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the laboratory connection

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

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word
from the Community Relations Office

The Laboratory's employees and management have a strong commitment to increase educational opportunities and enhance existing programs in northern New Mexico through volunteering, fund raising, grant writing, and other tools. As our workforce ages, we have become more focused on the need to recruit more local technical and scientific talent. With the help of the Northern New Mexico Council on Excellence in Education, we have taken steps to ensure that our regional schools will be up to the challenge of nurturing that talent.

Through the Science and Technology Base Division and the Education Program Office, the Lab also offers a variety of education and student programs that aim to spark student interest in science careers. Through our outreach activities and student employment opportunities, we hope to persuade talented young New Mexicans to enter the human resources pipeline and eventually join the Lab's workforce of the future.

Although our recruitment needs provide a compelling business reason for the Lab to take an interest in regional education, we also champion science education as a goal for all citizens. As science educator Rick Alexander puts it, their efforts within the education community are intended to "promote the importance of science and math, not only in the work we do at the Lab, but in everyday life."



Lab science education specialist Joe Vigil explains the basics of robotics to some of the students of all ages who attend the annual Robotics Competition. This year's event will be held in early May.

Lab's Education and Student Programs Look for Local Talent

Part of the Laboratory's future workforce is presently being educated in northern New Mexico schools, so it is for our mutual benefit that the Lab takes a keen interest in the regional education system. In order to develop and maintain a pipeline of qualified scientists and technicians, we have entered into partnerships with educational institutions in our area to raise standards and achievement for both teachers and students.

Those efforts have resulted in a number of outreach programs that share the Laboratory's information and technology resources for the benefit of our neighbors and in particular, their children.

Under the umbrella of the Northern New Mexico Council on Excellence in Education, which the Lab helped found and now facilitates, middle school teachers in Chama, Mora, and Española have received intensive training through the Math and Science Academy that has revolutionized teaching in their communities. (See related story pg. 3)

In addition to the focused efforts of the Math and Science Academy program, the Lab's Education Program Office offers competitions, workshops, and a variety of training programs for students of all ages.

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The *Go Figure* competition is aimed at sparking interest in younger students, but *Adventures in Super-computing* targets high school teams. The electromechanical and materials-science training programs are geared to developing career skills in college students. The *Los Alamos Space Science Outreach (LASSO)* program trains teachers in space science, and the annual Robotics Competition is open to kids of all ages.

Kurt Steinhaus, director of the Lab's Student and Education Program Office said that "our science education program focuses on the Lab's objective for community engagement and workforce development. There is a business reason for the Lab to be a good neighbor in northern New Mexico. Retention rates of Laboratory employees are higher if we hire locally. We know there's talent out there and we are looking for it."

The *Go Figure! Mathematical Challenge*, held every October at four northern New Mexico locations, is dedicated to strengthening kids' mathematical capabilities by identifying, recognizing, and rewarding students who are talented in mathematical thinking. The Challenge targets students in grades 7 through 12 and provides them the opportunity to participate in problem solving. It is intended for everyone from the average student who enjoys math to the very best student who excels in it.

During the contest, participants are offered 13 problems and 2 1/2 hours to solve them. The problems require a minimal amount of knowledge, but a great deal of creativity and analytical thinking.

Winning students have also been invited to the Laboratory for a *Go*

Figure! Enrichment Day, including tours and seminars conducted by Lab staff.

Adventures in Supercomputing gives teams of high school students from throughout the state the chance to work on the most powerful supercomputers in the world. The Challenge encompasses the entire school year, as each team of one to five students and their sponsoring teacher defines and works on a single computational problem of their own choosing. The projects are finished in the spring on a daylong visit to the Lab, where their science projects are run on our high-performance supercomputers. Awards are given for teamwork, best written report, creativity and innovation, and environmental modeling, among others.

The Laboratory offers a number of robotic technology workshops, some of them open to students of all ages. The annual Robotics Competition is a four-day series of workshops and competitions with the older students attending for three days and the younger children attending a basic one-day workshop.

The objective is to create designs that make robots more efficient and capable. But an even more important objective is to involve northern New Mexico youth in a technology that they can understand and that will turn them on to math and science.

As competition founder Mark Tilden used to say, "The idea of Robotics is to improve robo-genetic stock through stratified competition and have an interesting time in the process."

New for 2003 is an initiative to invite *Go Figure*, Robotics and *Super-computing Challenge* students to the Laboratory for summer internships and mentoring with a technical staff member.

The Laboratory partners with the University of New Mexico's Los Alamos campus to provide technical training programs to support the Lab's hiring needs. The Electromechanical Technology Program targets northern New Mexico students with the goal of recruiting entry-level technicians for the Laboratory. Ten positions are funded each year, and students are paid to work at the Lab while attending school.

The course work for the two-year program provides participants with basic academic and technical knowledge so they can perform as technicians in a variety of electromechanical environments. Although students spend a portion of every day in class, they are also assigned to work under the guidance of the Lab's technical staff in the course of the program. They assist with routine tasks such as performing diagnostic tests on equipment. Continued employment at the Lab is possible following completion of the program.

Another training program being offered in partnership with UNM-LA is the brand new Materials Science Technology certificate degree program (see related story, page 6). This program is part of the Lab's Critical Skills initiative, which seeks to educate students and recruit workers in areas including nuclear design and evaluation, physics, engineering design, and evaluation for weapons and dynamic experimentation.

The Laboratory takes a keen interest in developing teachers, as well as students. In addition to the Math and Science Academy, the Lab offers several summer opportunities for teachers to learn about cutting-edge science that they can take back to their classrooms in the fall. The LASSO program

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Math and Science Academy's Work Showcased at Legislature

Teachers and other representatives of northern New Mexico's flagship school-reform project, the Math and Science Academy (MSA), had the opportunity to showcase the three-year-old program's achievements during Lab Day at the New Mexico Legislature.

The initiative's two Master Teachers and several participating middle school teachers from Española and Chama accompanied an exhibit of student work to the State Capitol Rotunda in January to acquaint members of the legislature and the public with the results of their efforts.

"The Math and Science Academy is the Lab's longterm commitment to math and science teachers in northern New Mexico," said Kurt Steinhaus, head of the Lab's Education Program Office.

MSA's goal is to provide middle school teachers and their students the opportunity to work with exemplary science and math mentors to gain content knowledge, experience, and expertise by working collaboratively with other committed schools and teachers. Developed by the Northern New Mexico Council on Excellence in Education (NNMCEE), the program is part of a larger systematic change initiative to improve education for the students of northern New Mexico. "We have built a very productive and strong partnership with education and community leaders through NNMCEE," Steinhaus said. "They make their needs known at our regular meetings so we can



MSA teachers accompanied a display of student work to the NM State Capitol. They are, left to right, Tina Martinez (Chama Middle School), Jennifer Lopez Salazar (Española Middle School East), Veronica Fresquez (Española Middle School East), Master Teacher Carol Brown, Tito Rivera (Chama Middle School), Evelyn Sanchez (Mora Middle School) Master Teacher Cathy Berryhill, Paige Prescott (Española Middle School East) and Dora Sanchez (Mora Middle School).

listen before making plans. It has worked very well for us and for the community."

One of the most compelling signs that MSA is working is that some participating teachers have postponed planned retirement because they are so excited about the program.

"The program is great, it keeps us so focused," said Veronica Fresquez, a seventh grade science teacher from Española Middle School. "And this year, I see more parents. Last year, we didn't have as many parents involved, but I send home lots of information, and we had two Parent Nights and a Celebration of Learning. And we don't just get parents of the so-called 'good kids.' It's parents that we've never seen before."

Jennifer Lopez, a Spanish Language Arts and English as a Second Language teacher at Española Middle School, is in her first

year with MSA but agrees that parental involvement is critical.

"We try to educate parents about the value of education and the important role they play in learning," she said. "We ask them to sit down and read with their children. It's hard to teach when the kids are not prepared for seventh grade reading."

Fresquez added that "if we're going to do what the President says and leave no child behind, we're going to need help from the parents. We are hardworking teachers and we know it's not just a 9:00 to 3:00 job, but we really appreciate the support of the MSA program."

Steinhaus agreed that support from all segments of the community will be necessary for the program to thrive.

"We'd like to build a network of community support so the program can be sustained at the local level," he said.

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allows teachers and their students to learn about current NASA projects exploring the composition of the solar system.

A select team of master teachers from elementary and secondary

schools in northern New Mexico are chosen to participate with lab scientists to develop appropriate curricula for their students. The scientists identify basic concepts of space and planetary sciences and introduce new technologies behind

current and future explorations. The teachers then develop and implement related activities in their classrooms, providing an educational opportunity tied to the NASA mission.

NNMCC and the Lab Use Technology to Serve Rural Students

"The use of video streaming and web computer technology (WebCT) has revolutionized the way students learn at Northern New Mexico Community College," said Roger Salles, coordinator of instructional technology. Salles said he's pleased with the cooperative effort that NNMCC and the Laboratory used to provide this leading-edge technology to northern New Mexico.

Salles, who has worked at NNMCC since 1993, had been researching ways to serve the rural population, and one idea that surfaced was a long-distance learning program. For the last five years, his goal has been to build the infrastructure necessary to support two-way video and video streaming. Using grant funding, Salles established the first two-way video system at NNMCC in 1997.

However, two-way video still requires that students arrive at a physical location at a specific time and didn't offer the full flexibility needed by the nontraditional student population that is usually older, with family responsibilities and full-time jobs.

"A large majority of our students are older, in the 30 to 35 age bracket," explained Tomás Vallejos, the NNMCC WebCT/Video Streaming administrator. "They're trying to earn their degrees while working around other less flexible aspects of their schedules. The younger population is more likely to show up for class because they usually have fewer responsibilities and there's a social aspect."

Vallejos said that two years ago, the NNMCC distance education program was on the decline. Classes were not growing, and the grant money was expiring. In order to boost student participation, Salles decided to use his remaining grant money to buy a server and try video



Roger Salles (left), the NNMCC coordinator of instructional technology and Tomás Vallejos (right), the NNMCC WebCT/Video Streaming Administrator work on a program in their instructional technology laboratory.

classes. He also requested technical assistance from the Laboratory.

Richard Montoya and Alex Montaña, both of the Communications, Computing, and Networking group helped configure a router and switch provided by the Lab.

"A Lab coworker suggested that Salles contact me for the networking assistance," said Montoya. "I'm from the valley and it was nice to help out my local community."

Montaña, who had previously provided assistance to both the Pojoaque Valley schools and NNMCC, also provided technical assistance.

"The Lab has an abundance of technical knowledge and experience," Montaña explained. "So it's good to share with the communities."

Vallejos said that before receiving the necessary technical assistance, NNMCC offered three long-distance learning classes. After the new router, switch, and server were configured, the long-distance

learning classes offered grew to nine because of the extra bandwidth capability. "Once we started using video streaming, enrollment in the long-distance learning program shot up 300 percent every semester for the last three semesters," Salles said. "Responding to the demand from students and faculty, we added a WebCT server for the fall 2002 semester in addition to the video-streaming capability. In the spring of 2003, we're going to offer 15 online classes."

Salles and Vallejos both said there are many advantages to video-streaming, but the two main reasons are flexibility and cost.

"All the students need is a computer and a telephone line," Salles said. "Also, we archive the video streams. If a student misses a class, due to illness or a scheduling conflict, they have access to the video stream archive and can watch a class session at their convenience and as many times as they want to do so."

Vallejos said that there are some students who form study groups and watch the video-streamed classes on one good

Former Lab Scientist Donald Pettit Aboard Space Station

NASA astronaut Donald Pettit, a Laboratory staff scientist from 1984 to 1996, is remembered by his colleagues for his intelligence, creativity, and sense of humor. Pettit has been living aboard the International Space Station as part of the Expedition-Six crew. He was scheduled to return to Earth in the spring but plans are being reconsidered because of the Columbia disaster.

“At the Lab, Pettit was part of a large team that fielded rocket launches from Poker Flat, Alaska, and Barking Sands, Kauai,” said Maxwell Sandford, an astrophysicist who worked with him.

Sandford said that Pettit constructed a furnace for processing high-temperature superconductor materials that could only operate in a near-weightless environment. By the time Pettit joined the NASA astronaut program, he had completed more flights in the zero-gravity aircraft than anyone except the senior pilot.

“At his suggestion, I flew once with Don to assist him with his zero-gravity processing, and completed 11 of the 22 parabolas before being incapacitated by the experience,” said Sandford.



Donald Pettit

Pettit applied for the astronaut program for 18 years before being selected in 1996.

Kelly Michel, another Lab scientist, worked with Pettit at NASA from 1997 to 2001. She described him as naturally curious and inventive.

“When he first moved to Texas, he saw how when crawdads burrow into the mud, it creates a beehive-shaped mud pile,” she said. “He scooped one up, put it in a kiln and baked it. Then he put it on his desk and used it as a pencil holder because he thought it looked cool.”

“He never placed himself above other people,” she added. “He was always just a coworker and a friend, even though he was an astronaut.”

Pettit and his family were also active supporters of local record store owner Russ Gordon’s Summer Concert Series. Gordon said that he met Pettit just before he became an astronaut and left for Houston.

“He was a blues man,” said Gordon. “He and his wife sponsored a few of our concerts. He’s a good guy, and I wish him the best of luck.”

Lab scientist Jim Blacic has been exchanging e-mail messages with Pettit since he’s been up on the space station.

“We’ve talked about some of the technical aspects of the projects he’s working on and the Columbia disaster,” Blacic explained. “They have food to last until June and fuel for the space station for at least a year. Don is in no hurry to come down. The crew would not see an extension of their mission as a hardship. They have plenty to do, and they would see it as an opportunity.”

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computer. There are also students who take a live class and a video-streamed class scheduled at the same time because they can watch the video-streamed class at their convenience. Under the conventional class system, those students might have to wait until the next semester to take a required class for their degree program.

Salles said that he and Vallejos would like to add NNMCC-specific dial-up service for

their students. They’ve requested their own high-speed line from the NNMCC administration and have received approval. But, they still need about \$25,000.

“When we get the funding, we’ll be calling the Laboratory again to configure the dial-up server,” Salles said. “Richard and Alex were really helpful and we appreciated their effort.”

Montoya summed it up by saying, “I think Roger and Tom are doing a superb job and they should be commended for their hard work.”



Materials Science Technician Training Offered to Local Students

The first class of the Materials Science Technology Certificate Degree Program will graduate from the University of New Mexico, Los Alamos, in May, and their teacher and program manager Diane Albert is as proud of the accomplishment as her six students, whose hometowns include Peñasco, Española, and Los Alamos.

The former materials scientist is both a teacher and the creator and driving force behind the technician training program, cosponsored by UNM-LA and the Lab. The 36-credit degree program is geared for working adults, and the students who participate also get work experience at the Laboratory during the two-year program.

Materials Science technicians play an important role in the Lab's ability to ensure the reliability of the country's nuclear stockpile, and materials science has been

designated a Critical Skill area. Materials Science technicians have traditionally been recruited from within our region, and the program is designed to continue that trend.

"I designed the program to be very practical," she said. "There's no calculus, for example. My students need to work while they go to school, so they are each matched with a research scientist and hired on at the student pay scale."

At the Lab, Albert's students work in areas including fuel cells and chemistry. Others work in a metallography lab and an engineering test lab.

"What ties them together is some kind of materials aspect to their work," Albert said.

Albert had worked at the Laboratory for almost seven years as a technical staff

member in the Materials Science Technology Division and had worried that the average age of Lab technicians was in the early 50s.

"I wondered what we were going to do to address this problem and I wanted to help my division be more proactive," she said. She already had an internship program in mind when she met Education Program Office Director Kurt Steinhaus at the Wellness Center.

"We talked about education and workforce development for local kids," she said. "Later he notified me that money was available for critical skills training and I wrote a proposal. I wasn't funded the first time, but I applied again and was funded by the Department of Energy."

Albert had some experience teaching the basics of materials science through her participation in MESA, Inc. (<http://nmimesa.nmt.edu>), which exposes local students to a variety of scientific careers.

"We talk about metals, ceramics, and polymers," she said. "In one of the first lessons, I give each student a broken appliance to take apart so they can put the different materials into piles. They also get some hands-on skills and learn about engineering and why things are made the way they are."

Students who complete the program receive a "Certificate in Materials Science Technology." Continued employment at the Lab is possible, depending on position availability.

Albert is currently recruiting interns and supervisor/mentors for the next training class, and the application deadline is May 1. Prospective students can apply on her website at <http://education.lanl.gov/mstp/index.html>



Lab teacher and scientist Diane Albert lectures on materials science to students in a new certificate degree program co-sponsored by UNM-LA. The students are, left to right, Tripp Morris, Savannah Romero and Tammy Maestas.

The Science of Good Eats

Science can be difficult space to understand, and yet every time we step into a kitchen we encounter chemistry, physics, and materials science. On his “Good Eats” show on the Food Network, creator, host, and writer Alton Brown not only demonstrates recipes that match the show’s particular theme such as “Oat Cuisine,” or “Fry Hard,” he also teaches the science of cooking through the imaginative use of metaphors and illustrations that reach across all audiences.

One episode uses a shortage of desserts to illustrate how free radicals can cause tissue damage. In another it’s a blowtorch, a fireproof barrier, and a flare to demonstrate why garlic becomes more potent as the pieces are cut smaller. Practically anything can become fodder when he decides to make a scientific point: a racquetball court and a quilt demonstrate why a dirty oven results in uneven heating and two teenage dancers model how yogurt sauces will coagulate but cream-based sauces will not (fat molecules). In an effort to inspire Lab employees to better communicate their own scientific research, Brown will visit the Lab in April to show examples of his metaphors and talk about how he comes up with them.

Brown sees metaphors and entertaining illustrations as a way to make a connection with his audience. “With metaphors people have a parallel they can connect with, and you can meet in the middle. People can figure out what you are trying to say on their own, and so they don’t feel like you are talking down to them. If you dumb things down, you fail.” Brown also sees a difference between knowledge and understanding. “In school I had trouble because the teachers just wanted me to memorize things—that’s knowledge. But I wanted to grasp the concepts behind those things—that’s understanding.” And that, he says, is what he wants to impart through his shows—

understanding. Once people understand the concepts, they can apply them to multiple situations, he says. That’s also why his recent cookbook, “I’m Just Here for the Food,” is arranged by cooking method—unlike most cookbooks that start with appetizers and end with desserts. Searing is one section, and braising is another, among many others. He figures once people understand how to apply the right amount of heat to food with techniques



Alton Brown

like searing, they can use that knowledge across the board whether cooking steak or tofu.

Brown does enlist the aid of others to help explain the food universe. Shirley Corriher, a food scientist, drops in on occasion to explain why brining poultry works or the reasons that Alton’s crepes aren’t coming out right. And Deb Duchon, a nutritional anthropologist, takes the audience through what would probably really have been served at the first Thanksgiving dinner versus what’s traditional today or the global aspects of pickling.

The mix of education and entertainment was perceived as instructive enough that it’s now part of the “Cable in the Classroom” curriculum. Cable in the Classroom provides commercial-free programs and resources to schools. In addition to the science, history, and geography contained within Brown’s show, an available lesson plan uses the show as a jumping-off point and gives suggestions for additional class work. The lesson plans are developed by professional educators and can include social studies, nutrition, and language arts as well as science.

Although the outcome of Brown’s interest in cooking, science, and media is a show that communicates in a way that enriches, the genesis for all of that was somewhat less altruistic. While in college he found it hard to get dates. Then he discovered that if he offered to cook for them, he got a very different response. Once he started to learn to cook he realized that science made a difference in whether his meals were a success or a failure. “Then I realized I liked cooking even without the girls,” he said.

Sixth Edition of "For the Seventh Generation" available

The latest edition of the Laboratory’s annual report “For the Seventh Generation: A Report to Our Communities,” is now available. The report is intended to provide a highly readable avenue to inform the public about safety and environmental issues at the Laboratory. In addition to the usual scorecards on the Lab’s environmental and worker safety impacts, this year’s report also covers wildlife studies, environmental restoration progress, continued fire-recovery efforts, worker safety, and a sample of relevant research projects.

If you would like to obtain a copy of the publication, contact the Community Relations Office at 505-665-4400, 888-841-8256 (toll free), or eshreport@lanl.gov.

Interim Lab Director Tours Española Valley

Interim Lab Director Pete Nanos toured Española recently, accompanied by Española Mayor Richard Lucero and a host of additional city councilors and officials. The visit was one in a series to neighboring communities as Nanos attempts to better understand community interests that may impact the laboratory. Topics of discussion included park-and-ride, the Española industrial park, regional water concerns, and economic development interests. Nanos emphasized his desire to support community interests with common business principles that make sense and are practical for all involved. During the visit, Nanos toured a proposed regional transportation site location, the Prince Ranch,



which is the planned City regional water filtering site, the industrial park, a proposed city-sponsored youth center, and the Española Plaza and Misión Convento. Mayor Lucero (left) is shown explaining the historic relevance of the arches in the Plaza to Nanos. Also shown to Nanos' right are Española City Councilor and lab retiree, Floyd Archuleta, and associate director for administration, Richard Marquez. A small number of Lab officials and about 10 Española elected and appointed officials joined the Mayor and interim director Nanos in the tour of important city sites.

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