

volume 3 number 7

# the laboratory connection

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

august 2002

word  
from

the Community Relations Office

**E**very summer, the Laboratory gets both bigger and younger as students arrive to contribute for several months to our mission. This year, a network of community partnerships has allowed the Lab's Education Programs Office (EPO) to offer student employees an efficient and friendly experience, at work and at home.

The Los Alamos Chamber of Commerce, Los Alamos County Parks and Recreation, and many of the Lab's technical and support divisions are among those who contributed time, money, and ideas in an attempt to provide summer students a well-rounded look at what life might be like should they choose to return to Los Alamos to pursue a career.

The EPO developed a number of innovative ways to help students get acclimated to their work and living environments and to keep them focused on their long-term goals. Frequent contact with individual student mentors has been bolstered with workshops on resumé writing and preparing abstracts, technical papers, and poster sessions. These sessions helped the students prepare for Symposium 2002 in late July, which provided an opportunity for students to present their scientific research to their peers, mentors, and others and prepare them for careers in science.

This year, the symposium featured three professional development seminars based on suggestions from last year's summer students. The seminar topics were Academic/Life Success, Student to Permanent Employee and Financing Graduate Studies.

## Summer Students Discover Los Alamos, Science, and Themselves

A summer job at Los Alamos National Lab can be a daunting prospect for students, some of whom have never been so far from home. Lab staff who work with students try to offer support and guidance, in the hope that a positive summer experience may lead to permanent employment here someday.

**"We have been working hard, but also having fun,"** said Fuensanta Martinez, who won her summer job through a national contest in her native Mexico. A physics student at the University of Zacatecas, Martinez has been at the Lab since early June, living in student housing in downtown Los Alamos with Yared Santa Ana Tellez and Maricela Flores, both from Mexico City. The three students are all winners of the Leon M. Lederman Award or the Los Alamos Summer Stay Award.

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Sharing coffee and conversation are, left to right, Fuensanta Martinez, Yared Santa Ana Tellez and Maricela Flores.

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**Santa Ana Tellez is an experimental biology student at Metropolitan University and Flores studies electronics and communications engineering at the National Polytechnic Institute. The Education Programs Office helped them find housing in town and put them together with mentors.**

**Santa Ana Tellez worked with Judith Mourant on a project for noninvasive cancer diagnosis, using spectroscopy to measure the water content in tissue. Flores worked with William Roybal from LANSCE and Martinez worked with David Reagar at the Superconductivity Technology Center.**

**The women are all the first in their families to pursue higher education in science. All three plan to pursue PhDs in their respective fields and want to go into research. Only Martinez had ever been to the United States before and none of the three had ever been to Los Alamos.**

**“The first week was hard because I was living alone and didn’t know anybody,” Santa Ana Tellez said. “But when I started to work in the Lab it was different. It’s been easy to make friends, and everyone is great. And I love that the sky is so blue here; in Mexico City it’s very gray.”**

**The three women said that adjusting to such a different environment has been a challenge, but that their mentors and the student programs’ staff have been very helpful.**

**“I miss my family because we are very close,” Flores said. “It’s been kind of hard, missing my sister’s birthday and my cousin’s gradua-**

**tion. But I like Los Alamos. All the people say “hi” to you, it’s very unusual.”**

**Martinez said they have all grown up a lot this summer. “My family always supports me, but we’re learning that sometimes you have to be alone to learn about the world and grow as a person, and as a scientist,” she said.**

**They have also made other discoveries about themselves.**

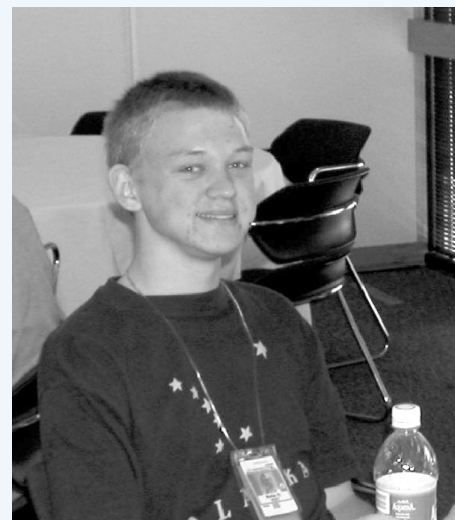
**“I have discovered that I cook very well, and I didn’t know that I could,” said Flores.**

**Martinez laughed, “At the beginning we were all cooking, but then we decided that Yared and I could clean instead.”**

**The EPO staff tries to keep recruiting in mind in designing programs for visiting students. A good summer experience might someday bring the Lab an important new hire.**

**“We have always tried to combine the work experience with social and educational/professional development activities,” said Lab student and mentor liaison Carole Rutten. “This year we’ve tried to close the circle with the career piece.”**

**Walter Voit, a computer science student from the University of Texas, Dallas, spent his Los Alamos summer writing computer programs and helping with the user manual for his mentor’s ocean modeling project. One of 20 Eugene McDermott Scholars, he first visited the Lab last summer while in Santa Fe for the program’s orientation. He is among five who decided to work at the Lab this summer and would consider coming to the Lab to work someday.**



Lab summer employee Walter Voit is a computer science student at UT-Dallas.

**“It’s definitely a possibility,” he said. “You have the best technology here, and great people, so you’d have lots of good colleagues. I may go into industry first, then do this for fun.”**

**In years past, lack of adequate housing has been one of the major challenges for summer students. Early contact with EPO staff has made finding an apartment no problem for most of the students interviewed.**

**Erik Stauffer is a Hertz Foundation graduate student studying electrical engineering at Stanford. Originally from Illinois, he spent his second summer at the Lab, where he worked on radio frequency and communication theory.**

**“Last year I was at the Los Alamos Inn,” he said. “I kind of liked it, but we didn’t have a cooktop, only a microwave. We didn’t really need the maid service, but it was nice to have air conditioning.”**

**This summer, Stauffer had no trouble getting into student housing on ninth St. in Los Alamos. “It’s**

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pretty nice,” he said. “My neighbors are all other students, and I met maybe a dozen of them in a week. They tend to group people by what program they’re in, and I finally found someone else from Chicago. Last year there was no one from Illinois.”

The EPO has designed new activities to quickly integrate even the busiest summer employees into the Lab community.

“In addition to helping with the usual housing and transportation challenges, we’ve tried to bring the Lab to the students,” said Rutten. “Students don’t always have time to get out and explore, so we’ve tried to connect the wealth of information out there to the students who want it.”

All-student meetings have featured presentations by Lab Director John Browne and other top managers, and every Thursday a different group hosted a student breakfast to acquaint participants with its activities. The Chamber of Commerce has passed out student discount cards and provided computers for student use. The Lab’s student association organized orientations, and Principal Deputy Lab Director Joe Salgado’s office provided funding for evening and day trip activities. Los Alamos County Parks and Recreation organized and sponsored events including a barbecue, swimming, and movie nights.

“I have met people from all over the world. Russians, Germans, and we have lots of activities,” said Flores. “We go to the Wellness Center and have taken tango and salsa classes. It’s not a boring place; it’s the opposite.”

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## Laboratory Team Wins White House Closing-the-Circle Award

A process improvement, a better system design, and a teamwork approach helped win a Laboratory team of scientists national recognition for developing and implementing a new way to eliminate acid waste.

The NMT-2 team, whose members include Aquilino Valdez, Ronald Chavez, Benjie T. Martinez, and Don Mullins, traveled to Washington, D.C., to receive the 2002 White House “Closing the Circle” award in recycling.

One of the common chemical processes at Technical Area 55 is purifying plutonium by dissolving it in nitric acid. The dissolved solution passes through a series of columns where most of the plutonium is recovered from the solution. Then the liquid waste, contaminated with nitrates, is concentrated by evaporation. The concentrated salts are stabilized for shipment to the Waste Isolation Pilot Plant (WIPP). The evaporated nitric acid and water are condensed. Historically, this stream was sent to the Radioactive Liquid Waste Treatment Facility (RLWTF) at Technical Area 50. It was then neutralized and the trace of remaining plutonium was removed. The neutralized nitrates were part of the water effluent discharged from RLWTF.

“Part of this was EPA driven and part of it was a recognition on our own for the need to reduce waste,” said Don Mullins.

Benjie T. Martinez agreed and added, “We’re concentrating the nitric acid here. So, instead of purchasing it, we reuse it and so our costs are lower too.”

The team led the design, manufacture, and installation of a Nitric Acid Recovery System that re-

concentrates the acid and separates a stream of 99.98 percent pure water, with no measurable plutonium. This is now the stream that is sent to the RLWTF. It also reduced the nitric acid used in its processing operations to about 20 percent of the historic usage.

The new system recovers nitric acid through fractional distillation, which separates chemicals with different boiling points. Because water boils at a lower temperature than nitric acid, almost pure water is removed from the top of the distillation column, but the reconcentrated nitric acid from the bottom of the column is reused.

“These days, we want to recycle what we can,” said Ronald Chavez.

Even though the Nitric Acid Recovery System team was restricted to taking only four of its members to Washington for the award, the team wanted to make sure that the entire team knew they were appreciated.

“We’d like to acknowledge all of the people who worked on this project,” Mullins said. “It’s a great demonstration of teamwork.”

Other team members were: Wayne D. Smyth and Steve B. Schreiber from NMT-2 and Anna D. Flores, Willie Maestas and Joey L. Moya from NMT-10.



The Nitric Acid Recovery Team: Don Mullins, Benjie Martinez, Aquilino Valdez, and Ronald Chavez.

## Machinist Apprenticeship Program Helps Meet Hiring Goals

Patrick R. Martinez, a life-long resident of Santa Fe, New Mexico, is a specialist staff member in Engineering Sciences and Applications—Weapon Materials & Manufacturing—and has a special interest in the Laboratory's Machinist Apprenticeship Program (MAP). Not only is he the current acting team leader of the MAP, he's also a 1975 graduate of the program.

Martinez and staff from the four divisions that support the program, Engineering and Science Applications, Dynamic Experimentation, Nuclear Materials Technology, and Materials Science and Technology conducted a projected manpower needs analysis and found a clear-cut need for machinists. The program was reestablished in September 1999 after a hiatus of eight years.

"It's a high-skill area and we weren't having any luck finding experienced machinists. A lot of our current machinists are approaching retirement," he explained.

The apprentices in this program become proficient in using math and algebraic formula manipulation principles to determine the sizes and shapes of fabricated parts and components. They use geometric/trigonometric concepts to calculate angles, tapers, and other forms to facilitate the operation of machine tools. They also interpret engineering drawings to ensure accurate transfer of designer and engineer's ideas into useful parts or products.

"Four years ago, we conducted a needs analysis and found that there was an immediate need for 34 machinists," Martinez said. "The projected need in four years was 20 more machinists and that was four years ago."

The resulting program is designed based on job needs identified by each of the four supporting divisions. The Laboratory, in

collaboration with Northern New Mexico Community College (NNMCC), has for the last three years offered an 8,000-hour program over four years that provides apprentices with a combination of classroom instruction and on-the-job training in machine tool operations.

"I think it's a fantastic program," said Priscilla Trujillo, Executive Vice President of NNMCC. "It's giving people in the area the opportunity to train for a great well-paying position. This is a wonderful example of what can be accomplished when we work together. It benefits the Laboratory, the employees themselves, the college, and the families. So we all win."

Currently, there are 21 employees in MAP. The first class began in August of 1999, the second class began in August of 2000, and the third in August of 2001. The selection process has just begun for another class to start this August.

Since graduating from the machinist program 27 years ago, Martinez has received a Bachelor of Science degree in environmental science and has worked in several divisions at the Laboratory. However, he said that he really likes working with the MAP.

"It's a great program," Martinez said. "During the first two years, they are full-time, 2-year, limited-term Laboratory employees. Usually, by the end of the second year, they have their Q-clearances, and when they complete the program, they are state certified as journeyman machinists."

Requirements for success in this program include having a strong background in math through algebra, effective communication skills, and

strong interpersonal skills. Potential applicants might also find it helpful to have either completed the NNMCC associate's degree program in Machine Technology or to have at least taken courses in the program.

A four-member MAP advisory board consisting of staff from each of the four supporting divisions selects the apprentices. The number of apprentices selected depends on Laboratory budget and staffing needs.

"The criteria is really stringent, and the selection is too," Martinez said. "Evaluations are done every six to seven weeks and they're on probation for six months. It's our job in the shop to teach them how to be responsible employees—not only for the Laboratory, but for themselves."

Applications for this program are accepted between January and the first week of March each year. Advertisements are published in the Albuquerque Journal, the Santa Fe New Mexican, the Los Alamos Monitor, the Rio Grande Sun, and the Taos News.

For more information call Patrick R. Martinez at 665-6790 or the HR representative for this program, Doris R. Megariz, at 667-4648.



A participant in the Machinist Apprenticeship Program works on a piece of equipment.

## At the Math and Science Academy, Teachers are Partners in Learning



MSA Master Teacher Carol Brown and Española Middle School's Dolores Salazar look over new classroom materials.

For the past five years, Dolores Salazar has taught New Mexico history in the Española Public Schools. Last year, she taught 154 students in her classes at the Española Middle School. And thanks to her involvement in the Math and Science Academy (MSA); it's been one of the best years of her career.

"MSA has been a critical component in getting our school to be a productive, safe environment," she said. "It has made an incredible difference in our school and our community. At first, I thought it would just benefit the math and science teachers, but the thought process involved can be used in language arts and social studies classes as well."

The goals of MSA are to improve math and science achievement and technology application in northern New Mexico, decrease the dropout rate, increase the pool of qualified teachers, support a flourishing economy by supplying a trained workforce, and effect systemic reform.

Over the past two years, students of MSA teachers in middle schools in Española, Mora, and Chama have learned to apply the principles of the scientific method to their

daily classwork. The new teaching method has actively involved students in their own learning and has had some surprising payoffs for the teachers as well.

"MSA had made a significant difference in my life as a teacher, and has given a different focus to learning," said Tina Martinez, a science teacher at Chama Middle School. "I have been teaching team building, staying on task, defending answers and coming to consensus. High standards have been set and adhered to. In this second year of MSA, we've seen the fruits of our labors."

Dora Sanchez, who teaches science and history at Mora Middle School, said she has taught for 13 1/2 years, and been a "partner learner in the classroom" for 18 months. "I learn from my students, and I learn along with them," she said. "I thank the Master Teachers for giving me that."

The driving force behind the classroom change described by the teachers has been MSA Master Teachers Carol Brown and Cathy Berryhill. They first trained and then

pushed and prodded their trainees to rethink all aspects of how they teach.

"They keep after us, asking 'What are you going to teach? And what will the kids show you to prove they have learned?'" said Sanchez.

The Master Teachers have had the challenge of dealing with teachers who are at different levels of professional development. Brown said, "As in most every change process, people feel worse before they feel better." But the payoff is that MSA allows teachers to think about what they are doing in the classroom and to learn from each other.

"I have learned more in two years in MSA than I did in college about what you need in the classroom to create quality students," Salazar said. At Española Middle School, the initially skeptical community has embraced the program. Incoming sixth graders and their parents often specifically request to be placed in classes with MSA teachers. The school principal has stated that he'd like the entire school to be part of the program.

In Chama, Martinez assigned a project on the digestive system and encouraged one

student with welding skills who made a life-sized abstract sculpture in which a marble placed in the mouth of the figure traveled through the digestive tract.

"Sometimes education goes through fads," she said. "MSA is a keeper."



An abstract sculpture of the digestive system made by a Chama Middle School student.

## The Electromechanical Technology Program Helps Students Develop Employable Skills

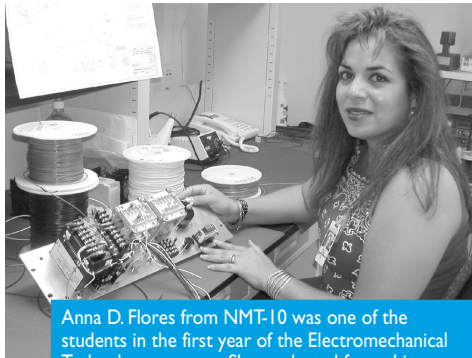
The Laboratory's Electromechanical Technology Program, co-sponsored by the Los Alamos branch of the University of New Mexico (UNM-LA), has been expanded to include an Associate of Applied Science degree as an option. Previously, only a Certificate in Electromechanical Technology was provided. The coursework for this two-year program emphasizes providing participants with basic academic and technical knowledge to help them perform as technicians in a variety of electro-mechanical environments.

"Our goal is to recruit entry-level technicians. We target high school students in northern New Mexico and provide information about the program through high school counselors," said Bonnie Martinez, the Laboratory's program coordinator.

Anna D. Flores, from Chamita, New Mexico, was one of the students in the very first year of the program. She started the program in January of 1997 and finished in December of 1998. She was the only female participant. She was hired at the Laboratory as an electromechanical technician in January of 1999 and currently works for NMT-10.

"I heard about the program through UNM-LA. I was working on an associates degree in pre-engineering," she explained. "At that point I was getting high grades in my math and science classes, and my counselor and advisor were encouraging me to apply to the program."

It helped too that Flores' father was a machinist for EG&G and that she was familiar with the work. The EG&G company, whose headquarters are in Maryland, provided the technology used to photograph atomic explosions during the Manhattan Project in World War II. After the war, EG&G supported the Atomic Energy Commission in its weapons research and development and had an office in Los Alamos that



Anna D. Flores from NMT-10 was one of the students in the first year of the Electromechanical Technology program. She graduated from this program in December 1998 and was the only female participant.

employed electronic technicians, program managers, and engineers.

"Right now, we build actual electronic components for the equipment inside the TA-55 plant," she said. "We're going to be getting into research and development too."

During the course of the program, students are assigned to work under the guidance of Laboratory technical staff or senior technicians. A portion of the student's workday is spent at UNM-LA attending academic courses specially designed for their position.

Participants assist with routine tasks such as performing diagnostic tests on equipment ranging from electronic to spectroscopic and basic projects. They also attend the required UNM-LA courses and must maintain an overall grade point average of 2.0.

"We review their transcripts and their resumes," Martinez said. "It really helps if they have an aptitude for math beyond algebra and an interest in electrical/mechanical work."

The deadline for applications is April of each year. Ten positions are funded each year. Continued employment at the Laboratory is a possibility, depending on position availability and funding.

For more information, call Bonnie Martinez at 667-5534 or go to <http://lansce.lanl.gov/mechtech/overview.htm>.

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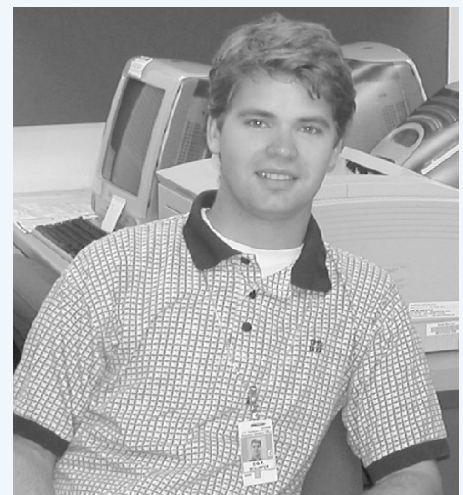
Stauffer said, "one thing that's really different from last year is that the forests are all closed. I'm an outdoors kind of guy, so that's been a bit disappointing but I've managed to entertain myself with my neighbors." (Editor's Note: The forests have since been reopened because of recent rainfall.)

Voit and his friends have found some open trails, and he hiked in Acid Canyon shortly after he arrived. "We play basketball at the high school gym, have barbecues, and share trips to Santa Fe, Española or to Bandelier," he said. "The student picnic at Urban Park was cool. We played Frisbee and soccer and I met lots of other students."

Being a student with a car is a definite plus.

"The secret is to be the guy with the car, or better yet, one degree away from the guy with the car," Stauffer said.

For more information about the Lab's student programs, visit <http://education.lanl.gov/EPO>



Erik Stauffer is a Hertz Foundation graduate student currently working for the Physics division.

## The Wow of Science—BSM Staff Members Make Learning Fun



Bettie Bedell and Jeannette Mortenson help Alexandra Nichols dress for space travel during the Summer Adventures in Science at the Bradbury Science Museum in June.

Making children say “wow” is the fulltime occupation of science educators Bettie Bedell and Elizabeth Watts. The Bradbury Science Museum (BSM) staff members have conjured up a magician’s bag of science-based tricks to show young students that in addition to being important, science is fun.

The pair has been busy over the summer with the museum’s Summer Adventures in Science program, featuring activities designed for students of various ages. The free programs include a snake show and tell presentation, but much of the focus this summer has been on space science. In addition to BSM’s ever-popular “Starlab” indoor planetarium presentations at Mesa Public Library and the always-filled Rocket Building and Rocket Launch classes, this year’s schedule includes several new space science programs brought back from a weeklong NASA workshop last winter in Houston.

“It was a free educational workshop specifically geared to informal science centers,” Bedell said. “It was perfect for science educators who work with young children.”

Based on this workshop, the staff developed two new summer programs, Back to the Moon and Space Robots. The Back to the Moon program, for children ages nine to 12, allows participants to learn about lunar rocks, meteorites and craters. This program uses actual moon rocks and meteorites on special loan from NASA just for these activities. Space Robots shows students in the same age group about robotic arms on the Space Shuttle and the International Space Station. Each class was offered four times for a group of up to 25 students. Bedell and Watts also brought a hands-on static electricity program to the National Youth Sports Program at Northern New Mexico Community College in Española.

The summer programs serve as a warm up for the science educators’ new school-year outreach program, Science on Wheels. During its inaugural year, Bedell and Watts logged 2,844 miles travelling to 40 elementary and junior high schools throughout

northern New Mexico. Their presentations on static electricity (“Volts and Jolts”), geology (“Let’s Rock”), light (“Lights, Spectra, Action!”) and circuits (“Circuit Connection”), seen by more than 3,655 children, were a big hit with both students and teachers.

“We try to expose kids to a wide range of learning activities by offering another way to present information that is visual, auditory, and kinesthetic,” said Bedell. Watts added that “teachers tell us that some students do remarkably better with active learning where there are hands-on activities. We want to show them that science is not just something in a book.”



For many participants in Science on Wheels, this is their first experience with hands-on science activities. Bedell and Watts show them how easily activities can be performed at home with very simple materials. For the static electricity

demonstration, for example, teachers can use aluminum pie plates, an empty paper towel tube and different kinds of fabric to perform their own similar experiments.

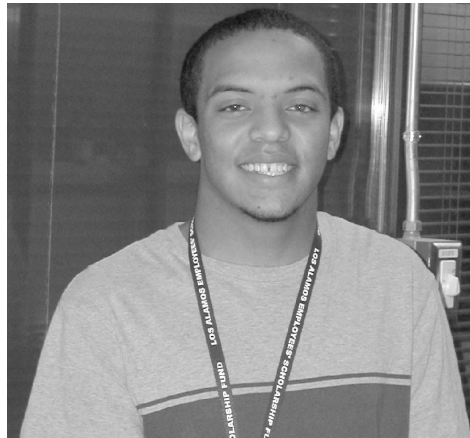
The museum has received requests for more programs in the younger grades, so in the fall Science on Wheels will also offer programs on magnets and robots for grades K-6 and chemistry for grades 3-8. Registration for these sessions and last year’s old favorites will be from September 9 through 20 only. The sessions filled up very quickly last year. To be placed on the mailing list for the museum’s educational program brochure, please contact Elizabeth Watts at [ewatts@lanl.gov](mailto:ewatts@lanl.gov) or Bettie Bedell at 667-8676.

## Foundation Scholarship Winner Wants to Teach

Gabriel Brown is a 2002 McCurdy High School graduate and one of the 2002 LANL Foundation Bronze Scholarship winners. He wants to teach high school when he finishes college and may even return to his alma mater, McCurdy.

Los Alamos National Laboratory Foundation Bronze Scholarships are awarded to students in the arts, education, math, engineering, and computer science. Brown was awarded a Bronze Scholarship based on his academic record, community service, and extracurricular activities. Platinum Scholarships are awarded only to students who major in math or science.

"I want to pursue a career in secondary education and be a high school teacher," he said. "I also want to coach football and track."



Gabriel Brown, one of the LANL Foundation Bronze Scholarship winners.

Brown said that the main reason he wants to teach is that his English and Drama teacher, Dee Dee Heffner, was his favorite teacher and had such a positive influence on him. Heffner teaches grades 9 through 12 and has been teaching for 25 years. She's been on the McCurdy staff for 28 years.

"Mrs. Heffner showed me how much you can influence people's lives," he said. "She also showed me how much fun teaching can be."

Heffner said that Brown wasn't afraid to take academic risks. He maintained a 3.9 grade point average during his high school career while playing football, taking advanced placement courses, and pursuing a number of extracurricular activities. He is currently working with the Laboratory's Information Management Group for the summer.

"I think Gabe has a really bright future. He was just outstanding. He's an outstanding athlete, an outstanding actor – he's an all-around outstanding guy," Heffner said.

Brown will be attending Colorado College in Colorado Springs, Colorado, this fall and he'll major in English and History.

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