SANDIA LABNEWS
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High school girls win math, science awards **Page 8**

SPACE TRAVEL — Labs Photojournalist Randy Montoya made a very early morning trek out to Sandia's Solar Tower to capture this image of the NEOWISE Comet, named after NASA's space telescope, Near-Earth Object Wide-field Infrared Survey Explorer, which first spotted the comet in late March. NEOWISE will continue on its orbit of the outer solar system, leaving Earth's view in August and not returning again for 6,800 years.

Planning for a pandemic

Sandia researchers used complexity science, modeling to create virus mitigation strategies

By ***Troy Rummler***

NATIONAL IMPACT — Sandia researchers worked with the U.S. Department of Homeland Security on a 2005 report to model events that would impact critical infrastructure, including a global pandemic. **Photo courtesy of Nancy Brodsky**

In 2005, a report directed to the U.S. Department of Homeland Security outlined the potential effects of a global pandemic in prophetic detail. It was one of the ways Sandians laid the foundation for the U.S. response to COVID-19.

The report described an outbreak of a novel virus for which there would be no effective vaccine. It foretold needing to stem the spread through a combination of medical and social distancing measures, including wearing masks, establishing quarantines, closing schools and restricting travel. It described an overwhelming demand on hospitals and the health care system, and hundreds of billions of dollars in economic losses.

Industries that rely on significant face-to-face transactions — mass transit, restaurants, tourism, arts and entertainment — would experience the sharpest declines, according to Sandia researcher Nancy Brodsky, one of the authors.

The disease in the report, though, was imaginary: a hypothetical bird flu based on real viruses, fabricated at the behest of DHS. Department officials would later use the report to guide staff through a role-playing exercise to practice responding to the real thing.

"Absolutely the picture was to grapple practically with a pressing problem while it's unfolding," said Sandia researcher Walt Beyeler, who also contributed to the report.

The researchers used an emerging discipline called complexity science to write a realistic, detailed story for the faux pandemic. The team projected the time the virus would take to hit U.S. shores. They modeled how effective different interventions would be. They projected which businesses would be hardest hit and which populations would be most at risk. They calculated the effects of delayed interventions or incomplete interventions, such as people disregarding stay-at-home orders.

Nancy still recalls the key takeaways from their work.

"You need to protect the health care workers, and you need to provide daycare support for their children, because that is the infrastructure that people are going to depend on."

Offshoot of infrastructure studies

The report wasn't a one-off revelation. Researchers from Sandia, Los Alamos and Argonne national laboratories had already been collaborating for several years to break down how a pandemic would ripple through U.S. infrastructures. They also sought to understand how to mitigate its effects.

Their research was funded by DHS and performed under two DHS programs: the National Infrastructure Simulation and Analysis Center and the Critical Infrastructure Protection/Decision Support System.

Some team members focused on specific infrastructure systems. Walt worked on financial institutions.

"(We studied) how one bank's problem would become another bank's problem. And, eventually, if enough banks have problems, then everyone has a problem," Walt said.

Robert Glass, now retired from Sandia, led a team studying the impacts of social distancing. People cross paths in many social circles — school, work, home and commerce, to name a few. Robert's team worked to understand how fast diseases pass through these different contact networks. They examined schools especially closely, according to Walt, because it was thought they could spread a flu quickly through society.

"One of the important insights (of the original research) is the value of understanding, at a finer scale, the actual contact networks," Walt said. "And how the understanding of that structure can help you design a better intervention."

Sandia researcher Sharon DeLand led a team that tied systems such as transportation networks and banks together to create a national model, showing how complex feedback loops are knit together.

Underground roots of social distancing

Some of the expertise came from an unexpected source: geoscience.

Several members of Sandia's research team "started in the laboratory trying to figure out how to map the sources and movement of environmental contamination and support difficult social decisions," said Erik Webb, a former senior manager over Sandia's systems analysis research. "The environmental cleanup research programs had to balance economics and social requirements

— CONTINUED ON PAGE 3

Fat Man sent to Nevada atomic museum

HANDLE WITH CARE — Sandia special material handlers Anthony Leyba, left, and Donald Adams perform a delicate task with an indelicate object. **Photos by John Korbin**

Trinity 75th anniversary exhibit features mock legacy weapon shell used in nation's first nuclear test

By ***Whitney Lacy***

The National Atomic Testing Museum in Las Vegas, Nevada, will soon honor, with a landmark exhibit, the 75th anniversary of the first U.S. atomic test, known as Trinity.

To help with the commemoration, experts from Sandia, the U.S. Department of Defense and the Defense Threat Reduction Agency came together to move two very rare items from the Manzano Mountain storage area at Sandia's Albuquerque site to the museum in Las Vegas. One item, weighing more than 10,000 pounds, is an actual Manhattan Project Fat Man weapon shell from 1945.

The first nuclear test in history occurred July 16, 1945, in a desolate region of New Mexico known as Jornada del Muerto, "Route of the Dead," using a mockup of the Fat Man weapon like the one pictured.

NNSA's Office of Stockpile Sustainment, members of several Sandia organizations, museum curator Justin Young and U.S. Air Force Master Sgt. Braham Bratton were instrumental in making this momentous move happen.

The Trinity exhibit at the **National Atomic Testing Museum**, with Fat Man on display, opens July 16.

PIECE OF HISTORY — Special materials handler Anthony Leyba secures the 1945 Fat Man weapon shell on the truck bed. Experts from several Sandia organizations worked together to prepare the shell for transport to the National Atomic Testing Museum in Las Vegas, Nevada, where it will be on display as part of an exhibit marking the 75th anniversary of the Trinity test.

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LAB NEWS ONLINE: sandia.gov/LabNews

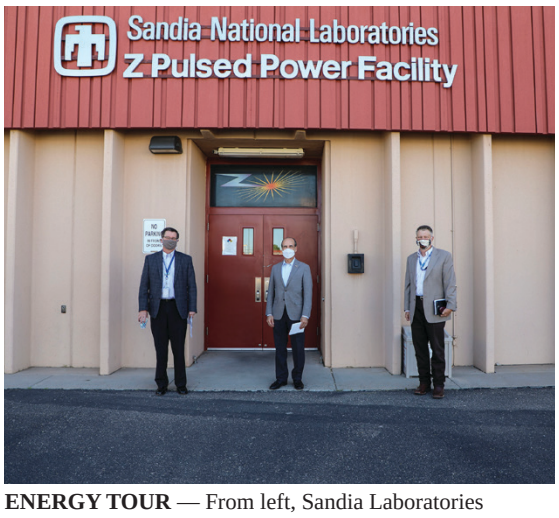
DOE Under Secretary visits Sandia

The Honorable Mark Wesley Menezes, DOE under secretary of energy, visited Sandia's Albuquerque campus on July 8 to tour facilities and attend briefings showcasing the Labs' energy program and other national security contributions. He was accompanied by DOE Senior Advisor Allan Webster.

The visit included tours of Sandia's Z Pulsed Power, Electromagnetic Pulse and Neutron Generator facilities, as well as the Megatron site, the Microsystems and Engineering Sciences Applications complex and the Battery Abuse Lab.

Sandia leaders and researchers provided briefings on several topics, including electric grid security and resilience and energy storage safety and reliability.

Under Secretary Menezes is DOE's principal advisor on energy policy and a wide array of existing and emerging energy technologies. He is responsible for driving transformative energy policy and technology solutions for the nation.



ENERGY TOUR — From left, Sandia Laboratories Director James S. Peery, DOE Under Secretary Honorable Mark W. Menezes and NNSA Sandia Field Office Manager Jeff Harrell toured the Labs' Z Pulsed Power facility during the under secretary's visit.

PROGRAM UPDATE — DOE Under Secretary Honorable Mark Menezes, left, received briefings on Sandia's energy programs and other national security work during his visit to the Labs' Albuquerque campus on July 8.

Photos by Lonnie Anderson

Good news in challenging times

Sandians find creative ways to combat stress

By ***Whitney Lacy***

For the past three months, with as many as 70% of Sandians working from home, Sandia health educators have been on the lookout for added stress.

"We've been very worried that pandemic stress would be much harder for those who had to work from home," said Callie Lovato, a health educator in Sandia's Preventive Health program. "People are adapting to new norms, but a lot of these new norms, such as the dual responsibilities of working and parenting or sitting through all-day virtual meetings, can cause fatigue, both mentally and physically."

Richie Spangler, an engineering project lead, agreed. While he usually travels 40% of the time, the stay-at-home orders during the pandemic added stress that he was not used to.

"In terms of regular office activities, even though I was making regular calls, I was missing the in-person human interaction with my colleagues and friends. This has been the biggest challenge," he said.

Parents in particular are reporting that "pandemic stress" is taking a toll on them due to the added work of caring for their children while also continuing to work from home.

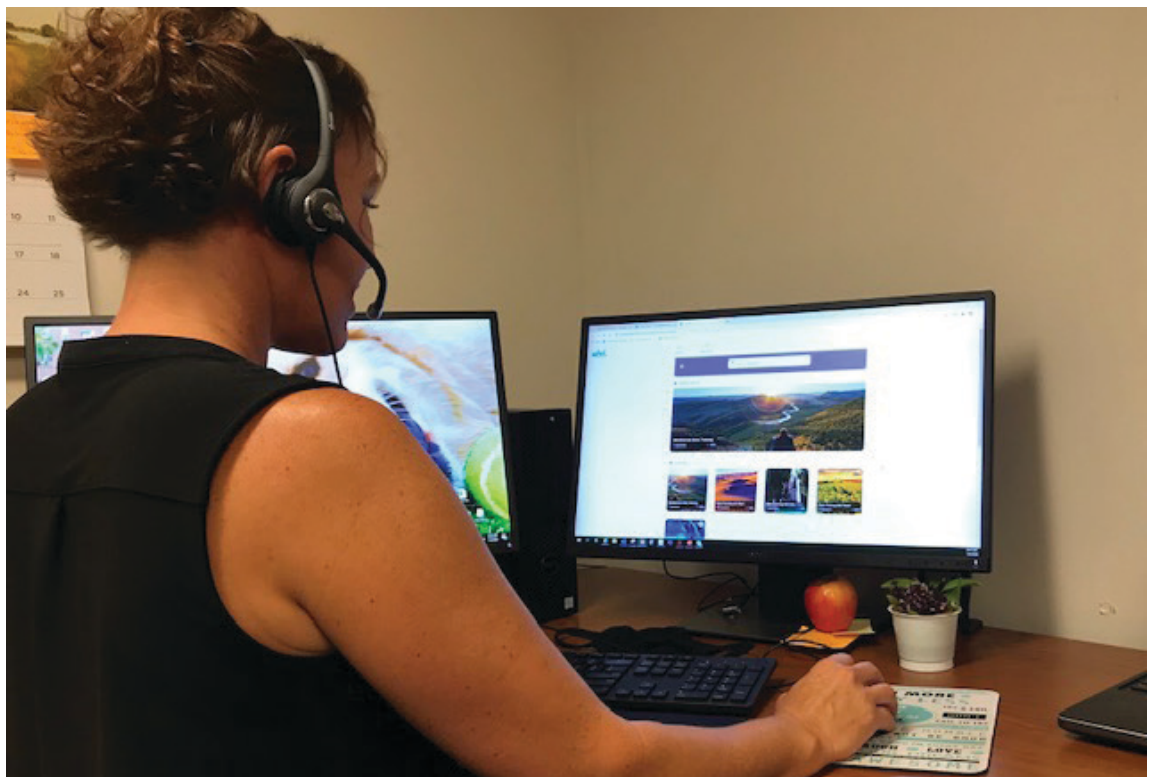
"I'm a single mom to a 9-year-old (third grader) who has an underlying medical condition," said Tricia Toya. "My son was also trying to adjust to distance learning, and we quickly became overwhelmed and stressed out with our lack of proper computer equipment at home."

But in spite of the added stress, Callie and other health educators have been hearing very positive stories from their clients.

Rising above the stress

"We have been surprised with what we are hearing," Callie said. "Sandians are facing this challenge head on and are coming up with solutions for themselves. In the midst of this 'pandemic storm,' our clients are finding their own new calm. This is good news."

Coaching sessions and support for Sandians with chronic conditions have always been a part of Sandia's Preventive Health programs. The Health Management Clinic offers a variety of appointments and resources to support Sandians with a number of health concerns, including high blood pressure, cholesterol, diabetes, allergies, asthma, tobacco cessation, weight control and more. To supplement Sandia's Employee Assistance Program, health educators also can confidentially discuss depression, anxiety and other aspects of wellness that employees may be dealing with.



VIRTUAL COACHING — Sandia Health Educator Callie Lovato prepares for a virtual wellness coaching session with a client. **Photo by Michelle Padilla**

Callie explained that while some clients are focusing on reprioritizing their lives — making what is important to them front and center — others are finding time for themselves and becoming less distracted. Many are reconnecting with family and friends while social distancing.

Fitting in fitness

"The fitness team has had to adapt the most," said Callie. "We're sending workouts to people, creating new ways to work out at home, and helping clients to keep exercising with all possible modalities. We even added virtual online workout classes."

Elaine Raybourn, a participant in Sandia's virtual workouts, said that taking the virtual group fitness classes gives her a break while getting her heart rate up and energizing her during the day.

She credits the Employee Health Services team: "I believe their role during the pandemic has been very important in bringing all of Sandia together — not just by promoting wellness, but more importantly, by modeling inclusion."

Small actions, big results

Tricia admitted to finding a new balance in her life after she enrolled in the Be Mindful, Be Safe (COVID-19 Edition) Health Action Plan.

"I started out with a basic meditation course titled 'Learn to Meditate,'" she said. "Two weeks into the action plan, I developed positive habits and learned to take frequent breaks, use breathing to relax, focus, stay calm and be safe. This has benefited my son, too."

Emily Miller said she deals with the added stress by literally locking it away. "At the end of the day, all of my work things go into a plastic tub. It has a lid. Then that tub goes into the spare bedroom and the door is closed."

Callie encourages all Sandians to find the path that works best for them.

"There are so many things that Sandians can do for themselves to find that 'calm in the storm,'" she said. "Our team can help, of course. But it's been so great to hear people tell us that they are coming up with solutions, and they are faring so much better than we could have hoped."

The Preventive Health team offers 30- or 60-minute virtual wellness coaching sessions that can be used to explore any health topic.

"I think the best part of Sandia's health educators team is that they are most interested in helping Sandians be healthy and well-balanced people," Richie said. "At the end of the day, that is what's best for everyone. They've helped remind me about those important things that often get swept away in the whirlwinds of day-to-day work."

For more information about Sandia's Preventive Health programs and the Health Management Clinic, visit **hr.sandia.gov/health**.

For information on emotional well-being programs specifically, employees can visit **hr.sandia.gov/health/emotional-well-being**.

Planning for a pandemic

CONTINUED FROM PAGE 1

by asking: 'How do you optimize the cleanup? How do you clean up the contamination while pumping the least amount of water? How do you scoop the least amount of dirt?'"

Their experience predicting uncertain futures with relatively small amounts of data was analogous to combatting a pandemic, Erik said.

Nancy, who now manages Sandia's geochemistry department, said geoscience training also gave them a knack for abstract thinking. For example, oil and gas research commonly deals with geologic systems far underground that can't be seen, and thus, are interpreted indirectly.

"We were all accustomed to dealing with things we couldn't see," she said.

As directives from DHS changed, members were pulled onto other projects and direct pandemic-related work dissipated. However, elements of their research evolved. Walt is now a leading member of Sandia's Complex Adaptive Systems of Systems initiative, or **CASoS**, an outgrowth of his DHS research. He continues to model scenarios and their effects on national infrastructure.

The art of persuasion

The pandemic research lives on in the national policy it influenced. However, from that point, it was the job of others to put that policy into practice.

From 2007 to 2017, Bradley Dickerson, now a Sandia senior manager, worked for DHS and the Centers for Disease Control and Prevention, developing national policies and operational plans to implement non-medical interventions like social distancing for a pandemic.

"We knew at the time many aspects of social distancing were extremely unpalatable," Bradley said.

Screening people at borders and ports was considered a piece of social distancing because the goal was to identify potentially infected people. That way, they could be separated from the rest of the population. Bradley worked to persuade airport and airline officials of the importance of additional screening measures during a pandemic.

The measures would cause delays and would have negative economic consequences for these industries.

"We worked very closely with the air carriers and airport authorities to make sure they knew they were being heard," Bradley said. He was also tasked with having similar discussions abroad.

"Our main goal was trying to protect American citizens, and we were trying to do that as good global citizens. And we thought that the best way to do that was to have a concerted international approach."

His team additionally worked with other departments and agencies across the federal government and with states and territories to help them create their own pandemic response plans. Now, Bradley is serving as an adviser to Sandia's Labs-wide COVID-19 response team, including ES&H and Sandia's medical team.

"The problem is you need a complete approach to (social distancing)," said Bradley. "There are many facets."

Walt also is supporting COVID-19 response with modeling research. His work initially helped leaders anticipate demand for resources at hospitals. Now he is modeling policies that could be put in place at hospitals to protect workers as communities ease out of strict quarantine conditions.

Research program opens doors for grad students

DOE Office of Science program helps students connect, collaborate with national lab researchers

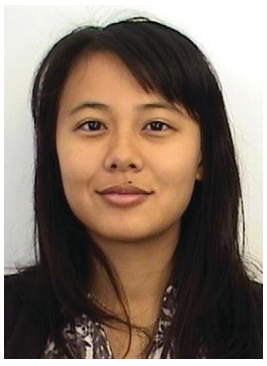
By ***Michael Ellis Langley***

The DOE Office of Science is looking for graduate students to take positions at Sandia and change the world with their contributions.

Chris Shaddix, Sandia's point of contact for the DOE Office of Science Graduate Student Research Program, said that each year the program supports about 100 graduate students working on their doctorate by funding positions for them within the national laboratories complex. Typically, five or six students are assigned to Sandia's New Mexico and California campuses each year, he said.

"If you get one of these (positions), you have to stay for at least three months and can stay there up to a year," Chris said. "Students collaborate with one or more Sandia researchers who are engaged in work similar to the topic of the student's Ph.D. thesis."

DOE supports both salary and housing costs while the students are in the program, after which their work will likely be published in the open scientific literature, hoping to inspire the next generation of American innovators.



RESEARCH PATH — Jill Hruby Fellow Chen Wang began her career in materials physics with the DOE Office of Science Graduate Student Research Program.

Those innovators include Chen Wang, now a Jill Hruby Fellow at Sandia, whose career in materials physics began in the program.

"My DOE Graduate Student Research Program experience gave me the opportunity to diversify my research beyond my original thesis work," Chen said. "I also got to work with top-notch equipment and scientists, all the while learning about how they used their resources to tackle problems of national relevance."

ON THE RISE — Chen Wang, center, participates in the Women in Science and Technology Conference in 2013, shortly before joining Sandia as part of the Office of Science Graduate Student Research Program. **Photos courtesy of Chen Wang**

Connecting with collaborators

Chris said students interested in being considered for the program should reach out to a Sandia research scientist in their field and ask for their collaboration.

"The application process is basically a research proposal from a grad student, developed in cooperation with a national lab researcher," he said. "The Office of Science prioritizes work in their six initiative areas: advanced and sustainable energy, artificial intelligence and machine learning, genomics, high-performance computing, large-scale scientific instrumentation and quantum information science."

Chris said the program can even serve as a pipeline to full employment in a national lab after the graduate students earn their degrees. Chen, who went through the program in 2015, corroborated his point.

"Working with experts really brought my scientific ability to the next level," she said. "I was pretty interested in a career at a national lab, but the DOE SCGSR program gave me the experience to know for sure. Afterward, I asked my mentors if they could recommend postdoc positions at Sandia to apply for, and they mentioned that there was a new opportunity called the Jill Hruby Fellowship.

"They believed it could be a good match, because they knew I was heavily involved in women in science initiatives. Both their support and my understanding of **Laboratory Directed Research and Development** projects definitely helped in the application process," she said.

"As an inaugural fellow, I've had a great degree of freedom in my research, as well as many leadership development opportunities. I hope to go into management, and I'm sure that learning about Sandia's various levels and opportunity spaces will be beneficial in that endeavor."

Visit the SCGSR program website at **science.osti.gov/wdts/scgsr** to learn more.

Engineers teach Stanford 3D printing students, virtually

By ***Kayla Norris*** *and* ***Tatiana Del Cid***

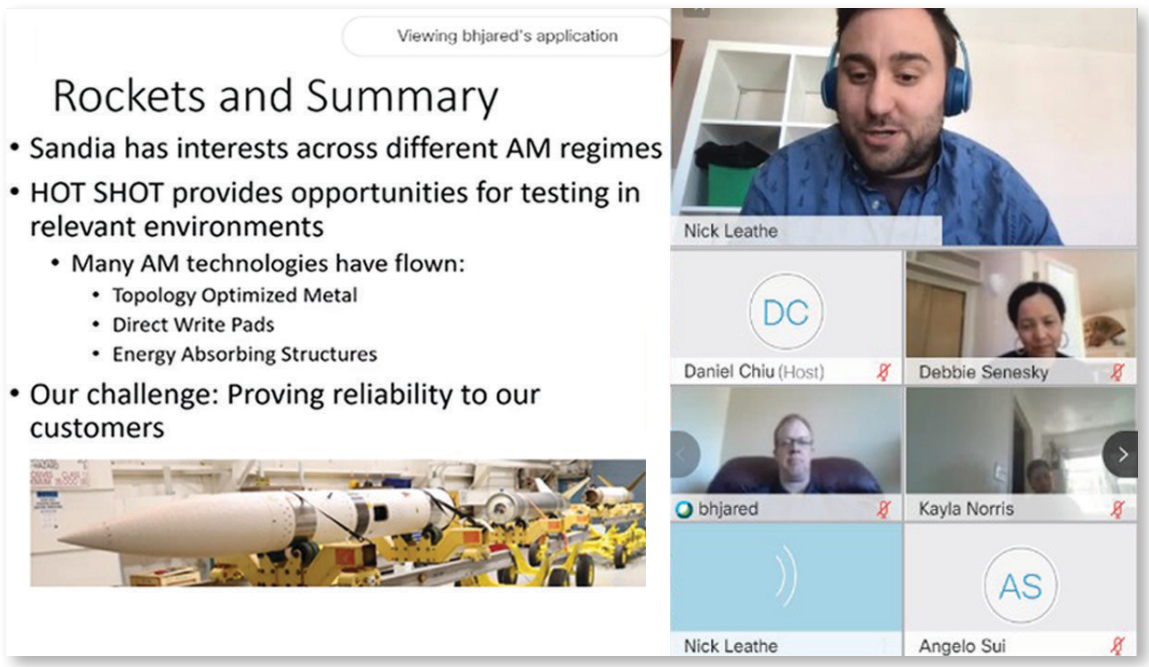
Sandia engineers Bradley Jared and Nick Leathe exposed more than a dozen freshman students from a 3D printing class at Stanford University to some of Sandia's additive-manufacturing capabilities in a May 20 online class.

Bradley kicked off the remote discussion via WebEx by introducing Sandia's wide-ranging portfolio and dedication to advancing and protecting national security. He went on to explain Sandia's focus on risk reduction and innovation while describing the complexities and details involved with engineering materials that are both durable and functional and can range from the development of batteries to rockets.

Finally, he described the development of multi-material integration as "print everything inside the box, not just the box."

Both Bradley and Nick discussed their roles at Sandia using additive manufacturing to engineer products, specifically in the aerospace field.

Nick described using 3D printing technologies to expand opportunities to develop prototypes that can be tested on rockets at Sandia's Kauai Test Facility in Hawaii. He also described Sandia's goal as working to prove reliability and functionality for customers while innovating engineering designs for the future of national security and engineering.



SANDIA AT STANFORD — Sandia engineer Nick Leathe discusses the Labs' application of 3D-printing technologies and engineering design development as co-presenter and fellow Sandia engineer Bradley Jared, Sandia Community Relations specialist Kayla Norris, Stanford University Associate Professor Debbie Senesky and Stanford University students listen in. **Image by Tatiana Del Cid**

Learning opportunities continue

"During this virtual world that we've immersed into, it's as important as ever for Sandia's Community Relations team to create and promote educational outreach opportunities," said Stanford Associate Professor Debbie Senesky. "The goal of Sandia's presentation was to expose students to real-world applications of additive manufacturing, as well as the career paths of Sandia employees."

Senesky, who was a big part of **STEM Day for Girls at Sandia's California campus** in March, said she was pleasantly surprised to learn about the range of fundamental science approaches that Sandia uses to bring additive manufacturing to maturity. She also shared that her students have adapted very well to the online lecture/class format. For example, they have used an additive-manufacturing service (**you3dit.com**) to give students "hands-on" experience with designing, building and testing 3D-printed parts. They made 3D-printed gliders for their midterm and final projects.

Bradley and Nick answered questions from the students and encouraged them to think about Sandia for future internships and career opportunities.

Senesky closed by thanking Sandia for the opportunity to learn more about the Labs' efforts in this area and for her students to have the opportunity to engage with Sandia engineers.

Basic laws of physics spruce up machine learning

Promise of observing huge change in scale wins Early Career award for Sandia researcher

By ***Neal Singer***

A proposed project to help scientists use the laws of physics to view multiscale physical events with a clarity never before achieved has won a DOE Early Career Research Program award for Sandia researcher Nathaniel Trask. Such work may require observations over a millionfold change in scale, with features ranging from the meter- to microscale.

Among areas that would benefit from increased accuracy, Nat said, are the design of microelectronic devices, resilient energy storage systems and the study of discrete fracture networks in subsurface flows, important in harvesting oil from sparse underground locations.

To achieve this, Nat expects to pre-insert basic laws of physics into machine-learning calculations to eliminate errors that otherwise would have to be found and remediated. Machine learning, a form of artificial intelligence, is the application of tools from statistics that enable limited amounts of data to improve working models created by neural networks.

Neural networks, a concept inspired by the firing of neurons in the human brain, create the overall architecture of the model through algorithms designed to recognize patterns.

Physics, meet neural networks

By bringing together traditional physics simulations with neural-network architectures, a machine-learning framework will be created that preserves unvarying physical laws, such as the conservation of mass, momentum and energy, he said.

"The presence of these known laws of physics are crucial to accurately handling problems in mechanics and electromagnetics. In this manner, physics is engineered directly into the neural network, guaranteeing accurate properties even in small data limits."

AWARD-WINNING INSIGHT — Sandia researcher Nathaniel Trask has earned a DOE Early Career Research Program award for his proposed project, aimed at helping scientists use the laws of physics to view multiscale physical events at a new level of clarity.

Photo courtesy of Nat Trask

Nat's project, titled "Physics-informed graph neural networks for data-driven multiscale modeling," will be supported by grants of at least $500,000 a year for five years to cover salary and equipment.

Paul Dabbar, DOE under secretary for science, said, "The Department of Energy is proud to support funding that will sustain America's scientific workforce and create opportunities for our researchers to remain competitive on the world stage. By bolstering our commitment to the scientific community, we invest in our nation's next generation of innovators."

Numerous applications

"Nat's novel approach to scientific machine learning should (make an) impact (on) many applications of DOE interest," said his Sandia manager Michael Parks.

"This is a very important area of research for DOE, and the Early Career Research Program is highly competitive," said Sandia senior manager Jim Stewart. "Nat's work stands out through his high level of creativity and mathematical depth."

Seventy-six scientists from across the nation this year were selected to receive Early Career program funding from DOE.

According to the organization, the 11-year-old program "is designed to bolster the nation's scientific workforce by providing support to exceptional researchers during crucial early career years, when many scientists do their most formative work."

Nat has organized workshops and symposiums at a variety of computing meetings. He has published 30 papers and given 57 conference talks, many on mesh-free simulations that produce more interesting results than the formerly standard method of breaking surfaces into small pieces and summing them.

He earned his doctorate and master's degrees in applied mathematics from Brown University in 2016 and 2012 respectively, a master's degree in mechanical engineering from the University of Massachusetts at Amherst in 2010, and double majored, earning bachelor's degrees in math and mechanical engineering from that university in 2008.

Nat joined Sandia as a research staff member in 2018, after employment as a National Science Foundation postdoctoral fellow at Sandia for the preceding two years.

Brush fire burns on Livermore campus

RING OF FIRE — Cal Fire drops fire retardant to control the spread of the fire near Darcie Kent Vineyards on Tesla Road, on the southeast side of Sandia's Livermore, California, campus. The fire was fully contained within two hours.

Photo courtesy of Kevin King

I WALK THE LINE — Sandia Associate Labs Director Andy McIlroy, left, and Emergency Manager Dennis Baker survey the containment effort by local and regional fire resources.

Photo by Paul Rhien

By ***Paul Rhien***

A brush fire burned approximately 28 acres of grassland on the southeast side of Sandia's Livermore, California, campus on June 18.

The blaze was initially spotted right before 11 a.m. Emergency responders and incident managers arrived quickly on the scene, alerting the workforce and evacuating nearby buildings. Alameda County Fire Department and Cal Fire also were dispatched and deployed ground and air resources to control the fire.

"There was a really well-coordinated response by Sandia's Pro (Protective) Force," said Sandia Emergency Planner John Norden. "We have policies and procedures in place, but until something like this happens, you can train all you want to, but there's nothing that trumps their professionalism and experience."

The fire was fully contained within two hours. Employees were cleared to re-enter evacuated buildings, and Alameda County Fire stayed on scene through the afternoon to monitor the area. No injuries or damages were reported.

A separate 1.5-acre vegetation fire was burning at the same time near Mines Road, about five miles east of Lake Del Valle in Livermore, according to local reports.

School supplies drive goes virtual

Donations needed to help students start the school year with the supplies they need to succeed

By ***Katrina Wagner***

Back to school is an exciting time of year for students and parents, but this fall, school may look a little different as districts across the country determine the safest way to educate children during a pandemic.

Sandia has a long-standing tradition of collecting school supplies for the Albuquerque Public Schools Clothing Bank and School Supply Barn, and this year is no different. The school supply drive will be all virtual. Instead of supplies, employees can make a monetary donation to the APS Education Foundation so the district can purchase needed supplies, which this year may include cleaning supplies and masks for students in addition to the usual pencils, paper and crayons.

Those wishing to donate can visit the **Donation Drives** page on Sandia's internal Community Involvement website or contact **Katrina Wagner** for more information.

SANDIA CLASSIFIED ADS

***NOTE:** The classified ad deadline for the July 31 Lab News is noon Friday, July 24.*

AD SUBMISSION GUIDELINES

AD SUBMISSION DEADLINE: Friday noon before the week of publication unless changed by holiday.

Questions to Michelle Fleming at 505-844-4902.

Due to space constraints, ads will be printed on a first-come, first-served basis.

Submit by one of the following methods:

- **EMAIL:** Michelle Fleming (classads@sandia.gov)
- **FAX:** 505-844-0645
- **MAIL:** MS1468 (Dept. 3651)
- **INTERNAL WEB:** Click on the News tab at the top of the TechWeb homepage to visit the News Center, then select Announcements >> Submit Announcement.

MISCELLANEOUS

TABLE & CHAIRS, antique, oak, enamel-top, $325. Stubblefield, 505-263-3468.

WEIGHT BENCH, Soloflex, all bands, butterfly & leg attachments, $450. Hoke, 505-264-9569.

OFF-ROAD WHEELS & CENTER CAPS, from '20 4Runner TRD, set of 4, machined aluminum/black, very low mileage, $425 OBO. Hennessey, rhennessey75@yahoo.com.

BEER BREWING EQUIPMENT & INSTRUMENTS, like new and extensive, $800 if purchased together, items can be sold separately. Updegraff, 505-340-4256.

IN-BED TOOL BOX, Weather Guard, diamond plate, 55-1/2"W x 20"D x 19-1/2"H, excellent condition, $275. Fleming, 505-869-9165.

DINING TABLE, 63"W x 30"H, w/6 chairs, $100; 4 bookcases, 5 shelves, adjustable, wood, 36"W x 72"H, $10 ea. Achyuthan, 505-216-1858 or keaama@juno.com, ask for Ann.

MOVING BOXES, many, broken down, used once, great condition, $25 OBO. Payne, 505-908-8120.

SPEAKERS, Swans Diva 6.1, matching C3 center and R3 di-poles, Elemental Designs A2-300 subwoofer, $2,000 OBO. Flury, 703-994-8872.

POWER CHAIR, Invacare, great shape, $500; powered wheel chair carrier, mounts on receiver hitch, $600. Gilbert, 505-249-7104.

TRANSPORTATION

'14 VW BEETLE, ~26-mpg, very well-maintained, clean title, 77K miles, $8,500. Chavez, 505-550-6608.

'06 MAZDA MX-5 MIATA SPORT, 37K miles, very good condition, $7,800. Wapman, 505-235-7464.

'08 BMW 528i, all leather, regular maintenance, runs superbly, 170K miles, immaculate, excellent condition, $5,800. Faculjak, 505-280-3488.

RECREATION

FISHER HYBRID BIKES, 2, multi-spd., w/helmets, $175, $225; Thule hitch carrier, like new, $225. Mosteller, 505-823-4778.

'09 YAMAHA R1, red & white, ~20K miles, clean, $5,900. Jones, 505-572-0253, call or text.

REAL ESTATE

2-BDR. HOME, 1 bath, huge garage for boat, upgraded tile, carpet, appliances, W/D included, affordable vacation home, Elephant Butte. Collins, 505-249-6982 or 505-235-4413.

VACANT LOT, near Cottonwood Mall, ready-to-build, paid $125,000, sacrifice at $110,000. Sanchez, 505-515-5997, ask for Joseph.

4-BDR. HOME, 2-3/4 baths, 3,168-sq. ft., gym, 2 living areas, Sandia Park, fully remodeled. Colombel, 505-234-2561.

WANTED

ROOMMATE, quiet NE Heights court, near Chelwood & Indian School NE, ~15 mins to Labs, $435/mo. including utilities. Tennies, 505-298-3804 or tenniesdot@gmail.com.

ROOMMATES, health conscious, 4-bdr. home, 2,200-sq. ft., Rio Rancho, with 2/male college students, $350/mo. Myers, 505-908-8890.

GOOD HOME, male cat, 1 yr. old, 4-lbs., orange/white, might do better as only cat, can share photos. Meyer, 505-449-8708, call or text.

LABNEWS Notes

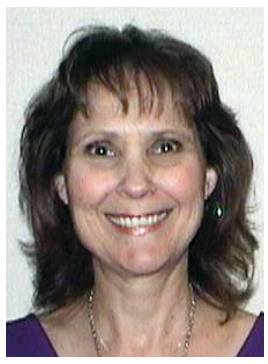
EDITOR'S NOTE: Lab News welcomes guest columnists who wish to tell their own "Sandia story" or offer their observations on life at the Labs or on science and technology in the news. If you have a column (500-800 words) or an idea to submit, contact Lab News Editor Tim Deshler at tadeshl@sandia.gov.

Mileposts


Lawrence Armijo 35


John Herzer 35


Barbara Mills 35

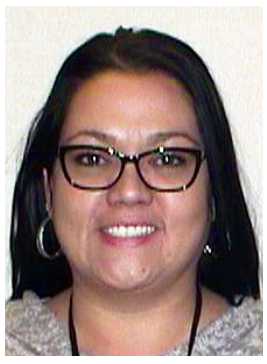

Jeanne Evans 30


Becky Martinez 30


Loren Riblett 30


Jim Woods 25


Robert Hohlfelder 20


Lisa Lucero 20


Matt Schrager 20


David Wilson 20


Komandoor Achyuthan 15


Jedediah Alderete 15


Jordan Carnahan 15

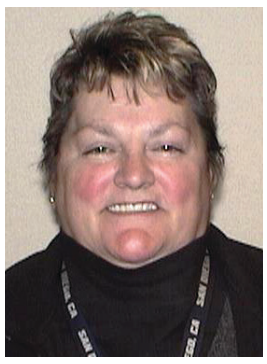

Mary Ann Cordova 15


David Cunningham 15


Michael Gutierrez 15


Gwen Herrera 15


Kat Jones 15


Donna Kao 15

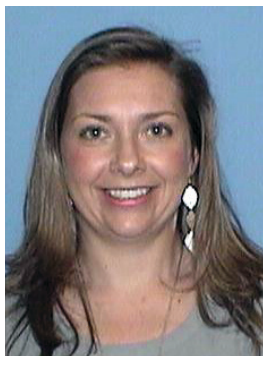

Brent Kucera 15


Robert Lovejoy 15


Robert Meagher 15


Dave Minster 15

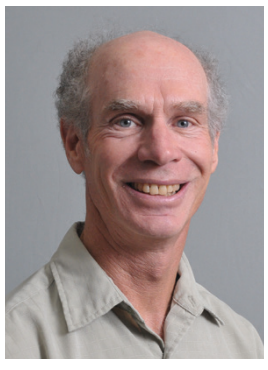

Vanessa Petty 15


Marla Pohl 15


Ben Sandoval 15


Alison Winstead 15

Recent Retirees


M. Barry Ritchey 38


Emily Lujan 30


Lars Wells 28

High school students excel at STEM

California high school girls honored for math, science achievements at annual event in June

VIRTUAL KUDOS — Sandia/California senior leaders and elected officials joined the Sandia Women's Connection in congratulating area high school girls on their academic achievements in math and science. This year's awards ceremony was held virtually, due to current COVID-19 restrictions. **Photo by Paul Rhien**

By ***Paul Rhien***

Sandia recently honored 26 young women from California high schools in Tri-Valley, East Bay and San Joaquin County at the annual Sandia Women's Connection Math & Science Awards. The honorees were nominated by their teachers for outstanding accomplishments in STEM. Due to COVID-19 restrictions, the students and their families participated in the awards ceremony virtually.

Hosted at the Labs' Livermore campus, the annual awards program helps introduce young women to the many careers available to them and highlights opportunities available through the Sandia internship program. Award winners also are paired with female scientists, engineers and mathematicians at Sandia who are available for mentoring as the students enter college and explore future careers in STEM fields.

"We are proud of you because we know that the accomplishments that brought you here require perseverance and determination," said Marcey Hoover, director of the energy and homeland security program management center at Sandia.

"Continue following your passion for math and science. We desperately need more women in these fields," she said, adding that women remain underrepresented in many key science and engineering fields.

"Through young women like you, we will continue to make strides in having more diverse mathematicians, engineers and scientists. This is really important because it takes diverse approaches in thinking to solve complex problems."

STEM EXCELLENCE — Pooja Mehta, a student at Foothill High School in Pleasanton, California, earned an award for outstanding achievement in science at Sandia/California's annual Math & Science Awards. **Photo courtesy of Pooja Mehta**

Spark of inspiration

Sarah Allendorf, director of the chemistry, combustion and materials center at Sandia also addressed award winners, encouraging them as they pursue future education and careers in math and science.

"You are here because you are part of that rare and wonderful group of students who have found a spark of inspiration in math and science. I hope today's celebration of your accomplishments and passion feeds that spark and brings you encouragement. I can't wait to hear about your future successes."

Local elected officials also participated in the recognition event via prerecorded remarks.

California State Assemblywoman Rebecca Bauer-Kahan of Orinda encouraged the young women in their future pursuits.

"Women often bring a different and important perspective to their work, and we all benefit from that," she said. "We will continue to need your bright minds to join the ranks (of STEM fields) and help solve some of society's hardest challenges."

U.S. Rep. Eric Swalwell also congratulated award winners.

"The number of women in science and engineering is, thankfully, finally growing, but the scarcity of women in STEM fields is a persisting problem. We need you," he said. "That's why I'm so excited to offer my sincere congratulations to all of you. You have shown that anything you set your minds to, you can achieve, and that no obstacle can prevent you from future success."

Following the virtual ceremony, award recipients had an opportunity to connect one-on-one with female mentors at Sandia to ask questions and discuss their academic plans and careers in STEM.

Outstanding Achievement in Mathematics

Ekaterina Osipova
Amador Valley High School

Kiara Kelly-Montoya
Castlemont High School

Lilly Jiang
Dublin High School

Andrea Cheng
Foothill High School

Tida Ngov
Granada High School

Cristina Pineda Carranza
Lathrop High School

Paige Felkins
Lincoln High School

Nevaeh Thompson
Merrill F. West High School

Emma Brown
Millennium Charter High School

Jaquelen Gómez
Oakland High School

Christy Ko
Oakland Technical High School

Samantha Ivey
Skyline High School

Natasha Rodriguez-Zanuto
Tracy High School

Outstanding Achievement in Science

Jocelyn Zhu
Amador Valley High School

Audrey Kwan
Dublin High School

Pooja Mehta
Foothill High School

Emily Macias
Granada High School

Tricia Mae Albano
Lathrop High School

Isabella Costigliolo
Lincoln High School

Manvitha Nandamuri
Livermore High School

Shannon Le
Manteca High School

Zeenat Entezar
Millennium Charter High School

Sahityasree Subramanian
Mountain House High School

Mia Pollard
Oakland High School

Samantha Ivey
Skyline High School

Mysha Mamsa
Tracy High School