Vol. 76, M **SANDIA SANDIA SANDIA SANDIA SANDIA STEM Day at Cochiti Pueblo Page 2**

Vol. 76, No. 9, May 30, 2024

Then and now	8
Art reception	8
Mileposts	10
Grease and gears	11

Electrical circuits encased in fluid may reshape data-center design



COOLING OFF — David Smith, front, and Dave Martinez, behind, work on a computer server submerged in liquid as part of testing at the High Performance Computing center at Sandia. The immersion system uses a nonconductive liquid coolant that enables 100% of the heat generated to be captured. The reflection of the computer demonstrates the high liquid level. **Photo by Craig Fritz**

Water and power increases for cooling no longer inevitable

By Neal Singer

eeping electrical circuits dry is generally considered a vital safety measure, but at Sandia's High Performance Computing center, technicians adjust live circuits submerged in liquid. "It's pretty cool — and a little unusual — to walk into a computing lab and see electrical hardware submerged in fluid," Sandia engineer David Damm said.

Complete immersion of computer components appears to be the most effective way to cool them, said Dave Martinez, engineering program project lead for Sandia's Infrastructure Computing Services. "We place whole computers — their power cables, everything — in a liquefied solution. We take an entire rack and drop it into fluid contained in big immersion tanks."

- CONTINUED ON PAGE 6

Richard Claassen: Manhattan Project veteran, fundamental research champion

By Mollie Rappe

Relation of Sandia's Livermore campus from June 15, 1982, to May 31, 1987. However, his greatest impact on the Labs perhaps dates to a 1957 presentation urging the development of a group within Sandia focused on fundamental physical sciences research.

Richard Claassen, also known as Dick, was born May 10, 1922, in Ithaca, New York, and died in Santa Rosa, California, on June 16, 2008, at the age of 86. He received his bachelor's degree from Cornell University, where he met his wife, Ruth. He and Ruth had three children: Peter, Ann and Sarah.

During his master's degree in physics at Columbia University, Claassen joined the Manhattan Project, serving as a research

- CONTINUED ON PAGE 6



FUNDAMENTALS OF RESEARCH — In 1962, Richard Claassen, left, then director of physical research, and Frank Hudson, then manager of the physical sciences research department, discuss the progress being made in hiring new Ph.D.s into the directorate, now known as a center. Both played major roles in creating a fundamental research program at Sandia. **Photo from the Lab News archives**





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TABLE of CONTENTS

- 1 | Electrical circuits encased in fluid may reshape data-center design continued on page 6
- 1 | Richard Claassen: Manhattan Project veteran, fundamental research champion continued on page 6
- 2 | Inquisitive minds, exploring a new world
- 4 | Math and science awards encourage girls to pursue STEM fields
- 8 | Then and now: Bunker at Tonopah Test Range
- 8 | Embracing creativity
- 9 Donate blood, collaborate for a win in June
- 9 | National Day of Prayer
- 10 | Mileposts and retirees
- **11** | Grease and gears

EDITOR'S NOTE: Please send your comments and suggestions for stories or for improving the paper. If you have a column (500-800 words) or an idea to submit, contact the Lab News editor at labnews@sandia.gov.

Inquisitive minds, exploring a new world



TEACHING THE NEXT GENERATION — Nelson Morez laughs with student Deanadra Bird as she finishes a project during a STEM event at Cochiti Elementary School on May 17. Photo by Craig Fritz

Sandia holds STEM Day at Cochiti Pueblo

By Kim Quintana

was fascinated as a little kid on the reservation, just looking up at the sky and seeing airplanes fly," engineer Nelson Morez said to a group of first graders at Cochiti Elementary School. "I was amazed at how something so heavy was able to stay up there."

Nelson, a systems engineer at Sandia, and proud member of the Dinè reservation, grew up much like these kids. As part of STEM Day, he joined a team of about a dozen volunteers from Sandia who visited the school on the Cochiti Pueblo.

"I love it; it really takes me back to my childhood," Nelson said. "I want to explain to them the things I wish I knew at that age. They are all very inquisitive and quick learners. Growing up on the reservation, at my school, none of this happened."

Nelson spent the day explaining Bernoulli's Principle, a fundamental concept in fluid dynamics regarding pressure, speed and height. While the students may not remember the famous physicist it is named after, Nelson hopes they will remember the fun they had blowing a ball off a straw and out of a cylinder, demonstrating how different dynamics affect flight.

That is the purpose of STEM events like this one: students engaging in fun activities that teach basic science, technology, engineering and math skills.

"Would you like to build a lava lamp?" asked Debra Menke, STEM Outreach Program Manager. "Yeah!" said the kids, unaware that they were about to learn about chemical reactions.

"Look at mine. It's perfect," first grader Albert Thomas said while showing off his dark-green lava lamp.

The students also explored computer programming using Ozobots. Each student drew a multicolored path on a piece of paper and watched the tiny robot follow it. Some wrote their names and watched it follow each curve and giggled or shook their heads when the robot made a wrong turn. "Oh no, where is that little guy going?" asked one student.

Another Sandia volunteer taught students how to build a basic circuit board, while others guided them in exploring structural engineering using spaghetti and marshmallows.

With the support of volunteers from Los Alamos National Lab and the Pajarito Environmental Education Center, students also had the opportunity to fly drones, build rockets and learn about birds and wildfires.



TESTING THE THEORY — John Tenorio attempts to blow a ping pong ball through a straw in a demonstration of the Bernoulli Principle during a STEM event at Cochiti Elementary School.

Photo by Craig Fritz

But the most popular attraction was GIZMO, Sandia's robotic dog.

As the gray, faceless machinery made its way down the school sidewalk, walking like a four-legged animal, highpitched screams filled the air. For kids who stood just a few feet tall, it was intimidating at first. Soon, the kids grew more comfortable and excited to touch the robot.

"Who wants to shake his hand?" Deb asked, prompting a sea of raised hands from excited kids. Some even jumped up and down to be recognized. Deb said GIZMO can be deployed in dangerous situations and detect hazards like radiation and gas leaks, patrol perimeters and test detection devices, or communicate with people in the area.

The kids though, were more captivated by GIZMO's ability to jump, wiggle and show love, forming his "paws" into the shape of a heart. The encore was accompanied by a little music. "Who wants to see him dance?" Deb asked, which set off squeals of excitement and a dance party with GIZMO.

Educators and Sandia volunteers hope that the students remember events like

this when they look back on their education and toward their future.

"I think it's really important for them to experience things like this because it broadens their horizons," teacher Melanie Harris said. "It exposes them to new things, and it encourages them to dive into worlds they might not know."

Nelson was happy to be a part of it. "I am Native, so I really enjoy coming back to Native communities to share my path."

His path included a career in the U.S. Navy supporting various aircraft electronics and flight test platforms. Nelson also served as a U.S. Naval Reserve Aircrewman Operator before working for Boeing, Lockheed Martin, Honeywell Aerospace and Bombardier prior to joining Sandia.

But his interest in aircrafts started in childhood.

"When I was a kid, I made a decision that one day I would learn how aircrafts fly, how they stay aloft," he said. "I was able to fulfill that in a lifelong dream. Now I am able to give back and hopefully inspire young minds."

Adventures with GIZMO

GIZMO the robotic dog joined Sandia's STEM outreach events in 2024 and is a big hit with students. The robot is equipped with LIDAR, which uses laser beams to enhance situational awareness by measuring the distance and shape of objects in the environment.

Robots like GIZMO can be programmed for autonomous operation to help access dangerous situations and identify hazardous areas including radiation or gas leaks. They can also help patrol perimeters and serve as a two-way communication device. Operators can use its microphone and speaker to send messages to audiences. GIZMO's job at Sandia, however, is to engage and excite students to explore STEM careers.

Math and science awards encourage girls to pursue STEM fields

Sandia Women's Connection holds 33rd annual event at Sandia California

By Lea Blevins Photos by Craig Fritz

andia opened the doors of math and science career possibilities for girls from 21 regional high schools at this year's Sandia Women's Connection Math and Science Awards.

"It's an amazing event to reach out to these young ladies and hopefully make a difference in their lives, exposing them to the national lab industry and encouraging them to look into careers they maybe weren't aware of but may have a passion for," said Pam Lober, co-chair of Sandia Women's Connection.

The 33rd annual event, held on April 16 in Sandia California's auditorium, honored 36 high school juniors from Livermore, Pleasanton, Dublin, San Ramon, Mountain House, Tracy, Manteca, Stockton, San Lorenzo, San Leandro and Oakland. The awardees, their families and their teachers joined Sandia volunteers for the event, which included mentoring sessions with workforce members in addition to the awards ceremony.

"The students can see a glimpse of the kind of work that Sandia does that will influence their

future careers," said Erika Tsang, who helped organize the event. "I enjoyed witnessing the proud moments from parents and teachers."

Sandia Women's Connection volunteers reached out to schools. Staff members from each school nominated one junior in math and one junior in science to receive awards. Nominators included teachers, department heads, guidance counselors, principals and vice principals — people who have noticed the girls' talents and hard work.

"I hope each of you continue to pursue a career in math and science," Associate



MENTORING MOMENT — Sandia mentor Karla Morris Wright, left, connects with awardee Ianna Diaz, center, from Tracy High School.

Labs Director Andy McIlroy told attendees via video. "Each of you has a bright future ahead, and I hope Sandia's recognition and support will propel you further toward your chosen careers. Please consider all of us at Sandia to be a resource for you now and in the future."

Speakers at the event included Trish Benguerel, Laura Losey and keynote speaker Gaby Bran Anleu, who all congratulated the girls and cheered them on in their educational journeys.

"We're not only celebrating you, but we also want to introduce you to the stories of successful female engineers



ATTENTIVE ATTENDEES — Associate Labs Director Andy McIlroy addresses the auditorium via video.

and scientists here," Trish said. "We invite you and encourage you to pursue an internship and work in something so important like national security."

In telling their own stories, Laura and Gaby both emphasized the importance of finding mentors to help along career paths. Laura shared her story of attending electrical engineering graduate school classes that had only 10% female students.

"I was looking around, and it was hard to feel like I belonged," Laura said. "I had a wonderful adviser, and he told me he believed in me and that I needed to believe in myself. That moment was a turning point."

Gaby spoke about connecting with a female role model — the co-author of her favorite heat transfer book — whom she found inspirational while in graduate school.



MEETING OF THE MINDS — Award recipients and Sandia mentors share stories outside the California auditorium.

"That's when I realized that having mentors is important, especially if they look like you. If she can do it, I can do it," Gaby said. "She motivated me even when things got hard."

Looking around the room, Gaby pointed out the families and teachers who have already shown support for the awardees.

"I can see right now you already have some people cheering for you," she said. "They nominated you because they see the potential in you. Even here at Sandia, I have found really great mentors helping me to get to where I am right now. Look for those mentors everywhere you go."

Attendees also heard from California Assemblymember Rebecca Bauer-

Kahan and U.S. Rep. Eric Swalwell via recorded video messages showing their support for the girls and the Sandia Women's Connection award program.

"I applaud Sandia National Laboratories for continuing to do their part in encouraging young girls to get involved in math and science," Swalwell said. "Because of programs like this, our STEM workforce is becoming more and more reflective of our community."

Event speakers not only encouraged the girls to pursue mentorships and



SANDIA WOMEN'S CONNECTION — SWC Co-Chair Pam Lober, right, speaks to honorees with Alejandra Dominguez.

education in STEM fields but also urged them to consider future internships at Sandia.

"If you want to work with the best, if you want to work on amazing projects, if you want to be able to move the needle in some way — think Sandia," said Mariaelena Marcano, who leads Sandia California's Student Intern Program. "You'll be challenged, and you'll be given real work. You'll leave here knowing you've increased your skillset and built your network. The hope is you might circle back at some point to Sandia."



Cooling

CONTINUED FROM PAGE 1

He believes that this direct contact between a liquid coolant and electrified equipment "could reshape the future designs of data centers."

Reshaping data-center architectures

By submerging all parts of the computing servers in a liquid coolant that doesn't conduct electricity, 100% of the generated heat can be captured, almost entirely eliminating the need for the power-hungry fans and chillers used in conventional cooling systems.

Dave estimates that this type of cooling system, using liquid approximately the viscosity of cooking oil, would cut energy consumption by 70%. Unlike water-chill systems that require evaporation to lower operating temperatures, no water is lost; the coolant gives up its heat to the open air, given the right temperature differential.

Sandia's forward-thinking approach arises from projections that the increasing water and electrical power demands for cooling in high-performance computing eventually will exceed the resources of small towns and become an unsupportable burden.

To address this, Sandia is formally testing a commercial nonconductive liquid system from Barcelona-based company Submer Technologies throughout the summer. Early positive results led Dave to envision a reduction



COLD PLUNGE DAVID SMITH MAKES NETWORK CONNECTIONS TO A COMPUTER SERVER SUBMERGED IN LIQUID AS PART OF TESTING AT THE HIGH PERFORMANCE COMPUTING CENTER AT SANDIA

Claassen

CONTINUED FROM PAGE 1

assistant at the Special Alloyed Metals Laboratory from 1944 to 1946. He built and used fluidic systems to test for leaks in diffuser tubes used for enriching uranium. At the end of the project, he continued his education and received a doctorate in nuclear physics from the University of Minnesota in 1950. Upon Claassen's retirement, the Lab News editor of the time,



TEMPERATURE DROP — Hoan Luu, left, and David Damm work on a computer server submerged in liquid. Save for the silver handles at the top, the entire computer server is submerged.

Photo by Craig Fritz

in the two big problem areas of power and water use that are expected to hinder the development of faster, more powerful machines.

Promising innovations and partnerships

According to the Submer website, their single-phase immersion cooling system uses a biodegradable, nontoxic, nonflammable and noncorrosive liquid. It boasts being 95% more efficient than traditional cooling technologies, while 1,400 times a better thermal conductor than air and eight times less electrically conductive.

Negotiating through Adacen Inc., a local Albuquerque data company, Dave convinced Submer to partner with Sandia. Submer would provide fluid and equipment and Sandia would provide its expertise in system cooling and testing to perform a thorough technical evaluation of the system. Meanwhile, Dave, who for 25 years has worked diligently to bring about the next stages of computer cooling, is happy to reduce Sandia's costs for power and water and provide a stage for a potential revolution for the industry.

In partnership with Adacen, code is being written specifically for the new task by Hoonify Technologies, composed of five former Sandia researchers who have taken entrepreneurial leave from the Labs.

Bruce Hawkinson, mused that he was likely the last Sandian who had directly worked for the Manhattan Engineer District.

From Sandia staff to vice president

Claassen joined Sandia in 1951 as a staff member in the electro-chemical division. By the summer of 1954, he was asked to demonstrate the feasibility of a new weapon delivery method called laydown.

"Laydown means releasing a weapon at

Meet Dave Martinez: Innovating energy-efficient data center solutions

Dave Martinez, engineering program project lead for Sandia's Infrastructure Computing Services, envisions building the most energy-efficient data center in the world. This center would aim not only to reduce energy consumption but also to use waste heat for various purposes, including heating buildings and preheating lab water, he said. Dave leads Sandia's involvement in COOLERCHIPS, a DOE Advanced Research Projects Agency-Energy initiative aimed at defining the future of liquid cooling in high-performance computing. Additionally, he plays a significant role in Energy Efficient High Performance Computing, a worldwide organization with 1,000 members, where he serves as the infrastructure lead.

Throughout his career, Dave has witnessed the evolution of computer cooling methods from liquid to air and back to liquid cooling. With a keen interest in the thermodynamics of computing systems, he has been actively involved in power and cooling solutions for nearly four decades. Notable contributions include assisting in the design of energy-efficient data centers, such as the one at the National Renewable Energy Laboratory, which currently boasts the world's most energy-efficient data center with 80% heat recapture.

Dave's dedication over the past 25 years has been pivotal in shaping the future of power and cooling solutions in computing, reflecting his commitment to advancing sustainable and efficient technologies in the field.

In 2020, Submer, in collaboration with Intel Corp., introduced the idea of a liquid coolant that would bathe all components of a computing system to provide even cooling and allow higher operating temperatures.

As a bonus, the warmer temperature of the returning liquid can offer some heat to adjacent buildings during winter months and can be used to heat labs and showers in the summer through heat-exchange processes.

Sandia will conduct comprehensive tests on this system, evaluating hardware reliability and infrastructure support cost and effort. A case study is expected to be released this fall to assess the pros and cons of the technology.

very low altitudes and very high airplane speeds, then have it lie on the ground and wait for the delivery aircraft to escape before detonating," Claassen told the Lab News in 1987. "In other words, you don't just drop it, you lay it down. But there were some real problems. One was that the weapon would have to be slowed down. That meant parachute retardation — it's hard to believe today, but in 1954, a lot of people believed that a nylon chute coming out of the airstream at Mach 1 would burn up."



RETIRED GENTLEMAN — In 1987, Richard Claassen retired from his final Sandia position, as vice president of Sandia Livermore. This photo appeared in Lab News Vol. 39, No. 13 on July 2, 1987. Photo by Randy Montoya

This challenge led to the development of Sandia's parachute lab, high-speed photography expertise, and the building of the **300-foot drop tower** in Tech Area III, he told the Lab News in 1987.

Claassen and Frank Hudson, with the support of the vice president of research a position now referred to as associate Labs director — Glenn Fowler, spent several years preparing a proposal for a fundamental research group at Sandia. In 1957, Claassen presented this proposal first to the Labs president and then the president of Bell Laboratories.

This directly led to Claassen becoming the manager of the fundamental research department in 1957, he told the Lab News in 1987. In 1960, he was named director of physical research, moved to director of electronic components in 1968 and became director of materials and process sciences in



25 YEARS OF SERVICE — In 1976, Richard Claassen, director of electronic components, celebrated 25 years at Sandia. This photo appeared in Lab News Vol. 28, No. 7 on April 2, 1976. Photo by Bill Laskar

1975. In 1982, Claassen was appointed vice president of Sandia's Livermore campus, which he called "the best VP assignment in the Labs," in 1987.

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A momentous memo

On March 16, 1957, Claassen gave his presentation to Mervin Kelly, the president of Bell Laboratories and a member of the Sandia Board of Directors, urging the development of a group within Sandia focused on fundamental physical sciences research. He documented the presentation in a May 1957 memo, which Susan Seestrom, associate Labs director of advanced science and technology from 2017 to 2023, credited as the origin for Sandia's fundamental research efforts, inspired by the Bell Laboratories approach to investing in basic research.

"It's the reason Sandia now has strong research organizations exploring the fundamentals of science and engineering, making an impact not only on national security but also on the international scientific community and global interest in the science of the possible," Susan told the Lab News in 2022.

Within the memo, Claassen outlined how a fundamental research group would serve Sandia and its main mission, how such a group should be organized and the research focuses of such a group. He specified that radiation effects on materials, semiconductors and theoretical mechanics were all important topics for Sandia to research.

While Claassen of 1957 might have been surprised at just how important semiconductors would become, and the revolutions



SCIENCE OF MATERIALS — Dave Tallant, left, explained to Director Richard Claassen, center, and Ruth Whan, the first female department manager (similar to the current title of senior manager) at Sandia, the procedures used to determine whether trace amounts of aluminum are present in a silicon layer deposited on quartz crystals. Aluminum would appear as visible fluorescence in spectrometer analysis — one of many techniques used in the materials and process sciences directorate to perfect production. This photo appeared in Lab News Vol. 31, No. 5 on March 9, 1979. Photo by Bill Laskar

in microelectronics, microsystems, and computer modeling and analysis research on that class of material would produce, he was fully aware that Sandia needed to invest in such research to stay ahead in the literal and metaphorical arms races.

"...Inventions are difficult things to come by and cannot be sought directly as such," Claassen wrote. "They can perhaps best be achieved by establishing the proper atmosphere for work by searching minds which are properly loaded with an impedance of known problems needing solutions. If the country is to maintain its lead in the technological weapons race, we must as a nation reach an equilibrium condition where the advances in fundamental technical knowledge balance the rate at which application can be made to new weapons designs."

Claassen's persuasive presentation and moving memo led to the establishment of such a research organization.

"Claassen's objectives for a fundamental research organization still guide us today even though the nature of national and global security work has changed," Labs Director James Peery told the Lab News in 2022. "Sandia has been strategic in adding new areas like high-performance computing, computational science, quantum information science and climate science. We have looked at what's on the horizon and made investments through LDRD and other vehicles to bring in the scientists and engineers. We've had a true impact, not only in the scientific community, but also in the national security community."

Then and now: Bunker at Tonopah Test Range



BLOCKHOUSE HISTORY — Observation Bunker 09-50 was built in 1960 to observe rocket launches at Tonopah Test Range in Nevada. In the historical photo on the left, R.C. Holland, who worked in the Rocket and Ordnance Section, inspects the new 09-51 bunker from the roof of



the older 09-50. The bunker to its left, Bunker 09-51, was used as the fire control bunker and to house instrumentation needed to fire rockets for nearby launches.

Left photo from the Lab News archives; right photo by Craig Fritz

Embracing creativity

National Security Programs spotlight staff talents

By Auri Atencio

n May 14, National Security Programs held an opening reception to celebrate the artistic talents of its team members across the division. The art show was organized by Program Communications Specialist Auri Atencio and hosted by division center directors in support



IN HARMONY — From left to right, National Security Programs staff members Tammy Brown, Mellisa Heller and Nick Flor perform at the celebratory event. **Photo Tina Jaramillo**

of the division's strategic plan to strengthen team connectedness and mission understanding. The event featured an ice cream and soda bar, a live performance by Tammy Brown, Mellisa Heller and Nick Flor from the Sandia Singers group, and an in-person showing of staff artwork.

"This was a positive and uplifting celebration that provided an opportunity for team members to showcase their artistic abilities outside of

their day-to-day work. What a great way to encourage cross-divisional connections," said David Wiegandt, a National Security Programs center director and Field Intelligence Element director.

The virtual showcase featured 37 artists and 58 works of art, creating an accessible experience for all staff, including those working remotely. This allowed everyone to engage with the diverse range of artwork, including paintings, sculptures, photography and mixed-media pieces,



SWEET CONNECTION — From left to right, National Security Programs directors Kate Helean, Kevin Dixon, Marcus Chang and Reno Sanchez serve ice cream to team members during a division-wide celebration on May 14.

Photo Tina Jaramillo

that showcased the immense talent and creativity within the National Security Programs.

"Amazing to see Sandians are not only the smartest and brightest, but also creative in so many ways," Business Operations Analyst Janet Lovato said.

National Security Programs is planning future opportunities to celebrate and support the artistic endeavors of its team members, which enhances a culture of creativity in the division.

For more information, please contact d5kcomm@sandia.gov.

Donate blood, collaborate for a win in June

By Amy Tapia

os Alamos National Laboratory and Sandia will face off in June in the second annual friendly blood donation competition. Sandians can donate in the lobby of Steve Schiff Auditorium. This year's competition is focused on encouraging new donors.

Last year, Sandia donated 145 units of blood, and Los Alamos donated 146 units, winning the competition by a single unit.



EVERY UNIT COUNTS — Sandia employee Andrew Harvey squeezes a cow toy to encourage blood flow during last year's blood drive. Last year, Sandians donated 145 pints of blood during the drive. This year, Sandians can donate June 11 or 24 at Steve Schiff Auditorium. **Photo by Craig Fritz**

This year, the champion lab must win at least two out of these three categories: the most units of blood, the most overall donors and the most new donors. Together, both labs hope to exceed last year's total of 291 units, which could potentially impact the lives of 689 people and result in a real win for New Mexicans in need of donated blood.

Donors who participate in the challenge will receive 1,000 Virgin Pulse Points, a Battle of the Labs T-shirt, a certificate for a free short stack of pancakes from IHOP, bonus points for a \$10 gift card in their donor account and be registered to win **one of five \$5,000 prepaid gift cards.**

A life-saving gift

I donated blood for the first time more than 35 years ago. It was during the holiday season, and it was a good way to help others when I didn't have much time or money to share. The experience was easy, and I felt rewarded knowing that my simple gift could save someone's life. When I joined Sandia, I continued to donate regularly at the bimonthly drives. Since then, Community Involvement began coordinating the blood drives. I'm proud to see our employees continue to exceed blood donation goals. If you've never donated blood, I hope you will consider donating in June.

—Amy Tapia, manager of Community Involvement



National Day of Prayer



PRAYERS FOR THE NATION

— Sandia's Lissette Carter opens the National Day of Prayer event by singing the national anthem on May 2 at Steve Schiff Auditorium. The Christians in the Workplace Networking Group and the Kirtland Air Force Base Chaplain Corps co-sponsored the event. Lissette was one of 11 people who led different portions of the assembly. More than 200 people from Sandia New Mexico and California attended in person and virtually.

Photo courtesy of Jeff Gruda

10

Mileposts





Sean Brooks



20



Jessica Montoya

Tom Quirk

20

20



Joy Giron

Patricia Smith

35

20





Eric Shaner

Summer Ferreira

15 Paul Putelli

15 Austin Silva



Recent Retirees





Kevin Rolfe



Rob Nelson



20

Dave Clovis



Sandia Labs has official social media accounts on several online communities to engage in conversations about our work, update followers about the latest Labs news, share opportunities, and support the open government principles of transparency, participation and collaboration.

Visit us on your favorite networks and join the conversation.



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Flickr

flickr.com/SandiaLabs



18

Grease and Gears

By **Sofia Wolinski** Photos by **Craig Fritz**

n May 16, the Shipping and Receiving group hosted the Grease and Gears Car Show for the first time since 2019. Originally conceived as a team-building activity for Logistics Operations, this event has evolved into a Sandia tradition. The event has been on hold since 2020 due to COVID-19.

This year's show, held north of the Shipping and Receiving building, showcased a colorful array of more than 40 cars and motorcycles owned by Sandia staff. The revival of the Grease and Gears Car Show marks a return to normalcy and reinforces the enduring spirit of togetherness and innovation that defines Sandia.



CLASSIC BEAUTY — Chris Overholser takes a look at a 1937 Ford Humpback.



REVVING UP — Patrick Lambert peers under a 2004 Jeep LJ with a custom suspension built for rock crawling.



DETAIL ORIENTED — Attendees take in an assortment of cars, trucks and motorcycles.



COMMUNITY SPIRIT — Cars and enthusiasts line up north of the Shipping and Receiving building.