



S A N D I A

## LAB NEWS

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workplace  
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**FULLY TESTED** — Sandia performed a drop test for the W88 Alt 370 program, designed to replicate a crane accidentally dropping the re-entry body onto a concrete surface. The test was conducted at Sandia's 185-foot Drop Tower Facility, using the same handling gear a crane would use to move the weapon.

Photo courtesy of Sandia

## With redesigned 'brains,' W88 nuclear warhead reaches milestone

*Completion of arming, fuzing and firing assembly precedes first full W88 Alt 370*

By **Michael Baker**

**S**andia and its nuclear security enterprise partners recently completed the first production unit of a weapon assembly responsible for key operations of the W88 nuclear warhead.

"The arming, fuzing and firing assembly is the brains of the warhead," said Dolores Sanchez, Sandia's senior manager for its part of the **W88 Alteration 370**.

"It looks for the correct code and the correct environmental signals that will unlock the system, and it also ensures that it's an authorized flight. In short, it makes sure it always works when we want it to and never when we don't."

The Kansas City National Security Campus completed production and shipped

the first unit for the W88 Alt 370 arming, fuzing and firing, known as AF&F, assembly at the end of May, three days ahead of schedule. The first fully operable unit was received the next day at the Pantex Plant near Amarillo, Texas. That shipment was followed quickly by completion of the system-level **first production unit** for the W88 Alt 370 at Pantex in early July.

The W88 nuclear warhead entered the stockpile in late 1988 and is deployed on the Navy's Trident II submarine-launched ballistic missile system onboard Ohio-class ballistic missile submarines. The weapon was beyond its original design life, and several updates were required to address aging issues and to maintain its current state of readiness. The W88 Alt 370 to

— CONTINUED ON PAGE 4

## Remote high-voltage sensor unveiled at Sandia gamma ray lab

*Tiny crystal safely measures powerful electric fields*

By **Neal Singer**

**E**ver since the first time a human placed a bare hand on an uninsulated electric line, people have refrained from personally testing energetic materials. Even meters made of metal sometimes can melt at high voltages.

Now, using a crystal smaller than a dime and a laser smaller than a shoebox, a Sandia team has safely measured 20 million volts without physically contacting the electrical flow at all. By contrast, the current from a home electrical outlet generally is 120 volts.

"No one had directly measured voltages this large anywhere in the world before our experiment," said Sandia scientist Israel Owens of his team's unique work, recently published in **Nature's Scientific Reports**.

— CONTINUED ON PAGE 9



**ELECTRICAL EXPERT** — Sandia researcher Israel Owens holds the optical sensor used to house the crystal that proved central to his team's successful attempts to measure very high voltages. The two red spots on each side of the crystal are due to laser light reflecting off the side mirror used to direct light through the middle of the crystal. The actual experiments used green laser light.

Photo by David Bret Latter

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**LABNEWS Notes**

Lab News may contain photos shot prior to current COVID-19 policies. Individuals in photos followed all social distancing and masking guidelines that were in place when photos were taken.

# Sandia joins 16 national labs on transgender-inclusive, name-change process for papers

*Name changes allow researchers of all genders to own their academic work*

By **Luke Frank**

**S**andia joins 16 other DOE national laboratories and many prominent publishers, journals and other organizations in scientific publishing in announcing the beginning of a partnership to support name-change requests from researchers on past published papers.

This agreement will allow researchers who wish to change their names to claim work

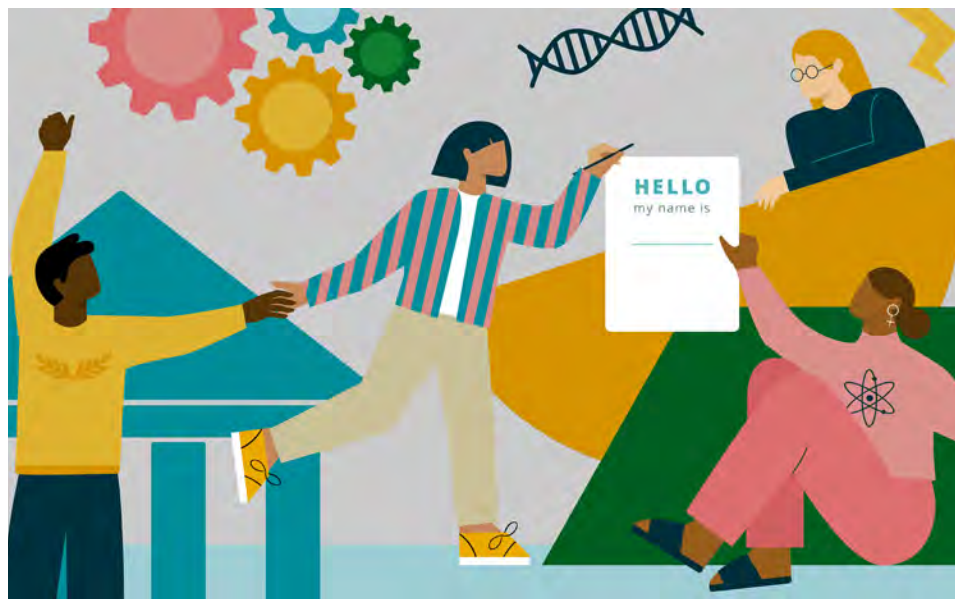


Image by Jenny Nuss, Lawrence Berkeley National Laboratory

more easily from all stages of their careers. Specifically, the agreement addresses the administrative and emotional difficulties some transgender researchers have experienced when requesting name changes associated with past academic work.

Previously, individual researchers shouldered the burden, administratively and emotionally, of initiating

name-change requests with each publisher of their past papers. Many publishers have been independently updating their own policies to address an increasing number of name-change requests.

This partnership aims to streamline these previously ad hoc processes and offers an official validation mechanism to all involved by enabling researchers


to ask their respective institutions to help facilitate name changes with the publishers and journals.

“Supporting transgender authors in changing their names on previous publications is a tangible way of supporting our transgender employees,” said Esther Hernandez, Sandia’s chief diversity officer. “It aligns perfectly with our inclusion and diversity goal of ensuring that all our employees are respected, valued and feel that they belong. Additionally, it can minimize the risk of the author appearing less experienced if they don’t get credit for all publications, which might impact job opportunities.”

For researchers of all genders, and transgender researchers specifically, the new process ensures they can rightfully claim ownership of prior work without fear of reprisal under their lived name and be known in their respective fields primarily through their merits as published authors.

As several researchers have attested, having their names updated on previous publications allows them to best represent their full suite of accomplishments. The ability to claim the volume of their work over time has significant implications for maintaining prominence in their area of research and for receiving credit for their academic impact.

The partnership between all 17 national laboratories, major scientific publishers, journals and other organizations represents a commitment to creating a more inclusive culture in STEM fields and STEM publishing. The participating national laboratories will facilitate requests for name changes for any reason, including religious and marital, where supported by the policies in place at their publishing partners.

The 17 national laboratories are pursuing this work in alignment with their respective diversity, equity and inclusion initiatives, not as a result of any federal policy changes, and welcome new partners as the effort advances. Lawrence Berkeley National Laboratory is coordinating the effort. 

## PARTICIPATING INSTITUTIONS

### Publishing organizations

- American Chemical Society
- American Meteorological Society
- American Nuclear Society
- American Physical Society
- American Society for Microbiology
- arXiv
- Clarivate
- eLife
- Elsevier
- Hindawi
- Royal Society of Chemistry
- protocols.io
- Science Journals – American Association for the Advancement of Science (AAAS)
- SAGE publishing
- Scopus
- Springer Nature
- Wiley

### National laboratories

- Ames National Laboratory
- Argonne National Laboratory
- Brookhaven National Laboratory
- Fermi National Accelerator Facility
- Idaho National Laboratory
- Lawrence Berkeley National Laboratory
- Lawrence Livermore National Laboratory
- Los Alamos National Laboratory
- National Energy Technology Laboratory
- National Renewable Energy Laboratory
- Oak Ridge National Laboratory
- Pacific Northwest National Laboratory
- Princeton Plasma Physics Laboratory
- Sandia National Laboratories
- Savannah River National Laboratory
- SLAC National Accelerator Laboratory
- Thomas Jefferson National Accelerator Facility

Sandia will be developing a process to support name-change requests. In the near future, more information will be available by contacting [publication-updates@sandia.gov](mailto:publication-updates@sandia.gov).

## JOIN THE CONVERSATION

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.



Sandia National Laboratories



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[youtube.com/SandiaLabs](https://youtube.com/SandiaLabs)



Flickr

[flickr.com/SandiaLabs](https://flickr.com/SandiaLabs)



Giphy

[giphy.com/SandiaLabs](https://giphy.com/SandiaLabs)



## W88 reaches milestone

CONTINUED FROM PAGE 1

modernize the warhead primarily included an updated AF&F assembly and a refresh of the conventional high explosive.

The AF&F assembly redesign was more than a decade in the making and included hundreds of people at Sandia working on more than a dozen major components that needed to be refreshed and requalified because of changes in technologies over the past three decades, said Jed Alderete, manager of the W88 Alt 370 AF&F assembly for Sandia. The assembly includes radar, communication, guidance and other key safety and security components.

“It speaks to the dedication of those involved throughout Sandia and the nuclear security enterprise for over a decade that the AF&F has been completed,” he said. “It is the major piece of the alteration, and it’s a huge accomplishment for all of Sandia.”

### Tests ensure AF&F assembly works with W88 warhead

Reaching the first production milestone for the assembly means it underwent an extensive set of tests to ensure it always works when authorized and never otherwise. The full-system W88 Alt 370 went

through similar rigorous testing to ensure its reliability and safety. The tests also ensure the AF&F assembly can be successfully integrated along with the W88 warhead into the full weapon system.

Impact, vibration, drops, extreme temperatures and massive electrical impulses are just some of the tests conducted to show the AF&F assembly will operate as intended.

The pairing of computational analysis and advanced computer algorithms with field testing data, including flight tests, combine to validate the AF&F design and its integration into the W88 Alt 370.

Under the guidance of the National Nuclear Security Administration, several national labs and plants have important roles in the program. Sandia and Los Alamos National Laboratory are the engineering and design labs for the W88 Alt 370. Sandia also manufactures integrated circuits and thermal batteries and serves as the technical integrator for the complete weapon, assuring that the system meets requirements as a whole and not just as individual parts.

Los Alamos also manufactures detonator assemblies; the Kansas City National Security Campus manufactures polymers, foams, gas transfer system components, cables, lightning arrestor connectors, reentry body hardware, Joint Test

**Labs Director James Peery praised the completion of the W88 Alt 370 first production unit in his monthly update to employees:**

*“In July, Sandia and our partners at Los Alamos National Laboratory, the Kansas City National Security Campus, the Pantex Plant, and others completed the first production unit of the W88 Alteration 370 for the Navy. Hundreds of dedicated members of the Labs staff had a role in this major warhead acquisition program that ensures the future viability of the sea-launched ballistic missile strategic deterrent. This major milestone for DOE/NNSA and DoD was completed a month ahead of schedule after more than 11 years of design, development, qualification, and component production. Please take a minute to read more in this [NNSA news release](#).”*

Assembly components and the AF&F assembly; the Y-12 National Security Complex manufactures weapon components and performs reacceptance activities; and Pantex is responsible for producing conventional high explosives and assembling the complete W88 Alt 370 system for delivery to the Navy. [📄](#)

# Nine high school seniors become STAR Fellows



**STEM STARS** — Sandia hosted a virtual science, technology and research camp for nine recently graduated high school students. During this two-week program, the students completed mentored projects including Introduction to Python, EM Image Analysis and Advanced Computing Data. They also learned about STEM careers at Sandia. Students who participated in the camp were nominated by their teachers to be part of the 2021 class of [STAR Fellows](#).

Photo courtesy of Cheryl Garcia



# NM kids to benefit from Sandia's computer donation program

Story by **Manette Newbold Fisher**


Photos by **Lonnie Anderson**

**R**epresentatives from 17 schools around New Mexico visited Sandia to pick up used desktop computers, laptops, tablets, keyboards and other equipment as part of the Labs' K-12 Computer Donation Program.

Reapplication team lead Joey Branch said the event on Monday, Aug. 2, went smoothly with more than 1,700 items donated to schools and nonprofits.

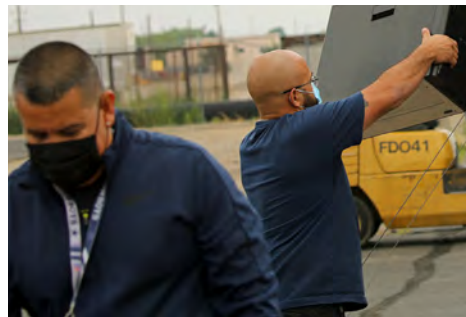
Sandia has donated 10,377 computers since 2012, Branch said, adding that the amount in donations since 2012 totals more than \$24 million.

The Labs can give used computer equipment to schools through [Executive Order 12999](#), signed by President Bill Clinton in 1996. The program is carried out by Sandia's Property Management and Reapplication team.

Due to COVID-19, the teams were unable to invite schools to pick up computer supplies in 2020. Meeting with school representatives this year was a success, Branch said, with some driving multiple hours from Truth or Consequences and Silver City. 



**BIG MOVE** — Reapplication team members Marisol Segura and Bernadette Bazan load computers into a large vehicle for one of the schools.



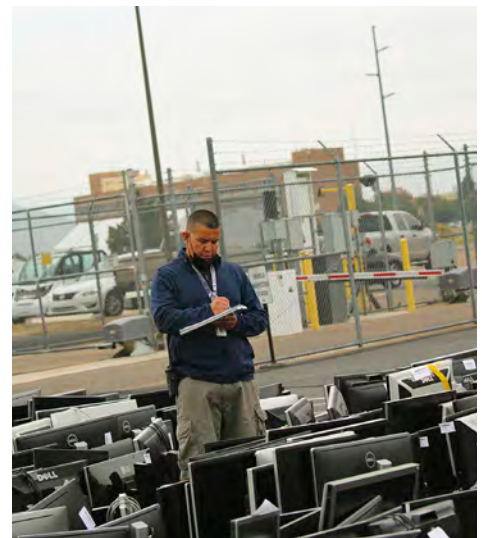
**TECHNOLOGY TRANSFER** — Reapplication team members Anthony Gonzales and James Vigil helped schools gather computers, monitors, keyboards and other equipment during the K-12 computer donation event at Sandia.



**PAYING IT FORWARD** — Reapplication team member Semiramis Novak moves equipment during the K-12 computer donation event. The used supplies will benefit kids throughout New Mexico.



**KEYS TO SUCCESS** — More than 1,700 desktop computers, laptops, iPads and keyboards were donated to schools and nonprofits during the event.



**MONITORING** — Reapplication team member Anthony Gonzales tracks inventory during the event.

## HR Focus

# A brave new world

By **Amanda Armenta**

**A**s states open and more Sandians return to on-site work, we brace ourselves for yet another transition: learning to work together in a hybrid work environment. Here are some practical tips on how to thrive in the brave new hybrid world.

Our approach to the hybrid workplace requires us to continually lean into Sandia's Core Values, particularly the values of Respect Each Other and Team for Great Results. There are many lessons learned from the past year, and we expect to learn new lessons that help us navigate a successful path forward.

Sandians primarily work together during meetings and through email and instant messaging. These activities are necessary to collaborate and communicate, but they are even more essential in a hybrid workplace.

## Tip: Customize your email signature

Many employees have added clever disclaimers to their email signatures that communicate their nontraditional work hours and set expectations with the recipient that they may not respond immediately. For example:

*I'm currently working from home and caring for a little one. There may be delayed responses and odd working hours. For immediate concerns, call or text my work cell at 505-555-5555.*

## Tip: Update your away message

Employees have also personalized their instant messaging away messages with similar statuses. This lets coworkers know when you are working from home or on-site.

## Tip: Add call-in options to meetings

Meetings can pose additional challenges, but with the right planning and preparation, hybrid meetings can be successful. When working on a hybrid team, it is courteous to include a virtual option in meeting invites.

It is also important, for security reasons, to start the meeting by confirming who is on the call, especially when meeting participants join as guests or by phone. Participants should anticipate technical issues in a hybrid setting and practice patience with both physically present and virtual attendees.

Inclusivity is also critical, especially during hybrid meetings. This looks like checking in periodically to ensure all voices are heard and perspectives shared. Video calls allow us to see virtual participants, but not everyone is comfortable on camera. It's important to know and respect others' comfort levels. Using others'

names and preferred pronouns often creates a more personalized experience and improves human connection.

## Tip: Fully 'virtual' meetings

You can equalize the playing field by asking on-site employees to join the meeting virtually from their desks.

With our busy schedules, someone may join a meeting late or need to leave early. In those cases, it is helpful to do a quick recap during or after the meeting to ensure the person feels included. Whether attending a meeting in person or online, raising your hand before speaking is a respectful way to ensure everyone gets a chance to speak and be heard.

## Tip: Shorten meetings to accommodate on-site employees

When scheduling meetings, shave a little time off the end to allow those on-site to travel to and from meetings and give all attendees a chance to breathe and rest.



**AROUND THE CLOCK** — Since the beginning of the pandemic, many Sandians have been working from home. This presents new challenges, like caring for young children, so many employees have adopted nontraditional work schedules.



Remember time zones and core working hours when scheduling meetings. Meetings are more effective when an agenda or desired outcomes are established ahead of time. When possible, avoid acronyms that can be misinterpreted or take time to define them. This clarification can also save time and questions. While it may be challenging, avoiding scheduling back-to-back meetings so that all participants are refreshed and mentally present.

### Tip: Frequent team check-ins

Leaders should periodically check in with team members to understand how things are going in the hybrid workplace. For example, asking employees to rate their hybrid work experience on a scale of 1 to 10 can help the leader gather quick, actionable feedback and allow

them to make team or work adjustments as needed.

These practices are even more critical for newer team members and student interns, many of whom have onboarded completely virtually. Tenured Sandians can help these folks build their network and comfort level with virtual or in-person lunch or coffee breaks. The goal is to avoid missed opportunities for connection due to limited peer discussion and social networking. Regardless whether we chat in person or online, it's a good idea to start conversations by checking on each other and seeing how others are doing before diving into work topics. Other best practices include virtual lunch hours or starting meetings with an ice breaker, especially for teams that are matrixed or do not frequently work together. These

activities can get the energy flowing, allow for more personal connections across screens and lines, and ultimately, make for more productive conversations.

### Tip: Expect an adjustment to on-site work

Employees working on-site may want to create new routines to incorporate changes they experienced over the last year. Figuring out a commute, deciding what to wear, planning meals and remembering where to store our devices will require some adjustment.

Employees returning on-site should expect to plan for these new routines, but it's important to give ourselves grace as we adjust and navigate when things don't go according to plan. Thinking ahead for the next day could save some stress, such as accounting for unexpected traffic or other obstacles.

### Tip: The Device Macarena

To avoid accidentally taking your mobile device into secured space, consider doing the Device Macarena: create your own TikTok-inspired dance to check bags and pockets for sneaky devices that sometimes feel like an extension of ourselves.

While we still have masking and social distancing requirements in place, be sure to respect each other's decisions about vaccinations.

By applying the lessons we've learned, we can blend the best of both worlds to create a great work environment that combines the flexibility and comfort everyone needs to do their best work. The last year has shown that Sandians are resilient. We pivot when needed, rise to the challenge and will continue to do so in this brave new hybrid world. 



MISSION  
FORWARD

This is  
why I got  
vaccinated.

They're safe. They keep you safe. They keep others safe. [coronavirus.sandia.gov](https://coronavirus.sandia.gov)

# Gearing up for back to school

*Sandia equips New Mexico and California students with backpacks, mentoring and more*

By **Amy Tapia**

**S**tudents, parents and teachers are preparing to start another school year, with both anticipation and uncertainty. In keeping with our culture, Sandia and our employees are generously providing resources to better prepare underserved students to achieve academic success in the upcoming school year.

## School supplies

Children need school supplies, and many families struggle to purchase the needed backpacks, notebooks, pens and calculators. As of Aug. 10, the annual Stuff the Bus Back to School supply drive raised \$10,000 to support the Albuquerque Public Schools Clothing Bank and School Supply Barn. Sandia is a longtime partner with APS, and Stuff the Bus is part of APS's citywide drive to support Albuquerque students.

## Academic enrichment programs

Kids need basic needs met to be able to learn. NTESS, on behalf of Sandia, gave more than \$400,000 in grant awards this summer as part of its corporate contributions program. Sandia's grants to nonprofits focus on improving family stability and educational success. Family stability grants fund food insecurity, housing, workforce development and services for families in temporary crisis.

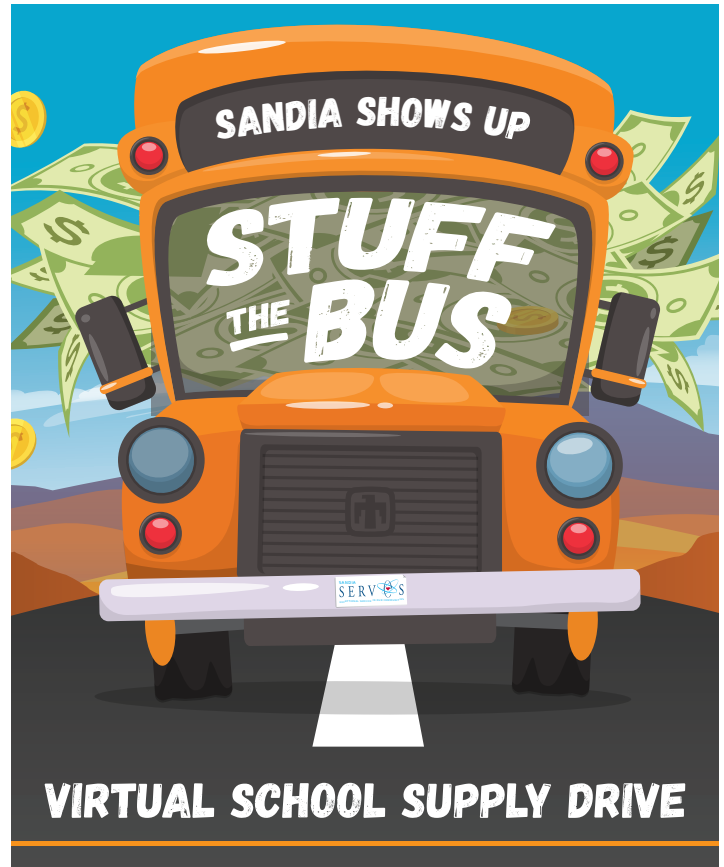
Educational success programs support the academic achievement of underserved K-12 students. With uncertainty about in-person volunteering, some grant recipients plan to continue successful virtual programs that they developed last year.

One organization that benefitted, the **Oasis Intergenerational Tutoring Program** in New Mexico, received a \$10,000 grant. Last year, they pivoted to provide training, support sessions and mentoring sessions online. Anne

Marie Strangio, principal of Lew Wallace Elementary, thanked Oasis and shared several heartfelt stories of students who struggled to stay connected to school through online learning but found connection with their reading mentors.

During the program, one student, who previously kept his camera off and mumbled, asked to skip the fifth-grade water balloon party to say goodbye to his mentor. Another student said coming to school in the spring was the second-best thing about school that happened all year — the first was time with his reading mentor. The Oasis program was a true bright spot for many kids and mentors.

**Scientific Adventures for Girls**, a California nonprofit, received a grant for \$22,000 and is partnering with Sandia to sponsor eight upcoming virtual Family STEAM Nights. The STEAM nights will be available to families in California and New Mexico and designed around a fun theme. Families will have the opportunity to do STEM projects and watch an exciting demo at each event. Event information will be available in September on the Sandia Daily News, California Daily Announcements and the **Community Involvement website**. [@](#)



**STUFFED BUS** — Through the annual Stuff the Bus supply drive and other back-to-school outreach, Sandia donated more than \$10,000 to equip local students with supplies. Additionally, NTESS, on behalf of Sandia, gave more than \$400,000 in grant awards this summer. Many local organizations are looking for volunteers.

## VOLUNTEER OPPORTUNITIES

If you are interested in helping underserved students make the most of this school year, here are a few organizations that are currently recruiting volunteers. Some volunteer opportunities are eligible for **paid time off**.

### New Mexico

- **Oasis Intergenerational Tutoring**
- **Big Brothers Big Sisters Mentor 2.0**
- **Albuquerque Reads**
- **Junior Achievement**

### California

- **Citizen Schools**
- **Scientific Adventures for Girls**
- **Techbridge Girls**



## Sensor unveiled

CONTINUED FROM PAGE 1

“When you have a high voltage over short distances, sensors break down,” said Sandia manager Bryan Oliver. “Israel’s diagnostic can survive these high electric fields and thus enable us to determine the voltage in an environment where that was previously not possible.”

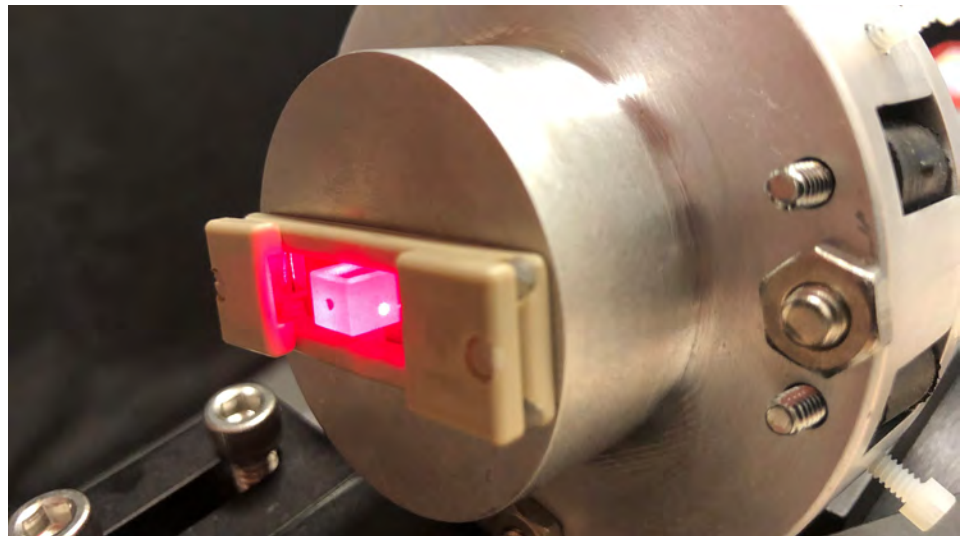
The achievement, which multiplies every electrical field reading by the same constant to read the voltage, opens a door to a number of possible applications.

The work took place at Sandia’s High-Energy Radiation Megavolt Electron Source, or HERMES III, where the building-sized accelerator converts powerful pulses of electricity into energetic photons called gamma rays.

“Being able to measure the output voltage of Hermes III instead of only calculating it allows us to accurately define the energies of the gamma rays,” said Israel. “And our crystal-laser system does it without disturbing the measurement environment as it would if we required radioactive tools like X-rays.”

### Benefits of precise generation of gamma rays

The HERMES accelerator generates a high-energy electron beam that in turn generates streams of gamma rays — the most energetic part of the electromagnetic spectrum — when passed through certain materials. These rays have a wide variety of uses, including sterilization of hospital equipment, pasteurization of food, medical imaging, smoke detectors, thickness gauges for thin materials and more.



**CRYSTAL LIGHTS** — This laser-illuminated crystal, less than a half-inch long, is supported by a plastic retaining structure inside the metal sensor housing. In the actual experiment, the light is initially extinguished by crossed polarizers. When the accelerator fires, the polarized light is rotated so that it leaks through the second polarizer. The leaked amount is directly proportional to the electric field strength.

Photo by Israel Owens

Because nuclear weapons also generate gamma rays, creating them in a lab can determine if military and civilian structures could continue to function when exposed to those energy streams.

Accurately achieving the desired output of gamma rays requires calibration with the voltages that produced them; thus, the need for a sensor that can measure the high voltages without being destroyed.

The idea of using lasers as a remote measurement tool is not new, said Israel. Laser infrared sensors are used at a distance to safely measure forehead temperatures. Laser range finders can determine the size of a room without the owner pacing the distance.

“Our procedure is a little different: we’re not pointing the laser directly at an object to measure its voltage,” he said. “We determine that information by using our laser simply to interrogate a secondary

object, a lithium niobate crystal.”

The crystal, placed where convenient for the experimenters, can remain undamaged because the electric field it measures decreases by the square of its distance from the high-voltage source.

### Tiny crystals altered by huge energy fields

The crystal, less than a half-inch long, is placed so



**HANGING OUT AT HERMES** — Technologists Chris Kirtley, top, and former Sandian JJ Montoya adjust the gamma ray generator HERMES accelerator for its next shot.

Photo by Randy Montoya from the archives

that the electrical field passes through it broadside, at right angles to the polarized laser beam traveling along the crystal's axis.

The crystal does not allow many of the conflicting energies of the electric field to

pass through it. But those that get through modify the crystal's capability to transmit light by causing its photons to travel at different speeds in the polarized beam's vertical and horizontal directions. This causes the polarized light to rotate, changing the

amount of light entering the photodetector. The photodetector converts the laser beam's intensity into a simple voltage that can be read on an oscilloscope.

"The voltage measured on the oscilloscope is directly related to the original applied voltage that created the intense electric field," Israel said. "In our experiments, tens of emerging megavolts translated into hundreds of millivolts on the oscilloscope."

(A megavolt is a million volts; a millivolt is a thousandth of a volt.)

"The signal is already in the correct form, and we just need to add in a fixed constant. There is also no need to perform any tedious calibrations or complicated post-processing to determine the electric fields and voltages," he said.


The high voltages measured with the new sensor agreed closely with what was expected through calculations and other indirect measurements that could only infer the intensity of the emerging high voltage at HERMES, Israel said.

Accurate gamma ray production might be only one of the benefits of the new measuring technique, Israel said.

"At the moment, this is a laboratory device for research, but as its development progresses it could find its way into accelerator facilities where a series of crystals could give nanosecond voltage readings," he said.

The technique also would work for the power transmission industry, auto manufacturers, lightning research centers "or anywhere one wants to remotely measure or monitor a very high energy source," Israel said. The device also could "see" an electrical short in a wall from a distance due to the disruption in the electromagnetic field surrounding the current-carrying wire, which would allow non-invasive detection of a fault in the circuitry.

"For measuring most large voltages, the technique is safe, efficient and inexpensive," he said.

The research was funded by NNSA. Other Sandia authors of the paper are Chris Grabowski, Andrew Biller, Ben Ulmen, Nathan Joseph, Ben Hughes, Sean Coffey, Debra Kirschner and Ken Struve. 

## Mileposts



Mark Hedemann

40



Carol Manzanara

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Julio Marchiondo

25



Marcellea Davis Sneddon

20



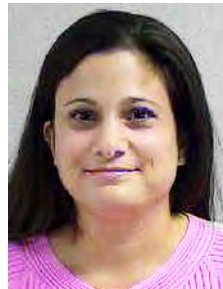
Randy Wells

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Angel Martinez

20



Roxanne Trujillo-Shiplet

15



Scott Nance

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## Recent Retirees



Mark Greenslete

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Dale Van Dongen

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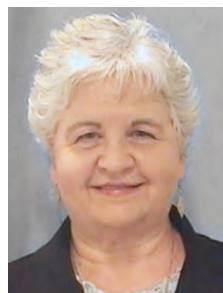
Carol Adkins

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Kelly Gomez

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Rita Betty

20



# Women @ Energy features Laura Price

*Sandia engineer recognized by DOE STEM Rising site for work in Advanced Nuclear Fuel Cycle Technologies*



**SPENT NUCLEAR FUEL DISPOSAL** — Throughout her career at Sandia, Laura Price has primarily focused on disposal of spent nuclear fuel and high-level waste. Laura has been recognized by DOE's Women @ Energy: STEM Rising website.

Photo courtesy of Laura Price

By **Sarah Jewel Johnson**

**S**andia chemical engineer Laura Price has been recognized by DOE's **Women @ Energy: STEM Rising** website, which honors women in STEM fields throughout the DOE complex.

Laura works on nuclear fuel cycle technologies. She has a bachelor's and master's in chemical engineering from Rice University in Houston, Texas.

Laura started her career at Celanese Chemical Company in Corpus Christi,

Texas before joining Sandia as a member of the radioactive waste disposal team in 1988. After a move to Florida in 1992, Laura worked as a Sandia subcontractor through the Science Applications International Corporation, during which time her research focused on defining a clear disposal path for radioactive wastes. She was then hired as a Sandia employee in 2007, telecommuting from Arizona, where she still lives.

Throughout her career, Laura's work has primarily focused on disposal of spent

nuclear fuel and high-level waste, specifically assessing the safety of waste disposal over geologic time scales. She worked on the Yucca Mountain project, where she was exposed to a multitude of scientific and technical disciplines involved in safety assessment. Laura's work on Yucca Mountain gave her an opportunity to learn new things and a newfound appreciation for how complicated assessments can be. When the Yucca Mountain project ended in 2010, Laura's focus shifted to studying disposal of spent nuclear fuel and high-level

waste in generic repositories, expanding her experience with a new and different set of physical processes that could affect repository performance.

Laura was recently interviewed for her feature on the DOE Women @ Energy website.

**Q What inspired you to work in STEM?**

I always liked math and science, so when it came time to pick a major, engineering seemed an obvious choice, as it combined both math and science. I liked chemistry, so chemical engineering also seemed like an obvious choice. It didn't hurt that my uncle was also a chemical engineer in the pharmaceutical industry, pioneering ways to produce life-saving medication and creating industrial standards.

**Q What excites you about your work at DOE?**

One of the things that excites me about my work at Sandia is that it supports the use of nuclear energy in the United States, even if indirectly, by finding technical solutions to the problem of waste disposal. Our nation's infrastructure requires stable, dependable, safe and carbon-free sources of energy — and nuclear energy is one of those sources. Another thing that excites me is that my area of work involves many technical disciplines and has thus provided the opportunity to expand my knowledge base well beyond what I learned in school. I always found nuclear energy to be fascinating, so being able to work in that field, even indirectly, is satisfying.

**Q How can our country engage more women, girls and other underrepresented groups in STEM?**

The U.S. Census Bureau's report on women in STEM seems to indicate that the number of women engaged in STEM jobs has increased over the last 50 years or so. As indicated in this report, as of 2019, women comprised 65% of social scientists, nearly half of the math and life and physical sciences occupations and about 20% of the computer science and engineering work force. These percentages are all higher than they were 50 years ago. In another study, the National Science Foundation's


National Survey of College Graduates in 2015 showed that, in the 29 and younger age group, 56% of those employed in STEM jobs were women. For all workers less than 75 years old, 48% of those employed in STEM jobs were women. It appears the efforts our country has taken toward engaging more women in STEM jobs have been effective.

One underrepresented group consists of those STEM-minded students who go to underperforming schools, where only about 20% of the students are proficient in math and reading. As a country, we can do better at finding new and creative ways for these students to receive a good education and learn basic math, reading, writing and science. One idea for how to do this would be to provide opportunities for people in STEM jobs to mentor and tutor children who are in these situations, thereby providing role models and promoting STEM proficiency.

**Q Do you have tips you'd recommend for someone looking to enter your field of work?**

Learn how to write well. When I was in college, I did not appreciate the importance of not only producing interesting and useful results, but also communicating them to others. I dreaded having to write lab reports, and it wasn't until later that I realized that while doing good technical work was necessary, it was not enough. Most of what I do is write and contribute to reports, and it is important to be explain to others why the technical work was done, why it is important and what it means.

**Q When you have free time, what are your hobbies?**

When I have free time, I like to play the piano, bake, volunteer at my church, ski, travel and stay in touch with our four adult children and their spouses. 

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