

LOS ALAMOS NATIONAL LABORATORY  
**CURRENTS**

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**May 2009**

*Setting new electrical safety standards*

*Changing how satellites are built*

*Powered by innovation*

*Caring for the environment*

 **Los Alamos**  
NATIONAL LABORATORY  
EST. 1943

## My View

# LDRD an investment in the Lab's future

Working models of the brain, global climate modeling, nuclear nonproliferation, these are just a few of the complex problems Laboratory researchers are solving with support from the Laboratory Directed Research and Development program. Solutions to hard problems require the full talent of the Laboratory's staff, which is why LDRD operates as a free market for ideas that is open to all. Los Alamos leads the other National Nuclear Security Administration laboratories by running LDRD as a Labwide competition.

While the competition is fierce — only 1 in every 10 proposals is funded — engagement with technical division leaders, program managers, and external reviewers helps maintain a balanced LDRD investment portfolio. Many of the Laboratory's strengths, such as magnetic imaging, actinide science, large-scale infrastructure modeling, and nuclear detection, can be traced to LDRD investment. A robust LDRD program is essential to sustaining the scientific capabilities needed for our Laboratory to provide mission solutions.

Transparency is key to a fair and competitive LDRD program. Winning proposals excel on three levels: technical innovation and creativity, potential mission impact, and strength of the research team. Selection committees are drawn from the breadth of the Laboratory and provide feedback on every proposal they review, whether or not the project ultimately is funded; conflict of interest is mitigated using federal standards adapted to the Laboratory's circumstance; and ongoing project reviews are open to the Laboratory community. All this helps ensure that LDRD researchers have an equal opportunity to obtain LDRD funding.

Last year, I celebrated 30 years of service at the Laboratory. My career has taken many exciting turns, but it never has been as rewarding as here and now, at the nexus of the Laboratory's science and technology. My staff and I work diligently to ensure the program remains transparent, fair, and fully supportive of the Laboratory's missions. LDRD is an invaluable opportunity granted by Congress to invest in our future, and we must honor their trust.

My door is always open, and I invite you to share your ideas about the future of the program.

**—Bill Priedhorsky, program manager for Laboratory Directed Research and Development**



Dixon Wolf

About the cover: Chief Electrical Safety Officer Lloyd Gordon stands in front of the 750,000-volt particle injector for the linear accelerator at Los Alamos Neutron Science Center. See Page 4 for story. Photo by Leroy N. Sanchez



Sandra Valdez

***Cantwell is associate director for Environment, Safety, Health & Quality***

James "Chris" Cantwell is the Lab's new associate director for Environment, Safety, Health & Quality succeeding Dick Watkins.

In addition to helping the Lab fulfill its environmental stewardship role, Cantwell leads the Lab's initiatives to protect the safety and health of employees and residents. Cantwell previously led the Lab's Environment, Safety, and Health Integration Office and served at Oak Ridge National Laboratory as Quality Services Division director, Safety Leadership Program director, and Health and Safety Field Services group leader. He also managed Environment, Safety, and Health Support Services at the Pantex Plant in Amarillo, Texas.

***Christensen is Laboratory's new Ombudsman***

Kirk E. Christensen is the Lab's new ombudsman. He takes over from Camilla Lopez and John L. Armijo.

Christensen, who joined the Laboratory in 1979, has an extensive engineering and management background. As group leader in Design Engineering and Weapon Design Services, he

helped transform a general design engineering group into a more programmatically focused engineering group. Since 2006, Christensen has directed the Conduct of Engineering Office.

He also is a skilled mediator, arbitrator, and negotiator with experience as a Lab volunteer independent-party reviewer, volunteer mediator, and informal division-level ombudsman.



***Lansing to lead Safeguards and Security***

New Associate Director of Safeguards and Security Mike Lansing will lead the Laboratory's physical security, safeguards, and emergency operations.

Lansing has more than 30 years experience in nuclear, federal, and military security operations and in safety, training, and law enforcement. He is an experienced liaison with federal entities, including the Department of Energy, the Department of Homeland Security, and the Department of Defense.

Previously, Lansing managed security operations at Babcock and Wilcox (BWXT) Nuclear Operations Group in Lynchburg, Virginia, and at the Pantex Plant in Amarillo, Texas.

***Network Infrastructure and Engineering Division leader named***

Elaine Santantonio is the new division leader for Network Infrastructure and Engineering. Santantonio has been acting in this position for several months, has a wealth of experience, and brings an attitude of innovation and cooperation to the position, according to Scott Gibbs, Engineering and Engineering Sciences associate director.

***Wastewater treatment plant wins award***

The Lab's Utility & Infrastructure Division sanitary wastewater treatment plant received the 2008 Good Housekeeping Award from the New Mexico Water & Wastewater Association for an Activated Sludge Plant 20 years of age and under.

The plant, which began operating in 1992, previously won Good Housekeeping awards in 1996 and 1998, a Certificate of Appreciation in 1995, a Plant Performance Award in 1996 from the Rocky Mountain Water Environment Association, the Max Summerlot award in 1999 from the New Mexico Water & Wastewater Association, and Laboratory Pollution Prevention awards in 1999, 2001, 2003, and 2008.



Lloyd Gordon shows Laboratory employees various electrical devices and cables that could pose electrical safety hazards.

Leroy N. Sanchez

## Chief electrical safety officer raises the bar *Setting new standards*

May is National Electrical Safety Month. The Laboratory's Chief Electrical Safety Officer, Lloyd Gordon, asks employees to take electrical safety to their homes, offices, and workplaces.

"Share electrical safety with family, friends, and colleagues," he said. "Electricity is a fundamental part of today's modern world, and sometimes it's easy to forget just how dangerous it can be." The National Safety Council estimates that 600 people die every year of electrical causes, making electrocutions the fourth-highest cause of industrial fatalities behind traffic, violence, and construction.

Electricity also can cause painful injuries: roughly 3,600 disabling electrical contact injuries occur every year in the United States,

along with another 4,000 nondisabling injuries. Most of these accidents involve low voltage (600 volts or less).

The Lab has become a much safer place to work since Gordon joined the then Environment, Safety, and Health Division in 1998. The past four to five years have seen an 80 percent improvement in electrical safety at the Laboratory, he said, adding, "We now lead the country in research and development of electrical safety."

Gordon has set new standards for electrical safety by providing leadership and technical guidance to nearly 150 group and division electrical-safety officers and by developing and delivering training to thousands of Lab workers. In addition, he helped develop the

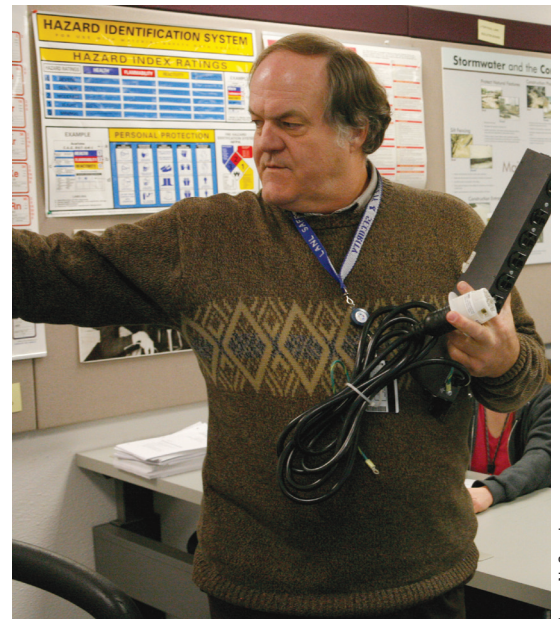
Electrical Severity Measurement Tool. According to the Department of Energy, this tool helps determine the severity of an electrical energy event based on a series of factors, such as electrical hazard, environment, shock proximity, arc flash proximity, thermal proximity, and any resulting injury to personnel. It is now used across the complex to categorize and report electrical incidents.

Gordon's achievements recently were recognized with the 2008 National Nuclear Security Administration Management & Operating Contractor Safety Professional of the Year award. The NNSA award recognizes distinguished service and outstanding achievements and contributions that are clearly and demonstrably greater than normally would be expected in performing assigned duties. This is the fourth year that NNSA has recognized one of its federal safety professionals and the first year that it has recognized an M&O contractor safety professional.

Gordon said he's honored by the recognition. "I'm pleased that a researcher can make such an impact and serve the complex in safety," said Gordon, who previously won a Laboratory 2006 Distinguished Performance Award. "My goal at the Laboratory over my 10 years in electrical safety for research and development has been to change the culture of safety among my colleagues, set an example for how safety can be efficiently integrated into the research field, and provide resources for all researchers in electrical safety."

Gordon first came to Los Alamos as a consultant and trainer following a serious electrical accident at the Lab in 1996, he said. After two years, his consulting work turned into a full-time position.

Among his many projects was leading the development of complex-wide electrical safety tools. Fortunately, Gordon, who holds a doctorate in electrical engineering from Texas Tech University, Lubbock, had extensive prior experience working with research institutions and national laboratories.



Leroy N. Sanchez

Since coming to Los Alamos in 1998, Lloyd Gordon has developed and delivered electrical safety training to thousands of Laboratory employees.

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*Electricity is a fundamental part of today's modern world, and sometimes it's easy to forget just how dangerous it can be.*

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"As an experimental researcher with a background in pulsed-power engineering and plasma physics, I saw an urgent need for improvement in electrical safety in government and university research laboratories," he explained. "From 1987 to the early 1990s, I developed innovative electrical-safety training for researchers at Lawrence Livermore National Laboratory, the Stanford Linear Accelerator Center, and Sandia National Laboratories."

Gordon presided over the Electrical Safety Subgroup of the the 30-member Energy Facility Contractors Group in 2008 and has chaired or cochaired EFCOG/DOE Electrical Safety workshops for the past five years. He also cochairs the ISA Standards Committee for High Power R&D Electrical Safety Standards and is the technical editor of the R&D sections of the DOE Electrical Safety Handbook.

For more information on electrical safety in May, watch for safety notes in *Links* and visit the Lab's Electrical Safety Committee Web site (<http://int.lanl.gov/safety/esc/>) and the Center for Excellence in Electrical Safety (<http://www.lanl.gov/safety/electrical/>), a national Web site hosted by the Laboratory.

—Tatjana K. Rosev

# Changing how satellites are built

## *Lab researcher applies supercomputing power skyward*

*Editor's note: These are the first two articles in a series that features the Laboratory's 2009 R&D 100 Award applicants and their technologies.*

Using commercial electronics in space exploration is critical to America's staying in the lead, according to Mark Dunham, a Threat Reduction senior projects leader. The Reconfigurable Computing team he co-founded continues to lead the nation in this novel approach to high reliability satellite systems.

In 1999, the team built the Cibola satellite into the first space supercomputing satellite. In April, they delivered to Lockheed-Martin a fourth-generation payload called the TeraOps Software Radio, capable of performing 40 billion operations per watt of power in a dictionary-sized payload.

"Employing commercial off-the-shelf parts, this Software Radio demonstrates graphically that one TeraOps of processing power may be had in a 40-watt, 14-pound box," said Dunham. "Compare this to the Mountain Blue supercomputer, which occupied an entire floor of the Laboratory Data Communications Center Building for the same integer computing capability."

The TeraOps Software Radio, which merited submission for a 2009 R&D 100 Award, was tested on the ground using accelerators, as well as thermal cycling, vibration, and other testing to simulate the space environment. It is scheduled to launch in fiscal year 2010. The team now is developing ground control systems and payload data processing/storage.

"Mark and his team's work is a leap toward moving computing resources from ground to space applications," said Glenn Mara, Principal Associate Director for Weapons Programs. "And their use of off-the-shelf materials to achieve this represents the kind of innovative

thinking that's critical to cost-effective technology solutions."

When away from the Lab, Dunham, who holds five patents and a master of science degree in electrical engineering from University of Arizona, is active with international conservation organizations and in community service through the Lutheran Church.

Of his breakthrough technology, he said, "At least 25 percent of all electronics components worldwide are useful in the most valuable orbits, low-earth and geosynchronous. This gives the USA a large pool of state-of-the-art components for building our space systems, ensuring they lead the global pack in performance. In military systems, leading the pack is a life-and-death matter."

—Mig Owens



Mark Dunham of Threat Reduction shows the Direct Conversion Receiver assembly of the just-delivered TeraOps Software Radio.

Leroy N. Sanchez

## Powered by innovation

### *Lab researcher pushes new microelectronics technology*

Ushering in a novel method of microelectronic fabrication is James Maxwell of Applied Electromagnetics. His technology, called Lasonix, is poised to revolutionize many facets of society, from household electronics to medical x-ray machines.

Lasonix enables the creation of three-dimensional electronic circuits, rather than circuit boards, and integrates a wide range of microelectronics through a single tool.

"It's the next wave of microelectronics miniaturization and integration and could generate an entirely new industry," said Maxwell, who holds a doctorate from Rensselaer Polytechnic Institute. "We'll see even greater computing speeds, smaller electronic systems, more capable and complex circuits and systems."

Recently submitted for a 2009 R&D 100 Award, Lasonix is a companion to Maxwell's 2008 R&D 100 award-winning Laser-Weave™ technology. It enables hybrid circuits of micro vacuum electronic devices, optoelectronics, and traditional silicon-based devices to be integrated in an automated fashion, without the use of mechanical assembly or circuit boards.

Using Lasonix, Maxwell and his team have created the first-ever three-dimensional diodes, which he explains are akin to the revolution that occurred with the first semiconductor devices in the late 1940s.

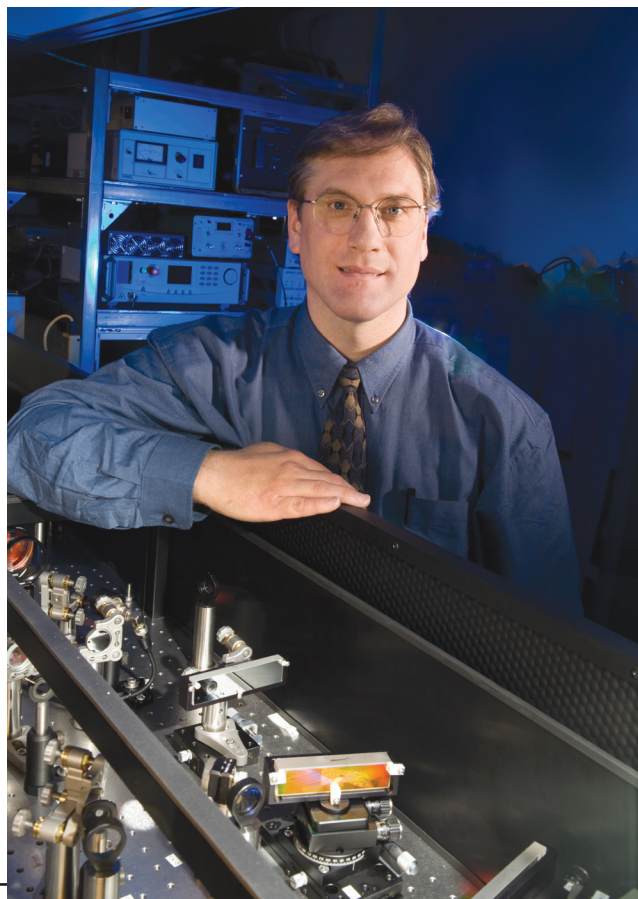
The scientist with a background in nano and microfabrication technology also is an avid amateur astronomer,

James Maxwell of Applied Electromagnetics with an optical amplifier used for the Lasonix fabrication method.

who takes astrophotos of deep-sky objects in his spare time. Maxwell has a desire to help the United States compete in a decidedly competitive field by introducing automated methods for advanced manufacturing.

"Lasonix illustrates the ability of the Laboratory – specifically that of James and his team – to truly push the envelope of current manufacturing techniques. They've created a technology that someday could enhance the very way we live our everyday lives," said Glenn Mara, principal associate director for Weapons Programs.

—Mig Owens



Leroy N. Sanchez

## Multitalented LANL Star shines brightly

Alyson Niemeyer of Risk Analysis and Decision Support Systems is a scholar, dancer, student, and natural leader.

She's also a scientist who was named a Los Alamos National Laboratory Star by the Women's Employee Resource Group for her contributions to the Lab. "It really is an honor to be recognized as a LANL Star," Niemeyer said. "I enjoyed the awards ceremony—it was wonderful to be sitting in the same room with people who have made amazing contributions to the Lab and learn about how they became successful."

Niemeyer first joined the Lab in 2006 as a summer student in the Materials Physics and Applications Division, where she worked on fabricating and testing photoconductors made from organic materials that could be used for radiation detection applications.

She later worked with the Second Line of Defense, where she got hands-on experience working with radiation detectors. Her current project with T-1 (Physics and Chemistry of Materials) focuses on a different aspect of the detectors. "I am using computational methods to optimize materials properties for supercapacitors based on carbon nanotube forests," Niemeyer said. "These supercapacitors offer promise as an integral component of hybrid power sources for portable radiation detectors."

She holds a master's degree in materials science and engineering and a bachelor's degree in chemical engineering and is completing a doctorate in materials science and engineering, all from the University of Florida. She served as secretary and treasurer in the Lab Students' Association and won awards in the 2007 and 2008 Lab Student Symposiums.

*'Hopefully, I will be able to serve as a mentor for other women.'*

When Niemeyer isn't conducting research or working on her dissertation, she choreographs tap, hip-hop, and ballet classes for Dance Arts Los Alamos. "Having dance each week helps decrease stress and helps me stay active instead of sitting at a desk all day," she explained.

Niemeyer said there are many women at the Laboratory who have inspired her. "Hopefully, I will be able to serve as a mentor for other women in the future," she said.

—Erika Martinez

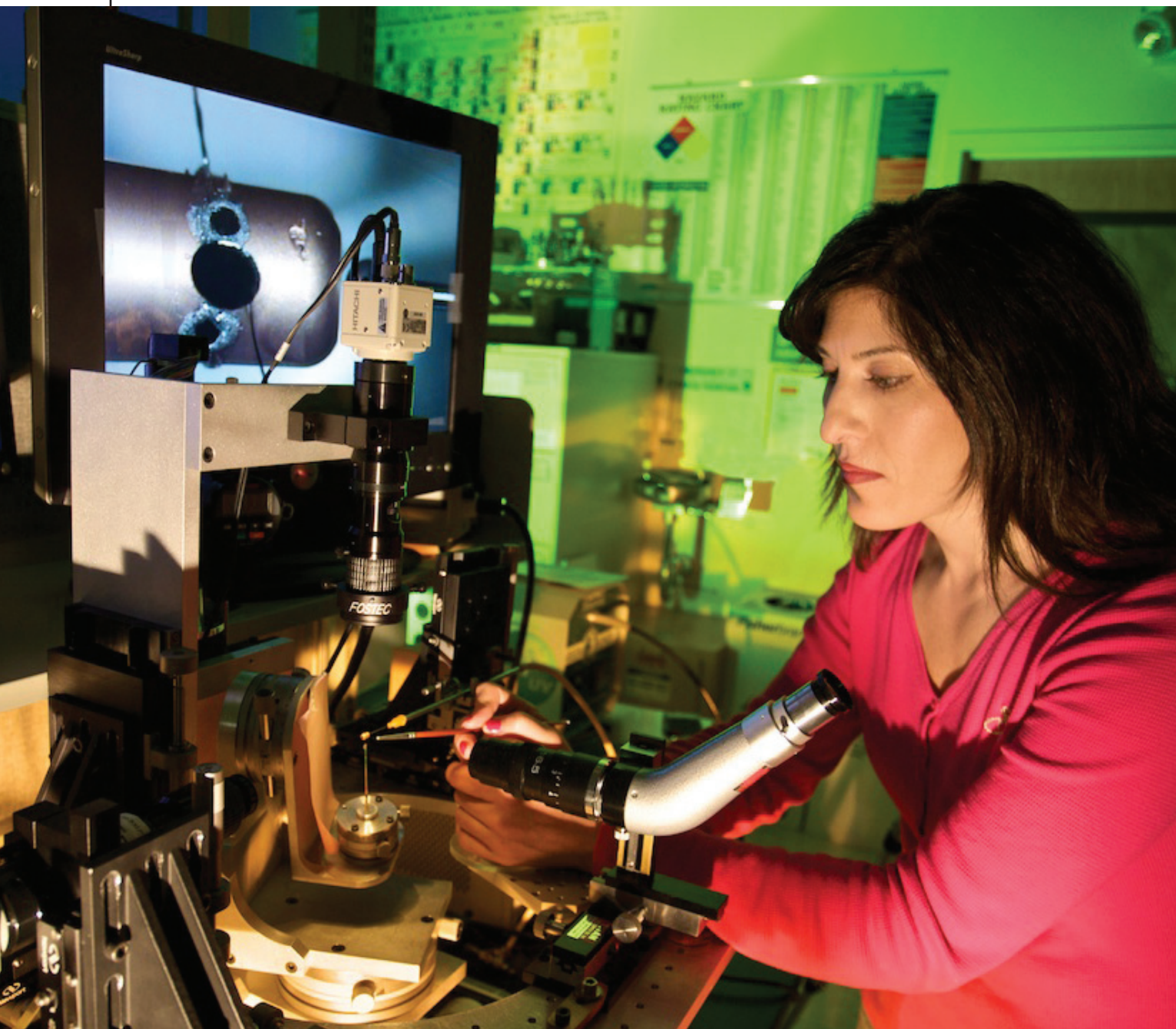


Sandra Valdez

Alyson Niemeyer performs stretches in the dance studio at Trinity on the Hill Episcopal Church.



## Science on target



Robb Kramer

Laida Valdez of Polymers and Coatings attaches a shield to a target. Using a cat whisker, Valdez applies an ultraviolet curing epoxy to attach the shield. The completed target will be used in an experiment to determine the effect of an asymmetric drive on the implosion of a fusion capsule. This particular step is part of a much longer assembly process in which 14 targets are assembled.

Each target is completed using multiple techniques involving several different workstations, along with a few stages that are completely freehand. Valdez uses a scope that displays high-resolution images (on monitor above Valdez) of the small assembly, often much less than 1/100th of a cubic centimeter.



## **New exhibit at Bradbury Science Museum**

The Bradbury Science Museum is hosting a traveling exhibit, The 1958 Mutual Defense Agreement. The historical exhibit was created by the British Atomic Weapons Establishment and marks the 50th anniversary of the agreement between the United States and the United Kingdom.

A timeline of events, pictures, and artifacts tell the story of the diplomacy and collaboration between the United States and the United Kingdom from World War II and the Cold War to today. Visitors can learn about cold war tensions, espionage, and nuclear experiments.

The exhibit is at the museum through June 30.

The Bradbury Science Museum is located at 15th Street and Central Avenue in downtown Los Alamos. The museum is open from 10 a.m. to 5 p.m. Tuesday to Saturday and 1 to 5 p.m. Sunday and Monday. Admission is free.

For more information, call the museum at 667-4444.

## **Occupational Medicine clinic changes hours**

Effective April 6, Occupational Medicine will be closed to unscheduled visits from noon to 1 p.m. Clinic staff will be available at 667-0660 to answer questions, schedule clinic visits, and assist individuals.

## **Find answers to questions about drinking water at Lab**

A frequently asked questions page and a fact sheet about drinking water at the Laboratory is available online.

The information is available at [http://int.lanl.gov/environment/h2o/lanl\\_only/docs/BottledWater-FAQs\\_090417.pdf](http://int.lanl.gov/environment/h2o/lanl_only/docs/BottledWater-FAQs_090417.pdf). The FAQ provides information on what Lab employees can do if they have concerns about other available sources of water in their building, how water coolers should be dispositioned, how to recycle plastic water bottles employees bring to work, and other information.

The Laboratory's water is supplied by Los Alamos County and it meets all state and federal drinking water regulations. Los Alamos County routinely monitors for constituents in the drinking water according to federal and state laws. Additionally, Los Alamos County publishes an annual water quality drinking report.

Earlier this spring, the Lab reduced the contract it has for delivery of bottled water. Federal requirements state that an agency may not use appropriated funds for bottled water for employees where the public water supply is safe for drinking purposes. Buildings that don't have a supply of drinking water aren't affected and bottled water delivery will continue as usual.

## **HSPD-12 badge appointments**

Workers whose appointments for enrolling or activating their new HSPD-12 badges were canceled must reschedule for the next available date. See the New Badge Process Web page for more information.

## **Wellness Center update**

The Wellness Center closes at 6 p.m. on Friday evenings. Other Wellness Center hours of operation remain the same.

For more information, contact Phyllis Webb at 667-7166.

## **Receiving outreach calls from United Healthcare**

Employees requesting information from United Healthcare (UHC) may receive return phone calls or subsequent outreach calls from UHC, in the course of which the member's birth date, for example, may be checked for eligibility. However, if you receive a call that you believe may be suspicious, contact Liz Kirschner at [elizabeth\\_kirschner@uhc.com](mailto:elizabeth_kirschner@uhc.com).

## **May service anniversaries**

Find the May service anniversaries online at <http://int.lanl.gov/news/currents/2009/may/anniversaries.shtml>.

## **In Memoriam**

- Sherman B. Sweet, 82  
February 4
- Charles Zeeb, 41  
February 9
- James D. Porter, 77  
March 18
- Eufemio Santiago Romero, 68  
March 21
- Paulus Powell Thomas, 90  
March 24
- Claire I. Baxman, 85  
March 28
- Tom O. Moore, 60  
March 28
- May Holmes Bergstresser, 96  
March 30
- Brenda Bryant, 61  
March 30

 *Establish excellence in  
environmental stewardship*

## Caring for the environment

The Laboratory is committed to preserving and maintaining the environment, and the recent recertification of the Lab's Environmental Management System (EMS) to the ISO 14001 standard demonstrates this commitment.

An Environmental Management System is a systematic method for assessing mission activities, determining the environmental impacts of those activities, prioritizing improvements, and measuring results. The Lab's EMS motto is "Safety for You, Security for the Nation, Environment for the Future."

Five goals were established as part of the Lab's EMS: compliance, waste reduction, energy and fuel conservation, disposition of unneeded equipment and materials, and achieving zero liquid discharge by 2012. These multiyear goals drive continuous improvement, according to Denny Hjeresen of the Risk Reduction Office, the Lab's EMS program manager.

Hjeresen noted that efforts are under way to incorporate EMS with the Lab's Integrated Work Management System. Last year, the Laboratory won a Department of Energy Environmental Stewardship Award titled "Integrating Safety and Security into the Environment Management System Lifecycle: A Body-contact Sport."

"The EMS is really a grassroots system that asks workers to evaluate environmental, safety, and security risks in their workplace and take steps to reduce those risks," said Hjeresen.

Training inspections and efforts have improved compliance, especially with regard to the *Resource Conservation and Recovery Act* (RCRA) and stormwater protection. The Laboratory had its first violation-free New Mexico Environment Department RCRA inspection in 2008.

In the area of waste reduction, the Lab's pollution-prevention program conducts outreach, provides technical assistance, and funds 20 pollution-prevention projects through the Generator Set Aside Fund Program. Additionally, 200 employees working on 40 projects received a Laboratory Pollution Prevention award last month.

Hjeresen also noted efforts to promote zero liquid discharge, explaining that the Lab is in the design and engineering phase with first activities focusing on the Sanitary Effluent Recycle Facility. The goal is to reduce outfalls while conserving water and meeting strict new compliance standards for water discharge.

"The Energy Management Plan addresses the life cycle of energy and fuel use at Los Alamos," said Hjeresen. "Energy availability, cost, and conservation have a direct impact on our ability to perform existing and possible new missions."



## Spotlight

# Safety...part of everything we do

Participation on the Laboratory's institutional Worker Safety and Security Team (WSST) isn't just a check-the-box exercise for Billy Turney of Remedy Solutions. He has a safety story worth telling that all employees should hear.

Turney's recounting of his commute to work one morning during the winter of 2007-08 is a lesson all employees should heed. That morning a car he estimates had a closing speed of close to 80 miles per hour struck his car on North St. Francis Drive as he was leaving Santa Fe. He was able to walk away from the accident, but soon came to realize "that fraction-of-a-second impact had changed my life forever."



Richard C. Robinson

An environmental professional in Remedy Solutions, Turney is the chairperson of the Waste and Environmental Services Division WSST, in addition to being the Environmental Programs Directorate's representative on the institutional WSST. It's a role he takes seriously.

"I jumped at the opportunity to lead the WES WSST, and have enjoyed the interaction, sharing, and spreading of safety consciousness at the Laboratory," said Turney. "Safety designs built into vehicles of all types always have been of interest me, and safety around construction sites has been a regular job duty as a field engineer."

In the accident, Turney said his glasses were broken and the interior of his car filled with a yellow smoke from the airbag that deployed. Only later did he realize that he had two broken ribs, some broken teeth, and what he described as "rug burns" on his neck from the airbag deployment.

Turney said a chemical used to speed up the airbag deployment can cause reactions in some individuals. In Turney's case, it led to two squamous cell carcinomas that had to be removed from his neck. "It was only when I was told that confirmation biopsies had shown that they got all the cancers did I realize that I was ever in any real danger. For some reason I thought that I would be back at work the day following the surgery," said Turney.

The lesson Turney wants to convey is safety should be part of everything we do, including driving to and from work. "Operating a motor vehicle is a serious thing. It's fun and enjoyable, but remember it's all fun and games until someone gets hurt."

—Steve Sandoval

Billy Turney of Remedy Solutions places a magnetic safety sign on a vehicle. Turney is on the Lab's institutional Worker Safety and Security Team that promotes excellence in safety and security across the Lab.

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