Dirt-cheap catalyst may lower fuel costs for H_2-powered cars

'Green' process can run on sunlight

By Neal Singer

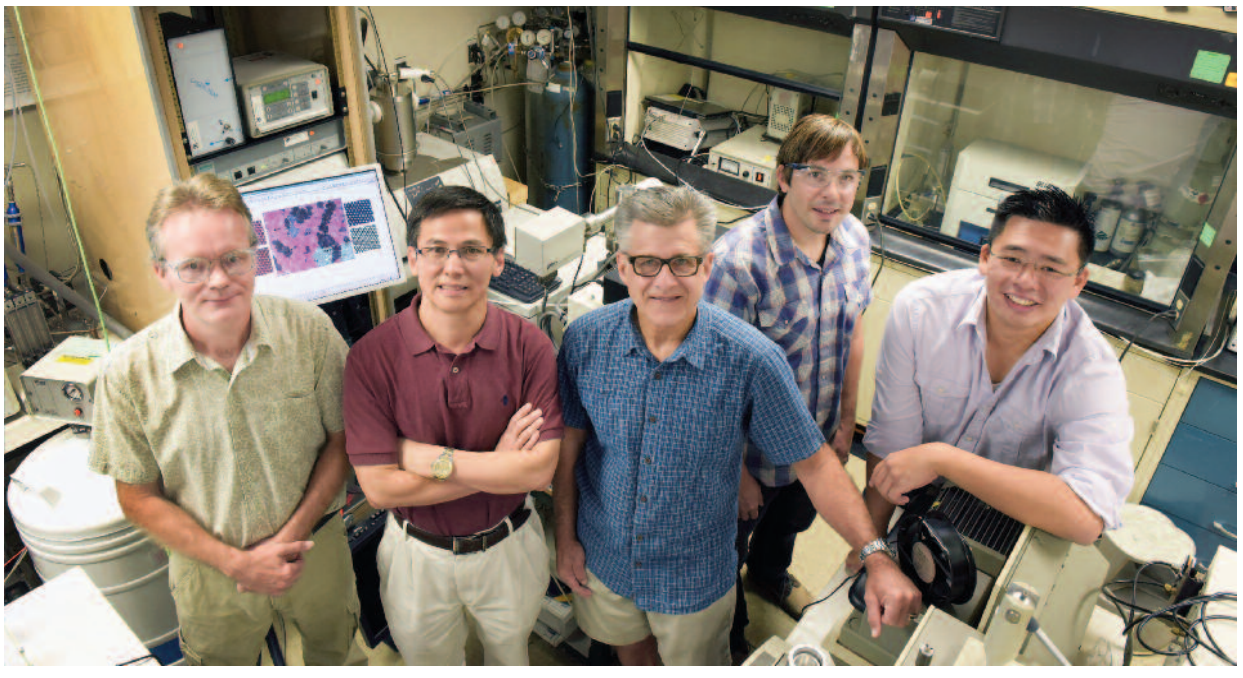
Hydrogen-powered cars don't pass carbon into the atmosphere. Unlike gasoline, which does, the combustion of hydrogen with oxygen produces an exhaust of only water. But hydrogen costs more.

So Sandia researchers, seeking to make hydrogen a less expensive fuel, have begun upgrading a plentiful catalyst nearly as cheap as dirt — molybdenum disulfide, "molly" for short — to stand in for platinum, a rare element with the moonlike price of approximately $900 an ounce.

Sandia-induced changes are taking the less-than-$2 an ounce molly from a welterweight outsider in the energy-catalyst field — put crudely, a lazy bum that never amounted to much — to a possible contender with the heavyweight champ.

And the catalyst's action can be triggered by sunlight, a feature which eventually may provide users an off-the-grid means of securing hydrogen fuel.

A catalyst is necessary to free hydrogen from compounds.



SANDIA RESEARCHERS, from right, Stan Chou, Bryan Kaehr, Jeff Brinker, Ping Lu, and Eric Coker, gather in a lab where improvements on the catalyst molybdenum disulfide, better known as molly, were achieved. (Photo by Randy Montoya)

Boosting hydrogen production

The improved catalyst, reported in Oct. 7 *Nature Communications*, has already released four times the amount of hydrogen ever produced by molly from water, and to Sandia postdoctoral fellow and lead author Stan Chou (1815), this is just the beginning: "We should get far more output as we learn to better integrate molly with, for example, fuel cell systems," he says.

In Stan's measured words, "The idea was to understand the changes in the molecular structure of molybdenum disulfide (MoS_2), so that it can be a better catalyst for hydrogen production: closer to platinum in efficiency, but earth-abundant and cheap. We did this by investigating the structural transformations of MoS_2 at the atomic scale, so that all of the materials parts that were 'dead' can now work to make H_2 [hydrogen]."

Why were the parts "dead," one might ask?

The rind of an orange

Visualize an orange slice where only the rind of the orange is useful; the rest — the edible bulk of the orange — must be thrown away. Molly exists as a stack of flat nanostructures, like a pile of orange slices. These layers are not molecularly bolted together like a metal but instead are loose enough to slide over one another — a kind of grease, similar to the structure of graphene, and with huge internal surface areas.

But here's the rub: While the edges of these nanostructures match platinum in their ability to catalyze hydrogen, the relative immense surface area of their sliding interiors are useless because their molecular arrangements are differ-

(Continued on page 4)

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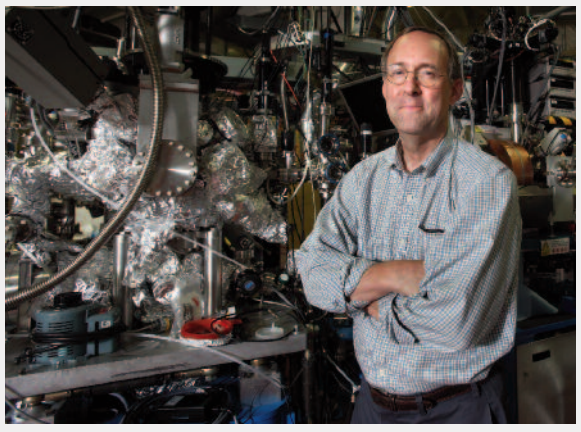
Taking on H_2 storage challenge

By Patti Koning



SANDIA CHEMIST Mark Allendorf, shown here at Berkeley Lab's Advanced Light Source facility, is leading the Hydrogen Materials-Advanced Research Consortium (HyMARC) to advance solid-state materials for onboard hydrogen storage. (Photo by Dino Vournas)

Sandia will lead a new tri-lab consortium to address unsolved scientific challenges in the development of viable solid-state materials for storage of hydrogen onboard vehicles. Better onboard hydrogen storage could lead to more reliable and economic hydrogen fuel cell vehicles.

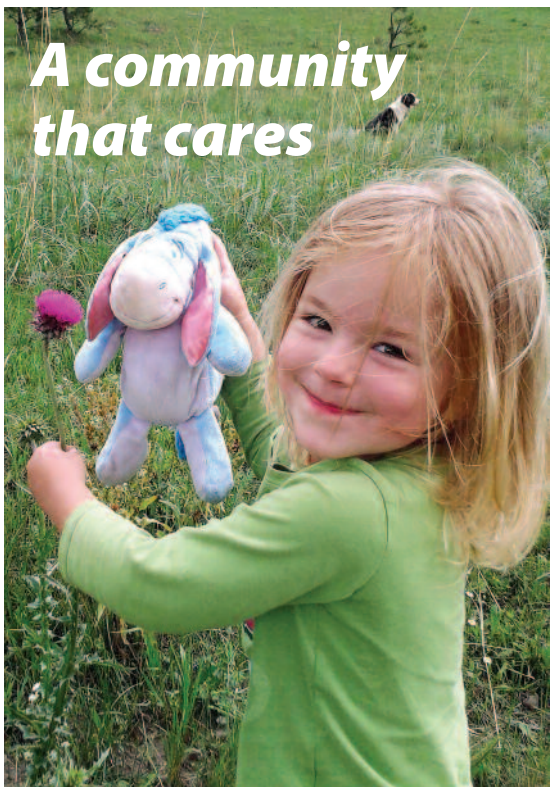
"Storing hydrogen on board vehicles is a critical enabling technology for creating hydrogen-fueled transportation systems that can reduce oil dependency and mitigate the long-term effects of burning fossil fuels on climate change," says Sandia chemist Mark Allendorf, the consortium's director.

Called the Hydrogen Materials – Advanced Research Consortium (HyMARC), the program is funded by DOE's Fuel Cell Technologies Office in the Office of Energy Efficiency and Renewable Energy at $3 million per year for three years, with the possibility of renewal. In addition to Sandia, the core team includes Lawrence Livermore and Lawrence Berkeley national laboratories.

> *"Hydrogen, as a transportation fuel, has great potential to provide highly efficient power with nearly zero emissions. Storage materials are the limiting factor right now."*
>
> — Sandia chemist Mark Allendorf

The consortium will address the gaps in solid-state hydrogen storage by leveraging recent advances in predictive multiscale modeling, high-resolution in situ characterization and material synthesis. Past efforts, which synthesized and characterized hundreds of materials for

(Continued on page 3)



2015 ECP campaign continues through Oct. 23

EMILY ROBINSON, the 5-year-old daughter of Charles Robinson (6112), is battling a rare cancer — but not alone. The family has received priceless help from support agencies and dozens of Sandia colleagues. Charles is one of the faces of this year's Employee Caring Program, which raises funds for the United Way of Central New Mexico. The campaign kicked off Oct. 5 with an extraordinary turnout. Read Emily's story and catch up on the campaign on **page 8.**

Distinguished alumna

Carol Adkins, director of Energy Technologies and System Solutions Center 6100, has been named a distinguished engineering alumna of the University of New Mexico's School of Engineering. See story on **page 5.**

Inside . . .

That's that

If that's the smell of roasting green chiles in the air, it must be fall in New Mexico.

Every region of the country claims its own unique smells, some charming, some not so much, but if there's a more magical and evocative scent anywhere than the one that tickles our noses every autumn in the Land of Enchantment, it could only be the combination of roasting chiles *and* the smoke from a pinon fire wafting across Old Town Plaza in Albuquerque.

I read somewhere that aromas linger in our memory forever, that a distinctive smell can evoke long-forgotten memories of a time and place more effectively than visual, audible, or tactile clues.

According to an article in *Psychology Today*, smells uniquely work on your memories and emotions in specific anatomical ways. The article states:

"Incoming smells are first processed by the olfactory bulb, which starts inside the nose and runs along the bottom of the brain. The olfactory bulb has direct connections to two brain areas that are strongly implicated in emotion and memory: the amygdala and hippocampus. Interestingly, visual, auditory (sound), and tactile (touch) information do not pass through these brain areas. This may be why olfaction, more than any other sense, is so successful at triggering emotions and memories."

For Sandians, the smell of roasting green chiles evokes associations that are especially welcome — not only does it mean fall is here, it also means it's the beginning of a new fiscal year and the beginning of a new performance management cycle.

That distinctive smell tells us that after living most of the year in the world of matter-of-fact prose, we can once again exercise our creative side as we put together our annual performance management goals, which in my case have all too often represented the triumph of hope over experience.

* * *

If you're from New Mexico, you probably didn't bat an eye at the way I spelled "chile" above. For us, that's the correct spelling and we cringe when we see it spelled "chili." According to our *Lab News* stylebook, "chili" is only acceptable when talking about "Texas chili," and that's something we'd just as soon not talk about anyway, thank you very much.

The rest of the country doesn't agree with us, to their everlasting shame. According to the *Associated Press Style Guide*, which is the go-to source that news organizations across the US turn to to resolve word usage issues, "Chili, chilies refers generally to spicy peppers, as well as the meat- or sometimes bean-based dish. Exception is the Hatch chile produced in Hatch, New Mexico."

The bigtime referees of usage at AP ought to know better. They've been told in no uncertain terms that they're wrong. I know because it was my colleague Sue Holmes who did the telling.

Sue spent many years at the New Mexico bureau of the AP, where she enjoyed a distinguished career as one of the state's most respected reporters. She recounts the time she went to the mat for the New Mexico spelling, taking the matter all the way to the big, big bosses in New York.

The AP-sanctioned spelling of "chili," she told them is not only wrong but personally and professionally embarrassing to her and her fellow New Mexico reporters. People didn't actually stop her on the street and chide her for misspelling chile in New Mexico-datelined stories, but she says it felt like they did. When covering a town council meeting anywhere in the state, she could almost hear the whispers: "There's that reporter who spells it chili." For a New Mexican, that's about as low as it gets.

Anyhow, Sue finally having had enough, took the matter all the way to the final style arbiters in New York. "It's spelled 'chile,'" she told them categorically and with righteous indignation. Their response? "Well, if we spell it that way, our readers will confuse it with the country."

That was too much for Sue, who exclaimed, "Well they don't have that problem with Turkey!" as she slammed down the phone.

And with that, Sue went out and bought herself a big bowl of green chile stew for lunch. Made with Hatch green chile! With an "e."

See you next time.

— Bill Murphy (MS 1468, 505-845-0845, wtmurph@sandia.gov)

Dan Sinars elected APS Fellow for pulsed power work

By Neal Singer

Dan Sinars (1680) has been elected a Fellow of the American Physical Society through its Division of Plasma Physics.

DAN SINARS

The distinction is awarded to no more than 0.5 percent of the society's membership.

Dan's citation reads, "For scientific contributions and leadership in the development of innovative X-ray radiography and spectroscopy diagnostics for the study of z-pinch physics, inertial confinement fusion [ICF], and high energy density [HED] physics."

Says Dan, "This honor is due to the many opportunities I've been given while working at Sandia, and the strong mentorship I've received along the way."

Keith Matzen, director of Sandia's Pulsed Power Sciences Center (1600) and an APS Fellow himself, says, "Dan's selection is a tribute to his research and leadership. While his election is an individual honor, it is also recognition of the team of people who have supported Dan during his career, and constitutes a great honor for Dan, our center, and Sandia."

Influence will extend well beyond Sandia

Mike Campbell, deputy director of the University of Rochester's Laboratory for Laser Energetics and one of Dan's nominators, says, "Dan is an outstanding scientist and I believe his influence will extend beyond Sandia as he becomes a leader for the national ICF and HED physics program."

Former Sandia pulsed power center director Mark Herrmann, now facilities director at Lawrence Livermore National Laboratory's National Ignition Facility, wrote in his nominating letter:

"[Dan] has had a remarkable impact on the field of pulsed-power-driven HED science and ICF. Over the course of his career, Dan has developed and applied innovative new diagnostic techniques in the challenging environment of the Z facility, advancing his own research and enabling many teams to develop new insights. ... Dan has also been a leading experimentalist on the Z facility, acting as primary investigator on more than 150 experiments (almost one year's worth of facility time), significantly advancing our understanding of magnetically driven implosions. He also has been a prolific writer of high-impact journal articles with 25 first author publications, 117 total publications, and an h-index of 27. This is a remarkable accomplishment."

Dan is the 11th Sandian to be inducted as a Fellow from Sandia's Division of Plasma Physics. The most recent three are Steve Slutz (2014), Mark Herrmann (2012, now at LLNL), and Mike Cuneo (2007).

A certificate presentation will take place at the annual meeting of the American Physical Society's Division of Plasma Physics, Nov. 15-20 in Savannah, Georgia.

Retiree deaths

Donald Rohr (age 82)	Dec. 8, 2014
Florence Moore (100)	July 24
Mary Lafrenz (92)	July 26
Damacio Sandoval (90)	July 30
Robert Mottern (91)	July 30
Maxine Randall (95)	July 31
Charles Lowe (64)	Aug. 1
Mildred Griffo (73)	Aug. 3
Ricky Pierson (63)	Aug. 3
Alice Pierson (71)	Aug. 4
Odilia Silva (97)	Aug. 6
Donald Cox (93)	Aug. 11
Henry Mullin (84)	Aug. 12
William Harwood (93)	Aug. 19
Larry Lee Larsen (72)	Aug. 19
Raymond Fry (83)	Aug. 20
Charles Berglund (92)	Aug. 20
Neal Carpenter (91)	Aug. 24
Dollie Jo Oldham (92)	Aug. 26
Bruce Hawkinson (77)	Aug. 30
Peter Cook (87)	Sept. 1
Allan Sattler (83)	Sept. 3
Joseph Maestas (84)	Sept. 6
Barbara Forrest (77)	Sept. 7
Albert Joe Angel (92)	Sept. 8
John Hall (87)	Sept. 12
Clarence Rogers (85)	Sept. 16

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Sandia researchers win 'best paper' award from AIAA

Paper focuses on scramjet engines used for supersonic flight

By Michael Padilla

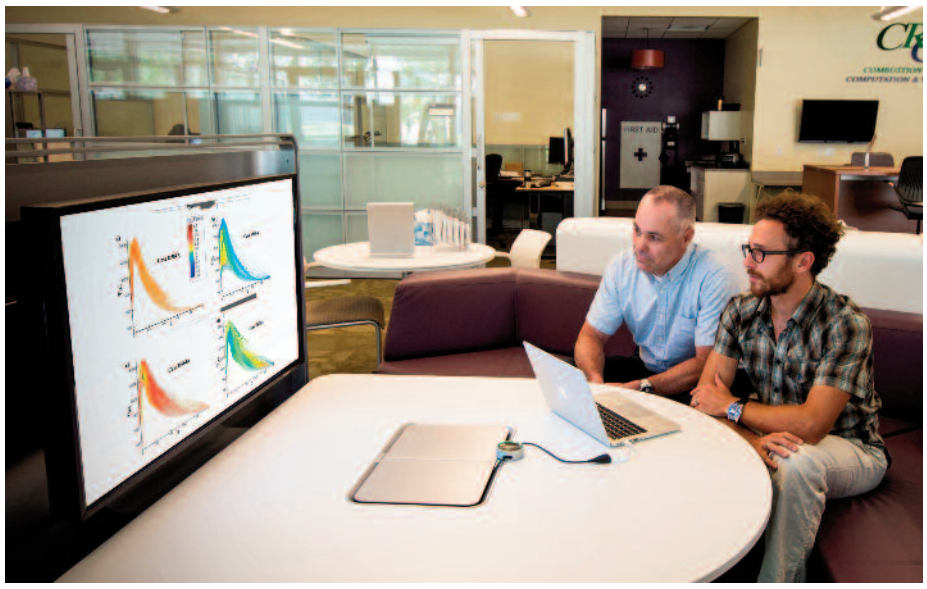
The American Institute of Aeronautics and Astronautics (AIAA) has recognized Sandia researchers Joe Oefelein and Guilhem Lacaze (both 8351) with a best paper award for their work on scramjet engine simulations.

The paper, "A Priori Analysis of Flamelet-Based Modeling for a Dual-Mode Scramjet Combustor," was a result of collaborations with Jesse Quinlan and James McDaniel from the University of Virginia and Tomasz Drozda from NASA's Langley Research Center. The award was presented by the AIAA High Speed Air Breathing Propulsion Technical Committee for accomplishment in the arts, sciences, and technology of air breathing propulsion systems.

The paper presents a detailed analysis of combustion regimes in a scramjet, an engine that operates at super- to hypersonic speed and will be used in the future for military, point-to-point transport and access-to-space applications.

"The results presented in the paper are an excellent example of how collaborative teams across institutions can combine their expertise to provide new knowledge supporting the development of predictive combustion models for these systems," says Joe.

The research described in the paper shows that both premixed and non-premixed combustion regimes contributed comparably to heat release in the studied case. The authors also demonstrated that using a typical "flamelet" modeling approach for the combustion process could significantly simplify the computational cost of such simulations.



SCRAMJET COMBUSTION REGIMES — Sandia researchers Joe Oefelein, left, and Guilhem Lacaze (both 8351) discuss their work on scramjet engine simulations. The American Institute of Aeronautics and Astronautics recently recognized their work with a best paper award. (Photo by Loren Stacks)

Choice of models is crucial

The choice of models to study combustion regimes in a scramjet is crucial as it directly impacts the global accuracy of simulations, the authors said. Currently, most combustion models are developed for a specific combustion regime, and don't work well across regimes. Thus, it is important to identify the broader range of regimes present. If the wrong model is used, numerical predictions will be incorrect, and efforts to develop and optimize the design of the scramjet system will go astray.

"Because of the extreme velocities, experiments are rare and limited; that's why we do simulations of those systems to better understand how to optimize them," says Guilhem. "To perform those simulations we need to use models to accurately represent the flame, and our paper shows which approach is the most relevant and why."

The study will help define the best simulation techniques needed to optimize future scramjets. Improved numerical accuracy at lower cost should help designers explore the key design attributes required for breakthroughs in supersonic engines.

Works fits into philosophy of Combustion Research Facility

The work also has helped establish new funding for Sandia through an award from the Defense Advanced Research Projects Agency (DARPA) involving uncertainty quantification of scramjet combustion. "We anticipate many future collaborative activities with Jesse, Jim, and Tom," Joe says.

This work fits into the philosophy of Sandia's Combustion Research Facility where simulations complement experiments and bring key insights to improve real engines.

The AIAA is the largest aerospace professional society in the world, serving a diverse range of more than 30,000 individual members from 88 countries and 95 corporate members. AIAA's mission is to inspire and advance the future of aerospace for the benefit of humanity.

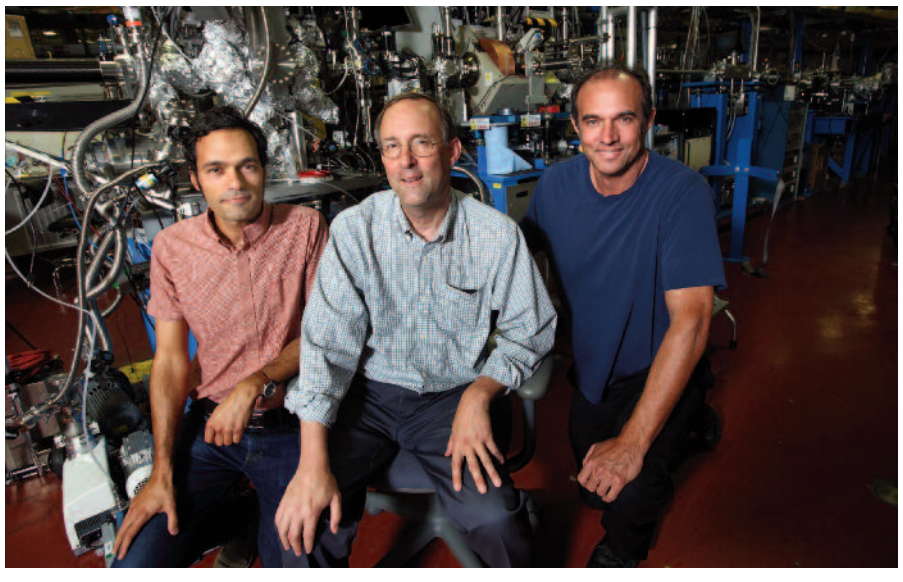
HyMARC

(Continued from page 1)

solid-state hydrogen storage, laid a solid foundation for current work, including the understanding of the kinetics and thermodynamics governing the physical properties of these types of storage methods.

Accelerating development of storage materials

"By focusing on the underlying properties and phenomena that limit the performance of storage materials, we will generate much-needed understanding that will accelerate the development of all types of advanced storage materials, including sorbents, metal hydrides, and liquid carriers," says Brandon Wood, who is leading the Lawrence Livermore team.



THE HYDROGEN MATERIALS-ADVANCED RESEARCH CONSORTIUM (HyMARC) will advance solid-state materials for onboard hydrogen storage. Mark Allendorf (8300), center, is leading HyMARC with significant contributions from Farid El Gabaly Marquez (8342, left) and Leonard Klebanoff (8367), all shown here at Berkeley Lab's Advanced Light Source. (Photo by Dino Vournas)

Sandia is an international leader in hydrogen materials science, exemplified by its role as the lead lab in DOE's Metal Hydride Center of Excellence, which ran from 2005-2010. The consortium will leverage the core capabilities of the three partners, primarily synthetic chemistry at Sandia, theory and modeling at Lawrence Livermore, and characterization at Berkeley Lab.

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The world-class supercomputing facilities at Lawrence Livermore and Sandia are key elements of the team's strategy to develop the enabling science for hydrogen solid storage technologies, along with advanced experimental tools available at Berkeley Lab's Advanced Light Source and Molecular Foundry facilities.

Current H_2 storage misses capacity, cost targets

In the past five years, fuel cell electric vehicles (FCEVs) have gone from a concept to reality. Automakers are starting to roll out commercial FCEVs and investments are being made to deploy hydrogen refueling infrastructure, especially in early markets such as California and the Northeast.

However, the commercial FCEV light-duty vehicles are designed for 700-bar compressed hydrogen storage on board the vehicle and hydrogen-refueling infrastructure is being deployed for compressed hydrogen refueling. Although compressed hydrogen provides a near-term pathway to commercialization, this storage method falls short of DOE targets for onboard hydrogen storage, particularly for volumetric hydrogen energy density and cost.

"Hydrogen, as a transportation fuel, has great potential to provide highly efficient power with nearly zero emissions," says Mark. "Storage materials are the limiting factor right now."

Thermodynamics, kinetics challenges

Although HyMARC will consider all types of hydrogen storage materials, two categories of solid-state materials, novel sorbents and high-density metal hydrides, are of particular interest. These materials have the potential to meet DOE targets to deliver hydrogen at the right pressure and energy density to power a hydrogen fuel cell vehicle.

A key challenge is the thermodynamics — the energy and conditions necessary to release hydrogen during vehicle operation. Sorbents, which soak up hydrogen in nanometer-scale pores, bind hydrogen too weakly. In contrast, metal hydrides, which store hydrogen in chemical bonds, have the opposite problem — they bind the hydrogen too strongly.

The kinetics, the rate at which a chemical process occurs, is also an issue for high-density metal hydrides. These materials undergo complicated reactions during hydrogen release and uptake that can involve transitions between liquid, solid, and gaseous phases. In some cases, the chemical reactions can form intermediates that trap hydrogen.

The consortium will explore several innovative ideas for solving these problems. The overall concept is to synthesize well-controlled materials to serve as model systems and develop experimental platforms for systematically probing key processes that limit performance.

Unprecedented spatial resolution

"Using these tools, we can study the hydrogen reactions with these materials using state-of-the-art techniques, such as those at Berkeley Lab's Advanced Light Source and Molecular Foundry, which can provide unprecedented spatial resolution of material composition and character in real time," says Jeff Urban, Berkeley Lab team lead.

The HyMARC strategy embodies the approach highlighted in the recent Materials Genome Initiative Strategic Plan for accelerated materials development. The focus is on developing a set of ready-to-use resources accessible to the entire hydrogen storage community.

"With our extensive knowledge base of hydrogen storage materials and new tools for characterization, modeling, and synthesizing materials, many of which were not available even five years ago, our goal is to develop codes, databases, synthetic protocols, and characterization tools," says Mark. "These resources will create an entirely new capability that will enable accelerated materials development to achieve thermodynamics and kinetics required to meet DOE targets."

Sandia experts tapped to assist Air Force remove excess nuclear waste from Alaska

Karli Massey

At a seismic array site located 60 miles north of the Arctic Circle, 10 radioisotope thermoelectric generators, or RTGs — once used as a power source by the Air Force Technical Applications Center (AFTAC) — awaited relocation to the Nevada National Security Site (NNSS).

Each of the thermoelectric generators contains from 1 to 3 pounds of a radioactive material called strontium-90. The material is about the size of a hockey puck and is securely contained in a vessel with an inner shield made of tungsten and a cast iron protective housing, weighing approximately 4,000 pounds.

Experts from Sandia's Waste Management and Pollution Prevention Dept. 4144 began working in collaboration with DOE and the US Air Force to dispose of the RTGs in 2001. While the project had been delayed for various reasons, the plan finally came together this July when the thermoelectric generators were transferred from the remote Arctic site to an underground disposal facility at NNSS.

By regulation, radioactive material determined to be excess must be moved to a facility with a mission, capability, and authorization to support long-term storage or recycling of the material. NNSS fits that bill.

Sandia filled the bill

In addition, to facilitate NNSS's waste acceptance criteria, there must be an entity with an approved Waste Certification Program. Sandia fits that bill.

"We provided the path for proper disposal," says Leroy Duran (4144), a Sandia environmental technical professional. Since 1997, Sandia has been shipping radioactive and mixed waste to NNSS, including a similar RTG in 2004. "Because of our proven successes, we were able to give the support the project needed," he adds.

SEVEN RADIOISOTOPE THERMOELECTRIC generators are lined up aboard an Air Force C-17 Globemaster III after being removed from Burnt Mountain, Alaska, and transported to Creech AFB, Nevada, July 24, 2015, in preparation for permanent disposal at the Nevada National Security Site. The RTGs, which contain nuclear material, were once used as a power source for the Air Force Technical Applications Center's seismic array, which monitors seismic activity in the region. The RTGs were replaced with a hybrid power source. (US Air Force photo by Susan A. Romano)

HOWARD SEELEY, left, Linda Gonzales, and Leroy Duran (all 4144), review a recent shipment of waste items bound for the Nevada National Security Site (NNSS). The three are members of Sandia's Waste Management and Pollution Prevention team, which this summer wrapped up a project with the United States Air Force to transfer excess nuclear materials from a site in Alaska to the NNSS. (Photo by Randy Montoya)

Others at Sandia tapped for their expertise included waste certification official Linda Gonzales, Weston Solutions contractor Howard Seeley for transportation, and manager Jeff Jarry (all 4144).

Once all the RTGs were recovered from the rugged terrain by Air Force team members and shuttled in Chinook helicopters to Eielson Air Force Base in Fairbanks, a C-17 Globemaster III was dispatched to the base for transport from Alaska to Creech Air Force Base in Nevada. There, the units were loaded onto ground vehicles and transported to NNSS for permanent burial.

Tundra fire raised concerns

"Upon arrival at NNSS, our team ensured 100-percent verification took place for each RTG," Leroy says.

The RTGs had been operated and maintained since 1973 by an AFTAC detachment based at Eielson, and were used because of their high reliability and low maintenance requirements to determine if regional seismic activity was caused by nuclear explosions or naturally occurring events. AFTAC's primary mission is to verify compliance with nuclear test ban treaties. A tundra fire near the Burnt Mountain site in 1992 raised concern among nearby inhabitants about the safety of using radioactive material as a power source at the station.

A proposal made to the Air Force by Patty Wagner, Sandia Site Office Manager in 2005, which led to the joint project. The Air Force, in coordination with multiple agencies and its mission partners, made the decision to remove the RTGs and relocate them to NNSS.

"This was, from start to finish, a 100-percent team effort," says Col. Jonathan VanNoord, on-site commander and AFTAC's director of operations. "To move the largest non-weapons grade nuclear material in the Air Force inventory was an incredibly intricate and complicated mission, requiring detailed planning and precise mission execution."

"It was our department's previous experience dispositioning RTGs that positioned us to be well-suited to help the Air Force with this project," says Jeff. "And, our staff members who were part of this project were keys to its success."

Dirt-cheap catalyst

(Continued from page 1)

ent from their edges. Because of this excess baggage, a commercial catalyst would require a huge amount of molly. The slender edges would work hard like Cinderella but the stepsister interiors would just hang out, doing nothing.

Stan, who studies two-dimensional materials and their properties, felt the Sandia intent should be to get these stepsisters jobs.

Empowering the center

"There are many ways to do this," says coauthor Bryan Kaehr (1815), "but the most scalable way is to separate the nanosheets in solution using lithium. With this method, as you pull the material apart, its molecular lattice changes into different forms; the end product, as it turns out, is catalytically active like the edge structure."

To determine what was happening, and the best way to make it happen, the Sandia team used computer simulations generated by coauthor Na Sai from the University of Texas at Austin that suggested which molecular changes to look for. The team also observed changes with the most advanced microscopes at Sandia, including the FEI Titan, an aberration-corrected transmission electron microscope able to view atoms normally too small to see.

"The extended test period made possible by the combined skills of our group allowed the reactions to be observed with the amount of detail needed," says Stan.

Lacking these tools, researchers at other labs had ended their tests before the reaction could complete itself, like a cook taking sugar and water off the stove before syrup is produced, resulting in a variety of conflicting intermediate results.

Ending confusion

"Why Stan's work is impactful is that there was so much confusion as to how this process works and what structures are actually formed," says Bryan. "He unambiguously showed that this desirable catalytic form is the end result of the completed reaction."

Says Sandia Fellow and University of New Mexico professor Jeff Brinker (1000), another paper author, "People want a non-platinum catalyst. Molly is dirt cheap and abundant. By making these relatively enormous surface areas catalytically active, Stan established an understanding of the structural relation of these two-dimensional materials that will determine how they will be used in the long run. You have to basically understand the material before you can move forward in changing industrial use."

Bryan cautions that what's been established is a fundamental proof of principle, not an industrial process. "Water splitting is a challenging reaction. It can be poisoned, stopping the molly reaction after some time period. Then you can restart it with acid. There are many intricacies to be worked out.

"But getting inexpensive molly to work this much more efficiently could drive hydrogen production costs way down."

Other paper authors were Ping Lu (1819), Eric Coker (1815), Sheng Liu (1765) and Ting Luk (1131), and Kateryna Artyushkova from the University of New Mexico.

The work was supported by DOE's Office of Science. Certain measurements were performed at the Sandia/Los Alamos-run Center for Integrated Nanotechnologies (CINT), and computing resources were provided by the National Energy Research Scientific Computing Center (NERSC) and the Texas Advanced Computing Center. CINT and NERSC are DOE Office of Science User Facilities.

'Green' inorganic photosynthesis

A molly catalyst is essentially a "green" technology: "We used sunlight for the experiment's motive power," says Stan Chou. The light is processed through a dye that harvests light. A photocatalytic process stores that energy in the chemical bonds of the liberated hydrogen molecule.

"It's similar to photosynthesis, but using inorganic materials rather than plants," says Stan. "Plants use enzymes powered by sunlight to break up water into hydrogen and oxygen in a delicate process. We're proposing a similar thing here, but in a more rapid reaction and with sturdier components."

"You could generate hydrogen and use it whenever," says Bryan Kaehr. "Hydrogen doesn't lose charge over time, or suffer from conversion inefficiencies as do batteries in a solar car."

'It ain't over till it's over'

Researcher Susan Rempe keeps her eye on the mountain

By Nancy Salem

The path to research success at Sandia may be meandering, but patience, perseverance, and flexibility will lead there in the end, says a scientist who is traveling that road.

"Even if you take the circuitous route, it can be valuable and rewarding," said Susan Rempe (8635), a theoretical chemist and computational biophysicist who joined Sandia in 2001. "But set goals and know which mountain you will go after. As Yogi Berra said, 'You've got to be very careful if you don't know where you're going, because you might not get there.'"

SUSAN REMPE told the audience at the quarterly SWAN Women's Lecture Series that she moved her career forward while raising four children who are now beginning their own professional journeys. "They are at the point I was at the beginning of my story," she said.

Susan, a distinguished member of the technical staff, spoke Sept. 29 at the quarterly SWAN Women's Lecture Series. The topic was "How to Survive and Thrive in Research at Sandia."

Susan said her path in work and life has been anything but direct. Growing up in Montana, she considered lots of options, from writing to being a physician, veterinarian, or astronaut. She was also serious about music and science.

She majored in premedical sciences, with concentrations in history and German literature at Columbia University in New York City, but ruled out medicine when she had to assist in brain surgery on a dog with no preparation. "It worked out fine, but the stakes were too high," she said. "It helped me decide what I didn't want to do."

P-chem 'the greatest thing ever'

Susan married and started a family, and she and her husband returned to Montana. She went back to school and earned a bachelor's degree in chemistry from the University of Montana and a master's and doctorate in physical chemistry from the University of Washington. "I had a great professor of physical chemistry," she said. "I worked in his lab, did research, and got published as an undergraduate. I thought p-chem was the greatest thing ever."

From that experience she learned that personal encouragement makes a difference. "It pointed me in the right direction," she said.

Susan planned to become a high school chemistry teacher until she ran into Sandia's Jim Martin (1124), who was recruiting at Washington. "I learned about the Labs. He told me Sandia is about science and solving fundamental problems, and about national security," she says. "I could do what I wanted science-wise. He said I could find colleagues with any expertise I needed. I found that very exciting."

Susan took a postdoc at Los Alamos National Laboratory and started working on essential proteins found in all living cells called ion channels that form nano-sized holes in membranes, and how they work. "I'm interested in biomolecular mechanisms and how structure relates to function," she said. "My question was how do you design a hole to control exactly what crosses a membrane?"

Network and be prepared

Susan dove into networking at conferences and publishing, and met people like physical chemist George Neilson of the United Kingdom, with whom she collaborated on the properties of hydrated ions; Rod MacKinnon, who read and commented on Susan's papers and later won a 2003 Nobel Prize in chemistry for his work on ion channels; and Arieh Warshel, who won a Nobel Prize in chemistry in 2014 for his computational studies of biological molecules. At one conference, Susan was asked to give an impromptu talk when a speaker canceled.

"I met the whole international ion channel community when I gave that talk," she said. "The lessons from that time were to network and to be prepared."

Susan joined Sandia and began the search for funding. For several years she worked on other peoples' projects, but nothing of her own. "Friends said if you have good ideas the money will follow. I thought I had some good ideas. But I couldn't get the funding," she said. "I was stuck. I felt I wasn't advancing my career."

She cultivated outside interests in music, at one point performing and recording with an Albuquerque symphony, and outdoor activities like back-country skiing and kayaking.

Finally, in 2004, Susan got funding. "What I learned was patience and persistence," she said.

Susan was among the first to join the Biosciences Center 8600. She continued going to conferences, making presentations, and talking about her ideas throughout the Labs. "Find out how your ideas can fit in. Educate the market," she said. "From communication, people came to me and provided funding," she said.

Choose good partners

When it came time to choose partners, Susan looked for "good, solid people I could rely on as collaborators, team players with good social skills."

"I found lots of good people to partner with," she said. "That's a huge key to whatever success I've had. Be choosy and pick good people. They can be the greatest thing that ever happened to you."

Susan has worked on three major projects at Sandia. One is a technology developed in partnership with the University of New Mexico that helps regulate carbon dioxide emissions from electricity-generating plants and other industrial activities. Her team's nano-stabilized enzymatic membranes for CO_2 capture provide a simpler, more energy-efficient approach than conventional methods. The work won a national Federal Laboratory Consortium (FLC) award and is a finalist in this year's R&D 100 competition.

Susan also led the development of biomimetic membranes, a revolutionary advance in the field of membrane technology for water filtration. The biomimetic membrane is inspired by the way the human body filters water and is designed for water purification using reverse osmosis, which removes impurities with applied pressure powered by electrical energy. The technology, also developed with UNM, received R&D 100 and Federal Laboratory Consortium awards.

Susan has worked with the MD Anderson Cancer Center in Houston on a problem involving an enzyme used to treat childhood leukemia that causes serious side effects. Susan's team showed how to potentially control the side effects by eliminating a side-reaction catalyzed by the enzyme. Susan and her colleagues are studying ways to use the enzyme in different cancer treatments.

She said researchers should be flexible or, as Yogi Berra said, "When you come to a fork in the road, take it."

"Recognize a good opportunity when it comes your way," she said. "You can't take every opportunity. You have to discriminate. Which will really move you forward in the direction you want to go?

"And if something isn't working out, change your goals or adapt and take a different route."

Susan closed with a final piece of advice from Yogi Berra: "It ain't over till it's over." In other words, don't call it quits until you're done. "For me, there are lots and lots of ideas for advancing my research and lots of important projects still to pursue," she said. "Keep moving forward and enjoy the journey. You can be successful here. Find your own personal balance, whatever it takes to keep you productive, healthy, and happy."

Carol Adkins named UNM Distinguished Alumna

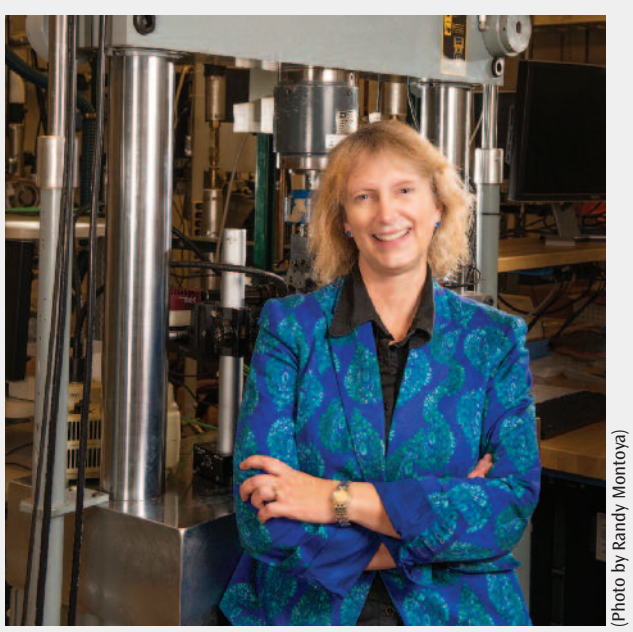
By Rebecca Brock

Carol Adkins, director of Sandia's Energy Technologies and System Solutions Center 6100, has been named a distinguished engineering alumna of the University of New Mexico's School of Engineering.

She was honored as one of seven distinguished alumni this year who have made a significant impact on UNM's School of Engineering. The award is the school's highest recognition bestowed on individuals for outstanding lifetime achievement. Carol and the other honorees were presented their awards at a ceremony Oct. 15 in Albuquerque.

Joseph Cecchi, dean of the UNM School of Engineering, says, "Carol has made extensive technical contributions in her career, for example, her work on supercritical carbon dioxide cleaning of wafers, for which she received a Department of Energy commercialization award. She has led many organizations and programs at Sandia, including the Materials Science and Engineering Center and the Materials Science Foundation. She has also been a leader outside of Sandia by serving on various National Academy boards and review panels. Her service to UNM as deputy campus executive and her dedication as chair of the advisory board to the department of chemical and biological engineering is also exemplary."

As deputy campus executive, Carol helped author the Sandia-UNM Strategic Alliance Memorandum of Understanding that was signed by both institutions in July.



(Photo by Randy Montoya)

CAROL ADKINS

"The Sandia-UNM Strategic Alliance agreement would not have happened without her thoughtful and energetic stewardship," Cecchi says.

Carol orchestrated the first joint recruitment and hire of a nationally recognized scientist and inventor, Fernando Garzon (1815), to both Sandia and UNM.

"I care a lot about UNM," Carol says. "It is the university in our community. For that reason, I think it is important to give back to it. It is to all of our benefit to make sure that we have a strong, vibrant university."

Carol grew up in Albuquerque and graduated from UNM's chemical and biological engineering department. She received her BS in chemical engineering from UNM and earned her doctorate in chemical engineering from the California Institute of Technology.

A love of engineering runs in the family. Carol's father, Orval Jones, is a mechanical engineer and a former EVP at Sandia. She says that she knew early on that she wanted to be an engineer because he served as a role model. Her husband, Douglas Adkins, is a mechanical engineer and a former Sandian, her daughter Emily is a chemical engineer, and her son Jeremy studies mechanical engineering at UNM. Her niece, Sarah Blair, who also studies chemical engineering at UNM, nominated her for the award.

The UNM Distinguished Alumni Award recognizes both professional accomplishments and outstanding community service. In her leadership role at Sandia, Carol is dedicated to supporting women in their careers by volunteering as a mentor for SWAN, Sandia's Women's Action Network.

The awards were last presented in 2007. Other Sandia recipients have included retired VP Heinz Schmitt and researcher Sandra Begay Campbell (6124).

Employee death

Jeanette Denaple was 'the heart and soul' of her team

Not every organization at Sandia, or anywhere, is fortunate enough to have that one special person who is the glue that holds the group together, that bonds them in ways that can't be broken. Physical Security Dept. 4238 was the happy exception that had such a person in Jeanette Denaple, whom manager Paul Keller describes as "the heart and soul of the group." Jeanette passed away Sept. 27 at age 53 after a heroic battle with cancer.

Jeanette provided administrative support for a team that included a senior manager and two level one managers. According to Paul, "The diverse security environment was a challenge each day and yet Jeanette managed to provide outstanding products and service in a warm and welcoming manner. As the Physical Security manager, I worked for her — yes, not a typo — for two-and-a-half years. Every day there was a smile, every day there was a hug and every day I learned something about becoming a better manager, friend, and human. From organizing 'mandatory' birthday parties to ad-hoc team celebrations, Jeanette helped focus this team on what was most important, the teaming."

Terri Lovato, senior manager in Security and Emergency Management Center 4200, recalls that in a recent conversation, Jeanette, who was struggling with the illness that eventually claimed her life, said she loved coming to work in Center 4200 and specifically in Bldg. 956.

Love and support from her work family

"She said she felt love and support from everyone," Terri remembers. "And she returned that love and support to each one of us. She loved her God, her family, and her work family."

Deborah Hovland (4229) says, "It's hard to put into words how much Jeanette meant to us. She was a part of our family. When her doctors were encouraging her to stay home, Jeanette refused. She liked coming to work and seeing her work family. It made her happy. She made us happy."

Everyone who worked with Jeanette agrees on a couple of things right across the board: She was incredibly good at what she did. And she was the nicest person you'd ever want to meet.

'Kind, giving, and loving'

"Jeanette was a key member of the team, always willing to roll up her sleeves and get right in the middle of things when we needed her help despite how she felt," says Tom Rodgers (4238). "Knowing what she was going through and watching her take on each day with that cheerful smile was an inspiration. I know I will miss seeing her, especially during the first part of the day when she usually made her 'good morning' rounds to see if anyone needed help. She is one of the sweetest and kindest people I've had the pleasure to work with here at Sandia."

Naomi Baros echoes Tom's sentiments. "Never have I met someone as kind, giving, and loving as Jeanette," Naomi says. "She was not just my co-worker, but a true friend. I miss her presence in my life tremendously. She will always and forever be on my mind and close to my heart. Heaven's door welcomed a new saint the morning Jeanette went to be with the Lord. I love you Jeanette and will see you again."

When Don Kaminski (4238) hired on at Sandia, Jeanette was his first contact. It couldn't have been a better way to start a new job. "I have never met a nicer lady," he observes. "She was always there to help when needed and was a delight to talk to. I will truly miss her. I hope she is in a better place."

Deborah drew inspiration from Jeanette's courage in the face of her final battle. "Even in her last days when she was in a great deal of pain, Jeanette always smiled," Deborah says, adding that "her faith gave her strength" to face each day's challenges.

"There are days when I can't believe I won't see her at her desk with a radiant smile and kind words for everyone who was blessed enough to pass her way," Deborah says. "She was a truly amazing person."

Teri Walker (4229) remembers how Jeanette was there for her when she had a medical scare.

"Last July I was told that I could possibly have breast cancer," Teri says. "I was in shock. Jeanette walked me through this scary time. She told me what to expect and was always there with a hug and an encouraging word. Jeanette was a very caring and loving person."

The first words that come to Jeanne Oselio's mind when she thinks of Jeanette are "sweet, gracious, and unselfish!"

"What an honor to speak of her," Jeanne (4221) says. "She made everyone smile and her display of faith, strength, and endurance will encourage me daily. I could go on and on describing what a beautiful person she is. She will be greatly missed."

'Have a groovy day!'

Annie Marquez (4200) was moved and inspired by Jeanette's example. "Her strength through everything she had to endure was so admirable. She really helped many of us put things into perspective. One of my favorite phrases she would say was 'Have a groovy day!' That always made me smile."

Jeanette is survived by her husband of 29 years, Sandian John Denaple (2999), and by her daughter, Shealynn Denaple. She is also survived by her sister, her stepmother, three stepsisters, and many nieces and nephews. Jeanette was born in Clovis, New Mexico, and had been at Sandia for 12 years. Away from work, Jeanette enjoyed travel, reading, flowers, and volunteering for various community service organizations.

Tom Rodgers speaks for everyone in Jeanette's circle of friends and colleagues at Sandia when he says, "I knew this time would eventually come but it doesn't make it any easier."

— Bill Murphy

ProForce marks 65 years protecting Sandia resources, facilities, people

HAPPY 65TH, PROFORCE — Current and former members of the Lab's Protective Force gathered to reflect on and recognize the contributions ProForce has made to securing Sandia's resources, facilities, and people. Over the past 65 years, the force has changed in size and structure but its mission has remained the same: To ensure the protection of accountable nuclear material, classified matter, and other Safeguards and Security interests from theft, espionage, and acts that may cause unacceptable adverse effects on national security or the health and safety of DOE and contractor employees, the public, or the environment. In the photo at top left, retired ProForce members Celso Montaño, left, Mario Garcia, Jim Armijo, and Ruben Garcia look on as Harold Garcia points out some highlights in photos from ProForce's early days. At top right, Jim Armijo, a retired member of ProForce, and son Lawrence Armijo (4237-4) show pride in their collective decades of service to Sandia and the nation. (Photos by Randy Montoya)

SANDIA CLASSIFIED ADS

MISCELLANEOUS

VIZIO COMPUTER MONITOR, 26" with speakers built-in $100; loads of earlier to mid-90s football cards. Walkington, 505-235-1025.

HOCKEY GEAR, candle-making equipment, $100 ea.; ParrotAR 1.0 Quadcopter; beginner electric guitar kit, $50 ea. Milton, 400-9510.

IRONMAN PREMIER INVERSION TABLE, with memory foam, excellent condition, hardly used. New, $325, asking $125. March, 379-9484.

FOUR PATIO CHAIRS, light brown metal frame. Black back and seat, 39"x22". Like new, $40. Dockerty, 828-0745.

YORKSHIRE TERRIER MIXED PUPPIES, $500; 8 weeks old; 2 females and 2 males; parents on site. Garrett, 832-439-5638.

BOOKCASES, cherry wood, 36"h x 32"w x 12"d, two at $80 each; antique server cart $80, pics available, email r_allman@q.com. Allman, 299-2438.

GONE CHRISTMAS WEEK? Sandians visiting from Livermore available to house sit, including pet care in Albuquerque, Dec. 26-Jan. 2. Sullivan 925-667-8494.

DINNING ROOM TABLE, heirloom quality, light color wood, and 6 chairs, 2 with armrests, excellent condition. $925. Sandoval, 269-6650.

BAR STOOLS, 3, solid wood, excellent condition, $20 each; round end table, on pedestal, $50. Drebing, 293-3335.

CHERRY WOOD BUFFET, Ethan Allen, $950; casual dining table, oblong, 2 leaves & 6 chairs. $550, Chirigos, 980-0319.

CHINA CABINET, Thompsonville; double pedestal dining room table, with 6 chairs. Excellent condition, $700. Pelletier, 884-3726.

CABINET, all steel, 60"w x 24"d x 32"h, w/5 slots, $50; TV cabinet, large heavy-duty, $50; acetylene/oxygen cutting/welding torch, $275 OBO. Herrera, 883-5035.

LG DRYER, model DLEX3470V, 7.3 cu.ft., electric with steam, in graphite steel, like new, $650. Graham, 293-7302.

COMMUNICATION ARTS, back issues, 2009-2013. $1 each. Stubblefield, 263-3468.

POPEJOY TICKETS, "A CHRISTMAS STORY" musical, 11/21 8 pm, left center balcony. Two tickets, $75/pair. Busse, 323-2812.

TRANSPORTATION

'13 SUBARU WRX STI, sedan white, 25K miles, 25 mpg, can email photos, awesome car. $23k obo. Shelton, 331-8987.

'96 SATURN L1, 5 spd., 91K, new stereo & radiator, fair condition, runs, 1 owner. $900 obo. Bristol, 505-400-3421.

'12 SCION xB, 5-spd. manual, 25K, garaged, regular maintenance, 4 cyl., peppy daily driver. Extremely reliable. $12,750. Wolfgang, 414-1483.

'71 VW BUG, excellent condition, new paint, tires, and interior. Runs great. $3,500. Rohl, 505-234-5415.

'99 MERCURY MOUNTAINEER, AWD, 247K miles, good condition, sunroof, regular oil changes. $1,500. Grover, 435-757-8789.

'08 DODGE GRAND CARAVAN SXT, 112K miles, white, very nice condition, $7,500. Neidigk, 822-0203.

How to submit classified ads

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

Submit by one of these methods:

- **EMAIL: Michelle Fleming (classads@sandia.gov)**
- **FAX: 844-0645**
- **MAIL: MS 1468 (Dept. 3651)**
- **INTERNAL WEB: On internal web homepage, click on News Center, then on *Lab News* link, and then on the very top of *Lab News* homepage "Submit a Classified Ad."**

If you have questions, call Michelle at 844-4902.

Because of space constraints, ads will be printed on a first-come basis.

Ad rules

1. Limit 18 words, including last name and home phone (If you include a web or e-mail address, it will count as two or three words, depending on length of the address.)
2. Include organization and full name with the 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. We will not run the same ad 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, retired Sandians, and DOE employees.
10. Housing listed for sale is available without regard to race, creed, color, or national origin.
11. Work Wanted ads limited to student-aged children of employees.
12. We reserve the right not to publish any ad that may be considered offensive or in bad taste.

'14 FIAT 500L, excellent condition, 6,600 miles, 4 cyl., mocha-latte color, call, leave msg. Will send pictures. Lobard-Thomas, 505-263-5263.

'08 MITSUBISHI LANCER EVOLUTION, GSR, 5-spd, turbo AWD, only 44K miles, 1 owner, clean, pics: http://evoxabq.blogspot.com, $22,800. Chang, 505-385-6158.

LEER TRUCK CAB, silver, 4 ft. by 5 ft., side windows, top rack, $300. Thomas, 822-1923.

RECREATIONAL

'07 TRIUMPH ROCKET 3 CLASSIC, 12,800 miles, blue/white, several extras, new tires. Excellent condition. $8,000. Graveline, 505-294-6411.

BRUNSWICK SORRENTO POOL TABLE, lots of high-end accessories, always covered, excellent condition. Asking $3,500. Olson, 228-2165.

SEASWIRL 17' BOWRIDER boat, equipped for remote use, many extras, with 88 hp Johnson outboard motor, $5000. Barnard, 284-4605.

REAL ESTATE

7-BDR. EAST-MOUNTAIN HOME, perfect for home schooling, ranch-style, walk-out-basement, home-theater, 2-acres, 4,992 sq. ft., 24 min. to Sandia. $410,000, MLS#842530. Weaver, 505-480-9951.

4-BDR. HOME, 3 baths, 2,200-sq. ft., updates, large backyard, ample storage, great neighborhood, near Wyoming and Candelaria, $268,000, MLS#850533. Billau, 440-5374.

3-BDR HOME, 1813 sq. ft., 2-1/2 bath, 4 Hills North, 11 min. to Eubank gate, cul-de-sac, open space access, many upgrades, $270,000. Mirabal, 270-0074.

8 ACRES, near Lake of the Ozarks, Warsaw, Mo. McCormick, 505-869-3123.

SANDIA PARK 2 or 4 acre lots, build-to-suit available, includes utilities, new fence+road, owner financed $600/month. Mihalik, 281-1306.

WANTED

ACOUSTIC ELECTRIC GUITAR and/or AMPLIFIER, aspiring 18 yr. old musician in need of his first acoustic electric. Clark 505-401-5610.

PING PONG TABLE. Walkington, 505-235-1025.

LOOKING FOR A GOOD HOME for a pure-bred, 3 year old intact Alaskan Klee Kai. Hammer, 505-314-6043.

FALCON OR RAPTOR, for National Museum of Nuclear Science & History. nuclearmuseum.org. Hanks, 977-3372.

URGENT: Free to good home; ~8-year-old, female, spayed, solid-white, short-haired domestic cat. Owner allergies, can't keep. Williams, 379-8994.

AARP TAX-AIDE VOLUNTEERS needed to assist taxpayers at senior centers. More info: call Lea Long, 296-2590 or go to www.aarp.org/taxaide. Long, 296-2590.

WORK WANTED

NEED A NANNY? I am 18, great with kids, call Jasmine Perry. Robison, 505-917-6708.

Mileposts

New Mexico photos by Michelle Fleming

Ann Campbell
30 5900

Jackie Kerby Moore
30 1933

Richard Simpson
30 1384

Patricia Tempel
30 2622

Recent Retirees

Jane Farris
25 10520

Becky Wilcox
30 10656

Jan Williams
30 281

Karen Armstrong
25 3658

Cynthia Blain
25 5339

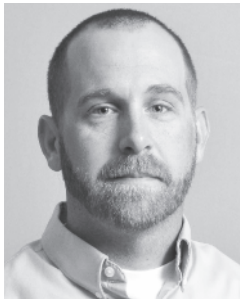
Melissa Miller
25 10264

Judy Cardenas
20 9543

Mark Ladd
20 6815

Sheila Pounds
20 10678

Scott Sanderville
20 6621



Ryan Halle
15 5335

LabNews locations

Lab News is available in news racks at 24 locations throughout the Labs. Delivery to mail drops has been discontinued. A digital version of *Lab News* continues to be available on Tech Web as well as on Sandia.gov.

***Lab News* Rack Locations:**

1. Bldg. 802, elevator lobby
2. Bldg. 810, east lobby
3. Bldg. 822, south entrance
4. Bldg. 858 EL, lobby
5. Bldg. 880, Aisle D, north lobby
6. Bldg. 892, lobby
7. Bldg. 894, east entrance, lobby
8. Bldg. 898, east lobby
9. Bldg. 887, lobby
10. Bldg. 878, lobby
11. Bldg. 836, lobby
12. Bldg. 831/832 north lobby
13. Bldg. 861, Cafeteria lobby
14. Bldg. 870, lobby
15. Bldg. 701, lobby
16. IPOC, lobby
17. CGSC, lobby
18. CRSI, lobby
19. M.O. 308, lobby
20. Bldg. 960, lobby
21. Bldg. 962 (TA III), lobby
22. Bldg. 6585 (TA V), lobby
23. Bldg. 905, lobby
24. 800(A), outside of Vicki's

ECP kickoff draws big, exuberant crowd — and more for the Community Fund

By Nancy Salem

Ted Kreifels heard it as he crossed the parking lot to the Steve Schiff Auditorium. "There was a real, loud buzz from the group," he says. "It was indicative of the excitement we're feeling and hearing from Sandia itself as the campaign lifts off."

Ted, manager of System Surety Engineering III Dept. 424 and campaign chairman of this year's Employee Caring Program (ECP), says the agency fair Oct. 5 that launched the 2015 ECP was a huge success. Hundreds of people came out to meet representatives of nonprofit organizations where Sandia employees volunteer.

So many participated that Sandia, which generally donates up to $5,000 to the United Way of Central New Mexico (UWCNM) Community Fund on behalf of the attendees, doubled that amount to $10,000. "People voted with their feet and with their hearts to contribute to the Community Fund, which supports a range of nonprofit agencies and programs that help people in Bernalillo, Sandoval, Torrance, and Valencia counties," Ted says. "The turnout showed our employees are really behind this and that senior leadership is behind the employees."

The ECP campaign, which raises funds for UWCNM, runs through Oct. 23. This year's goals are:

- Increase overall participation to 78 percent.
- Increase new employee participation to 70 percent.

Fundraising events included book fairs Oct. 6-8 at the Thunderbird Cafeteria and Oct. 13-15 at the Steve Schiff Auditorium. Another is scheduled for Oct. 20-22 in the IPOC second floor break room from 10 a.m.-3 p.m.

Since the ECP was launched in 1957, Sandia has been the single largest supporter of the UWCNM annual campaign. Sandia staff and retirees have given more than $88 million to hundreds of agencies serving tens of thousands of people needing help.

TED KREIFELS, campaign chairman of the 2015 Employee Caring Program, talks to Carol Eiffert (3600), center, and Melissa Freeman, executive director of the Southwest Chapter of Healing the Children, at the agency fair that launched the ECP on Oct. 5. Healing the Children provides health care to children in New Mexico and around the world who lack access to services or financial resources.

Ted says his message to Sandia is to get connected to the campaign. "Sign on to the website, make your contribution, and get involved," he says. "People are doing all kinds of cool things. One group raised awareness with a managers' football-kicking contest."

He says new employees are especially important to the campaign. "People who have been here under five years are a big part of Sandia's changing identity," he says. "We know that employees who give early in their career continue to give throughout their career. They show how much they care being part of a team and connected to the community."

Pam Catanach (3652), the Community Involvement specialist who coordinates the ECP, says the dozens of ECP representatives throughout the Labs are doing an outstanding job this year reaching out to the workforce. "The campaign revolves around real people," she says. "The reps are getting Sandians to connect with other Sandians."

Donations can be directed to any nonprofit worldwide or to the Community Fund. All UWCNM administrative expenses are covered by companies that direct their gifts to the Corporate Cornerstone program, so 100 percent of employee donations go to the chosen nonprofits. Employees can make changes to their donation online until Oct. 23 and later in the year using a paper form.

Ted says the song "Let it Be Me" by Ray LaMontagne captures the ECP's spirit of giving and helping others. "When you're down and you need a friend, let it be me. The song highlights singular acts of charity," he says. "At Sandia we make that choice. At some point in your life you make a choice between thinking about yourself or thinking about the well-being of others. Sometimes you give a little and open a door, or sometimes you take a big step. Sometimes it comes from adversity you've experienced and sometimes from a place of joy and love. Everything in your life leads to that point.

"When you make the choice, you change, too, by giving of yourself. You rise to a whole new level and become a more selfless person through charity."

A family of thousands

Help came from all sides when a Sandian's daughter fell ill

By Nancy Salem

Three years ago, Charles Robinson's 6-month-old daughter was hospitalized for febrile seizures. Charles (6112) and his wife Myra were scared and adrift in a place they didn't fully understand. Help came from Child Life, an organization at the University of New Mexico Children's Hospital that prepares kids and their parents for medical experiences.

"They explained procedures and gave us coping mechanisms to ease stress," Charles says. "They maintain a huge playroom, separate from treatment facilities, where kids can be kids. They encourage play to take the edge off the discomfort."

EMILY'S COURAGE through monoclonal antibody immunotherapy and chemotherapy was inspiring. During the treatment she always had a smile for visitors.

Charles was so impressed with Child Life, a national program that operates out of most major medical centers, he designated it for a contribution through Sandia's Employee Caring Program (ECP), which supports the United Way of Central New Mexico.

Child Life became an even bigger part of the Robinsons' lives when their older daughter Emily was diagnosed in July 2014, at age 4, with neuroblastoma, a rare cancer of the sympathetic nervous system. "The treatments — high-dose chemotherapy and immunotherapy — are very painful, horrific," Charles says. "Child Life helps kids deal with the pain. It was an integral part of Emily's cancer treatment and recovery."

Another organization the Robinsons turned to was the Children's Cancer Fund of New Mexico, which helps families cope with the daily emotional, financial, and educational issues around living with and fighting cancer. The group provides counseling to children and college scholarships to survivors. "Through it all, one of the most important things was Emily being able to talk about her disease, the pain, and treatment," Charles says. "She just needed to talk to someone with experience with children who have gone through this."

The family also received tremendous support from people at Sandia. Senior manager Charles Hanley (6110) donated to a fund to help cover medical bills, Bruce King and Josh Stein (both 6112) visited Emily in the hospital, and Brett Eller (5332) gave valuable advice.

Amanda Spinney (1931) went to the hospital and read to Emily. "I didn't even know Amanda," Charles says. "She heard about us and came to help."

John Bowers (2225), who Charles met in the Dallas airport, and Melissa Sisneros (2955) collected donations. Other support came from John Lott (1342), Donna Baldonado (6916), Terrence Bock (1674), Dan Riley (6112), Melanie Atterbom (10629), Catherine Rutledge (1631), and managers Ross Guttromson (6113) and Abraham Ellis (6112). Charles's entire department made donations.

"I know I'm leaving out a lot of people," Charles says. "So many Sandians stepped up to help us."

THE MAKE-A-WISH FOUNDATION sent Emily Robinson, second from the right, to Disneyland with her parents Charles and Myra and sister Evelyn. "It was a magical trip," Charles says. "Emily couldn't have had a better time."

An important visit came from Joy Giron (6612), whose 18-year-old daughter survived neuroblastoma. "Myra and I needed that visit like oxygen," Charles says. "Survival rates for this kind of cancer are extremely low. We didn't know any survivors."

Charles says he continues to donate through the ECP to agencies that have helped Emily. "It's easy to designate an organization," he says. "I appreciate that."

Emily's cancer was in remission for five months but recently returned. "We don't know what the future holds," Charles says. "Things are tough for us right now. But I know without the support of Child Life, the Children's Cancer Fund, and our friends at Sandia, it would be much more difficult. Sandia is a family 10,000 strong."

I give because . . .

JOY GIRON

"I have always had a soft spot for people who are less fortunate than me. When I see a homeless person on the street, I don't care if it's a penny or a dime, I always help. It makes me happy that I have passed this on to my children, but I had never known so much generosity from strangers, family, and friends until I went through a difficult time when my daughter was diagnosed with cancer in 2001. It is because of the generosity showed to me by so many people that I want to give back to our community, and that is why I give to the United Way Community Fund."

— Joy Giron (6612)