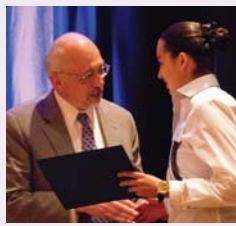


## The courage to keep going

Sandia's Thunderbird Awards program helps teens who conquered adversity move from high school to college, awarding 20 recipients \$1,500 each in recognition of their exceptional ability to overcome challenges on the path to graduation. See the story and photos on page 8.



# Sandia LabNews

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## New NNSA Administrator Frank Klotz says he and lab directors are strengthening partnership

By Sue Major Holmes

Newly appointed NNSA Administrator Frank Klotz said his visit to Sandia and meetings with the directors of the three NNSA laboratories is strengthening their partnership to ensure that those who work at NNSA laboratories and plants have what they need to do their jobs.

Klotz, who was sworn in April 17, arrived in Albuquerque on May 7 for a day and a half of meetings with NNSA staff, Sandia executives, and the three directors, Sandia President and Laboratories Director Paul Hommert, Los Alamos National Laboratory Director Charles McMillan, and Lawrence Livermore National Laboratory Director William Goldstein. The NNSA Administrator toured the NNSA complex in Albuquerque, held an all-hands meeting with NNSA staff May 7, and had briefings with Sandia officials. He held an all-day meeting with the directors to discuss the NNSA mission, its successes, and its challenges. The group also toured Sandia's Superfuge Facility, part of a multiyear Test Capabilities Revitalization program.

The Sandia upgrades, important to handle testing in both normal and abnormal environments in a range of facilities, cost about \$100 million, Paul told a news conference at the Superfuge, one of four refurbished facilities reporters saw



MEET THE PRESS — NNSA Administrator Frank Klotz discusses with members of the news media the challenges and opportunities facing NNSA during a time of tight federal budgets, demanding mission work, and an infrastructure in need of modernization. With the Administrator are, from left, Sandia President and Laboratories Director Paul Hommert, Los Alamos National Laboratory Director Charles McMillan, and Lawrence Livermore National Laboratory Director William Goldstein. The news conference was conducted at Sandia's Superfuge facility during Klotz's May 7-8 visit to Sandia and the NNSA Sandia Field Office. (Photo by Randy Montoya)

back as the Manhattan Project of World War II, Klotz said. "Facilities age, equipment becomes obsolete, better technology is available to do some of the things we do," he said. "For this reason, NNSA is revitalizing existing facilities not only at Sandia, but at the other national laboratories and plants across the entire complex."

on a tour May 8.

The weapons components testing that takes place at those facilities is critical to ensuring the nation's nuclear arsenal remains safe, secure, and effective, Klotz told reporters. He also said he was enormously proud that Sandia completed the revitalization program \$4 million under budget.

"We've made promises we have to keep — promises to sustain the nuclear weapons stockpile, promises to conduct leading-edge scientific research, promises to help prevent nuclear material from falling into the hands of terrorists, promises to support the Navy nuclear reactor program, promises to repair and modernize our aging facilities, and promises, perhaps most important of all, to protect the safety and security of our sites, our employees, and the public," he said.

And, he said, all that must be done in the face of tight federal budgets.

Many test facilities at the NNSA complex were built decades ago, some as far



## California celebrates Family & Friends Day

IN LATE APRIL nearly 500 members of the workforce, along with their family members and friends, attended Family & Friends Day at Sandia/California. Visitors learned about the breadth and depth of the work at the site and gained new insights into how their loved ones spend their workdays. Story and photos on page 4.



## Sandians, share your thoughts in 2014 LM Voice survey

By Tim Deshler



The 2014 LM Voice survey is coming to Sandia May 19-June 6. The survey provides employees with a quick, confidential opportunity to assess various aspects of their work environment, and to let leaders know what they think about working at Sandia.

"We want to hear your voice," says Pam Hansen Hargan, VP for Human Resources and Communications Div. 3000. "What are we doing well? Where can we improve? Your feedback and ideas are critical components in helping us to achieve our strategic objectives and to create a learning, inclusive, and engaging environment for all our employees."

Employees will receive an email invitation from voice.lm@lmco.com, with a link to the survey. The invitation will include instructions and a personal, confidential password for each participant. Limited term, post doc, and foreign national employees will be included in the survey.

"LM Voice is a way for you to share thoughts about many of the facets of your work experience at Sandia," says Pam. "The questions will cover a number of topics, including job satisfaction, career development,

integrity, inclusion, and leadership."

Completing the survey should take less than 20 minutes. Sandia participants should charge their primary project and task to take the survey, or ask their managers if they are unsure which project and task to use. Employees should direct other questions to their HR Business Partner.

### Results will drive action plans

Overall survey results will be shared with employees in a *Lab News* article in September. Local results will be shared with leadership, who will then develop and implement action plans to address the feedback received.

"We are strongly committed to act on what you tell us in the survey," Pam says. Labs leadership took action based on feedback from the 2012 LM Voice survey, including leveraging the line of sight concept to help employees understand how their work contributes to Sandia's mission.

Other actions taken as a result of the 2012 feedback include encouraging managers to engage in career discussions with their employees to gain an understanding of the employees' motivators (e.g., recognition preference), career aspirations, interest in being mentored or being a mentor, and other career development needs.

"We will carefully evaluate the feedback we receive from you in this year's survey, to understand what we're doing well and where we need to improve," Pam says. "Please take advantage of this opportunity to share your voice so we can work together to shape the future of our workplace and our culture at Sandia."

### Inside . . .



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## That's that

Our new NNSA administrator, Gen. Frank Klotz, was here last week as part of a tour of the facilities that make up the nation's nuclear weapons enterprise. That the visit went very well for Sandia is hardly a surprise. Whenever we host these high-level guests, a lot of folks on staff work extra hard on our behalf to ensure that we are showing off the Labs to our best advantage.

It's a given that we have smart, sometimes brilliant, people working on solutions to the nation's toughest challenges, maintaining our nuclear deterrent, supporting the warfighter, anticipating and preventing technological surprise. Our visitors invariably come away impressed with what they see and hear in their briefings and tours.

But if I may speculate for a moment, I think the main take-away for our guests is something intangible. In a world where the trivial and the trifling command so much attention, our visitors encounter something else at Sandia. They find people who bring to their work a seriousness of purpose, a selfless dedication, and a desire to bore down into the deep essence of things that sets us apart from the crowd. Over our 60-plus years of exceptional service, our awesome responsibilities for the nation's security have shaped us, have made us who we are. When our visitors go home, their enduring impression is: "These are the very people I want doing this work."

\* \* \*

It's like a scene from a horror movie . . . or at least a very, very bad dream: You are flying to Atlanta for a conference and find yourself surrounded by a bunch of hale-fellows-well-met on their way home from a used car salesman convention in Las Vegas.

Trying to go over your notes, you heroically manage to block out the airborne fraternity club meeting with its forced jollity so you can give your paper a final once-over. Then, the barely tolerable situation spins out of control. One by one, out come the cell phones. One is talking to his grandma in Pork Rind, Alabama: "GUESS WHERE I AM? . . . WHAT? WHAT YOU SAY? GUESS WHERE I AM?" Another is closing that deal he left hanging last week: "IT HAS COLD AIR AND RUNS GOOD. I'M TELLIN' YOU, PAL, IT'S CHERRY." The noise reaches a crescendo just as you wake up in a cold sweat, screaming, like Luke Skywalker did when he learned Darth Vader was his father: "Nooooooooooooo."

We've been able to avoid this nightmare at 30,000 feet so far because FCC regulations forbid the use of cell phones for voice calls in airliners. Now, though, the commission is considering changing the rules, which were based on long-since resolved technical issues, not behavioral considerations. As part of its due process, the FCC opened up the proposal for public comments, which are posted online. In a random but not cursory search through the more than 1,400 comments received so far, I couldn't find a single person who said, "Gee, this sounds like a great idea!" To the contrary, if there's a general theme running through every comment, it is: "I beg you, do not do this thing."

If the public feels strongly about this, it's nothing compared to flight professionals. Pilot and flight attendant organizations cite the safety issue as being paramount – not the issue of radio interference but the potential for air rage prompted by ceaseless phone calls on a transcontinental flight.

To be clear and fair: The FCC ruling is only about the technical merits. Given today's technology, the commission sees no technical reason to maintain the cell phone ban. And the FCC has made clear that if the ban is lifted, it will be up to the FAA and to the airlines to decide whether to permit cell phone calls.

And that's where this whole idea could end – for now. CEOs at several airlines are already on the record as saying "Never!" But I've been around long enough to know that "never" in these cases tends to mean: "Not until we figure out how to make some money on the deal." And that's fine. That's the way the system works. My guess is that they'll make the cost so high that there just won't be many of those "guess where I am" calls. And maybe they'll plow whatever money they make from this new profit center back into the peanut budget.

See you next time.

Bill Murphy (MS 1468, 505-845-0845, wtmurph@sandia.gov)

## Mike Desjarlais wins 2014 IEEE Plasma Science and Applications Award

By Neal Singer

Mike Desjarlais (1600) will receive the 2014 IEEE Plasma Science and Applications Award.

Mike's pioneering research into the application of density-functional theory to calculate electrical conductivity and the equation of state of warm dense matter has internationally impacted research into dynamic materials, pulsed power, Z-pinch physics, laser-matter interactions, and planetary sciences.

Density-functional theory is a computational quantum mechanical modeling method used to investigate the electronic structure of many-body systems.



MIKE DESJARLAIS

Mike's work was cited for "pioneering contributions to the understanding of electrical and thermal transport properties, and [for] equations of state for materials at extreme conditions through the use of first-principles density functional calculations, and [for] generating numerous state-of-the-art wide-range conductivity models for use in a broad spectrum of simulation codes."

Mike, a Sandian since 1986, is credited initially with creating an ion diode model that greatly improved scientific understanding of high-powered ion diode physics. In 1996, when the Sandia inertial confinement fusion program switched from light ion beams to z-pinches, his modeling work improved understanding of electrical conductivity in magnetohydrodynamic simulations and had immediate impact on the simulation of wire array z-pinches and magnetically driven flyer plates. Then, as experiments on Z became more sophisticated, Mike was first to use density-functional theory as the framework for the next generation of electrical conductivity calculations. His initial simulations showed a 70 percent higher conductivity for expanded liquid aluminum components than indicated by the model then in use. Next, his wide-range modeling for the behavior of aluminum permitted new simulations of the aluminum-based flyer plates on Z. These were an immediate success. They revealed the right amount of surviving solid aluminum on impact, and opened a new era in the use of simulations to design dynamic materials experiments on the Z machine. Models for stainless steel, tungsten, beryllium, and many other materials were soon to follow.

Building on this work, Mike leveraged his density-functional theory experience to calculate the shock Hugoniot of deuterium and achieved very good agreement with both gas-gun data and Z data. Subsequently, these techniques have been used to study the equations of state of a growing number of materials, including the shock melting of beryllium and diamond for the National Ignition Campaign.

Mike will receive a plaque and present a plenary talk when his award is formally announced at the 41st IEEE International Conference on Plasma Science, held May 25-29 in Washington, D.C.



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# Widespread hydrogen fueling infrastructure goal of H<sub>2</sub>FIRST project

By Mike Janes

As hydrogen fuel cell vehicles continue to roll out in increasing numbers, the infrastructure for fueling them must expand as well. To this end, a new project launched by DOE and led by Sandia and the National Renewable Energy Laboratory (NREL) will work in support of H<sub>2</sub>USA, the public/private partnership introduced in 2013 by DOE and industry stakeholders to address the challenge of hydrogen infrastructure.

Established by the Energy Department's Fuel Cell Technologies Office in the Office of Energy Efficiency and Renewable Energy, the Hydrogen Fueling Infrastructure Research and Station Technology (H<sub>2</sub>FIRST) project will draw on existing and emerging core capabilities at the national labs. It aims to reduce the cost and time of new fueling station construction and improve the stations' availability and reliability.

By focusing on these aspects of the hydrogen fueling infrastructure, the effort is intended to accelerate and support the widespread deployment of hydrogen fuel cell electric vehicles.

The vehicles themselves continue to proliferate, as evidenced by Toyota's recent announcement that it will begin selling its Fuel Cell Vehicle in 2015. Last year, General Motors and Honda announced plans to jointly develop hydrogen fuel cell cars, and Hyundai will lease its Tucson Fuel Cell hydrogen-powered vehicle in California this spring.

## Success depends on availability of stations

"The success of hydrogen fuel cell electric vehicles largely depends on more stations being available, including in neighborhoods and at work, so drivers can easily refuel," says Daniel Dedrick (8367), hydrogen program manager. "With H<sub>2</sub>FIRST, we're definitely on the road to making that happen more quickly."

Keith Wipke, manager of NREL's fuel cell and hydrogen technologies program, says, "We're excited to be able to work with industry members who are on the ground installing stations right now and finding out what's working and what needs improvement. H<sub>2</sub>FIRST aims to address cross-cutting, urgent challenges related to station performance and availability."

The partners include several agencies from the state of California, widely regarded as the nation's epicenter of zero-emission vehicles.

"This new project brings important federal know-how and resources to accelerate improvements in refueling infrastructure that support the commercial market launch of hydrogen fuel cell vehicles," says Air Resources Board Chairman Mary D. Nichols. "California is committed to deploying at least 100 hydrogen refueling stations in the next decade, and the H<sub>2</sub>FIRST effort is a big step toward the development and deployment of a broader, consumer-friendly infrastructure for us and the rest of the United States. We are excited to be joined by such prestigious partners in this effort."

## Objectives focus on better, less expensive hydrogen fueling stations

H<sub>2</sub>FIRST's technical goal is to develop and apply physical testing, numerical simulation, and technology



Hydrogen Fueling Infrastructure Research and Station Technology

validation to help create low-cost, high-performance materials, components, and station architectures. H<sub>2</sub>FIRST also will collect and distribute data supporting industry's efforts to reduce the costs of integrated fueling systems and networks.

Specific H<sub>2</sub>FIRST objectives include:

- Development of improved hydrogen fueling station design and requirements, including a broader technical understanding of what is needed to achieve a national hydrogen fueling infrastructure.
- Acceleration of hydrogen fueling station deployment, including the identification of a flexible set of technical experts and facilities to respond quickly to challenges that arise as new hydrogen stations are built.
- Reduction of hydrogen fueling system costs and improvement of system availability, safety, and reliability through inventive materials and novel designs.
- More innovative, efficient hydrogen fueling stations, making them competitive with conventional gasoline stations and more consumer-friendly.

## Sandia California News

• Integration of renewable hydrogen and the power grid through development, optimization, and validation of technologies that enable distributed generation of renewable hydrogen in a broader energy ecosystem.

As the leads for H<sub>2</sub>FIRST, Sandia and NREL will share their hydrogen expertise, including research in hydrogen-specific materials and systems engineering. Two research facilities, Sandia's Center for Infrastructure Research and Innovation in California and NREL's Energy Systems Integration Facility in Colorado, will serve as hubs for H<sub>2</sub>FIRST.

Sandia's facilities will develop and test innovative infrastructure technologies to accelerate market readiness, drawing on Sandia's broader hydrogen program, which includes research on storage, delivery, production, systems analysis, and safety, codes, and standards.

NREL will use its performance-testing, analysis, and safety, codes, and standards expertise to study renewable hydrogen generation and infrastructure systems and components. At NREL's new Energy Systems Integration Facility, capabilities such as a hose reliability testing robot and construction of additional refueling hardware will support H<sub>2</sub>FIRST's hydrogen infrastructure research needs.

## Moving forward with hydrogen fuel stations in the near term

The H<sub>2</sub>FIRST project initially is expected to identify opportunities that offer "high probability for success" for timely advancement of near-term fueling stations. The project also will work to identify and develop common laboratory capabilities that can serve many purposes for advancing hydrogen fueling technologies.

The H<sub>2</sub>FIRST project is expected to eventually include companies and organizations in the automotive, energy, and industrial gas sectors, fuel cell manufacturers, station component providers, state and regional government agencies, and research institutions.

"We think H<sub>2</sub>FIRST can help improve the path for hydrogen fuel cell vehicles by creating opportunities for private industry to pool their resources to address infrastructure needs," says Daniel. "We're also excited to forge strong relationships with state agencies in California."

## In New Mexico . . .

# Old Iron on display at employee car show

You could almost hear *Green Onions* by Booker T. and the MGs as the vintage cars — the old iron — rumbled into the lot at Bldg. 957 on May 1. All told, 18 Sandians brought their hand-polished, lovingly cared for, meticulously maintained and restored rides to the car show, which was intended as a way to celebrate team morale and a shared interest in classic vehicles. Look! Over there was a 1951 Chevy truck. And there was a 1947 Willys Jeep. A 1965 Ford Mustang. And a gorgeous 1947 Buick wagon.

With the enthusiastic support of management, David Veitch and Daniel Sanchez (both 10262) coordinated the show. Participants were primarily from Division 10000, but Divisions 4000 and 2000 were also represented.

To the sounds of 1950s rock 'n roll, the more than 100 attendees and participants enjoyed pizza and soft drinks, swapped stories, and shared tips earned by hard experience. John Moya and his 1953 Chevy Bel Air took home the people's choice trophy.

David and Daniel say they plan to put together another show next year, even bigger and better than this year's inaugural event.

In the photo, Jay Ortiz preps his 1955 Chevy Bel Air for display. Jay has owned the car since 1981 and finished restoring it in 1986. It has a classic 327-cubic inch engine and a four-speed transmission. "It's not too much of a show car any more," says Jay, "but I do take it out to a lot of the local cruise nights."

(Photo by Randy Montoya)



# California site welcomes family and friends

Photos by Dino Vournas

On Saturday, April 26, nearly 500 members of the workforce, along with their family members and friends, attended Family & Friends Day at Sandia/California. Through activities, tours, and demonstrations, the visitors learned about the breadth and depth of the work at the site and gained new insight into how their loved ones spend their workdays.

Among the day's offerings were tours of the Applied Biosciences Laboratory and an optical engine lab in the Combustion Research Facility; displays and discussions of Sandia's Urban Shield exercise, Arroyo Restoration project, and B83, W80, and W87 nuclear weapons; and Family Science Night, computer programming, and bioscience activities.



ELIJAH BERG (son of Tim Berg, 8940), prepares to pop a balloon while being filmed with a high-speed video camera run by Chuck Mueller (8362), on the left. This activity demonstrates how researchers use high-speed video cameras to study interactions that occur too quickly for the human eye to see, like a balloon popping.



IN THE APPLIED BIOSCIENCE LAB, Kiefer (left) and Brecken McLeod, sons of Jamie McLeod (8611), check the cleanliness of their hands under a UV light after washing with glogerm.



GRACE BEASLY, daughter of Stephanie Beasley (8521), compares results of a chromatography activity with Pam Lane (8623).



RICH CONTRERAS (8247) discusses the W80 warhead with Megan Door (8627), second from the left behind the caution tape, and her family.



OLIVER O'BRYAN, son of Greg O'Bryan (8223), makes friends with a snake at the Arroyo Restoration Project display.

# W76-1 Life Extension Program remains major effort at Sandia

By Sue Major Holmes

Sandia's Life Extension Program to replace the W76 warhead in the nation's stockpile with a refurbished version, the W76-1, has provided a roadmap for weapon system modernization work to come.

Production on the W76-1 began in September 2008 and is slated to run for several more years. The original W76, what manager Nick DeReu (2222) calls the "Mod-0," has been extended beyond its original service life in the stockpile, he says.

He believes the W76-1 program has set the stage for work to follow on other systems, such as the W88 Alt370.

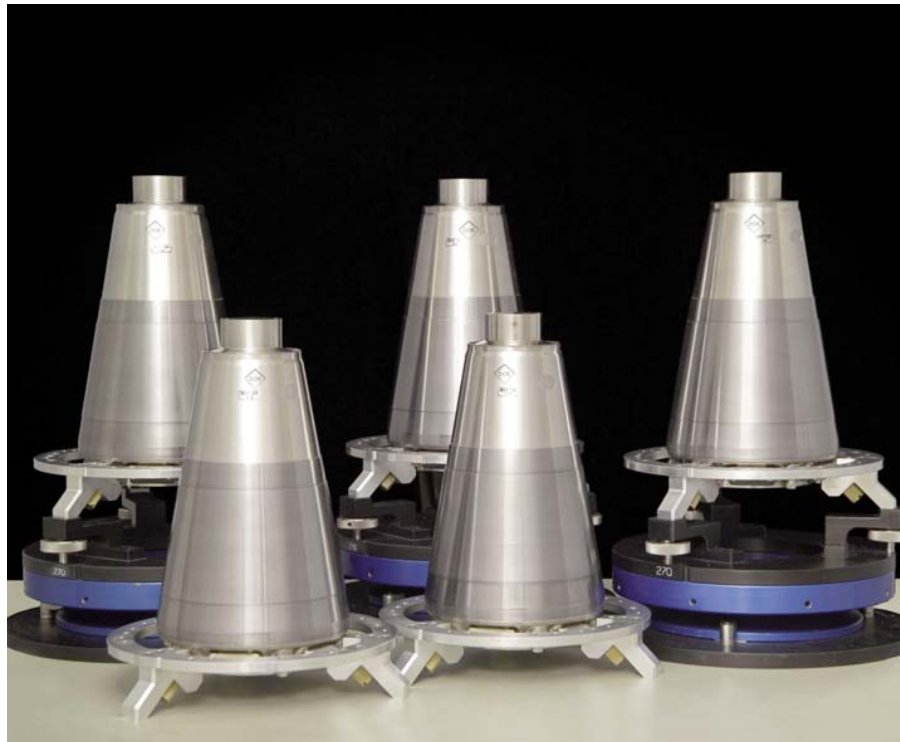
The Navy's submarine-launched ballistic missile carries the W76-1 warhead, which is part of the US defense triad. Sandia is responsible for helping extend its service life, including replacing the weapon's arming, fuzing, and firing subsystem (AF&F), Nick says.

"The end game is to put something in the stockpile that's going to work every time if needed," he says.

Finishing production on the W76-1 also will free production capacity at the National Security Campus in Kansas City and the Pantex Plant in Amarillo, Texas, for upcoming production on the W88 Alt370 and the B61-12 Life Extension Program (LEP), he says.

"The B61-12 LEP is more complex, just in design and complexity and the sheer number of parts," Nick says. "The scale is completely different from the W76-1. Both are going to turn out to be very demanding programs."

Centers 400, 1700, 2200, 2500, 2600, 2700, 2800, 2900, and 5300 support the



THE KANSAS CITY PLANT delivered these first five arming, fuzing, and firing units for the W76-1 to the Pantex Plant near Amarillo, Texas, in mid-2007. (Photo courtesy of Org. 2222)

W76-1, "so it remains a significant effort for the Labs," he says.

The current challenges in the W76-1 program are centered on production, Nick says. The Kansas City Plant has been moving from an older production facility to its new National Security Campus (NSC) about 10 miles away, adding new challenges to the production schedule.

## A dual-build approach

That requirement necessitated a twofold approach of build ahead and dual build. In the build-ahead approach, the Kansas City Plant built enough of particular components at the old facility to bridge the amount of time it took to get that production started at the NSC. Sandia and Honeywell FM&T, which manages the NSC, worked together to ramp down production at the original facility for both production lines, making sure the work at the new plant met requirements before shutting down the line at the old one, Nick says.

"That's all gone remarkably well. We didn't miss a beat," he says.

The team also kept production going over the last year at the Pantex Plant while working through facilities issues. Sandia's

release of updated weapon response information in July 2013 marked a significant milestone for the program.

Surveillance activities will continue to ensure the W76-1 Reentry Body Assemblies in the stockpile are safe, secure, and reliable. "Surveillance provides us the confidence that what we're building for the Mod-1 is functioning properly and meeting reliability requirements," Nick says.

## Navy honors Mark Rosenthal for his role in W76-1 LEP

Hundreds of Sandians have had some involvement over the past decade and more in Sandia's W76-1 Life Extension Program, making contributions large and small to one of the most demanding weapon programs in the Laboratories since the end of the Cold War.

Among those who have been with the program since its inception is Mark Rosenthal (2620). Now Mark has been recognized by the US Navy for his role in the program, being named a 2014 recipient of the prestigious Fleet Ballistic Missile (FBM) Achievement Award.

As described in the nomination package, Mark made "a significant and enduring contribution to the US Navy's Fleet Ballistic Missile (FBM) program by successfully leading the Sandia portions of the W76-1/Mk4 Life Extension Program (LEP) from its initial development to its transition to production and deployment."

### An integrated system solution

"I was honored to receive this prestigious award from the director of Strategic Systems Programs, Vice Adm. Benedict, and to represent Sandia," Mark says. "I was also humbled because the accomplishments were made possible through an exceptional team at Sandia and through a true partnership we developed with our customers, stakeholders, and suppliers."

Mark was the lead Sandia senior manager ultimately responsible for the W76-1 LEP, which provided an integrated system solution in an environment of rigorous delivery schedules that met or exceeded significant cost constraints and negotiated performance requirements. Sandia was responsible for the development, qualification, and production support for the NNSA and Navy-contracted non-nuclear components in the reentry body assembly (RBA), system integration of these components with the nuclear explosive package and the Navy systems

(including the reentry body, release assembly, missile, submarine, and handling equipment), the joint test assembly (JTA) design, development testers, and the systems integration.

According to the nomination package, "Mark applied his exceptional talents and experience beginning in 1998 and persisted with strong performance through first production in September 2008." Mark managed a total budget of several hundred million dollars during this time period.

When the W76 program got the go-ahead, new teams had to be formed, technologies had to be developed, test facilities had to be stood up, computational simulation tools had to be developed and qualified, and systems engineering and program management tools and processes had to be established.

### Incorporating COTS

The W76-1 LEP incorporated several design changes to meet unique mission requirements and volume and weight constraints.

The LEP effort also included development of a characterization, acceptance, and surveillance program to incorporate commercial off-the-shelf (COTS) components into the unique nuclear weapon environment and still meet high reliability requirements.

A number of test facilities and capabilities critical to the development and qualification of the W76-1/Mk4A had to be reconstituted or generated and new computational simulation tools had to be developed and qualified.

Finally, rigorous systems engineering and project management tools and practices were established and employed specifically for the W76-1/Mk4A program.

As the system integrator, Mark led the technical and programmatic interface/coordination activities with the

DoD customer and partners across the nuclear weapon enterprise.

Under Mark's leadership, the W76-1/Mk4A program established capabilities and practices that are being used on the W88 ALT 370, the B61-12 LEP, and other weapon programs.

The W76-1/Mk4A is now in steady production; approximately one-fifth of the total planned production units are fielded.

"I was truly fortunate to have a major part of my career be associated working on an integrated arming, fuzing, and firing system for the Navy," Mark says, "a legacy that started in 1966 on the W86/Mk3 Poseidon fleet ballistic missile system. I appreciated the opportunity and confidence from my management at Sandia to let me lead the W76-1/Mk4A Life Extension Project."

Mark is the fifth Sandian to win the Fleet Ballistic Missile Achievement Award. Other recipients have been Ron Hartwig (2200), Rick Knudson (5352), Rich Heintzleman (5353), and Dan Hardin (ret.).

Mark was honored at a ceremony in Washington, D.C., on May 8.



MARK ROSENTHAL is congratulated by Vice Adm. Terry Benedict upon receiving the Fleet Ballistic Missile Achievement Award. (Photo courtesy US Navy)



A DELEGATION OF SANDIANS involved in the W76-1 LEP, including Mark Rosenthal (center), in 2002 had an opportunity to visit the USS Wyoming, an Ohio-class ballistic missile submarine. The delegation was briefed on a variety of the submarine's systems and came away with a better understanding of how the Navy integrates the W76 into its at-sea operations. (US Navy photo)

# Pocket-sized anthrax detector aids global agriculture

By Stephanie Holinka

When most people in the US think about anthrax, they think about the 2001 terrorist incidents in Washington, D.C., and New York. Melissa Finley (6825) thinks about farmers in developing nations like Afghanistan.

As a researcher in the International Biological Threat Reduction program, Melissa works with veterinary labs in low-resource environments, helping them become safer, more secure, and also more efficient at diagnosing infectious diseases.

This work inspired the creation of the credit card-sized anthrax detection cartridge, called BaDx, which allows for safer, easier, faster, and cheaper testing for anthrax.

*Bacillus anthracis*, the bacteria that causes anthrax, is commonly found in soils all over the world and can cause serious, and often fatal, illness in both humans and animals. The bacteria can survive in harsh conditions for decades. In humans, exposure to *B. anthracis* may occur through skin contact, inhalation of spores, or eating contaminated meat.

## Making labs efficient, safer, and more secure

"Working with dangerous samples like *B. anthracis* spores places laboratory staff at risk. Concentrating many positive test samples in a lab could also tempt someone to steal positive anthrax samples for nefarious uses," Melissa says.

Currently, samples must be propagated in a laboratory that uses specialized tools requiring a consistent power supply not always available in the developing world, Melissa says.

Then there's the cost.

"Farmers in many developing countries don't make a lot of money, so they don't pay for diagnostic testing often. When they do, they can't afford to pay a lot for it," Melissa says.

The most common diagnostic test for anthrax costs around \$30, which is out of the reach of many farmers, perhaps discouraging them from testing animals they suspect are infected, Melissa says. The BaDx device, which is more like a pocket-sized laboratory, could cost around \$5-\$7 and does not require specialized tools to use.

The consequences of not testing animals suspected of having anthrax are life-and-death.

"Because anthracis forms spores when exposed to oxygen, slaughtering or opening the carcass of an infected animal places many people at risk. People can become extremely sick if they come into contact with



SANDIA'S BaDx pocket-sized detector has everything needed to test a sample for anthrax.

(Photo by Thayne Edwards)

the spores, either through inhalation or ingestion. The gastrointestinal form of the bacteria can be acquired by eating the contaminated meat," Melissa says.

## Complex and sensitive, but simple to operate

BaDx requires no battery or electric power to operate. It's hardy against wide temperature variation and can detect very small numbers of *B. anthracis* spores. That could make it especially useful in parts of the world where anthrax is prevalent, but refrigeration and lab facilities are lacking.

The device can be used by a trained technician in the field. The technician would put a sample swab into the amplification chamber, which contains selective growth media. The device then uses a lateral flow assay, similar to a common pregnancy test, to detect *B. anthracis*. Magnetically operated valves allow the sample to advance from stage to stage to complete the testing process. If the test is positive for the bacteria, a colored line will appear on the device several hours later.

After testing, the technician can initiate a chemical process that sterilizes the device, which avoids the risk of positive samples accumulating and falling into the wrong hands. In addition to the sterilization process, BaDx is sealed closed, making extraction of live bacteria

difficult.

"The device amplifies the *B. anthracis* so it can detect as few as 100 spores instead of the typical 1 million-10 million required for detection," says device engineer Jason Harper (8622).

## A strong team

Melissa says a strong team of technical staff brought BaDx to life.

Jason and engineer Thayne Edwards (1714) developed the microfluidics platform with the patented magnetic valving that moves the sample through the testing process.

Lead bioscientist Bryan Carson (8622), with technologists Jackie Murton

(8622) and Bryce Ricken (8622), developed the selective media formulations, and worked on building and testing the device, as well as helping to develop the decontamination strategy.

Nanotechnology researchers George Bachand (1132) and Amanda Carroll-Portillo (1132) are working on strips for the lateral flow assays.

Bill Arndt (6825), a researcher in the International Biological Threat Reduction program, who works internationally in low-resource environments, provided guidance in device design.

Sandia has licensed BaDx to Aquila, a New Mexico small business that specializes in the design and manufacture of technologies and services for nuclear security and international safeguards.

"We see a lot of potential for government customers and nongovernmental organizations as well as commercial markets," says Markku Koskelo, chief scientist for Aquila.

The team hopes to use the basic device design to develop tests for other types of disease-carrying bacteria such as salmonella and group A streptococcus, which causes strep throat. Future devices could be created to detect infectious diseases in humans and stem the spread of infectious diseases during epidemics.

The work is funded under Sandia's Laboratory Directed Research & Development program.

## Fresh @ the Labs

More than 400 people braved high winds and blowing dust to attend the kickoff of the Fresh @ the Labs Farmers Market in CINT's front parking lot Wednesday, May 7. The event was sponsored by HBE.

Local farmers and vendors brought vegetable garden plants and flowers, produce, and fresh milk, the kind with the cream on top, from grass-fed dairy cows. Items for sale included local honey and solar ovens that cook using only the sun's heat. Artists displayed glass art and solar scarves made from photoreactive dye that imprints shapes onto dyed scarves left in the sun. Attendees earned 1,000 Virgin HealthMiles for their participation.

According to organizer Jessika Brown (3334), if all goes well HBE intends to hold a monthly farmers market during the growing season and expand vendor participation.

Story and photos by Stephanie Holinka



**Sandia Classified Ads Sandia Classified Ads Sandia Classified Ads Sandia Classified Ads**

**MISCELLANEOUS**

ANTIQUE IRONS, large collection, best offer. Wright, 505-332-0773.  
 BARBERSHOP EXTRAVAGANZA, New Mexichords annual show, May 16-17, www.newmexichords.com for info & tickets. Taylor, 323-6435.  
 SEWING MACHINE, Singer 401A Slant-O-Matic, w/foot pedal, limited accessories, \$200; Oz Rally Wheels (4), plus Pirelli P195/60 R15 tires, \$200. Diaz, 821-0868.  
 FILM CAMERAS, 2, Minolta VE (TIS 2), Pentax Zoom 105-R, very good condition, free. Aragon, 505-892-3033.  
 CAMPER SHELL/BED RUG, for Toyota Tacoma 6-ft. bed, black, operable windows, latch lock w/key, \$200/both OBO. Eanes, 293-4298.  
 HDMI ADAPTER, 30-pin., for iPad 2, 3, iPhone, \$49 new, asking \$25. Kincaid, 296-6014.  
 ELLIPTICAL, Vision Fitness X6200 hrt, \$400; black twin bed frame, \$50; wooden entertainment center, \$40. England, 602-738-0308.  
 FLUTE, Gemeinhardt, Series 50, model 52SP 2009, \$350; cargo mat from '01 Honda Odyssey, \$30; hammer dulcimer, \$250. Olewine, 797-0189.  
 CHINA, Mikssa Parchment, 45-pc. set, new, unused, \$175 OBO; proceeds go to nonprofit Lap Dog Rescue. Hoffman, 505-280-0554.  
 UPRIGHT PIANO, Wurlitzer, w/music, excellent condition, \$500 OBO. Hochrein, 505-797-7363.  
 COMPLETE SEASON TICKETS, 2, Dallas Cowboys home games, already paid luxury tax. Maes, 505-259-6092.  
 LEATHER RIDING JACKET, Ladies, BMW Motorrad, size small, stock photo available, like new, paid \$479, asking \$375. Galbraith, 505-269-2889.  
 JORDAN FLIGHT CLUB 91 SHOES, almost new, size 10, \$80; Intense bike frame, used for BMX bike, \$85. Brewster, 238-4704, ask for Julie.  
 DESK, maple, early American, 9-drawer, 45" x 29" x 22", brass hardware, glass top, perfect computer desk, excellent condition, \$180. Kirk, 281-6668.  
 TV, Magnavox, 27-in., call for photo, \$20. Rodenbeck, 505-515-1440.

REFRIGERATOR, GE, white, dated, but runs great, good for rental unit or garage use, \$120. Stiles, 275-2941.  
 REFRIGERATOR, KitchenAid Superba, 28-cu. ft., stainless steel, side-by-side, ice/water in door, great shape, \$500. Ambabo, 274-3254.  
 DRUM SET, Premier, 6-pc., lacquered wood, Sabian cymbals, drum & hardware cases, excellent condition, \$1,000 OBO. Estrada, 480-1776, ask for Joe.  
 CARGO CARRIER, Yakima Space Booster, 6' x 2' x 2', am downsizing, paid \$550, asking \$300. Serna, 301-8652.  
 GAS DRYER, Maytag, Neptune, top of the line, white, front loading, side open door for easy access, like new, can be converted to propane, \$350. Vigil, 505-270-7667 or 575-386-6377.  
 BOXES OF VHS TAPES, no movies, free. Lewis, 323-7268.  
 AQUARIUM, 50-gal., w/full-size stand, 2 pumps, great condition, no leaks, call for photos, \$50. Martinez, 792-3608.  
 COUCH, \$300; coffee table, end tables, \$900; lounge chair, \$250. Wymer, 507-2501.  
 REFRIGERATOR, dorm size, \$20; microwave, \$30; Verizon M4G LTE mobile broadband hotspot, \$30; rectangle kitchen table, glass, leather chairs, \$350. Chavez, 999-7929.  
 ALFALFA HAY, barn stored in Peralta, \$7.75/bale, 25 bales min. Greenwood, 869-0153.  
 BATTLESTAR GALACTICA, complete series, Blu-ray, \$75; Lord of the Rings, complete on audio CD, \$30. Cocain, 281-2282.  
 THREE SALES, 2 yard sales, 1 estate sale, Wisconsin NE, between Menaul/Candelaria, Thursday-Saturday, May 15-17. Langwell, 299-1024.  
 TABLE, rectangular, side buffet, ornate, light/med. golden brown, excellent condition, \$125. de la Fe, 903-0717.

**TRANSPORTATION**

'02 FORD MUSTANG, V6, upgraded stereo, 128K miles, excellent condition, \$4,400. Woodall, 505-797-7702.

**How to submit classified ads**  
**DEADLINE: Friday noon before week of publication unless changed by holiday. Submit by one of these methods:**  
 • EMAIL: Michelle Fleming (classads@sandia.gov)  
 • FAX: 844-0645  
 • MAIL: MS 1468 (Dept. 3651)  
 • INTERNAL WEB: On internal web homepage, click on News Center, then on Lab News link, and then on the very top of Lab News homepage "Submit a Classified Ad." If you have questions, call Michelle at 844-4902. Because of space constraints, ads will be printed on a first-come basis.

- Ad rules
1. Limit 18 words, including last name and home phone (If you include a web or e-mail address, it will count as two or three words, depending on length of the address.)
  2. Include organization and full name with the ad submission.
  3. Submit ad in writing. No phone-ins.
  4. Type or print ad legibly; use accepted abbreviations.
  5. One ad per issue.
  6. We will not run the same ad more than twice.
  7. No "for rent" ads except for employees on temporary assignment.
  8. No commercial ads.
  9. For active Sandia members of the workforce, retired Sandians, and DOE employees.
  10. Housing listed for sale is available without regard to race, creed, color, or national origin.
  11. Work Wanted ads limited to student-aged children of employees.
  12. We reserve the right not to publish any ad that may be considered offensive or in bad taste.

'07 LEXUS LX470, 4WD, silver, leather, moon roof, navigation, 3rd row, DVD, 91.7K miles, KBB \$34,800, asking \$32,000. Moore, 220-8678.  
 '06 LINCOLN TOWN CAR, Signature Limited, V8, fully loaded, leather, white, 58K miles, \$10,500 OBO. Dunham, 280-3817.  
 '11 TOYOTA COROLLA LE, 4-dr., AT, white, aux input, traction control, side curtain airbag, 59K miles, very good, \$11,900. Watson, 281-2691.

'02 HONDA CIVIC EX, 4-dr., 5-spd., PW, PL, AC, moon roof, 80K miles, 1 owner, well maintained, \$5,700. Carroll, 292-5436.  
 '93 TOYOTA T100, V6, 2WD, regular cab, long bed, 200K miles on body, ~100 miles on rebuilt engine, \$5,000. Wolfgang, 505-414-1483.  
 '05 HONDA CIVIC HYBRID, 4-dr., silver, 1 owner, 131K miles, \$3,000. Dinge, 505-818-8933.  
 '07 CADILLAC CTS, 3.6L, AT, Bose sound system, sun roof, diamond white paint, 61K miles, \$13,250 OBO. Ward, 296-2207.  
 '72 CHEVY 1/2-TON, 4x4, w/4 alloy wheels, \$4,500. Overall, 220-4139, ask for Ron.  
 '12 FORD MUSTANG, V6, AT, loaded, extras, Pony pkg., silver, >5K miles, top condition, \$20,000 OBO. Yip, 294-8124.

5-BDR. HOME, 4,992-sq. ft., finished walk-out basement, theater, new kitchen, on 2 acres, ranch-style, East Mountains, \$449,990. Weaver, 505-480-9951.  
 3-BDR. HOME, 1 bath, 1-car garage, 1,052-sq. ft., Lomas & Betts area, FHL loan assumption, FSBO, \$132,000. Salmonson, 315-8226.  
 3-BDR. HOME, 1-3/4 baths, 1,613-sq. ft., Lomas/Tramway, AC, ceramic tile throughout, stainless appliances, landscaped backyard, MLS#812624. Walters, 505-463-0127.  
 2 OR 4 ACRE BUILDING LOTS, Sandia Park, gorgeous, electric, well, phone, ready-to-build, \$105,000, \$175,000, easy terms. Mihalik, 281-1306.  
 LARGE .19 ACRE CLEARED LOT, Jade Park, 7404 Frank Place NE, all city utilities, cement pads for patio, carport, shed, email photos on request, \$75,000. Mann, 505-269-7302.  
 4-BDR. HOME, 3 baths, 4,280-sq. ft., pool, full walkout basement, www.817lampostcircle.com, \$455,000. Ramos, 972-951-0290.  
 3-BDR. HOME, 2 baths, 1-car garage, huge shed, large backyard, new stucco, starter home, Constitution & Wyoming area, \$145,000. Torres, 505-715-7047.

**RECREATION**

'12 TRAVEL TRAILER, Forest River Flagstaff V-Lite, 30WRKSS: 2 slides, 1-1/2 baths, extras, mint condition, \$24,900. Sandoval, 505-792-7883.  
 FREESTYLE BIKE, boys, 20-in. Next Chaos, \$20. Maestas, 883-7617.  
 '05 HYOSON ALP MOTORCYCLE, 250 cc, 7670 AM, good condition, \$1,000. Finley, 293-1961, nights or leave message.

**REAL ESTATE**

4-BDR. HOME, 1-3/4 baths, 1,920-sq. ft., 2-car garage, fireplace, refrigerated air, many new upgrades, Taylor Ranch area, FSBO, \$180,000. Abrams, 898-3769.  
 2.56 ACRES, all utilities on property line, Edgewood, 15 min. from Albuquerque, near stores & schools, great vistas, \$57,000 OBO. Sanchez, 505-980-2532  
 1/2 ACRE, Mission Park Loop, Los Lunas, shared well, septic tank, telephone, part fenced, \$18,000. Crosby, 260-1070.  
 2-BDR. CONDO, 6501 San Antonio Drive NE, unit 3002, on Zillow.com, \$165,000. Juarez, 980-7177.

**WANTED**

SAFETY RAZORS, vintage, double edge, interested in any safety razors (Gillette, etc.) from 1900-1970. McElhanon, 321-1732.  
 CROQUET INSTRUCTOR, for 10-yr.-old girl, she has some experience, to croquet small toys. Martinez, 792-3608.  
 SUMMER ROOMMATE, furnished bdr. in 3 bdr. home, close to base, \$375 utilities included. Roche, 505-366-3884.  
 GOOD HOME, Pekingese/Tibetan spaniel, male, 3 yrs. old, ~12-lbs. sweet & adorable, photos available. Baca, 505-301-7807.  
 FEMALE ROOMMATE, 3-bdr. townhome, on base, call for more info, \$500/mo. Caldwell, 859-358-4553, ask for Amanda.  
 DOG/HOUSE SITTER, for occasional overnight stays while owner is traveling, far NE heights. Creange, 710-7517.

**Mileposts**

New Mexico photos by Michelle Fleming



Ivory Alexander 40 6523



Mary Ann Sweeney 40 1600



Linda Gonzales 35 4144

**Recent Retirees**



Gordon Smith 34 857



Andrew Orrell 24 6100



Paul Hommert 35 1



Ken Nunez 35 6633



Douglas Adams 30 6815



Mark Dowdican 30 5338



Phil Forbes 30 5214



Clint Hall 30 6634



Joseph Kotulski 30 1352



Alice Maese 30 751



Mark Nissen 30 1535



Steve Ratheal 30 6614



Dennis Roach 30 6620



Tommy Woodall 30 430



Debra Browitt 25 2728



Pam Catanach 25 3652

# The courage to keep going

## Sandia helps teens who conquered adversity move from high school to college

By Nancy Salem

Photos by Norman Johnson

Ashley Carriaga was a senior at West Mesa High School when her brother was murdered. "It was the worst feeling in the world. He was my best friend, my rock," Ashley says. "It tore my family apart." Ashley reached for support at school. "It was a struggle to get up every day, but my friends were there for me," she says. "Teachers, administrators, and counselors also helped me get through it and back on track to graduate. There was a lot of kindness and understanding."

Lupita Lopez faced a different kind of challenge. She was born blind in Culiacan, Mexico, and immigrated to the United States with her family as a young child. At age 8 she had to learn new languages. "It was hard because not only did I have to learn English, I also had to learn how to read and write Braille in both English and Spanish," she says. "I also had to learn mobility skills, how to use a cane and navigate around places, and the whole school system. And I was adapting to a new culture."

Lupita kept a positive attitude and had the support of friends, teachers, and school administrators who integrated her into regular classes. Her drive took her to the top quarter of her senior class at Albuquerque High, where she took advanced placement classes and will graduate with a bilingual seal.

Angelo Romero was a victim of bullying by a sports teammate at Rio Grande High. When he spoke up he became an outcast at school. Angelo confronted the bully with a letter that was read in court and reported in the media. "I knew that being a victim was not going to defeat me," he says. "I know right from wrong. There were times when I had doubt, but I had to fight for what was right."

Ashley, Lupita, and Angelo are headed to college. Ashley has been accepted to the University of New Mexico to study nursing. Lupita will major in psychology at UNM. Angelo is going to New Mexico Tech to study mechanical engineering.

All three will have help from Sandia and Lockheed Martin Corp. They are among this year's 20 Thunderbird Award winners who each received \$1,500 in recognition of their exceptional ability to overcome significant personal challenges on the path to high school graduation.

### Stories of courage

Family, friends, school principals, advisers, and mentors of the winners attended the ceremony at the Embassy Suites. Also on hand were representatives of the New Mexico congressional delegation and state Department of Education, members of the Albuquerque



TWENTY HIGH SCHOOL SENIORS who overcame adversity on the road to graduation each received an educational award of \$1,500 from Sandia and Lockheed Martin. The students said in remarks at a May 7 ceremony that the award will help them reach their goals.

*"It has been said that adversity builds character. These young people certainly embody that maxim. Their stories are heartwarming and amazing, and demonstrate the enormous character each one has shown while persevering in the face of adversity."*

— Paul Hommert, President and Laboratories Director

20th annual awards ceremony on May 7.



OVERCOMING ADVERSITY — From left, Ashley Carriaga, Angelo Romero, and Lupita Lopez faced challenges ranging from loss of a family member to bullying. All three found the courage to move forward and graduate from high school.

Public Schools board, and superintendents Winston Brooks of APS, Sue Cleveland of Rio Rancho Public Schools, Bernard Sais of Los Lunas Public Schools, and Ron Marquez of Belen Public Schools.

The stories were filled with examples of courage. There was D'Ambra, who has been living on her own with no financial help since her sophomore year, working full time to pay her rent. Celine was diagnosed in her sophomore year with thoracic outlet syndrome, which caused a deadly blood clot under her collarbone and ribs and resulted in rib re-section surgery. Cassandra was raised by a single mom who died of breast cancer last year, leaving her to maintain the household and become a mother to her 12-year-old sister.

"It is impossible not to be touched deeply by these young people," said event emcee Frederick Bermudez, senior manager of Public Relations and Communications Dept. 3650. "They are amazing role models to anyone who has faced a challenge."

### The road to higher education

Each of the honorees is headed to college with a career goal. Majors range from sociology to education to sports administration.

Ashley says her dream is to work as a pediatric nurse.

She says the Thunderbird scholarship will help her get there. "It means a lot," she says. "I will need all the help I can get."

Lupita says she wants to become a counselor because she's outgoing, enjoys talking to people, and wants to help others as she was helped. "I am really limited on money, so this award is very important," she says. "It's going to help me pay for college. Every bit helps."

Angelo wants to work in the automotive industry. "After all the tragedy I went through, this award is a real positive," he says. "I've learned that nothing can hold me back."

Paul said Sandia wishes all the recipients continued success in life. "Throughout our lives, we all make choices that determine our character and our future. This year's recipients of the Thunderbird Award have already demonstrated they know how to make the right choices, which are often the tough choices," he said. "You exemplify the triumph of the human spirit over adversity. You are an inspiration to everyone here."



SANDIA PRESIDENT AND LABS DIRECTOR Paul Hommert congratulates a 2014 Thunderbird Award winner.

## ASIAN AMERICAN

What does it mean to be Asian American? How do Asian Americans create a lifestyle or settle in the United States? In partnership with the Asian Leadership and Outreach Committee (ALOC), this month's Diversity Cinema will feature various stories of notable Asian Americans and how they have established themselves in American culture.

CNSAC Auditorium (Bldg. 810)  
Wednesday, May 21  
11:30 a.m.-12:30 p.m.

Register at  
<http://tiny.sandia.gov/57yiv>

Questions? Contact Marie Capitan @ 284-3171 or Melanie Gallegos @ 845-9593