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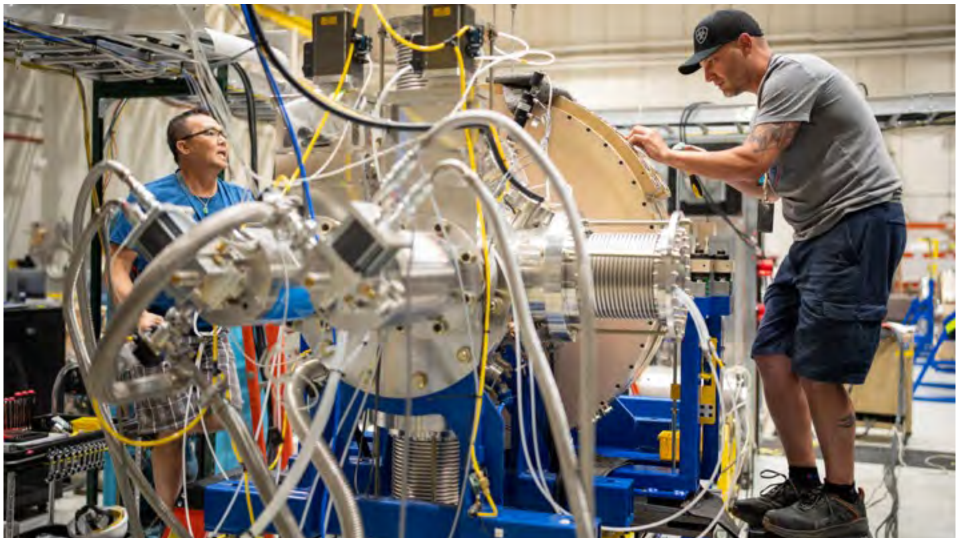
Scorpius images to test nuclear stockpile simulations



SPECIAL DELIVERY — Two cathode inductive voltage-adder cells on the electrical test stand are being aligned at Sandia. After thousands of tests, each holding 50 kilovolts across the insulating gap, they are ready to be mounted on seven-cell modules. **Photo by Craig Fritz**

Sandia injector is key to validating plutonium pit performance

By **Neal Singer**

One thousand feet below the ground, three national defense labs and a remote test site are building Scorpius — a machine as long as a football field — to create images of plutonium as it is compressed with high explosives, creating conditions that exist just prior to a nuclear explosion.

These nanosecond portraits will be compared with visuals of the same events

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Wearable sensor system tracks levels of 'last line of defense' antibiotic

By **Mollie Rappe**

Since the discovery of penicillin in 1928, bacteria have evolved numerous ways to evade or outright ignore the effects of antibiotics. Thankfully, health care providers have an arsenal of infrequently used antibiotics that are still effective against otherwise resistant strains of bacteria.

Sandia researchers have combined earlier work on painless microneedles with nanoscale sensors to create a wearable sensor patch capable of continuously monitoring the levels of one of these antibiotics.

The specific antibiotic they're tracking is vancomycin, which is used as a last line of defense to treat severe bacterial infections, said Alex Downs, a Jill Hruby Fellow and project lead. Continuous monitoring is crucial for vancomycin because there is a narrow range within which it effectively kills bacteria

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MAKING MICRONEEDLE MONITORS — Sandia postdoctoral fellow Alex Downs places a wearable puck with microneedles under a microscope. Sandia researchers have combined earlier work on minimally invasive microneedles with nanoscale sensors to create a wearable sensor patch capable of continuously monitoring the levels of vancomycin in patients. **Photo by Craig Fritz**

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Sandia National Laboratories

Albuquerque, New Mexico 87185-1468
Livermore, California 94550-0969
Tonopah, Nevada | Kauai, Hawaii
Amarillo, Texas | Carlsbad, New Mexico | Washington, D.C.

Katherine Beherec, Editor kgbeher@sandia.gov
Valerie Alba, Interim Editor vnalba@sandia.gov
Ray Johnson, Production rbjohns@sandia.gov
Craig Fritz, Photographer cvfritz@sandia.gov
Michael Langley, California Contact mlangle@sandia.gov

CONTRIBUTORS

Michelle Fleming (milepost photos, 505-844-4902), **Neal Singer** (505-846-7078), **Kristen Meub** (505-845-7215), **Troy Rummler** (505-284-1056), **Meagan Brace** (505-844-0499), **Mollie Rappe** (505-288-6123), **Skyler Swezy** (505-850-2063), **Kim Quintana** (505-264-1886), **Kenneth Vigil** (505-537-1528), **Luke Frank** (505-844-2020), **Michael Baker** (505-284-1085)

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Labs director signs annual stockpile assessment letter

ANNUAL ASSESSMENT — Labs Director James Peery signed the annual stockpile assessment letter in September. The letter is the culmination of a yearlong process that evaluates the safety, reliability and performance of weapons in the U.S. stockpile. **Photo by Craig Fritz**

Yearlong evaluation process verifies weapons' reliability

By **Kenny Vigil**

In September, Labs Director James Peery signed and sent the annual stockpile assessment letter to U.S. Secretary of Energy Jennifer Granholm, U.S. Secretary of Defense Lloyd Austin and the Nuclear Weapons Council. The letter will ultimately reach President Biden's desk before he sends it to Congress.

The Labs director is required by law to complete a yearly assessment of the safety, reliability and performance of the non-nuclear components that Sandia is responsible for in each weapon system in the nation's stockpile.

"One of Sandia's most important roles is assessing the stockpile. Employees from across the Labs work year-round to provide critical scientific and engineering data and information that form the basis for the annual assessment letter," James said. "Finalizing and signing the annual letter represents the culmination of a lot of work and dedication."

Information in the letter is subject to internal and external peer review. Directors from Los Alamos and Lawrence Livermore national laboratories and the commander of the U.S. Strategic Command are also required to submit annual stockpile assessment letters for their areas of responsibility.

Science-based stockpile stewardship

As the Cold War ended, the U.S. implemented a moratorium on underground nuclear testing in 1992. With the absence of underground testing, the NNSA established a science-based stockpile stewardship program to increase scientific understanding of nuclear weapon performance and the aging behavior of weapon materials and components. Science-based stockpile stewardship includes non-nuclear testing and computational simulation.

As part of the stockpile stewardship program, a formal annual certification process for the safety, reliability and performance of the weapons was created.

"The annual stockpile assessment process was established to evaluate the technical basis that supports our assertions that the stockpile remains safe and reliable in the absence of underground nuclear testing. Sandia's annual stockpile assessment letter represents one of our largest responsibilities in stockpile stewardship," said Chris O'Gorman, director of the Weapons Stockpile Management Center.

The bulk of the Labs' non-nuclear testing takes place at the Weapons Evaluation Test Laboratory, co-located with the Pantex production facility in Amarillo, Texas, and at Sandia's Tonopah Test Range in Nevada. Additional testing critical to the assessment occurs at Sandia's New Mexico and California sites, as well as throughout the NNSA's nuclear security enterprise.

Scorpius

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generated by supercomputer codes to check how accurately the computed images replicate the real thing.

"It's clear we need to know that the stockpile will work if required," said Sandia project lead Jon Custer. "Before President Bush's testing moratorium in 1992, we knew it did since we were physically testing. Now we have computer codes. How well do they predict what really happens? Do we have accurate data we put into the codes? To answer these questions with higher fidelity, we need better experimental tools, and Scorpius is a major new experimental tool."

The $1.8 billion project, combining the expertise of researchers from Sandia, Los Alamos and Lawrence Livermore national labs with support from the Nevada National Security Site — a test area bigger than the state of Rhode Island — is expected to be up and running by late 2027.

Tickling the dragon's tail

"We intend to use Scorpius' actual images, gained from what we call 'tickling the dragon's tail,' to check our computer simulations," Jon said. "These simulations theoretically describe the hydrodynamics of plutonium in its various states, and we want to see how closely they match." Hydrodynamics here refers to material compressed and heated with such intensity that it begins to flow and mix like a fluid.

Tickling the dragon's tail in this case means designing experiments that approach but stay below the threshold of criticality — that is, always subcritical, involving less than the mass needed for an explosion — while enabling a study of plutonium in that highly compressed and thermally heated state.

Aboveground facilities have tested the explosive behaviors of surrogate materials, but the inherent differences with plutonium cannot be accurately accounted for. While Scorpius will produce X-ray images during full-scale testing of plutonium, facilities that are equivalent but aboveground, including the Dual-Axis Radiographic Hydrodynamic Test machine at Los Alamos, instead must use implosionlike episodes to test the behaviors of surrogate materials.

"Plutonium is a very strange element," Jon said. "There is no true surrogate. Nothing else behaves like it.

A CLOSE LOOK — An inductive voltage-adder insulator ring is being inspected for defects that could cause cell failure. After passing inspection, it will be assembled into a cell. **Photo by Craig Fritz**

"So, the question to us is, are we feeding accurate data into our codes about plutonium's behavior?" he said.

To find out, Scorpius, the buried interrogating machine, will produce X-ray images of plutonium as it implodes, with experiments specially designed to remain subcritical.

Three questions for Scorpius

First, researchers want to evaluate the effect of aging on plutonium to continue to validate that the U.S. deterrent will be effective if called upon. Plutonium, which transmutes from uranium, ages through a process called radioactive decay. Many nuclear weapons have been in service for thirty to fifty years.

"If you had a car in a garage for thirty to fifty years and one day you insert the ignition key, how confident are you that it will start?" Jon said. "That's how old our nuclear deterrent is. It has been more than 30 years since we conducted an underground nuclear explosive test. And cars are mass-produced by the millions, with every problem well exposed. Our deterrent is built individually, one at a time. So, we want every assurance of reliability to warn potential adversaries that the U.S. stockpile remains a credible deterrent, now and into the future."

Second, he says, consider weapons built since the underground nuclear explosive testing moratorium declared by President George Bush in 1992. The issue here is to show that changes in designs from 1992 to the present that were linked to physical tests of the past are just as potent, if not more so, than their underground-tested ancestors.

Finally, the congruence of theoretical and physical processes in both these test series, providing theoretical validation with Scorpius data, will help remove doubt about future simulations. These subcritical tests with Scorpius are expected to show that newly designed weapons of the future will function if called upon, even though constructed mainly from supercomputer designs and potentially significantly altered to overcome the changes in overall environments expected from the use of new materials and unanticipated electronic advances.

Daniel Sinars, director of Sandia's Pulsed Power Center, said, "We are entering an era where our modernization programs are going to start making significant changes to the nuclear explosive packages, even if the performance characteristics of the weapons don't change. That is, they are not 'new' weapons, but they may have a lot of new technology."

"Having Scorpius is part of what will be needed to have an agile and responsive stockpile for weapon design that can qualify such changes in the absence of underground testing," Dan said.

Programs to modernize the U.S. stockpile currently can take up to 15 years to execute.

"If instead we wanted to develop a new weapon or modernize them in more like five years, we will need capabilities to quickly assess design changes and risks for new hardware options," Dan said. "Scorpius is part of a suite of capabilities that the weapon science folks envision as critical to going faster."

Josh Leckbee, who led the injector development and design for Scorpius, confirmed that requirement.

"One of the key benefits and drivers for needing the Scorpius capability is to give confidence in existing and new designs," Josh said.

"All the existing weapons in the stockpile have traceability to underground testing. It will be difficult to put weapons with new designs that are not directly tied to underground testing into the future stockpile," he said. "To do this, we'll need extreme confidence in our predictive modeling capability. Scorpius allows diagnosing of subcritical tests to build that confidence."

In short, said Dave Funk, vice president for Enhanced Capabilities for Subcritical Experiments at the Nevada National Security Site, "The specific goal of ECSE is to understand the hydrodynamics of plutonium and validate current models of plutonium behavior with the goal of certifying the changes to the nuclear stockpile without the need to return to underground testing."

CHECK, CHECK — Each of the 20 high-voltage connectors on an inductive voltage-adder cell are being checked for assembly defects before moving the cell to electrical test. **Photo by Craig Fritz**

"We are looking forward to establishing this capability in 2027, conducting the first subcritical experiments using these new capabilities to support our nuclear deterrent and demonstrate once again our technical prowess as a nation," Funk said.

The most complex part

Sandia's role in the Scorpius project is to design and construct the electron beam injector that will occupy the first 45 feet of the big machine, Jon said. "Much of the rest is to accelerate our electron pulses up to their final energy before slamming them into a heavy metal target to create the very bright X-ray flashes that will take the pictures."

Stainless steel tubes able to maintain high vacuum levels inside the machine will transport electrons, aluminum will be used where possible for its lower weight and lack of magnetic susceptibility, and magnets will focus the electron beam. "Lots of vacuum pumps, sensors, wiring for power and signals, water lines for cooling, et cetera," Jon said.

The machine will be able to produce four separate 80-nanosecond pulses of electrons at 1,400 amps per pulse. Those four pulses can be produced anywhere the experimenters want over a three-microsecond window.

Demonstrating that the injector is capable of four independent pulses was a key part of the technology maturation that the team has been doing for the last several years to be ready for this phase of the project.

"Being able to see multiple images in time as the device implodes really puts the computer codes to the test," Jon said.

Sandia's resume fits the job because of the Labs' long-standing expertise in pulsed power. Its Z machine, Saturn and Hermes-III are three of the five largest pulsed power machines in the world. Sandia has made pulsed electron beam machines and done novel experiments in radiography with its series of Radiographic Integrated Test Stand accelerators, an ancestor of the current project and jointly developed by Sandia and Nevada.

Los Alamos is responsible for post-pulse acceleration — taking the beam from 1.7 megavolts up to 22 megavolts — and for turning the electrons into X-rays downstream, as well as for the X-ray camera system. Los Alamos also oversees integration of all the components into a functioning system ready for experiments, Jon said.

Lawrence Livermore will provide the pulsed power for both the injector and the accelerator. They also have responsibility for several of the injector subsystems.

"It is worth noting that Scorpius is based on 'solid state' pulsed power promoted by Lawrence Livermore," Dan said. "That means that the initial pulses of electrical energy are coming from large numbers of circuit boards rather than the big banks of massive capacitors, or Marx banks used by Sandia's Saturn and Z, and that was Lawrence Livermore's primary contribution to the injector."

Personnel at the Nevada National Security Site have helped all parties with design and testing, will assist with assembly and ultimately will be the owner and operator of the system in the underground U1a Complex. They are also doing extensive construction to prepare the space where Scorpius will be installed.

Plans for the complicated project were the focus of nearly 10 years of proposals modified, discarded and accepted through a multistage DOE Critical Decision vetting process that finds and removes conceptual and technical errors before funding can be committed to the project. Final approval came late last year.

To design the injector responsible for creating the images was an engineering challenge. "No data existed to guide multipulse high-voltage design and no multipulse high-voltage test capability existed to conduct experiments," Josh said. "We teamed with the beam physics group at Lawrence Livermore, who led electron beam optics design and simulation for the injector." The Sandia mechanical engineering team dedicated more than 30 individuals to developing creative solutions to manage competing requirements in high voltage, thermal, structural, alignment, vacuum and space constraints, Josh said. "The resulting injector design is an assembly with over 1,000 unique part drawings."

"Our first shipment of injector components is slated to be sent out in March of 2024 when our assembly space in Nevada is ready, with the last shipment by early 2025," Jon said. "Assembly and testing will take until the fall of 2025 when we will turn the injector over to Nevada. They will then move it underground into the U1a facility at the [Nevada] Test Site in 2026 or 2027."

"I think I'm biased," Jon said, "but, yes, I think the injector is the most complex part of the whole system."

Beyond Bennu: How OSIRIS-REx is helping scientists study the sonic signature of meteoroids

By **Kristen Meub**

In the high desert of Nevada, Elizabeth Silber watched NASA's Sample Return Capsule from OSIRIS-REx descend into Earth's atmosphere on Sept. 24, but unlike most scientists, she wasn't there for the asteroid rocks.

Elizabeth, a physicist at Sandia, is working with researchers from Sandia and Los Alamos national laboratories, the Defense Threat Reduction Agency, TDA Research Inc., the Jet Propulsion Laboratory, the University of Hawaii and Oklahoma State University in a campaign to record and characterize the infrasound and seismic waves generated by the capsule as it moved through Earth's atmosphere at hypersonic speed, about 26,000 miles per hour. This was the largest observational campaign of any hypersonic event in history, and Elizabeth hopes the data will improve scientists' ability to use

BALLOON PREP — A Sandia team prepares a solar-powered hot air balloon. This flight supported past research at Sandia. **Photo by Craig Fritz**

infrasound to detect meteoroids and other objects moving at hypersonic speeds.

Scientists currently use infrasound, a low-frequency sound wave that is generally inaudible to humans, to detect and observe volcanic activity, earthquakes and explosions. Elizabeth said infrasound can also be observed when meteoroids enter Earth's atmosphere, but atmospheric conditions like wind can distort the signal, and there's usually relatively little information available about the incoming meteoroid to help with data analysis.

"The OSIRIS-REx capsule is the perfect candidate for studying a hypersonic event because we know everything about it — the entry angle, velocity, spin rate, size and mass — and we can use that information to calibrate our models and test our sensors' abilities," Elizabeth said. "Because the capsule was traveling faster than the speed of sound, it generated a shockwave. As the shockwave propagated away from the capsule, it turned into infrasound waves that could be detected."

The multiagency team launched four solar balloons and two weather balloons equipped with microbarometers in Nevada and had ground-based sensors in multiple locations.

"These are tiny little sensors that measure minute changes in air pressure," Elizabeth said. "Infrasound is a pressure wave, and when we group sensors together in an array, we can determine the direction the infrasound is traveling from."

Elizabeth said the group had an unprecedented number of sensors recording data, including 45 single sensors, one large rectangular array with 200 sensors and three arrays composed of four sensors in a triangle formation. At first, the team checked to see how many sensors detected the signal. Back home in the lab, Elizabeth and her colleagues will conduct a more extensive study.

"We want to determine where along the trajectory of the capsule the shockwave came from," Elizabeth said. "The wave will be a continuous thing along the trajectory, so the question will be where exactly did that signal originate from? From a certain altitude? From different parts of the trail?"

The team plans to compare signals recorded from different locations in Nevada and Utah to see if they point to the same origination spot along the capsule's trail. Because the capsule's speed will change as it plunges toward the surface, moving from hypersonic to supersonic to transonic, the team will also be able to study all stages of flight.

"Moreover, we will study how strong acoustic waves propagate, test how well our instruments can capture signals and study the effects of the atmosphere on infrasound waves," Elizabeth said. "All this will enhance our knowledge and ability to use infrasound to detect meteoroids and artificial objects with infrasound."

In preparation for this campaign, Elizabeth, Daniel Bowman and Sarah Albert published a paper in Atmosphere reviewing past infrasound and seismic observation studies from the four other sample return missions that have occurred since the end of NASA's Apollo missions and summarizes their utility in characterizing the flight of meteoroids through Earth's atmosphere. Elizabeth is also leading a separate but similar Laboratory Directed Research and Development project to investigate if infrasound can be used to determine the altitude and speed of bolides — bright, exploding meteoroids — in situations when other types of sensors don't provide adequate data.

Wearable sensors

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without harming the patient, she added.

"This is a great application because it requires tight control," said Philip Miller, a Sandia biomedical engineer who advised on the project. "In a clinical setting, how that would happen is a doctor would check on the patient on an hourly basis and request a single time-point blood measurement of vancomycin. Someone would come to draw blood, send it to the clinic and get an answer back at some later time. Our system is one way to address that delay."

The researchers shared how to make these sensors and the results of their tests in a paper recently published in the scientific journal Biosensors and Bioelectronics.

SMALL SENSOR SYSTEM — A microneedle-based sensor puck designed by Sandia researchers means quicker results for health care providers and less pain than a blood draw for patients. **Photo by Craig Fritz**

Making electrochemical microneedle sensors

The sensor system starts with a commercially available microneedle, commonly used in insulin pens. Adam Bolotsky, a Sandia materials scientist, takes a polymer-coated gold wire about one quarter of the thickness of a human hair and trims one end at an angle. He then carefully inserts the gold wire into the needle, solders it to a connector and ensures it is electrically insulated. The researchers also construct reference and counter electrodes in a similar manner, using coated silver and platinum wires inside commercial microneedles, respectively.

These needles are then inserted into a plastic patch, the size of a silver dollar, designed by Sandia technologists Bryan

Weaver and Haley Bennett. This patch includes room for nine microneedles but can be adjusted for any number desired, Alex said. On the exposed, diagonal surface of each gold wire, the researchers chemically attach the nanoscale sensors.

The sensors, called aptamers, are strands of DNA with a surface linker on one end and an electrically sensitive chemical on the other. Alex explained that when the DNA binds to the antibiotic vancomycin, it changes its shape, bringing the electrically sensitive chemical closer to the gold surface. This movement increases the current detected by the sensor system. When the concentration of vancomycin decreases, some of the DNA returns to its original shape, which is also detected electrically.

"This reversibility is useful for things like real-time measurements," Alex said. "If you want to see the concentration of a certain chemical present in the skin or in the blood at any given time, then being able to measure increases and decreases is really important."

Alex worked with the aptamer sensor during her doctoral research and brought the knowledge with her to Sandia, where she worked to combine it with Sandia's expertise with microneedles that can provide doctors with similar information of a blood draw with less pain.

"I merged my knowledge of aptamer-based sensing and real-time monitoring with the technology that Ronen Polsky and Phil Miller had developed at Sandia," Alex said. "By integrating these two tools, we substantially miniaturized the sensing system and verified that it worked in a microneedle."

Putting the needles to the test and next steps

After constructing the microneedle sensors, the team tested whether it could detect vancomycin in a saline solution mimicking the conditions inside the body, Alex said. Once successful, they tested the entire system, complete with reference and counter electrodes, in a much more complex solution: undiluted cow blood. The system was still able to detect vancomycin.

Then, to test if the microneedles and aptamers would work after being inserted into the skin, the researchers inserted the patch into pig skin several times, monitored the electronic signal from the patch while it was in the skin and tested its ability to detect vancomycin.

"It was very uncertain if this was going to maintain a signal when you put it in the skin," Alex said. "Each microneedle is its own individual sensing electrode. If the sensors are not forming good electrical contact, then this really wouldn't work. That was the biggest uncertainty and something we had never tested at Sandia."

Since successfully testing the sensor patch system, the next step is partnering with another research group to test them in humans or other animals, Alex and Philip said.

"The next big technical hurdle is proving that it works in the body for an extended amount of time," Philip said.

Looking ahead, a similar system with different DNA aptamers could be used to monitor cytokines, small proteins used to convey messages within the body, as well as other proteins or smaller molecules that change significantly during infections. These systems could help doctors diagnose what illness a patient has more rapidly or even assist with triage during emergency situations.

Alex has also been studying what things in the blood and skin could "clog" up the sensors and reduce their accuracy over time. She, along with summer intern Amelia Staats, found that fibrinogen, a protein involved in blood clotting, is a key culprit in signal interference. The researchers plan to publish these findings in an upcoming paper.

"This system could be used really anywhere where you're having large chemical changes in the body, where you want to measure those changes over time to better understand what's happening in the body," Alex said.

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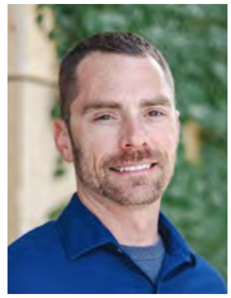
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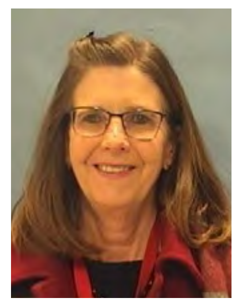
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Retiree Deaths

June 2-Sept. 12, 2023

Laurence Chavez (age 94)	June 2
John Smatana (92)	June 7
Edward Graeber (89)	June 10
John Castle (99)	June 11
Fred Franklin (89)	June 14
Sandra Mays (67)	June 20
Darrell Dykes (91)	June 23
George Beller (91)	June 23
Gerald Nelson (83)	June 26
Fred Duimstra (93)	June 28
Eugene Simpson (91)	June 28
Thomas Brumleve (92)	June 28
R. Jorgensen (94)	June 29
Ronald Husa (87)	July 1
Jerry Smith (76)	July 1
Rose Gonzales (94)	July 3
Jesse Bozone (94)	July 5
Timothy Stephens (72)	July 8
Heinz Schmitt (86)	July 14
David Stout (68)	July 15
J. Anne Nist (83)	July 17
Warren Fisher (77)	July 20
Robert Walsh (82)	July 21
Vernon Gabbard (78)	July 29
James Hubbs (82)	Aug. 2
Edward Barkocy (82)	Aug. 3
Elton Mederios (81)	Aug. 5
Suzy Wagner (76)	Aug. 6
Angela Lari (66)	Aug. 9
John Lewin (94)	Aug. 11
Diane Diemer (77)	Aug. 14
Gila Yaniv (80)	Aug. 16
Paul Souder (93)	Aug. 17
Bertha Trollinger (99)	Aug. 20
Lawrence Bennett (79)	Aug. 22
Robert Morris (92)	Aug. 25
Karen Sparks (83)	Aug. 29
John Williams (69)	Aug. 30
Gordon Box (68)	Sept. 3
William Davidson (66)	Sept. 4
James Lund (66)	Sept. 4
Dorothy Jordan (92)	Sept. 5
Eddie Garcia (90)	Sept. 7
Fred Juan Villa (98)	Sept. 10
Neil Pundit (83)	Sept. 12

Sandia equal employment opportunity specialist named Aspen Ideas Fellow

Inspired by family, Aaron Jim uses his experience to elevate belonging

By ***Maggie Krajewski***

ROLE MODEL — Aaron Jim, pictured here in southwest Albuquerque, was recently named an Aspen Ideas Festival Fellow. **Photo by Craig Fritz**

Aaron Jim keeps a small stuffed tiger in his car's console. A gift from his Grandma Cecilia, or as he calls her, his Red Grandma.

"She lived in a red house, so we'd call her Red Grandma. My mom's mom was Green Grandma, because she lived in, you probably guessed it, a green house," Aaron explained.

Aaron grew up in Tohatchi, a small community on the Navajo Nation, 30 miles north of Gallup, New Mexico.

"Navajo culture is very matriarchal, and my grandmothers both embodied that sense of leadership," Aaron said. "Red Grandma was a single mom and the sole provider for her family. She worked at the hospital in Gallup and work started at 4 a.m. Rain or shine, and sometimes snow, she did whatever she needed to get there on time. Sometimes my dad would drive her, other times she would walk along the main road until someone driving that way would give her a ride. She taught me that you do what you need to take care of your family."

With Green Grandma, Aaron learned to count.

"I remember sitting in her living room or kitchen in the morning and we'd count pennies, that's how I learned to count," Aaron recalls. "About a year after she retired, Green Grandma had a stroke and then she was diagnosed with cancer. Both significantly impacted her quality of life, but she kept on fighting, she never gave up. She taught me about determination."

Both of Aaron's grandmothers have passed, but he credits much of his success today to the lessons they instilled in him and his strong Christian faith.

From roller coasters to Sandia

Aaron is a registered member of the Navajo Nation and a lifelong member of the Cochiti Pueblo tribe. At Sandia he works as a senior equal employment opportunity specialist. He is a senior adviser to the Chief Diversity, Inclusion and Belonging Officer as the Labs subject matter expert in federal employment law and best practices in areas such as Affirmative Action, Title VII and ethics.

Working at the Labs had been a long-time dream for Aaron but when he started college, he had his sight set on designing roller coasters.

Aaron started at the University of New Mexico as a civil engineering major, but in his second year discovered it wasn't the right fit. He switched his major and graduated with a degree in business administration with a focus in finance. From there, Aaron attended UNM's School of Law and after graduating worked for the UNM's Office of Equal Opportunity conducting employment discrimination investigations and adjudications.

"I'm a child of learning and I'm always looking forward, in search of an opportunity to grow," Aaron said. "I had my bachelors, my Juris Doctorate, but I still felt like something was missing."

Aaron went back to school, this time for his executive master's in business administration.

Shortly after graduating in 2019, Aaron was hired at Sandia.

A seat at the table

Aaron explains that as a Native American man, one of his biggest hurdles has been overcoming his own imposter syndrome and learning to accept his seat at the table.

"There are not a lot of Native American voices at these tables of power," Aaron said. "And while I know that my hard work and accomplishments got me here, I've still struggled with the stigma that I don't deserve my seat, but I've had to get over that. Because not only do I belong, but I know my experiences add value."

And Aaron brings that perspective into everything he does.

Aaron's impact

Aaron was selected as a 2023 Aspen Ideas Festival Fellow. The honor is awarded to a select group of professionals around the globe for their work, accomplishments and ability to transform ideas into action.

"Aaron's selection as a fellow underscores his ability to think forward and, in the process, move the needle by inspiring, mobilizing and leading those around him," Larry Thomas, Sandia Chief Diversity Officer and the person behind Aaron's nomination said. "Aaron returned from Aspen with elevated clarity, conviction and connections to help advance our nation and communities towards a more equitable, diverse and inclusive future."

In his role, Aaron has worked with two Sandia employee resource groups taking ideas from conception through fruition.

In 2020 he helped guide Sandia's Asian Leadership Outreach Committee through a successful campaign to win the Society of Asian Scientists and Engineers' prestigious Organization of the Year award.

A GIFT FROM GRANDMA — The small stuffed tiger was a gift from Aaron's grandmother when he was attending the University of New Mexico School of Law.
Photo by Craig Fritz

In 2021 Aaron supported an effort with the Abilities Champions of Sandia to increase the number of Sandians who self-identified as disabled. Efforts like these help increase representation and visibility within the community. Additionally, they play a critical role in increasing resources made available for necessary accommodations. When Aaron started working with the group, 4.7% of the Sandia workforce identified as disabled but by the end of 2022, that number was up to 7%.

"I want to help people from all communities see how they belong at Sandia," Aaron said. "My team is peeling the onion to reach a state of greater belonging, and to do that we are working to better understand different demographics and build pipelines into those communities through apprenticeship opportunities, recruiting within various indigenous populations and also working to better embrace our diverse communities here now."

But Aaron's impact doesn't stop when the workday ends. Aaron works with his brother as an assistant football coach at Wingate High School, which serves the Native American community.

"I get to give back to the community where I grew up and help my players see what's possible for them," Aaron said. "I am honored to be able to serve as a positive role model for these young men and have this chance to invest in their future."

The tiger

As far as that little tiger Aaron keeps in his car, it's seen him through much of his professional journey. The orange has faded, and the stripes aren't quite as bright, but what the tiger represents and the importance of the person who gave it to him is still as present as ever. Aaron has moved through his life fueled by the determination and drive he saw in his grandmothers and with the courage and tenacity to own his seat at the table. Today he's doing the work to help make room for others.

Healthy at Hardin

HEALTHY HABITS FOR THE WIN — To commemorate the close of the fiscal year, the Mission Services division's Workplace Improvement Network and Inclusion and Diversity teams invited the Sandia workforce to enjoy fresh air, exercise and camaraderie at Happy and Healthy at Hardin Field in September.

The event included a walk around the tree-lined field on Kirtland Air Force Base, all-levels yoga and healthy breakfast snacks. Lorenzo Gutierrez, director of Enterprise Excellence, said, "We designed this event to take a break, enjoy some morning air and sun and celebrate the hard work and dedication in getting through another FY. The turnout was great, and I was excited to see colleagues from across the Labs, including partners from the Sandia Field Office, join in a celebration of our accomplishments and to welcome the year ahead."
Photo by Bret Latter

Volunteers pick thousands of pounds of apples to help feed New Mexicans

Photos and story by ***Katrina Wagner***

On a beautiful September Saturday in Corrales, 120 volunteers including Sandia employees and their families and friends collected apples for Seed2Need, a local nonprofit that aims to reduce food insecurity in New Mexico. The organization manages an acre and a half of land, including two orchards, where volunteers grow and harvest produce that is donated to Roadrunner Food Bank for distribution statewide. Seed2Need volunteers also harvest fruit from other orchards in Corrales and the surrounding area.

Sandia volunteers, along with another community group, picked a total of 12,000 pounds of apples that day.

Sandia's Corporate Contributions program also supported Seed2Need with a $5,000 grant this year to help them in their mission of serving New Mexicans in need.

A FRUITFUL HARVEST — Likhaya Dayile, husband of Angela Dayile, a Sandia environment, safety and health security compliance and assurance analyst, collected boxes of apples with Seed2Need.

SANDIA FAMILIES SERVE — Likhaya Dayile and Angela Dayile and their children Nehemiah, Elena and Adele spent a Saturday in September volunteering with Seed2Need.

FALL IS IN THE AIR — Sandia engineer Wyatt Peterson harvested apples that were donated to Roadrunner Food Bank, which distributes enough food to feed nearly 70,000 people each week.

WORKING TOGETHER —Elisa Cummings, a human resources operations generalist, and husband Anthony enjoy picking apples together while giving back to the community.