

# LOS ALAMOS NATIONAL LABORATORY **CURRENTS**



**January 2009**

*Meet the Laboratory's newest Fellows*

*Predicting chip reliability*

*Big-picture nanoscientist*

*Anticipating and meeting user needs*

*Laboratory ships last high-activity drums*

### *Who are the Laboratory Fellows?*

The Laboratory Fellows organization was established in 1981 and consists of technical staff who have been appointed by the director. I congratulate Robert Albers, Paul A. Johnson, and Kurt Sickafus on their recent selection as Fellows of Los Alamos National Laboratory. This high honor has been bestowed upon these gentlemen in recognition of their sustained, outstanding contributions to the Laboratory and their exceptional promise for continued professional achievement.

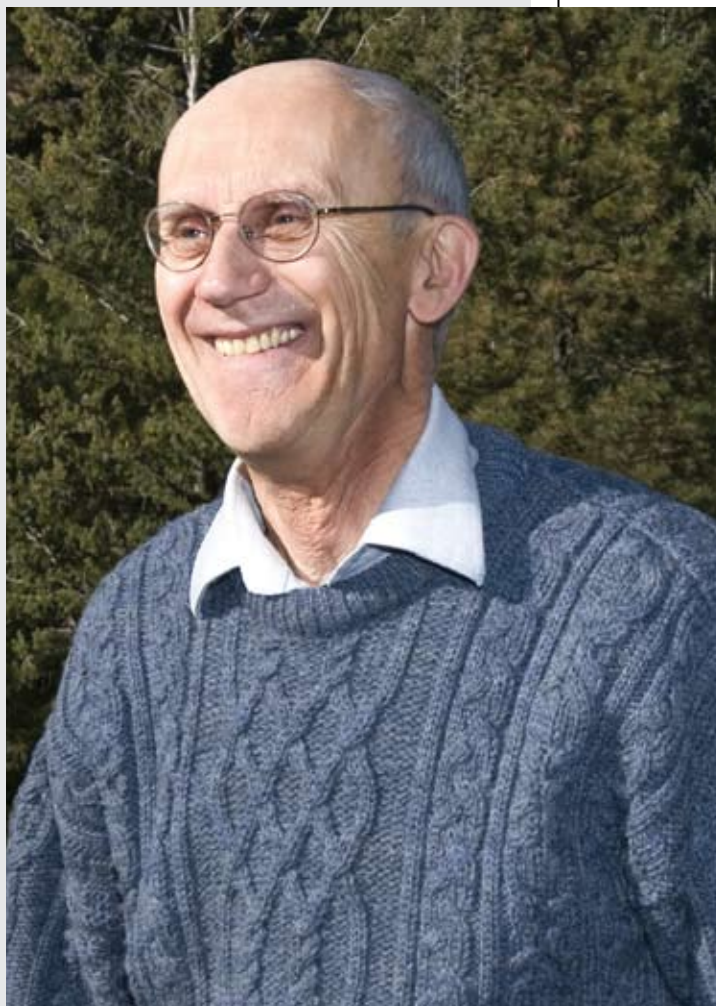
Their new status as Fellows carries not only recognition but responsibility. The Fellows often are asked to advise management on technical issues of importance to the Laboratory. They also are responsible for the annual selection of winners of the Fellows' Prizes for Outstanding Research and Outstanding Leadership in Science or Engineering.

They perform other tasks that benefit the Laboratory. For example, at the request of Laboratory Director Michael Anastasio, a Fellows committee has been working to develop and help implement a procedure to measure the time spent by technical staff on administrative and business duties. Quantification of the time spent on activities, such as completing purchase requests and travel paperwork, can help the director lead the Lab toward higher efficiency and technical productivity.

Another example of a Laboratory Fellows activity is the Frontiers in Science Lecture Series. The Fellows sponsor three or four of these lectures per year, which are given by distinguished Lab scientists in Los Alamos, Santa Fe, Albuquerque, Española, or Taos. Recent talks include "The Shapes of Proteins: A Look Inside the Molecular Machines of Life," "Use It, Lose It, or Save It: The Science of Renewable Energy Storage," "Continental Breakup and the Dawn of Humankind," and "The Dark Universe: Revelations and Mysteries."

Each of these contributions involves a commitment of time and effort by Laboratory Fellows. I hope each of our new members will be able to make such a commitment to the Fellows-sponsored programs. By doing so, they will help the Laboratory to become a better place to work and New Mexico a better place to live.

—**S. Peter Gary**, *Fellows coordinator and a staff member in Space Science and Applications*



*About the cover: The Laboratory's newest Fellows are, from left to right, Kurt Sickafus of the Materials Science and Technology Division, Paul A. Johnson of the Earth Environmental Sciences Division, and Robert Albers of the Theoretical Division. See Page 4 for story. Photo by LeRoy N. Sanchez*

### **Taylor selected MPA Division leader**

Toni Taylor is the Materials Physics and Applications Division leader. Taylor was the Office of Science Director of the Center for Integrated Nanotechnologies and group leader of MPA-CINT.

Taylor, who holds bachelor's, master's, and doctoral degrees from Stanford University, has earned numerous awards and fellowships. Included among these are the Hertz Foundation Predoctoral Fellow and Scholar, Fellow of the American Physical Society, Fellow of the Optical Society of America, Fellow of the American Association for the Advancement of Science, and the Los Alamos National Laboratory Fellows' Prize.

### **Laboratory students excel at Science and Energy Research Challenge**

Laboratory students took home 7 out of 15 prizes awarded at the 2008 Science & Energy Research Challenge (SERCh) at Oak Ridge National Laboratory. The challenge was sponsored by the Department of Energy's Office of Science.

Pawan Rastogi of the Center for Integrated Nanotechnologies (Columbia University) took first place, and Jesse Resnick of Physical Chemistry and Applied Spectroscopy (Westminster College) took third place in chemistry.

Diana Donati of the LANL Institutes (University of California, Davis) took first place, and Molly Renee Nelis also of the LANL Institutes (Rose-Hulman Institute of Technology) took third place in materials science and engineering.

Jessica Kubicek of Physical Chemistry and Applied Spectroscopy (University of New Mexico) took second place in biological sciences. Joseph Koby of Ground Disruption Processes (New Mexico Institute of Mining and Technology) took

second place in environmental science, and Frank Chen of Center for Integrated Nanotechnologies (Rice University) took third place in physics.

The 2008 SERCh poster competition showcased the research projects of DOE-funded students and interns at the national laboratories. Student researchers competed for awards in each of five categories.

### **Sosinski new general counsel**

David Sosinski is the Laboratory's new general counsel. He replaces Steve Porter, who stepped down to join the Stanford Linear Accelerator Center.

As general counsel, Sosinski will serve as the primary source of legal advice and counsel to all levels of Laboratory management on complex legal issues affecting the Lab. He also will lead the Office of Laboratory Counsel.

He has more than 25 years of legal experience in government contracts, human resources, litigation, health and safety, and environment.

Sosinski received a bachelor's degree from the University of Kansas and a law degree from the University of Illinois at Urbana-Champaign.

### **Thoma elected ASM Fellow**

Dan J. Thoma is a new Fellow of the Materials Information Society (ASM). Thoma is leader of the Materials Design Institute in the National Security Education Center and an adjunct faculty member in the Department of Chemical Engineering and Materials Science in the College of Engineering at the University of California, Davis.

Being named a Fellow represents recognition of distinguished contributions in materials science and engineering and provides an opportunity for technical and professional leaders to serve as advisors to the society.



Richard Robinson

Michael Graham

### **Graham takes helm of Environmental Programs**

Michael Graham is the new associate director for Environmental Programs. He succeeds Susan Stiger, who left Los Alamos to take a new assignment with Bechtel National.

For the past two years, Graham has been president of Bechtel Savannah River Inc., the contractor responsible for more than \$400 million per year of construction, environmental remediation, decommissioning, and dismantlement at the Department of Energy site.

Graham holds a master's degree and doctorate in geological sciences from Indiana University. He earned a bachelor's degree from Notre Dame.

# Meet the Laboratory's newest Fellow

New Laboratory Fellows, from left to right, Kurt Sickafus, Robert Albers, and Paul A. Johnson share thoughts on their latest honor.



LeRoy N. Sanchez

Three researchers recently were selected as 2008 Laboratory Fellows. Designation as a Laboratory Fellow is recognition of sustained outstanding scientific contributions and exceptional promise for continued professional achievement.

Robert Albers, Paul A. Johnson, and Kurt Sickafus received the honor. The designees come from a variety of scientific disciplines and have sustained high-level achievement important to the Laboratory, become recognized authorities in their fields, and made important discoveries used or cited by peers inside and outside of the Laboratory.

Fellows play a continuing role in helping maintain the scientific excellence of the Laboratory. Fellows often are asked by the Laboratory director to assess issues and provide advice. As recognized leaders, Fellows are advocates for the continuing conduct of science at the Laboratory.

### **Robert Albers**

Laboratory Fellow Robert Albers of the Theoretical Division is an American Physical Society Fellow and expert on the role

of electronic structure on the physical properties of complex materials.

"It is very satisfying to be awarded this great honor," said Albers. "I am very happy that I have been able to repay the wonderful scientific environment and the nurturing that I have received at Los Alamos with some accomplishments of my own."

Albers, who lives in Santa Fe, attributes his success in part to the people he drives to work with. "For the last 30 years, I have been in the same carpool," he said. "All of the other staff members in the carpool are Laboratory Fellows. I guess it helps to hang around good company!"

Albers came to Los Alamos in 1977 as the very first postdoc in the then newly created Condensed Matter and Statistical Physics group (T-11), after having received a bachelor of science degree in physics from the University of Santa Clara and master's and doctoral degrees in physics from Cornell University.

Harold Agnew was Lab director then, he said. "Agnew was deeply committed to science and to the Laboratory," Albers explained. "I remember meeting him at a reception that was

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held for new postdocs at the Laboratory — Agnew always made a point of meeting the new postdocs — where the most amazing tamales were served. Agnew had a deep and intimate knowledge of Northern New Mexico cuisine.”

### **Paul A. Johnson**

Paul Johnson of the Earth and Environmental Sciences Division said that never in his wildest dreams did he imagine being named a Laboratory Fellow.

“I’m speechless,” Johnson said. “It means so much to be in the company of those I follow into this position, people for whom I have tremendous respect and admiration. I am in the company of scientific giants.”

Johnson, who has been with the Laboratory for more than 25 years, pioneered a new field of research: nonlinear, nonequilibrium dynamics. His discovery has implications for geophysics, nondestructive evaluation of materials, seismology, and medical diagnostics.

Johnson also is known for his research in seismology, where he studies earthquakes. He has worked on strong ground motion, as well as contributed to programs that monitor for potential nuclear explosions. His work also is leading to possible development of new diagnostic tools for osteoporosis. Johnson’s published papers have been cited nearly 1,200 times.

Johnson grew up in Los Alamos and holds a bachelor of science degree in geology from the University of New Mexico, a master’s degree in geophysics from the University of Arizona, and a doctorate in physical acoustics from the Université Pierre et Marie Curie at the Sorbonne, Paris.

“After many travels, I realized that New Mexico was a compelling place to live and work,” he said. “Los Alamos National Laboratory is highly respected worldwide. It is truly unique with amazing talent and resources.”

### **Kurt Sickafus**

New Laboratory Fellow Kurt Sickafus of the Materials Science and Technology Division is an expert in electron microscopy and in understanding the effects of radiation on solid materials.

Sickafus said that being named a Laboratory Fellow also has brought recognition to his team. “My close colleagues, James Valdez and Blas Uberuaga, and I have experienced many years of modest funding, so it is particularly satisfying to be acknowledged for our achievements,” he said. “We are particularly indebted to the Department of Energy Office of Basic Energy Sciences and to John Sarrao, the Laboratory liaison, for keeping us going for more than 20 years.”

Sickafus holds bachelor’s degrees in physics and mathematics from Ohio Wesleyan University and master’s and doctoral degrees in materials science and engineering from Cornell University.

“The Laboratory has been very good to me throughout my career,” said Sickafus, who joined the Laboratory 20 years ago and who also is a Los Alamos Fellows’ Prize recipient. “I have greatly enjoyed the academic freedom that LANL offers to its staff to chase their science and their dreams as they see fit.”

Sickafus also enjoys pursuing his hobbies, which include bird watching, horseback riding, spending time with his five dogs, and playing basketball. “My noontime basketball buddies are responsible for keeping me sane over all of these years,” he said. “We have more fun than anyone can imagine, though I have a reputation for fouling more than I score.”

—Tatjana K. Rosev

# Predicting chip reliability

## *LANSCE offers 'real world' evaluation*

One of the best places worldwide for chipmakers to test the reliability of their devices is at the Laboratory's Los Alamos Neutron Science Center. Every year, between 15 and 20 integrated circuit manufacturers and users perform accelerated testing of chips and other equipment using LANSCE's neutron beam.

Behind the program is Steve Wender of Neutron and Nuclear Science. "It's a wonderful example of the Laboratory working with the private sector," said Wender, who holds a doctoral degree from the University of Iowa. He also was named a Fellow of the American Physical Society in 1995 and has worked at McMaster University, Duke University-Triangle Universities Nuclear Laboratory, and The Svedberg Laboratory in Sweden.

Wender said that such companies as Intel, Honeywell, Advanced Micro Devices (AMD), Boeing, Texas Instruments have tested their equipment at LANSCE.

Testing prototypes of devices at Los Alamos helps manufacturers identify and correct weaknesses in their design early on in the production process, Wender said.

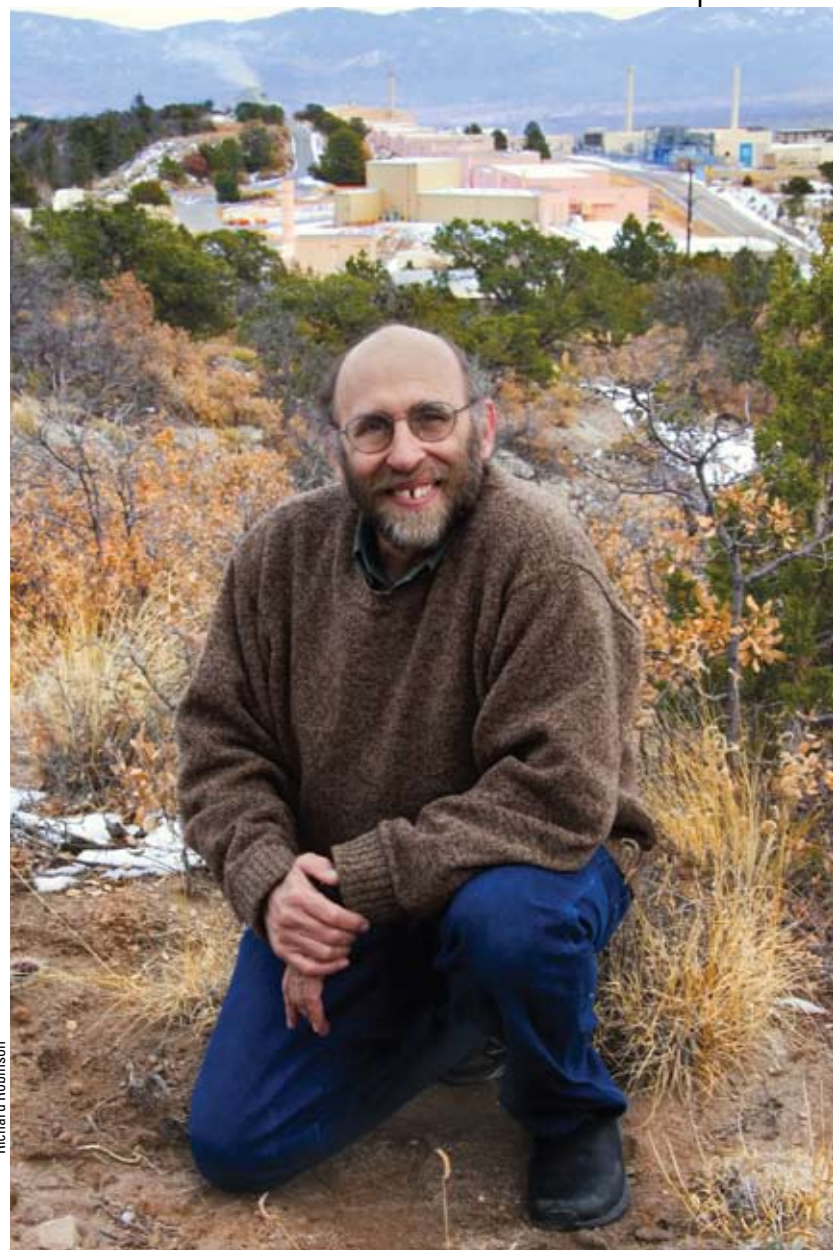
The greatest threat integrated circuit devices face is from neutrons, which are produced in the atmosphere by cosmic rays, Wender said. "Neutrons have been shown to cause a variety of upsets in semiconductor devices," he said. A single neutron can cause a failure in a brand new device.

The neutron spectrum generated at the high-energy neutron source at LANSCE has energies similar in shape to the atmospheric neutron

spectrum produced by cosmic rays at 40,000 feet, he said. Testing a chip for a minute in LANSCE's neutron beam allows manufacturers to evaluate how that chip will behave in the "real world" during a year of operation.

Wender said he is looking forward to having more semiconductor manufacturers use the LANSCE facilities as a resource. "We're fully booked up at this time," he said, adding that his team is planning the construction of an additional flight path to allow for more testing. "We're writing the proposal right now."

— *Tatjana K. Rosev*

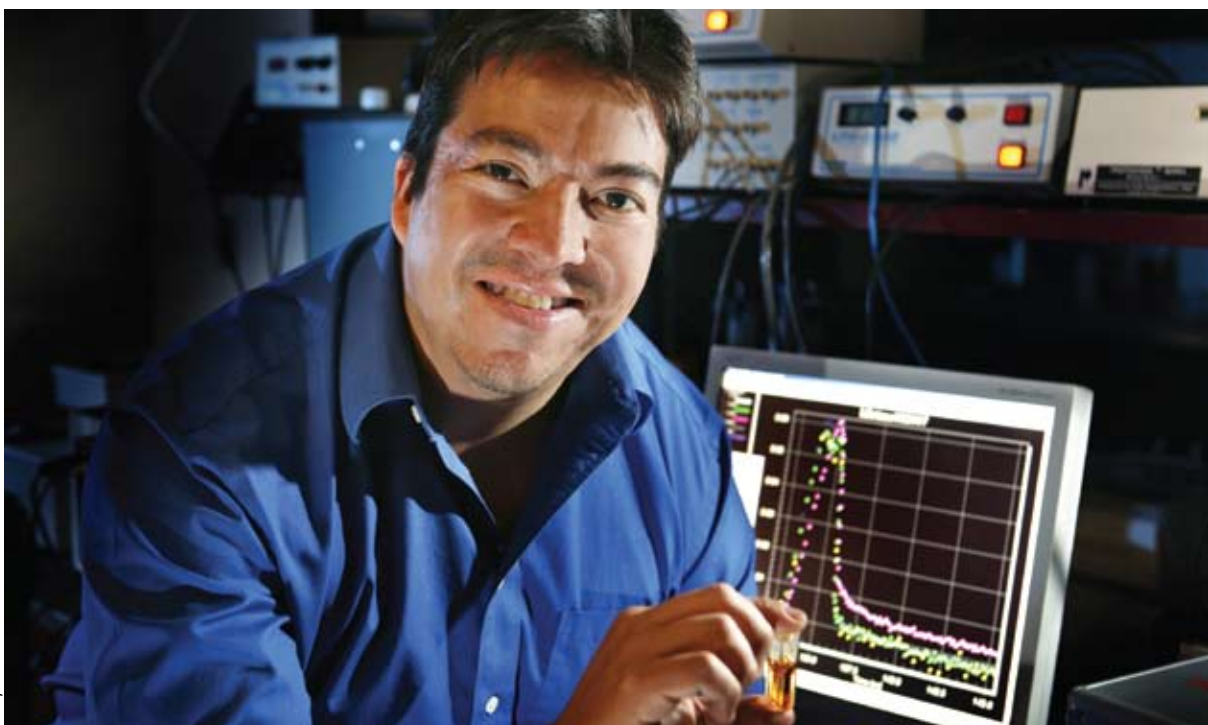


Steve Wender of Neutron and Nuclear Science

Richard Robinson

Gabriel Montañó holds a vial of a polymer mixture with photoluminescent properties. He uses fluorescence spectroscopy to determine the lifetime of the mixture. The data points on the computer monitor show how the mixture's fluorescent properties decay over time.

LeRoy N. Sanchez



## Big-picture nanoscientist *researcher driven by biological questions*

Gabriel Montañó is something of a contradiction. For a young man, he sees the world from an unusually deep and timeless perspective. His specialty is not philosophy, however, it's nanotechnology—the science of building things on an extraordinarily tiny scale.

Montañó directs a nanotechnology laboratory at the Center for Integrated Nanotechnologies' (MPA-CINT's) core facility in Albuquerque. "My interests in nanotechnology are driven by biological questions. I try to understand a biological process and then attempt to recreate it," he said. Montañó is intent on assembling microscopic mechanisms that convert light into energy. He takes his cue from simple, elegant structures in plants that have been converting the Sun's light into energy for more than 3,000 million years.

Andrew Dattelbaum of MPA-CINT, his closest collaborator, explains that they are assembling proteins and other substances into photosynthetic membranes that are an astonishing 5 nanometers thick—that's 200 billionths of an inch.

Montañó admits that his greatest breakthrough could have disintegrated in the laundry. As a graduate student, he was attempting to isolate a certain protein, a process that had confounded his peers. One day while relaxing, he jotted down a fresh concept on a cocktail

napkin that almost got thrown in the wash. Fortunately, the correct solution was saved from the laundry just in time.

Initially an English major at New Mexico State University, Montañó soon gravitated to chemistry. "Performing experiments, that's when it changed for me; that's where the love of science began," he said. And as a doctoral student in chemistry and biochemistry at Arizona State University, Montañó learned the advantages of working on a multidisciplinary team.

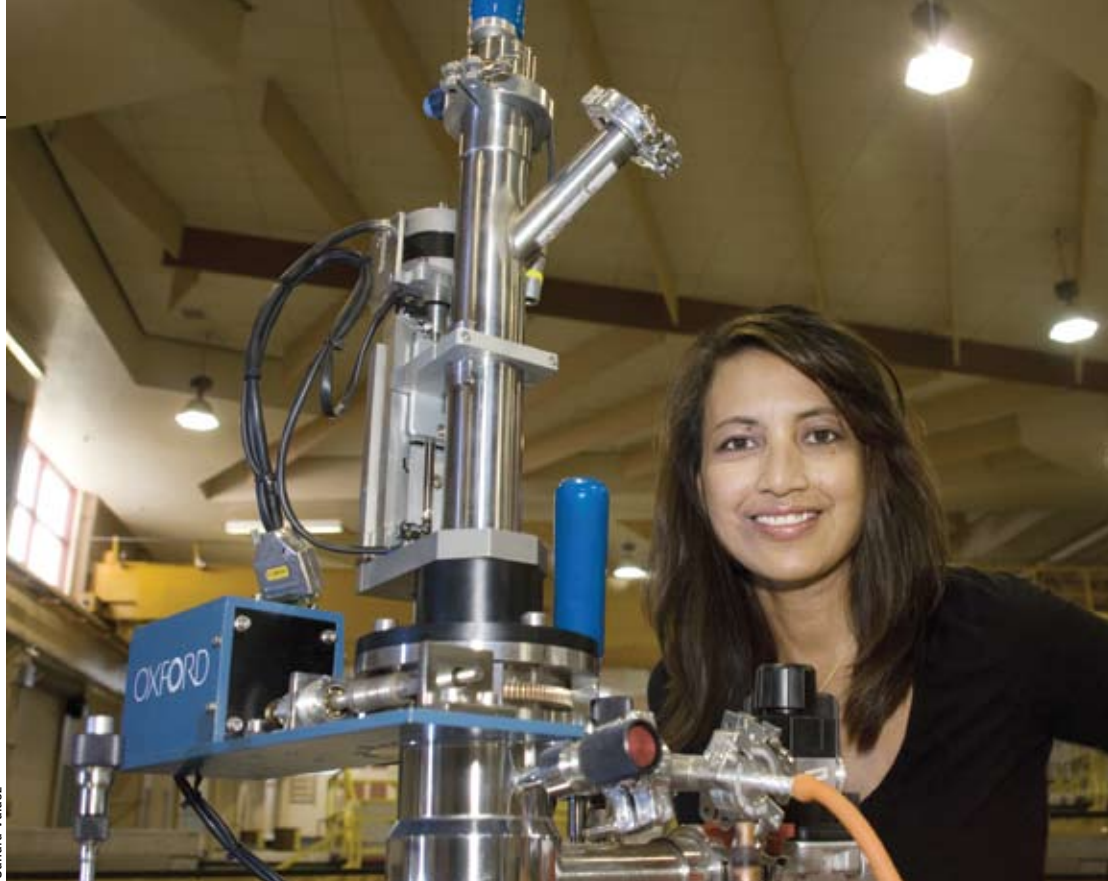
Andrew Shreve of MPA-CINT said Montañó's "experience extends from molecular biology and biophysics to material science and chemistry. He is a valuable asset because of his breadth of knowledge across many fields."

CINT's nanotechnology capabilities attract a broad spectrum of users from government, education, and industry. Although CINT's mission focuses on tiny microscopic materials, Montañó's versatility lets him see the big picture.

—*Editor's note: This is an excerpt from an article by Tom King that was published in the Materials Physics and Applications Division publication MPA Materials Matter (<http://int.lanl.gov/orgs/mpa/materialsmatter.shtml>).*

Leilani Conradson sets up a displax for Lujan Center users. The apparatus cools samples in a neutron scattering experiment to cryogenic temperatures near absolute zero.

Sandra Valdez



## Anticipating and meeting user needs

### *LANL Star key to LANSCE experience*

Leilani Conradson of the Los Alamos Neutron Science Center is a woman of many talents. She is the experiment coordinator for the Lujan Neutron Scattering Center, as well as the LANSCE user program manager and division student liaison.

She also likes to travel with her family, concentrates better while listening to death metal music, and loves her pet rats, Arthur and Humphrey.

To the more than 700 researchers from all over the world who come to the Lujan Center annually to conduct experiments, Conradson is the nexus of the facility. She and her coworkers coordinate all aspects of the user experience at Lujan; ensure that users are provided with all necessary equipment, materials, and resources; manage user safety orientation and training; obtain the required authorization and records for all users, many of whom are foreign nationals; and schedule visits.

In recognition of her contributions to LANSCE, the Women's Diversity Working Group named

Conradson a 2008 LANL Star. But Conradson said the Lujan and User Office staff deserves the award just as much as she does.

"I wouldn't be able to do this without my colleagues," she said. "We're very close, very supportive of one another."

Of Hawaiian heritage, Conradson received a baccalaureate degree in chemistry from San Jose State University. While at the university, she organized the Local and Nanoscale Structure in Complex Systems meeting in Santa Fe and worked at the Seaborg Institute for Transactinium Science and the Stanford Synchrotron Radiation Laboratory. Her experience as a user, Conradson said, helps her anticipate and meet users' needs. "I love helping the LANSCE users get their work done," said Conradson.

"I have a lot of autonomy, and that's allowed me to grow," she said. "But the best thing about my job is the people I work with. We're like a family."

— Tatjana K. Rosev



# Laboratory ships last of high-activity drums to WIPP

Laboratory personnel place the inner lid on one of three TRUPACT containers of high-activity waste — the Laboratory's final 2008 shipment to the Waste Isolation Pilot Plant near Carlsbad. "This is a significant achievement for the Laboratory," said Mark Shepard of Los Alamos's Waste Disposition Project. "It closes a chapter on the February 2007 commitment to the Defense Nuclear Facilities Safety Board to prioritize characterization and disposal of the highest-risk transuranic [TRU] wastes stored at Technical Area 54, Area G," he said. A total of 282 high-activity drums were shipped to WIPP as part of this campaign.



Dixon Wolf



## **Recycling an important part of the solution**

Recycling is one of the easiest ways you can help slow climate change and global warming. Recycling significantly helps lower carbon emissions associated with extracting virgin materials, manufacturing products, and waste disposal. For more information on recycling, go to <http://www.nrc-recycle.org/fact-sheet.aspx>.

## **Taking electronic equipment on foreign travel**

Workers who take government-owned electronic equipment on foreign travel must submit the Travel-Computer User Form to the Technical Surveillance Countermeasures Team on return to the Laboratory. To access the Travel-Computer User Form, go to [http://int.lanl.gov/orgs/sg/sg\\_3/tscm/LoFT.pdf](http://int.lanl.gov/orgs/sg/sg_3/tscm/LoFT.pdf).

## **Study finds radioactivity around Los Alamos largely due to natural sources**

A recent study that assessed levels of radioactivity near the Laboratory confirmed that nearly all measured radioactivity in the area is due to natural sources. To read a news release, go to [http://int.lanl.gov/news/index.php/fuseaction/home.story/story\\_id/15300](http://int.lanl.gov/news/index.php/fuseaction/home.story/story_id/15300).

## **Report accidents involving government vehicles**

The Laboratory's Vehicle and Pedestrian Safety Program (P101-7) requires that all accidents involving government vehicles be reported using General Services Administration Form SF-91. The form must be forwarded to the line manager for signature, and the line manager must forward the form to the Industrial Hygiene and Safety Division within two working days of the accident.

## **Changes to Education Assistance Program**

The revised Education Assistance Program, formerly called the Tuition Assistance Program, reflects best business practices and aligns more closely with other Department of Energy facilities. Employees and managers familiar with the previous assistance process will want to review the changes to determine whether current education plans may need to be adjusted. For more information, go to <http://www.lanl.gov/worklife/benefits/perks/tuition.shtml>.



## **Snowing? Check UPDATE**

In the event of inclement weather, Laboratory workers should call the Laboratory's UPDATE phone line at 667-6622 or toll free at 1-877-723-4101 for information about the Lab's operating status.

The UPDATE phone line is the Lab's official, primary source for obtaining such information.

## **DOE extends deadline for draft GNEP PEIS comment period**

The Department of Energy has extended by 90 days the comment period on the Draft Global Nuclear Energy Partnership Programmatic Environmental Impact Statement.


DOE decided to extend the comment period because of extensive interest expressed in the draft GNEP PEIS. Comments can be submitted through March 16, 2009. To read a release, go to <http://www.energy.gov/news/6775.htm>.

## **January service anniversaries**

Find the January service anniversaries online at <http://www.lanl.gov/news/currents/2009/jan/anniversaries.shtml>.

## **In Memoriam**

- Antonio "Tony Green" Roybal, 89, died November 13
- Antonio "Tony" Roybal, 81, died November 13
- Ernest Keith Hodson, died November 18
- Jean A. Lindsey, 87, died November 20
- Ray Davenport, 73, died November 25

 *Deliver improved business processes, systems, and tools that meet the needs of our employees, reduce the cost of doing business, and improve the Laboratory's mission performance*

## Lab improvements equate to millions in cost savings

Soon, each time employees at the Dual Axis Radiographic Hydrotest Facility head to the firing point, they will appreciate, first-hand, the effects of Lean Six Sigma. Some of the funds (totaling \$840,000) saved through hydrotest execution process improvements are being used for radiation decontamination at the facility, eliminating the need for employees to dress out in personal protective equipment for on-site work.

“Improving their internal processes not only saved money, but the savings are being reinvested in Lab work scope that was unfunded,” said Dave Earnhart, Lean Six Sigma manager. “That reinvestment continues to benefit the program and makes it easier for employees to execute their jobs.”

Lean Six Sigma efforts yielded many millions in cost savings from improvements at the Laboratory in fiscal year 2008. Major contributors to this savings included financial management, hydrodynamic testing execution, recycling and reuse of government resources, Work for Others agreement processing, sample management and data validation, and procurement.

Another \$7 million of potential benefits during 2008 exist in the form of known projects not yet validated by the Chief Financial Officer. And, according to Earnhart, there are millions of dollars in savings resulting from process improvement projects not directed by the Lean Six Sigma Office. A database designed to collect this information is in the works, with the first phase up and running and a second on the way in June.

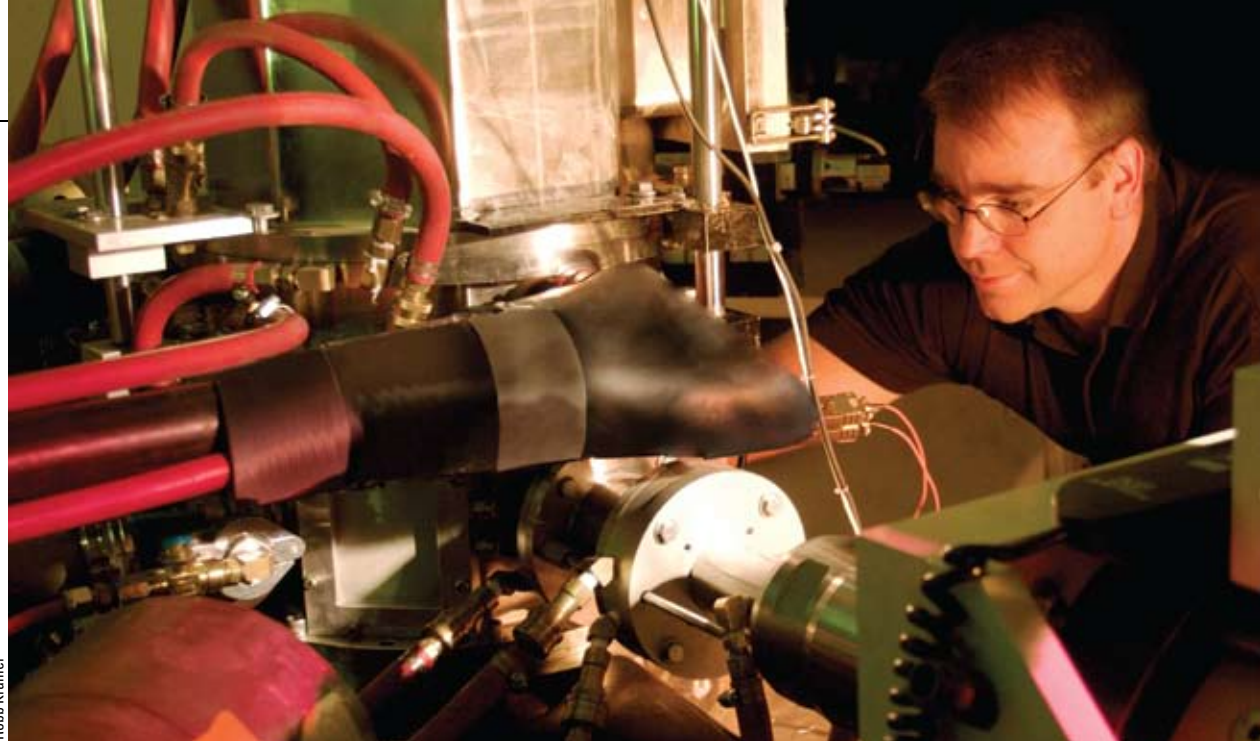
“Improving our efficiency is imperative. Doing more with less means optimizing our processes, and that’s where Lean Six Sigma can help. In the coming year, the focus will be on more complex projects, as well as issues that affect the bulk of the institution,” he said, citing as examples the hiring process and the authorities system.

Dominic Tafoya works on one of the refurbished accelerator cells for DARHT's second-axis accelerator.



LeRoy N. Sanchez

Don Brown, instrument scientist for the Spectrometer for Materials Research at Temperature and Stress, makes final adjustments before the beam is available to the Lujan Neutron Scattering Center.



Robb Kramer

## Thriving on 24/7 science

Don Brown of Structure/Property Relations (MST-8) thrives on the intensity of his work. When the beam is on at the Los Alamos Neutron Science Center (LANSCE) and he's running an experiment, coming to work for him is "an adrenaline rush."

Brown is the instrument scientist on SMARTS, the spectrometer for materials research at temperature and stress, which uses neutron diffraction techniques to probe metals and structural materials.

Users come from around the world to work on SMARTS and, on average, a new experiment starts every three days, with Brown relishing the pressure and the variety of his work. With the time constraints and cost of accelerator operations, all instruments at LANSCE, including SMARTS, run on a 24/7 schedule while up.

"I just perform well when there is a deadline," explained Brown, "and I'm always doing new science."

Brown is quick to point out that SMARTS is a team operation, which includes Björn Clausen of the Lujan Center at LANSCE and Thomas Sisneros and Saurabh Kabra of MST-8. The core team is supplemented by a constant flux of students. "The user program at LANSCE is perfect [for students]," Brown said. "If someone is assertive and gets involved in things, you can kick start a career here." Which is exactly what Brown did.

"Right from the outset Don came at it with a whole lot of energy," said MST-8 Deputy Group Leader Mark Bourke, who built the SMARTS instrument before recruiting Brown and turning it over to him to run. As a graduate student Brown, who earned his doctorate in physics from Pennsylvania State University, conducted experiments at facilities similar to LANSCE in the United States, United Kingdom, and France and knew he wanted to run a beam line at a world-class facility.

"He saw the other side of it, the user side," said Bourke. "Don is certainly someone who understands what [user] needs are, respects them, and if they are prepared to invest the time on the instrument, he will give them a huge amount of his time to maximize their experiments."

—*Editor's note: This is an excerpt from an article by Karen Kippen that was published in the October issue of MSTeNEWS ([int.lanl.gov/orgs/mst/files/enews08/october08enews.pdf](http://int.lanl.gov/orgs/mst/files/enews08/october08enews.pdf)).*

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