



# the laboratory connection

volume 2 number 8

your community's link  
to information, opportunities, and people  
at Los Alamos National Laboratory

november/december 2001

word  
from

the Community Relations Office

**P**rior to September 11th, 2001, "Homeland Security" was not a familiar term to many Americans. Now it is both the focus of a new, Cabinet-level department in the federal government and the subject of a great deal of media attention.

At the Laboratory, Homeland Security has long been a goal of the threat-reduction component of our mission. Research and development of our capabilities to deal with nuclear, chemical, and biological weapons are an essential part of the work we are funded to do. Scientists at the Lab have labored for years in relative obscurity, designing and perfecting techniques to detect these threats and strategies to counter them. Sadly, the time has come when we must put our know-how to work to protect our country and our way of life.

The 9-11 Response Team has been created within the Threat-Reduction Directorate to assess the Lab's current capabilities to respond to attacks, and to rethink how the chain of events leading to a terrorist attack—including motivations—can be better understood so we can find and stop such acts before they happen. This effort will encompass work from all directorates, divisions, and groups.

Associate Director for Threat Reduction Don Cobb has observed that although there is much work to be done, we have a head start. "We are building on existing Laboratory capabilities and programs, a good starting point," he said. "But there is no question, a lasting new component to our Laboratory will be Homeland Security."

## Lab Technologies Will Help Counter Biological Threats

In northern New Mexico, like everywhere else in the country, we have learned to fear a tiny organism that has been present in our soil for centuries. Along the route of the Santa Fe Trail, and in other areas where livestock has been historically present, there's a good chance that enough digging would uncover *B. anthracis*.



*Bacillus anthracis*, discovered in the 1870s, was the first organism shown to cause a particular disease. It causes anthrax in animals, mostly cattle, horses, goats and sheep, and in humans. Cutaneous anthrax in humans occurs most frequently on the hands and forearms of people working with infected livestock, and results in sores that develop coal-black scabs. The term anthrax comes from the Greek word for coal.

Within anthrax itself, there are hundreds of strains from around the world, and they are remarkably similar. Laboratory scientists and their collaborators have been conducting intensive research for years on *B. anthracis* and have separated the subtle biological features of each strain to understand how they differ. They have created libraries of genetic profiles and now have more than 1,200 strains on file. This database and several new specialty genetic analysis tools will allow the Laboratory to assist in identifying the source of any sample delivered to us for analysis.

continued on page 3

## Lab Gives a Hand to Regional Business Seeking New Horizons

Regional business and political leaders were on hand for the ribbon-cutting ceremony at New Horizons 2001, an October trade fair sponsored by the Northern New Mexico Supplier Alliance (NNMSA) in partnership with the Lab and the state Procurement Assistance Program.

Speaker of the New Mexico House of Representatives Ben Lujan, former New Mexico Governor Toney Anaya, Española Mayor Richard Lucero, and State Representative Jeanette Wallace were among the hundreds who toured the booths of more than 145 local vendors who hoped to make some valuable new business connections. Laboratory workers, particularly technical staff who make purchasing decisions for their organizations, were encouraged to attend by Principal Deputy Lab Director Joe Salgado, who called participating in the fair "a win-win opportunity for everyone."

The NNMSA is a 600-member not-for-profit organization whose membership includes businesses from the seven-county region around the Lab. Originally formed to direct procurements for the Lab, the NNMSA's mission is now to target business opportunities for its members.

One recent success story was the award of two interim contracts worth \$1 million to Española businesses Cook's Home Center and Hacienda Home Center. The contracts to sell building supplies, hardware, and lumber to the Lab were announced just days before the trade fair. "The increase in sales volume will allow us to hire new employees," said Richard Cook, owner of Cook's Home Center. "Our corporate entity, Española Mercantile, has been in operation since 1903 so our store's been around a long time. This contract will help us make it 100 years." A newer addition to the roster of prospec-



tive regional providers, Optimos is an information technology consulting company that has also been successful doing business with the Lab. Business Development Manager Kimberly Anaya Segotta said the trade fair helped her renew old Lab contacts and make new ones.

"The trade fair gave Optimos the opportunity to meet again with LANL personnel we had previously met, and to meet new Lab staff involved in the procurement process, and learn more about the types of opportunities available at LANL," she said. "The trade fair also provided an opportunity for various business representatives to exchange views on how we can work together to improve the economic climate in northern New Mexico for the benefit of all."

Optimos was a principal sponsor of the trade fair, but many of the other participating

**TOP:** NM House Speaker Ben Lujan cuts the ribbon opening the New Horizons trade fair. Also present were, left to right, J.R. Trujillo, owner of QUICKfix Home Improvement and head of the Northern New Mexico Supplier Alliance, Art Blea, superintendent of the Pojoaque Schools (partially hidden), Tim Martinez of the Lab's Group Management and Administration group, and Bennie Gonzales of the Lab's Small Business Office.

**ABOVE:** Española Mayor Richard Lucero and Speaker of the New Mexico House of Representatives Ben Lujan confer at the opening of the New Horizons trade fair, held at the Pojoaque Schools' Ben Lujan gymnasium in October.

**ABOVE LEFT:** Former Española Mayor and head of the Española Chamber of Commerce Connie Thompson, right, gets some information technology advice from Kimberly Anaya Segotta, business development manager for Optimos Incorporated. Looking on is former New Mexico Governor Toney Anaya.

businesses are family enterprises with few employees. Judy Gale has a small graphic design business in Española, Signs, Banners and More. She has been making banners for Safety Days and the United Way campaign at the Lab for several years, but hopes for more and bigger contracts in the future. "The trade fair was a very positive experience for me and I have already heard from several people I met there," she said.

Lab Technologies...  
continued from page 1

Researchers use the libraries to analyze medical, veterinary, forensic, and environmental samples to determine their microbial content. The goal is to generate a profile from a sample containing unknown microbes, compare it electronically to all the archived profiles, and determine its phylogeny, and possibly its exact identity and geographic origin.

An example of the Lab's work in this area is the case of an anthrax outbreak that occurred in central Australia in 1994. The Laboratory was able to determine that the strain of anthracis found in the Australian cattle was the same as that from an outbreak in India in the 1850s. This suggests that the source of the Australian bacteria was related to cattle imported 150 years earlier, that the infected animals were buried, and that the outbreak occurred when the buried carcasses were disturbed more than a century later. The spores were inhaled by grazing cattle, which in turn developed anthrax from these 144-year-old spores.

Based on the analysis of tissue samples, Los Alamos researchers proved that the victims of the 1979 anthrax outbreak in the Soviet Union were infected with at least four different strains of *B. anthracis*. This provided definitive evidence that the deaths were not caused by a natural infection. It was later revealed that the deaths had been caused by the accidental release of *B. anthracis* spores from a Soviet military biological research facility suspected by western intelligence experts of producing large quantities of spores. More recently, the Lab's DNA analysis of samples from Iraq in the aftermath of the Gulf War was directly linked to Iraq's

disclosure of an offensive biological warfare program that included the use of *B. anthracis*.

The Laboratory has highly advanced equipment for high-speed and high-sensitivity DNA testing. It requires less than 2-trillionths of a gram of DNA to perform the analysis. The Laboratory does not currently use actual bacteria in its studies.

The Lab is also working on potential anthrax treatments. One scientist is developing decoy molecules that fool the toxins generated by dangerous bacteria. The toxins latch onto the decoys by mistake, allowing the body's immune system's killer cells to mount a defense.

### Simulation, Modeling and Sensors Among LANL Strengths

Los Alamos National Laboratory will make an important contribution to efforts to ensure Homeland Security now and in the years to come. We are a recognized leader in modeling critical infrastructure and using that expertise in a number of ways. We attempt to look at the as-yet-unanticipated consequences to events, to understand the links between events, to examine the byproducts of events in an effort to protect our infrastructure, and to better understand our vulnerabilities.

The National Infrastructure Simulation and Analysis Center, known as NISAC, supports policy decisions through modeling, simulation and analysis of systems comprising critical infrastructures like power grids, oil and gas supplies, water supplies,

transportation, telecommunications, and computer networks.

Sensor development teams across the Lab work to provide early warning of the presence of chemical and biological agents and nuclear materials. The Laboratory has been asked to assist in analyzing potential hazards at Ground Zero, the site of the former World Trade Center.

BASIS, short for Biological Aerosol Sentry and Information System, attempts to provide biodetection systems for special events. It consists of a network of distributed sampling units deployed in and around potential target sites. Each unit continuously collects, stores and time-registers aerosol samples that are regularly retrieved and brought to the heart of BASIS: the Relocatable Field Laboratory, where collected samples are analyzed with the most sensitive and reliable detection and identification techniques available. BASIS will estimate event location, exposure levels and duration, assisting the public health system in identifying the population requiring treatment.

The Lab is a leader in sensors, systems, and detectors, and the data they collect loops immediately back into the information analysis tools to look for trends, patterns and indicators of future activity. As large amounts of written and photographic information flows into organizations like the FBI and others, the skilled analysis techniques and tools we possess will support those agencies and help them do their work.

With our skills related to nuclear materials, we've provided technical assistance in selecting proper equipment for mail irradiation and decontamination. Over the years, we have developed and installed monitors for perimeter control of nuclear materials, such as the pedestrian, truck, and rail systems in place in Russia at Vladivostock and elsewhere.

## NM Teachers Explore Space

Nearly two dozen teachers blasted off the new school year using a curriculum they developed with the help of space scientists from the Laboratory. The 20 teachers from throughout New Mexico and from El Paso spent three weeks at the Lab during the summer, learning about space science as part of the Los Alamos Space Science Outreach (LASSO) program. In 120 hours of intense learning activities, the teachers received instruction in basic physics concepts, the sun, moon and planets, Earth's magnetosphere, NASA missions and instruments aboard the spacecraft, and data processing and analysis. Lab scientists gave lectures and conducted tours of laboratories for the teachers, providing hands-on activities using cutting-edge

science and technology. The scientists also helped the teachers develop lesson plans and science projects for the grade levels they are teaching—kindergarten to junior college. These lesson plans are put on the Web for teachers around the world to use.

Laboratory scientists also visit classrooms throughout the school year as part of the LASSO program and engage students and teachers in a variety of activities, such as robot building, and lectures and demonstrations on the sun and solar wind. LASSO's funding comes from the many projects NASA funds at the Lab. For more information on the LASSO program, visit <http://set.lanl.gov/programs/lasso/lassomain.htm>

### Bradbury Museum Staff Take Science on the Road

Science teachers within a 90-minute drive of the Bradbury Science Museum can bring cool science demonstrations to their school through Science on Wheels. Four new hands-on activities are being offered to classes free of charge through April 15. The classes can be scheduled on Mondays and Thursdays for a minimum of four and



Jessi Chipper, an eighth grader at Los Alamos Middle School, writes her Prediction and Conclusions with an assist from Bettie Bedell from the Bradbury Science Museum. Chipper's class had just finished the Volts and Jolts exercise involving static electricity, courtesy of Science on Wheels.

### Business Brief

The Lab purchased more than \$357 million in goods and services from businesses in northern New Mexico during the last fiscal year. Businesses in Los Alamos, Rio Arriba, Santa Fe, Taos, San Miguel, Sandoval and Mora Counties and on Native American pueblos in the northern part of the state were the source of the procurements, \$11 million more than in the previous fiscal year, which nearly doubled the amount spent five years ago.

The goods and services bought by the Lab included computers, office equipment and supplies, furniture and machine shop fabrications, as well as support services from contractors like Johnson Controls Northern New Mexico and Protection Technology Los Alamos.



Floyd High School teacher Gary Gill, left, Ben Diaz, center, from Dr. Hornedo Middle School in El Paso, Texas, and Susan Cunningham from Jefferson Elementary in Lovington, N.M., shine a flashlight onto a robot designed to orient its solar panels toward the light. The teachers, part of the Los Alamos Space Science Outreach program, learned the basics of robotic components and how components are combined to make more complex robotic designs. The robots have solar sensors similar to those found on satellites with solar panels.

a maximum of six classes at each school.

For students as young as second grade, museum staff can demonstrate how to build a static electricity generator and then use it to light up a fluorescent light. Third graders can become part of a giant electromagnetic spectrum. Then in small groups, they break white light apart into colors and assemble colored light into white. The activities conclude with a look at the colored spectra of different gases.

For older students, fourth grade and above, activities include a rockhounding experience, classifying a variety of rock specimens using flash scopes and rock hammers, and Circuit Connection, where students assemble simple circuits with batteries, wires, and light bulbs. They then test materials to check for insulating and conducting properties, and construct their own fuses and electromagnets.

Each class is 50 minutes long, with a maximum class size of 30 students. To schedule a visit from Science on Wheels, call the Bradbury Science Museum at 667-8676.

## Lunch Buddies Demonstrate the Power of Friendship

Hundreds of elementary school students in Española and Los Alamos have a valuable new ally as they negotiate the challenges of life and school: a lunch buddy. Scores of Lab employees have been trained to provide one-on-one support and friendship for children who may need a little extra attention by sharing lunch (or breakfast) with their buddies once a week.

Since it was started in Los Alamos in 1996, Lunch Buddies has paired screened, caring adults with elementary school students.

The program was expanded to Española in 1998. The adult volunteers meet with their Lunch Buddies once a week, either to eat breakfast or lunch or just to provide a sympathetic ear when the children want to talk.

Research suggests that one meaningful relationship between an adult and a child exerts significant protection against the child's later use of drugs. Unfortunately, the pressures of daily routine can diminish the quality of family relationships. Lunch Buddies, initiated in Washington State, was developed to provide additional support for students in need of extra adult attention.

Locally, the Lunch Buddy Foundation recently received grants worth nearly \$20,000 to support the program, which helps prevent both drug abuse and gang violence by fostering child-adult connections outside of the family circle. The Los Alamos National Lab Foundation contributed a grant of \$10,000. Several of the program's board members are both Lab employees and Lunch Buddies themselves.

"I joined because I love children and I wanted to do whatever I could to help kids who need just a little encouragement and reassurance," said Ternel Martinez, a Lab procurement specialist. "I'm currently with my second student, and I've had great



relationships with my Lunch Buddies. I think my biggest contribution lies in the fact that they can confide in me and I always make sure I listen to them—I mean really listen to them—and respond to their needs, concerns or fears as best I can."

Mary Erwin, leader of the Lab's Accounting group, learned about the program from the local newspaper, but didn't become involved until she talked to a colleague who was a Lunch Buddy. She is now paired with her fourth student.

"I've had a third grader, first grader, fifth grader, and now am back to a first grader, and each experience has been unique," she said. "I love being a Lunch Buddy for a number of reasons: first, it gets me out of the office and actually makes me eat lunch; second, the kids just love the extra attention, and there is nothing like the look on their faces when you show up to have lunch with them; and third, it's just plain fun to play games and chat with a child for 45 minutes. It tends to put life in perspective."

Bill Wadt of the Quality Improvement Office agrees. "How many people get to play tag or cards, spin tops or play kickball on their lunch hour?" he asked, adding that being a lunch buddy has helped him feel connected to the future generation and the school system.

And Wadt has also found another benefit to participating in the program: "Being in the program has made me a better listener, both at home and in the office," he said.

Many young students still need lunch buddies. For more information, call 747-3454.



**UNITED WAY'S MONSTER MASH.** Audra Tucker of Customer Service at the Lab carves a pumpkin at the MonsterMash to benefit the Lab's United Way campaign. The gathering featured food, games and entertainment and secured an additional 50 campaign pledges. Tucker's Statue of Liberty costume won second prize in the costume contest.

## ReefNews Provides Underwater World to Area Schools

This 5-foot, loggerhead turtle is among marine creatures featured on an educational CD-ROM about the islands of Bimini and the life of its tropical reefs. The CD-ROM was produced by ReefNews, Inc., supported by grants from the Los Alamos National Laboratory Foundation, Los Alamos National Bank, and the Los Alamos Medical Center. ReefNews will distribute the CD-ROM to over 550 elementary school libraries throughout New Mexico. ReefNews, Inc., is an educational, nonprofit organization with the mission of teaching students of all ages about the oceans and their shores.



## Inside

**Lab Helps Counter Biological Threats**

**Business Seeks New Horizons**

**Simulation, Modeling, and Sensors**

**NM Teachers Explore Space**

**Taking Science on the Road**

**Lunch Buddies**

**United Way's Monster Mash**



The Laboratory Connection, a monthly publication for northern New Mexico, is published by the Information Management Division and the Community Relations Office. The staff can be reached by e-mail at [community@lanl.gov](mailto:community@lanl.gov), by telephone at 1-800-508-4400, by fax at (505) 665-4411, or by Laboratory interoffice mail at Mail Stop A117.

Los Alamos National Laboratory, an affirmative action/equal opportunity employer, is operated by the University of California for the U.S. Department of Energy under contract W-7405-ENG-36. All company names, logos, and products mentioned herein are trademarks of their respective companies. Reference to any specific company or product is not to be construed as an endorsement of said company or product by the Regents of the University of California, the United States Government, the U.S. Department of Energy, nor any of their employees.

Editor: Kay Roybal

Contributing writers and photographers: Public Affairs and Community Relations Office staff contributed to this publication.

LALP-01-06



Los Alamos, New Mexico 87545

A National Nuclear Security Administration,  
U.S. Department of Energy Laboratory  
John C. Browne, Director