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 flows in particle suspensions. The magnetically stimulated flows offer an alternative for when heat transfer is difficult, 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, a physical behavior stemming from fundamental phenomena.

“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 of Physics: Condensed Matter.

The researchers discovered various flow patterns they’ve termed isothermal magnetic advection, has shown very good results for noncontact heat transfer and cooling in a war. “That says it all,” says Jason. (Photo by Randy Montoya)

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. They say the magnetically stimulated flows they’ve discovered offer an alternative for when heat transfer is difficult because they overcome natural convection limits.

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.

(Continued on page 4)
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 hatched 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 still have the same exercise run-off 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 just sticking over the edge of the abyss.

During his all-hands meeting about the shutdown, Paul Hommet 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 aplug 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 comprised 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 Krane replies, “With all due respect, sir, I believe this is gonna be our finest hour.”

I think that’s what 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: “Support 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 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

“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, m50148, 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 Radiati-
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 Sieged, 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 enabled Criegee intermediates to be probed, and Argonne National Laboratory's Stephen Kipling. "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 (MPMSX) 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-reviewed publications and has given more than 50 invited lectures.
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 they’re behaving as a single organism. “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 Domenique Wittner (4488-5). “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 Domenique 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.”

**Fluid flow**

(Continued from page 1)


**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. 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 disaggregated, 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 made from one to a few millimeters in size, as looking like worms slithering by each other, tadpoles swimming in the same direction, sand ripples, ridges, ridges, 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, each 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. “The one thing it’s trying to become is that the flow 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 between field components.”

One pattern is a vortex lattice of micro-tornadoes spinning in the opposite direction of their neighbors. Jim explains that it is essential that the vortex have a checker-board 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; the flow is redirected.

“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 dialys 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 where the field was redirected.

**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 valves 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-like plate 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.

This also 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 scale.”

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 just not 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.

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**SANDIA LAB NEWS • November 1, 2013 • Page 4**

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 Clean- ing 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 and 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 prac- tices, 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 demon- strate leadership in creating a safe and environmentally responsible approach to cleaning.

Custodial Services team supervisor Chris Romero (4848-6) teaches Sandia custo- dians 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 Domenique Wittner (4488-5). “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 Domenique 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.”

“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.”

The custodial team supervisor Kyle Cole (4848-6) says, “You learn a lot about the auditors. 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.”

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 DOR/UNNA Best in Class award, in collaboration with the recycling program.

**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 flow in particle suspensions. (Photo by Randy Montoya)
**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 (2098), 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 their family members a community-friendly, non-judgmental place where emotions, feelings, and stories can be discussed.

**Earn veterans’ trust**

Community resource representatives. “We had some very positive feedback from the US Department of Veterans Affairs, and community resource representatives,” said Boehm. “We had some very positive feedback from the US Department of Veterans Affairs, and community resource representatives.”

“Ironically, it’s not the worst thing we shared,” says Steve, who has been familiar with those feelings in different stages of their lives. “It was emotionally and physically drained — in a good way.”

Sandia’s Combat Stress Support 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.”

“It doesn’t matter what you do or say. 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**

“Switching on and off combat 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.”

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? Any normal person would look at what you do in combat and say, ‘Are you nuts? You’re running into that? Right now, 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.”

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**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 505-352-6368 or jmthomas@sandia.gov.

SANDIA HONORED – New Mexico Gov. Susana Martinez salutes the flag at an Oct. 25 Employer Support of the Guard and Reserve (ESGR) event at Albuquerque. The ESGR New Mexico Patriotic Employer Award Luncheon honored companies — that hired unemployed or underemployed members of the National Guard and Reserve in 2013. James Perry (director of Center 5600), John Larson (senior manager of Dept. 90), N. Beso Campbell-Dumme (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.

(PhotobyRandyMontoya)

SANDIA LAB NEWS • November 1, 2013 • Page 5

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 meet-ups 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 I would 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.”
Randy McKees 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 the last three decades mentoring in minority recruitment, graduate, and undergraduate programs at Sandia. “Connecting back to the community through the people who want to get into science fields is important to me,” he says.

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 organizations 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 these careers provide promising career paths through graduate school. It also offers professional development, mentoring, networking, community service, and networking opportunities.

“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 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 Matten (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.

“Here I was at 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 with them directly. But my managers decided I should be well-rounded. I even 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. I kept up, and I was told I’d have to be well-rounded. I even wanted to be sure I stayed with physics research.

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Office Chair, $50 OBO. 300dis cd changer, $100 OBO Volvo, 400-8888.
Chest Freezer, 5-cu. ft., $15 to $25 a 23rd, excellent condition, $100. Tab.
286-1598.
Gas Dryer, Whirlpool, 1 yr. old, used.
Goode, $119-3127.
Radiator, $100. Eichel, 292-5795.
Gun, $290. Foehse, 401-9491.
Soda / Beer Fridge, long, $50 OBO. Rosech, 301-0963.
1999 Volvo V70, 1 owner, 55K miles, $6,500.
Tina Newlander 15 5518
Village, $400+
Tina Newlander 15 6531
Large bedroom (15x12), $300 OBO. Stewart, 505-681-4650.
1999 LS1, black, black leather, T-tops, 2
Ohlhausen, 301-0963.
47K miles, great condition, $9,000.
Gibson, 707-414-0923.
1999 LEXUS RX300, engine has no com-
Chris Blankenship, 505-681-7517.
For sale at Lab News:
1999 PONTIAC GRAND AM, black,
$300. Cline, 250-702-6380.
1998 HUMMER H1, silver, 110K miles,
$10,000 OBO. Lott, 505-891-8623.
1995 JEEP GRAND CHEROKEE, 4-dlp,
$300. Fisher, 297-1688.
1977 FORD MUSTANG, $500.
Coulhos, 973-1214-0923.
1967 CHEVY NOVA, $1,000.
Couplin, 707-1688.
Paintball gun, $80.
Thompson, 505-891-8623.
HIPSTERS CRAFT SHOW, quilt raffle to
good cause. Miller, 505-891-8623.
Ronor, $100. Eichel, 292-5795.
1999 FORD TAUNUS, $600.
Twila B., $100.
394-6904.
"If you provide us with all the
donor's information, we will mail the receipt.
"We are seeking to help those in need,
who have given to the cause in the past,
and who are able to keep giving in the future."

\section{Recycling}

\subsection{Paper Recycling}

The recycling program is implemented to:

\begin{itemize}
\item Help reduce the amount of waste sent to landfills.
\item Reduce the demand for new paper production.
\item Conserve natural resources.
\end{itemize}

\subsection{Glass Recycling}

The glass recycling program is designed to:

\begin{itemize}
\item Collect and sort glass containers for recycling.
\item Reduce landfill disposal of glass.
\item Promote environmental awareness.
\end{itemize}

\subsection{Plastic Recycling}

The plastic recycling program aims to:

\begin{itemize}
\item Collect and sort plastic containers for recycling.
\item Reduce landfill disposal of plastic.
\item Encourage recycling habits.
\end{itemize}

\subsection{Metal Recycling}

The metal recycling program focuses on:

\begin{itemize}
\item Collecting and sorting metal scrap for recycling.
\item Reducing landfill disposal of metal.
\item Promoting environmental conservation.
\end{itemize}

\subsection{Electronic Recycling}

This recycling program is intended to:

\begin{itemize}
\item Collect and sort electronic waste for recycling.
\item Avoid sending electronic waste to landfills.
\item Promote environmentally friendly disposal methods.
\end{itemize}

\section{Conclusion}

By implementing these recycling programs, the Lab News contributes to the overall effort of minimizing our environmental impact. Through recycling, we are able to:

\begin{itemize}
\item Reduce resource consumption.
\item Prevent pollution.
\item Promote sustainability.
\end{itemize}

Recycling is an essential part of our commitment to environmental stewardship, and we encourage all members of our community to participate in these efforts.

\section*{References}


\section*{Acknowledgments}

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\section*{Authors}

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\section*{Appendix}

A detailed list of recycling bins and their locations within the Lab can be found in the Lab News recycling section.

\section*{Glossary}

- BPA: Bisphenol A
- EPE: Expanded Polystyrene
- HDPE: High-Density Polyethylene
- LDPE: Low-Density Polyethylene
- PET: Polyethylene Terephthalate
- PVC: Polyvinyl Chloride

\section*{Future Directions}

As the recycling programs continue to evolve, future efforts will focus on:

\begin{itemize}
\item Improving collection efficiency.
\item Expanding recycling education campaigns.
\item Collaborating with local businesses and organizations.
\end{itemize}

These initiatives are aimed at further reducing our environmental footprint and promoting a sustainable future.

\section*{Conclusion}

The Lab News' recycling programs exemplify our commitment to sustainability and environmental responsibility. By engaging in these practices, we not only reduce waste but also contribute to a cleaner and more sustainable future.
Kim Sawyer selected for 2013 Governor’s Distinguished Public Service Award

By Chris Miller

Kim 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 New Mexico Govs. Garrey Carruthers and Tony 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 and state government and national laboratories, state government and universities, local and American Indian governments, and business and civic.

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

“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

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

Jill 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 trends, 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 work didn’t leave any reason 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 fast 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, she 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 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.”