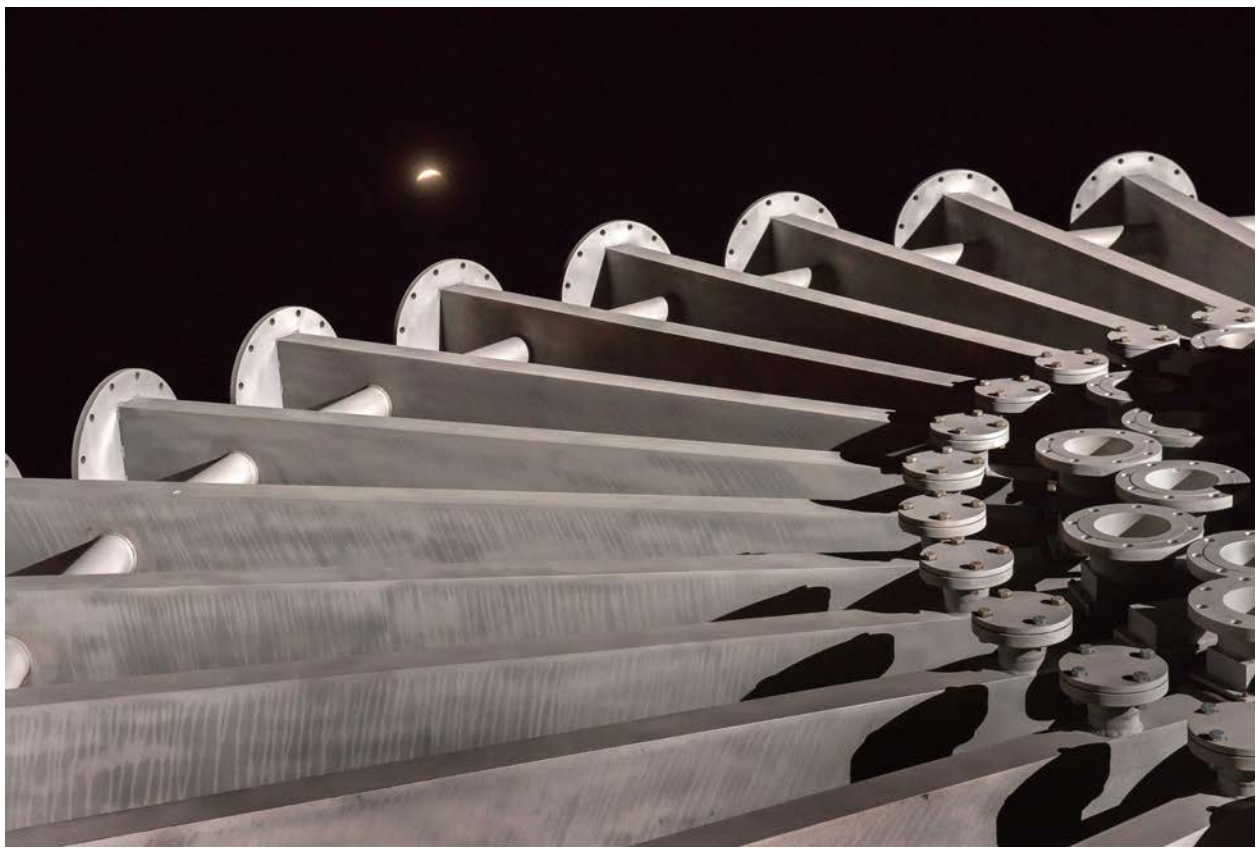
SANDIA LABNEWS
PUBLISHED SINCE 1949

Vol. 71, No. 3, February 1, 2019

LOCAL STUDENTS DESIGN CITIES OF THE FUTURE
PAGE 9

Blood drive	2
W76 milestone	4
Vice Adm. Wolfe	6
Classified ads	6
CSI: Dognapping	8

Lunar eclipse rises over Sandia Labs



BLOOD MOON ON THE RISE — The lunar eclipse rises over the Starburst sculpture at Sandia in New Mexico on Sunday, Jan. 20. The Starburst was once the power flow section of Particle Beam Fusion Accelerator I, which was removed when the accelerator was converted into the Saturn X-ray simulator. **Photo by Randy Montoya**

Deconstructing deleterious soot

Sandia discovers compounds in soot formation, findings could lead to cleaner engines

By ***Sarah Sewell***

In most situations, breaking things apart isn't the best way to solve a problem. However, sometimes the opposite is true if you're trying to characterize complex chemical compounds. That's what Sandia scientists Nils Hansen and Scott Skeen did to definitively identify soot precursor species in a flame.

The researchers discovered aliphatically bridged polycyclic aromatic hydrocarbons and PAHs with aliphatic side chains, which have been hypothesized to serve as "seeds" for soot particles in engine emissions. These are different variations of normal PAHs.

The newly recognized compounds can be used to create more detailed, up-to-date models of combustion that, in turn, can help in the design of cleaner, more efficient engines that emit less soot and fewer harmful hydrocarbons into the atmosphere.

"The role of these molecules as soot precursors has been hypothesized and there is indirect experimental evidence of their presence on the surface of soot extracted from flames" Scott said. "Until now, however, no one had definitive experimental proof of their existence in the flame's gas phase."

Working with former Sandia postdoctoral researcher Brian Adamson and Musa Ahmed of Lawrence Berkeley National Laboratory, Nils and Scott recently published their discovery in the Journal of Physical Chemistry A. Funding for the research came from Sandia's Laboratory Directed

— CONTINUED ON PAGE 3

TALKING SOOT — Scott Skeen, Nils Hansen and Brian Adamson (left to right) discuss the tandem mass spectrometry technique they used to detect aliphatically linked polyaromatic hydrocarbons in a sooting flame. **Photo by Michael Padilla**

Creating the Future

By ***Jennifer Awe***

What might the global security environment look like in 20 years?

What are the most significant national security challenges in this environment?

What role should Sandia play in addressing these challenges?

Answers to these questions, examined over a 15-month period by more than 1,000 experts inside and outside the Labs, led to Sandia's new Creating the Future strategic direction document, and Labs-level strategic priorities.

"Given the pace of global events, we believe such a long-range view is essential to avoid technology surprise and ensure that the U.S. is prepared to meet future threats," Labs Director Steve Younger said. "Rather than let things happen and respond to them, we have an opportunity to create the future."

But, just how do you Create the Future?

QUESTIONS — Sandia's strategic direction evolved from a systematic analysis of the questions in this graphic.

An individual might draft a list of personal goals, create a vision board or surround herself with like-minded people on a similar path to some future state. An organization might enlist diverse experts in a variety of fields, assess the current landscape and predicted futures and conduct SWOT-like analyses to help determine where to have the most impact and how to cultivate a desired state.

When you're a world-class national laboratory that develops advanced technologies to ensure global peace the future is incredibly dynamic, shifting with government direction and leadership and global events.

"As a Federally Funded Research and Development Center, we were created to address long-term challenges," Steve said. "Part of our service to the nation is to scan the horizon for emerging national security issues and articulate the challenges we anticipate for the country."

Process to progress

Sandia's strategy development encompassed a broad range of activities, such as research and analysis,

— CONTINUED ON PAGE 4

LAB**NEWS** Notes

Was it the cookies, or did the act of giving blood make me feel like a hero?

By ***Courtney Chavez***

Free snacks! Two words and I was sold — whatever the task, I was up for the challenge. Turns out in exchange for these free snacks, I'd have to donate blood. I'd be lying if I said I didn't consider going out and buying my own snacks. This would be my first time donating and, like anyone else, I was nervous. I had heard the stories before, just like you. "It hurts! I was so dizzy after!" In fact, I looked for any reason not to go.

Donating blood can feel like a task with little reward if you don't take some time to look at the bigger picture. According to the website for Vitalant, which conducts blood drives twice a month at Sandia, "Every two seconds, someone in the U.S. needs blood." If you base your math on our typical nine-hour work day, that's 16,200 people in just one shift who need blood — more than the number of employees at Sandia.

After reading that statistic, I began to feel guilty that I hadn't donated blood sooner, and so I began looking for more excuses to back out.

Maybe it takes a long time? Nope, only about 10 minutes. Maybe it doesn't help that many people? Nope, up to three lives can be saved from one donation. "Dang. That's a lot of people in need, a lot of lives saved, and not a lot of my time," I thought to myself.

I was running out of excuses to back out faster than I had anticipated. So, I did the only normal thing and I deflected away from that line of thinking. After all, no one I knew ever needed a blood donation, and so I told myself that it wasn't my responsibility.

Boy, was I wrong. As a matter of fact, the simple explanation is that receiving blood just isn't a typical topic of conversation for most people.

I found out my own dad has received a blood transfusion. He has suffered multiple heart attacks, and wears a pacemaker. Additionally, he has the blood of a hero who donated and unknowingly helped save my dad's life. I had never considered that his heart surgeries would also mean that he would need donated blood. I finally realized I couldn't keep making excuses. A stranger had helped save my dad's life, and it was my turn to be that hero for someone else. Since I had no way to thank that individual, I had to pay it forward.

So, I made the appointment for donation (although walk-ins are welcome, too). On the appointed day, they sent me a link to a questionnaire, which took less than 10 minutes to complete. I showed up for my appointment and they ran a basic health screening. This precheck included taking my temperature, blood pressure and a small blood sample from my finger, to ensure I was a good candidate to donate. Then I took my spot on the comfy recliner and the process began. Once they found a vein and cleaned my arm, they inserted the needle and began drawing my blood. It took about 10 minutes for them to collect enough blood, and all of the time spent was completely pain free.

After that came the part I had been waiting for so eagerly — snacks! I had my choice of cookies, chips and goldfish crackers. I opted for the cookies, and they happened to be the best-tasting cookies I had ever eaten. Not only had I put them on such a high pedestal emotionally, but they came with a feeling of accomplishment. As trite as this sounds, I felt that in a small way I, too, had become a hero, as though perhaps I helped save someone else's dad, mom, brother, sister or friend.

The most painful part of donating blood was the anxiety and fear leading up to it. The actual physical pain was less than that of a paper cut. Combined, the predonation anxiety and the poke of the needle paled in comparison to the benefits I got out of it: I overcame my fear, I helped save a life and, of course, cookies — all in practically no time at all.

WHY DOESN'T IT HURT? — Dawn Acevedo of Vitalant (left) helps Courtney Chavez prepare for some nourishing cookies, while Courtney provides blood that potentially could save up to three lives. **Photo by Amy Tapia**

The Vitalant bloodmobile collects donations at Sandia frequently. **The next donation event is Tuesday, Feb. 5, 9 a.m.-5:30 p.m., in the Bldg. 823 parking lot.** Schedule an appointment at Vitalant.org.

Ft. Bliss Army Medical personnel visit Kirtland Air Force Base quarterly to collect much-needed blood donations for deployed military. All donations will be in deployed locations within 72 hours of donation. **The next donation day is Monday, Feb. 25, 9 a.m.-3 p.m., at the KAFB Outdoor Recreation Center.** Walk in or make an appointment.

Watch the Sandia Daily News for future donation events. Always bring an ID to a donation appointment, as the Sandia badge cannot be used for identification.

SANDIA LABNEWS

PUBLISHED SINCE 1949

Managed by NTESS LLC for the National Nuclear Security Administration

Sandia National Laboratories

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

Jim Danneskiold, Acting Editor	505-844-0587
Darrick Hurst, Managing Editor	505-844-8009
Laura Hatfield, Production	505-845-0612
Tim Deshler, Production and Web	505-844-2502
Randy Montoya, Photographer	505-844-5605
Jules Bernstein, California Site Contact	925-294-3609

CONTRIBUTORS

Michelle Fleming (ads, milepost photos, 505-844-4902), **Neal Singer** (505-846-7078), **Stephanie Holinka** (505-284-9227), **Kristen Meub** (505-845-7215), **Michael Baker** (505-284-1085), **Troy Rummler** (505-284-1056), **Manette Fisher** (505-844-1742), **Valerie Alba** (505-284-7879), **Meagan Brace** (505-844-0499), **Michael Padilla** (925-294-2447), **Jim Danneskiold, manager** (505-844-0587)

Classified Ads 505-844-4902

Sandia National Laboratories is a multimission laboratory managed and operated by National Technology & Engineering Solutions of Sandia, LLC, a wholly owned subsidiary of Honeywell International Inc., for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-NA0003525.

Published on alternate Fridays by Internal, Digital and Executive Communications Dept. 3651, MS 1468

LAB NEWS ONLINE: sandia.gov/LabNews

LAB**NEWS** Notes

EDITOR'S NOTE: Lab News welcomes guest columnists who wish to write about "Why I work at Sandia" 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 Jim Danneskiold, the acting editor, at jddanne@sandia.gov.

W76-1 milestone feted at Pantex

W76 FIESTA IN TEXAS — Sandia staff members and managers gathered with DOE and NNSA officials at the Pantex Plant in Amarillo last week to mark the conclusion of the W76-1 Life Extension Program of Record. Thousands of NNSA employees and contractors from across the country have worked for more than two decades to develop, produce and deploy the W76-1, an effort that will extend the strategic weapon's lifespan for decades. Pictured at the celebration (left to right) are Aaron Perea, assistant manager for programs at NNSA's Sandia Field Office, DOE Secretary Rick Perry, NNSA Administrator Lisa E. Gordon-Hagerty and Labs Director Steve Younger.

Photo courtesy of Pantex Plant

Deconstructing soot

CONTINUED FROM PAGE 1

Research and Development program, while Ahmed is supported by the DOE's Office of Basic Energy Sciences.

The team used an analytical technique called tandem mass spectrometry — using an instrument provided by Lawrence Berkeley Lab and cleverly customized by Adamson — to identify polycyclic aromatic hydrocarbons in flames that produce soot, something never done previously.

The device removes an electron to positively charge, or ionize, large molecules sampled from the flame, measures the molecule's masses then further identifies the chemical structure by the way the ionized molecules crack apart.

Discovery builds on recent Sandia research

Recent work by Sandia scientist Hope Michelsen, technologist Paul Schrader and former postdoctoral researcher Olof Johansson broke ground by demonstrating chemical chain reaction processes in which hydrocarbons could form in soot. That work heightened the challenge of detecting and characterizing the compounds that participate in these processes.

One area of debate is whether the chemical byproducts in soot are purely polycyclic aromatic hydrocarbons, made up of ring-shaped groups of atoms, or contain extra, non-cyclic structures called alkyl, or aliphatic, chains. These long hydrocarbon chains can make the links among polycyclic aromatic hydrocarbons more stable at the high temperatures of combustion, greater than 2,000 degrees Celsius.

"Without the tandem component of this new mass spectrometer, each molecule's mass is obtained but no information about its structure is revealed. You see something at mass 78, at mass 128, etc., but you don't know what it is. You just use your chemical intuition," Nils said. "Think of a mass spectrometer as an instrument that sorts a container full of mixed nuts based on the weight of each individual nut, but at the end you still don't know if you sorted peanuts, hazelnuts or walnuts."

Breaking big molecules

The customized tandem mass spectrometer that the team used makes it easier to characterize the structure of large molecules by breaking them apart through high-energy collisions in a collision induced dissociation cell, Scott said.

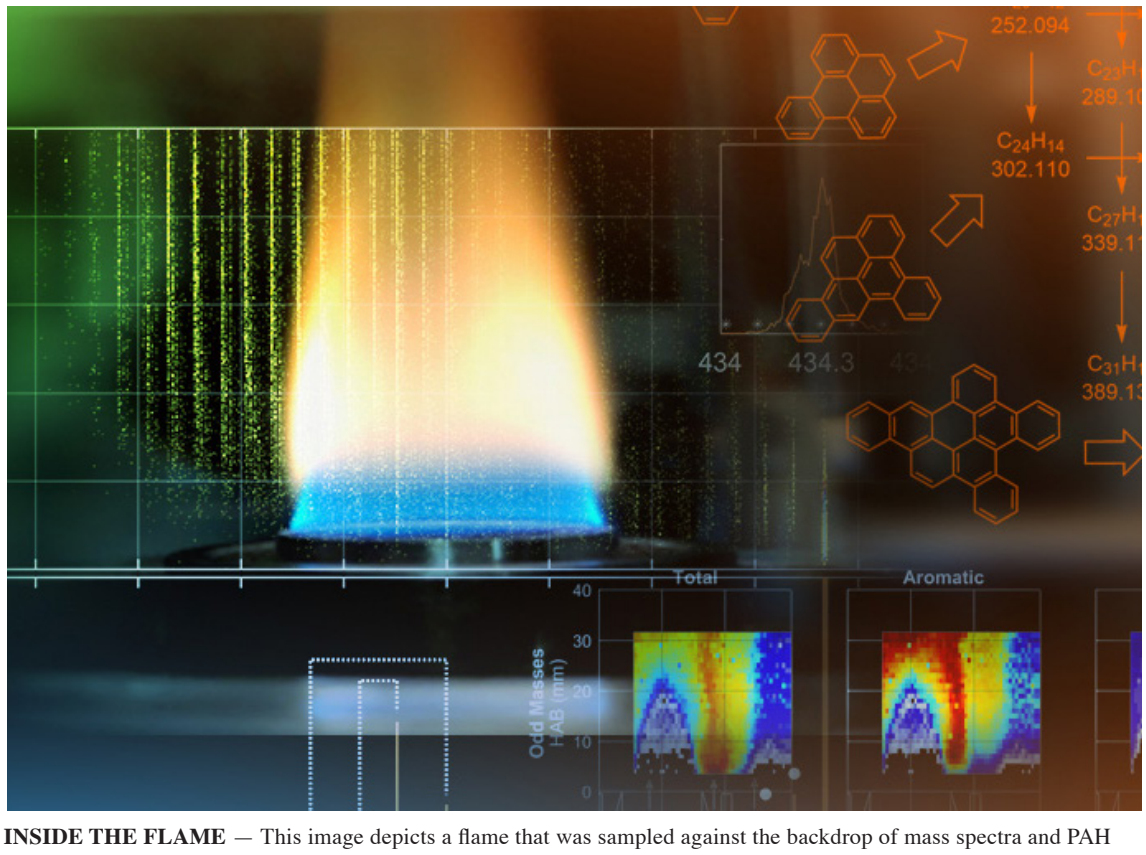
"Normal mass spectrometry can tell you how many atoms of each element are present in a molecule, but it won't tell you anything about how those atoms are joined together," Adamson said. "Tandem mass spectrometry with collision induced dissociation isolates molecules of a single mass and then breaks them apart. The way they break apart provides clues as to the structure of the parent molecule."

The team found direct evidence that polycyclic aromatic hydrocarbons and PAHs with alkyl chains exist in the sampled gases of the sooting flame. Such species may be sufficiently stable at the high temperatures of combustion to serve as key components in incipient soot particle formation.

The team also used a special flame configuration to minimize disruptions to the flame chemistry caused by the sampling process. Scott said the novel experimental setup involved sampling and examining large molecules from an inverted candle-like flame.

"In a candle, the wax moves up the wick and then vaporizes before burning in the surrounding air. The flame appears yellow because soot particles get very hot as they move through the flame," Scott said. "In this configuration, it is impossible to sample soot particles or molecules that lead to soot formation without disturbing the flame because a probe must be inserted through the flame sheet.

"To overcome this problem, we generated a flame in which the air is in the center of the flame with the fuel on the outside," he said. "This way, we can probe the gases of interest from the outside of this 'inverse' flame. This is perhaps the first time that such a flame has been attached to a tandem mass spectrometer."



INSIDE THE FLAME — This image depicts a flame that was sampled against the backdrop of mass spectra and PAH compounds the Sandia team found inside the flame. **Image courtesy of Scott Skeen**

Engines creating solid soot from gas

In an engine, soot particles form when gaseous, carbon-containing molecules that originate from the fuel escape oxidation and combine to create larger molecules that eventually turn into a solid material.

Soot is harmful to the environment and a significant contributor to global climate change. Moreover, it impacts public health by damaging the lungs. Substantial evidence links polycyclic aromatic hydrocarbons and soot formation, although the evidence isn't completely conclusive.

The chemical components leading to soot are difficult to decipher. What is known is that when the chemicals in hydrocarbon fuels are broken down during combustion, new molecules form rapidly.

The search for soot precursors is motivated by the need for cleaner engines that still run efficiently. Under certain driving conditions, diesel emissions exceed government regulations. This has led to the use of particulate filters that effectively capture soot particles from diesel exhaust, but they make the vehicles significantly more expensive and less efficient. Engines that produce less soot would need smaller particulate filters, reducing costs and increasing fuel economy.

Engine manufacturers typically use computer simulations to improve engine designs. They model the fuel injection, combustion and pollutant formation processes. Scott said that better understanding of how soot compounds are produced — specifically definitive identification of polycyclic aromatic hydrocarbons with alkyl chains attached — should lead to models that more accurately describe the effects of engine design parameters on emissions and efficiency.

"If we can understand the chemistry, we can develop a model that will allow engine designers to optimize fuel injectors, air flows and the shape of internal engine surfaces, among other things, that will keep these compounds out of the atmosphere," Scott said.

Future steps

This discovery of alkyl-substituted and aliphatically bridged PAHs in sooting flames is only the starting point for using tandem mass spectrometry to decipher the complex chemistry of polluting emissions, the team said.

In the published paper, the team analyzed compounds at two different masses. However, the technique potentially could lead to identification of thousands of different types of compounds. Even for the most basic polycyclic aromatic hydrocarbons, there are about a hundred different ways the atoms can come together. Seeing all the different arrangements presents a formidable challenge. Musa will continue his work with Sandia scientists and plans to use complementary methods such as infrared spectroscopy for less ambiguous identification of alkyl-substituted and aliphatically-bridged PAHs in soot.

The Sandia scientists hope to collaborate with data scientists to develop more efficient, realistic models of engine soot formation, ultimately leading to designs for cleaner, more efficient engines.

Creating the future

CONTINUED FROM PAGE 1

environmental scans, workshops, Labs-wide crowdsourcing, surveys and leadership meetings and engagement.

The imagined futures reflected a complex global security environment driven by several key dynamics: technical convergence and individual empowerment; a polycentric world with new actors challenging institutions; climate change and constrained resources; continuing superpower dynamic with emerging frontiers of engagement; and accelerated information diffusion.

Discussions about how to prepare for these dynamics focused on five broad roles for Sandia to play in addressing these challenges: anticipator, technical advisor, technology developer, systems integrator and rapid responder. Variations on the roles can be found within the Labs' strategic priorities.

Labs-wide teams composed of experts in technical fields, mission support and strategy studied national security topics and presented their findings to executive leadership. Sandia's leadership team then finalized the topics and language, and developed a set of Labs-level strategic priorities:

1. Deliver on today's commitments.
2. Maintain an agile and effective nuclear deterrent.
3. Anticipate threats to national security through intelligence science.
4. Develop transformational technical solutions to detect threats to national security.
5. Invent and demonstrate pathfinder systems to address threats.
6. Deploy outstanding engineering, science and technology to our missions.
7. Unleash the power of Sandia.

Avoiding another 'Sputnik moment'

The Labs' strategic direction document hopes to serve as Sandia's "North Star." It's a living document that provides a framework for decisions needed to bring the purpose statement to life over the next two to three decades.

Steve recently met with each priority team and challenged them to take up to a year to study their threat space and challenges and come back with big ideas that will change the world.

"Start with what problem we are trying to solve, then evaluate the whole spectrum of actions we could take," he said. "The solution may even seem impossible — well, lots of things used to seem impossible."

Recognizing strong interdependencies among priorities, Unleash the power of Sandia is partly charged with imagining the ideal institution needed in order to support the others. One example is a collective desire among all priority teams for greater institutional agility, allowing rapid course changes, even if that means failing and trying again.

THINKING BIG — For more than a year, Sandia's core strategy team has been working with executive leadership and groups throughout the Labs to develop and execute the corporate strategic planning process. They recently published the Sandia's strategic direction document and currently are working to coordinate implementation plans with strategic priority teams. Shown are (left to right, front row) Elizabeth Roll, Elizabeth Kistin Keller, Emily O'Bryan, Amber Harwell and Emily Gaffney, (standing) John Foley and Jennifer Awe. **Photo by Norm Johnson**

While many nations around the world are actively working to anticipate and prepare for the future, Sandia leadership believes the Labs must be at the forefront, looking for what can't be seen. They're calling for deep thinkers from varied disciplines throughout Sandia, and even external partners, to challenge current paradigms with divergent thinking to uncover what's beneath.

"The United States has enjoyed technology dominance for a long time," Steve said. "With rapidly rising budgets and capabilities in other countries, that is changing. And, if we don't look we won't be the ones to find the breakthrough. We may not find it even if we look, but we certainly won't if we don't try. Another Sputnik moment is coming."

The recognition that other nations are spending a lot of time and money on discovery is part of what fueled leadership discussions about risk acceptance, and how Sandia might work within its governing parameters to think big. Innovative, forward-leaning people throughout Sandia have taken up this charge.

"Team members have served in addition to their 'day jobs' for over a year," said Elizabeth Roll, senior strategist. "They've become subject matter experts on their priority and have helped the rest of us better understand the threat space and opportunities for impact."

Now what?

The strategic direction document outlines the why and what, intentionally leaving the how to be determined by the priority teams, and any area of Sandia that sees its work aligning with the intent of the priorities. Currently, teams are busy working on priority development and deployment, which will take the planning project well into 2019.

"This is really hard, and it takes time," Steve said. "I'm asking folks to not focus only on what Sandia does today, but what we need to do in the future in order to tackle a big idea that changes the world. With a 20-year horizon, we can spend a percentage of that time thinking."

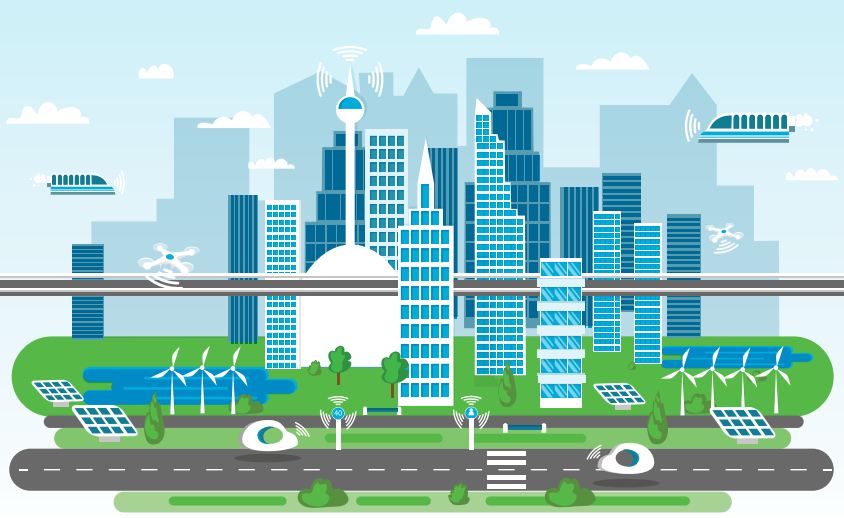
Each priority has an associate labs director as champion, a director lead and a supporting team (in some cases multiple teams, or variations) tasked with overseeing the big ideas that will give the priorities substance and attention over the years, and tracking their progress through familiar methods – management reviews, milestones, etc.

"Implementation is spread throughout Sandia, with no priority existing in a vacuum," Elizabeth said. "We've worked with these groups from the beginning – everyone from ALDs, directors, managers, and staff from every division. We did this with intention, so that the deployment phase would not be a surprise to those charged with making it happen."

With or without a strategy, Sandia would continue to play its part in the global security environment, delivering exceptional service in the national interest. However, a strategy may help Sandia do more than that, allowing the Labs the freedom, and permission, to think beyond current responsibilities and on to the next big idea.

"There is something out there as important to national security as the Manhattan Project," Steve said. "We're the ones to find it."

LONG-RANGE PLANNING — Sandia managers gathered more than a year ago to brainstorm about the Labs' future directions and priorities. Many of their ideas went into the recently published Strategic Direction document. **Photo by Amber Harwell**



Middle school teams design cities of the future

by ***Valerie Alba***

Photos by ***Cliff Ho***

Students from 18 rural and urban middle schools took part in the sixth annual New Mexico Future City Competition regional finals at the UNM School of Architecture and Planning. Each of the 37 teams worked with an educator and mentor skilled in the fields of Science, Technology, Engineering and Math to design their vision of a resilient city that could withstand and quickly recover from natural disasters. The students also prepared essays and scale models of their cities and then presented their ideas to a panel of STEM professionals. The students vied for the chance to represent New Mexico at the national Future City Competition in Washington, D.C., in February. The winner, Citta Forte designed by Annunciation Catholic School students (bottom photo), featured smart grid technologies, autonomous vehicles and shock-absorbing buildings. Eighty-six volunteers supported the event, including 21 Sandia employees. "Taking a relevant infrastructure challenge and inspiring kids to come up with engineering solutions is just one of many avenues to sustain their interests in science and technology. Middle school students attending this event get new ideas by witnessing other models as well. The New Mexico Future City Competition is very fortunate to have strong community support from two national laboratories, New Mexico professional societies and local businesses," said Amy Sun, Sandia engineer and regional coordinator for the New Mexico Future City Competition.

Vice Admiral Johnny Wolfe visits Sandia

NAVY VISIT — Vice Admiral Johnny Wolfe, director of Strategic Systems Programs for the Navy, visited Sandia last week and formally recognized Sandia and its staff for their key role in the development and production of the W76-1/Mk4A Life Extension Program. During his tour, he presented an award to W76-1 leadership. Pictured (left to right) are Chris O'Gorman, senior manager; Vice Adm. Wolfe; Mark Rosenthal director; and James Klarkowski, manager. (bottom photo) Vice Adm. Wolfe talks with systems engineer Mark Meyer of Military Liaison.

Photos by Randy Montoya

SANDIA CLASSIFIED ADS

MISCELLANEOUS

EXERCISE BIKE, ProForm 135 CSX Upright, w/gel seat, great shape, text for photos, $75 OBO. Moore, 505-440-3059.

TRUCK RIMS, 17-in., set of 4, w/245/70R17, tires need replacement, call/text for details, $200 OBO. Baxley, 505-238-5084.

ROWING MACHINE, Diamondback 910R, air/magnetic resistance, folds for storage, 19 workout programs, excellent condition, $475. Gendreau, 505-266-7573.

1987 APPLE MACINTOSH PLUS, M0001A Apple mouse & keyboard, Kensington Turbo mouse, cutting edge SCSI, etc. works, $475. O'Grady, 720-587-9857.

FURNITURE: full-size bed, sectional couch, coffee & end table, adult tricycle, entertainment center. Dickman, 505-828-4980.

FEMALE PROFESSIONAL PANT SUITS, 3: size 12 P ($30); 12 ($60); 12 ($60); never been worn. Laros, 505-507-2403.

LOVE SEAT, leather, Natuzzi, good condition, $250. Raether, 505-298-7156.

SOFA, 96-in. queen sleeper, $350; chair/recliner; 5-1/2' x 6-1/2' rug, Native American green/red/blue blanket design, great condition. Strosinski, 505-720-0697.

STAND MIXERS: KitchenAid 3.5-qt., white, $75; Sunbeam Mixmaster, chrome, $50; both have tilt-head/mixing attachments/bowls. Garner, cj7garner@gmail.com.

COUCH SET, brown, 4-pc., good condition, $400; entertainment center, dark oak, expandable, $200. Graham, 505-293-7302.

ELECTRIC WHEELCHAIR, Quickie P220, used, gel-cell batteries, good clean condition, $500, will negotiate. Reid, 505-270-0257.

ELECTRIC HEATER, attractive wood cabinet, fake fire place, 18" x 12" x 32", used little, very good condition, $75. Anderson, 980-9617, ponyexpress6119@gmail.com.

TRANSPORTATION

'03 TOYOTA RAV4 L, 2WD, silver body, blue cloth interior, Bluetooth added, 159,385 miles, $4,600. Wogenrich, 505-715-0959.

'13 LEXUS GS-350 F-SPORT, 20,995 miles, cherry,$32,000. Blickem, 505-323-6832.

'11 FORD F250, King Ranch, FX4, short bed, 68K miles, great condition, $38,000 OBO. Eytcheson, 505-507-4106.

'88 FIERRO, V6, all options, <100K original miles, new fuel pump, battery, immaculate, $10,000 OBO. Hanks, 249-1931, send text.

'08 INFINITI G37 COUPE, fully loaded, silver, 109K miles, great condition, $10,000 OBO. Theobald, 505-980-8660.

'92 CHEVY CORVETTE, AT, 5.7 300-hp V8, Quasar blue, removable hardtop hatchback, original owner, 19,873 miles, $10,000 OBO. Navarrete, 505-821-0596.

'96 DODGE DAKOTA SLT, AT, 4x4, 215K miles; '88 VW Cabriolet, convertible, 5-spd., 233K miles; project vehicles, $1,000 ea. OBO. Harrison, 505-804-1728.

'12 FORD FOCUS, 2-dr. hatchback, 4-cyl., AT, AC, PW, 154K miles, really good condition, $2,400. Vittitow, 505-507-3849.

'00 JEEP CHEROKEE SPORT, 6-cyl., standard transmission, 4WD, 129K miles, good condition, $2,250. Stubblefield, 263-3468.

'13 FORD F150, Lariat, 4X4, supercrew, Exoboost, loaded, one owner, 75K-mile warranty, 69.5K miles, excellent condition, $28,000. Baca, 505-980-1169.

RECREATION

'10 HONDA SABRE, 1300 cc, 14K miles, new condition, $5,500 OBO. Meyer, 505-263-2766.

'17 SYLVAN SPORT GO ULTRALIGHT, pop-up tent camper, used 4 times, almost new, www.sylvansport.com, $8,500. Orlando, 321-0302.

'00 STAR CRAFT, pop-up truck camper, heater gas or electric, AC, cook top, fits 7-ft. truck bed, $3,200. Hibray, 505-821-3455.

REAL ESTATE

3-BDR. HOME, 2 baths, 1,800-sq. ft., completely updated throughout, Taylor Ranch area, $199,000. Caffey, 242-2997, ask for Nicholas

WANTED

TAKE OVER APT. LEASE, 1-bdr., 1 bath, top floor, 5 mos. left, Mountain Run complex, rent <current market, $750 mo. Wickliffe, 505-301-9076.

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.

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. At the bottom of the NewsCenter page, click the **"Submit a Classified Ad"** button and complete the form.

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

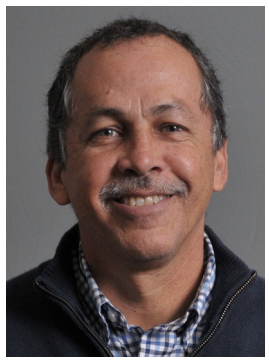
AD RULES

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.

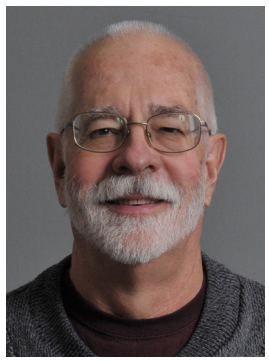
Mileposts

New Mexico photos by Michelle Fleming
California photos by Randy Wong

Gloria Christensen 35



David Kozlowski 35



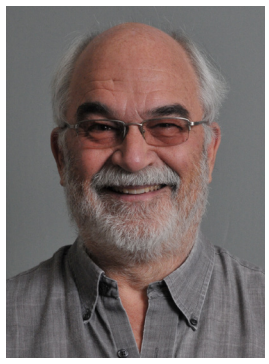
Melvin Krein 35

Jeff Adams 30

Cindy Serna 30

Barb Wampler 30

Dennis Anderson 25



Mike Du Mond 25

Michael Lopez 25

Chris O'Gorman 25

Mark Spoonamore 25

David Clifford 20

John DeBassige 20

Eric Varley 20

Ryan Kristensen 15

Victor LaJeunesse 15

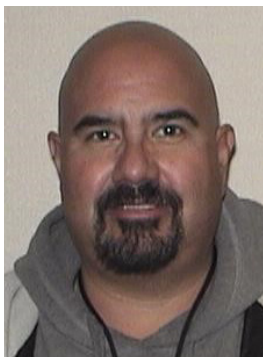
Jimmy Lloyd 15

Jason Min 15

Beverly Polyard 15

Talbot Smith 15

Mark Taylor 15



Nick Vargas 15

Recent Retirees

New Mexico photos by Michelle Fleming
California photos by Randy Wong

Jeff Brinker 39

Bob Cutler 37

Debbie Duran 37

Bob Benner 35

Michael Maurer 30

Lynn Schluter 30

Dwight Stockham 27

Tamera Ortega 24

Jeff Figiel 21

Tina Newlander 20

Retiree Deaths

Paul Seiwald (age 78)	January 2, 2018
Robert Boye (52)	January 10
Lola Lenz (93)	January 25
John Aragon (70)	February 9
Jean Burstein (90)	February 13
H. Parke Davis (71)	March 5
Kevin McBride (57)	March 6
Philomene Harris (91)	March 16
Hattie Dietzel (84)	March 27
Horatio McKinney (85)	March 29
Joe Abeyta (74)	April 26
Andrew Silva (60)	April 27
Judy Ewing (79)	May 17
Stanley Zehr (77)	June 6
Walter Morris (92)	June 10
Howard Hugh Cole (95)	June 13
Daniel Koleske (56)	June 29
Robert Galbraith (84)	July 2
Marilyn Hoover (66)	July 22
Joann Painter (86)	July 31
Ronald Bodo (79)	August 16
Dea Orrell (87)	August 17
Roger Bouscal (70)	August 29
Brenda Forget (59)	September 3
James Landavazo (73)	September 4
Deborah Eaton (62)	September 18
Kenneth Flynn (83)	September 19
William Wall (85)	October 9
Kenneth Finders (94)	October 9
Willa Urbanoski (99)	October 12
Gwen Seccombe (82)	October 23
W. Hugh Walker (79)	October 27
Sharon Downs (64)	October 28
Robert Fisher (79)	November 1
David Varoz (72)	November 3
Richard DiPrima (77)	November 7
Norman Elliott (93)	November 8
Fred Johnson (88)	November 8
William Alzheimer (78)	November 9
Julio Pardo (89)	November 9
Joe Costales (87)	November 10
Helen Temperly (96)	November 11
Luis Mora (94)	November 16
Donald Robbins (94)	November 17
Lewis Hanchey (85)	November 19
Clarence Himes (103)	November 24
William Zagar (86)	November 28
Wayne Trump (89)	December 1
John Romero (94)	December 1
Rose Brigham (84)	December 2
Raymond Klein (77)	December 3
Robert Parson (62)	December 5
J. Archie Lackey (80)	December 12
Richard Clarkson (89)	December 15
Alan Bolles (94)	December 17
Norman Brisbin (93)	December 18
Robert Crain (96)	December 23
Emiliano Sanchez (82)	December 25
Barbara Champion (89)	December 28
Earl Simonson (90)	December 29
Alice Vancil (93)	December 29
Lee Rieger (64)	January 6, 2019
William Hartman (86)	January 6

CSI: DOGNAPPING

Photos by ***Randy Montoya***

More than 500 fourth-graders visited the Sandia/UNM Advanced Materials Laboratory at the University of New Mexico recently for a chemistry magic show, but instead were accused of dognapping the chemistry dogs, GreyShoes and Sister. For the rest of the week, the students applied their minds to the "Whodunit" and examined physical evidence, data and clues based on chemistry, biology and basic science. They analyzed purple water in the dogs' drinking bowl and other liquids found at the scene of the dognapping, examined various fibers, powders, gases and other items, and gained hands-on experience in the disciplines that comprise Science, Technology, Engineering and Math. All the activities were part of the 15th CSI Dognapping program, organized by LaRico Treadwell with help from Tineca Quintana of Community Involvement and numerous volunteers from Sandia, UNM and the Albuquerque Public Schools. This year, students came from Chelwood, Eugene Field, Emerson, Mission Avenue, Tomasita and Lowell elementaries. "The workshop promotes and challenges youth in scientific methods and encourages self-confidence and teamwork," LaRico said. "They learn lab safety, how scientists must use all five of their senses and, most importantly, that it's OK to ask questions and have fun." The program — founded by Sandians Timothy Boyle and Bernadette Hernandez-Sanchez — won the ChemLuminary Award for Outstanding Kids and Chemistry from the American Chemical society, making Sandia the first national laboratory to do so.