Sandia LabNews

Vol. 64, No. 19 October 5, 2012

Managed by Sandia Corporation for the National Nuclear Security Administration

Sandia National Laboratories

A culture of giving

Since the Sandia Employee Caring Program was launched in 1957, Sandia has been the largest single supporter of the United Way of Central New Mexico. Now, as the 2012 campaign begins, Sandia is aiming to raise $5 million in community aid. Details on **pages 6-7**.

ECP campaign is Oct. 8-26

Sandia entering performance review, compensation cycle under new system

By Sue Major Holmes

Sandia is moving into this year's performance review and compensation cycle under a new job-based system, which went into effect in April and will mean some changes in the process.

The system strongly links pay to individual performance and considers not only how well a person does the job and the impact of the results, but also behaviors such as teamwork, adaptability, and innovative thinking.

In addition, employees will be placed into one of five zones, each with its own criteria. The top four zones are considered acceptable performance. Zone 5 equals top performers; Zone 1, which will be used as appropriate, means the employee's performance or behavior needs improvement. Each zone carries a distribution target: 15 percent of employees will fall into Zone 5; 25 percent into Zone 4; 50 percent into Zone 3; and 10 percent into a combination of Zones 1 and 2.

President and Labs Director Paul Hommert told a Sept. 20 All Employees meeting that the new structure will bring greater transparency to the process of clearly linking compensation to performance.

When managers differentiated how well employees met objectives under the previous system, employees naturally fell into subgroups within a certain value of contribution, but subgroups were not transparent to them and compensation decisions were based on those subgroups, Paul says.

The new system is more transparent and better clarifies alignment of performance with compensation. Sandia cannot pay for performance without a spread in performance zones, says Div. 6000 VP Jill Hruby, who also spoke at the meeting. "We're trying to find that balance where we think those natural breaks are and allow us to have a differentiation in pay that reflects what we see as the differences in performance," she says.

A merit matrix

Zones will drive suggested pay increases in a new merit matrix that makes compensation recommendations based on an employee's performance zone and compa-ratio, which is the base salary divided by the midpoint of the market band for that particular job. For example, the compa-ratio would be 100 percent for someone who makes $72,800 in a market band in which that salary is the midpoint. The merit matrix, which is a common standard in industry, will recommend a larger percent increase for an employee with a low compa-ratio and a high performance rating than for one with a high compa-ratio and a high performance rating.

This year's review will include a non-base component, similar to last year's Total Cash Compensation concept, in which the combination of an employee's base and non-base was considered the total salary and would grow from year to year.

Sandia is working with DOE to obtain approval on the compensation increase plan for this year, Paul says. Once Sandia receives its approved compensation package, the executive leadership will work the details of the merit matrix.

New job descriptions that went into effect in April will help managers compare people who are doing the same type of work and will bring more consistency to performance reviews because the descriptions list the knowledge, skills, and abilities an employee should have.

Performance evaluations begin with the employee's immediate manager, who reviews an employee's performance and evaluates objectives and expectations against performance zone criteria. Considerations that go into the evaluation include progress toward objectives, taking into account their completeness, scope, and complexity. Managers also consider model behaviors and the impact of results. The manager chooses the performance zone that best reflects the employee's overall performance.

Managers then assess employee performance through a relative review in which performance reviews are conducted by job family — a group of jobs that require similar skills and expertise. The relative review compares employees doing similar work to measure how effective a given employee is at the job, recognizing the scope and complexity of an employee's objectives in comparison to that employee's peers. When all reviews are final, zone distribution targets are met at the division level by non-exempt, exempt, and management job categories.

For more information, go to http://info.sandia.gov/compensation_performance.

Strong response to LM Voice employee survey shows positive attitudes in most areas

By Jim Danneskiold

Many more Sandia employees took part in this year's LM Voice employee survey than in 2011 and the results reflect a more positive view of work life at the Labs.

LM Voice
Powered by employees.

Over the next two months, managers will share detailed Labs-wide and center-specific results with employees and engage them in discussions about how to use the survey results to identify improvements, says Pam Hansen Hargan, VP for Human Resources and Communication (Div. 3000).

"We were all extremely encouraged by the great participation rate this year and really appreciate that so many of you took the time to give us your take on what we are doing well and what areas may need work," Pam says.

(Continued on page 5)

Inside

NISAC helps sniff out contamination in food supply. See **page 12.**

Labs honored for sustainable energy management . . 2
Employee death: Remembering Carl Pretzel 3
Security Connection launched 10
Sandia experts help analyze Louisiana sinkhole . . 11
Sandia Research and Technology Showcase 11

HBE

BE A BETTER HEALTHCARE CONSUMER

2013 Benefits Choices Open Enrollment for Employees, Retirees and Surviving Spouses

See details for employees on page 8; for retirees see page 9.

Primary Standards Lab

Sandia's the word for precision measurements, calibrations

By Sue Major Holmes

You probably never gave roundness a thought.

But when it's crucial that something be really round, federal labs and agencies can turn to the DOE Primary Standards Laboratory (PSL), operated by Sandia.

Take the standard for roundness, or deviation from a circle. The PSL uses a specialized instrument to measure roundness deviation against a roundness standard, a polished quartz ball nestled in a padded box. That roundness standard has been certified to national standards to be round within about 20 nanometers.

Primary Standards Lab museum displays history of measurement. See **page 4.**

"You can't measure the actual diameter of a circle in here, but we can measure how far off that circle is from being a perfect circle," says project lead Hy Tran (2541). "We are capable of resolving a tenth of a nanometer from this piece of equipment. … The resolution is exquisite."

If you blew up the quartz ball to Earth size, the instrument could detect hills and valleys about 1¼ inch high, he says.

The PSL develops and maintains precision measurement standards, provides measurement assurance training and consultation, provides calibrations and technical support, and performs technical surveys and measurement audits. Its work ranges from doing electrical, physical, dimensional, and thermodynamic calibrations for Sandia organizations to certifying refer-

(Continued on page 4)

REALLY ROUND — The image of project lead Hy Tran (2541) is reflected in a polished quartz ball that is the standard for roundness. The Primary Standards Laboratory at Sandia uses a specialized instrument to measure roundness deviation against the roundness standard, which has been certified to national standards to be round within about 20 nanometers. (Photo by Randy Montoya)

That's that

We all know the story, at least in its broad outline if not in its particulars.

In 1949, as it became clear the nation's nuclear weapon enterprise needed to be ramped up to meet the challenges of a complex post-war world, President Truman challenged AT&T "to render an exceptional service in the national interest" by taking on management of Sandia laboratory. Inevitably, that phrase, "exceptional service in the national interest," became Sandia's own motto, a mission statement and a vision statement rolled into one neat, concise — and memorable — phrase.

Sandia sought out and hired the country's finest engineers, scientists, technicians, and administrators to carry out its mission. Given the caliber of the people, it's hardly surprising that our forebears, the first Sandians, fulfilled the promise of that mission statement day after day, week after week during those early years of the Cold War, setting the bar high for those of us who came after them.

Our record of mission success speaks for itself. We have continued to clear that high bar, still true to our original charge "to render exceptional service in the national interest."

Who knew, though, that those same Sandians, the first ones, would also be such committed and passionate champions of the local community? But they were. They set a high bar for us there, too, rendering exceptional service in the local community.

In 1957, after a memo-writing campaign that had started several years earlier, then-Public Relations Director Ted Sherwin and several like-minded colleagues launched the charitable giving program that we now call the Employee Caring Program, or ECP.

In a special publication produced for Sandia's 40th anniversary in 1989, Ted talked about the origins of ECP. "I knew the specifics of the plan would make it unique — unique not only in the community but in the Bell System. Year-round giving by payroll deduction would be the key. That was new in those days . . ."

In that first year of the formal ECP campaign, Sandia giving increased more than 35 percent over previous, more informal efforts. Sandia contributions that year represented about 20 percent of the total pledged to the United Way of Albuquerque. In the 55 years since, Sandia's contributions have continued to be the foundation upon which our local United Way has been able to serve the community. We are still, by far, the largest contributor to United Way in New Mexico.

Last year, Sandians — and retirees, don't forget our retirees! — pledged more than $4.5 million during the ECP campaign. And don't forget, too, that in 2011, we were in a salary freeze situation; even so, Sandians dug deep and established a new giving record. Again. Seems like every year, we top ourselves.

When I first started at Sandia in 1995, $2 million was the magic number; now we're at twice that and then some. I just have a feeling that $5 million is within our reach this year, which would be an awesome way to share our good fortune to have good jobs in a tough economy.

Beginning on Oct. 8, the 2012 ECP campaign gets under way. You can read the details in a spread of stories on pages 6-7. Most Sandians already participate generously in ECP, so I'm mostly preaching to the choir here. But if you're not currently contributing, I hope this year you'll consider donating something — anything, really, as every dollar counts — to this effort. You'll feel good about yourself, you'll be helping neighbors in need, and you'll be helping Sandia stay connected to the community. That's a win-win-win.

* * *

Okay, it's only a game, but in the popular culture games can be important. Can anyone deny that the NFL is a big, big deal in this country? A huge deal? Super Bowl Sunday is maybe the biggest event of the year. If it fell on a Monday, it'd be a national holiday. You can mess with a lot of things in the US without causing a ripple, but don't — don't! - mess with football. Everybody knows that. Well, almost everybody, it seems, except the NFL owners, who thought they could offer up an inferior "replacement" product for fans and everything would be fine. Except the fans weren't fooled. This wasn't their beloved NFL. This was some bizarre simulacrum of the NFL, a circus act with guys in zebra stripes instead of clown suits to provide the comic relief. No one was laughing, though, when blown call after call affected the outcome of too many games.

The owners, wising up before they themselves became total laughingstocks, settled their labor dispute with the real referees. The deal came none too soon; if there had been another game like the Packers-Seahawks game of Sept. 23, fans would have started abandoning the NFL for something with more integrity — like professional wrestling.

See you next time.

— Bill Murphy (505-845-0845, MS0165, wtmurph@sandia.gov)

Sandia gains national recognition for sustainable energy management

By Stephanie Holinka

Sandia has received a 2012 DOE Sustainability Award for energy management of its computer servers.

The awards recognize DOE laboratories and sites nationwide for outstanding accomplishments in sustainability, specifically in managing pollution, waste, energy, water, and vehicle fleets.

Sandia's award in the comprehensive energy management category was for its efforts to deploy virtual servers, which have reduced energy use and costs and prevented pollution through reductions in equipment purchases, operations, and disposal.

In April, the project also received an NNSA Pollution Prevention Best in Class award.

Typical physical computer servers are 10 to 15 percent efficient, yet require 100 percent power and cooling.

Over four years, Sandia moved to large-scale server virtualization through a "virtual first" policy, maximizing energy efficiency. More than 700 virtual servers were deployed, spanning six network partitions and multiple Sandia sites.

Sandia's current hardware can have up to 100 virtual servers on each individual physical host server. By combining physical host servers into virtualization clusters using commercial software, host servers work together to balance the loads on virtual servers, resulting in applications operating nearly 100 percent of the time. The design also incorporates a reserve margin so in the event of a crash other servers will pick up the slack, making the entire system more reliable.

Server virtualization led to estimated total hardware savings of $3.4 million and net electricity savings of roughly 7.6 billion BTUs a year for additional cost savings of more than $200,000 annually. Server virtualization also eliminated the need to periodically upgrade and dispose of old servers. Sandia's computer group estimates it is about 50 percent complete in converting candidate computing systems to server virtualization Labs-wide.

John Zepper, director of Sandia's Computing and Network Services Center 9300, and Laura Lenberg of Infrastructure Computing Services Dept. 9329 accepted the award Thursday, Sept. 27, at a ceremony in Washington, D.C.

"Today's Sustainability Award winners are leading by example, showing what's possible when employees bring creativity, innovation and dedication to their efforts to make the Department of Energy more sustainable," said Deputy Energy Secretary Daniel Poneman. "The efforts undertaken by these individuals and teams are helping the department to deliver on President Obama's sustainability goals, while inspiring others both inside and outside of government to start investing in cost-saving clean energy technologies."

Ralph Wrons (4144) of Sandia's Pollution Prevention program says the project "is a perfect example of cost austerity by saving on computer purchases, energy costs, and computer disposal costs, with the likelihood of increasing savings every year that the Labs depends on server-hosted information, which could be a long time."

Sandia's Pollution Prevention program works on electronics stewardship with many Labs organizations, including procurement, computer support, and property management.

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

Sandia National Laboratories is a multiprogram laboratory operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corp., for the US Department of Energy's National Nuclear Security Administration.

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Lab News fax **505/844-0645**
Classified ads **505/844-4902**

Published on alternate Fridays by Media Relations and Communications Dept. 3601, MS 0165

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Employee death

Carl Pretzel: A Life of Exceptional Service

On August 27, Carl Pretzel died from a heart attack at the age of 60. In his 31-year career at Sandia, he was known for his engineering skills, expertise in metallurgy, his wit, and his tremendous knowledge of trivia. In his personal life, Carl was dedicated to his family and to the Boy Scouts of America.

"Carl was a very detailed engineer who would thoughtfully and thoroughly investigate all nuances of his designs. That attention to detail transcended his technical work and he would continually amaze me with his bottomless knowledge of trivia. Most of all, I'll remember Carl as someone who was sincerely happy with the successes of others. When something went well for me it was as if Carl felt it as much as I did," says Mike Hardwick (8240).

CARL PRETZEL

Carl began his career at Sandia in 1981 after five years at Lawrence Livermore National Laboratory. Early in his career at Sandia he supported the nuclear weapons and solar engineering programs as a metallurgy engineer. In 1987, Carl became a systems engineer for the W89/SRAM II program and continued working on the program until 1994.

He next moved to Gas Transfer Systems (GTS) where he developed systems that store and transport hydrogen isotopes for weapon applications. He became an expert in various GTS technologies and received acclaim for his work on the "stem remediation team" that developed a process to remediate and qualify tritium reservoir stems, saving NNSA a large expense.

In 2007, Carl returned to a systems engineering role and worked on the Reliable Replacement Warhead (RRW) program and later on the Reentry Systems Transformation (RST) program until 2011, when he moved to the Capabilities Engineering Department.

Throughout his varied career, Carl had the opportunity to work with colleagues across the country and around the world, most notably with those at the Kansas City Plant, Savannah River, Pantex, and the Atomic Weapons Establishment (AWE) in the United Kingdom.

Ben Markel (8254) remembers Carl as a great engineer, collaborator, and resource. "I often had the experience of asking Carl a 'quick' question and then receiving far more information, history, and new questions than I had when I started the conversation. I think that in addition to Carl being very technically proficient, he really and truly cared about the work, the mission, and sharing his experience and knowledge with others. I know I will remember him years from now and still think 'If only I could talk to Carl about this'," he says.

"I think of Carl as a true human being. He would find the best in people, and he genuinely cared about the people he worked with. He was always there to help and encourage his friends," says Nick Paradiso (8254). "Carl believed that family comes first. He loved his sons very much and was very proud of them. He knew they would pick a different path through life than he did, so he tried to guide them through the rough spots we all face. You could ask Carl for advice on anything and he would be there to help whether it was personal or professional. He was a very good person and I will miss him very much."

Carl also was very involved in the Boy Scouts of America. He became an assistant scoutmaster for his son's troop in 2003 and logged more than 110 hours of community service for the troop. In 2006, he was inducted into the Order of the Arrow (OA), Scouting's National Honor Society.

"I knew Carl not only as a competent engineer but also through Scouting," says Tim Shepodd (8220). "Carl was a selfless servant to the boys in the Order of the Arrow. He led countless trips with many boys, donating his time to the growth of young men from around the Bay Area."

Dean Buchenauer (8252) knew Carl both as a colleague and through Boy Scouts. "The OA's brotherhood of 'cheerful service,' especially in promoting camping, was a perfect match for Carl," he says. "He became a tenacious promoter of the OA's activities within our troop, worked as an adviser to the OA youth, helped introduce new members to Native American traditions through his work on the dance team, and participated in two national OA conferences.

"Exceptional service is what I will remember most about Carl. He shared a dedicated commitment to service: service to his family, service to the youth in Scouting, service to his local community, and service to the nation, through his work at Sandia National Laboratories."

— Patti Koning

Sandia CaliforniaNews

Better engine design: A Look at the Engine Combustion Network

By Vanitha Sankaran

American industrialist Henry Ford once said, "If everyone is moving forward together, then success will take care of itself." Ford was no doubt speaking on the basis of his business expertise but some 100 years later, his ideas of success are still in motion at the Combustion Research Facility (CRF). In keeping with the concept that research is most effective when moving forward together, Lyle Pickett (8362) developed the Engine Combustion Network (ECN). The CRF has a long history as a leader in engine combustion research, which is supported by the DOE Energy Efficiency & Renewable Energy Vehicle Technologies Program.

Made of groups from all over the world, the ECN grew out of a need to make computational modeling more predictive for engine design. Advances are made only when the computational models are based on conditions most appropriate to engines, but there are noticeable gaps in the available data.

Focusing on spray combustion

"Our research focuses on spray combustion in a controlled chamber at high temperature and pressures, paying attention to conditions that inform computer modeling. Researchers have developed a handful of these chambers throughout the world but never compared their performance. Although our own datasets are quite limited, they are widely requested by the engine computer modeling community," says Lyle.

It would be easier, he thought, if the datasets his group generated were easily available and searchable by parameter set. Better yet would be to invite other researchers in different aspects of engine design to work under the same parameters, and then meet to discuss for mutual benefit.

Modeled after a similar effort at the CRF in turbulent flames research, the ECN received support as a collaboration between international research groups, each working in their own labs with the same equipment and parameters. Lyle developed a website archive for past data (http://www.sandia.gov/ecn), then proposed an initial set of conditions for future research to the engine community. Automotive parts supplier Bosch donated fuel injectors for the work.

The ECN formed and delineated its goals: First, establish an Internet library of well-documented experiments appropriate for model validation and the advancement of scientific understanding of combustion at conditions specific to engines. Second, provide a framework for collaborative comparisons of measured and modeled results. And third, identify priorities for further experimental and computational research.

After international participants joined the ECN and research commenced, the group convened at a workshop now called ECN1, held in Ventura, Calif., in May 2011. Sponsors from a French ministry paid registration costs for the workshop and Lyle worked with Gilles Bruneaux from IFP Energies Nouvelles (IFPEN), a French public-sector research, innovation, and training center active in the fields of energy, transport, and the environment, to co-organize the event. Results from experimental and modeling efforts were presented in topical subgroups with organizers leading the collection and analysis of data prior to the meeting. Fifty-three researchers attended the workshop in person, with an additional 16 attending by webcast, and even more accessing the results and workshop materials since.

Overall, the results of ECN1 were impressive. First, results from experiments and computations between different facilities were compared to see if the community was correctly controlling its boundary conditions. The data obtained showed good repeatability, implying they were on the right track. Second, the experiments were studied to understand better the functional components in engine design. For example, the effects of fuel temperature and composition on performance and the development of spray were studied by some while others focused on injector shape.

Participants from more than 20 countries attended ECN2, held in September in Heidelberg, Germany. Led by organizers from Sandia and IFPEN, the workshop addressed key stages of spray development and combustion, with eight institutions contributing experimental data and 16 groups offering computational fluid dynamics simulations at the same operating conditions.

Significant progress

"We've made significant progress. The number of attendees nearly doubled between ECN1 and ECN2," says Lyle. "What impressed me was the level of coordination between experimentalists and modelers, which was possible through a lot of preparation before the meeting. This allowed side-by-side comparisons and expert review of the current state of the art for diagnostics and engine modeling."

The ECN workshops are especially valuable, says Lyle, because participants come willing to share their work, compare data, and work on-site to improve their understanding of engine processes in a manner that's different from a typical conference. From the enthusiastic support the ECN garners, it's clear the investment is a worthwhile one, Lyle adds.

RESEARCHER LYLE PICKETT, shown here in the Engine Spray Combustion Lab, created the Engine Combustion Network to facilitate modeling/experimental exchange that leads to improved engines. (Photo by Randy Wong)

The two main workshops are certainly the highlights of the network, but that doesn't mean the community stays idle in between. In fact, constant collaboration and dialogue is a necessary component of running comparative activities. A major web-based workshop, dubbed ECN1.5, netted 125 attendees; in addition, topical subgroups meet every few months over the Internet. Datasets and other tools are offered through the ECN website, with improvements and additions constantly made in an ongoing show of community effort. The website features a searchable database open to the public.

What does all of this come down to? In a phrase, better engine design. Improved understanding of experimental results and modeling predictions leads to engine designs that can be optimized before implementation, with a great savings in both cost and time. This, in turn, leads to higher efficiency, lower-emission engines available sooner and more cheaply than what would be on the market if these researchers followed the traditional model of working independently.

A third ECN workshop is in the works for early 2014. The date and location are still to be determined.

Sandia's Primary Standards Lab displays history of measurements

By Sue Major Holmes

ANCIENT MEASUREMENTS — Mark Benner, left, and David Sanchez (both 2541) show off two items from the Primary Standards Laboratory's museum in the PSL lobby. Mark holds a replica of a master cubit, an official measurement of the ancient Egyptians, while David holds a box containing benzoic acid cells and the handwritten 1957 instructions on their use. (Photo by Randy Montoya)

Two nearly floor-to-ceiling glass showcases tucked into a corner of Sandia's Primary Standards Laboratory's lobby form a little history museum of the science of measurement. The PSL's Mark Benner and David Sanchez stand in front of the display, describing instruments, musing over who might have once used the equipment, and wishing they had enough space for stuff researchers still have squirreled away.

The museum, brainchild of staff members and several since-retired Sandians, was formed after the PSL moved into its current building in 1994. Some instruments exhibited were retired when they no longer met the specifications of that time, says David, project lead for the PSL's flow, acceleration, shock, and humidity lab. Others show older technology now replaced by something newer and more accurate.

What seems old-fashion now was cutting edge in its day, say Mark and David (both 2451).

"There are a lot of advances in materials and electronic technology that have upgraded and replaced most of this equipment," David says.

Retiree Dick Pettit says some equipment was replaced after the move because funds were available for new measurement systems and standards. He also says the staff, aware of the National Institute of Standards and Technology's all-things-metrology museum in Gaithersburg, Md., wanted space to display items "that had a unique history or looked impressive."

"Metrologists are very reluctant to throw stuff out," says Mark. Their reasons: Someday they're going to use it; it was so precise; it still works; it has so much history behind it.

"That's the big thing in any calibrated measurement and test equipment and standards. The more history you have on a calibrated instrument, the more confidence you have" in that measurement, David says.

Measurement standards and calibration have been around for millennia. Ancient Egypt had the cubit, the official measurement of the distance from the Pharaoh's elbow to the tip of the middle finger — which changed as leaders changed. Still, there was an attempt at calibration with a requirement to periodically compare cubit sticks to a master cubit.

The museum has replicas of a wooden cubit, a stick with lines across it, and an Egyptian royal cubit of Amenhetep I from 1550 B.C., a thin stone length carved with hieroglyphics. A brochure translates the symbols and explains the master cubit, about 20.6 inches long and subdivided into two spans, six palms, and 24 digits, or finger breadths. Digits are further divided.

Studying the cubits, Mark and David assume the wooden one corresponds to a modern-day working standard and the stone one is the primary standard it's checked against. "Let's see how accurate it is," Mark says, setting the wooden cubit against the stone one. "Looks pretty darn close."

The crude measuring system helped build the pyramids, distinguished technologist Jim Novak (2542), noted during a building tour. "Without calibration, they wouldn't have been able to do that. It wouldn't have been squared or aligned properly," he says.

A rectangular wooden box on display contains two benzoic acid cells, bulbous glass tubes with a stem on one end. They're temperature standards, based on the principle that benzoic acid becomes liquid at a certain temperature and pressure, which is an intrinsic property, David says. Tucked into the lid are sheets of notebook paper with handwritten instructions, "Steps in Using a Benzoic Acid Cell," dated July 1957. They start like a recipe: "1. Have an agitated bath or oven at a temperature of 130 to 135 degrees C before inserting cell. 2. Leave cell in bath or oven until all crystals have melted, about 2-3 hours."

Permanently precise!

The maroon cover of an instrument catalog's Silver Anniversary Edition — date unknown — proclaims: "Permanently precise! Electrical instruments of precision," although nothing ever is permanently precise. The catalog describes equipment, including one electrical meter in the showcase, a Universal Polyranger for measuring AC and DC currents.

The exhibit has three two-pan balances, some from around the turn of the last century, each encased in its own glass-sided box. The largest, in an elegant oak box, holds pride of place in the lobby. Balances are used to calibrate mass artifacts — something physical on which to base a measurement. For example, the PSL calibrates 1-kilogram mass artifacts sent by other labs by comparing them against the PSL's primary standard, taking into consideration such factors as different densities of materials and buoyancy corrections, David and Mark say.

A quantity of something is placed on one pan and weights on the other. Without a standard, "what's to keep them from cheating people by modifying the weights, making them heavier or lighter than they should be?" Jim says. "So everybody's going to get weights and one authority is going to check the weights."

The showcases also display accolades to PSL staff over the years: certificates of appreciation; plaques for outstanding work; two William A. Wildhack medals, the National Conference of Standards Laboratories' highest award for metrology; and a 2008 R&D 100 Award for one of that year's most technologically significant products, the Silicon Micromachined Dimensional Calibration Artifact for Mesoscale Measurement Machines.

Standards lab: Measurement and calibration

(Continued from page 1)

ence standards for Pantex, Y-12, and other DOE sites to doing work for others like NASA. The consultation work is often overlooked but vital to Sandia's mission. The PSL is called on to support other nuclear security sites and organizations outside DOE.

Measurement and calibration are critical because they affect the quality of scientific and technical data that's published, conclusions drawn from data, and certification of product-to-performance requirements. Sandia's calibrations largely trace to reference standards from the National Institute of Standards and Technology (NIST) for just about anything that can be measured.

"Anything that's manufactured, you have to be able to measure quantities. This is what we do," says PSL distinguished technologist Jim Novak (2542). "It doesn't matter what the discipline is, whether its voltage or mass or pressure or temperature, you have to quantify it and it has to meet some type of standard" and an estimate of accuracy.

Most measurements and calibrations are based on comparison.

"You're always comparing with a standard," explains Bud Burns (2541). "You have a standard, you know what that uncertainty is, and you compare an unknown with that standard."

There's a gray area with measurements, and instruments must be calibrated to reduce those uncertainties to acceptable tolerances, Jim says. Over the decades, new instruments and techniques have lessened the uncertainties.

There are basically two types of measurement standards, those based on an artifact and those that are intrinsic. Measurements often are based on an artifact — something physical such as that polished quartz ball that could vary in the tiniest way from another object that's based on it. An intrinsic standard, on the other hand, means you can reproduce a measurement anywhere on the planet and get the same results because it relies on inherent and reproducible properties of a phenomenon or substance.

Specially built for precise measurements

The 45,000-square-foot PSL includes 30,000 square feet of specially designed lab space for measurements and calibrations representing more than 100 metrology disciplines — physical and mechanical quantities such as gas flow, acceleration, or vacuum standards; radiation, including alpha radiation, laser pulse energy, neutron pulse, and solar power; electrical quantities such as DC and AC voltage and current; and microwave electrical quantities.

To ensure calibrations can be done accurately, temperature and humidity are rigidly controlled in each PSL lab, and the building is shielded from radio frequency waves and electromagnetic radiation and isolated from vibration. Even gravity has been calculated at specific locations within some labs because of its importance to precise calibrations. The work requires uncommon equipment, impeccable attention to detail, and experts in metrology, the science of measurement.

Sandia has performed calibrations since the 1950s, but in 1968, the Atomic Energy Commission, a DOE precursor, designated Sandia to maintain the Primary Standards Laboratory for the weapons complex. That makes the PSL NNSA's technical arm for measurements, Jim says.

It has unique capabilities to support the nuclear weapons complex, including pulsed neutrons for neutron generators, microwave devices for radar systems, and gas leak measurements for components that must retain seal integrity at different temperatures and pressures, such as from sea level to space.

The PSL also tests how proficiently other DOE laboratories perform their own measurements based on standards provided by Sandia. If a particular laboratory's core capability is measuring DC voltage, the PSL sends it a voltage source. The PSL knows what the voltage is, but it's up to the other lab to measure it. "Then we look and see if the results are what they should be," Jim says.

Looking at capabilities

A snapshot of some individual PSL labs:

• **Length/Mass/Force**, which deals with dimensional, mass, and force: One specialized machine, resembling a giant washing machine, compares items up to 64 kilos, about 140 pounds. A similar machine does comparisons

(Continued on next page)

LM Voice survey results show positive attitudes in most areas

(Continued from page 1)

"I hope all of you use these results, which represent a true majority of the workforce, to engage in discussions locally about what you can do in your own departments and centers bring about the kinds of changes that will make Sandia a better place to work," Pam adds.

The 2012 response rate of 58 percent shattered the 46 percent response rate last year, the largest one-year increase across Lockheed Martin, Pam points out. Among the reasons for the increase in this, the second year that Lockheed Martin conducted the survey in this format, were the following: expansion of the survey at Sandia to include limited term, postdoc and foreign national employees; clear guidance on how to get to the survey tool on the Internet and how to properly charge time spent taking the survey; and active encouragement from Sandia leadership, including President and Laboratories Director Paul Hommert, who addressed Sandia in a video message about the survey.

Well thought-out, constructive responses

"Employee responses were well thought-out and constructive," Pam comments. "Many of the suggestions we saw are action-oriented and show an overall desire to use the survey effectively to institute positive changes."

Once again, the highest marks in the survey results came in response to questions about Sandia's ethical culture and strong values and about how Sandians model personal excellence. The average index score in the most general of the ethics areas, "Ethics Issues," was 4.8 on a five-point scale. Employee commitment and compliance readiness also received strongly positive scores.

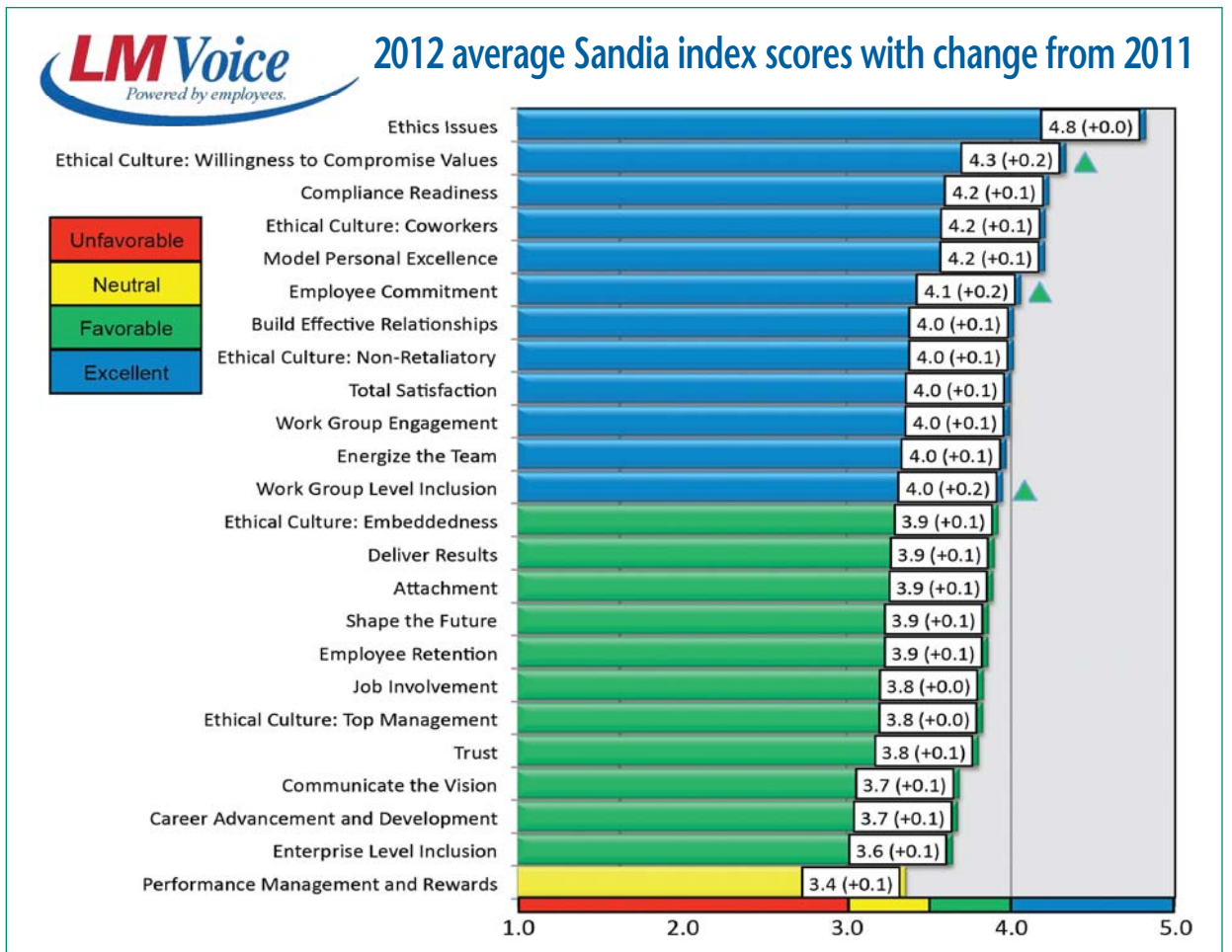
In nearly every major category, scores were higher than last year. Ethical values, employee commitment and work group level inclusion saw the largest positive increases.

And, much like the 2011 survey, employees rated the category of performance management and rewards the weakest. The other area where employee responses indicated a desire for improvement was career advancement and development.

"We believe that the changes we've made to the performance and compensation system over the past year will yield a process that employees will see as more performance-based and transparent," says Pam. "Where your feedback showed areas of concern, we will focus our efforts to identify specific actions that management can take in response to make those areas better."

In the analysis, a score of 4 to 5 is considered excellent; a score of 3.5 to 3.99 is considered favorable; a score of 3.0 to 3.49 is considered neutral (an area for improvement), and a score of less than 3.0 is considered unfavorable, an issue requiring immediate attention.

Responses were nearly all in the "excellent" or "favorable" range. Only performance management and rewards, at 3.4, fell into the neutral category.



The LM Voice employee survey is conducted across the Lockheed Martin Corp. to ascertain the overall health of the company. The survey takes the pulse of employees in four general workplace-related areas: Employee experience; leadership excellence; diversity and inclusion; and ethics and integrity. For tracking purposes, the questions asked in the 2012 survey are mostly identical to those asked in 2011 and previously in 2009.

Looking for common themes and trends

Pam adds that directors and vice presidents are studying responses to specific questions in some detail, as they provide insights into how employees view their work life at Sandia. Over the next three months directors and vice presidents will formulate improvement actions and send them to Laboratory Leadership, who will look for common trends and themes.

"By year's end, the Leadership will define Laboratory-wide actions and deploy them at the division level," Pam says.

Among the some of the more frequent comments from employees were the following:

• Employees want to understand better how their work fits into the overall mission and goals of the Labs. Some expressed this desire as a need to understand Sandia's strategic direction at the department level.

• Employees want their immediate supervisors to act as leaders, not managers, and want more focus on defining and encouraging effective leadership.

• Many agreed that the technical work is challenging and provides positive motivation.

• The alignment of pay to performance needs to improve.

• More focus needs to be placed on project management.

• In safety, security, ethics, and other areas, Sandia appears to be too compliance-driven.

• The highly complex work environment and competition for project funding are among sources of stress for employees.

Lockheed Martin has announced that it does not plan to conduct the LM Voice employee survey next year, but instead rely on the data gathered during the 2012, 2011, and 2009 surveys.

Sandia's Primary Standards Lab: Support for DOE and beyond

(Continued from preceding page)

from one to 10 kilos, about 2.2 to 22 pounds; another does 100 grams to one kilo. The equipment is so sensitive operators must leave after starting it so their body doesn't affect the results, Hy says. Comparisons for less than 100 grams are done manually on other equipment. In another area, two interns, an Air Force Academy cadet and a University of Santa Clara junior, helped qualify an interferometer system that measures surface texture in the nanometer range. Anything that's been machined has texture marks, and that surface affects everything from friction to wear, Hy explains.

• **Microwave**, which tests instruments used for radar, guidance systems, and satellites: Arriving at a single precise calibration could require painstaking attention to an extraordinary array of equipment. One particular morning, technician Santiago "Jimmy" Cheykaychi (2542) set up to calibrate power meters and sensors using a collection of electronic equipment: a pulse generator, an amplifier, modulators, a frequency counter, an oscilloscope to make sure the signal is as pure as possible, and couplers and isolators laid out on acoustical foam. Connecting equipment to minimize reflections and noise for the level of accuracy needed requires specialized training and practiced technique.

• **Radiation and optics:** The lab supports neutron generator production, builds detectors that measure pulsed neutrons, calibrates that instrumentation in a capability not found anywhere else in the US, supports radiation measurement techniques, and does research and development for other customer needs. Optics work is augmented by Sandia's photovoltaic and materials groups. The lab houses a low-power laser, but sometimes it uses high-power lasers at other Labs sites for calibrations. "So the optics business is not just in this lab. It's multi-laboratories throughout Sandia," Bud says.

• **Temperature:** Jobs include calibrating temperature probes using a reference probe for comparison. The standard for primary temperature measurements is a standard platinum resistance thermometer, or SPRT, which looks like a glass wand. SPRTs are calibrated at several temperatures with metal fixed point cells — standards that depend on using the latent heat of the metal transitioning from liquid to solid in the case of a freeze plateau or solid to liquid in the case of a melt plateau, thus maintaining a stable temperature plateau under standard atmosphere. The temperatures are very reproducible and stable, says project lead Lisa Bunting Baca (2541). "It's kind of a process to get them on a plateau and those plateaus maintain a very steady temperature for a period of hours or days, depending on the exact fixed point. Then we monitor with control SPRTs, so it's a lot of maintenance, a lot of monitoring equipment, a lot of control charts" to make sure SPRTs can measure precise temperatures to 5 millidegrees, she says.

• **Flow, acceleration, shock, and humidity:** Equipment includes an acceleration system, a centrifuge, instruments for measuring the flow of gases, a drop box system for shock, and chambers capable of measuring humidities from 5 to 95 percent and dewpoints from about 25 degrees C to about minus 40 degrees C. Why? Thermal batteries require a certain humidity condition when they're assembled, for example, and shock is key to figuring out how much force a projectile wields on a target and how well it will penetrate.

• **DC:** The lab maintains the ohm — a basic unit of electrical resistance — with an artifact standard based on very accurate resistors housed in a mineral oil bath maintained at 25 degrees Celsius, plus or minus 0.003 degrees. Technicians use instrumentation to transfer a one-ohm value to resistors being calibrated, such as those from other federal laboratories, with uncertainties as low as plus or minus 55 nano-ohms per ohm — 55 parts per billion. The lab also does pressure and temperature tests so the end user can correct for different temperatures or altitude for that particular resistor, Jim says.

• **AC:** The lab uses a miniaturized microcircuit to derive the standard for AC current, given that the unknown AC current produces a certain amount of heat. "Then you apply an equivalent amount of DC to produce that same amount of heat, and because DC current is calibrated you know what the AC value is," Jim says. In another part of the lab, project lead Stefan Cular (2542) explains a pulse high-voltage system capable of operating from about 10,000 volts to 300,000 volts in durations of 2 to 30 microseconds. There are variations for different currents, different voltages, and different ranges for impedance, capacitance, and inductance.

* * *

Customers interested in the PSL should contact customer representative Aaron Garcia or managers of Depts. 2541 or 2542.

A culture of giving

Sandia reaches for record milestone in community aid

By Nancy Salem

It's that time of year when the eyes of thousands of the area's most needy people look to Sandia for help. And they have every reason to be hopeful.

Sandia kicks off its Employee Caring Program on Oct. 8 with the goal of becoming the first New Mexico company to raise $5 million in a single year for the United Way of Central New Mexico (UWCNM). Sandia's 2012 campaign also aims to increase participation in every division from the 2011 baseline and engage newer employees in the Labs' culture of giving.

"This year we have set some challenging and ambitious goals for our employees in both New Mexico and California," says Anthony Thornton, this year's ECP campaign chair and deputy to the VP of Defense Systems and Assessments Dept. 5220. "In light of the current economic conditions nationally, there is a much greater need for us to support our community."

Sandia holds a special place in the history of UWCNM. Since the ECP was launched in 1957, Sandia has been the single largest supporter of the organization's annual campaign. Sandians contributed more than $4.6 million of the $27 million collected last year. That adds up to more than $650 per active employee, with retirees adding $680,000.

And Deputy Laboratory Director and Executive VP for Mission Support Kim Sawyer is chairing central New Mexico's 2012-13 $28.15 million campaign.

"The spirit of giving at Sandia has never been stronger and we offer our heartfelt thanks for your continued generosity," says Ed Rivera, president and CEO of UWCNM. "This year Sandia is setting an aggressive goal to support those most vulnerable in our community. Under the leadership of Anthony Thornton, there's no doubt Sandia will achieve that record-setting milestone."

The ECP kicks off Oct. 8, 11 a.m.-1 p.m., in the Steve Schiff Auditorium lobby and courtyard. There will be barbecue and the chance to meet representatives of nonprofit agencies where Sandia employees volunteer. A donation will be made to the Community Fund based on the number of Sandians who attend.

The campaign runs through Oct. 26. A number of fundraising events are planned, including book fairs Oct. 9-11 at the Thunderbird Cafeteria, Oct. 16-18 at the Steve Schiff Auditorium and Oct. 23-25 at IPOC. On Oct. 18, ECP and HBE will host the Great Cross Training Opportunity from 11 a.m.-1 p.m. at Hardin Field. There will be strength stations around the park, with one lap providing a full body workout. Participants will earn VirginHealthMiles.

"I am asking each and every one of you who already contribute to ECP to 'add a dime to each dollar' you have previously designated," Anthony says. "In so doing, Sandia can cumulatively become the first $5 million contributor to our local community."

Corporate Cornerstone

100 percent of your donation helps people

The United Way of Central New Mexico established the Corporate Cornerstone program in 1997 to cover the organization's administrative expenses. All those costs are paid by companies that choose to direct their gifts to the program.

Because of those corporate gifts, 100 percent of money donated by individuals goes directly to help people in need. When Corporate Cornerstone donations exceed administrative expenses, the excess goes to the Community Fund. Corporate Cornerstone also established the Center for Nonprofit Excellence, the Family Violence Initiative and Family Advocacy Center, and the Technology Assistance Fund for local nonprofits.

From 1997 to 2011, Corporate Cornerstone companies contributed $33.3 million to support the community, increase the value of gifts made by individuals, and fund system improvements. Lockheed Martin/Sandia is among the more than 70 Corporate Cornerstone companies.

The program originated in New Mexico and is being replicated at United Ways across the country.

In answer to the question, 'Why have you been a loyal contributor to the Employee Caring Program?'

"In addition to charitable contributions I make through my church, I have always found it valuable to contribute through ECP here at Sandia. My reasoning is simple. By both observation of, and participation in the program for over 30 years, I am confident the activity is well-managed and that the funds efficiently go to the most needy causes in our community."

— Tom Zipperian (2700)

"Short and simple: Because it's the right thing to do.

— Russ Skocypec (0240)

"I feel that it is important to contribute to those who are not as fortunate as I am. Those who are less fortunate appreciate every little bit of help they receive, and it gives me a lot of satisfaction to know I made a difference in someone else's life. Especially children … I love seeing the smiles on their faces."

— Kelley Bedford (3653)

ECP Kickoff Event
October 8th
11:00 a.m. – 1:00 p.m.
Steve Schiff Auditorium Lobby & Courtyard

ROVING BARBECUE WILL BE THERE

United Way – Community Fund Display
Accion NM
Albuquerque Rescue Mission
ALS Association New Mexico Chapter
A Park Above-Inclusive Park in Rio Rancho
ARCA
Big Brothers Big Sisters
Breast Cancer Resource Center
Cancer Foundation for New Mexico
CASA (Court Appointed Special Advocates)
El Ranchito de los Ninos
Enchantmutts Adoptions
Family Promise
Girl Scouts
Greater Albuquerque Habitat for Humanity
Healing the Children SW Chapter
Identity Theft Resolutions
Junior Achievement of New Mexico
Lap Dog Rescue of New Mexico, Inc.
Meals on Wheels of Albuquerque
New Mexico Animal Friends
New Mexico BioPark Society
New Mexico Philharmonic
Parents Reaching Out
Presbyterian Ear Institute
Project Linus
National Multiple Sclerosis Society
Samaritan Counseling Center
Saranam
Shandiin Child Development Center
Sickle Cell of NM
Southwest Creation Collaborative
Title I Homeless Project
YWCA

Sandia employees will be given a form at the event. For each agency they visit and have them initial their form, $1.00 will be donated to the United Way Community Fund.

ECP/United Way Campaign

October 8 - October 26

The ECP/United Way campaign runs from October 8-26 this year. Anthony Thornton, Sandia's 2012 ECP Campaign Chair encourages all to check out the website at https://www.trygiving.com/ and take advantage of the opportunity to sign up for a payroll deduction that will go to support either our local community fund or any non-profit organization that we care about.

The Community Fund

Helping the most vulnerable

In 2012-13, the United Way of Central New Mexico's Community Fund will provide grants to 125 programs touching the lives of more than 213,000 people.

Donations to the Community Fund go into a pool totaling about $4.1 million. The fund supports a range of programs that help the most vulnerable people in Bernalillo, Sandoval, Torrance, and Valencia counties. Nonprofit agencies that qualify for Community Fund support work with families, education, health, hunger, family violence, senior citizens, the homeless, and the disabled.

A panel of community volunteers, including many Sandians, decides how the funds will be allocated in an open, competitive process. By combining gifts, Community Fund donors provide a deep resource pool that helps solve complex human problems.

Last year, Sandians contributed $1.4 million to the Community Fund. By giving to the fund you help make quality services available to people struggling to improve their lives, and help improve systems of care.

We live in a diverse community, with people from all walks of life. While most residents live comfortably, others face many challenges. United Way helps ensure those in need receive necessary services, including food for the elderly, programs to keep our children in school, a place to live for the homeless, or programs to prevent family violence.

Kim Sawyer, Deputy Laboratories Director and Executive Vice President for Mission Support

2012 United Way of Central New Mexico Campaign Chair

At Sandia, we have the opportunity and privilege to give back to our community. The United Way of Central New Mexico's Community Fund helps those most vulnerable through program grants to qualifying health and human service agencies in Bernalillo, Sandoval, Torrance, and Valencia counties. United Way also allows us to designate our gifts to specific charities that are important to us personally. Every dollar we give goes directly to helping people. That's because Sandia and Lockheed Martin Corporation participate in the Cornerstone program, which funds administrative costs and ensures that 100 percent of employee contributions go toward helping people in need.

When Ed Rivera, president and CEO of United Way of Central New Mexico, asked me to chair this year's United Way campaign, I didn't hesitate for a second. I thought there's no better way to serve the community than to lead a program that has such a positive impact on so many people. Sandia has a strong culture of giving and I'm delighted to share our knowledge with employee giving campaigns in other companies.

When I arrived at Sandia in 2010, I was struck by the generosity and spirit of giving not just of Sandia, but of the entire community. United Way of Central New Mexico has 575 Alexis de Tocqueville Society members — those who contribute at least $10,000 each year — which ranks Albuquerque and the surrounding area 11th nationally in the number of Alexis de Tocqueville members. At Sandia, we have 101 members.

Sandians historically have given about 20 percent of United Way of Central New Mexico's annual contributions. Last year we gave $4.6 million and this year I hope we can push that even higher. I'm proud of Sandia's giving culture and very happy to be chairing a program that is so vital to the well-being of the community in which we live and work.

Employee Caring Program

A movement that started in Denver

The origin of the United Way can be traced to 1887 when a woman, a priest, two ministers, and a rabbi in Denver recognized the need to work cooperatively to address the city's welfare problems. They organized the first united campaign to help health and welfare agencies and later established an organization to collect funds for local charities, coordinate relief services, and make emergency assistance grants.

The first campaign raised $21,700 for 22 agencies and launched a movement that would spread across the country. Community Chest organizations were founded in the first half of the 20th century to jointly collect and allocate money based on a model of "federated giving." Community Chest and other charities merged in 1948 to form the United Foundation.

The name United Way was adopted in 1963 after several name changes. The goal has remained consistent: to pool efforts in fundraising and support to address needs and improve communities, particularly in education, income, and health.

United Way supports widespread fight against hunger

By Nancy Salem

Every week, tens of thousands of New Mexicans do not have enough food. One out of five children in the state goes hungry. One in seven senior citizens doesn't know where their next meal will come from.

"Hunger is a huge issue in New Mexico, huge. Hunger is pervasive," says Samantha Blauwkamp, executive director of Meals on Wheels of Albuquerque. "New Mexico is the second-worst state in the nation in senior hunger. I look at it this way: You can live without a cell phone. You can live without a TV. You can't live without food."

Lisa Powers Giering of The Storehouse of Greater Albuquerque says hunger exists when people must make a decision between buying food and buying something else. "Do I buy food, or do I buy medicine, pay the rent, take my child to the doctor, buy gasoline? They start skipping meals," she says. "Something as small as car trouble or a trip to urgent care can wipe out the monthly budget of a family that is surviving marginally."

Hunger is linked to poverty in New Mexico, a state that ranks among the lowest in per capita income. Many of the state's hungry are among the working poor — people who make enough to pay for housing, utilities, phone, a car, but can be set back financially for months by a random expense.

"We see veterans of Korea and Vietnam. We see lots of women who have found themselves with dependents and no support. We see kids. And kids who don't eat don't learn. They can't retain," Giering says. "We see a lot of elderly people, and that's very disheartening. They did all the things we were told our whole lives to do — work hard, take care of your kids, save, and pay bills. Now they're 75 and don't have any money."

Blauwkamp says the need for nutritious meals is vast. "It breaks your heart," she says. "We could be feeding hundreds and hundreds more every day if we had the money."

Giering says her organization sees many families that have known poverty for generations with no prospects for improvement and few places to turn for help. "The amount of money the federal government used to give to keep people fed has gradually been reduced the past 20 years while the number of poor people has risen at double and triple the rate it should have," she says.

Meals on Wheels and The Storehouse are two organizations fighting hunger that are supported by the United Way of Central New Mexico's Community Fund.

Get to know them a little better.

The Storehouse of Greater Albuquerque: Hunger lives everywhere

The Storehouse is the largest food rescue/food share organization in the state, and ranks in volume among the top such organizations nationally. It provides free food and clothing to about 54,000 low-income New Mexico families.

The Storehouse was founded in Albuquerque in 1969 by Lutheran Pastor Titus Scholl, who distributed food from the back of his Volkswagen van. The mission then and now follows the Biblical mandate, "For I was hungry, and you gave me food … I was naked, and you gave me clothing."

The Storehouse depends on the community for most of its donations. It collects from 5,000 sources food that would go to waste if not retrieved and given to the city's poor. Donors include grocery stores, restaurants, churches, schools, businesses, foundations, and individuals.

Food is collected at The Storehouse's central Albuquerque location where it is sorted, measured and placed on market-type shelves. People who register for assistance can shop for food and clothing one day a month.

"We can't give them enough food to live on. We try to round out their budgets and fill in the gaps," Lisa Powers Giering of The Storehouse says.

In 2011, The Storehouse gave away 1,792,154 pounds of food. Of the total, 1,676,141 pounds were rescued, 50,521 pounds were donated, and 65,492 were purchased. About 137,000 individuals are registered for help.

FAMILIES STOCK UP on groceries at The Storehouse in central Albuquerque. The shelves are filled with thousands of pounds of recovered food that was destined to be thrown away.

In 1996, The Storehouse provided food for 33,000 meals. The number jumped to 650,000 in 2000 and 2.3 million last year. It also provided 500,000 articles of clothing in 2011.

The Storehouse has seen a 20 percent increase in clients since 2010 and is serving about 140 people a day. In addition to food and clothing donations, The Storehouse receives grants from the United Way and other organizations, but no federal funding.

"I don't think people realize that hungry people are no different than the rest of us," Giering says. "They could be your neighbors."

Meals on Wheels of Albuquerque: Something to eat and someone to talk to

A MEALS ON WHEELS VOLUNTEER driver drops off a hot lunch for a homebound client, and sticks around to visit. Companionship is a key ingredient of Meals on Wheels.

Meals on Wheels volunteers hit the city's streets every weekday, delivering more than 130,000 hot, nutritious meals a year to homebound people. A recent survey found that a Meals on Wheels volunteer is the only person 47 percent of the service's clients see in a day. And for 67 percent, that meal is their only source of nutrition.

"There is a huge need for what we do," Samantha Blauwkamp, executive director of Meals on Wheels says. "We touch hunger and loneliness. There are very heartwarming stories."

The nonprofit organization was started in 1971 by five women from Immaculate Presbyterian Church who wanted to address hunger in Albuquerque. They made sandwiches in the church kitchen and asked the staff of a senior center if they knew of any homebound elderly who'd like a meal. The answer was yes.

They delivered 1,200 meals the first year and in 1972 established Meals on Wheels as a private nonprofit organization. Today Meals on Wheels has 400 volunteers who help prepare and deliver about 500 meals a day. The service delivered 119,000 meals in 2011.

Clients range in age from 22 to 104. They include people who need the service temporarily while recovering from surgery or injury, those with chronic disability, and people with special dietary needs.

The service offers heart-healthy and special menus: diabetic, renal, vegetarian, soft/bland, mechanical soft, and pureed. "No one else can provide that kind of variety," Blauwkamp says.

The cost is $6.30 for a hot meal with entrée, vegetable, starch, salad or fruit, dessert, and milk or juice. A frozen meal is $3.65. And low-income people who need a special diet for medical reasons can receive free meals through a program funded by a variety of donors including the United Way of Central New Mexico and Sandia.

Social interaction is a key ingredient of Meals on Wheels. "People love the companionship," Blauwkamp says. "Our volunteer drivers provide a daily check on the health and safety of those we serve."

Meals on Wheels receives no federal or state funding. It survives on grants and donations, and income from an entrepreneurial catering service. Presbyterian Hospital donates a large commercial kitchen and office space at its northside facility.

"This only works because of our donors and volunteers," Blauwkamp says. "We build a lot of love into those meals."

BE A BETTER HEALTHCARE CONSUMER

2013 Benefits Choices
Open Enrollment for Employees

2013 Open Enrollment for all active employees (represented and non-represented) will be held: Monday, Oct. 29-Thursday, Nov.15, 2012 (5 p.m. MT)

Open Enrollment elections

Your 2013 Open Enrollment elections must be made online. The link will be provided on hbe.sandia.gov beginning Monday, Oct. 29. hbe.sandia.gov is a public website available externally. However, if you wish to make your elections from home, you must first log into Sandia using your Crypto-card and then go to hbe.sandia.gov.

Note: If you have changed your mailing address since last year's Open Enrollment, please update your address in HR Self-Service.

During Open Enrollment you may:

- Enroll, disenroll, waive, or make changes to a medical plan
- Enroll, disenroll, or waive the dental and/or vision plan
- Enroll or disenroll an eligible dependent in a medical, dental, or vision plan
- Enroll in the healthcare or daycare flexible spending account
- Enroll in the Vacation Buy Plan

Important: Even if you are currently enrolled in the Healthcare FSA, Daycare FSA, and/or Vacation Buy Plan, you must re-enroll to receive these benefits in 2013.

Detailed information on 2013 changes can be found in the 2013 Benefits Choices Open Enrollment Newsletter, which will be available on hbe.sandia.gov beginning Monday, Oct. 15.

Employee Benefits Fairs

This year, Health, Benefits, and Employee Services (HBE) will host several benefit fairs for employees. During the Open Enrollment Fairs you can meet with and ask questions of the health plan vendors and Sandia's Benefits staff.

Albuquerque, New Mexico

Sandia Benefits staff and your plan administrators (BCBSNM and UHC) will deliver a presentation during the fairs at the Steve Schiff Auditorium. The presentation will include information on 2013 changes, a high-level overview of the plan, and your new prescription drug vendor (Express Scripts). Due to space constraints, the presentation will only be delivered at the two Steve Schiff Auditorium events. Beginning Monday, Nov. 5, the recorded video presentation will be posted on hbe.sandia.gov.

Date	Tuesday, October 30*	Saturday, November 3	Thursday, November 8	Tuesday, November 13
Location	Steve Schiff Auditorium Bldg. 825	Sandia Laboratory Federal Credit Union at 3707 Juan Tabo Blvd.	IPOC — 2nd floor break room and Thunderbird Conference Room	Steve Schiff Auditorium Bldg. 825
Audience	Employees	Employees and spouses	Employees	Employees
Fair Time	9 a.m.-3 p.m.	9 a.m.-1 p.m.	10 a.m.-2 p.m.	9 a.m.-3 p.m.
Presentation Time	11:30am-12:30pm	n/a	n/a	11:30am-12:30pm

* Remote locations (NTS, Tonopah, Amarillo, Carlsbad, Minnesota, and Washington, D.C.) will be connected via video link.
Can't attend? Beginning Monday, November 5, the recorded video presentation will be posted on hbe.sandia.gov.

The following representatives will be available during the entire fair:

- Sandia Health Plans Team
- Sandia Retirement Processing Team
- Blue Cross Blue Shield of New Mexico
- ABQ Health Partners
- Delta Dental
- HBE Preventive Health
- UnitedHealthcare
- Lovelace Health Systems
- PayFlex
- Davis Vision
- Express Scripts (replacing Catalyst Rx for prescription drugs effective Jan. 1, 2013)
- Workplace Options

More information

Open Enrollment website:
hbe.sandia.gov
HBE Customer Service
505-844-HBES (4237) or 1-800-417-2634, ext. 844-HBES (4237)
Hours: Monday-Friday, 8 a.m.-5 p.m. MT

Livermore, California

As you can see in the table below, Kaiser will have its own presentation at this fair. Immediately following, Sandia will present a combined presentation for UnitedHealthcare and Blue Cross Blue Shield of New Mexico. The presentations will include information on 2013 changes, a high-level overview of the plans, and the new prescription drug vendor for BCBSNM and UHC (Express Scripts).

Date	Tuesday, November 6	
Location	904 Auditorium, 7011 East Ave., Bldg. 904, Livermore, Calif.	
Audience	Employees and spouses	
Fair Time	10 a.m.-2 p.m.	
Presentations Times	11 a.m.-Noon Kaiser Permanente	Noon-1 p.m. UnitedHealthcare / BCBSNM

The following representatives will be available during the entire fair:

- Sandia Health Plans Team
- Blue Cross Blue Shield of New Mexico
- Kaiser Permanente
- UnitedHealthcare
- PayFlex
- Delta Dental
- Davis Vision
- Express Scripts (replacing Catalyst Rx for prescription drugs effective Jan. 1, 2013)
- Workplace Options

Retiring in 2012?

If you are retiring in 2012, you do not need to enroll for 2013 benefits through the Sandia HR Self Service application. Please contact Extend Health at 1-888-598-7809 no later than Friday, Nov. 16, to discuss your benefits options for 2013.

Considering retirement in 2012 or 2013? If so, you may want to attend a Retiree Open Enrollment presentation to learn about the medical plans offered to our retirees. For details, please see the companion article on the next page titled Benefits Choices 2013 — Open Enrollment for Retirees and Surviving Spouses. For additional retirement information, please review the Retirement Planning Meeting Presentations page on hbe.sandia.gov.

Sandians learn compression-only CPR

Sandia celebrated Heart Awareness month by offering compression-only CPR training to help its employees learn how to save the life of someone experiencing a heart attack. The training took place on the afternoon of Thursday, Sept. 20, at Hardin Field. Jennifer Perea (3334), Healthcare & Support Services's Project Heart Start champion, says nearly 400 people participated in the event.

Sudden cardiac arrests kill more than 400,000 people every year in the US. Many who die from cardiac arrest could have survived if a companion had quickly called 911 and then performed compression-only CPR until help arrived. Studies now show that continuous chest compression without rescue breathing is as effective as traditional CPR. — *Stephanie Holinka*

Photos by Randy Montoya

BE A BETTER HEALTHCARE CONSUMER

2013 Benefits Choices Open Enrollment for Retirees and Surviving Spouses

PreMedicare Retirees

Monday, Oct. 15-Friday, Nov.16, 2012 (5 p.m. MT)

Medicare Retirees

Monday, Oct. 15-Friday, Dec. 7, 2012 (5 p.m. MT)

This year, PreMedicare and Medicare retirees will have different Open Enrollment dates. The Open Enrollment schedule for Medicare retirees will be the same as the federal Medicare open enrollment schedule. The Sandia Open Enrollment 2013 for Sandia retirees and surviving spouses will be held:

PreMedicare Retirees
Monday, Oct. 15-Friday, Nov. 16, 2012 (5 p.m. MT)
Medicare Retirees
Monday, Oct. 15-Friday, Dec. 7, 2012 (5 p.m. MT)

Extend Health manages Open Enrollment for Sandia's retirees, surviving spouses, and long-term disability terminees. Extend Health offers personalized assistance through licensed benefit advisors to help you navigate through your health care options, evaluate, and select the option that is best for you. This service is provided at no cost to you and/or your spouse.

Detailed information on 2013 benefits changes will be published in the *2013 Benefit Choices and Enrollment Guide* sent from Extend Health to all participants' home addresses the week of Oct. 1. Please review your *2013 Benefit Choices and Enrollment Guide* for information on your 2013 premium rates and (Medicare) Your Spending Account (YSA) credits. If you have changed your mailing address since last year's Open Enrollment, please contact Extend Health 888-598-7809 to update your address.

Open Enrollment Fairs

Extend Health will host several Open Enrollment sessions in Albuquerque and Livermore for PreMedicare and Medicare retirees to provide information on your open enrollment choices. Representatives from Extend Health, Sandia Benefits, and the health insurance carriers will be available during these sessions to answer your questions.

Albuquerque, New Mexico

Albuquerque PreMedicare Open Enrollment Fairs

All fairs are open to all PreMedicare retirees and their dependents and will be held at the UNM Continuing Education Conference Center, 1634 University Blvd. NE.

Date	Tuesday, October 23	Thursday, November 1
Fair Time	1- 3 p.m.	9- 11 a.m.
Presentation Time	1- 2:30 p.m.	9-10:30 a.m.
Presenters	Extend Health/Marsh UnitedHealthcare Blue Cross Blue Shield of New Mexico	

The following representatives will be available during the entire fair:
- Extend Health/Marsh
- UnitedHealthcare
- Blue Cross Blue Shield of New Mexico
- Lovelace Health Systems
- ABQ Health Partners
- Express Scripts (replacing Catalyst Rx effective 1/1/2013)
- Davis Vision
- Delta Dental

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Albuquerque Medicare Open Enrollment Fairs

All fairs are open to all Medicare retirees and their dependents and will be held at the UNM Continuing Education Conference Center, 1634 University Blvd. NE.

Date	Tuesday, October 23	Wednesday, October 24	Thursday, November 1
Fair Time	8:30-1:30 a.m.	8:30-11:30 a.m. and 1-3:30 p.m.	1- 3:30 p.m.
Presentation Time	9:30-11 a.m.	9:30-11 a.m. and 1:30-3 p.m.	1:30 – 3 p.m.
Presenters	Extend Health Presbyterian Lovelace		

All retirees are welcome to arrive before the presentations begin or stay after they end to speak with representatives from:
- Extend Health
- Lovelace
- Delta Dental
- Presbyterian
- Davis Vision

More information

For more information regarding Retiree Open Enrollment, contact Extend Health customer service at 888-598-7809 between 7 a.m. and 7 p.m. MT.

You may also visit the Sandia HBE website at hbe.sandia.gov.

Livermore, California

Livermore PreMedicare Open Enrollment Fair

This fair is open to all PreMedicare retirees and their dependents and will be held at the Robert Livermore Community Center, Cresta Blanca Ballroom, 4444 East Ave., Livermore, Calif.

Date	Thursday, October 18	
Fair Time	12:00 noon - 3:30 p.m.	
Presentation Time	1-2 p.m.	2-3 p.m.
Presenters	Extend Health / Marsh Kaiser Permanente	Extend Health/Marsh BCBSNM/UHC

The following representatives will be available during the entire fair:
- Extend Health/Marsh
- Blue Cross Blue Shield of New Mexico
- UnitedHealthcare
- Kaiser Permanente
- Express Scripts (replacing Catalyst Rx effective 1/1/2013)
- Davis Vision
- Delta Dental

* * *

Livermore Medicare Open Enrollment Fair

This fair is open to all Medicare retirees and their dependents and will be held at the Robert Livermore Community Center, Cresta Blanca Ballroom, 4444 East Ave., Livermore, Calif.

Date	Thursday, October 18
Fair Time	8:30-11 a.m.
Presentation Time	9:30-10:30 a.m.
Presenters	Extend Health Kaiser Permanente

All retirees are welcome to arrive before the presentations begin or stay after they end to speak with representatives from:
- Extend Health
- Kaiser Permanente
- Davis Vision
- Delta Dental

Retiree and surviving spouse Open Enrollment schedule

PreMedicare Retirees

Monday, Oct. 15-Friday, Nov.16, 2012 (5 p.m. MT)

Medicare Retirees

Monday, Oct. 15-Friday, Dec. 7, 2012 (5 p.m. MT)

Sandia Classified Ads

MISCELLANEOUS

REFRIGERATOR, Maytag, $275; washer, $225; dryer, $200; commercial chest freezer, $300; apt. size washer & dryer, $200; table w/4 chairs, $150. Willis, 304-5034.

VITO ALTO SAX $375; Yamaha keyboard, $65; Ab-Lounge XL, sit-up exerciser, $75. Aragon, 888-3473.

FUTON, medium-dark wood frame, buff/beige upholstery, standard/double-size bed, excellent condition, $250. Kercheval, 266-5833.

OSCILLOSCOPE, Tektronix 2225, 50 MHz, manual, 4 probes, lab Scope-Mobile, excellent condition, $165. Harris, 343-0683.

CAMERA, Samsung TL220, 12.2 MP, rear 3-in. touch screen display, front 1/12-in. display. Hale, 298-1545.

FUNDRAISER, Montessori of the Rio Grande charter school, raffle tickets, $20 ea., email for more info. Trevino, 274-0760, cassietrevi74@yahoo.com.

FENDER FLARES, Jeep Wrangler, used, fits '97-'05 models, 6 pcs. w/mounting hardware, good condition, $125. Dotson, 850-2939.

BREAST PUMP, Medela In-Style Advanced, w/AC outlet/battery adapter, like new, $120. Segura, 505-573-4608.

AQUARIUM, 28-gal., complete w/accessories, plants & fish, free. Jursich, 505-205-1356.

REMOVABLE THIRD SEAT, from '89 Suburban, free. Laub, 299-3321.

SMARTPHONE, Blackberry Bold 9780, black, only 3 mos. old, $225 OBO. West, 505-550-1651.

TIMESHARE, premium, 1 bdr., sleeps 4+, 7 nights, Maui, Paris, Orlando, good worldwide, use by Sept. 2013, $950. Lovell, 944-6662.

BROADWAY TICKETS, Popejoy: Rock of Ages, Jan. 6; Dreamgirls, Feb. 17; 2 tickets, 2 p.m., balcony w/aisle & adjacent seat, $35 ea. Witt, 565-0028.

STROLLER, Safety 1st Trivecta, barely used, excellent condition, $50. Rogillio, 385-4830.

TONNEAU COVER, for Toyota Tacoma, fits '05 & newer long bed, installs easy, no drilling needed, $100 OBO. Mihalik, 281-1306.

RABBIT HUTCH, new, w/supplies (cage, crate, carrier, bowls, bottles), $125; older hutch, $25, see at http://tinyurl.com/cxsrqdr. Sjaardema, 856-6139.

MOBILE STORAGE CONTAINERS, Maloy, 20-ft., heavy-duty, secure arm closures/lockbox, you pickup, $2,400 ea. or $4400/both. Rivers, 505-720-4701.

GLIDER/ROCKING CHAIR, w/ottoman, dark green, $100; man's camo field (hunting) jacket, size small-regular, $30. Smith, 268-5392.

DINING TABLE, w/6 chairs & 1 leaf, $450; china cabinet, $250; dresser w/mirror, $100; 6-drawer dresser, $100; good condition, sell together or separately. Aragon, 265-9109.

SEWING MACHINE, Singer 201K, hand-crank, very rare, very nice condition, w/case & attachments, $250. Vigil, 505-553-9596.

SIBERIAN HUSKY PUPPIES, 2 boys, 3 girls, all black & white, located in Bernalillo, $350 ea. Gomez, 261-6402, ask for Terrie.

DINETTE SET, 42-in. round, acrylic table, 18-in. leaf, 4 beige vinyl armchairs, w/2 bar stools, $350. Thompson, 505-292-2877, rthompson144@comcast.net.

CRATE/KENNEL, for puppy or small dog, 24"L x 16"W x 16"H, like new, $25. Brunt, 294-8220.

MINI ROLL-TOP DESK, oak, great condition, $125; ping pong table, w/accessories, $75. Thomas, 315-1069.

KING BED, Stanley Modern Craftsman Cabinetmaker, saddle color, retails >$1,700, new, never used, $600 OBO. Kral, 298-6699.

ENTERTAINMENT CENTER, hardwood, accent lighting, pier curio cabinets, call for photos, $800 OBO. Martin, 453-6522 or 385-0855.

'LION KING' TICKETS, 4, Oct. 13, 2 p.m., center orchestra, row D, at cost, $125/ea. Altman, 296-3447.

SEWING MACHINE, Singer industrial, model 16-188, walking foot, bobbins, needles, wood/metal stand, double spool thread stand, $400. Morris, 292-5112.

ALL-IN-ONE PRINTER/FAX/SCANNER, OfficeJet 6450, w/new cartridge, $75; Dish Turbo HD satellite dish, $75. Garcia, 280-5815, ask for Frank.

GOLF CLUBS: Ping Zing 3-PW, $75; Touredge set, $50; Taylormade driver 360XD, $25; stand bag, $20. Kerschen, 821-2848.

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 0165 (Dept. 3651)**
- **DELIVER: Bldg. 811 Lobby**
- **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.

TRANSPORTATION

'95 CHEVY C2500, turbo diesel, stake bed, 133K miles, very good condition, $5,500 OBO. Browning, 340-5787

'67 FAIRLANE GTA, 383 stroker AOD, see at lemon lot on base, $13,900 OBO. Sammons, 710-6859,

'01 JEEP WRANGLER SPORT, soft top, 6-cyl., 3-in. lift, American Racing rims, 19,693 miles, $13,500. Littlefield, 353-0201.

'07 INFINITI G35 JOURNEY, dark gray, spoiler, alloy wheels, moon roof, navigation, heated leather, 52K miles, beautiful, $21,500 OBO. Bruno, 505-417-7672.

'02 ACURA TL 3.2, 149K miles, new tires, all maintenance records, $5,800. Prior, 239-9586, ask for Cindy.

'02 BMW M3 CONVERTIBLE, top condition, new tires, battery, brakes, & belts, navigation & SMG, $15,500. Hart, 505-453-0173.

'10 TOYOTA SEQUOIA SR5, 5.7 V8, sun roof, tow pkg., gold, ~33K miles, NADA clean, retail $37,000, asking $35,000. McRee, 505-898-5030.

'76 CADILLAC COUP DEVILLE, blue, interior great condition, needs minor body work, engine knocks, restorable or use for parts, $1,200 OBO. Brazis, 450-5866, ask for Mel.

'09 TOYOTA PRIUS HYBRID, fully loaded, leather seats, Spectra blue (navy), 18K miles, excellent mileage, excellent condition, $17,500 OBO. Chavez, 265-9092, ask for Sonny.

'06 CHEVY EXPRESS 2500 VAN, PW, PL, AC, AM/FM/CD, new tires, tow pkg., 67K miles, well maintained, $9,000. Focia, 286-6486.

'01 AUDI A6 2.7T QUATTRO, 1 owner, leather, Bose AM/FM/CD/6-disc changer, all service records, excellent, $8,100. Harrison, 897-0658.

'94 TOYOTA PICKUP, 4-cyl., 2WD, 5-spd. manual, 42K miles, camper shell, $3,500. Kepler, 296-0402.

RECREATIONAL

'10 PALOMINO Y-4124 POP-UP CAMPER, 12' x 24' total opened, $8,500 OBO. Bakke, 263-4024.

SEGWAY HTi167 w/bag, light, car rack, manuals, custom paint, new batteries, new tires, $3,000 OBO. Martinez, 281-7058.

'07 KEYSTONE PASSPORT 285RL TRAVEL TRAILER, 29-ft., 5,000-lbs., sleeps 6, 1 slide, great interior, $13,000. Carpenter, 379-1737.

BOAT, 14-ft., Lowe Deep V Hull, 25-hp Evinrude motor, trailer, steering & canopy cover, $2,500 OBO. Padilla, 294-3127.

'96 HARLEY-DAVIDSON HERITAGE SOFTAIL, excellent condition, $8,500; older 14-ft. fishing boat, motors, trailer, $1,300. Boulton, 292-7836.

'94 DAMON CHALLENGER 5th WHEEL, 29-ft., w/1 slide, $6,200. Arning, 256-9229.

REAL ESTATE

3-BDR. HOME, 2 baths, 1,660-sq. ft., not including sunroom, Taylor Ranch area, excellent condition, MLS# 738593, $179,900. Yagow, 899-0854.

3-BDR. TOWNHOME, 2-1/2 baths, 1,580-sq ft., beautifully remodeled, near Ladera Golf Course, owner financing, MLS#736963, $124,900. Woodard, 505-239-0517.

4-BDR. HOME, 2 baths, Four Hills, refrigerated AC, new windows/roof/heater/heater/water heater, many updates, MLS# 736417, $269,000.Mayer, 306-4377, ask for Christi.

TRIPLEX, ea. unit 1-bdr., 1 bath, 530-sq. ft., near KAFB, good income property, newer AC, wood/tile floors, MLS# 729035, $129,000. Lioce, 697-9521.

4-BDR. CUSTOM HOME, 3 baths, 3,032-sq. ft., newly remodeled, North Four Hills, views, call for more info, $315,000. Braun, 425-445-8928.

WANTED

DISPOSABLE BED PADS, working refrigerator & washer, for family on a budget, need free or cheap. Rodriguez, 440-5198.

LONG-TERM HOUSESITTER, house located SW Albuquerque, must have DOE security clearance. Ewen, 836-3563.

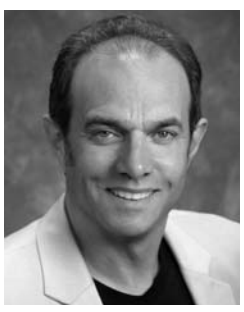
Mileposts

New Mexico photos by Michelle Fleming
California photos by Randy Wong

Rodney Schmidt
25 1444

Maxine Norton
20 5335

Julie Fruetel
15 8114



Lennie Klebanoff
15 8367

Dean Martin
15 2956

James Schreiber
15 2552

Brian Somerday
15 8252

Security Connection to Answer Your Security Questions

Beginning Nov. 5, members of the workforce with security questions can call Security Connection, Sandia's new security call center. Security Connection will provide members of the workforce at all Sandia locations with one easy place to go for all kinds of security information.

Security Connection was established directly in response to feedback from last year's SEC2011, Security Learning and Feedback Activity, in which many of you told us that you have a difficult time finding the security information you need.

Security Connection will be open on business days, from 8 a.m.-4:30 p.m. (Mountain Time). Just dial 321 from Sandia/New Mexico or Sandia/California, or (505) 845-1321 from anywhere. You can also email us at security@sandia.gov or search the security knowledge database at Security's website on Sandia's internal web at https://info.sandia.gov/iss/home/.

If you are concerned about a security incident or need to report, you should still contact SIMP at (505) 283-SIMP or (925) 294-3238. But for all other questions about security, call Security Connection.

If you have questions about Security Connection or the services it will provide, stop by during one of our live events and talk to a Security representative. Our live event schedule is as follows:

Sandia New Mexico:
All meetings will be held at the Thunderbird Cafeteria and Area 4 Cafe - 11 a.m.-1 p.m.

- Oct. 31
- Nov. 1
- Nov. 5
- Nov. 6
- Nov. 7

Sandia California:
Meetings will be held at the following times and locations:

- Oct. 23 - 11 a.m.-1 p.m. Farmers Market
- Oct. 24 - 7 a.m.-8:30 a.m. Front of the Redwood Center and 11 a.m.-12:30 p.m. Bldg. 915 Deli
- Oct. 25 - 3 p.m.-4 p.m. Gate 10
- Oct. 30 - 11 a.m-12:30 p.m. Bldg. 915 Deli
- Oct. 31 - 7:30 a.m.-9 a.m. Gate 1

Have a Security Question? Call...
Security Connection
Starting November 5
Call:
321 from SNL/NM or SNL/CA
(505) 845-1321 from anywhere
Email:
security@sandia.gov
Website:
https://info.sandia.gov/iss/home/

Sandia helps technical panel when sinkhole opens up in Louisiana

LOUISIANA SINKHOLE — This Aug. 3 aerial shot released by the Louisiana Department of Natural Resources shows the sinkhole near Bayou Corne, La., which has grown since it first began forming in August. Sandia researcher David Borns (6912) is part of a group of experts providing technical evaluations about possible causes and remedies for the sinkhole. (Photo courtesy of Louisiana Department of Natural Resources)

By Sue Major Holmes

The US Geological Survey turned to Sandia for help when the earth opened up in August near Bayou Corne, La.

Sandia's Dave Borns (6912) is providing technical evaluations in weekly teleconferences about possible causes and remedies for a 300-foot-wide sinkhole there."We support federal and local governments when they're trying to understand technical issues related to their natural resources," says Dave, manager of geotechnology and engineering.

Authorities have been trying to determine whether the sinkhole was caused by the collapse of an abandoned brine mining cavern along the margin of the Napoleonville Salt Dome or by something else. The operator of that cavern has drilled a borehole into the cavern at a depth of 3,500 feet to learn whether the cavern is the cause. The results of the drilling will determine what the technical evaluation committee recommends, Dave says.

The sinkhole opened up overnight on Aug. 2 off the western edge of the salt dome near Bayou Corne. It was reportedly originally about 300 feet deep, but Dave says only one part was that deep; the rest was about 50 feet deep.

Broad impacts

"There were some broad impacts to the area," he says. "A nearby community was evacuated, this big sinkhole formed, and it forced the closure of two major natural gas pipelines."

The USGS, which is known for its seismic expertise, already had been keeping an eye on the area because of harmonic tremors that began in June, along with gas bubbling up at seven different locations in the wetlands of Bayou Corne and nearby Grand Bayou.

"What they were seeing was some sort of fluid movement through fractures, which they thought might be the natural gas that was bubbling up in the bayou," Dave says.

Authorities first thought the source might be a broken pipeline, but all pipelines checked out. Then they started exploring whether something was happening within the caprock or surrounding sediments where natural gas comes from. The harmonic tremors continued for about six weeks but stopped after the sinkhole formed. Since then, only small seismic events continue to be recorded near the cavern under investigation, Dave says.

The cavern was developed for brining operations, in which companies dissolve salt to extract chlorine for use as a precursor for petrochemicals, he says.

On Aug. 22, the Louisiana Governor's Office of Homeland Security and Emergency Preparedness formally asked Energy Secretary Steven Chu for help from Sandia. The Labs previously worked on cavern collapse and sinkhole formation problems on Weeks Island, La. Dave says Sandia experts are called in once or twice a year to study similar concerns.

The USGS had suggested the state of Louisiana include Sandia on technical conference calls based on the Labs' expertise in salt and salt caverns. Sandia first worked on salt formations in the 1970s, when it began investigating the geomechanical response of salt caverns as a potential medium for underground nuclear weapons testing, Dave says. About the same time, some authorities proposed using underground nuclear shots in salt to create storage caverns for natural gas, he says.

Sandia's studies of salt mechanics led to decades of research on the Strategic Petroleum Reserve, which has two locations in Louisiana and two in Texas, and on the Waste Isolation Pilot Plant, or WIPP, which stores radioactive waste from defense programs in rooms excavated in ancient salt beds near Carlsbad, N.M.

Sandia reaches out to business, academia, tech communities

By Nancy Salem

Sandia took its research and technology transfer messages to the community in a first-of-its-kind event that drew more than 400 people from academia, industry, business, and technology.

"Tech transfer is a Sandia mission requirement," said Sandia President and Laboratories Director Paul Hommert, who opened the daylong Sandia Research & Technology Showcase Sept. 12 at the Embassy Suites in Albuquerque. "We want to leverage research dollars for economic growth, and the community is a key partner."

Paul told attendees the showcase was about "connections and communication."

"We want to acquaint the community with our science and engage in a dialog on tech transfer," he said.

Dennis Croessmann (1910), chief of staff to the chief technology officer, told the meeting that Sandia has deep roots in fundamental research and a huge body of work. "What do we do with it?" he asked.

The answer is a new deployment strategy that manages IP as a portfolio throughout a project lifecycle. "This is exciting and moving along faster than expected," he said.

Dennis said Sandia is committed to industrial partnerships and tech transfer, and needs help from the community to define and manage collaboration. "We look forward to the dialog," he said.

Pete Atherton, senior manager of Industry Partnerships Dept. 1930, told the group there are many Sandia technologies available for immediate licensing. He singled out Solar Glitter, tiny photovoltaic cells; SpinDx, a speedy blood analyzer; and the Sandia Cooler, a hyper-efficient CPU cooler.

He talked about companies that had successfully licensed technologies including TEAM Technologies of Albuquerque and its Stingray, a device that uses water to disable IEDs; EFT Holdings of Huntsville, Ala., and its decontamination foam used in meth lab cleanup; AMO WaveFront Sciences of Albuquerque and its sensing metrology; and Black-I Robotics of Tyngsboro, Mass., and its Gemini Scout rescue robot.

JULIA PHILLIPS, deputy chief technology officer and director of Research & Development Science & Engineering Center 1900, addressed the crowd at the first annual Sandia Research & Technology Showcase. (Photo by Randy Montoya)

"Technology transfer enables the mission and advances science," Pete said. "Put your entrepreneurial hat on. We need your guidance and business acumen so we can transfer technology and deliver on our mission."

Panel discussions moderated by John Freisinger, president and CEO of Technology Ventures Corp., and Jackie Kerby Moore, manager of Technology & Economic Development Dept. 1933 and director of the Sandia Science & Technology Park (SS&TP), focused on how to do business with Sandia and how to take advantage of the Labs' economic development programs, such as the New Mexico Small Business Assistance Program and the SS&TP.

Panelists said it is important to have open lines of communication between businesspeople and the Labs and to be specific in defining the business plan. "It feels really good to deploy technology for the public good," said panelist Mark Allen, manager of Intellectual Property Management Alliances & Licensing Dept. 1931.

Mayor Richard Berry, in a discussion moderated by Deputy Laboratories Director and Executive VP for Mission Support Kim Sawyer, said Sandia creates opportunities in Albuquerque. "How do we take that public-sector investment and use it to keep our leadership role in the world and make ourselves more competitive?" he said.

He said the SS&TP is a major contributor to the economy and that Sandians enrich the community in many ways. "Sandia and its ideas are a big, full apple tree, and we want to pick the fruit," he said.

Bernalillo County Commissioner Maggie Hart Stebbins added that Sandia works with the city and county "to bring the area an economic development mindset."

The showcase was rounded out by a poster session focusing on cybersecurity research, energy security, nano and micro science and technology, and water security. The projects on display illustrated a range of Sandia work from early stage research through technology deployment.

Sponsors of the event were Sandia Labs, Technology Ventures Corp., city of Albuquerque, Bernalillo County, and the Sandia Science & Technology Park.




Food Safety

Sandia probability maps help sniff out contamination in food supply

By Stephanie Holinka • Photos by Randy Montoya

Uncovering the sources of fresh food contamination could become faster and easier thanks to analysis done at Sandia's National Infrastructure Simulation and Analysis Center (NISAC).

The study, in the *International Journal of Critical Infrastructures*, demonstrates how developing a probability map of the food supply network using stochastic network representation might shorten the time it takes to track down contaminated food sources. Stochastic mapping shows what is known about how product flows through the distribution supply chain and provides a means to express all the uncertainties in potential supplier-customer relationships that persist due to incomplete information.

If used on a larger scale, such methods also might assess the vulnerability of food supplies to wide-scale, deliberate contamination.

Tracking down the source of fresh food contamination can be difficult and time-consuming. Stephen Conrad (6924) says difficulties in adequately characterizing connections and product flows among producers, distributors, and suppliers can contribute to significant uncertainty in assessing the risk of foodborne illness.

"This is often a serious problem when there is an outbreak of food poisoning in a particular region and the healthcare authorities cannot quickly trace the source of the outbreak," Stephen says.

When an outbreak occurs, epidemiologists must interview affected people to track down where foodborne exposures happened. Often those interviews take place weeks after the exposure, leading to inaccurate or incomplete information and making it difficult to pinpoint a likely food culprit. Once the tainted food has been identified, investigators must trace up through the food distribution supply chain to locate the source of contamination.

"Epidemiologists involved in trace-back start behind the eight ball," Stephen says. "They attempt to reconstruct the pathway the contaminated food has traveled through the distribution network well after the fact."

Even at the supply chain level, investigating how food moves through the system is daunting. Stephen says supply chains vary widely from one food marketing system and agricultural sector to another. Some supply chain parts change frequently. Even within a single agricultural sector, some parts of the food supply chain may be characterized by enduring supplier/customer relationships, while others may be market-based and highly transitory.

Even industry insiders may not understand the supply chain map. Many only know "one up and one down" — that is, they know only their direct supplier and direct customer. Some information about customers and suppliers can be proprietary and therefore hard to get, Stephen says.

In 2011, sprouts were the focus of a serious E. coli outbreak in Europe, but tracing contaminated products to their source proved difficult.

Sandia researchers applied the stochastic mapping technique to test data from the fresh sprout sector in a single state in the US, using a case study of the edible seed sprout distribution system as the basis of their computational model.

"Stochastic network representation provides the ability to incorporate and express the uncertainties using probability maps," Stephen says. "The method enables effective risk analysis and designing robust food defense strategies."

Future work for the team will include scaling the analysis up to the company or industry level as well as mapping commodity flows into, out of, and within a geographic region.

Ultimately, NISAC intends to work with partners in business and federal and state agencies to ascertain whether the agencies have a business case for adopting the method. If there is, the team will seek to help achieve wide acceptance of using data analysis to assess risk.

Building on techniques and knowledge developed at NISAC over the past four years, the work was initiated with funding from Sandia's Laboratory Directed Research and Development program and continued with funding from the Department of Homeland Security.

"If stochastic mapping was widely used now, perhaps outbreaks such the recent ones involving salmonella could be more quickly tracked down and contained. Quicker containment would benefit not only consumers but also the farmers who grow fresh food for our nation and who can be severely impacted economically by uncertainties and market restrictions on sales of their products caused by delays in pinpointing an outbreak's source," Stephen says.

Relay for Life

PARTICIPANTS WALKED into the night with luminarias to light the way. Each luminaria represents a person who is fighting, has fought and won, or in memory of those who have lost their fight with cancer. (Photos by Raymond Mares)

SANDIA RELAY FOR LIFE team members seen here are, from left, Debbie Haycraft (6832), Christine Straut (6823), Melissa Herron (10667), and Karen Gutierrez (6912).

Sandia's team was recognized as a "Pacesetter Team" in the recent Relay for Life of Albuquerque sponsored by the American Cancer Society. The annual event celebrates survivors and what they have overcome, remembers those lost to cancer, and fights back against the disease. "Pacesetter Team" is a designation awarded to teams that meet American Cancer Society national criteria to be the most successful relay teams. Sandia was one of only seven teams to achieve Pacesetter status in Albuquerque and was asked to lead the first official lap of the night following the survivor and caregiver laps. The Sandia team raised almost $3,000 and was a Top 10 Corporate Team for the 2012 event. This year's Relay for Life of Albuquerque raised more than $140,000.

Kelley Garcia (6237) participated in Relay for Life as a runner, completing 80 miles in less than 23 hours. Kelley, a self-proclaimed "marathon maniac," used Relay as a stepping stone in her training cycle. Taken by the spirit and excitement of the event, Kelley said, "It really was a grand party. Every time I think about the event I remember something new and have to laugh. . . . I got to talk to so many survivors and was humbled at what they went through."

Planning and fundraising has begun for the 2013 event. Sandian Karen Gutierrez (6912) is serving as the event co-chair and is looking for planning committee members, team members, and donations for the 2013 Sandia team.