

# Well done: Corey Knapp wins NNSA Administrator's Award for career accomplishments in nuclear weapons program

*Months-long medical procedure, recovery mark next challenge for recent retiree*

By Bill Murphy

Corey Knapp, who once was turned down for a job at Sandia because the hiring manager thought he wasn't aggressive enough, was honored recently with the NNSA Administrator's Silver Award in recognition of his contributions to the continued safety, security, and reliability of the nation's nuclear stockpile.

Corey, who retired in February, received the award from Wendy Baca, the W78 LEP program manager in NNSA's Office of Stockpile Management, who was acting on behalf of Administrator Tom D'Agostino. The award citation took note of Corey's "impressive record of accomplishments over a third of a century in many programs and technological areas critical to NNSA missions." His award nomination noted that Corey, first at Lawrence Livermore National Laboratory and then for 30 years at Sandia, "dedicated his considerable engineering and management skills to the stewardship of the nation's nuclear deterrent."

There was a bittersweet aspect to Corey's recognition  
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IN REMARKS FOLLOWING his acceptance of the NNSA Administrator's Silver Award, Corey Knapp, far right, thanks his family and his colleagues for their support during his 30-year career at the Labs and for their ongoing support as he faces a complex and lengthy medical treatment regimen. (Photo by Randy Montoya)



# Sandia LabNews

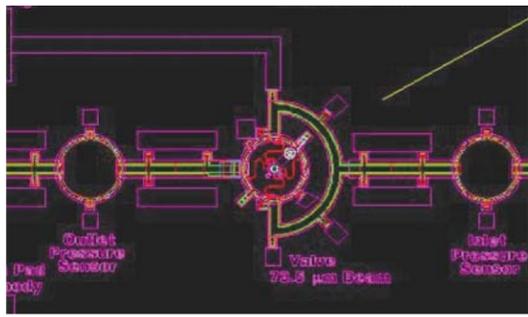
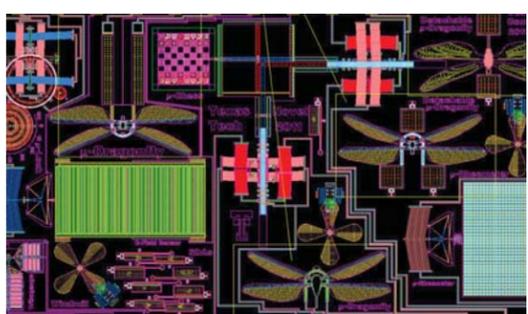
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## Dragonflies and microvalves make mark at annual MEMS design contest

By Neal Singer



A dragonfly as small as a piece of dust, its four tiny wings beating like it had settled momentarily on a lily pad, and an unusually sensitive microvalve were the big winners in this year's design contest for extraordinarily tiny devices held annually at Sandia.

The winners — Texas Tech University for the novel insect and Carnegie Mellon University for the educational valve — were announced in late May at Sandia at an awards ceremony. There, student researchers presented their microelectromechanical system (MEMS) designs to the scrutiny of Sandia engineers. Sandia will fabricate all students' design submissions using its advanced SUMiT V™ fabrication process, which makes MEMS devices with five levels of polysilicon (the most of any standard process), and is especially well-suited for making the complex mechanisms thought up

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**BIG IDEAS, TINY DESIGNS** — Students from Texas Tech and Carnegie Mellon Institute came home winners in the 2011 MEMS University Alliance Design Competition at Sandia. For larger images of the winning designs see page 5.

### Inside . . .

Each year, the Sandia Women's Connection presents its Math & Science Awards to young women from high schools in Livermore and surrounding areas, recognizing their outstanding achievement in math and science. Story and photos on page 3.

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Photo by Dino Vourmas

## Sandia wins three 2011 EStar Awards

*Awards recognize excellence in pollution prevention, environmental sustainability*



Sandia has won three 2011 Environmental Sustainability (EStar) awards from DOE for notable accomplishments in pollution prevention and sustainable environmental stewardship. The Sandia initiatives honored with EStar awards are:

- Integrated Sustainability Planning and Design
- High-Performance Computing Water Reduction and Energy-Efficient Cooling
- Water Consumption Reduction

"You can be justifiably proud of this accomplishment. Only 15 EStar awards and three EStar honorable mentions were granted from 186 nominations," wrote Beverly Whitehead of DOE's Office of Sustainability Support in a congratulatory email to Sandia about the awards.

As EStar award winners, the Sandia sustainability

*"These awards validate the proactive nature and mastery of Sandia staff and management supporting energy and facilities work."*

— Art Ratzel III, director, Facilities Management and Operations Center 4800

programs will be submitted for consideration for the prestigious White House Closing the Circle award.

### More about the winners

Sandia's Integrated Sustainable Planning and Design initiative aims to advance high-performance sustainable building (HPSB) guiding principles and associated building-related energy and

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## That's that

The Great New Mexico smokeout of 2011 had nothing to do with tossing that half-smoked pack of Lucky Strikes in the trash bin and going cold turkey. Rather, this year's version had everything to do with a very un-lucky strike: a lightning strike (perhaps) or, as now appears more likely, a match struck at the wrong place and time. Still not completely clear what set off the blaze, but the Wallow Fire, which started in eastern Arizona and seems poised as I write this to surge into New Mexico, is one of the biggest fires on record in the region. By the time you read this, the fire will almost certainly be the biggest of all time in Arizona.

Though it's actually a couple of hundred miles away, the fire has been an issue in Albuquerque because the wind patterns over the past few days have acted like a perfect funnel, sending a dense smoky haze straight to the heart of New Mexico. How thick has the smoke been? Last night I was out in my backyard in the Northeast Heights of Albuquerque with a high-powered flashlight (looking for our cat, as it happens). My wife exclaimed, "Look at this!" indicating the flashlight beam. In the shaft of the bright white LED, you could see the airborne particles of ash glittering in the light. Kind of pretty, if you could set aside the fact that you were breathing the stuff. And this morning, I practically had to grab my cordless blower to clean the ash off my windshield. All kidding aside, this smokestorm has been a real hardship for people with breathing difficulties.

The big fire in Arizona has been made distinctly worse than it might have been because the region - dry at the best of times - is in the midst of a brutal drought. Albuquerque so far this year has received .19 inches of precipitation (and no, that decimal point isn't in the wrong place). The norm for us around here is 2.8 inches by this point in the year, not a lot, but probably enough to preclude the kind of inferno we're seeing in Arizona right now.

\* \* \*

What to make of the deadly fires, floods, tornadoes, droughts, blizzards, arctic freezes, and heat waves that have battered the country this year? Some argue that our own activities are behind the record-shattering weather phenomena that have become fixtures of the national news. I don't know about that, though I don't deny the possibility. What I do know is that we need more and better information: Are we seeing a new baseline here? Is today's "extreme" tomorrow's "norm?" Are we seeing the early manifestations of longer-term trends where storms are more deadly, fires bigger, floods worse, summers hotter, winters more brutal? With lives at stake, a better understanding of these issues is vital. I'm glad to know that some of our work at Sandia for DOE's atmospheric research program is helping the nation find those answers.

\* \* \*

In the May 20 issue, we honored Memorial Day by publishing a photo by Randy Montoya, one he shot at Arlington National Cemetery during a vacation trip to Washington, D.C. I received a number of messages from Sandians and retirees - and so did Randy - thanking us for running the photo, which shows an elderly woman alone at a graveside at the cemetery, clearly wracked by a long-standing grief. The most poignant note I received came from a retiree who has resettled overseas and so only got her latest copy of the *Lab News* a couple of days ago.

She wrote:

*Dear Mr. Murphy, The most recent Lab News reached this retiree in Sopron, Hungary today. Some pictures can say thousands of words and Randy Montoya's WAR AND REMEMBRANCE is one such picture. For me, it carries more than words. It touches the heart, fills it with gratitude. Please tell Mr. Montoya I congratulate him, most sincerely, and thank him for it. And for you, too, thank you, for publishing it, giving it the most appropriate place of the issue. It will be framed and treasured.*

*With warmest regards, Suzy R. Wagner*

Of all the things that have been published under the *Lab News* banner since I became editor, I don't believe I've ever been prouder to publish something than I was to publish that photo. I consider it an instant classic, one of those rare images that, once you see it, it changes the way you look at things. I know that for me, I'll never think of Memorial Day again without thinking of that image, one that reminds us that war's costs and sacrifices do not end at the battlefield. You can see the photo at <http://tinyurl.com/3tslkb>.

See you next time.

- Bill Murphy (505-845-0845, MS0165, [wtmurph@sandia.gov](mailto:wtmurph@sandia.gov))

## NMSBA program seeks groups of companies facing common challenges to receive technical assistance grants

By Heather Clark

The New Mexico Small Business Assistance Program (NMSBA) is looking for groups of small businesses facing common challenges that could use technical assistance from researchers at Sandia and Los Alamos national laboratories.

The NMSBA is soliciting initial proposals for 2012 leveraged projects, in which two or more small businesses request assistance as a group.

The program - a partnership of the two federal laboratories and the state of New Mexico - connects scientists, engineers, and others with New Mexico businesses to solve critical challenges and promote economic development.

While individual businesses can apply for help throughout the year, these group projects are considered once a year. The deadline for submission is July 8.

Businesses that apply must explain the problem they face, what expertise NMSBA offers that can't be found in the private sector for a reasonable cost, and what economic benefit they expect. Successful applicants will be invited to submit full proposals.

The program funds researchers' time and incidental materials and must be completed in one year. Grants range from \$20,000 to \$100,000, depending on the number of companies involved and their locations.

In April, two group projects were among 10 honored by the NMSBA program.

Espanola Valley business Kenny Salazar Orchards, which irrigates with water from the Santa Cruz reservoir, was suffering because of sediment buildup in the water. Sandia and Los Alamos researchers uncovered the sources of the sediment and recommended solutions to the Santa Cruz Irrigation District.

And, four Albuquerque companies, Vibrant Corp., Mechtronic Solutions Inc., Fiore Industries Inc., and ZTEC Instruments Inc., requested help evaluating process compensated resonance testing (PCRT), a technology that provides fast, cost-effective reporting on the structural integrity of aviation components. Since working with Sandia, Vibrant has earned Federal Aviation Administration approval to use PCRT, which increased business opportunities and contacts for the other partner companies, as well as substantial cost savings for the aviation industry.

Since the overall NMSBA program began at Sandia in 2000, it has helped 1,736 small businesses with \$25.2 million worth of research hours and materials. The program has created or retained 1,550 jobs paying an average annual salary of \$38,000, increased small companies' revenues by \$82 million, and decreased their operating costs by \$45 million. These companies have invested \$19 million in other New Mexico goods and services.

For further information about the NMSBA Program, entrepreneurs may click [http://www.nmsbaprogram.org/content/leveraged\\_assistance](http://www.nmsbaprogram.org/content/leveraged_assistance) or call Genaro Montoya at (505) 284-0625.



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## Lab News science writer Neal Singer to discuss . . . The future of nuclear fusion energy

*Lab News* science writer Neal Singer, author of the new book, *Wonders of Nuclear Fusion: Creating an Ultimate Energy Source*, is the guest speaker at the June meeting of the New Mexico Academy of Science, to be held June 23, 6:30 p.m., at the University of New Mexico School of Law, Rm. 2401, 1117 Stanford Ave. NE (at the southern end of the UNM North golf course).

The focus of Neal's talk will be on the status of the major global initiatives to eventually achieve baseload-scale electrical energy through controlled nuclear fusion. Scientists at three big machines assert that with proper funding, they will reach at least break-even fusion in this decade: at Sandia's own Z machine and Lawrence Livermore National Laboratory's National Ignition Facility in the next few years and at the international effort called ITER in southern France by decade's end. The talk is free and open to the public.

In addition to writing about science at Sandia, Neal has written articles for *Science*, *Scientific American*, *Smithsonian*, and many other magazines.

*Wonders of Nuclear Fusion* was published last month by the University of New Mexico Press as part of its Barbara Guth Worlds of Wonder Science Series for Young Readers. It is available at local bookstores in the Albuquerque area as well as through online retailers including Amazon.com.

## Take Note

Retiring and not seen in *Lab News* pictures: James Grossman (6916), 30 years.

## WEAPON INTERN PROGRAM 2012 NOMINATIONS

Nominations for 2012 are now being accepted through July 15th, 2011

Providing the Nation with Preeminent Staff for Innovation, Technical Leadership, Program Management & Responsive Stewardship, for our Nuclear Security Enterprise.

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# Sandia honors young women for outstanding achievement in math and science

By Patti Koning

Over the past two decades, the Sandia Women's Connection (SWC) has recognized 400 young women for academic excellence through its annual Math & Science Awards. In May, the event was held for the first time at Sandia in the Combustion Research Computation and Visualization (CRCV) building, part of the site's new General Access Area (GAA).

Each year, teachers from 10 high schools in Livermore, Dublin, Pleasanton, Tracy, and Manteca nominate two students, one for outstanding achievement in math and one for outstanding achievement in science. The award is given to young women in their junior year of high school so they can include it on their college and scholarship applications.

"Even though women have made big strides, particularly in the biological sciences, when we look at chemical and mechanical engineering, mathematics, physics, and computer science, there is a big gap in the number of women in these fields versus men, particularly in high-level positions," says Cathy Branda (8623), the event's chair. "These awards are one way we are trying to address that gap."

## 'A tremendous number of doors open'

The event honors the young women for their academic achievements, but it's also about introducing them to successful women scientists and the many career paths available in math and science.

"We hope you recognize that when you excel in math and science, a tremendous number of doors open for you," said Cathy in presenting the awards.



CAROLYN MURRAY, a junior at Granada High School in Livermore, accepts her award for outstanding achievement in science from Cathy Branda. (Photo by Dino Vournas)

Before the awards presentation, the awardees met their Sandia hosts, women with careers in math and science. Donna Djordjevich (8116) explained her Ground Truth program, an interactive gaming platform used to simulate critical homeland security activities. Victoria VanderNoot (8125) shared her work on the RapTOR (Rapid Threat Organism Recognition) Grand Challenge, a project to develop a tool for rapid characterization of biological organisms.

The awardees also learned about internship opportunities at Sandia.

"While this event has always been about fostering mentoring relationships between career scientists and students, in recent years it has become a pipeline for interns," says Cathy. "Over the past few years, we've had several awardees return as summer interns. It would be wonderful to see some of these talented young women return to Sandia as staff members when they have completed their education."

The speakers were Tammy Kolda (8966) and Rene Bierbaum (8245), who shared their personal stories. Both women said they had accomplished far more than they ever expected to, and that they were driven by passion for math and science.

## 'Something switched on' in college

Tammy discovered her love of math in college and ultimately graduated first in her class. "In college, something switched on, and I started studying more and getting straight A's. Although I'd gotten a lot of A's before, I never got them all in the same semester," she said in her remarks. "I'd always liked math, but had no idea what you could do with it. Suddenly I realized I was taking lots of math classes so, almost by default, math became my major."

She described her research as analogous to suggesting "friends" on Facebook. "We are looking at the structure of networks, the underlying process that drives them — can I describe them in an equation? Can I describe your social life in an equation? If that sounds hard, it is," she said. "I can't look in the back of the book for an answer, but that's a good thing. It's fun to figure out the answer on your own."

Rene characterized her career path as a series of "microforks" in the road. "These little microforks didn't seem significant at the time, but when I look back I see how important they were in my life," she said.

Rene said she was interested in engineering before she even knew what it was. At Halloween, when other kids were thinking about their costumes, she collected and analyzed data on the number of trick-or-treaters that came to her house, their candy choices, and anything else she could record numerically.

She described going through a series of majors in college — chemical engineering, computer science, math, and philosophy — before settling on electrical engineering.

"It was really a magical moment when I found my passion," Rene said.

An important microfork, maybe even a millifork, occurred after she was promoted to manager. "After six years, I decided to leave management and return to my data," said Rene. "This was a hard decision, but it paid off for me in terms of personal happiness. I think it's really important to listen to those messages about what you love."

## Award came as a surprise

The awardees and their families enjoyed meeting the scientists and learning about their careers. "I really liked seeing all the displays and learning about so many different fields," says Nicole England, the math awardee from Manteca's Sierra High School.

Angela Evans, the math winner from Livermore High School, described the program as wonderful, especially the speakers. "I wish I could have gone to something like this before I went to college," says her father, Louis. The winner of the math award from Pleasanton's Amador Valley High School might be familiar to people at Sandia — Madeline Quinn, daughter of Margaret



DONNA DJORDJEVICH shares her Ground Truth research with two award winners. (Photo by Dino Vournas)



RENE BIERBAUM shares the "microforks in the road" that have guided her career as an electrical engineer.

(Photo by Randy Wong)



STEPHANIE BOOKE from East Union High School accepts her award for outstanding achievement in math from Cathy Branda. (Photo by Dino Vournas)

Quinn (8522). The award came as a surprise to Margaret; she first learned her daughter had won when she was reviewing the spreadsheet of winners at work.

"Maddie was honored to receive this award, and really enjoyed the event. It was a great chance for the girls to get an 'inside look' at some of the work done at a national laboratory and meet some very impressive role models," says Margaret. "Both Mike [Maddie's father] and I are really proud of her accomplishments. At this point, she talks about wanting to pursue her interests in math and science when she goes to college — and we enthusiastically support her!"

## Sandia California News

### Award Winners

#### Outstanding Achievement in Mathematics

Madeline Quinn, Amador High School  
 Kristyn Lue, Dublin High School  
 Stephanie Booke, East Union High School  
 Yuan Jiang, Foothill High School  
 Devyn McConachie, Granada High School  
 Angela Evans, Livermore High School  
 Nicole Deleon, Manteca High School  
 Mellisa Villacarte, Merrill F. West High School  
 Nicole England, Sierra High School  
 Maddie Lau, Tracy High School

#### Outstanding Achievement in Science

Ruchita Gupta, Amador High School  
 Cathy Yuan, Dublin High School  
 Brenda Buenrostro Alvarado, East Union High School  
 Annie Yuan Wie, Foothill High School  
 Carolyn Murray, Granada High School  
 Natalie Dimits, Livermore High School  
 Myklyn Grace Balmut, Manteca High School  
 Amy Ly, Merrill F. West High School  
 Francis I. Scherry, Sierra High School  
 Karen Hoi, Tracy High School

#### Special thanks to the Sandia hosts and Math & Science Awards Committee:

Sandia Hosts  
 Patricia Gharagozloo (8365)  
 Mary E. Gonzales (8240)  
 Yalin Hu (8135)  
 Kirsty Leong (8651)  
 Yanli Liu (8621)  
 Kari Neely (8514)  
 Lorraine Sadler (8132)  
 Jeanne Stachowiak (8621)  
 Victoria VanderNoot (8125)  
 Jessica Westbrook (8114)

#### Committee

Pat Smith (9000), director champion, SWC  
 Cathy Branda (8623), Chair  
 Donna Blevins (8953), co-chair  
 Marilyn Hawley (8116), co-chair  
 Seanna Crouch (8942)  
 Deneille Wiese-Smith (8128)

# Corey Knapp

(Continued from page 1)

ceremony: It gave him a chance to be among friends and family as he accepted kudos for a distinguished and consequential career in service to the nation. But it also gave him a chance to speak movingly of the next stage in his life, where he faces several months of intense medical care to treat complications from a course of chemotherapy. The hard-hitting drugs beat back Corey's lymphoma, which had been diagnosed in 2007 and is now in remission. Unfortunately, the chemo triggered myelodysplastic syndrome, a serious blood and bone marrow disorder that can be a precursor to leukemia. After fighting off the lymphoma and a tumor (in 2010) that cost Corey about one-third of his stomach, he now faces what will perhaps be the fight of his life. In an email, Corey describes what lies in store for him:

*"Based on my blood tests and the cytogenetics of the cells, I am high intermediate risk, which means I need a stem cell transplant; this used to be done by bone marrow transplant. Fortunately, my two brothers are matches for my stem cells, so on June 3 my wife, Cindy, and I leave for MD Anderson Cancer Center in Houston to start the transplant process. My older brother, Myles, will meet us there on the 6th. [Corey notes elsewhere that both his brothers, Myles and Bret, were good stem cell matches for him and both were ready to step up to be donors; Myles, because he shares Corey's blood type, got the bid.] He and I have some tests the first week, then they collect his stem cells and I start a four-month process of the transplant. I get to spend a month in the hospital followed by three months as an out-patient.*

*The first week is high-dose chemotherapy to "cleanse" my bone marrow, then the transplant, giving me my brother's stem cells through an IV. After that, I spend three weeks in the hospital in a special ward where people have to "gown up" to visit. Finally, I get released to a local apartment we've rented, but for some period of time, I'll need to have daily follow-up with the doctors at MD Anderson and be extremely careful going out in public (must wear a mask, etc.). Hopefully, we will be home about Balloon Fiesta time. As you can imagine, this puts a huge load on my wife, as I will need 24-hour supervision and won't be very useful for doing much of anything for at least a month after getting out of the hospital. So, we have some challenges ahead. We have a lot of faith, and God has given me peace about all this.*

## A coach intervenes

But Corey is a fighter, something that perhaps that Sandia interviewer 30 years ago who dismissed him as not aggressive enough didn't fully appreciate.

Corey recounts that as a local boy growing up in Liv-



COREY KNAPP, center, with brother Bret, left; wife Cindy (to Corey's right); Wendy Baca, the W78 LEP program manager in NNSA's Office of Stockpile Management, who presented Corey the NNSA Administrator's Silver Award on behalf of Thomas D'Agostino; and brother Myles, who will serve as a stem cell donor for Corey during Corey's treatment for myelodysplastic syndrome, which can be a precursor to leukemia. (Photo by Randy Montoya)

Corey is in Houston now, chronicling on his blog at <http://clknapp.wordpress.com> his course of treatment at the MD Anderson Cancer Center in Houston.

ermore, he watched his dad, a PhD nuclear physicist, go off to work each day at what is now called Lawrence Livermore National Laboratory. Naturally, Corey was interested in landing a job at the same place, and planned his education accordingly. After earning a degree in computer science electrical engineering at UC-Davis, he did get the LLNL job, where he worked while pursuing his advanced degree. After earning a master's degree in EE from Stanford, Corey thought he'd be in for a substantial raise; his boss offered him \$50 a month.

"I had thought it was worth \$500. I had just bought a house and needed the money so I walked across the street to Sandia [California] and applied."

That first interview didn't go so well, but, as Corey notes, Livermore was a small town back then; everybody knew everybody. Corey's basketball coach knew the Sandian who had nixed Corey's first application. The coach told the hiring manager, "You're wrong about Corey; he's very aggressive." One thing led to another and Corey got a second interview and a job offer at Sandia, where he stayed — in California and in New Mexico — for 30 years. During that time he left a permanent mark on the way Sandia manages its nuclear weapon stewardship responsibilities.

Over the course of his career, Corey served as director

## Corey Knapp: 'Conscience' of the weapons complex; working with him 'an invigorating breath of fresh air'

I had the pleasure and privilege of working with Corey Knapp for several years within the leadership of Sandia's nuclear weapons program. Corey has given nearly a third of a century of his life to preserving the nation's security through his efforts to maintain the safety, security, and reliability of our nuclear deterrent. Over that time frame he became a font of wisdom on matters pertaining to the stockpile, whose counsel was sought regularly by leaders within the weapons labs, the government, and the military.

His advice was not always easy to receive, because it often required tough decisions to be made on the part of policy makers. But it was always based upon a thorough knowledge of the situation, a large dose of prudence, and keen sense of what was right. Corey and I didn't see eye-to-eye on everything, but I always came out of our discussions much more thoroughly informed, and at times with a fundamentally changed perspective. Those of us who are close to Corey know that he is a man of deeply held moral and religious beliefs. He relies on those beliefs as the foundation for everything he does.

At a time when there seems to be a proliferation of individuals who want to parse and obfuscate everything, Corey is an invigorating breath of fresh air as someone who wants to simplify and clarify issues. As he moves into a new phase of his life, I and all who know him wish him Godspeed and look forward to his continued valued friendship — Mike Cieslak, director, Monitoring Systems and Technology Center 5700

Corey Knapp served as the conscience for Sandia, the NNSA, and the national nuclear program. His breadth of nuclear stockpile knowledge, spanning multiple technical disciplines, provided a rational, credible voice of reason in our nuclear culture.

His influence went well beyond the nation's nuclear stockpile and complex, to impact everyone who worked with him. Personally, he taught me the value of leadership with integrity through consistent application of my faith-based principles in my professional life.

Corey challenged me in my professional growth, counseling me to pursue opportunities I would have otherwise passed on. Corey is extremely insightful regarding people and their values. He taught me to first understand another's value system to communicate effectively. He had a knack for getting to the bottom line and understanding the essence of an issue.

Corey saw firsthand the need to not only prepare for and practice our technical skills, but to execute those skills in product development for the stockpile. He believed we practiced to play the game and it was time to play the game on the LEPs and ALTs. Corey's technical insight, blunt manner, and down to earth rational will be missed at Sandia, in NNSA, and within the larger nuclear community. — Doug Mangum, director, NW Product Engineering Program Center 2800

for each of the weapon systems engineering centers, both in California, and most recently, in New Mexico. In heading up the Surety Assessment and Engineering Center, Corey led Sandia's efforts to ensure that all weapons in the enduring stockpile remain safe, secure, and effective.

The nomination language for the NNSA Administrator's Silver Award states that "In particular, his leadership in matters of weapon system surety, warhead retirement and dismantlement, and the sustainment of the future stockpile are seminal contributions that have had major impact on the work of the nuclear weapons complex."

## High points, frustrations, challenges

As Corey reflects on his career, some high points stand out.

"I've been fortunate enough to be involved in many things that I consider successful, and a few that weren't," Corey says. Among the successes he cites:

- His personal role in the W62's retirement
- Leading the development of the tri-lab/NNSA surety plan
- Leading the Sandia/California team during dismantlement of many weapons types in

the 1990s

- Leading the tri-lab team that generated the principles that led to new thoughts on how to do surveillance.

"While I'm proud of these things," Corey says, "I want to make it clear that there were many people involved in all those activities. In some, I had a central and catalyzing role, at least in my mind; in some I provided some leadership while others did the work; and in a few I led a team that generated the ideas that others successfully implemented years later."

There were frustrations, too, as there are with any career that spans 30 years at one institution.

"The most frustrating thing for me has been the changes to surveillance. Thanks to efforts by many at Sandia, we were making significant progress in changing [the way we do] surveillance, making it more predictive, which would significantly enhance our annual assessment process. Unfortunately, due to budget shortfalls/allocations we were failing to realize many of the benefits in the timeframes we had initially planned for. That was very frustrating."

And along with frustrations and rewards, there have been challenges. For Corey, perhaps the biggest is one that has just begun to be a factor at the Labs.

"I consider it a huge challenge to convey to NNSA the daunting volume of work required at Sandia for the B61 LEP [Life Extension Program]."

During the course of his career in the weapons field, Corey has seen a lot of changes, many for the better, some not so much, in his view. Especially in the past few years, Corey says, he has been troubled by what he describes as a "growing bureaucracy and an upward movement" of the decision-making process.

"Over the years," he says, "I noticed that in spite of a few promotions and being much more knowledgeable about my work, the decisions I was able to make were more limited."

After 30 years on the job, Corey says he will miss the people he worked with, "the great, dedicated, intelligent (and sometimes arrogant) people at Sandia and the rest of the nuclear weapons complex."

"I really enjoyed the personal relationships. I also enjoyed the variety of work. I had the opportunity to work on many different aspects of the nuclear weapons business, so I never got bored."

## Class and grace

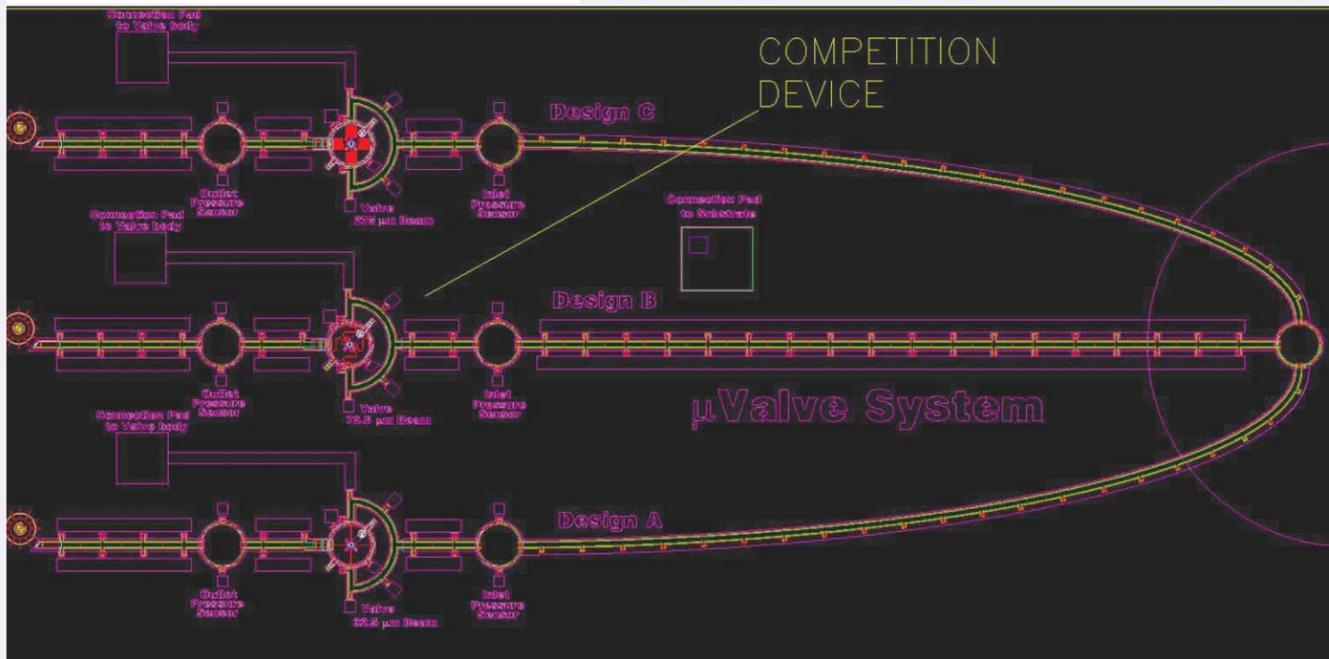
As Corey embarks on his daunting medical schedule, he dismisses any suggestion that his approach to his illness has been courageous.

"I used to think of it as courage," he says, "but now that it's me I don't think so anymore. To me courage and heroism come when you have a real choice. Cindy and I don't see doing nothing as a viable option, so I really am doing what I have to do."

"The way I think of it now is facing it with class and grace. Perhaps even being a model for others in how to deal with something like this. That's one reason I have been very open about my illness and treatment. While I was still working, I lost count of the number of people who told me that during their own medical ordeals they thought, 'This isn't near as bad as what Corey's going through, so I can do this.' I actually never agreed with them, as all their stories involved significant treatment and challenges of their own, but I was glad to be whatever little help I could."

"There is nothing private about my medical issues. I decided that God must have a purpose and some good must come out of it, and that couldn't happen if I remain silent."

# Student designers craft memorable MEMS devices



The CARNEGIE MELLON student design for a MEMS-based, electrostatically operated microvalve won in the educational category. (Image courtesy of Carnegie Mellon University)

(Continued from page 1)

by student contestants.

Other institutions competing this year included the universities of Oklahoma and Utah, and the Air Force Institute of Technology. Students representing each submission presented their designs at the awards ceremony.

## New design possibilities

The dragonfly opens new possibilities in the design of aerial surveillance devices. These currently have many uses, from quantifying the radiation leaking from damaged Japanese nuclear reactors to delineating enemy positions. Current state-of-the-art micro air machines have components in the centimeter range (from 15 cm to slightly less than 1 cm). The insect-inspired device is smaller, with biologically mimetic wings approximately 0.5 millimeters long and 0.1 mm wide. It is intended to generate aerodynamic lift and thrust by flapping its wings rather than by a motor-driven propeller or jet thrust. Flapping is achieved when small intermittent electric currents cause thermal expansion and contraction in the wings. Clever engineering uses this material's response to make the wing strokes more aerodynamic and hence more efficient.

"Among the countless insect species able to fly, we chose the dragonfly because it flaps its wings in the vertical direction, rather than back-and-forth or in a rotary motion," said Texas Tech student Sahil Oak. "The vertical motion of the large wings in our design not only provide greater surface area for lift than most flying insects but cool faster, enabling faster flapping."

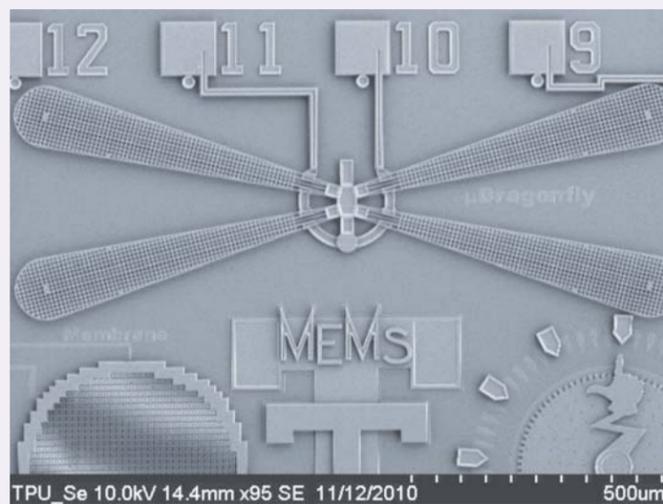
The work was supervised by TTU faculty advisor Tim Dallas.

Valves are the largely underappreciated method by which advanced technical societies control the flow of fluids. Commonly, their motions are screw-based like a shower stall, water sink, or garden hose bib, or they are switch-based, using ball-and-flapper valves like most toilets, heart valve prostheses, and inkjet printers. The winning project from Carnegie Mellon involved a micro switch-based valve that makes possible very fine control over tiny amounts of liquid flow. This valve requires only picojoules of energy to switch its state. The test

**T**he entire contest process takes almost nine months. It starts with students developing ideas for a device, followed by creation of an accurate computer model of a design that might work, analysis of the design and, finally, design submission. Sandia's MEMS experts and university professors review the design and determine the winners.

module the students designed will help determine characteristics that would create the most efficient and lowest leakage microvalves, and ultimately may help facilitate tiny flow-through experiments. These are increasingly common in biological research laboratories and in medical facilities attempting rapid analysis of a patient's medical state from tiny fluid samples.

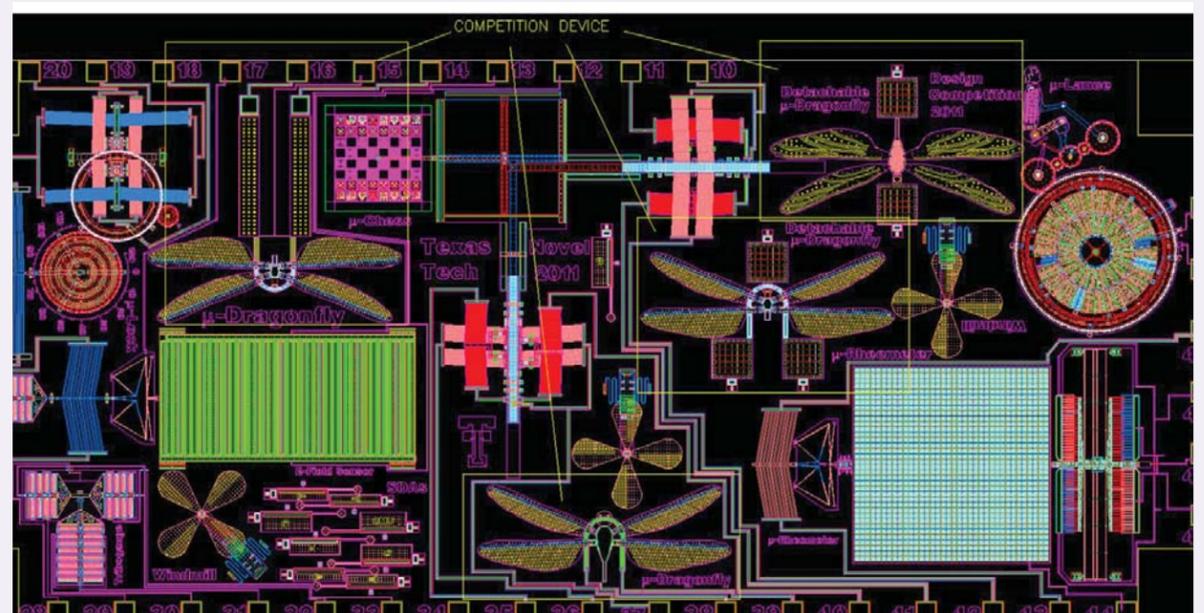
"One of the most common types of microvalves is



SCANNING ELECTRON MICROSCOPE image of Texas Tech student-designed micro-dragonfly. (Image courtesy of Texas Tech University)

electrostatically operated, which is the model for our design," says Carnegie Mellon student research lead Vitali Brand. "The best microvalves are useful in certain fuel cell designs and in microengines because they can close or open in less than one-thousandth of a second and function against heavy pressures without leaking."

CMU professorial oversight was provided by Maarten de Boer.



TEXAS TECH STUDENTS won in the novel design category for their MEMS-based dragonfly design. (Image courtesy of Texas Tech University)

The student contest, open to institutional members of the Sandia-led MEMS University Alliance program, provides an arena for the nation's student engineers to hone their skills in designing and using microdevices. Such devices are used to probe biological cells, arrange and operate components of telecommunications and high-tech machinery, operate many home devices, and strengthen national security.

## Process takes months

The MEMS University Alliance is part of Sandia's outreach to universities to improve engineering education. It is open to any US institution of higher learning, and most recently has extended an invitation to select Mexican universities to help that country develop its technological base.

The alliance provides classroom teaching materials and licenses for Sandia's special SUMMIT V design tools at a reasonable cost. This makes it possible for a university without its own fabrication facilities to develop a curriculum in MEMS. The design competition is an

increasing activity within the University Alliance, which now has more than 20 members.

The entire contest process takes almost nine months. It starts with students developing ideas for a device, followed by creation of an accurate computer model of a design that might work, analysis of the design and, finally, design submission. Sandia's MEMS experts and university professors review the design and determine the winners.

Sandia's state-of-the-art MESA fabrication facility then creates parts for each of the entrants. The design competition capitalizes on Sandia's confidence in achieving first-pass fabrication success, which restricts the entire process to a reasonable student timeframe.

Fabricated parts are shipped back to the university students for lengthy tests to determine whether the final product matches the purpose of the original computer simulation.

The University Alliance coordinates with the Sandia-led National Institute for Nano Engineering (NINE), providing additional opportunities for students to self-direct their engineering education, and the Sandia/Los Alamos Center for Integrated Nanotechnologies (CINT), a DOE Office of Science center with the most up-to-date nanotechnology tools.

Travel by 26 students and five professors to the awards ceremony was made possible by grants from SPIE (<http://spie.org/>).

The Sandia student presentations were hosted by Tom Zipperian (1740), group manager of MESA microfabrication, and Keith Ortiz, manager of MEMS Technologies (1749).

For more information regarding the University Alliance and the design competition, contact Stephanie Johnson at [srjohns@sandia.gov](mailto:srjohns@sandia.gov).

Images and white papers describing the winning designs can be found on the web at <http://mems.sandia.gov/vaa/contest.html>.

# Mileposts

New Mexico photos by Michelle Fleming



Paul Mix  
40 1656



Kenneth Reil  
35 1384



Lucille Forster  
30 9513



Carmela Gallegos  
30 10653



Daniel Lucero  
30 1532



Pat Smith  
30 9000



Edwin Duckett  
25 2625



Eden Eager  
25 2952



David Sawayda  
25 2956



Mark V. Smith  
25 5946



Ricardo De La Rosa  
20 4843



John Matthews  
20 5348

# Sandia projects win three prestigious 2011 EStar Awards

(Continued from page 1)



Linda Sparling  
20 5403



Calvin King  
15 5713



Julio Marchiondo  
15 1734



Tedd Rohwer  
15 5350

water reductions. Based on data from comprehensive building audits, Sandia staff are implementing a variety of cost-effective initiatives to meet sustainability goals. The initiative aims to meet the guiding principles in 15 percent of Sandia buildings by 2015; prioritize the top 75 percent of energy-consuming buildings for auditing over four years; and prioritize and fund energy- and water-saving opportunities.

**Notable accomplishments in the HPSB arena to date include:**

- Certification of six LEED® (Leadership in Environmental and Energy Design) buildings for new construction and one certification for existing building operation and maintenance
- LEED gold certification for the Ion Beam Laboratory

**Major strides in energy conservation include:**

- Implementation of large-scale “free cooling,” using evaporative cooling from a cooling tower when conditions permit
- Completion of the Heating Systems Modernization project, which replaced the Bldg. 605 steam plant with more than 100 energy-efficient hot water boilers
- Installation of a sophisticated lighting-control system
- Retrofits and replacements of chillers
- Deployment of Nightwatchman, a site-wide computer power-management system that has the potential of reducing desktop computer energy use by more than 93 percent

Point of contact for this award is Chris Evans, Facilities Management and Operations Center (FMOC) Dept. 4853 Resource Conservation lead.

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The Water Consumption Reduction award highlights Sandia’s continuing success in water conservation, including, notably, a 30 percent reduction in use since

2007, with the biggest savings coming from the biggest users, cooling and ultra-pure water. Based on these results, three successful systems have been installed: a high-efficiency reverse osmosis (HERO) system; a deionized water recycling system; and a system that reclaims water for cooling towers.

Additional water-conservation projects include deployment of the “Green Machine” for nonchemical water treatment; computer-controlled irrigation; flow meters on irrigation lines; meters on the Dolphin water-treatment unit; cisterns and rainwater harvesting; retrofits of restroom fixtures; and more.

Point of contact for this award is Dept. 4821 Manager Israel Martinez.

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The High-Performance Computing Water Reduction and Energy-Efficient Cooling award represents the successful collaboration between the Facilities Management Operations Center and a line organization.

Center 9300 built the Red Sky supercomputer in response to the nation’s critical need for high-performance computing (HPC). Beyond raw horsepower, a goal was set for Red Sky to maximize its eco-efficiency by using cutting-edge technological innovations. The system uses a newly designed power-distributing system that significantly reduces power leakage and a unique cooling system that is more than 95 percent efficient in cooling the system’s numerous computer racks.

The Red Sky project was a unique collaboration between the Computer System Design and Implementation team and the Corporate Computing Facilities Infrastructure team, the latter being instrumental in the vendor-selection process and teaming with Oracle/Sun. Project results have set a precedent for other HPC efforts by achieving notable results:

- Marks the first HPC procurement specification to require energy efficiency
- Requires 1/6th power usage per flop compared to its predecessor system
- Realizes more processing capability per space used
- Demands 40 percent less water use, resulting in 5 million gallons saved annually
- Represents a 10-fold increase in cooling efficiency
- Uses the first-ever, rack-mounted refrigerant-based passive cooling system, removing 90 percent of heat load
- Occupies a carbon footprint 25 percent smaller than its predecessor system

Point of contact for the award is Facilities technologist David Martinez (9324).

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The EStar award ceremony will be held in conjunction with the Federal Energy and Water Management awards ceremony on October 12 at the Forrestal Main Auditorium with a reception at the Omni Shoreham Hotel in Washington, D.C.

## Using old ties to build new alliances



Neal Shinn (1130), right, senior manager for Energy Sciences, discusses some of Sandia’s nanotechnology work while giving a tour of Sandia’s Center for Integrated Nanotechnology to a group led by Les Shephard, former VP of Sandia’s Energy, Security, and Defense Technologies Div. 6000. The group, hosted by Rick Stulen, VP of Energy, Climate, Infrastructure, and Security Div. 8000, included members of the San Antonio community who visited Sandia to explore plausible clean technology partnerships between Sandia and the University of Texas at San Antonio (UTSA). The visitors included, left to right, Wayne Alexander, chair of the Port of San Antonio and former president of Southwestern Bell, Mike Burke, chairman and founder of San Antonio Clean Technology Forum, Tracy Idell Hamilton, energy reporter for the *San Antonio Express-News*, and Robert Rivard, editor and managing director of *San Antonio Express-News*. The group toured the Center for Integrated Nanotechnology, the National Solar Thermal Test Facility, and MESA, and participated in talks on solid-state lighting, solar glitter, and energy security microgrids. Les retired from Sandia last year to become director of the Texas Sustainable Energy Research Institute at UTSA. (Photo by Randy Montoya)

# Edward Sandoval has had several careers and worn many hats

By Iris Aboytes

He opens my office door every morning. “Good morning *mi hijita* (my little one). How are you?” He is Edward Sandoval (4848), our custodian. To the residents of Bldg. 811, Edward is not just our custodian, he is our friend.

Edward began cleaning our building about six months ago. In some ways it seems like we have all known him for a longer period of time. Through our interactions we have discovered that Edward has worn many hats.

He is a retired US Army command sergeant major. He was in the military for a total of 24 years. He served one tour and then went to school and earned his degree. He taught school for a year-and-a-half until he says, “Uncle Sam made me an offer I couldn’t refuse.” So he went back in, this time for 21 years.

During his first hitch, he was in Vietnam for a year. He was part of the 101st Airborne Division that fought at Hamburger Hill, and earned the Bronze Star, the Vietnam Cross of Gallantry, the Meritorious Service medal, as well as many other honors.

“The picture I’m holding (see image at right) is from 1968 during my service in Vietnam,” Edward says. “We would come in to base camp from the zones about every three weeks to shower. Our unit made a comrade pact where pictures were taken. That way, if anyone in the pact was killed in action a photo would be sent to the loved ones signed by the survivors.”

The second time in, Edward was stationed in Germany, where he participated in numerous joint service exercises and campaigns. Part of Edward’s military career was spent in military intelligence, which he found exciting and very rewarding.

“I cherish my war experiences,” Edward says. “They reinforced in me the value of life, regardless of beliefs or backgrounds. Life truly is one of our greatest values.”

After retiring from the military, Edward went to work in human resources (HR), first at Horizon, then for the state of New Mexico, for a total of 15 years. As an HR admin-



EDWARD SANDOVAL looks for the names of his buddies he served with who did not return from battle during the Vietnam War. The New Mexico-shaped monument contains the names of the 399 military personnel who never returned home. The monument is part of the New Mexico Veterans Memorial. (Photo by Randy Montoya)

istrator, one of Edward’s priorities and his most rewarding experience was assisting others in enhancing their careers.

“As a senior noncommissioned officer in the Army and as an HR administrator, I was asked many times how is it that your employees are always eager to do what you ask,” Edward says. “I simply replied, ‘I treat them all with respect, dignity, and impartiality.’”

Edward has already worked more than 40 years and he is still working. Why?

“I am a diabetic,” he says. “I need to keep active to stay healthy, and I like the people here.” In addition to being a diabetic, Edward suffers from oculopharyngeal muscular dystrophy (OPMD), which is characterized by droopy eyelids and trouble swallowing. He also has diffuse idiopathic skeletal hyperostosis (DISH), a form of degenerative arthritis.

“It is not a big deal,” Edward says. “One of these days I will have an eyelid lift, and I take pain pills for the rest.”

“I subscribe to a very basic philosophy whether writing HR policies and regulations or being a custodian: Take pride in your work and do it well.”

Edward has been a volunteer teaching immigrants English as a second language. “I find it very rewarding,” he says. He plans to continue that when he retires. He also hopes to volunteer at the Veterans Administration hospital when the time comes.

He had planned on retiring at the end of his last career but, got bored quickly and decided to do something different. When I tell him it is *really* different, he just laughs and says he has bathroom detail.

His wife, Victoria, is also still working. She is a nanny. “We are going to retire at around the same time,” he says.

When his thoughts take him to a future retirement, he says he is going to do carpentry. “I love to work on houses,” he says. “During my transition from job to job, I managed to get on construction crews.”

“I built the addition to our home,” he says. “I can hardly wait to work with my hands and create. I certainly won’t be waking up at four in the morning.”

But for now that has to wait. . . he has another building to clean.

## Why is the Eubank gate closed? Why wasn’t I told?



US AIR FORCE Senior Airman Lanier checks identification prior to allowing the driver to proceed onto Kirtland. (Photo by Randy Montoya)

By Iris Aboytes

It was Tuesday afternoon about 4:20 p.m. and many Kirtland Air Force Base residents were headed home. It wasn’t bad enough that the air was filled with smoke from the Arizona fires, but the Eubank gate was closed.

What an inconvenience. Why does the base always seem to close the gates when it is time to go home? Frustration and questions filled peoples’ minds. Why weren’t we told? How

long are we going to be here?

According to Lt. Col. Jason Beers, 377th Security Forces Squadron commander, there was a security incident at the Eubank Gate when an individual failed to stop for the entry controller. As a result, this forced activation of the barrier system on both the inbound and outbound lanes. It was not a planned exercise.

Sandia’s Emergency Operations Center (EOC) received notification from the base command post that there was a

medical incident at the Eubank Gate. As it turns out, the base fire department was working multiple incidents, so they were slammed. The other incident had to do with an American Airlines airplane at the airport.

“We tried to contact the Kirtland Air Force Base Fire Department, hoping to get more information,” says Lita Suina of Sandia’s Emergency Operations Center, Dept. 4136. “We wanted to find out how long it would take. We were overwhelmed with calls.”

Often, the EOC receives notification from Kirtland that a gate is closed with no further explanation as to why or the expected duration of the closure.

“A notice went to Sandians and was posted on TechWeb,” Lita says. “Unfortunately, because of staggered work schedules, many Sandians were caught in traffic. This could not be helped; it was a true incident.”

Bob Brown from Sandia’s Pro Force Dept. 4211 says Kirtland requested assistance from Sandia’s Pro Force to help evacuate people through Sandia’s Contractor Gate. “This is not done very often,” Bob says, “but this was an emergency.”

“Situations like what happened Tuesday, when we activated the barrier system, will impact traffic flow on base,” Colonel Beers says. “Additionally, when certain alarms go off inside the base, it mandates closure of base gates. This is a required procedure to ensure the security of all base assets, to include those on Sandia proper. We work as quickly as possible to resolve the incidents and minimize disruption to all Kirtland personnel and mission operations.”

“Many people were inconvenienced on Tuesday, as they are when the gates are closed,” Michael Knazovich (4137) says, “but we all need to remember we are co-located on an Air Force base. That comes with more benefits than drawbacks. The base’s response to this emergency was just a reassurance of that.”