

# Magnetically stimulated flow patterns offer strategy for heat transfer issues

Sue Major Holmes

Jim Martin and Kyle Solis have what Jim calls “a devil of a problem.”

They’ve discovered how to harness magnetic fields to create vigorous, organized fluid flows in particle suspensions. The magnetically stimulated flows offer an alternative for when heat transfer is difficult

*“Just because an effect is easy to generate doesn’t mean that it’s going to be easy to understand.”*

because they overcome natural convection limits. Jim and Kyle even demonstrated a potential application: cooling overheated computers with a heat transfer valve they created.

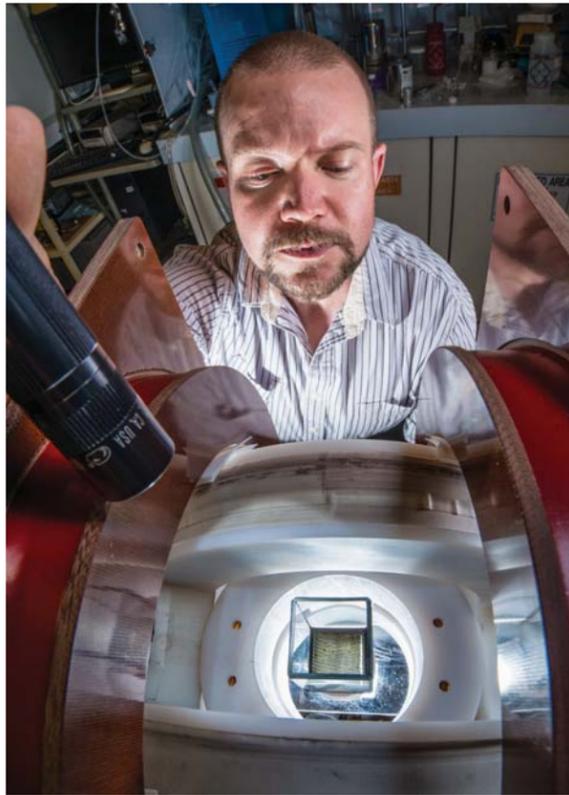
But Jim and Kyle (both 1114) aren’t sure how and why the magnetically stimulated flow patterns occur,

although clearly it’s a complex physical behavior stemming from fundamental phenomenon.

“Just because an effect is easy to generate doesn’t mean that it’s going to be easy to understand,” Jim says. It’s also a tough problem to simulate because of the huge scale of the flow patterns compared to the tiny particle size, he says.

He and Kyle, a Student Intern Program doctoral researcher, have been generating flow patterns in magnetic platelet suspensions for about three years. They published a paper in 2010 in the American Institute of Physics’ *Applied Physics Letters* and another paper, which the editor selected as a research highlight, in February 2012 in the Royal Society of Chemistry’s journal *Soft Matter*, outlining flow patterns and how they created them. Jim has been invited to lead a topical review, called “Driving self-assembly and emergent dynamics in colloidal suspensions by time-dependent magnetic fields,” for the international journal *Reports on Progress in Physics* in November.

The research, funded by the DOE’s Office of Science, is concentrating on extending



DOCTORAL RESEARCHER Kyle Solis shines a light on an experiment in which he and Jim Martin (both 1114) make fluids move by adding a small amount of magnetic platelets to a liquid and applying modest, uniform AC magnetic fields. They say the magnetically stimulated flows they’ve discovered offer an alternative for when heat transfer is difficult because they overcome natural convection limits. (Photo by Randy Montoya)

fundamental understanding of novel heat transport in liquids, evaluating the effectiveness of various flows, and exploring what happens when researchers modify parameters of various experiments.

Jim and Kyle found the patterns occur only for magnetic particles shaped like plates, essentially magnetic confetti. Spherical and rod-like particles don’t produce the effects.

## Making fluid flow like convection

The goal is making fluid flow on its own, as in thermal convection. Convection is familiar to everyone who boils water or marvels at birds and gliders riding on thermals. However, it doesn’t work in outer space where there’s no gravity or in a liquid that’s beneath rather than above a hot object. The modern world forces convection by using pumps and fans with associated seals and valves in contact with the particular fluid, but sooner or later those moving parts corrode and break down.

Jim and Kyle make fluids move by adding a small amount of magnetic platelets to a liquid and applying modest, uniform AC magnetic fields. The phenomenon, which they’ve termed isothermal magnetic advection, has shown very good results for noncontact heat transfer and would be useful for cooling microsystems or cooling in microgravity or for transferring heat in circumstances that prevent convection, they say.

“We don’t have a lot of understanding of why these things occur, but we can determine what the effects are and how well it works,” Jim says. Ongoing experiments, coupled with modeling, are advancing the understanding of the phenomena.

Because a uniform magnetic field can be easily scaled to any size, Jim says, the technology could be practical for problems ranging from microfluidics to reactor cooling.

The researchers discovered various flow patterns they call advection lattices. “The patterns are pretty remarkable because it’s not easy to understand why the fluid should

flow in the first place because a uniform magnetic field does not exert a force on a particle, just a torque,” Jim says.

(Continued on page 4)

## Sandia LabNews

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### POWWOW KICKS OFF HERITAGE MONTH

Sandia’s American Indian Outreach Committee (AIOC) is planning several events to celebrate Native American Heritage Month in November.

- An opening ceremonial and powwow will be held Monday, Nov. 4, 11:30 a.m.-12:30 p.m., in the Thunderbird Cafeteria in partnership with Sodexo. The drum group Red Road Crossing and the Church Family Dancers will perform. “There will be surprises lined up, so come dance with us,” says Yvonne Batchelor (2992), chairwoman of heritage month activities.
- On Wednesday, Nov. 13, Diversity Cinema will present “Games of the North” from 11:30 a.m.-12:30 p.m. in the Bldg. 810 CNSAC Auditorium.
- Leigh Cleveland will demonstrate Navajo rug weaving on Monday, Nov. 18, 11:30 a.m.-12:30 p.m., in the Steve Schiff Auditorium.
- A closing ceremonial is planned Monday, Nov. 25, 11:30 a.m.-12:30 p.m., at the Steve Schiff Auditorium featuring Indian flute music by Sandian Ronald Hoskie (4842).



RANDY MCKEE named Professional of the Year by American Indian Science and Engineering Society. Story on page 6.

### and . . .

- ▶ Saturn/Hermes team wins EPA sustainability award . . . 2
- ▶ SHARE event launches annual giving campaign . . . . . 3
- ▶ Craig Taatjes honored for combustion research . . . . . 3
- ▶ Sandia custodial program is best of the best . . . . . 4
- ▶ Weng Chow wins IEEE quantum electronics award . . . 6
- ▶ EVP Kim Sawyer wins Public Service Award . . . . . 8
- ▶ Jill Hruby honored in *Profiles in Diversity Journal* . . . . . 8



## Lean on me

Veterans confront combat stress in a different kind of support group



GOT YOUR BACK — From left, John Bailon (5627), John Boehm (5343), Steve Becker (2144), and Jason Shelton (2998) say they are proud to step forward and talk about how combat affects a person. “It’s part of who you are,” Jason says. (Photo by Randy Montoya)

By Nancy Salem

There’s nothing normal about fighting in a war. “That says it all,” says John Boehm (5343), an Iraq combat veteran.

“My first experience with an IED (improvised explosive device), I thought I was watching a movie,” he says. “Until the truth hits you, it’s real, but it’s not.”

One percent of Americans serve in the military. About half of them are sent into battle. “It’s a very unique subset of people who actu-

(Continued on page 5)

### Veteran event honors those who have served



Sandia will recognize Veterans Day Thursday, Nov. 7, with an information fair and ceremony at the Steve Schiff Auditorium.

## THANK YOU!

COUNTDOWN: 9 DAYS remaining to make a difference for someone in need.



give.sandia.gov  
October 7–November 8  
For more info, see page 7

## That's that

We're all breathing easier this week, grateful to be back at work after getting a reprieve from a shutdown that looked all too likely a week ago. With the short-term agreement hashed out by our elected leaders in Washington, it seems we'll be open for business for at least the next several months. Beyond that, we could go through the same exercise all over again.

After we got off the hook – for the time being, anyway – I recalled the phrase attributed to the Duke of Wellington, speaking of his victory over Napoleon at Waterloo: "It has been a damned close-run thing – the nearest-run thing you ever saw in your life."

This whole shutdown business was a close-run thing, too, wasn't it? Our toes were sticking out there over the edge of the abyss.

During his all-hands meeting about the shutdown, Paul Hommert expressed optimism that, in the end, lawmakers would reach an agreement and a shutdown would be averted. Turns out he was right, though I wouldn't have bet a plug nickel on that outcome.

"I'm confident that we're going to get through this," Paul said at the time. "I really, really believe that I'll be able to send out a message that we can take a deep breath, go on with our work, and put this interesting theoretical exercise on the shelf." Let's hope it stays there, and that we don't have to dust off all those contingency plans any time soon.

Speaking of Paul, I really think he and the leadership team deserve a ton of credit for the way they handled the situation. They clearly had our backs, doing everything they could think of to minimize the impact a shutdown would have on employees and on the mission.

For that matter, the entire Sandia community comported itself admirably during the crisis situation – if, by crisis, you mean setting aside other work to deal with an unexpected, unsolicited, and unwelcome situation. Folks in my organization – and I know this was echoed across the Labs – rolled up their sleeves and did what had to be done to ensure that if we *did* have to go home, we'd do so in an orderly and professional way.

In the movie *Apollo 13*, when the fate of a crippled spacecraft carrying three astronauts is still uncertain, a space program official says, "This could be the worst disaster NASA's ever faced." To which flight director Gene Kranz replies, "With all due respect, sir, I believe this is gonna be our finest hour."

I'm not sure I'd go so far as to say Sandia's response to the events of the past couple of weeks represents our *finest* finest hour, but it ranks right up there.

\* \* \*

A *Sandia Daily News* item from a few days ago stopped me in my tracks: "Sunport exercise victims needed." Reading that teaser, I wondered, Huh? I envisioned a bunch of people in running shoes and headbands collapsed in a heap at the foot of an escalator. Turns out, of course, that Sunport emergency planners were looking for people to play victims in an airport training exercise. But for a minute there, they really had my attention. I related; I've felt like an exercise victim many a time, and more so as I get older.

\* \* \*

How about a joke after a trying couple of weeks: A new-hire is working late, trying to make a good impression, putting in face time at least until he gets through his probationary period. Hearing someone behind him, he looks around and there's the boss, standing in front of the new office machine, scratching his head and muttering, a document hanging loosely from his hands. Sensing a serious schmooze opportunity, the new hire springs to his feet, chirping, "Can I help, sir?!" Boss says, "Johnson, are you still here? Good for you, good for you. Seems I'm stumped; never used this thing before."

"Oh, it's real easy, sir. Let me show you." Johnson takes the document from his boss, who says, "That's very sensitive stuff, Johnson, one-of-a-kind."

"Yes sir, understood sir, that's what this thing's for."

He flips a switch and feeds the document into the machine, which makes a grinding sound and then stops. "There you go, sir! All done!"

"Thank you, Johnson, but where's the copy?"

See you next time.

— Bill Murphy (505-845-0845, MS0148, wtmurph@sandia.gov)

## Saturn-HERMES III team recognized for sustainable greenhouse gas management

By Stephanie Holinka

Sandia has won a Best in Class Sustainability Award for improvements in its Saturn and High Energy Radiation Megavolt Electron Source (HERMES) pulsed power facilities.

Sandia's award was for reducing the use of sulfur hexafluoride (SF6), which is identified by the EPA as having the highest global warming potential of any gas, at 23,900 carbon dioxide equivalents. NNSA named Sandia in the Greenhouse Gas Scope 1 and 2 category.

Sandia's Saturn-Hermes III pulsed power facilities use SF6 as an electrical insulator for high-voltage switching devices, such as spark gaps and cascade switches.

The accelerators create X-ray and gamma ray environments powerful enough to simulate some of the conditions created by nuclear weapons, allowing researchers to conduct radiation effects testing in a laboratory setting.

The Saturn/Hermes III team has reduced Sandia's SF6 emissions by upgrading the gas handling systems, and identifying and replacing probable leaks and failure modes in the systems. NNSA's Readiness in Technical Base and Facilities (RTBF) funding paid to update the reclaimer systems and replace most of the fittings, valves, regulators, and tubing in the expansive systems.

"It's something we can do that benefits the environment and, in the long run, can improve our efficiency," says Ray Thomas, manager of Dept. 1342.

NNSA has given out the Sustainability Awards for more than a decade. They recognize effective programs and projects that increase energy, water, and fleet efficiency and reduce greenhouse gases, pollution, and waste.

## Retiree deaths

Mark Kincy (age 55)	Aug. 9
Harold Tate (80)	Aug. 12
Henry Sanchez (76)	Aug. 16
Joseph Fedzuga (83)	Aug. 16
Esther Ethel Martinez (79)	Aug. 18
Benjamin Johnson (81)	Aug. 26
Byron Hock (83)	Aug. 28
Clarence M. Vick (88)	Aug. 29
Robert Elder (60)	Sept. 1
Louis Aragon (95)	Sept. 1
Mabel Hurley (89)	Sept. 6
Robert Shuman (91)	Sept. 7
E. Genese Stewart (88)	Sept. 10
Kenneth Ream (85)	Sept. 14
Jack Walker (78)	Sept. 20
Bonnie Montano (88)	Sept. 22
Consuelo Gonzales (95)	Sept. 24
Russell Acton (86)	Sept. 25
Malcolm Shannon (91)	Sept. 27
Sandra Anderson (76)	Sept. 30
Walter Huebner (94)	Oct. 1
Kenneth Shipley (84)	Oct. 2
Robert Vasquez (74)	Oct. 9



## Sandia National Laboratories

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**Bill Murphy**, Editor ..... 505/845-0845

**Randy Montoya**, Photographer ..... 505/844-5605

**Mike Janes**, California site contact ..... 925/294-2447

**Michael Lanigan**, Production ..... 505/844-2297

**Contributors:** Michelle Fleming (Ads, Milepost photos, 844-4902), Neal Singer (845-7078), Patti Koning (925-294-4911), Stephanie Holinka (284-9227), Darrick Hurst (844-8009), Stephanie Hobby (844-0948), Heather Clark (844-3511), Sue Holmes (844-6362), Nancy Salem (844-2739), Jennifer Awe (284-8997), Tim Deshler (844-2502), Mario Alba (284-5768), Jim Danneskiold, manager (844-0587)

**Lab News fax** ..... 505/844-0645

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**MAKING A DIFFERENCE IN THE COMMUNITY** — The National Museum of Nuclear Science & History welcomed volunteers from Sandia for "Make a Difference Day" activities this year. The volunteers assisted in several activities for middle and high school students as part of the Museum's annual National Nuclear Science Week celebration. During one activity, Sandia volunteers — including Mario Garduño, above, being assisted by Patty Zamora of Community Involvement Dept. 3652 — dressed in clean room suits before showing students the special protocols followed in a clean room. The students had the opportunity to see a particle counter and learn how dirty the museum is compared to a clean room. (Photo by Randy Montoya)

# A SHARE kickoff with a twist



THE WINNING TEAM celebrates with Steve Rottler and Carole Le Gall (on far right). From left, Duane Linder (8100), Haifeng Geng (8623), Ashley Cera (8522), Marilyn Romo-Hamilton (89491), Jim Lund (8130), Kevin Krenz (8135), Holly Mendoca (8244), Joe Pratt (8366), and Kristi Duenas (8126).



TEAM 8100 before the twist that mixed up the center-specific teams.

By Patti Koning  
Photos by Jeff McMillan

On Oct. 3, the California site kicked off the annual Sandia Helps and Reaches Everyone (SHARE) campaign with a team competition, silent auction benefitting the Make-A-Wish Foundation, and pizza lunch.

"I consider myself and everyone who works here quite fortunate. Not everyone has what we have," said Div. 8000 VP Steve Rottler. "For me, decisions about giving — where, how, and the amount you choose to give — are very personal choices. But at the same time, I want to make sure that it is not possible for anyone to walk away from this campaign and say that they were not asked. Making a contribution really adds value to our community."

After introductions by SHARE chair Alf Morales (8126) and Scott Shanborn of the United Way, the team competition got started — but with a twist.

Each center was represented by six team members and a coach. Before the first event, however, team members drew colored slips of paper from a bag, which assigned them to a new team. "This is an opportunity

to test your teamwork and collaboration skills," said Div. 8000 deputy Carole Le Gall (8005), who served as co-host for the event with Steve.

The newly formed teams then tackled the engineering challenge, in which they had to roll a marble down a track made of staples. The trick to this challenge, as most of the teams discovered, was to use the erasers (the only other item supplied in addition to staples and the marble) to raise the table legs and tilt the table.

In the next challenge, "Key to Success," teams had 60 seconds in which to flip three keys into a paper cup. The twist on this activity was that team members had to flip the key using another key — they could not touch the key directly with their hands.

After that, it was on to the 80s pop culture trivia challenge. The teams answered questions on topics like the movies, music, trends, and politics of the era. Center 8100 Director Duane Linder's team of Ashley Cera (8522), Kristi Duenas (8126), Haifeng Geng (8623), Marilyn Romo-Hamilton (89491), Kevin Krenz (8135), Jim Lund (8130), Holly Mendoca (8244), and Joe Pratt (8366) emerged as the victors.

As the winners of the SHARE kickoff challenge, the team had the opportunity to direct a \$500 donation to the charity of its choosing. The team chose the Make-A-Wish

Foundation, which was also the beneficiary of the proceeds from the silent auction, which raised \$2,360.

While other SHARE events were canceled in light of the partial government shutdown in the first half of October, the SHARE campaign remains open through Nov. 8. To learn more and to make your contribution, visit <https://share.sandia.gov/share/>.



THE GIFT BASKET SILENT AUCTION raised \$2,360 for the Make-A-Wish Foundation.

## Sandia California News



SHARE CHAIR Alf Morales welcomes everyone to the SHARE kickoff event.

## Craig Taatjes to be awarded Polanyi Medal for pioneering work in combustion chemistry

By Mike Janes

Sandia combustion chemist Craig Taatjes (8353), whose groundbreaking work on Criegee intermediates has provided scientific insight into hydrocarbon combustion and atmospheric chemistry, has been selected to receive the prestigious Polanyi Medal by the International Symposium on Gas Kinetics.

Craig will receive the award and present the Polanyi Lecture at the 23rd International Symposium on Gas Kinetics and Related Phenomena, to be held July 20-24, 2014, in Szeged, Hungary.

The Polanyi Medal is awarded every two years. The recipient, chosen by the Committee of the Gas Kinetics Group of the Faraday Division of the Royal Society of Chemistry, is someone who has made outstanding contributions to the field of gas kinetics. The Polanyi medal is named after professor Michael Polanyi, 1891-1976, whose research helped to define the modern subject of gas kinetics and reaction dynamics.

"The list of previous recipients of this award includes some of my greatest scientific mentors and role models," says Craig. "So it is a surprise and a tremendous honor to now be listed among them."

Craig says he has been "exceptionally fortunate to work with generous and brilliant coworkers at Sandia" as well as external collaborators. He cited his Sandia colleague David Osborn (8353), who led the development of the machine that



CRAIG TAATJES

enabled Criegee intermediates to be probed, and Argonne National Laboratory's Stephen Klippenstein. "Without colleagues like them and my excellent postdoctoral associates, I would not have been able to carry out the work that this award recognizes," says Craig.

During his distinguished career at Sandia, Craig has carried out research aimed at understanding the fundamental chemistry of combustion and hydrocarbon oxidation, including flame measurements and the reactions that govern low-temperature autoignition. Recently he led a project that made the first direct measurements of the reactions of Criegee intermediates, formed in ozone-initiated oxidation of hydrocarbons, showing that their impact on tropospheric chemistry and climate may be substantially greater than previously assumed. Through funding by DOE's Office of Science, Craig and his research team conducted studies of gas phase Criegee intermediates using Sandia's multiplexed photoionization mass spectrometer (MPIMS) at the Advanced Light Source, a scientific user facility also supported by the DOE.

Though the atmospheric importance of these Criegee intermediates has long been postulated, this was the first direct measurement of the rates and products of their reactions. The groundbreaking work was published in January 2012 in *Science* magazine, and in a follow-up paper in the April 2013 edition of *Science*.

Craig, a distinguished member of the research staff, received a PhD in chemical physics from the University of Colorado, Boulder, and a BS degree in chemistry from Calvin College. Among other awards and honors, he is a Fellow of the American Physical Society, a two-time winner of the David A. Shirley Award, an O.W. Adams Award winner for outstanding achievement in combustion science, and a Lockheed Martin NOVA award winner for Individual Technical Excellence. He has authored or co-authored more than 120 peer-review publications and has given more than 50 invited lectures.

# Sandia custodians earn top award at Simon Institute Symposium

By Tim Deshler

**S**andia's custodial department took home top honors at the 12th annual Simon Institute Symposium in Dearborn, Mich., being awarded Best Cleaning Program from among 15 institutions across the country, including the University of Michigan, the University of Texas, Boeing, Raytheon, and the US Postal Service. The awards, determined by independent audit, are based on (OS1), a widely used cleaning management system that provides measurable benchmarking standards for best practices in the cleaning industry.

The annual audit is performed by ManageMen, a cleaning industry consulting and education firm. The audit measures standardization, simplification, best practices, benchmarking, lean processes (six sigma and ISO 14001), and green cleaning recognition. Competition includes best-in-class peer organizations. The audit involves approximately 370 questions and takes two days to complete. One day is devoted to auditing the custodial crew and the second day involves auditing management and processes.

In 2000, prior to implementing the (OS1) system, Sandia was audited by ManageMen and received a baseline score of 38 percent. A standard score for a functioning system is 80 percent. This year, Sandia scored a 93 percent, winning Best Audit. Sandia has earned the Best Audit award for the past six years in a row.

Sandia also earned a "Green Certified Program of Excellence" for achieving an audit score of more than 90 percent. Programs awarded this designation demonstrate leadership in creating a safe and environmentally responsible approach to cleaning.

Custodial Services team supervisor Chris Romero (4848-6) teaches Sandia custodians not just how to clean, but why. The training program is extensive, and covers topics like microorganisms and routes of transmission. "If we keep the Labs healthy, then we're doing our part of the mission," Chris says.

"The training is very in-depth," says custodian Dominique Wittner (4848-5). "I never would have expected that this is what a custodian does. One of the philosophies we learn is cleaning first for health and then for appearance."

Other philosophies Dominique mentions include treating cleaning workers as first-class citizens, minimizing environmental harm, and exceeding expectations.

"We have MSDS [material safety data sheets] sheets for everything," she says. "We use six sigma principles and have standardization throughout all of our storage areas and our processes."



GRADE 1 CUSTODIAL crew member Robert Naranjo (48485) vacuums Sandia President and Labs Director Paul Hommert's office using an ergonomic backpack-style vacuum. Robert is part of the Sandia custodial team that took home the Best Cleaning Program award at a major cleaning industry symposium. (Photo by Randy Montoya)

Custodians and team leads prepare for the annual (OS1) audit through pre-audits. The pre-audit involves not only checking the cleaning work itself and the associated paperwork, but also the knowledge of the systems, processes, and materials used in the (OS1) system. Custodians and leads have embraced the audit process and take it very seriously, Chris says.

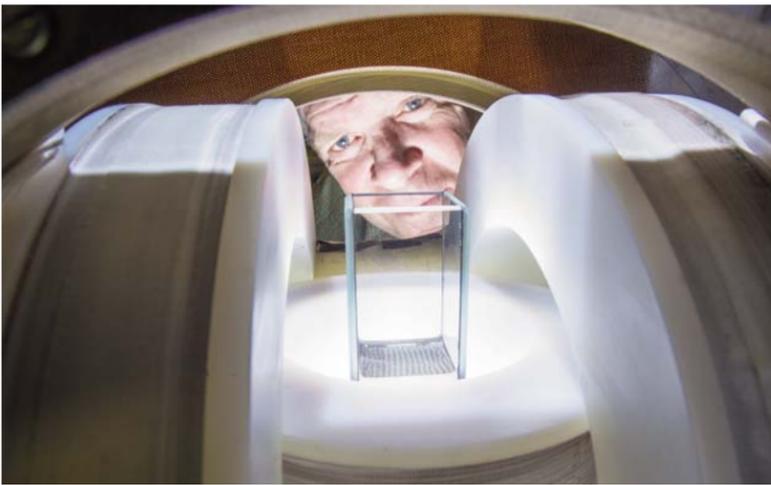
Custodian Cole Papen (4848-6) agrees. "When you work with the auditors," Cole says, "you see things from a different perspective. They want to know how you do things — they ask for your input and value your opinions."

Chris and Charlene Argo (4848) gave a presentation on recycling at the symposium. The custodial program works hand-in-hand with the recycling program at Sandia, and is part of why Sandia won the Best Program award. Recycling completes the cycle and goes above and beyond what other facilities are doing, Chris says.

The custodial program has won other awards this year, including an ERA award and a DOE/NNSA Best in Class award, in collaboration with the recycling program.

## Fluid flow

(Continued from page 1)



WATCHING PATTERNS FORM — Jim Martin (1114) peers between specially built magnets as he watches patterns form in a fluid inside a 3 cm glass container. Jim and doctoral researcher Kyle Solis have discovered how to harness magnetic fields to create vigorous, organized fluid flows in particle suspensions. (Photo by Randy Montoya)

He compares the flow lattices to the patterns, or murmurations, of flying, wheeling flocks of birds, with "every bird obeying some simple rules like avoiding crashing into neighboring birds. There's no leader. These patterns just spontaneously emerge from these simple rules. That's more or less the same thing here. Each particle is obeying simple rules but collectively there's this emergent behavior that's quite surprising."

### Specially built magnet generates uniform field

It's not necessary to use very strong magnetic fields for the fluid flows. The researchers generate a uniform multiaxial AC magnetic field with a specially constructed magnet consisting of three nested pairs of coils arranged to create three mutually perpendicular magnetic fields. Imagine a rectangular box with a wire coil glued flat to each of the six faces. Coils on opposite sides are wired together and produce a field directed along their cylindrical axis. The arrangement enables researchers to create magnetic fields with independent frequencies along the north-south, east-west, and up-down directions simultaneously.

The net effect is a magnetic field whose direction and

magnitude vary wildly and rapidly with time.

Normally a magnetic field is a constant DC field, which results in stationary magnetic field lines like those of the Earth. Jim and Kyle, on the other hand, use alternating magnetic fields ranging from about 50 Hz to 1,000 Hz. Only two field components are needed to create flow fields, but three can create especially vigorous flows.

In Jim's lab, they demonstrate patterns, first with a fluid suspension containing a small percentage of magnetic platelets by volume and then with a much denser suspension. Platelets start out as disorganized sediment, but when the field is applied patterns emerge immediately, their structure dependent on the magnetic field used. Jim and Kyle describe various patterns, whose features are mere millimeters in size, as looking like worms slithering by each other, tadpoles swimming upstream, fishing nets, sand ripples, ridges, a lattice of rivers. One pattern wriggles as if tiny bugs moved underneath.

Jim points out not all the "rivers" in the lattice flow in the same direction: Cutting through the fluid would reveal a checkerboard pattern of flow columns, some going one way and adjacent columns flowing the opposite.

"It's an enigmatic phenomenon," he says as he uses a tiny light to illuminate the 3 cm square glass container of fluid sitting in the middle of the magnets.

### Patterns evolve as magnetic field changes

The demonstration starts with one coil pair running at 150 Hz, or 150 cycles per second, and a second set at 75 Hz. Kyle changes frequencies by computer, and at one point introduces a slight frequency change in one field component to continuously modulate the flow pattern.

"The sample will go through all these transformations," Jim says. "In any one moment it's trying to become what the field is directing it to become, but now the field is continuously changing, causing the pattern to evolve. In other words, there are lots of patterns that are possible and we can select these by carefully adjusting the phase angle between field components."

One pattern is a vortex lattice of micro-tornadoes spinning in the opposite direction of their neighbors. Jim explains it this way: Suppose you had a checkerboard with a gear mounted on a shaft in the middle of

each square. If you turn a gear clockwise in the lattice of mesh gears, its four neighbors turn counterclockwise, and each of their neighbors turns the opposite direction and so on.

"This is the same kind of thing but it's all a fluid," he says.

Kyle changes the experiment's parameters by diluting the fluid with more solvent, in this case isopropyl alcohol, or removing most of the solvent. He also dials the magnetic strength up and down. Some patterns move rapidly, even violently, and the solution can suddenly crawl up the sides and spill out. At one point, Kyle shuts off the field and the fluid shows a ghostly remnant of the previous pattern. The flow immediately resumes when the field is restarted.

### Demonstrating heat transfer valve

Jim and Kyle used the phenomenon to create a heat transfer valve they can control to transfer or block heat. They made flow cells a few inches long with blocks on the outside walls through which water flows to keep the blocks cold. The water blocks flank a chamber divided by a razor-blade-size heater made of plastic embedded with wire. To test thermal transfer properties, they run current through the heater and measure how hot it gets. Since the temperature depends on the heat transfer properties of the chamber's magnetically structured fluid, they can control the temperature by controlling the flow created by platelets in the magnetic field.

Some fields freeze the fluid and cause the heater to become very hot, while others create strong flows so efficient in extracting heat that the heater rises only 0.3 degrees C higher than the water block temperature, Jim says.

Thus it acts like a valve because it can control the transfer of heat over a 1 cm gap by a hundredfold, he says. "Think of a water valve that can control water flow by a factor of 100 —perhaps a little leaky, but still better than no valve," he says. There's room for improvement, he adds.

"Heat transfer can be controlled over any size volume, and the relative efficiency of heat transfer actually increases with scale," Jim says. "It's easy to create heat transfer over a large volume because the coils that produce magnetic fields are equally efficient at any size."

Isothermal magnetic advection could help efficiently manage overheating in computers. A difficulty with modern supercomputers is drawing heat away from chips that run ever hotter and use more power, a technical challenge that's limiting development, Jim says. And it's not just large systems. "One of the limitations for cooling right now on personal electronics like laptops is just how fast people can run the fans inside of them before the noise becomes too obnoxious," Kyle says.

# Veterans Day

(Continued from page 1)

ally experience combat," says John Bailon (5627), also an Iraq veteran. "It's impossible to explain what it's like to someone who hasn't been there. People who are familiar with those feelings in different stages of their lives should talk to each other."

Jason Shelton (2998), a veteran of the wars in Afghanistan and Iraq, says no one comes out of combat unchanged. "It's part of who you are," he says. "You can't erase it but you can minimize the impact it has on your life."

Boehm, Bailon, and Jason are in Sandia's Wounded Warrior Career Development Program, which opens specific jobs at the Labs to military veterans injured in combat. They're working with the Labs' Military Support Committee (MSC) to establish the Veteran Combat Stress Support Group to give Sandia veterans and the surrounding Department of Defense community a friendly, non-judgmental place where emotions, feelings, and stories can be discussed.



STEVE BECKER (2144), a 30-year veteran of the military, spent two combat tours in Afghanistan and one in Iraq.

"When the MSC was established a few years ago, one thing we wanted to do was address issues the military service members in our workforce might be faced with," says committee member Jody Thomas (2995).

One issue was combat stress. The MSC held an awareness day featuring a panel of Sandia veterans, staff from the US Department of Veterans Affairs, and community resource representatives. "We had some very emotional testimony. It was heart wrenching. That gave us the first clue," Jody says. "The need is there for a support group on Kirtland Air Force Base."

## Earn veterans' trust

Jason, Bailon, and Boehm helped launch the idea with support from city of Albuquerque veterans' liaison Roger Newell and Tim Hale of the New Mexico Department of Veteran Services. "They've been running with it ever since," Jody says.

Jason says the group wants to earn the trust of the veteran community. "This is a different type of support group. It's peer driven," he says. "There are no psychologists or doctors, no reporting, no attendance lists, no public knowledge, or emails. The meetings are in a neutral place. We make it as laid-back as possible. When people show up, if they want to talk, they can talk. If they want to sit and listen, they can do that, too."

Steve Becker (2144), a veteran of two combat tours in Afghanistan and one in Iraq, attended a meeting and had a long conversation with Jason. He hadn't talked to anyone about his combat experiences in a year. "I'd forgotten the common things we shared," says Steve, who

## Sandia honored for support of Guard, Reserve



SANDIA HONORED – New Mexico Gov. Susana Martinez salutes the flag at an Oct. 25 Employer Support of the Guard and Reserve (ESGR) event in Albuquerque. The ESGR New Mexico Patriotic Employer Award Luncheon honored companies — including Sandia — that hired unemployed or underemployed members of the National Guard and Reserve in 2013. "James Peery (director of Center 5600), John Larson (senior manager of Dept. 90), N. Bess Campbell-Domme (manager of Dept. 4021), Robert Mitchell (4021), and H.E. Walter (4224-4) were proud to accept this prestigious award on behalf of Sandia," says Rose Gehrke (10617) of the Labs' Military Support Committee. (Photo by Randy Montoya)

spent 30 years in the military. "Sometimes you feel you're on your own and need to deal with it alone. I felt so much better when Jason and I talked, knowing there are others with the same perspective and feelings. Afterward, I was emotionally and physically drained — in a good way."

The group did not want to be branded with the post-traumatic stress disorder (PTSD) label. PTSD applies to a multitude of situations, Jason says. "Those four letters carry huge baggage. There is a stigma assigned to anybody who identifies as having PTSD," he says. "It doesn't matter what you say or do. People will look at you and wonder if you're going to freak out. It's not right. That's not me. PTSD can come from any number of upsetting situations, from a car accident to falling off a horse."

Combat stress is specific to the experiences of military personnel who fight in wars. It affects different people different ways, Boehm says. "Some react right away. Some don't realize they have it until later on," he says. "Everybody is different. Some go to groups. Some find their own way through. Some need activities to keep their mind off it."

## Switching on and off

Jason says many soldiers face the demands of combat by pushing reality away. "It's almost like you don't feel anything — fear, horror, anger — right then because you have to do a job," he says. "If you get emotional and start thinking about what's really going on, that can put you in worse trouble. It's a stereotype, but you go into a mode of doing what you are trained to do. Switch emotions off and do what you need to do to keep our people safe and stop the bad guys."

Difficulties arise when the switch turns back on, he says. "I didn't have an issue with combat stress until I got out of the military," he says. "I went back to a normal life, and all the stuff I had pushed to the back of

my mind started catching up with me."

Boehm says combat is counterintuitive in every way. "The phrase I use is 'crazy, insane, stupid.'

Any normal person would look at what you do in combat and say, 'Are you nuts? You're running into that? Why aren't you running the other way?'" he says. "You lose objectivity. It has to be done, and you do it. When the adrenaline wears off, it sinks in."

Steve describes the experience as "pushing things to the back of the brain, storing it in drawers and file cabinets."

"While it's happening you can't deal with it right then and there. The brain protects you. But when there's time outside of combat, the mind has to digest all those experiences."

Emotions that surface range from deep sadness at the loss of friends to revulsion to terror, all triggered by images, sounds, and smells. "Weird things will trigger a memory, something as innocent as going to a fireworks show," Jason says. "Those are the things you work on as you return to a civilian life, minimize the impact of those triggers in your life."



JOHN BAILON (5627), a veteran of the war in Iraq, was one of the founding members of a peer-driven support group for combat vets.

## Promises kept

Jason, Boehm, and Bailon hope the Combat Stress Support Group will help. They set up a website and presence on Facebook and Twitter, and plan two meetings a month, the first and third Tuesdays at the Kirtland Air Force Base chapel, one featuring a theme and speaker to spur discussion.

Bailon says he got involved to keep a promise he made to the Marine Corps. "The Corps' values are honor, courage, and commitment. Commitment doesn't end after four years," Bailon says. "Seeing guys in action, doing really brave things, if I can help them in some way I'm continuing my commitment."

Steve says he also fulfilled a promise when he stepped forward. "I do this publicly because, at a bad point in my life, I made a commitment to God that if I could get back to normal, I would do what I could to help others," he says.

Boehm says his activism stems from the fact that many combat veterans commit suicide. "Live another day," he says. "That's enough for me."

## Event honors, thanks those who have served

Sandia will recognize Veterans Day on Thursday, Nov. 7, with an information fair and ceremony at the Steve Schiff Auditorium.

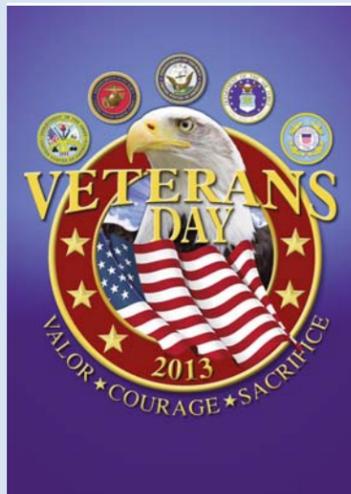
The fair will run from 11:30 a.m.-1:30 p.m. and feature booths for the Sandia Military Support Committee (MSC), American Red Cross, National Park Service, United Veterans Council of New Mexico, Healing America's Heroes, Employer Support of the Guard and Reserve, Tribute to Women in the Military, and Sandia's Veteran-owned Small Business Utilization advocates.

Lt. Col. Antoinette Gant, commander of the Albuquerque District of the US Army Corps of Engineers,

will speak in the auditorium at noon.

"Our Veterans Day event is a great opportunity for us to recognize and thank our veterans and military service members for their service and sacrifices for our country," says Rose Gehrke (10617), an MSC member and chair of the events subcommittee. "I'd like to invite our veterans, current service members, and all who support them to join us at the Steve Schiff Auditorium on November 7."

For more information contact Rose at 845-8049 or rmgehrk@sandia.gov, or Jody Thomas (2995) at 284-5376 or jmthomas@sandia.gov.



## Sandian Randy McKee named Professional of the Year by American Indian Science and Engineering Society

By Nancy Salem

Randy McKee's passion is engineering excellence. "I'm a process guy," he says. "I always put that first in anything I do."

Close behind is a desire to help young people become professional engineers. Randy (1657) has spent countless hours mentoring in minority recruitment, graduate, and undergraduate programs at Sandia. "Connecting back to the community through young people who want to get into science fields is important to me," he says.

In recognition of his technical excellence and community service, Randy was named 2014 Professional of the Year by the American Indian Science and Engineering Society (AISES). He is being honored at the organization's national conference in Denver this week.

Since 1977, AISES has worked to increase American Indian and Alaska Native representation in science, technology, engineering, and math (STEM) fields as students, professionals, mentors, and leaders. The group supports and provides STEM educational services at all levels through graduate school. It also offers professional development, mentoring, networking, community service, and awards programs.

"It was very humbling to be recognized. I'm honored," says Randy, a member of the Cherokee Nation. "The competition is steep, and Sandia gave me the advantage. I've had great mentors and peers who have helped me along the way. Reaching up for help is as important as reaching back and giving help. I wouldn't be here without guidance and mentorship from Keith Matzen (director of Nuclear Weapons Science & Technology Programs Center 1200) and John Porter (manager of Laser Operations & Engineering Dept. 1682)."

### Robotics at Sandia and LANL

Randy's family moved from Oklahoma to Albuquerque, where Randy earned a bachelor's degree in mechanical engineering and a master's in business administration from the University of New Mexico.



RANDY McKEE (1657) says he enjoys guiding students to advanced technical degrees. "It's great to see young minds grow into mature scientists," he says.

(Photo by Randy Montoya)

He joined Sandia in 1991 as a contractor in the robotics center and was hired in 1995 as a principal member of Laboratory staff. He worked with Los Alamos National Laboratory in nuclear materials handling using robotics.

In 2000, Randy left Sandia to start the manufacturing division of Ktech Corp., a high-tech engineering firm in the Sandia Science & Technology Park. "Ktech is closely tied to Sandia, and I did contracting back into

the Labs," Randy says.

He returned to Sandia in 2003 as a pulsed power manufacturing engineer and was promoted within six months to manager of Pulsed Power Engineering Dept. 1657. "Sandia offers lots of opportunities to succeed and be really challenged," Randy says. "It's very difficult work with great rewards and significant impact on the weapons and energy sectors. The Z machine is a fantastic place to be with its significant engineering, manufacturing, and operations challenges. Engineering excellence is required with all we do here."

Randy says one-on-one mentoring can make the difference in a young person's career. "I spend a lot of time really helping them find their way into advanced technical degrees," he says. "It's great to see young minds grow into mature scientists over a period of three to five years. They come in as freshmen, doe-eyed and looking at a world of science they can't comprehend. By the time they leave they can function in a technical environment."

Much of his effort has been directed to student interns from minority-focused colleges such as North Carolina A&T State University, working with recruiter Ken Holley (35553). "We create an environment at Sandia that keeps them focused on STEM and advanced degrees," Randy says. "Most of them go on to master's degrees and PhDs. Some come back to Sandia and others go out and work at other places. They have been very successful, and that's the important thing."

"I tell them that if they want a challenging and rewarding career, STEM will always provide that."

AISES is the only professional society established by and for American Indian and Alaska Natives that specifically emphasizes lifelong learning and education achievement using cultural aspects with STEM. More than 200 tribal nations are represented within AISES.

Randy says mentoring is critical to building staff in STEM fields. "We need new people coming in so we can sustain the national position Sandia holds," he says. "Young people are very important. Developing a pipeline of diverse talent is key to our success."

## Weng Chow receives 2013 IEEE Quantum Electronics Award

By Neal Singer

Weng Chow (1121) is the recipient of the 2013 IEEE Photonics Society Quantum Electronics Award "for contributions to semiconductor-laser theory, in particular the implementation and verification of many-body effects."

The honor is particularly sweet to Weng because he originally thought many-body research to be more fun than useful with respect to lasers.

"I came to Sandia to work as an engineer on lasers because I was tired of being a [theoretical] physicist," he says "I loved lasers. I wanted to work on them directly. But my managers decided I should be well-rounded. They wanted to be sure I stayed with physics research.

That's the way we were then at Sandia. So I picked the most far-out subject around, many-body effects, to research, because why would any engineer think that's important in semiconductor lasers? But it turned out to be more than just fun calculations. Did engineers growing crystals take quantum mechanics into account? I don't think so. But eventually they must know how much indium they should use, how small the quantum dots they must make, whether managers should even invest in quantum dots. That's what basic physics like many-body theory allows you to do, to make these evaluations."

### Quantum statistics

Many-body effects — the interactions of many electrons, in this case — require knowledge of a field called

quantum statistics. "If you have more than one electron, it's not just two times the effect when you move two electrons around instead of one. You must properly symmetrize or antisymmetrize the wavefunction. Actually, the formulism used is such that the wave function itself becomes an operator."

Many years ago, he says, the semiconductor laser engineering community was mostly clear that such calculations were unimportant in semiconductor lasers. But as work grew more detailed, the many-body effects showed up more than engineers had expected.

"The moment you change the current, the many-body effect becomes important. The many-body effect plays a role in how the beam's shape changes. If I modulate the frequency, there are many-body effects. When I change carrier density, the many-body interaction shows up. So if I want to design a laser that gives the minimum chirp — a chirp is a bad thing if you want a fixed carrier frequency — you have to understand many-body effects."

### Homesick for the Southwest

Weng, a distinguished member of the R&D staff, received his PhD in physics in 1975 from the University of Arizona. His dissertation work was on fluctuation phenomena in quantum optics, under Marlon Scully. As a post-doc at the Max Planck Institute for Biophysikalische Chemie in Göttingen, he made some of the first direct electrically discharged excimer lasers, before they became commercially available from companies such as Lambda Physik. These lasers proved useful in discovering new ultraviolet dye lasers.

Homesick, Weng returned to the Southwest to work on laser gyros with Scully at U of A. In 1980, he moved with the Scully group to the University of New Mexico to help start quantum optics and quantum electronics programs that eventually helped lead to the establishment of UNM's Center for Advanced Studies and the Center for High Technology Materials.

When Weng received his US citizenship in 1986, he

no longer felt constrained to work in academia and moved to Hughes Aircraft to pursue his dream of working on high-power chemical and gas-dynamic lasers. The mostly modeling work turned into actual experiments on high-power semiconductor lasers in 1988, when he joined the Optoelectronic Device Development Division at Sandia.

### Collaborations with experimentalists

With encouragement from his managers, who believed in the value of a well-rounded engineer, Weng started calculations on many-body effects in semiconductor lasers as a diversion from the pressure of preparing laser components for flight tests.

He partnered on research that led to results summarized in two texts, *Semiconductor-Laser Physics* and *Semiconductor-Laser Fundamentals: Physics of the Gain Materials*. The work benefited significantly from collaborations with experimentalists, he says.

These collaborations led to greater understanding of observed abnormalities in microcavity lasers such as VCSELs, recognition of the dominance of many-body effects in wide-bandgap lasers, and drastic improvements in accuracy and predictive capability of semiconductor-laser gain calculations. With the winding down of component engineering work following the end of the Cold War, Weng's many-body studies became his full-time work.

His other interests include laser gyros, phased arrays, coupled lasers, laser ignition of pyrotechnics, and quantum optics.

Among other honors, Weng is a Fellow of the Institute for Quantum Science and Engineering at Texas A&M University, the Optical Society of America, and IEEE. He is the recipient of DOE Basic Energy Science's Material Science Award and the Alexander von Humboldt Society's Senior Scientist Award.

The award presentation took place at the 2013 IEEE Photonics Conference in Bellevue, Wash., on Sept. 9.



WENG CHOW

**Sandia Classified Ads Sandia Classified Ads Sandia Classified Ads Sandia Classified Ads**

**MISCELLANEOUS**

NUWAVE OVEN, convection/conventional/infrared, w/extender, \$65; Xpress grill, RediSetGo.com, \$20; both excellent condition. Caskey, 298-6428.

PLAY KITCHEN, w/accessories, food, \$30; kid's bicycle, 18-in., light blue, puppy paw designs, training wheels, like new, \$60. Mowry, 238-0363.

SPEAKERS, 2, Bose Acoustimass, 5 series, \$290. Foehse, 401-9491.

TEMA CHAISE, microfiber, sage green, \$250; large teal folding triple mirror, \$100. Eichel, 292-5795.

DINING CHAIRS, 4, Bassett, tall back, off-white, wood w/cane back, sturdy, \$60 firm. Robbins, 299-2516.

WOODWORKING EQUIPMENT: Craftsman molding machine, free standing, 1/2-in. spindle w/molding heads, \$150; 6-in. planner, \$225. Kelly, 797-1475.

SOFA & LOVESEAT, traditional style, floral print, great condition, \$250/offer; 2 designer lamps, \$75. Robles, 294-6904.

MOVING BOXES, packing paper, ~30 boxes, used once, good condition, \$25, OBO. Knowles, 681-3961.

MICROWAVE, Kenmore, 1100-W, black, works great, \$65; snowshoes, Red-feather PACE 500, \$90. Brewster, 238-4704, ask for Julie.

ELLIPTICAL CROSS TRAINER, Octane Fitness Q35c, new condition, paid \$3,000, asking \$1,500. Maestas, 459-7650.

ALUMINUM ALLOY WHEELS, 5-spoke, from '13 Toyota Tundra, used for 250 miles, hardware included, \$250 OBO. Hennessey, 915-241-8634.

POOL TABLE, Olhausen Santa Ana, 8-ft., cherry wood, exceptional condition, serious inquiries only, \$1,600. Hoke, 264-9569.

SOFA & LOVESEAT, La-Z-Boy, reclining, leaf floral pattern, overall green in color, photo available, excellent condition, \$800. Hill, 205-1496.

SOFA, loveseat, couch, TEMA, beige leather, \$300. Sansone, 05-296-7945.

WINTER BREAK IN TUCSON, Dec. 29, 4 nights, 1 bdr., Wyndham Rancho Vistoso resort, \$500. Padilla, 263-1168.

DINING SET, oak, table, 2 leaves, 6 chairs, lighted china hutch, very good condition, \$850 OBO. Roesch, 281-9751.

OFFICE CHAIR, \$50 OBO; 300-disc CD changer, \$50 OBO. Verley, 410-9885.

CHEST FREEZER, 5.4-cu. ft., 35" x 25" x 23", excellent condition, \$100. Talant, 286-1598.

GAS DRYER, Whirlpool, 1 yr. old, used ~4 mos., paid, \$500, asking \$200. Burfeindt, 505-897-0179.

SNOW BLOWER, John Deere model 828, electric start, 8-hp, 28-in., runs like new, \$500. Blankenship, 281-2257.

BOSQUE FARMS CHRISTMAS BAZAAR, Nov. 30-Dec. 1, Cowboy hall at the arena in Bosque Farms, tables/booths available. Cordova, 869-1122.

DINING ROOM HUTCH, 48"W x 75"H, medium oak, good condition, \$150 OBO. McDonald, 554-2048.

HIPSTERS CRAFT SHOW, quilt raffle to benefit 2 charities, Nov. 9, 9 a.m.-4 p.m., San Antonio at Louisiana, hipstichabq.com. Rogulich, 459-6241.

NEW BIKE PARTS: Fox fork, \$400; FormulaR1 brake set, \$300; TruvativX9 crank set, \$200; Crank Brothers Cobalt 3 handlebar, \$50. Barker, 730-7532.

CEILING FAN, brass, w/light, \$30; flush ceiling lights, \$10. Stubblefield, 263-3468.

MOBILITY SCOOTER, \$600; Scooter lift, \$500; (together \$1,000); HP Pavilion 20-in. all-in-one computer, \$400 OBO. Griffiee, 296-8129.

BIG SALE, dishes, kitchen items, games, bedding, more, Nov. 8 & 9, 9 a.m.-3 p.m., 9642 Elvin NE. Gibson, 294-6831.

GAS LOG FIREPLACE, used, built-in, complete w/logs, chimney pipe, valve, propane or natural, \$400 OBO. Rector, 286-1217.

CRIB, converts to toddler bed, then daybed, cherry finish, w/mattress, \$50. Vandevender, 332-8824.

SIDE BUFFET TABLE, rectangular, ornate, beautiful, light/medium golden brown, excellent condition; Medela breast pump. de la Fe, 903-0717.

LOFT BED; Commodore computer; foam couch/bed; car cover; snow chains; Nintendo. Stogsdill, 897-9813.

WHEAT PENNIES, 6.75 lbs.; ~100 silver coins. Kerschen, 821-2848.

GRINDER/BUFFER MOTORS, on pedestals, 2 ea.; lawnmower; 2 handicap walkers; exercise bike; oxygen/acetylene torch w/tanks, gauges, accessories, call for prices. Herrera, 833-5035.

**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.

'02 TOYOTA HIGHLANDER, AWD, cloth interior, clean, silver, 115K miles, \$8,900 OBO. Webb, 977-9794.

'04 JEEP WRANGLER RUBICON, 6-cyl., 5-spd. manual, 4x4, hardtop, brown, 101K miles, \$12,900. Armijo, 575-418-0461.

'99 LEXUS RX300, engine has no compression, 178K miles, great project/parts car, \$1,500. Lifke, 382-9448.

'05 CADILLAC DEVILLE, fully loaded, 68K miles, excellent condition, \$9,400. Sleafie, 505-281-4103.

'08 MINI COOPER, hardtop, oxygen blue, standard, sun/moon roof, 33-mpg, 49K miles, fun to drive, \$13,500 OBO. Dent, 505-379-7685.

'12 GMC TERRAIN, 4-cyl., FWD, color mocha steel, 34K miles, \$23,000. Montoya, 505-331-6459, ask for Lawrence.

'01 CADILLAC STS, 1 owner, 300-hp, diamond white, 55K miles, \$6,500. Senseney, 620-6737, ask for Jeff.

3-BDR. HOME, 2,000-sq. ft., pool, sun-room, hot tub, putting green, Willow Wood, walk to work, \$279,000. Werner, 386-986-9601.

2-BDR. TOWNHOUSE, 2 baths, 2-car garage, 1,429-sq. ft., study/office, fireplace, open floor plan, landscaped, Tramway/Comanche, MLS#800736, \$235,900. Floyd, 505-681-4650.

**WANTED**

ROOMMATE, 3-bdr. home, 2 baths, near Unser/Ladera NW, washer/dryer, WiFi, cable, backyard w/ city view, \$500/mo. utilities included. Sanchez, 720-1119.

ROOMMATE, large house near Carlisle/Indian School, call/text for info. Tran, 801-842-2366.

SNOW BLOWER OR THROWER, good to excellent condition. Bell, 239-8606.

WORKING VCR, w/remote control and instructions. Chorley, 296-1454.

ROOMMATE, 2nd master bdr., private bath, new neighborhood, \$425 plus utilities. Delgado, 505-440-8599.

FORMING ANGLOPHILE WOMEN'S BOOK GROUP, if you love British authors/culture, check it out. Summerlin, 463-5144.

**WORK WANTED**

RESPONSIBLE, mature 17-yr-old St. Pius girl, looking for weekend job, experienced w/disabled children. Molley, 505-296-8653.

FLUTE LESSONS, experienced flute instructor, accepting beginning/intermediate students, \$20/half-hour, \$30 full. Gruetzner, 702-6435, ask for Sasha.

**RECREATION**

'04 KAWASAKI KLR 650 DUAL SPORT, many upgrades, gel seat, luggage, <6K miles, \$3,200. Halpern, 340-8555.

'99 HARLEY-DAVIDSON ROAD KING, blue w/custom paint on hard bags, custom accessories w/extras, nice, \$10,000 OBO. Lott, 505-891-8623.

'95 GULFSTREAM RV, 34-ft., Class A, slide out, new tires, 18-in. awning, 14.7K miles, excellent condition, \$25,500; tow bar, \$425. Garcia, 554-2690.

**REAL ESTATE**

3-BDR. HOME, 2 baths, 1,270-sq. ft., sunroom, Volterra SE, 4 yrs. old, tiled throughout, \$198,500. Cox, 505-440-0643.

**TRANSPORTATION**

'01 PORSCHE 911 TURBO, AWD, 6-spd., maintenance records, 36.5K miles, excellent condition, photos on Craigslist, \$42,590. Wareing, 652-2883.

'04 TOYOTA CAMRY, 4-dr., 4-cyl., 2.5L AT, PL, PW, power seats, cruise control, 22/32-mpg, gold, gold interior, 47K miles, great condition, \$9,000. Ohlhausen, 301-0963.

'01 CAMARO SS, 6-spd., manual, V8 LS1, black, black leather, T-tops, 2 owners, 80K miles, \$10,500. Coupous, 973-214-0923.

**ECP gets back on track as deadline nears**

By Nancy Salem

The Employee Caring Program (ECP) was sidetracked by the federal budget crisis and possibility of a Sandia shutdown, but the charitable campaign has a week to go and is gaining steam, organizers say.



"Sandians are amazing," says Kelly Westlake, manager of Business Operations Support Dept. 10586 and this year's ECP campaign chair. "We continually deliver, and I am confident the campaign will succeed."

The campaign, which raises funds for the United Way of Central New Mexico (UWCNM), was extended through Friday, Nov. 8, to give employees time to address their individual situations and determine if they can support the cause. "To get back on track, we simply ask one to take the action to participate," Kelly says. "It's a few simple clicks that result in a positive difference to someone with need."

Kelly says the federal budget situation has had a negative impact on the campaign. "Rightfully so; I believe that employees have taken precautionary measures to ensure that their personal situation is addressed first," he says. "This has resulted in a delayed action to commit through an ongoing and/or one-time contribution. Although a permanent governmental solution has not been resolved, I'm hoping that Sandians recognize that any commitment, regardless of size, matters to someone who is less fortunate."

Pam Catanach (3651), the Community Involvement specialist who coordinates ECP activi-

ties, says momentum is returning. "It's important to know," she says, "that employees can make changes to their donation online by Nov. 8 and later in the year using a paper form."

At Lab News press time, 65 percent of Sandians had pledged about \$5.1 million to the ECP through recurring donations and the give.sandia.gov website. Last year Sandia became the first New Mexico company to top the \$5 million mark in a single campaign when employees and retirees gave \$5,508,717, a 17.1 percent boost over 2011.

Donations can be directed to any nonprofit worldwide or to the Community Fund, which supports a range of agencies and programs addressing self-sufficiency, health, and education. Since the ECP was launched in 1957, Sandia has been the single largest supporter of the UWCNM's annual campaign, donating more than \$76 million.

Kelly says his message to Sandians is one of acceptance. "Whether you choose to participate or not does not change the great person you are or the way that one thinks about you," he says. "ECP is only one of the many impactful activities that Sandians use to support the local community and/or your designated agency."

"I know that everyone gives in their own special way. For those who do not currently participate, I simply ask you to consider supporting this effort as I guarantee your donation will be effectively used to help those who are most vulnerable. For those who are participating, I sincerely thank you for your support."

**Mileposts**

New Mexico photos by Michelle Fleming



Michael Spoerner 15 1387



Steve Lindsay 15 5518



James Majors 15 6531



Johnny Montano 15 2614



Tina Newlander 15 9517



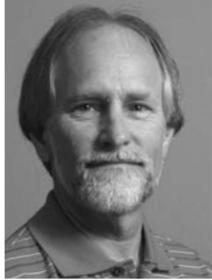
Joe Sanders 15 5943



John Shaw 15 9535



Neill Symons 15 5336



Michael Trahan 15 5515



Gabriel Velasquez 15 2123

## Kim Sawyer selected for 2013 Governor's Distinguished Public Service Award

By Chris Miller

**K**im Sawyer, Deputy Laboratories Director and Executive VP for Mission Support, is one of 12 New Mexicans selected to receive the 2013 Governor's New Mexico Distinguished Public Service Award (NMDPSA). Gov. Susana Martinez, along with former



KIM SAWYER

New Mexico Govs. Garrey Caruthers and Toney Anaya, will present the awards Nov. 12 at the 44th annual New Mexico Distinguished Public Service Awards Banquet at the Marriott Pyramid hotel in Albuquerque.

The awards recognize "unusual contributions to the public service and to the improvement of government at all levels by both government employees and private citizens." They are given in four categories: federal government and national laboratories; state government and universities; local and American Indian governments; and business and civic.

Kim was nominated for the federal government and national laboratories award category.

The nomination noted: "Ms. Sawyer has shown herself to be a leader in her work and in helping others in the community. She strives for excellence in everything she does, and readily mentors others to achieve their potential."

"I'm delighted and honored to receive the award," Kim says. "I feel this award really represents the efforts of all Sandians, who work hard to make this a great laboratory and do so much to give back to the community."

Sandia President and Laboratories Director Paul Hommert supported Kim's nomination in a letter to the NMDPSA. "Since she

*"I'm delighted and honored to receive the award. I feel this award really represents the efforts of all Sandians, who work hard to make this a great laboratory and do so much to give back to the community."*

— Sandia Deputy Laboratories Director and Executive VP for Mission Support Kim Sawyer

became one of Sandia's executive leaders, Ms. Sawyer reorganized Sandia's Mission Support programs to bolster their effectiveness for supporting efforts that aim at aligning the business components of the Laboratories with business realities of the 21st century," he said. "Her dynamic and engaging approach to leading change made her instrumental in initiating organizational and cultural change, developing relationships with customers, advocating innovation, controlling costs, and applying savings toward meeting mission requirements."

Ed Rivera, president and chief executive officer of United Way of Central New Mexico, also supported Kim's nomination. "Due to her leadership, Kim has helped to elevate an already strong culture of philanthropy at Sandia National Laboratories to even higher levels. Kim was instrumental in setting a record high \$5 million company goal. . . . Sandia employees not only met that goal, they surpassed it, raising \$5.5 million dollars."

The nomination cited Kim's support of Sandia's outreach programs and her passion about encouraging girls at an early age to pursue careers in science, technology, engineering, and mathematics (STEM).

Kim serves as a board member for Albuquerque Economic Development Inc., and the Economic Forum of Albuquerque. She also is vice chair of United Way of Central New Mexico and will serve as board chair in 2014. In addition, she is a member of the Society of Women Engineers and Women in Defense.

## Jill Hruby named to 2014 Women Worth Watching list in *Profiles in Diversity Journal*

By Tim Deshler

*"Humor is important for me. I live by the notion of taking my job seriously but not taking myself too seriously. . . . I try to bring my sense of humor to work with me every day. It's a natural way to stay positive, even when the situation is difficult."*

— Div. 6000 VP Jill Hruby

**J**ill Hruby, VP of Energy, Nonproliferation, and High-consequence Security Div. 6000, has been named in the class of 2014 Women Worth Watching by *Profiles in Diversity Journal*. The 12th annual special issue features more than 150 senior women executives, all of whom were nominated by their peers. According to the journal, this honor is given to women executives who have demonstrated outstanding career achievement and leadership.

*Profiles in Diversity Journal* is a bimonthly magazine that covers diversity and inclusion in business, government, nonprofit, higher education, and the military. The journal's focus includes senior leadership, best practices, workforce diversity strategies, and recognition of employee contributions. "There is an overwhelming desire for business people and companies to not only celebrate diversity and inclusion but to share and pay forward to those following in their footsteps," says James Rector, publisher and founder.

Women Worth Watching nominees are asked to write a personal essay describing their journey to leadership, who and what contributed to their success, and what advice they would give to someone just beginning a career.

### 'Things happened'

Jill's engineering experience began as a college student working in a foundry in the 1970s. The job was challenging — factory workers didn't like any engineer to be on the "floor," and being a 20-something female made things even harder for her. "It was not a professionally kind environment, and it went as far as sabotage," says Jill. "Things happened — drawings disappeared and screws were removed overnight." But that experience taught her to establish recovery plans. It also taught her how to anticipate issues and how to be determined without developing a negative attitude.

The rest of Jill's engineering career has been in a research and

development environment. The obstacles, she says, have been more subtle than in her foundry work, but not too different. "I became a leader by working with and through exceptional people," says Jill. "Anticipating issues, finding the positive in a situation, and being determined have served me well."

Today, Jill manages an organization with more than 1,000 people, as well as a complex business unit. As a leader, Jill says she has added a few more coping skills, including humor and authenticity. "Humor is important for me. I live by the notion of taking my job seriously but not taking myself too seriously," she says. "Laughing with others is wonderful, and I try to bring my sense of humor to work with me every day. It's a natural way to stay positive, even when the situation is difficult."

Jill says she has learned over the years that people want to know who their leaders are. She spent much of her career staying private, willingly expressing her opinions but not her feelings. "My behavior was driven by being different, since I was usually the only woman in my work group at my level and did not want to accentuate the differences," she says. "I did laundry, cooked, worried about daycare, kids, and getting homework done — but I kept it to myself."

Over time, Jill says, she has become more comfortable sharing her life and feelings. "It seems to help others understand they can be real people and still be successful."

Jill says that what is most important to her now is to create a work environment where all women and men can bring themselves more fully to work every day.

The keys to succeeding and being competitive in her field, Jill says, include staying current on technical developments and national security trends; constantly focusing on the most important issues, while not ignoring the routine — which she says is a difficult balance; never being afraid to express opinions and ideas; and being willing to adjust. Her philosophy is "Be positive and determined, and don't forget to laugh."



JILL HRUBY