ERA EMPLOYEE RECOGNITION AWARDS 2024

W80-4 Detonator Stronglink Team

The team collaborated across multiple sites to meet challenges, including additional scope, to support critical system needs and schedule reduction for the W80-4 System first production unit date.

Stack Production and Resurgence Campaign Qualification Team

The SPARC team innovated a replacement for the supply of externally sourced, legacy lead zirconium titanate material nearing depletion. Their efforts ensure current stack material manufacturing for use in all weapon systems that employ ferroelectric neutron generators.

Nuclear Enterprise Assurance Data Mining Team

Applying a novel approach to data mining a large database, the team was able to sort through hundreds of artifacts in a timely fashion using artificial intelligence and machine learning tools to inform creation of and reduce the impact of a production waiver that impacts two nuclear weapon programs.

B61-12 Anomaly Resolution Team 1 of 2

The team successfully addressed the B61-12 program's highest risk by collaborating across Sandia and the nuclear security enterprise to identify the source of that risk, developed long-term resolution options and execute mitigations.

W87-1 Firing Set Assembly Product Realization Team

The team successfully completed all testing of the development build 1 design, culminating in passing their conceptual design review.

Disablement Management System Mod - System Qualification Team

The team provided design and system integrator oversight to deliver an enhanced surety program on an accelerated schedule. The program had a highly successful year, culminating in full system qualification and delivery to the U.S. Air Force.

Pioneering Value Optimized Thermoelectric Power Supply Team

A sudden mission need emerged in fiscal year 2023 requiring accelerated assessment of the experimental Pioneering Value Optimized Thermoelectric power supply for size, power and readiness. Ultimately, the customer selected PIVOT, representing the first all-new thermoelectric power supply in over a decade and supporting major cost and risk reductions.

ChemPod and Chiller Thriller Cross Cutting Weapon System Issue Resolution Team

A large team resolved two critical and challenging production issues, specifically ChemPod and Chiller Thriller. The resolution urgently addressed the need to ship quality product to military customers.

Realize Product SubSystem Visualization Team

RPSS developed an enhancement through collaboration with web developers, systems engineers and various support partners. Model-Based Systems Engineering diagrams represent each Realize Product Procedure and are available to the workforce via the RPSS web portal.

EXECUTIVE SUPPORT DIVISION

Unleash Excellence Team

Sandia launched a portal to gather ideas from the workforce and each idea manager developed a process for dispositioning ideas. The team collected more than 500 ideas and engaged leadership and experts to review, disposition and complete improvements. Fifty-four projects were completed, and 15 ideas were accepted and planned.

Administrative Professionals Career Pathing Project Team

In a pioneering effort, this team developed a comprehensive competency model for administrative professionals. Through meticulous research and collaboration with stakeholders, team members established eight core competencies, enhancing administrative professional hiring, performance and career advancement. The model streamlines managerial tasks and elevates administrative roles, ensuring a well-rounded, skillful workforce.

DIVISION 1000

W87-1 Environmental Specifications Red Team

A team composed of members from the engineering sciences, science and technology community and W87-1 Systems,

reviewed and delivered a comprehensive update to the W87-1 Environmental Specification in six weeks. This critical update supported component-level tests in shock and vibe, electromagnetic pulse and radiation environments.

Survivability for Reentry Environments Pegpost Team

The team collaborated extensively across numerous organizations to complete a significant milestone for the NNSA, incorporating experimental testing, model development, simulation and documentation to fulfill requirements to create a hypersonic reentry environments loading and component response qualification capability for current and next generation systems.

NOT-FLAT Cassette Rapid Redesign and Fabrication Team

New, NOT-FLAT hardware was designed and implemented to enable exposure and recovery of component-sized objects at the Z Pulsed Power Facility. When production of critical customized hardware was delayed, two Sandians rallied a manufacturing team spanning three divisions to produce necessary fixturing, enabling a successful test at Z.

Laboratory Directed Research and Development Interlaboratory Collaboration Team

In partnership with Lawrence Livermore National Laboratory and Los Alamos National Laboratory, Sandia's Laboratory Directed Research and Development Program Office collaborated to develop and implement the first NNSA Joint Interlaboratory Laboratory Directed Research and Development cycle, which began in fiscal year 2024.

First Test of Mock Component on Z Machine Team

The team conducted the first warm X-ray test of a component in more than 30 years, reinstating the capability lost with the cessation of underground tests, by developing a component-scale recovery platform for the Z Pulsed Power Facility.

Tech Area V Nuclear Facility Safety Culture Team

The safety culture at the Tech Area V Nuclear Facilities underwent a significant revitalization in fiscal year 2023. A focus on positive reinforcement of safety principles and building resilience into the nuclear facility systems through a learning team model has radically improved morale, safety and stakeholder confidence.

Work Planning and Control Documents Team

The team created an organized and comprehensive repository and review process for center-wide documents that are current and relevant for safely working on complex and highly technical systems.

DIVISION 3000

2023 Negotiation Team

Sandia's negotiations team positively impacted the fiscal year 2023 Performance Evaluation Report's excellent rating when, according to the report, they "simultaneously negotiated a new three-year collective bargaining agreement and a three-year extension to another collective bargaining agreement, avoiding the use of contingency support and achieving alignment with nonrepresented employee benefits to reduce administration costs."

Performance Redesign Team

Sandia's performance engagement system was developed in response to feedback from employees who wanted more development-focused conversations and recognition of team and individual performance. Individuals from across the Labs assisted with the design, development and implementation of the new system.

LABS DIRECTOR AWARD WINNER

2024 New and Enhanced Benefits Implementation Team

In collaboration with teams from communications, finance, information technology, procurement and legal, the 2024 New and Enhanced Benefits Implementation Team is modernizing and executing the 2024 New and Enhanced Benefits program. Their efforts have resulted in implementing several impactful benefits, catering to the evolving needs of the workforce.

Human Rights Campaign-Corporate Equality Index Initiative Team

The Human Rights Campaign Foundation's Corporate Equality Index is the national benchmarking tool on corporate policies, practices and benefits pertinent to lesbian, gay, bisexual, transgender and queer employees. Through diligent effort and collaboration, Sandia received a top score involving LGBTQ+ workplace inclusion.

Disability Equality Index Initiative Team

Disability Equality Index, hosted by Disability:IN, is the most well-recognized benchmarking and assessment tool in the disability space. Through diligent effort and collaboration, Sandia demonstrated a culture of inclusion, equitable employment practices and supplier diversity, which resulted in Sandia being recognized as one of the Best Places to Work for Disability Inclusion.

California Diversity Council Leadership Team for Inclusion and Diversity

The California Diversity Council Leadership Team is made up of Sandia Parents' Group-CA, Hispanic Leadership Committee, Asian Pacific Leadership Committee, Military Support Committee-CA, Living Alone and Thriving, Sandia Pride Alliance Network-CA, Advancing the Next Generation of Excellence-California, Abilities Champions of Sandia-CA, African American Outreach Committee, Foreign National Networking Group and Policy and System Advisors-CA.

DIVISION 4000

Circuit Breaker Maintenance and Testing Implementation Team

The team implemented a new circuit breaker maintenance and testing program required under Sandia Prime Contract Asset Management Requirements for the reliable and safe operation of electrical systems, developing new streamlined processes to prevent unplanned outages and interruptions while ensuring the safety of electrical workers.

Roof Exhaust Stack Emergency Response and Repair Install Team

Due to high winds, the roof exhaust vent stack of a Sandia New Mexico building was damaged, hindering line partner operations. Infrastructure Operations responded immediately collaborated with other Facilities teams to develop a temporary solution, then design and implement a final solution.

Tech Area V Emergency Planning Hazards Assessment Revision Team

Throughout fiscal year 2023, Emergency Management's Tech Area V EPHA team has collaborated across multiple Sandia organizations to create a new assessment process and a revised EPHA for Tech Area V that promotes partnerships, focuses on operational end users and reduces potential emergency risk.

New Emergency Operations Center Team

The new Emergency Operations Center building is the culmination of extensive teamwork and collaboration across numerous Sandia organizations and federal partners. The successful Enhanced Minor Construction and Commercial Practices project resulted in a LEED Gold-certified building with improved space, tools and capabilities for Emergency Management.

DIVISION 5000

Drifter Team

The cross-divisional Drifter team achieved its second satellite launch in two years, released full operational capability of ground station command and control software and hardware, and successfully demonstrated the mission capability on orbit. These accomplishments could not have been achieved without collaboration, grit and technical expertise of the Drifter team.

WESTWORLD Team

WESTWORLD is a DOE initiative that offers an intelligence-driven, experimental platform for critical energy infrastructure cyber experimentation. Last year, the team worked diligently to run and complete the most complex WESTWORLD experiment to date, improving on Sandia capabilities and furthering institutional knowledge.

Field Intelligence Element Equipment Inspection and Compliance Team

The team developed and implemented an Equipment Inspection and Compliance process to bring Sandia Field Intelligence Element Equipment into compliance with the DOE. This involved development and maintenance of an electronic application, acquiring and modifying space, partnering across organizations to implement physical inspections and providing training.

Record-setting diamond stamped delivery of 25,269 NPN HBTs with zero defects

A Sandia team shipped more than 25,000 NPN heterojunction bipolar transistors with zero defects to the Kansas City National Security Campus. This is the largest delivery ever made through their organization.

Joint Flight Campaign Software Qualification Team

The team successfully completed three quick-turn software Flight Qualification Test events that support high-consequence hypersonic glide body flight tests for the Joint Flight Campaign. This resulted in high confidence flight software delivered on time as determined by Conventional Prompt Strike program objectives.

Panther D30 Delivery Team

The team successfully delivered the Panther D30 application-specific integrated circuit three months ahead of schedule, allowing its early integration into flight testing. This early insertion allows the next level assembly to see flight test results nearly two years ahead of the baseline milestone.

MESAPack Validation Team

The team collaborated to qualify internal packaging of plastic ball grid array application-specific integrated circuits. This alleviates the risk of single-point-of-failure vendors for plastic ball grid arrays.

Next Gen Hypersonics Wind Tunnel Test Team

The team completed six trips to the Arnold Engineering Development Center wind tunnels. They worked around the clock in three shifts to complete extensive test matrices that gather key data products, furthering the aerodynamic models for next-generation hypersonic vehicle designs.

Electrical Environmental Sensing Device Bias Transient Resolution Team

The team worked through a variety of serious issues during development of the Electrical Environment Sensing Device component for the W80-4. These issues were realized late in development and were resolved rapidly to avoid jeopardizing the component and W80-4 performance and first production unit timelines.

Toast Team

The team designed, built, tested and deployed a technology that seemed hard to achieve but offered significant benefits to Sandia sponsors and partners.

LABS DIRECTOR AWARD WINNER

Advanced Engagement System Team

The team developed and deployed a set of critical advanced nonkinetic effects capabilities called Sidetrack. These capabilities provide daily impact on Integrated Deterrence and Defense in operational theaters and have been identified as an urgent operational need by the warfighter for more of this capability.

Digital Assurance for High Consequence Systems Mission Campaign Team

A multidiscipline, multidivision, multisite team, comprised of more than 100 staff members across the Labs, collaborated to develop a new Laboratory Directed Research and Development mission campaign.

DIVISION 6000

Radiological Assistance Program Ukraine Support Team

In response to an urgent request from NNSA Counter Terrorism and Counter Proliferation and in support of the Office of International Nuclear Security, Sandia's Radiological Assistance Program personnel collected excess isotope identification systems, ensured operability of these systems and transferred them to the Ukraine government.

Mobile Guardian Transporter Door Qualification Test Team

The team completed a rigorous environmental test series off-site in Huntsville, Alabama. This test culminated more than two-years of effort designing, building, planning and testing a full-scale and fully operational Mobile Guardian Transporter door against all normal transportation environments to ensure a robust door design.

Mission Performance Capability Assessment Team

The team completed the assessment of 27 mission performance capabilities for a new remote sensor, providing the government confidence that mission performance will meet the needs of the DOD and intelligence community. This work was highly successful and discovered key areas that can be improved to further evolve this critical national security mission.

IAEA/NNSA Nuclear Security Countermeasures for Uncrewed Aerial Vehicles Meeting Team

This team coordinated a first-ever technical meeting discussing the implications of uncrewed aerial vehicles on international nuclear security; featuring panelists from 15 countries, as well as regulators and operators from 27 countries; and an eye-opening drone demonstration by Sandia, Los Alamos and Oak Ridge national laboratories. Outcomes will inform global uncrewed aerial vehicle security guideline development.

LABS DIRECTOR AWARD WINNER

Global Burst Detector IIIF Prompt Flash-X-ray Radiation Testing Qualifying Mission Performance Team

The team exhibited exceptional multidisciplinary, multilab collaboration to execute a prompt radiation test on Global Burst Detector IIIF payload at Sandia's High-Energy Radiation Megavolt Electron Source, known as the HERMES facility. For qualification, payload tested at simulated nuclear detection prompt radiation levels. The test was successfully completed to support system design review in January 2024.

Red Coast and North Star Team

The team, representing multiple centers and diverse technical specialties, delivered a technical solution to the warfighter, improving a key performance metric of a critical intelligence, surveillance and reconnaissance system by ten times. The team achieved this by delivering a closed-loop calibration system that enables enhanced performance without loss of persistence in monitoring.

Minot Air Force Base Weapons Storage Area Line of Detection Refresh Team

The team collaborated internally and externally with numerous entities to design, install and test a line of detection protecting critical national security assets. Budget, team experience, time and environmental constraints created significant challenges, but the resulting outcome was a successful installation followed by government acceptance and a certified system.

Leading-Edge Advancement Project Geolocation Team

The team successfully delivered an entirely new suite of algorithms for optomechanical models, attitude estimation and in-scene registration for geocorrection. Initial demonstrations with real data have shown the quality of the delivered code and its ability to impact critical national security applications.

DIVISION 8000

W80-4 Systems Baseline Replan Team

The W80-4 program was required to coordinate an entire replan of all costs and schedules. The systems team coordinated with more than 50 project realization teams and external partners to ensure alignment of schedule, scope and dates. The team coordinated multiple internal approvals prior to submission to NNSA.

W80-4 System Control Accounts Replan Team

Through collaboration with internal and external partners, the team provided quick work and expertise in scheduling and estimating resource costs for the W80-4 System Control Accounts Replan, ensuring alignment of schedules, accurate resource loading and dates, and supporting internal approvals prior to gaining NNSA approval.

At-Risk Material Mitigation to 3M PFAS Obsolescence Team

When 3M Company discontinued many PFAS-containing materials, the cross-center team ensured no negative impact to nuclear deterrent production schedules, despite their current use in several components. The team is a leader in long-term mitigation of these and other at-risk materials.

Battery Leak Remediation Team

In August, an on-site grid-scale flow battery owned by Sandia's Energy Storage Technologies and Systems Department leaked 10 gallons of highly acidic electrolyte. Teams from divisions 8000 and 4000 collaborated to quickly remediate the leak and meet all DOE and New Mexico reporting requirements by the end of September.

Tremendous Technologists of Biological, Radiation and Signature Science, Technology and Engineering Team

The team organized outstanding efforts in support of six principal investigators and others outside of their centers to publish results, meet project milestones and secure new project funding in 2023.

W80-4 War Reserve and Joint Test Assembly System-level Test Team

The W80-4 electrical design teams, qualification team and functional electrical test team partnered to successfully complete numerous system-level electrical tests of initial hardware built to version 2.0 requirements in War Reserve and Joint Test Assembly configurations in preparation for the system-level final design review.

Experimental and Analytical Wargaming Team

This team developed a leading-edge experimental gaming capability that enables rigorous, data-driven analysis of strategic interactions, including integrated deterrence, cyber deterrence and consensus-making under crisis. The capability is advancing deterrence theory and strategy and producing synthetic data where real-world data is missing to inform U.S. and global security strategy

OnGuard Conversion Team

The OnGuard Conversion Team overcame a series of significant challenges throughout fiscal year 2023 by exercising creative thought, team building, full accountability and unwavering commitment.

Telemetry Space Radiation Testing Team

A multidivision team came together to quickly define a radiation test methodology, perform testing and evaluate data for at-risk, non-radiation tolerant electrical components for multiple Environmental Test Units and Joint Test Assemblies programs when new requirements were levied late into the development of telemetry designs.

Labs Cyber Strategy Team

Following the creation of the Labs Cyber Strategy, the team advanced all top five identified priorities. For three research and development priorities, the team matured research ideas into proposals, culminating in a successful mission campaign proposal. Foundational priorities improved processes, communication and fostered innovation.

Sandia California Improvement Project Team

This project sought to transform the California campus from an "abandoned fort" into a modern, cutting-edge laboratory that is visually consistent with — or better than — other laboratories and technical companies in the Bay Area.

W80-4 Abnormal Thermal Environments Qualification Team

The team successfully planned, integrated and executed the Abnormal Thermal Environments 2 test at Sandia's Crosswind Facility in Tech Area III. The engineers and technologists were able to develop a strategy to safely deliver a fast heat environment that exceeded 1200 degrees Celsius for one hour and captured qualification evidence.

Sandia Puerto Rico 100 Team

The team has demonstrated effective and impactful collaboration among federal government, national labs and local stakeholders in Puerto Rico to allow the people of Puerto Rico to better understand the challenges and opportunities of an energy transition involving a massive increase in renewable energy.

DIVISION 9000

ServiceNow Implementation Team

At the direction of the chief information officer and organization leadership, the team implemented the ServiceNow cloud platform on an extremely short schedule while sustaining the legacy IT Service Management platform. The project included platform and IT Service Management configuration, essential data migrations and integrations and redevelopment of high-volume service catalog items.

Classification Assist Portfolio Team

The team has successfully developed software that demonstrates using AI to assist derivative classifiers in identifying classified information in documents. The work, supported by the DOE Office of Classification, contributed to multilab capabilities and is operating on multiple classification guides with expanded coverage and deployment on the horizon.

Joint Materiel Accounting and Tracking System Team

The team demonstrated excellent partnership across the DOE, NNSA, U.K. Ministry of Defence and U.K. Atomic Weapons Establishment. This led to recognition by the DOE and NNSA for delivering outstanding results, advancing Sandia's service to the nation and stockpile stewardship.

gait Development Team

gait is a publicly available software, a Zeek extension, that enriches network monitoring logs by adding metadata on timing analysis. This metadata has led to the discovery and detection of numerous cyberthreat actors. The team developed and shared this innovative and powerful tool with the community.

NNSA Secret Network Cloud Services Team

Sandia was selected to design, architect and implement a revolutionary secure communication and collaboration capability. The team implemented classified cloud services to improve collaboration across NNSA. This supports the NNSA strategic goal set by the Office of Associate Administrator for Information Management and Chief Information Officer.

Cyber Security Incident Response Team

Sandia Cyber Security performed site assists at the request of the FBI, DOE and NNSA to perform forensic analysis of Barracuda devices affected by zero-day attacks across seven DOE sites, which uncovered novel indicators and malware that contributed to a national response.

OnGuard Conversion Principal Project Team

The OnGuard Conversion was a three-year, multisite, $9 million security system modernization project that replaced an end-of-life system. The security system processes all alarm and access control events for Sandia New Mexico and Sandia California. The team overcame complex challenges through technical innovation, team collaboration and persistent commitment to enable seamless mission operations.

DIVISION 10000

Environmental Test Planning Tool Team

The team developed an online test planning tool used to streamline the Experimental Mechanics and Dynamics test request and work acceptance processes, saving time for both internal customers who need environmental testing of component and system level test units and Labs personnel conducting environmental testing.

Sandia Production MDS Implementation Team

The team identified an opportunity and developed a process to significantly increase demand stability between Sandia Production and Kansas City National Security Campus, resulting in a reduced number of change requests that need to be implemented over the life-of-program deliveries for components.

Sandia Travel Team

When Sandia business travel demand sharply increased after COVID-19 restrictions were lifted, the team retooled its programs and implemented many service and system improvements.

Transform the Way We Work Team

The team developed the division's first-ever robotic processing automation solution to transform workflows, optimize high-value, efficient services, and enhance analytical and financial insights by using expanded digital technologies. It automated a process that previously took about 10 hours per week to an automated solution that takes about two minutes.

Touchless Transactions Efficiencies Team

The team challenged customer norms, updated internal approaches and negotiated with outside organizations to automate procurement actions and actively manage customer supplier pools saving more than 3,000 labor hours annually while also working to decrease a key supplier pool by over 90%.

Transformational Investment Wedge Team

In October 2022, Sandia learned that $50 million fewer in pensions contributions were required, presenting an opportunity for a transformational investment wedge. The funds needed to be used before October 2023, so cross-functional teams quickly organized and made prompt decisions that ultimately led to largely successful execution in fiscal year 2023.

LABS DIRECTOR AWARD WINNER

Supply Chain Disruption Tiger Team

The team was formed to develop new systems and activities to manage disruptions and increase resiliency in Sandia's supply chain. The team's efforts resulted in risk mitigation for high-visibility programs that are faced with challenges attributed to unstable supply chain activity, resulting in threats to national security deliverables.

DIVISION 11000

WIN Team for Inclusion and Diversity

The 11000 Workplace Improvement Network team worked tirelessly on division and Labswide initiatives to promote morale, foster closer working relationships and support and socialize various corporate initiatives in diversity, inclusion, wellness, culture and knowledge.

ERA EMPLOYEE RECOGNITION AWARDS 2024

From sea to desert: Building for America

Local veteran awarded by DOE

By **Kim Vallez Quintana**

When Paul Farless joined the Navy after graduating from Los Lunas High School in 1992, he was looking for his future. That future turned out to be building.

Farless became a part of the Navy's Construction Battalion known as the Seabees. Their primary role was to provide advance wartime infrastructure support and construction during Navy and Marine Corps ground force operations.

"Our teams were often deployed to undeveloped areas where we were tasked with everything from humanitarian objectives to building base operations from the ground up. That included everything from runways to bridges," Farless said. "The Seabees must be ready to respond under any circumstances, so we also had to be combat trained. When something was bombed out, we had to be ready to repair it immediately and defend our teams and others. This lends to the Seabee motto of 'We Build, We Fight.'"

Today, Farless' job is much less dangerous, but he still supports America's mission. He is president and CEO of SDV Construction, which stands for Service-Disabled Veteran Construction.

VETERAN BUSINESS OF THE YEAR — Paul Farless, president and CEO of SDV Construction, left, accepts the DOE Service-Disabled Veteran Business of the Year Award for its outstanding work helping Sandia accomplish its mission.

Photo courtesy of Patricia Brown

The DOE recently named SDV Construction as the Service-Disabled Veteran Business of the Year for its extraordinary work in supporting Sandia's mission.

Working for Sandia

SDV Construction is recognized as a top-performing general contractor at Sandia, earning $80 million in subcontracts. It is also the sole Certified Service-Disabled Veteran-Owned Small Business providing construction services to Sandia. SDV has traveled as far as Prudo Bay, Alaska, to support projects for Sandia, primarily involving facility building, expansion, design and remodeling.

But it's not just the work itself that has earned SDV Construction recognition. Alongside its efficiency and safety record, the company also embraces new technology, practices and creative solutions to elevate its work. In one example, they used an elevated work platform attached to a telehandler to aid in the assembly of a pre-engineered metal building.

The company also boasts a substantial number of employees with security clearances, reducing escort costs and project times. They also provide a 4-10 work schedule, which has proven to be an incentive for their workforce.

Providing a place for veterans

Supporting veterans is the reason founder Kirk McWethy started the company in 2005. He wanted to provide opportunities for veterans transitioning into the civilian world. Farless continues to carry that torch.

"Veterans transitioning out of the service are not always given a lot of opportunities," Farless said. "Veterans say they are taught how to write a resume and how to look for a job, but they don't help you find the role you need or the best possible role for the skills you have."

BUILDING FOR AMERICA — Paul Farless, left, began his building career as part of the U.S. Navy's Construction Battalion. He continues serving his country through projects at Sandia, other national labs, federal institutions and private industry.

Photo courtesy of Paul Farless

VETERANS HELPING VETERANS — Paul Farless, right, advanced wartime infrastructure support and construction when he served in the Navy. Today, he uses his experience in the military to mentor other veterans and help them start careers in the civilian world through SDV Construction. **Photo courtesy of Paul Farless**

Fareless says another challenge is the difference between the skills taught to active-duty members and the ones in the civilian world. "If you have roles that are combat centered, there isn't necessarily a role like that in the civilian world. You must learn new things," he said.

SDV Construction helps veterans build those needed new skills through trade association sponsored apprenticeship programs and scholarships they fund at the University of New Mexico and Central New Mexico Community College. These scholarships are exclusively reserved for veterans and their families looking to get into the construction industry.

SMALL BUSINESS MVP — Royina Lopez, center, accepts her MVP award from the Small Business Administration's Supply Chain Management Center on May 1. She is pictured alongside Sandia Integrated Supply Chain Director Louis Griego, left, and Supply Chain Management Center Senior Director Scott Bissen.

Photo by Candice Montoya

DOE MENTOR OF THE YEAR — Sandia's small-business team accepts the DOE Mentor of the Year Award for Sandia's Mentor-Protégé Program. From left to right, Sandia supplier diversity advocates, Marie Simms and Royina Lopez, Director of DOE's Office of Small and Disadvantaged Business Utilization, Ron Pierce, and Sandia Small Business Manager Zach Mikelson.

Photo by Tricia Sena

Following his mentor

It's a situation Farless knows all too well. After leaving active duty, he knew he wanted to continue to build, but needed additional wisdom and guidance. He worked as a journeyman carpenter and worked toward starting his own construction business. Knowing the value of mentorship, he connected with Air Force veteran Kirk McWethy with whom he had worked on other projects. He ultimately found a home in SDV Construction.

Today, Farless leads the company and serves as a mentor to his team, including the veterans on staff. While the primary goal is to help veterans find a place where they can use their skills, SDV Construction also supports veterans in other ways. This includes donating to and volunteering at numerous veteran-centered nonprofits, as well as Roadrunner Food Bank, which often supports homeless or struggling veterans. SDV Construction has also donated to the Habitat for Humanity Honor and Remember house, a home dedicated to veterans.

Being honored by DOE

Farless and SDV Construction are now being awarded by the DOE for their work in supporting Sandia and its mission. He says it's an honor.

"It gives my team the recognition they deserve for the work they put in every single day. It's really the icing on the cake."

But Farless says it's the work they do every day that brings the most satisfaction. "The entire premise of veterans as a whole is service. We are able to continue our service to our country, and national defense just as veterans have sworn to do."

Three years running, and honored again for helping small businesses

The DOE has named Sandia's Small Business Mentor-Protégé Program as DOE Mentor of the Year, an award that the program has received for three years running.

Now in its fifth year, the program has mentored five protégés from around the country. It takes 153 volunteer mentors and support personnel to help these small and disadvantaged businesses grow, succeed and navigate doing business with Sandia and others in the DOE enterprise.

Royina Lopez leads the program and has become known at Sandia as the go-to person for helping small businesses. She was also named this year's Small Business Advocate MVP by the Small Business Administration's Supply Chain Management Center. This award recognizes outstanding performance by a small-business professional who has made a significantly positive impact on the NNSA's small-business program.

Royina's outreach efforts have not only helped protégés but have also expanded small-business opportunities throughout DOE. She received the Small Business Advocate MVP award on May 1 and accepted the DOE Mentor of the Year award on behalf of Sandia on June 4 in Minneapolis.

Read To Me book drive

COMMUNITY CONNECTION — Sandia employees and family members gathered at the Read to Me Book room to clean, sort and pack books for this year's annual Children's Book Drive. Sandians raised over $3,400 and collected more than 2,900 books.

Photo by Amanda Armenta

PAGE TURNER — Physical security specialist Scott Weitzenhoffer holds a copy of "The Phantom Tollbooth" while preparing books for distribution. **Photo by Amanda Armenta**

Don Cook: Setting up major Sandia projects

Led work on Z, MESA and early underground subcritical testing diagnostics

By **Neal Singer**

In 1963, Don Cook made Eagle Scout. This designation — indicative of character and leadership — foreshadowed a life of significance.

Validating the Boy Scouts' early insight, Cook, years later, spearheaded a team that undertook the multiyear conversion of Sandia's ion beam facility, known as Particle Beam Fusion Accelerator II, into the globally renowned, high-current driver of electrical pulses he named Z.

Z is the world's most energetic fusion-oriented pulsed power facility. It worked by delivering brief yet powerful electrical currents through foil cylinders and, later, through thin wires hanging vertically in the Z direction. The accompanying magnetic field wrapped around and compressed the metallic plasma the wires had become. The result resembled a lightning bolt, but one vastly more powerful than nature's version. This reaction, known as a Z-pinch, produced X-rays at Sandia that in power surpassed the world's entire electricity production for nanoseconds.

After investing half a decade exploring the fusion implications of this breakthrough, Sandia's management urged Cook to apply his administrative and scientific acumen to the most ambitious project on Sandia's horizon: the Microsystems Engineering and Science Applications complex, or MESA.

"My management believed I could effectively communicate with Washington, justifying the funding we needed," he said. "Sen. Pete Domenici helped immensely."

Cook's innate forthrightness was key to his success in the capital city. He had been candid with funding agencies during both problematic and successful project phases. "They valued that honesty in Washington," he said.

Transitioning from overseeing Z, Cook engaged in "defining, designing and constructing" Sandia's new major experimental facility. The speed, efficiency and cost-effectiveness of the project were indicative of Cook's management prowess. For instance, he organized MESA's development as a matrix project, bringing together Sandia's top performers in a central design area while keeping them in their prior management structure through the project's completion.

"Do you have any idea what it means to a Washington agency head to be told one of his projects has been completed on time and under budget?" a Lab News story quoted a Washington administrator as saying at MESA's formal opening in 2007. The complex microfabrication facility, designed to produce a weapon's microchip brain protectively hardened against incoming radiation, also made it possible for Sandia researchers to explore broader fields impacting U.S. security, such as micro-optics, microphotonics, micromechanics and microelectromechanical devices, or MEMS.

Cook attributes his funding successes to a fundamental principle: "Money follows vision. It never leads it." This belief in communication aligns with his leadership style, emphasizing attentiveness to staff insights. "I love working with people," he said. "I did engineering management at Z and program management at MESA, but I love even more motivating people. I really listen, try very hard to get to know them, try to reason together what needs to be done. I feel that telling them what to do is an unworthy shortcut. I want to assemble a plan that makes sense to a large variety of people, so I never decided what was important by myself. The technical experts always decided." Only once a strategy had emerged, he would approach DOE to ask for project funding.

Keys to success

Cook credits early "luck and circumstances" in his life's journey when he

MASSIVE PROJECT — In a 2002 Lab News photo, Don Cook stands at the location where the Microsystems Engineering and Science Applications complex would be built. **Photo by Randy Montoya**

PULSED POWER PLANS — In a 1996 Lab News photo, Don Cook poses with Particle Beam Fusion Accelerator II in the background. At the time, Cook was director of the Pulsed Power Sciences Center, which later became the Z Pulsed Power Facility under his leadership. **Photo by Randy Montoya**

attended the University of Michigan for a bachelor's in nuclear engineering and later, despite his initial doubts he was "smart enough" to attend, a doctorate in applied plasma physics at the Massachusetts Institute of Technology.

"My academic background gave me an engineering and physics outlook that together have been very helpful," he said. "They taught me how to design equipment and facilities yet helped me maintain an overall outlook that focused on achieving the mission need with a high probability of success."

His comprehensive approach led to experimental and theoretical research programs that delivered, he said, "exponential increases in information for nuclear weapon stockpile stewardship."

In 1994, when physical testing of nuclear weapons was placed administratively beyond reach, Cook volunteered Sandia for X-ray imaging of subcritically compressed plutonium far underground at the Nevada test site. The method made it possible to determine the material's pressure and density, thus deriving its temperature and equation-of-state. This initiative, stemming from earlier accelerator work that only Sandia had pursued, contributed decades later to the Labs' pivotal role in the Scorpius project, which attempts a more intricate version of the same feat.

After 28 years, Cook transitioned from Sandia to become the managing director of the U.K. Atomic Weapons Establishment before being appointed by President Obama as the deputy administrator for Defense Programs within NNSA. In his five-year role at NNSA, he provided leadership and direction for the U.S. nuclear security complex, led the preparation of the President's Budget Request for Defense Programs and defended planned expenditures in annual congressional testimony.

Upon completing this chapter of his life, Cook retired, returning to his home in Washington state. There he serves on three Sandia review committees and assists his church in maintaining overnight facilities for 16 homeless people.

POWERFUL ACCOLADE — In a 2006 photo, Lockheed Martin Information and Technology Services Sector President Mike Camardo, left, presents Don Cook, center, with a recognition award for his work on MESA. Joining the two is then-Labs President Tom Hunter.
Photo from the Lab News archives

"These are good people down on their luck," he said, "and I'm a hands-on guy." He repairs items broken through harsh use and performs welding, plumbing and electrical tasks. His active post-retirement life remains committed to service and making tangible impacts, or, as Cook puts it, "not a whole lot different from my previous work."

Center for Cyber Defenders at center of digital evolution

By **Michael Ellis Langley**

For more than a third of Sandia's 75-year history, the Center for Cyber Defenders has cultivated new generations of cybersecurity experts who have brought ingenuity to defending the nation.

When the center was established in 1999 at Sandia California, the internet was less than a decade old and cybersecurity was in its infancy. In the quarter century since its founding, the interns fostered through the program have helped build, refine and secure the online ecosystem.

"It started very humbly with a handful of interns from Las Positas College (in Livermore)," said Steve Hurd, retired Sandian and former program lead for the center who joined the program in 2002. "It exploded from there. I think it went from eight or nine interns to 30 something interns in the matter of a couple of years."

Cybersecurity was not yet widely seen as a viable career choice at the turn of the century. The Center for Cyber Defenders would be one of the ways that would change.

"We couldn't find talent at that time," Hurd continued. "We needed talent, so we grew our own."

DEFENDERS — In a photo from 2016, interns with the Center for Cyber Defenders in California work on security measures ranging from ubiquitously used technologies, like videoconferencing, to writing initial code to automate reverse-engineering malware. **Photo by Randy Wong**

What a difference 25 years makes

Since its launch, more than 800 interns have worked in the center in New Mexico and California. Current center lead Steven Barker now manages its robust internship program, where undergraduate and

DEFENDER-IN-CHIEF — Steven Barker, who was once an intern with the Center for Cyber Defenders, now leads the center and remains committed to training the best new minds of each generation **Photo by Randy Wong**

graduate students come from all over the nation to learn with the experts.

"In general, our goal is not to teach interns how to do cybersecurity. We help them take what they were taught in their classes and learn how to apply it in a real environment," Steven said.

Mentor Alex Marti said the interns get access to problems that aren't classified but may lead to methods that solve other, more sensitive issues.

"We'll talk with them and ask, 'How would you start this?'" Alex said. "Seeing their thought process not only helps us view their ideas and see from their perspective, but also helps them think through the problem step by step. Exchanging new ideas back and forth helps the interns to overcome technical challenges as well as keep forward progress. The intern learns something new, helps us in our research and also brings us one step closer to our goal."

Steven agrees that the interns add value to Sandia's national security work.

"They're fresh in school, they're learning new things, and they have a lot of new ideas and perspectives that we may not have considered," he said.

Real problems lead to innovative solutions

That commitment to immersion hasn't changed as far as Hurd is concerned.

"It's real world. They're not just being assigned some random task that we don't care about," he said. "One constant has been that the projects we do are real-world projects. Some of them, as you might imagine, are pieces that are carved from a set of work that is either classified or sensitive. Generally, we try to find things that aren't too terribly sensitive but are connected so that they can understand some of the context."

While Center for Cyber Defenders staff can't disclose project specifics, interns might be assigned to look into a ubiquitously used system, like videoconferencing or file transfer systems, and try to break it in any way they can think of or write initial code to automate reverse-engineering malware.

"We want to try to determine what the malware does so that we can either identify how it impacted us or be able to block it in the future," Hurd said. "It's an incredibly time-consuming task. The people who do it are rare as unicorns and extraordinarily expensive. With that initial intern work, our researchers, who are incredibly busy, could focus exclusively on tasks that require their expertise."

He added that mentors also try to teach interns how to work in teams and communicate their work.

"That sort of differentiates the Center for Cyber Defenders," Hurd said. "You're being mentored by an experienced professional in the field, and that's been a lot of what is the special sauce of the brand."

One of us

That close mentorship was incredibly important to Steven and Alex when they were interns, and something they are actively continuing in their current leadership roles.

"We intentionally plan lots of opportunities for interns to get to know other staff members and learn about other projects that they're not working directly with to build connections and give them a bigger picture of the work that is done at Sandia," Steven said. "If I was having a problem, I could just ask a question and then I would immediately have two or three other interns right there helping me. Later, another intern would ask a question about something I was familiar with, and I could take a turn helping them."

Alex recalled how those kinds of relationships built him up during his time as a CCD intern.

"Having a mentor close to you, leading and guiding you really helps to build confidence," he explained. "I personally had a few ideas that the mentors I was working with thought were great and wanted to implement them into the project. Having an intern make meaningful contributions is the goal."

It's all in the culture

According to Sandia records, at least 200 of the more than 800 interns who passed through the program in the last 25 years were hired as full-time researchers — with 153 of them still employed today. That number is not only deeply gratifying to Steven, Alex and Hurd, it has provided the Labs with a cybersecurity workforce that is steeped in the evolution of the profession and in the culture of Sandia.

"One of the things about the culture that was the most important in my eyes was the openness of everybody," Steven said of his internship experience. "You would hear, just in passing, that somebody worked on something cool. If you shot them an email and just asked to talk about it, nine times out of 10, they'd say absolutely. Everybody is so open and willing to talk about and share what they're working on."

"It wasn't just the cool cybersecurity

work we do here that made me want to stick around," Alex said. "The culture, the people and the wonderful intern program played a big role in me going full time. I loved how everyone is so nice and willing to help and that stuck with me to this day. I consider Sandia to be the gold standard. Even if interns don't end up working here, they at least can see what a good working environment that respects their employees looks like and judge what they want as they continue their professional career."

According to Steven, Sandia's culture has yielded an incredibly deep and well-trained cybersecurity workforce.

"A lot of our staff members, especially within the cybersecurity positions, have come in through the center program," he said. "Instead of hiring blindly from a stack of 100 resumes, interns have almost like a trial period — a chance for these people to work with our staff members for them to get to know each other, make connections and see what Sandia is like. We also have a much better idea if they are somebody who would be a good fit long term as a Sandian."

And that, Hurd said, has given the Labs an exceptional reputation.

"There's absolutely no way that Sandia would be in the position it is now in terms of cybersecurity had it not been for the number of people we've brought in through the Center for Cyber Defenders," he said. "I think the impact has been staggering. We would not be able to do all that we have done, had we not had all the best talent coming through."

"The way I felt as an intern is still very much the way I feel today," Steven said. "I am surrounded by amazing people, including our interns, and I am constantly saying, 'Wow. You can do that?' I am consistently amazed by the caliber of work that Sandians do."

Mileposts

Arturo Brito 30

Dahlon Chu 30

Marc Gunkel 30

Greg Tipton 30

Marvin Cook 25

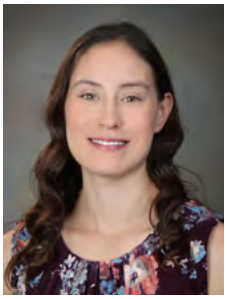
Heather Pennington 25

Kristopher Klinger 20

Laura Biedermann 15

Adam Flynn 15

Lance Hutchinson 15



Rachel Jones 15

Pride Month at Sandia

PRIDE ALLIANCE — Deputy Labs Director Laura McGill, center, waves a pride flag as she walks with Andres Sanchez, right, down Central Avenue in Albuquerque during the pride parade on June 8. **Photo by Bret Latter**

UP, UP, UP — From left, Sandia Pride Alliance Network preceding chair Chris LaFleur and Katrina Wagner of Community Involvement raise the Pride flag at Sandia New Mexico as members Stephanie Watzman and Elizabeth Ames cheer them on. The flag was raised during a ceremony on June 3 to kick off Pride Month. **Photo by Lonnie Anderson**

JUN 22 Pride on the Pitch

Saturday, June 22, 2-6 p.m. MT

Join the Sandia Pride Alliance Network at the New Mexico United tailgate for Pride on the Pitch. There will be food, games and fun for the whole family. Parking is $12 at the UNM South Lot. After the tailgate, march to the match with New Mexico United supporters groups. Discounted tickets to the game can be bought through the Sandia Employee Recreation Program.

JUN 22 Guest speaker Cindi Love on intersectionality

Monday, June 24, 10:30-11:30 a.m. MT

The Sandia Pride Alliance Network welcomes Cindi Love for a talk on intersectionality as an intentional practice. Cindi says that no matter how or when someone becomes involved with equity work, it is always possible to integrate intersectionality more fully into their view of these issues. Love is an American human rights advocate, organizational consultant, corporate executive, educator, entrepreneur, author, public speaker and activist. Since 2018, she has served as the executive director of Out for Undergrad, a not-for-profit organization that helps high achieving and otherwise diverse LGBTQ2+ undergraduates and early-career professionals achieve their full potential. Location information and a Teams link are available on the Sandia Pride Alliance Network website.

FLYING HIGH — The pride flag flies for the first time during Pride Month next to the Sandia California Visitor Badge Office. Organized by the Sandia Pride Alliance Network, the flag-raising ceremony kicked off Pride Month at Sandia. **Photo by Spencer Toy**

PASSING THE PRIDE — Myra Blaylock, left, passes the pride flag before it is raised on-site in Livermore. A group of Sandians proudly stood outside Sandia California's Visitor Badge Office on June 3 to celebrate the pride flag being raised on-site for the first time. **Photo by Spencer Toy**