



# Portable gas detection shrinks to new dimensions

*Smaller size means big advance for Sandia's micro sensors*

By **Melissae Fellet**

A sensor for detecting toxic gases is now smaller, faster and more reliable, thanks to researchers at Sandia. The sensor's performance sets it up for integration into a highly sensitive, portable system for detecting chemical weapons.

Better miniature sensors can also rapidly detect airborne toxins where they occur, providing key information to help emergency personnel respond safely and effectively to an incident.

Chemical identification typically involves collecting a sample at the scene of a chemical release and bringing it back to a room full of equipment operated by trained personnel. The machines sift through a sample of various gases and weigh the molecules to determine their identities.

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**MINI SENSOR, MAJOR IMPACT** — Sandia analytical chemist Joshua Whiting examines a gas sensor that could be used in a sensitive portable system to detect chemical weapons or airborne toxins. **Photo by Randy Montoya**



**SUCCESS STORY** — Sandia optical engineer Dawson Stokley, left, partnered with Advanced Optical Technologies CEO Malini Hoover and her team through the NM Small Business Assistance Program. Sandia helped AOT facilitate comparative studies to ensure the quality and affordability of high-performance titanium aerospace parts. **Photo by Norm Johnson**

# Budgets double for small business assistance projects

By **Troy Rummler**

Sandia will be doubling the amount of technical assistance it provides to small businesses, following legislation signed into New Mexico state law this year.

The new law raises the cap on the value of services Sandia and Los Alamos national laboratories can offer a company through the New Mexico Small Business Assistance Program from \$10,000 to \$20,000 for businesses in urban counties and from \$20,000 to \$40,000 for businesses in rural counties. The changes took effect July 1.

The program, formed through legislation in 2000, provides New Mexico small businesses facing technical challenges access to the expertise and capabilities of the state's two national laboratories and numerous subcontractors. At no cost, small businesses can seek assistance from Labs scientists and engineers to solve challenges and overcome barriers to the company's success. Expenses incurred by the Labs are reimbursed by the state of New Mexico as tax credits.

Since the program began, Sandia has provided \$38.8 million in technical assistance to 2,263 businesses. Altogether, it has provided \$62.5 million in technical assistance to 2,931 businesses, enabling 7,853 jobs to be created and retained across the state's 33 counties.

"Sandia supports small businesses because we believe in their ability to create jobs and upward economic mobility for the people of New Mexico," said Jackie Kerby Moore, Sandia technology and economic development manager.

Sandia materials engineer Paul Clem has helped companies develop new optical and electrical technologies through the program. His work has included testing their prototypes and providing expert analysis.

"The increase in funding will double the level of effort that can be supplied to assist companies," Paul said. "This is very helpful to explore topics in more depth and to provide access to advanced diagnostics and more experienced

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# Sky's the limit

*Sandia interns help high school students build rockets at STEM camp.*

— STORY AND PHOTOS, PAGE 8

**STRATEGIC PRIORITIES**

**Never surprises, always options: Anticipating threats to national security through Intelligence Science**

By **Michael J. Burns**  
Associate Labs Director for National Security Programs

Sandia's Strategic Priority No. 3 will enhance our ability to anticipate threats, the single most important factor affecting future national security.

On July 26, 1777, Gen. George Washington, commander in chief of the new United States Continental Army, wrote to Col. Elias Dayton, an officer trusted with assignments that were both extraordinarily delicate and very secret. Washington instructed Dayton to "take every possible pains in your power" to "obtain intelligence of the Enemy's situation & numbers."

Washington was concerned about the deployments of British troops along the route of advance of the Continental Army division commanded by Maj. Gen. William Alexander, the patriot-loving Scottish nobleman known as Lord Stirling. Dayton was also instructed to obtain information concerning boats and other transports available to Lord Stirling so that the division commander might consider the option to "make an Attempt upon the Enemy."

Essentially, Washington instructed his agent to collect military intelligence information and to perform the analysis necessary to prevent the British surprising Lord Stirling with superior force, while also providing him options to attack the Red Coats. In closing, Washington wrote: "The necessity of procuring good Intelligence is apparent & need not be further urged."

"Good intelligence" has been a military and statecraft requirement for centuries. Sun Tzu, the 6th century B.C. Chinese military strategist, wrote that what enables the "wise

sovereign and the good general" to "achieve things beyond the reach of ordinary men" is "foreknowledge."

The foreknowledge that Dayton provided to Lord Stirling prevented surprise and provided options. Preventing surprise with foreknowledge remains important to this day. In his 1997 memoirs, Markus "Mischa" Wolf, of the dreaded East German Stasi, wrote that the intelligence services of the east and west kept

the peace in Europe for more than 50 years. "They did so," wrote the notorious spymaster, "by keeping their leaders from being surprised."

In Sandia's future vision document, *Creating the Future*, we assert that the single most important factor affecting future national security is intelligence. Our approach to intelligence must evolve to better enable us to anticipate future threats while they are still manageable by diplomatic, economic and other means. The evolution we need is Intelligence Science, the third of the Labs' seven strategic priorities.

Our goal is to move beyond recognizing the obvious to anticipating the likely. We must anticipate what might occur with the level of precision and rigor necessary to motivate action, and then develop options to anticipate, detect, defend and defeat challenges to our national security.

Achieving this goal will require adding non-traditional approaches to traditional intelligence capabilities and increasing internal and external collaborations. To form a science-based framework to support actionable and efficient information, forecasting and response, seemingly disparate disciplines will need to be integrated. Our engineering, science and modeling/simulation skills will have to be expanded and further combined with our domain knowledge of nuclear weapons, defense systems, microelectronics, radiation effects and other high-technology areas.

Critical partnerships with universities and agencies with expertise in cultural anthropology, economics, forensics, operations research and more will be essential. New computing fields such as neuromorphic computing, targeted quantum techniques, artificial intelligence, machine learning and



**PRIORITIZING INTELLIGENCE** — Associate Labs Director Mike Burns believes future national security leaders and policymakers, and the nation in general, will benefit from Sandia's Intelligence Science work. **Photo by Randy Montoya**

visualization have the potential to add to our data analytics and computer engineering/science skills to create more powerful and predictive modeling and simulation capabilities.

The Intelligence Science we envision will offer more than the interpretation of today or projections of tomorrow. It will offer the opportunity to experiment, in a systematic manner, with potential futures and options for influencing their trajectories, including diplomatic, economic and military. As we develop this new discipline, we will need to be mindful of the governance issues involved in this terrain, containing ethical and moral implications around data collection and analysis, jurisdictional issues among government agencies and other considerations.

Priority No. 3, Intelligence Science, will let us create an expanded national security capability. Never surprises, always options, is our Intelligence Science aspiration. I believe future national security leaders and policymakers, and the nation in general, will benefit from this work. I also think Washington and Dayton would applaud this evolution of our exceptional service in the national interest.

Development of the Intelligence Science priority is well underway. Our Intelligence Science core team is co-championed by center directors Jim Hudgens and Carol Adkins. Contact Chrisma Jackson or Kathryn Hanselmann for more information.

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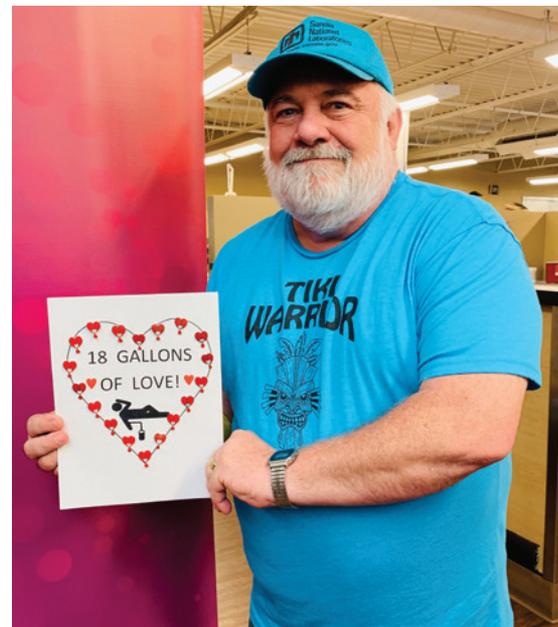
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**Blood donors for the win**



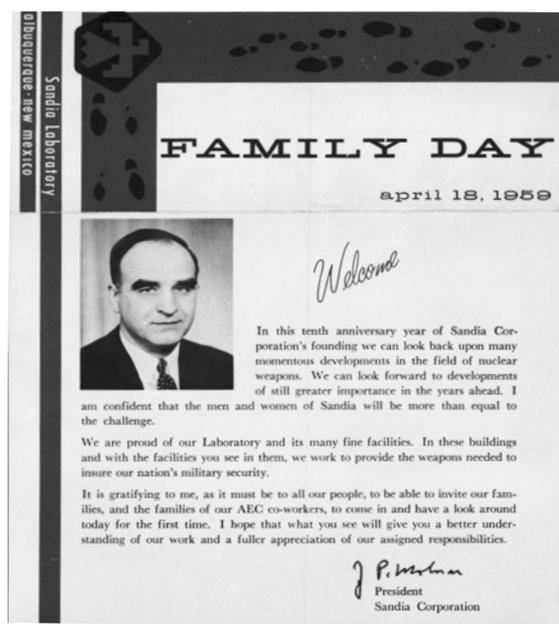
**TRADITION OF SERVICE** — Sandia HR specialist Tory Witt, left, has been a loyal blood donor for seven years, following the example set by her dad, former Sandian Terry Witt. Tory was the lucky winner of Vitalant's May Harley-Davidson Giveaway promotion. Manufacturing operations engineer Duane Richardson has been donating blood for 40 years. When he started, he set a personal goal to donate 18 gallons of blood to those in need before he retires. He achieved his goal in June and is planning to retire later this summer. Sandia hosts weekly onsite Vitalant blood drives. Check the Sandia Daily News for locations.

Photos courtesy of Vitalant

# Family Day at Sandia



1959 — A crowd gathers to view a test vehicle in Building 865.



1959 — Labs President Julius Molnar welcomes families.



1959 — Faces light up during a visit to the photo lab.



1972 — Visitors tour exhibits in Building 840.



1972 — A family plays with an early desktop computer.



1986 — Curious visitors take a peek inside the Z machine.



1986 — A boy checks out metal shapes at the machine shop.



1986 — A robot catches a family's interest.

## Registration begins for Labs-wide show and tell

By **Stephanie Holinka**  
Photos courtesy of **Sandia Lab News**

Sandia is getting ready for this year's Family Day Saturday, Sept. 7, in New Mexico, and Saturday, Sept. 14, in California.

Family Day has been a part of Sandia culture since 1959, when 15,000 participants in New Mexico, 3,100 at the California laboratory and 300 from the Salton Sea Test Site came to Sandia sites to see where people performed important work for the nation. A few years later, in 1962, the Tonopah Test Site hosted its own event.

Sandia historian Rebecca Ullrich said there have been 12 Family Days (sometimes also called Sandia Day) in New Mexico, at least 14 at Sandia/California, and at least two at the Tonopah Test Range.

The 1966 New Mexico Family Day is documented as the most widely attended, with around 17,000 participants.

Active Sandia employees can register to bring their families to this year's event at the Family Day website, where participants can also find event details and a complete list of security requirements. To bring foreign national visitors to Family Day, hosts must contact the Foreign Interactions Office helpline at 505-844-8263 as soon as possible for advice and assistance.

Below, a few current Sandians shared their memories of attending Family Day as kids. <#>

## Family Day Memories

"Tommy Glauner, my grandfather, worked at the Labs for 40 years as a staff member designing original W88 radar. I came to Family Day in the late '80s/early '90s, when I was around 9-10 years old. My grandfather at the time was working in Bldg. 821. As a kid, I remember thinking 'those are the coolest windows!' I also remember how excited my grandfather was to show us all of the different areas and speak about the significant technological advances the Labs was making. My grandfather was, and still is, very proud of what he did for the nation by working at Sandia."

— *Classification manager Carly George*

"I was a sophomore in high school at the 1976 event, and we came to Sandia with Mr. Puariea, my friend's dad. We walked through what I think was Bldg. 806. There was the standard LN2 shattered banana demo, and another one where the air was sucked out of a ping pong ball and it imploded. Stuff like this led me into engineering. I later became a Navy Nuke Submariner for 20 years, and eventually came to work for Sandia."

— *ES&H analyst Marc Williams*

"I came to Family Day sometime in the mid-to-late '90s. Karen Current, my mom, was a manager in IT. My stepdad, Fran Current, also worked here, and my husband brought me to Family Day before I became a Sandia employee in 2015. I loved going over to the Solar Tower for solar cookies and learning about the sun's energy. As a high schooler, I remember trying out a digital tool that was being used for 3D modeling — there was a joystick that the user could hold and mold the material on the screen with their hands."

— *Designer Stacey Reynolds*

"I've been at Sandia for nearly 37 years. I came to Sandia as a teenager with my dad, Eloy Montoya, who was a computer operator back when we had the large mainframes. I liked touring the different areas around the Labs and watching the demonstrations."

— *Business manager Rosemae McKillip*

# Sandia breaks ground on new California data center

By **Paul Rhien**

National Nuclear Security Administration officials joined Sandia leadership June 3 to break ground on a new data center at the Sandia/California site. The 8,900-square-foot facility will house information-processing equipment essential for providing connectivity and computing support.

Replacing the current California Data Center was identified as a critical need during the contract transition to National Technology & Engineering Solutions of Sandia, LLC. Sandia has worked closely with NNSA on plans to replace the aging facility, which was originally constructed in the late 1960s.

“When we first saw the data center during the transition, I can’t tell you the poor state it was in,” said then Associate Labs Director Dori Ellis. “Given the critical services the California data center provides, the existing 50-year-old facility was inadequate for meeting our growing needs.

“Keeping the status quo, particularly right now in our history, is just not tenable,” Dori said. “We are going through a growth process, and having the capability and the reliability to support our mission is critical.”

At the ceremony, NA-50 Deputy Associate Administrator for Infrastructure Ken Sheely expressed NNSA’s commitment to Sandia.

“I see this groundbreaking as the first step in revitalizing the whole Sandia/California campus. We’re working together to finalize plans to improve office space, modernize laboratories and acquire new equipment,” Sheely said. “I know this infrastructure investment is long overdue, but we are on the verge of really making it happen. This data center is our first commitment — our down payment — to modernizing the Sandia/California campus.”

The new data center will position Sandia’s California campus to support all of the new



**LEADERSHIP BREAKS NEW GROUND** — NNSA officials and the mayor of Livermore joined Sandia leadership on June 3 to break ground for the new data center at Sandia’s Livermore site. **Photo by Randy Wong**

mission work at the Labs and modernize the site’s information technology infrastructure, said Sandia Chief Information Officer Carol Jones. “Our IT needs are constantly evolving, and the data center is being built so that it can meet those needs and continue to grow.”

Sheila Feddis, director of NNSA’s Office of Infrastructure & Modernization, also spoke of the investment in recapitalization at the California site and addressed the reliability, safety and efficiency of Sandia/California’s IT infrastructure.

Prior to the groundbreaking ceremony, Sandia’s facilities management team met with PTS Data Center Solutions, which was awarded the construction contract. Construction is planned for completion by July 2020. [i](#)



**DATA CENTER RENDERING** — The new California data center will be essential for providing connectivity and computing to support Sandia’s missions at its California site. **Image courtesy of 3AE Green/Dekker-Perich-Sabatini Architects**

## Spying on batteries while they work

*Sandia Talks series features Labs-wide research and ideas*

By **Stephanie Holinka**

**M**aterials science researcher Eric Sorte discussed how his work seeks to help researchers understand what goes on in a battery during operation in his recent talk to employees, “How to See What’s Happening Inside a Battery Without Disturbing It,” part of the June Sandia Talks series.

When Eric started at Sandia in 2016, he focused on fuel-cell components, working on new ideas for energy-storage-device components, such as fuel cell membranes and batteries.

“Improved battery technology has made possible the ubiquity of personal electronics from cell

phones to laptops, and has changed the world in the last 30 years,” Eric said. “But despite the improvements and innovations of the last several decades, batteries are not yet where they need to be for power grid storage or transportation.”

Eric was awarded a Laboratory Directed Research and Development grant to develop new in-situ nuclear magnetic resonance technologies to monitor and diagnose batteries during charge and discharge cycles without having to tear them apart. That work will continue via a new Grand Challenge LDRD, focused on customized lithium batteries, that will start this fall.

“Only with better batteries can renewable energies be utilized optimally, and research projects such as this one get us ever closer to that goal,” Eric said.

Eric completed his doctorate at the University of Utah in 2011, followed by post-doctorals at Washington University in Saint Louis and at Georgetown University in Washington, D.C.

The Sandia Talks series began in 2016 and features 15-minute talks that highlight significant research and ideas from around the Labs. Labs employees can view Eric’s talk and others at the Sandia Talks SharePoint site. [i](#)



**KEEP ON TICKING** — Sandia materials scientist Eric Sorte is working to help battery researchers understand what goes on in a battery during operation. He spoke about his work during the Sandia Talks series in June.

**Photo by Randy Montoya**

## NM small business assistance

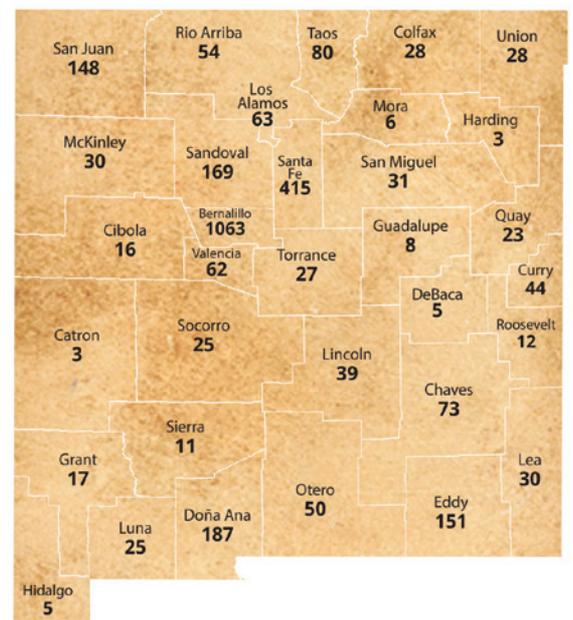
*CONTINUED FROM PAGE 1*

staff that may not have been possible under the prior funding levels.”

Sandia environmental engineer Brian Dwyer helps companies minimize the pollution they generate. His work on small-business assistance projects has included analyzing soil and water samples to understand how companies can improve, and then creating treatment plans and preventive measures they can implement.

One difficulty, he said, has been managing the companies’ expectations because the funding has not always been enough to cover everything they need.

“More funding will likely lessen this burden by allowing a little more assistance to be provided,” Paul said. [i](#)



**STATEWIDE IMPACT** — A map of New Mexico shows the number of businesses, by county, that Sandia and Los Alamos national laboratories have helped through the New Mexico Small Business Assistance Program from 2000 to 2018.

**Image courtesy of Sandia National Laboratories**



**TRADES TALK** — Congressman Ben Ray Luján and Sandia Labs Director Steve Younger participated in a recent roundtable to discuss the ACCESS Act, which would create apprenticeship and pre-apprenticeship programs in colleges and technical education schools to fill nuclear industry jobs at national laboratories. **Photo by Randy Montoya**

## Steve Younger joins roundtable to expand trades in New Mexico

By **Luke Frank**

**S**andia National Laboratories Director Steve Younger met with New Mexico 3rd District Congressman Ben Ray Luján at a recent forum to discuss an act that would expand trades in New Mexico.

The roundtable, led by Luján, included tradespeople and students who had interned at Sandia, academic and research groups from New Mexico's national labs and leadership from Central New Mexico Community College, the University of New Mexico, Navajo Technical University and others to build on the DOE National Labs Jobs Apprenticeships for Complete and Committed Employment Specialized Skills Act recently introduced in the U.S. House of Representatives by Luján.

The ACCESS Act would establish a five-year grant program run by DOE to create apprenticeship and pre-apprenticeship programs in colleges and technical education schools to fill nuclear

industry jobs at national laboratories. Under the act, veterans, young people and those with barriers to employment would be given priority in grant awards.

Research labs depend on technologists, machinists, welders and other trades to advance science and technology, Steve said. "Someone has to actually make the products and instrumentation that enable us to accelerate discovery."

During the lively discussion, participants sought ways to improve the link between curricula and career opportunities in New Mexico and to better communicate numerous existing programs, like Sandia's trades training program and its various internships and apprenticeships. Several Sandia employees who were CNM students spoke of how their experience in trades training programs led them to good jobs at the Labs.

CNM President Katharine Winograd said the strong relationship between CNM and Sandia Labs is important in creating a workforce "that supplies the skilled trades you need when you need them."

To better align education with industry, CNM and UNM Los Alamos are creating two-year programs in welding, radiologic technology, computer-aided design technology, maintenance and more.

On the employer side, Steve is exploring the development of scholarships, endowed chairs and educational foundations at Sandia. "Sandia and New Mexico can only benefit from efforts to expand a steady pipeline of skilled technical workers in our local academic centers," Steve said.

Sandia already has numerous outreach programs that introduce science, technology, engineering and math principles to students in New Mexico from kindergarten through high school.

Toward the end of the session, Luján steered the discussion to the importance of communicating these programs and opportunities to New Mexico students. "We need to engage youngsters into programs to work at the Labs," he said. "Fifty percent of the national labs' workforce will become of age to retire in five years. This legislation can be a great tool to fill that gap." <#>

## Micro gas sensors

*CONTINUED FROM PAGE 1*

Portable versions of these instruments, known as mass spectrometers, are commercially available, but they are less sensitive than their lab-based counterparts.

For more than 20 years, Sandia researchers have been working to avoid the performance penalty for portable gas detection. Their sensors employ a technique called gas chromatography, or GC for short.

Briefcase-sized instruments from Sandia have sniffed for nerve and blister agents continuously for 22 months in the Boston subway without a false alarm. Sensors about the size of a AA battery can detect a compound in sweat that signals smuggled humans. And a handheld gas sensor system can also monitor crop health by identifying gases that plants release when stressed by drought or sickness.

Now, Sandia analytical chemist Joshua Whiting and his colleagues have shrunk their sensor to

about the size of a dollar bill while also increasing the sensor's performance. The system separates a gas sample twice — and the entire analysis happens in less than 10 seconds. The extra separation step reduces interference from solvents, cleaners and diesel fuel that could also be in the air during a chemical weapons release.

Less interference also means the signal for detected target compounds is more reliable. "The false alarm rate for this multidimensional GC system is even lower than before," Joshua said.

In a paper recently published in *Lab on a Chip*, the researchers used the sensor to identify each ingredient of a 29-compound mixture in seven seconds. The system also reliably detected compounds that simulate mustard gas and phosphonate-based nerve agents during 40 days of continuous operation.

"With rapid analysis, operators can learn about an exposure to toxic gases in time for people to take personal precautions, evacuate an area and mitigate potential damage,"

Joshua said. The trick to that rapid analysis is a pressure valve in the sensor that controls how quickly gases flow through each separation step. Controlling this flow with pressure means the sensor uses less energy than similar temperature-controlled systems.

Energy efficiency combined with reliable detection in an increasingly small package sets the researchers up for the next phase of the project: building a fully portable analytical system with integrated chemical separation, selective detection and computerized data analysis that performs as well as — or better than — lab-based equipment.

The majority of the funding for the micro-gas sensing research has come from the Defense Advanced Research Projects Agency and the Defense Threat Reduction Agency, along with some funding from Sandia's Laboratory Directed Research and Development program. The researchers are now seeking funding to build the integrated system and to incorporate additional functionalities that can compete with lab-scale equipment. <#>

# Recent Patents

January — March, 2019

- **Wendy Amai, Stephen Buerger, Charles Q. Little and Jason C. Neely:** System and method for operator control of heterogeneous unmanned system teams. Patent #10168674
- **Douglas Thompson:** Robust power detector for wideband signals among many single tone signals. Patent #10171189
- **Lauren E. S. Rohwer and James E. Martin:** Multifunctional composite coatings for metal whisker mitigation. Patent #10178756
- **Todd Bauer, Jason Hamlet and Ryan Helinski:** Repeatable masking of sensitive data. Patent #10177922
- **David Bruce Burckel:** Passive radiative cooling of a body. Patent #10173792
- **Michael Joseph Haass, Mark Daniel Rintoul and Andrew T. Wilson:** Analysis and categorization of eye tracking data describing scanpaths. Patent #10181078
- **Michael B. Sinclair:** Trajectory-based triggering system for hyperspectral imaging flow cytometer. Patent #10180398
- **Michael Hibbs and Timothy N. Lambert:** An electrochemical cell having a vanadium phosphorous alloy electrode. Patent #10186740
- **Marie Yvette Arrieta, Matthew David Carlson and Bobby Middleton:** Cooling systems and methods for thermoelectric power generation. Patent #10184726
- **Giorgio Bacelli and David G. Wilson:** Optimal control of wave energy converters. Patent #10197040
- **Nicholas Argibay:** Monolithic MAX phase ternary alloys for sliding electrical contacts. Patent #10199788
- **Ronald P. Manginell, Matthew W. Moorman and Kent B. Pfeifer:** Miniaturized pulsed discharge ionization detector, non-radioactive ionization sources, and methods thereof. Patent #10197532
- **John E. Dec:** Additive-mixing fuel-injection system for internal combustion engines. Patent #10202929
- **Khalid Mikhiel Hattar and Somuri V. Prasad:** Ion beam modification of noble metals for electrical contacts. Patent #10210964
- **Stanley Shihyao Chou and Bryan James Kaehr:** Additive manufacturing of crystalline materials. Patent #10214833
- **Christian Lew Arrington, Eric Langlois, Todd Monson and Jamin Ryan Pillars:** Electrodeposition processes for magnetostrictive resonators. Patent #10215648
- **Eric Nicholas Coker:** Methods utilizing durable functional materials for chemical processes that include an oxidation step. Patent #10214700
- **Scott D. Habermehl:** Hybrid cmos-mems devices adapted for high-temperature operation and method for their manufacture. Patent #10214415
- **Hung Loui:** In-situ active impedance characterization of scanned array antennas. Patent #10218068
- **Kurt W. Larson, Randy J. Shul, Jeffry Joseph Sniegowski and William A. Zortman:** Method for simultaneous modification of multiple semiconductor device features. Patent #10217704
- **Andrea Ambrosini:** Methods utilizing durable functional materials for chemical processes that include an oxidation Step. Patent #10214700
- **Adam Jones:** Via configuration for wafer-to-wafer interconnection. Patent #10224312
- **Jason Ryan Finn, Steven F. Glover and Jason C. Neely:** Emulator for rotary energy sources. Patent #10228665
- **Robert W. Brocato:** Communication device and method of making the same. Patent #10235614
- **Darwin K. Serkland:** Connectors for multicore optical fibers and methods thereof. Patent #10234632
- **Vipin P. Gupta, Michael Hibbs, Jeffrey S. Nelson, Paul J. Resnick and Carlos Anthony Sanchez:** Moldable photovoltaic solar cell module. Patent #10243095

*Note: Patents listed here include the names of active Sandians only; former Sandians and non-Sandia inventors are not included.*

*Following the listing for each patent is a patent number, searchable at the U.S. Patent and Trademark Office website ([www.uspto.gov](http://www.uspto.gov)).*

## SANDIA CLASSIFIED ADS

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**Questions to Michelle Fleming at 505-844-4902.**

**Submit by one of the following methods:**

- **EMAIL:** Michelle Fleming ([classads@sandia.gov](mailto: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. At the bottom of the NewsCenter page, click the "Submit a Classified Ad" button and complete the form.

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### MISCELLANEOUS

**CAR CANOPY,** Monarc by Shelter Logic, <https://www.shelterlogic.com/shop/monarc-canopy>, no fabric, free. Eichel, 505-507-8554.

**K&N AIR FILTER KIT,** 57-3021-1, fits '99-'04 Chevy Silverado/GMC Sierra, 4.8-5.3, \$150. Friday, 505-249-3708.

**GOLF PUSH CART,** Sun Mountain V1 Sport Speed, Bullseye Golf, excellent condition, works great, \$60. Pitts, 505-293-5481, leave message.

**SWIM SPA,** 14' x 8', Cal Spa F-1437, brand new, int. white/grey, text/call for more info, retails for \$26,000, asking \$15,000 OBO. Miller, 505-980-9552.

**BIKE RACK,** Saris Bones, 2-bike trunk car rack, great condition, text for photos, \$60. Joy, 505-917-7591.

**ELLIPTICAL,** new condition, \$50; knee inversion machine, good condition, \$25. Jones, 505-275-5668.

**SHOES:** Dansko, Sanita, Klogs, various sizes: 7-8, 37-38, never worn, call or text for photos, \$50 ea. Canavan, 505-980-7192.

**COMPOUND MITER SAW,** Delta 36-040, 8-1/4-in., w/2 blades, \$65 OBO. Weagley, 505-385-4059.

**FULL/TWIN BUNK BED SET,** oak, built-in stairs, drawers, desk, w/both mattresses, full box spring, matching dresser, text for photos \$425. Martinez, 505-249-4057.

**TRAMPOLINE,** assembled, needs to be disassembled & hauled away, \$200. Maldonado, [musselcrows50@yahoo.com](mailto:musselcrows50@yahoo.com).

**TREADMILL,** Sole F63, very good condition, \$300. Valdez, 505-550-1993.

**URGENT MOVING SALE:** leather sofa set \$160 OBO; industrial garage rack, \$160 OBO; need to pick up by July 7, call to see items. Brining, 775-338-9700.

### TRANSPORTATION

'13 FORD FUSION TITANIUM, AWD, 2.0L ecoboost, 103K miles, \$9,000 OBO. Arnot, 505-221-1428.

'87 JEEP CHEROKEE LAREDO, 5-spd., 4x4, 6-cyl., 4.0L, 2-dr., gold, sole owner, 170K miles, \$1,500 OBO. Lorence, 505-237-1205.

'99 GMC SIERRA 1500 SLT, extended cab, long bed, 4WD, 23K miles, excellent condition, \$9,500 OBO. Smith, 505-596-1191.

'14 MUSTANG GT, track pkg., premium edition, gray exterior, low miles, ~33K miles, \$26,000 OBO. Clausen, 505-401-9385.

'97 CHEVY SILVERADO, 4x4, extended cab, camper shell, 120K miles, \$6,000 OBO. Reece, 505-256-3856, ask for Betty.

'08 BMW 328i, manual, mechanic inspected, runs very nicely, 113K miles, located in CA, \$5,900 OBO. Srin, 512-419-8325, [ss.nedunuri@gmail.com](mailto:ss.nedunuri@gmail.com).

### RECREATION

'95 HONDA GOLDWING SE, teal, 83K miles, great condition, \$4,750 OBO. Sanchez, 505-720-2340.

'13 HEARTLAND GREYSTONE RV 5TH WHEEL, 3 slides, king bed, washer/dryer combo, new tires, solar panel, sleeps 4, lives large, \$30,000. Holt, [ngh@zuzax.me](mailto:ngh@zuzax.me).

**ROAD BIKE,** Trek Emonda, black carbon fiber frame, Shimano Ultegra components, >500 miles, extras included, \$1,500 firm. Baswell, 805-910-9653.

'09 HARLEY VRSCDX NIGHT ROD SPECIAL, ABS, security, new tires, denim black, V&H, K&N, extras, excellent condition, \$7,450. Davis, [chdavis001@gmail.com](mailto:chdavis001@gmail.com).

'14 HARLEY-DAVIDSON FLHX STREET GLIDE, clean title, 5,840 miles, photos available, \$16,000 OBO. Marquez, 505-250-2988 or 505-412-7177.

'19 MEN'S SANTA CRUZ CHAMELEON R+, medium, upgraded tires, a must see, excellent condition, \$1,950. Herrera, 505-506-8898.

**SPECIALIZED COMMUTER BIKE,** 17.5" frame, 8-spd. internal hub, 26-in. wheels, more, \$500 OBO; Cannondale 29er hard tail mountain bike, medium frame, more, \$500 OBO. Costin, 505-449-7006.

'97 PONTOON BOAT, 24-ft., Smoker Craft, Dolphin series, w/115-hp Mariner motor, very clean, low hours, full shades, \$7,700 OBO. Argo, 505-235-2484.

### REAL ESTATE

5-BDR. HOME, 3 baths, 3-car garage, built in 1995, <https://tinyurl.com/y5gky5n3>. Yohannes, 505-348-9495.

3-BDR. HOME, 4 baths, 3,700-sq. ft., 2 acres, Nature Pointe Drive, Tijeras, gated community, \$899,000. Clarke, 505-850-4093.

4-BDR. HOME, 2 baths, w/solar, corner lot, Loma Colorado, 3717 Tierra Abierta Place NE, Rio Rancho, \$249,900. Reher, 505-917-6057.

### WANTED

**SUNFISH SAILBOAT,** in good condition. Rea, 505-328-6328.

**ABLE PERSON,** for yard work & odd jobs. Byers, 505-821-0947, leave message.

**APARTMENT/CONDO,** needed in Orlando, FL area. de la Fe, 505-377-7224.

**HOMESHARE,** male, late August-June, furnished, beautiful NE Heights, perfect for grad student, new hire, visiting professor, \$1,200, including utilities. Yourick, 505-259-8005.

### WORK WANTED

**HOUSE/PET/BABY SITTING,** for Albuquerque area, Academy grad, references available. Stegmaier, 505-331-7676, ask for Rachael.

### AD RULES

1. Limit 18 words, including last name and home phone (web or email address counts as two or three words, depending on length).
2. Include organization and full name with ad submission.
3. Submit ad in writing. No phone-ins.
4. Type or print ad legibly; use accepted abbreviations.
5. One ad per issue.
6. The same ad may not run more than twice.
7. No "for rent" ads except for employees on temporary assignment.
8. No commercial ads.
9. For active Sandia members of the workforce and retired Sandians only.
10. Housing listed for sale is available without regard to race, creed, color or national origin.
11. Work wanted ads are limited to student-aged children of employees.
12. We reserve the right not to publish any ad that may be considered offensive or in poor taste.

# Mileposts



New Mexico photos by Michelle Fleming  
California photos by Randy Wong



Jim Blankenship 35



William Cordwell 35



Dennis Roach 35



Dan Vortolomei 35



Ken Keahbone 25



Steve Showalter 25



Helen Bailey 15



Bruce Behrends 15



Shanann Candelaria 15



Ben Cipiti 15



Melanie Corn 15



Julie Farkas 15



Keith Frakes 15



Diane Goins 15



Jeff Greathouse 15



Derek Hart 15



Derek Lamppa 15



Jason Lechtenberg 15



Al Lopez-Gaston 15



Raymond Lovato 15



Jason Mays 15



J.T. McClain 15



Sunni Moore 15



Marin Noriega 15



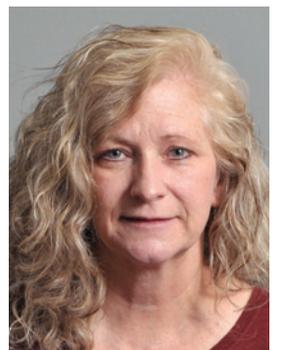
Brad Norman 15



Thomas Quirk 15



Marilyn Romo-Hamilton 15



Dianna Sammons 15

# Recent Retirees



New Mexico photos by Michelle Fleming  
California photos by Randy Wong



Barbara Funkhouser 34



Gary Bultmann 33



Kim Denton-Hill 31

## ATTENTION RETIREES:

The Coronado Thunderbirds club meets on the second Tuesday of every month.

Call Connie DeFoe for information, 505-298-0330.



# Sky's the limit

By **Luke Frank**  
 Photos by **Randy Montoya**

Four Sandia interns mentored eight high school students from throughout New Mexico who participated in this year's Model Rocket Design and Telemetry project at the 2019 Joint Science and Technology Institute residential STEM camp this June.

The two-week event, hosted for the first time in New Mexico by the Oak Ridge Institute for Science and Education, enables high school students to participate in projects mentored by research scientists and engineers from Sandia and Los Alamos national laboratories.

"We mentored a group of eight students who completed a research project on rocket design and telemetry," Sandia intern Skyler Valdez said. Skyler, joined by year-round Sandia R&D interns Duncan Madden, Collin Lockemer and Robert Stroud, built rockets with students in teams and launched them at Balloon Fiesta Park.

The DOE Oak Ridge Institute for Science and Education, headquartered in Oak Ridge, Tennessee, facilitates a variety of scientific initiatives by placing students and scholars in organizations seeking interim expertise. The institute strives to inspire students to pursue careers in STEM fields, increase STEM literacy and expose students to the importance of STEM through hands-on, relevant research. [@](#)

