

Answering the nation's call: Sandia part of team assessing aftermath of Hurricane Katrina

NISAC looks at industrial and economic consequences of infrastructure destruction regardless of cause

By Michael Padilla

What began as Sandia helping with computer simulations to determine the potential impact of Hurricane Katrina on infrastructures has turned into a series of nearly daily analyses of one of the nation's worst natural disasters.

A team from Sandia and Los Alamos national laboratories is looking at Katrina's long-range implications on infrastructure, including energy, telecommunications, agriculture, and the chemical industry.

Consisting of scientists, engineers, and economists, the group is part of the National Infrastructure Simulation and Analysis Center (NISAC), organized by the Department of Homeland Security.

NISAC began its work on the Saturday prior to Katrina hitting the Gulf Coast region. Sandia's main goal is to look at flooding and infrastructure failures; LANL focuses on electricity systems.

"We help determine the long-range industrial consequences regardless of the cause," says Kevin Stamber (6226), a NISAC member.

The idea is to use the models to warn officials of potential problems before they happen. The team often has less than one day from the time they are notified by DOE or DHS to generate reports concerning an event's potential

(Continued on page 5)



FAMILY MATTERS — Karla Causey (second from left) and her husband Garry took in their niece and two nephews from New Orleans after Katrina devastated their home. The children, two of them seen here along with Karla's son Jared, on their way to their new school in Albuquerque, will be reunited soon with their parents, Garry's twin brother Karry and Karry's wife Deanna. Karry has been temporarily relocated to Orlando, Fla., by his employer, Southwest Airlines. More about Karla and her family on page 5. (Photo by Randy Montoya)

Sandia LabNews

Vol. 57, No. 19

September 16, 2005

Managed by Lockheed Martin for the National Nuclear Security Administration



Getting to work a real pain in the (\$3) gas Alternatives to one-car-one-driver paradigm looking better and better

By Bill Murphy

All of a sudden, that Sandia car pool option doesn't sound half-bad. And the thought of riding a city bus to work? Bicycling? Walking? *Walking?!?* Bring 'em on.

As the price of gasoline gushes over \$3 a gallon — with some analysts warning that \$4 gas isn't out of the question — Linda Stefoin, Sandia's alternative commuting maven, is probably entitled to feel just a bit of vindication, a tad of "I told you so."

For years, Linda has been trying to coax, cajole, encourage, and inveigle Sandians into considering alternatives to the one-person-one-automobile model of getting to work.

Now, Linda and her colleague Debbie Moore (both 3330) are handling a new torrent of requests from Sandians about their commuting options (see "Options abound for getting to work" on page 4).

Debbie, at 844-RIDE, will help match you up with car pool partners, help you (if you need it)

parse the city bus schedule to determine your best options, and otherwise point you in the direction of the resources and information you need to get to work alternatively. And oh . . . Sandia's SERP

office (844-4237) will sell you bus passes — monthly bus passes — for \$20. At that price, and with bus tickets normally selling for \$1 each way, you only have to ride 10 times a month to break even. Every additional ride that month is, effectively, free.

Over the years, Linda notes, Sandia has earned a reputation as one of Albuquerque's most commuter-friendly employers. The Labs' ongoing initiative to encourage alternative commuting has been held up by the City of Albuquerque as a model for other employers to follow.

With some 1,000 people registered for car-pooling (they get special parking privileges), and with perhaps 160 daily bus riders, 75 to 100 regular bicyclists, 60 van-poolers (traveling from outlying areas such as Belen and Moriarty)

(Continued on page 4)



100 regular bicyclists, 60 van-poolers (traveling from outlying areas such as Belen and Moriarty)

Operational excellence



Labs President and Director Tom Hunter does an ES&H walkthrough of the MESA construction project. More Bill Doty photos on page 7.

Labs project advances next-generation secure wireless networks

Encrypted Ultra Wideband helps protect soldiers, weapon systems

By Michael Padilla

A new secure wireless network can soon be used to help monitor soldiers in the field and help protect US Air Force bases and DOE nuclear facilities.

Matured from work over the last decade, Ultra Wideband (UWB) has recently surfaced upon the radar screen of wireless technologies.

"Although the first certified product appeared in 2002, UWB is becoming an important player with wireless security and other applications," says Timothy Cooley (6428), principal investigator of the project. "The role of Sandia has been to spearhead and accelerate the development of UWB for secure wireless communication networks used for sensor networks and for wireless

(Continued on page 4)



Sandia-developed iDEP device may revolutionize bio sample prep. Story on page 3.



Sandia 401(k) Savings Plans — A fresh look, and some changes. The Benefits Dept. explains. Story on page 6.



Sandia and Lockheed Martin support Hispanic Cultural Center education programs. Story on page 12.

What's what

It sometimes seems that pretty soon, every square inch of Sandia/New Mexico's Tech Area 1 will be covered with buildings, walkways between buildings, building construction sites, or fenced areas connecting all these. One result is that parking is becoming problematic.

Aggravating the hunt for a space is our affinity for bigger and bigger vehicles – SUVs, kingcab/longbed pickups, custom conversion vans, etc. And navigating between rows of these supersized chariots is often complicated by vehicles whose drivers seem to have just turned into a slot and stopped – sometimes three or four feet short of the bumper and maybe a little askew.

When you're on the verge of being late to work and already stressed by a seemingly hopeless search for a parking place, having to bob and weave your way through row after row of vehicles is not the way to start the day.

So, save a colleague from a before-work meltdown: Drive all the way to the bumper – especially if you're parking one of the big ones.

* * * * *

Remember the rhyme you learned in one of those low-number grammar school grades, about the number of days in each month?

*Thirty days hath September,
April, June, and November;
February has twenty-eight alone,
All the rest have thirty-one,
Excepting leap year, that's the time
When February's days are twenty-nine.*

Well, one of those California Sandians is pulling a fast one on the rest of us. At least, after reading a note from Dennis Miller, it looks that way.

Dennis, a contractor in CSU Special Projects (4341), used to work in Videoconferencing (8947), whose main office is in Livermore. As a result of that connection, his current group (in Albuquerque) got some 2005 wall calendars that say "Sandia National Laboratories | California" across the top.

"I noticed on Wednesday, Aug. 31, that the calendar did not have such a day/date," he e-mailed recently. "It did, however, have both Tuesday, Aug. 30, and Thursday, Sept. 1. So I wonder if we'll get paid for that missing day (please don't tell management that I worked without first raising this question). . . ."

"Hopefully some printing company is responsible for this *faux pas*," he went on. "If it was the fault of somebody at Sandia, perhaps we should not be in the calendar business."

* * * * *

A reminder that if you haven't done any business with a cyber financial transaction place or a bank that's not yours, you should just deep-six e-mail from either asking you to update your account information. Scammers seem to be rolling out new waves of messages from those – and other bogus business "deals."

And if we're getting those, it probably won't be long before that Nigerian guy who wants to give all of us a ga-zillion dollars for helping him out with a trifling little problem that, oh, say, a couple of thousand dollars from you could lay to rest.

Remember the notion that "the more things change, the more they stay the same?" Just think of these ethereal "folks" as the medicine show hucksters of the cyber age, and don't buy the tonic.

– Howard Kercheval (844-7842, MS 0165, hckerch@sandia.gov)

UT names Watson to oversee peer reviews of Sandia research

The University of Texas System has appointed David A. Watson to develop and oversee an independent peer review system for Sandia's research foundations activities.



DAVID A. WATSON

Watson was named to UT's newly created position of associate vice chancellor for research.

A strategic partnership between the 15-campus UT System and Sandia was announced

in February (*Lab News*, Feb. 18). The UT System's five-year agreement with Sandia will encompass peer reviews of the effectiveness of unclassified research at Sandia. As part of this activity, the UT System is opening a new office in Albuquerque.

"It's good for both institutions and establishes processes for continuous improvement," says Rick Stulen (1000), Sandia VP for Science and Technology and Research Foundations. "Sandia will get feedback and communication from the best academic scientists in the country; scientific reviewers will be exposed to significant discoveries that are going on at Sandia."

"Sandia will get feedback and communication from the best academic scientists in the country."

Rick Stulen

Watson is currently program manager for the National Space Biomedical Research Institute (NSBRI) Peer Review Services, InDyne, Inc., and an adjunct professor at the University of Texas Medical Branch at Galveston. He was to assume his new position in Albuquerque on Monday (Sept. 12).

In announcing the appointment, Robert E. Barnhill, UT System vice chancellor for research and technology transfer, said the independent peer review process will take advantage of the complementary nature of the UT System and Sandia technical, scientific, and research competencies.

"Dr. Watson has many years' experience in conducting external peer reviews at NSBRI," said Barnhill. "We are very fortunate to be able to hire someone with his capability, breadth, intellect, and experience."

Under the agreement, the UT System is to create a robust, consistent peer review process to provide an objective analysis for work conducted in the science, technology, and engineering foundations at Sandia. The agreement is also expected to serve as a model for future collaborations between academic institutions and national laboratories.

Employee deaths

Stephanie Ketring of Communications Technology Dept. 6957 died September 10. She was 51 years old.

Stephanie had been at Sandia for two years. She is survived by her daughters Kyssandra, 17, and Kylene, 14.

Carl E. Lippitt of Computer Software Research and Development Dept. 6641 died August 31 when his heart stopped while riding his bicycle home from work.

He was 48 years old. Carl had been with Sandia for nearly three years.

He is survived his wife Dianne, daughters Casey and Caitlyn, and son Christopher.

Chris Mehring of Vehicle and Equipment Maintenance Dept. 10265-1 died September 8. He was 47 years old.

He had been at Sandia for over four years. Chris is survived by his wife Renee, daughters Adrianna Chavez and Alyssa Mehring, and his son Raymond Sigala.

Sandia LabNews

Sandia National Laboratories

<http://www.sandia.gov/LabNews>

Albuquerque, New Mexico 87185-0165
Livermore, California 94550-0969
Tonopah, Nevada • Nevada Test Site • Amarillo, Texas •
Carlsbad, New Mexico • Washington, D.C.

Sandia National Laboratories is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin company, for the US Department of Energy's National Nuclear Security Administration.

Ken Frazier, Editor 505/844-6210
Bill Murphy, Writer 505/845-0845
Chris Burroughs, Writer 505/844-0948
Randy Montoya, Photographer 505/844-5605
Nancy Garcia, California site contact 925/294-2932

Contributors: Janet Carpenter (844-7841), John German (844-5199), Neal Singer (845-7078), Larry Perrine (845-8511), Howard Kercheval (columnist, 844-7842), Will Keener (844-1690), Iris Aboytes (844-2282), Michael Padilla (284-5325), Rod Geer (844-6601), Michael Lanigan (844-2297), and Michelle Fleming (Ads, Milepost photos, 844-4902). Erin Gardner (intern, 284-8432). Dept. 3651 Manager: Chris Miller (844-0587).

Lab News fax 505/844-0645
Classified ads 505/844-4902

Published on alternate Fridays by Media Relations and Communications Dept. 3651, MS 0165



Lab News Reader Service

The *Sandia Lab News* is distributed in-house to all Sandia employees and on-site contractors and mailed to all Sandia retirees. It is also mailed to individuals in industry, government, academia, nonprofit organizations, media, and private life who request it.

* * *

Retirees (only):

To notify of changes in address, contact Carol Wade, Benefits Dept. 3332, at 505-845-9705, e-mail cawade@sandia.gov, or Mail Stop 1021, Sandia National Laboratories, Albuquerque, NM 87185-1021.

Others:

To receive the *Lab News* or to change the address (except retirees), contact Michelle Fleming, Media Relations and Communications Dept. 3651, 505-844-4902, e-mail meflemi@sandia.gov, or Mail Stop 0165, Sandia National Laboratories, Albuquerque, NM 87185-0165.

Employees:

To change the number of copies of the *Lab News* your Mail Stop is receiving please call Honario Anaya, Mail Services Team 10268-4, at 844-3796. At Sandia/California contact the Mail Room at 294-2427.

Web Users:

The *Lab News* is on the Web at www.sandia.gov/LabNews.

Sandia's device may revolutionize bio sample prep

iDEP quickly concentrates live pathogenic bacteria for speedier analysis

By Mike Janes

Sandia/California researchers have developed an enhancement to a well-known "force phenomenon" called dielectrophoresis that they say could revolutionize the way biological sample preparation is conducted. Sandia is actively seeking commercial partners to help bring the technology to the marketplace.

Known as an insulator-based dielectrophoretic device (iDEP), the new tool selectively — and very quickly — concentrates live pathogenic bacteria within large water samples. The technology development was internally funded through the Laboratory Directed Research and Development program.

iDEP can deliver detectable amounts of material in small sample volumes, eliminating any need for overnight culturing and significantly speeding up water analysis.

In addition to water analysis, the technology may have applications beneficial to other industries. "Medical diagnostics applications might include enabling detection of diseases that produce anomalous cell morphology, such as cancer, sickle cell anemia, and leukemia," says Carrie Burchard (8529), who

Sandia California News

handles business development opportunities. "In laboratories, iDEP could contribute to differential sorting of live and dead cells in cell culturing, and allow for protein isolation and concentration, sample concentration and focusing, analytical chemistry, and mass spectrometry for proteomics and drug discovery," she said.

iDEP also could enable verification of biological decontamination efficacy for viable cell populations — as contrasted to inactivated cells and denatured proteins. For homeland security and public health purposes, it could improve water analysis and spore and vegetative cell differentiation. In industrial settings, iDEP could separate nanoparticles and nanotubes for materials synthesis.

Commercialization opportunities

Sandia scientists are actively developing application-specific iDEP devices and architectures for concentrating and separating bacteria, spores, viruses, and other particles.

Commercial partners could help further develop the technology for a variety of applications:

- To differentiate between live and dead cells for cell culturing
- To analyze water purity for public utilities and public health agencies
- To concentrate and focus samples for proteomics research, drug discovery, homeland security, and public health
- To verify the efficacy of biological decontamination
- To sort anomalous cells to diagnose diseases such as cancer, sickle cell anemia, and leukemia
- To sort nanoparticles and nanotubes for materials synthesis applications and industry.



BLAKE SIMMONS prepares the iDEP polymer microfluidic device for use as a particle concentrator. iDEP can deliver detectable amounts of material in small sample volumes, eliminating any need for overnight culturing and significantly speeding up overall water analysis. (Photos by Bud Pelletier)

iDEP: How it works . . . and its already-demonstrated capabilities

How iDEP works

First reported in 1951, dielectrophoresis is the movement of particles toward concentrated electric fields. The magnitude and direction of this motion depends on the size and shape of the particle as well as on the difference in conductivity between the particle and the suspending fluid. Thus, cell types can be sorted dielectrophoretically on the basis of shape and size, and dead cells separated from live on the basis of their higher conductivity.

Conventional dielectrophoretic sorters place electrodes within a sampling device and use the nonuniform electric field adjacent to electrodes to provoke dielectrophoretic motion of cells. Unfortunately, these electrodes require costly microfabrication, produce bubbles and electrolysis products that can harm device operation, and can damage cells with their strong field gradients.

In contrast, iDEP places electrodes outside the device. Current from the electrodes conducts through the particle-bearing liquid into the device where patterned walls or insulating obstacles produce the required nonuniform electric field. This arrangement eliminates many of the disadvantages of conventional devices: insulating structures can be replicated economically, produce no electrolytic effect, and can be contoured to be gentle on cells.



ERIC CUMMINGS visually inspects an iDEP device for proper alignment before evaluating it with a fluorescent microscope. Among other potential applications, iDEP may allow for protein isolation and concentration, sample concentration and focusing, analytical chemistry, and mass spectrometry for proteomics and drug discovery.

Demonstrated capabilities

iDEP devices have demonstrated the ability to perform the following functions:

- Discriminate and separate live and dead cells
- Differentiate vegetative and sporulated cells
- Differentiate cell types
- Selectively concentrate to solid density a variety of particles, including cells, spores, viruses, proteins, and inert substances
- Operate in continuous and batch mode
- Concentrate particles by 104x

In addition, Sandia researchers have demonstrated a wide range of device architectures that support the following:

- Processing of nanoliter- to liter-scale samples
- Manufacturing with a host substrate of any insulating and impermeable material, such as glass, silica, plastic, or ceramic
- Easy and cost-effective replication through injection molding and hot embossing

Wireless communications

(Continued from page 1)

controlled operated weapons systems.”

Sandia's task was to develop an “ultra-secure wireless network communication,” says Timothy. A highly secure wireless communication was defined to be a highly secure physical layer such as that offered by UWB that is combined with highly encrypted data.

This secure form of wireless communication leverages UWB with the unyielding encryption protection of the Advanced Encryption Standard (AES) to form UWB/AES.

UWB transmits a flood of ultra-short microwave pulses of energy on the order of 100 picoseconds (one picosecond is one-millionth of one-millionth or 10^{-12} second) in duration that extend over an extremely wide band covering several gigahertz of frequency.

“With the spreading of impulse energy over such wide frequency spectrum, the signal power falls near or within the noise floor, making these signals extremely difficult to detect, intercept, or jam, and when combined with AES, virtually impossible to crack,” he says. “Utilizing the immense available spectrum of UWB also improves wireless performance to accommodate the increased data rate needed by advanced sensors.”

Impulse technology

UWB — often called fast frequency chirp, super wideband, carrierless, or impulse radio — is unique since its classical form is non-carrier based communication and the FCC has allotted it a very wide frequency spectrum ranging from 3.1 to 10.6 GHz or 7.5 GHz, he says.

“While UWB impulse provides a new form of wireless communication, its impulse signal can also be used for radar,” says Timothy.

According to Timothy, the new wireless technology promises to be a gateway for a new generation of advanced sensors created by fusing UWB communication with UWB radar. The new technology can be used to detect intrusion of adversaries or insurgents for the protection of tactical forces and forward bases such as those deployed in the Middle East or Iraq. He says this technology is of particular value to the US Air Force Electronic Systems Center (ESC), whose mission is to provide the latest in command, control, and information systems for the Air Force. The ESC sponsored the work, he says.

UWB wireless communication can help soldiers in the field where stealth operation and covert technology are crucial.

Any RF detection by an adversary can target critical operating positions, jeopardizing assets and forces. UWB can offer lower probability of detection and interception “This lowers the risk posed by enemies or combat adversaries from detecting our positions and from jamming our vital wireless communication,” he says.

An advanced form of UWB wireless network located on each soldier can send his state-of-health information — heart rate, respiration, and a biometric identifier to distinguish the soldier from a foe.

“This helps eliminate accidental death from fratricide,” he says. “GPS can be also combined to provide his location at all times as well.”

Other advantages are in size, weight, and battery life.

UWB transceivers can be small and use less power for longer operation and greater battery life in the field.

At this point the current UWB technology is too large and expensive for troops, but progress to miniaturize and reduce costs is expected within the next five years. The cost could fall from \$10 to \$100 per soldier when mass-produced.

Tests

Based upon tests conducted at the KoolSpan Encryption Laboratory in Santa Clara, Calif., earlier this year, Sandia with KoolSpan Inc. demonstrated a wireless UWB network bridge with real-time 256-bit AES encryption for live-streaming video images generated from a surveillance camera or thermal imager. The tests used only microwatts of transmitted power, approximately 1,000 times less power than typically used by conventional wireless IEEE 802.11b or Wi-Fi. Timothy says research on the technology will continue and will eventually be used to help secure DOE labs.



TIM COOLEY is helping perfect next-gen wireless communications. (Photo by Randy Montoya)

Commuting

(Continued from page 1)

and even a few daily walkers, Linda says, Sandia already has the infrastructure and cultural mindset in place for a really effective, consequential alternative commuting effort.

Linda says the numbers are pretty good, but come nowhere near tapping the Labs' full potential. Linda's coaxing and cajoling — with no small support over the years from Sandia's Benefits organization — got the Labs this far; \$3+ gasoline will push the effort to the next level.

Speaking of \$3-per-gallon gasoline, that seems to be one of those magic numbers, like the sound barrier, the 4-minute mile, or the five-cent

cigar. Linda recalls that when she was trying to gin up some interest in commuting alternatives a few years ago, she surveyed Sandians. The key question was, “What would it take to get you to consider alternative commuting?” And the answer was “\$3-per-gallon gasoline.” Says Linda: “One guy even said, ‘When gas hits \$3 a gallon, I'm selling my car.’”

Linda is nothing if not a pragmatist; she knows that not everyone will embrace commuting alternatives. And she knows that the alternatives aren't for everyone. But she has something of the dreamer in her, as well. “I'd like to see 50 percent of Labs employees make an honest-to-goodness commitment to do at least some of their commuting via alternative commuting. That would make a huge difference.

“The issues are really compelling right

now,” she says. “The cost of gas is getting all the headlines, but as the cost of gas goes up, the cost of everything else will go up as well. Everything is going to cost more, and alternative commuting is one place where you may be able to save some real money. Also, here at Sandia, parking is a giant concern, and it's not going to get any better for a couple of years, probably. Emissions. Air quality. Those are issues that always become more urgent — and evident — in the winter. There are just a lot of very, very good reasons to get on the bus or the bike or in that carpool right now.”

So call it enlightened self-interest. Call it expensive gasoline. Call it “I got them eight miles per gallon, why'd I buy that SUV” blues. Call it what you will. But call: 844-RIDE.

Options abound for getting to work

Sandia encourages and supports a range of commuting alternatives that can save money, help the environment, ease the parking situation at the Labs, and even give you exercise. Options also include car pool, van pool, public transportation, biking, and walking.

If you need help determining which alternative is best for you, call Debbie Moore at 844-RIDE. She'll evaluate your individual situation and provide you with the information you need.

Car Pool

Car pool parking, in designated spaces, is available to employees who register annually with the Benefits Department.

Current car pool placards must be displayed. If you have a car pool partner, you may call 844-RIDE for a car pool parking application and rules. To find a car pool partner, call 844-RIDE and request a Rideshare form. After the form has been filled out and returned to MS 1021, the City of Albuquerque will provide a list of people located in your geographic area. The list will be mailed to you by the city in approximately four weeks.

You can also run an ad in the *Lab News* classified ad section seeking car pool partners.

844-RIDE

Biking to Work

A city bike route map is available by calling 844-RIDE. In addition, Sandia Bicycle Commuters' Group assists and educates Sandia bicyclist on all issues regarding KAFB access, safety, and bicycle-supporting facilities.

- Ralph Wrons at 844-0601, rjwrons@sandia.gov

- Frank Bouchier at 845-8382, fabouch@sandia.gov

Several Sandia buildings are equipped with bicycle racks, showers, and lockers for use by employees commuting to work by bicycle. In most cases, you don't have to be resident in those buildings to use the showers.

Public Transportation

Several Albuquerque bus routes from most areas of the city serve Kirtland AFB and Sandia. (And you can combine bus and bike commuting; city buses have an easy-to-use bike rack on the front.) Call 844-RIDE for complete bus schedules and route information or visit the City of Albu-

querque Transit Department web site at <http://www.cabq.gov/transit/tran.html>. For commuters originating in Los Alamos and Santa Fe, there is regular motorcoach service provided by All Aboard America/Northern New Mexico Park & Ride. One-way fare between Santa Fe and Albuquerque is \$2; one-way fare between Los Alamos and Albuquerque is \$4.

The City of Albuquerque Transit Department web site details bus schedules, fares, information about Guaranteed Ride Home, etc. ABQ Ride Customer Service can be reached at 243-RIDE (7433).

- The monthly Gold bus pass is available to Sandians at the discounted rate of \$20 (regularly \$28). Passes may be purchased at the Kirtland branch of Sandia Laboratory Federal Credit Union or through the SERP office in Bldg. 832.

Van Pool

Van pools, which may park in designated spaces in the lot south of the cafeteria, originate from Belen, Los Lunas, Moriarty, Edgewood, and Cedar Crest. Costs and schedules vary. Call 844-RIDE to obtain the contact information for the pool in your area. As with car pools, van pool vehicles must display a placard

Karla Causey's household adds three relatives from hurricane-stricken New Orleans

Three children, victims, are with family in Albuquerque, but this time not to celebrate the holidays

By Erin Gardner

Parents everywhere are facing the stress of the new school year and the homework, whining, and frustration that go along with it.

For Karla Causey of Supplier Information and Relations Dept. 10222 and her husband Garry, this year may be especially challenging. They have added their two nieces and nephew under their roof, which was already covering her family of five (see front page photo).

Karla received a phone call from Garry on August 30 asking her if it would be ok to house his identical twin brother's children, victims of Hurricane Katrina. Their parents, Karry and Deanna Causey, are temporarily in Orlando, Fla. Karry works as a ramp agent for Southwest Airlines, which will station him in Orlando for the time being. Deanna works for a small company in downtown New Orleans. Their home in the Orleans Parish is covered by a fallen tree and filled with five feet of water.

After agreeing, Karla was informed that her nieces and nephew would be arriving in Albuquerque that very day at 2:30 pm.

Karla promptly contacted Eisenhower Middle School where her son Jared, 13, attends, to arrange for her niece, Blair, 11, and nephew, Justin, 13, to attend school this semester. "They were able to get them into school at Eisenhower the next day. They did a great job," says Karla.

She was also able to register her niece, Meghan, 17, as a senior at Eldorado High School, where her twin sons, Jason and Jeremy, 15, attend as well.

Blair and Justin were the first Hurricane Katrina victims to start attending school in Albuquerque.



"People here in Procurement have been wonderful, a tremendous help."

Karla Causey

"They come out for Christmas, but full-time, will add many expenses," says Karla.

Meghan, Blair, and Justin arrived in Albuquerque with small duffel bags, which included a couple of outfits and flip-flops.

Karla and Garry face the expenses of purchasing new clothes and school supplies for the three, buying more groceries, and driving their gas-guzzling SUV to get the children to and from school.

"People here in Procurement have been wonderful, a tremendous help," says Karla, in regards to the clothing and school supplies her colleagues are donating for the children.

Meghan, Blair, and Justin seem to be adjusting well to their new home. According to Karla, they like their new schools, and people have been very friendly to them.

The hard part for them, however, is they are unable to contact many of their friends to see where they are and whether they are OK at this very chaotic time.

According to Karla, it will be at least a year before New Orleans will be rebuilt because of the mass destruction Hurricane Katrina left behind.

SANDIA THIS WEEK designated a point of contact for specific support requests from employees directly impacted by Katrina. The contact is Gigi McKenzie of Prevention & Health Management Dept. 3330, phone number 844-2088, e-mail gmcken@sandia.gov.

Katrina response

(Continued from page 1)

effects on infrastructure.

Nancy Brodsky (6222), the Fast Analysis and Simulation Team lead, says the reports are not made public but are given to DHS for analysis and planning. Reports are not issued to the public because they could be misrepresented.

"We're looking at a variety of things, including economic effects and what sectors of the nation will be affected," Nancy says. "We don't play the numbers game and we can't predict everything."

Tom Corbet (6222), a member of NISAC, says the supply of oil and gas could be problematic during the winter months. Refineries in the Gulf Coast region account for 14 percent of US refin-

THE SANDIA TEAM consists of Chad Davis, Sharon Deland, Sue Downes, Mark Ehlen, Dean Jones, Katherine Jones, Vern Loose, Andy Scholand (all 6221); Nancy Brodsky, Theresa Brown, Steve Conrad, Tom Corbet, Jim Ellison, Paul Kaplan, Louise Maffit, Robert Taylor, Adam Turk, Lillian Snyder, Vanessa Vargas (all 6222); Leo Bynum, Bill Fogleman, Kevin Stamber (all 6226); and Andrew Kazensky (6032).

SC '05 deadline requires immediate response from interested Sandians

If you want to play, apply today

Researchers interested in participating in the Advanced Simulation and Computing (ASC) program for the Supercomputing '05 convention in Seattle Nov. 12-18 need to submit their proposal by Sept. 19, says Neil Pundit (1423), who leads the tri-lab effort there this year.

The ASC exhibit's theme, "Visualize the Difference," will emphasize contributions that advance high-end computing.

Project requirements and forms are available at the tri-lab web site <http://www.lanl.gov/conferences/sc05/index.html>.



KATRINA'S POWER devastated the Gulf Coast. In the inset photo, Katrina roars toward the US mainland — again. The storm had already pounded Florida before regaining strength over the Gulf of Mexico. (NOAA photos)

ing, and refineries in other parts of the country will not be able to make up for capacity lost because of Katrina, he says.

Tom says the team looks at other areas that oil will impact. This includes other businesses, commerce, and competition from other products. "We'll potentially see something happen in one or two months," Tom says.

Ongoing analysis

The pre-event analysis included an estimate of outages to electric power and wireless telecommunication infrastructure due to wind damage, and an estimate of the potential impacts on other infrastructure sectors based on projected power outages, including identification of critical assets in the storm's path.

The post-event analysis includes almost daily reports on implications for recovery and rebuilding operations based on known damage to infrastructure. This also includes identification of critical electric power substation/generation facilities for balanced restoration and operation of the power grid in the southeastern United States.

Theresa Brown (6222), NISAC project manager at Sandia, says analysis is based on estimated flood zones and telecommunication industry switch location data. This identifies what the

probable loss and recovery steps will be.

NISAC has conducted a supply chain analysis of chemical production in the New Orleans and Baton Rouge region, and performed a series of analyses of disruptions to rail commodity flow assuming different levels of disruption to the rail network in the affected region.

In addition, models have been created to simulate the national petroleum system to evaluate potential distribution and magnitude of fuel shortages and post-event economic analysis.

Potential economic impacts of chemical supply and transportation disruptions are also studied.

NISAC will continue to look at stresses on infrastructures and demand for services in communities supporting large numbers of the displaced populations.

Sandia vols answer call — literally

Sandia provided 60 volunteers to staff a Red Cross/KOAT-TV telethon Friday, Sept. 2. "We were able to fill all of the shifts (6 a.m.-7 p.m.) in about three hours on Thursday afternoon," reports Amy Tapia of Community Involvement Dept. 3652. "Sandians are incredible volunteers!"

Benefits organization explains

Sandia 401(k) Savings Plans — A fresh look . . . and some changes

This is the fourth article in a series discussing benefits and health care plan issues, prepared by Health, Benefits, and Employee Services Center 3300.

The Savings Plans and Benefits teams have come together to bring you the next part in the series of articles around your Benefits at Sandia. In this article you will learn about the New Sandia Fund Structure and a few related fund changes — and it's good news.

Sandia is exceptional in many ways, and with regard to the Savings Plans our population in general does an excellent job at saving for retirement. However, a majority of Sandia Savings Plans participants select an investment mix upon initial enrollment in the Plan and fail to revisit and reassess their account. Yes, the idea is to invest for the long term, but it is also important to reevaluate your strategy with any major life event, when changes are made to the Plan, and even as retirement draws near. The New Sandia Fund Structure has been created to encourage you to take a fresh look at your Sandia 401(k) Savings Plan.

So, whether you looked at your account yesterday or are now wondering if you are even enrolled, the New Sandia Fund Structure is built for you.

Purpose

The purpose of the new layout is to give you several pieces of information at a glance to help you create a diversified portfolio of investments that may be right for you. Broad asset categories are identified to help you more easily determine higher and lower risk funds. The structure also identifies funds that provide one-step diversification in the pre-mixed strategies, and it separates funds with exposure to broad asset classes — the Asset Class Funds layer — from the additional Sandia Fund options.

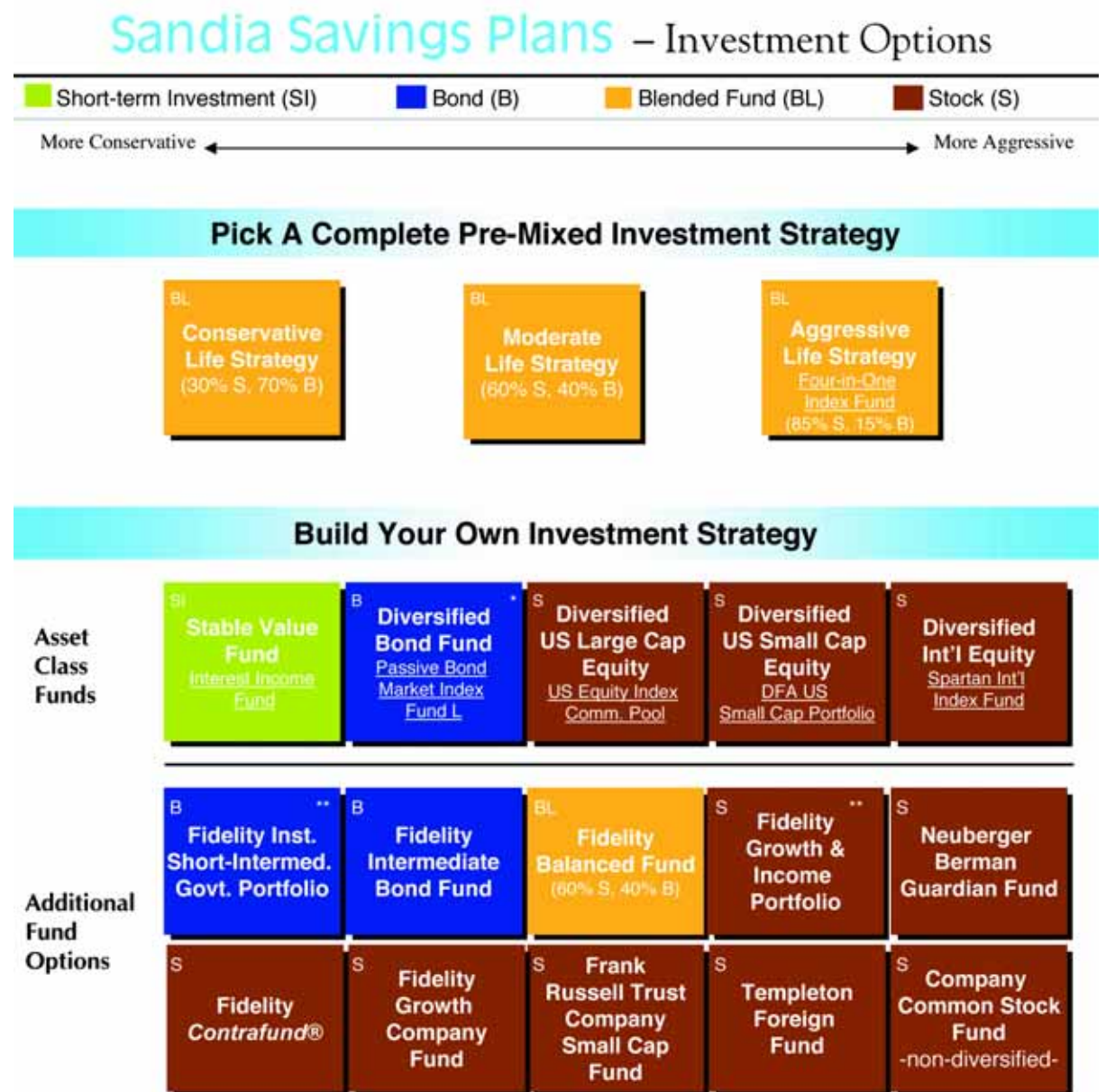
How It Works

The New Sandia Fund Structure works by identifying the broad asset category of each fund, and grouping the funds into two basic strategies — giving you the option to choose a pre-mixed strategy or to build your own.

Look at the Structure in the chart on this page, and you will see the broad asset categories indicated in the key near the top. The broad asset categories are, from left to right, Short-term Investment, Bond, Blended Fund (a combination of bonds and stocks), and Stock. It is important to note that, in general, short-term investments have less investment risk than bond funds, and bond funds have less investment risk than stock funds. Because blended funds are a combination of stocks and bonds, the risks associated with those funds tend to fall somewhere between the two categories. (Please remember that past performance is no guarantee of future results. Before you invest in a fund, it is important to review prospectuses and other fund information.)

Each Sandia fund option falls into one of these asset categories based on the investment focus and management strategy. You are able to determine the broad asset category of each fund by looking at the color, and/or the abbreviation in the upper left corner, of each fund box. This information will help you to easily determine which funds will fill a specific asset category in your investment strategy. As stated above, the Fund Structure is made up of two strategies.

The first option is to Pick A Complete Pre-Mixed Investment Strategy that fits your investment goals. Each of the three Life Strategy options provides you with a lower-cost diversified mix of stock and bond investments. The three options have different levels of risk — conservative, moderate, and aggressive. These fund options are designed for investors who do not want to go through the process of picking several funds, or have to worry about rebalancing among funds. The idea is to pick the one Life Strategy option that matches your level of risk, although you are not prohibited from using these pre-mixed options in building your own strategy.



* New fund, effective 11/01/2005

** Will be closed to new contributions as of 11/01/2005 (4 pm ET), and removed from the Plan 01/31/2006 (4 pm ET)

Note: Generally, short-term investments have less investment risk than bond funds, and bond funds have less investment risk than stock funds. Blended funds are combinations of stock and bond funds.

The Equity Funds in the Additional Fund Options section are shown alphabetically within their Morningstar category. Information was provided by Sandia. Fidelity Investments is not responsible for its content.

Contacts . . .

- Sandia internal web — http://www-irn.sandia.gov/HR/benefits/401k/Fund_Structure.htm (lots of information here, including an online overview)
- Fidelity online — <http://www.401k.com> (You can make changes to your account here)
- Fidelity toll-free phone number — 1-800-240-4015

A second option is to Build Your Own Investment Strategy by selecting from among any of the Savings Plans fund options, including, but not limited to, the fund options in the Asset Class Funds and Additional Fund Options layers.

The Asset Class Funds layer contains lower-cost fund options that can give you exposure to broad asset classes. An asset class is a way to group investments by risk and return characteristics: bonds and stocks are two examples. These fund options, which are index funds, passively managed funds, or funds designed specifically for Sandia, generally have lower fees, and therefore reduce your investment returns by a relatively small amount.

The Additional Fund Options layer contains actively managed funds that provide you with choices in various asset categories, and with differing management strategies. These strategies are different from index funds in that these investment managers actively seek out stocks or bonds that they believe have potential for higher investment returns. Of course, we cannot guarantee that these funds will have higher returns.

Changes

As mentioned at the start of the article, there are also a few changes that come along with the Fund Structure.

First, it is important to point out that although the fund options are categorized in a new way, most of the funds have remained the

same. The actual changes include the addition of one fund, the eventual removal of two funds, and lower fees for three of the existing funds.

The new fund that will be added to the Savings Plans, effective Nov. 1, is the Diversified Bond Fund (the Passive Bond Market Index Fund L, managed by State Street Global Advisors). It is an index fund providing exposure to the US bond market, and fits in the Asset Class Funds layer.

The two funds that will be removed from the Plan effective Jan. 31, 2006, are the Fidelity Institutional Short-Intermediate Government Portfolio and the Fidelity Growth & Income Portfolio. Sandia decided to remove the funds after determining that they overlap other funds in the Plan and had performed below their benchmarks. As of Nov. 1, 2005 (4 p.m. ET), both funds will be closed to new contributions and any exchanges into the fund.

The final change is to the fees for three of the existing fund options. Fees will be lowered for the Frank Russell Trust Company Small Cap Fund, the Neuberger Berman Guardian Fund, and the Templeton Foreign Fund, effective Nov. 1, 2005.

Whether you choose a pre-mixed investment strategy or build your own, it is important that the strategy is right for you. Look for more information about your New Sandia Fund Structure and the related changes in the mail and/or e-mail.

The next articles in this Benefits series will explain the new health care plans for the coming year.

Operational excellence gets executive attention



LABS PRESIDENT AND DIRECTOR Tom Hunter (in foreground of each photo) has made operational excellence — the process of performing world-class engineering and science R&D safely, securely, efficiently, and effectively — a centerpiece of his administration. To emphasize the importance he places on these issues, Tom has been conducting ES&H walkthroughs like the one depicted here, in which he inspected the Weapons Integration Facility, part of the MESA construction site, and received thorough briefings on the project's safety procedures. (Photos by Bill Doty)

Feedback

How about a speed bump?

Q: I enter and exit Tech Area 1 through the turnstile gate at the southwest corner of Bldg. 806. The potential hazard is exiting the gate to the adjacent parking lot after work when drivers are heading home in a hurry going west. Many of the drivers do not adhere to the speed limit, and the fence and gate partially block the view of the driver and the pedestrian crossing the road. Would it be feasible to put a speed bump in the road to slow down the drivers as they approach that gate, or put up a stop sign just to the east of the gate?

A: The area of concern you mention is scheduled for reconstruction by KAFB in the near future. The road outside of the gate area is also owned by KAFB. We will ask our representative to address this issue at the next meeting with the KAFB Traffic Safety Group. We will also look into the possibility of placing caution signs inside the gate area at the next meeting of the Sandia Traffic Safety Committee. — Darrell Fong (6322)

OPQC gathers school supplies



MEMBERS of the Office Professionals Quality Council (OPQC) in partnership with Community Involvement recently completed the Back to School — School Supplies Drive. Sandians contributed a record 28,769 items benefiting students in 12 Albuquerque schools. Volunteers sorting, counting, and boxing the supplies are from left to right Amy Tapia (3652), Kimberly Fernandez (3652), Gina Lovato (3555), Patricia St. John (4343), and Patty Zamora (3652).

Elected officials attend second annual briefing on small business programs at Sandia

New Mexico congressional, state, and municipal elected officials and their representatives attended the 2nd Annual Elected Officials Briefing on Small Business Programs at Sandia on Aug. 1.

They were greeted by Al Romig, Sandia's deputy director for integrated technology programs, who provided a current look at Sandia. Small business clients/suppliers presented their products and services, as well as their experience interacting with Sandia through a number of programs, including the New Mexico Small Business Assistance Initiative, the Mentor Protégé Program, the Mini Trade Fair, and the Supplier Showcase & Matchmaking Event.

Sandia's Small Business Team (10102 and 10222) was introduced to the elected officials, and directors Bonnie Apodoca (10200) and David

Goldheim (10100) gave briefings on program specifics.

Hosts were managers Theresa Carson (10222) and Vic Chavez (10102).

Laura Scott (5993) gave a demonstration on Sandia's Homeland Security technologies.

Small businesses included in the briefing were Diana and Reggie Alsbrook, Diana's Homegrown; Maria Griego-Raby, Contract Associates; Bill Miera, Fiore Industries; Richard Nunez, N-Corp; Kim Smith, Cumbres/Toltec Railroad; Jim Mannatt, Focus Energy.

Organizers Mariann Johnston (10102) and Toni Leon Kovarik (10222) say survey results were positive and that the group believes this is a useful event to continue and expand in the future.

— Toni Kovarik (10222)



LAURA SCOTT of Business Support Center 5900 demonstrates Labs-developed sticky foam to a group of elected officials. The demonstration was part of a briefing sponsored by the Office of Advocacy and Small Business Development departments to familiarize elected officials with the Labs' small business programs. (Photo by Randy Montoya)

Sci-Tech park wins national economic development award

Sen. Pete Domenici, R-N.M., reported last week that the Sandia Science and Technology Park, outside the Eubank Gate, is being recognized by the federal government for excellence in generating economic development through technology.

Domenici said the Economic Development Administration (EDA) has selected the Sandia tech park to receive its 2005 Excellence in Technology-led Economic Development award. The honor is among those chosen as part of the Department of Commerce's 2005 Excellence in Economic Development Award program.

"The Sandia Science and Technology Park is one of the most dynamic areas in the state in terms of job creation, research opportunities, and sheer potential high-tech breakthroughs," Domenici said. "This honor is well-deserved and highlights how well a technology park can, and should, work."

Excellence Award winners will be formally honored at the EDA "Symposium for 21st Century Economic Development" on Sept. 22 in Arlington, Va.

Sandia's Jackie Kerby Moore (10105) is the park's executive director.

"The Sandia Science and Technology Park is very proud to receive this award from the Economic Development Administration," Jackie told the *Lab News*. "The EDA has been key to the success of our Park, as its funding enabled us to put in a state-of-the-art telecommunications system that has been essential to attracting high-tech companies."

The Sandia Science and Technology Park was created to attract high-tech jobs to the Albuquerque area. It is positioned to tap into the resources of the entire New Mexico Technology Corridor that stretches the length of the state. A majority of the buildings at the tech park are facilities associated in some way with Sandia.

In August, for example, ground was broken at the technology park for Sandia's Computer Science Research Institute (*Lab News*, Aug. 19) — the fifth new tenant to locate at the Sandia Science and Technology Park during the last 90 days alone.

Management promotions

New Mexico

Kristin Flores from SMLS, Property Management and Reapplication Dept. 10267, to Manager, Logistics Operations and Business Office 10262.

Kristin joined Sandia in 2001 as a graduate student intern in the Former Soviet Union Cooperative Initiatives Department.

In 2003, Kristin became a limited-term employee in Property Management and then moved to SMLS. In Property Management she managed the High Risk Property Program, the Government Furnished Property Program, and the Database Accuracy Program, along with a wide range of programmatic initiatives.

Kristin was recently awarded the "2005 Outstanding Administrative Manager/Advisor" award



KRISTIN FLORES

at the 10th Annual Student Internship Program Symposium.

Kristin has a BBA from the University of Nevada, Las Vegas, an MA in economic theory from UNM, and a PhD in economic theory from UNM.

Steven Gianoulakis from PMTS, Engineering Mechanics Models and Simulation Dept. 8774, to Manager, Thermal/Fluid Computational Engineering Sciences Dept. 1541.

Steven originally joined Sandia in 1992. He left in 2000 to manage the High Density Plasma CVD Engineering Group at Applied Materials in Santa Clara, Calif. He returned in 2004.

Steven has spent most of his career at Sandia as a thermal/fluids analyst in Engineering Sciences Center 1500. He has worked in weapon components manufacturing, laser welding, brazing, crystal growth, microsystems, and semiconductor equipment design and performance enhancement.

Steven has a BS in mechanical engineering from Washington State University, an MS in aerospace engineering from Virginia Polytechnic, and a PhD in mechanical engineering from the University of Texas at Austin.

Scott Hutchinson from PMTS, Electrical and Microsystem Modeling Dept. 1437, to Manager, Electrical and Microsystem Modeling Dept. 1437.

Scott joined Sandia in 1993 as a research fellow and became a senior member of technical staff in 1994. He has worked on a variety of computational projects including inverse problems for electrocardiography. Some of these projects include: parallel Krylov iterative solution methods resulting in the Aztec solver library, parallel finite-element methods for reacting flows in the MPSalsa code, and finite-element modeling of continuum plasmas. Scott was also the technical lead for the parallel circuit modeling code Xyce.

In 2004, Scott took a matrix assignment to the Simulation-Enabled Product Realization (SEPR) Systems Engineering Group to help coordinate activities for electrical modeling and simulation at Sandia. While in that position, he became involved with the Qualification Alternatives for the Sandia Pulse Reactor (QASPR) project where he continues to help coordinate verification and validation activities.

Scott has a bachelor's, a master's, and a PhD in electrical engineering, all from New Mexico State University.

Elmer Klavetter from DMTS, Patent Agent Services Dept. 11501, to Manager, Patent Agent Services Dept. 11501.

Elmer joined Sandia in 1983 where he worked in multiphase fluid flow and transport associated with high-level underground radioactive waste disposal.

In 1989 he joined the



STEVEN GIANOULAKIS



SCOTT HUTCHINSON



ELMER KLAVETTER

Fuels Process Research Department to work on advanced fuel cell development, including sensor diagnostics development and fuel reaction mechanistic studies.

Subsequent assignments included coal processing and catalyst research as well as crystalline silicotitanate materials development for radioactive waste separations, primarily for the DOE Hanford, Wash., site, resulting in an R&D 100 Award in 1996 and a promotion to DMTS in 1995. Elmer also performed risk assessment model development and analyses to support Sandia environmental restoration efforts.

Elmer joined the Sandia Legal Division in 1997, passing the patent agent bar exam to become a Registered Patent Agent.

He has a BS, an MS, and a PhD in chemical engineering from the University of Missouri-Rolla.

Mike Orrell from PMTS, W76-1 Life Extension Dept. 2132, to Manager, Target Systems Dept. 5415.

He joined Sandia in 1980 in Plant Engineering. In 1984 he was promoted into management in a design definition department and then returned to a technical staff position in 1986 in order to pursue weapon systems experience.

Mike participated in weapon system concept and feasibility studies, engineering design and development activities, advanced fuzing and detonation system designs, weapon system production support, UK liaison interface, and a two-year assignment with the Navy/SSP office in Washington, D.C.

Mike has a BSME from the University of New Mexico, an MSME from UNM, and an MSIE from Texas A&M.



MIKE ORRELL

Sandia sponsors Filipino American conference this weekend at Marriott

The Filipino American Foundation of New Mexico announces a Filipino and Asian American Conference to take place this weekend (Sept. 16-18) in Albuquerque at the Marriott Hotel on Louisiana Blvd. and I-40. Sandia is one of the major sponsors, along with the City of Albuquerque and several local businesses.

The event will be the first Philippine and Asian-American function of its type in New Mexico catering to a national audience. It is expected to attract more than 200 participants. Its purpose is to promote "Visibility through Empowerment" among the Filipino and Asian community.

Topics for discussion include political activism, economic development, immigration and naturalization, dual citizenship, labor issues, education/literacy, diversity in the workplace, medical issues, entrepreneurship, youth leadership, and environmental justice.

For more information, visit the conference website at <http://www.naffaacnferencenm.com> or call Emilie Underwood at (505) 255-2060.

Natl' Federation of Filipino American Associations, Region VI
& the Fil-Am Foundation of NM present ...

SEPTEMBER 17, 2005
marriott hotel • albuquerque

a day of panels and empowerment presentations on
environmental justice and low-income neighborhoods • employment •
the new immigrant & dual citizenship • loans and predatory lending •
leadership and youth • naturalization • the workplace • and more!

\$25 advance general registration (includes lunch)
for more information or to reserve your place visit
www.naffaacnferencenm.com
or contact emilie 505-255-2060

major SPONSORS: City of Albuquerque's Human Rights Office and Cultural Services Department • A Sound Look • Elite Travel • Ethicon Endo-Surgery • McAfee • Lockheed Martin/Sandia Nat'l Labs • Los Alamos Nat'l Labs • Nichols Gallery • Rhombus
other sponsors: asian american association of nm • japanese american citizens league • chinese american citizens alliance • hispano chamber of commerce

Sandia's LDRD program shines in review

Sandia's Laboratory Directed Research and Development (LDRD) program had its day in the sun last month at a program review meeting in Livermore, Calif. Representatives of the three NNSA labs and other federal agencies attended the three-day session, Aug. 23-25.

Sandia's FY 2005 LDRD program funds 410 projects across 18 areas of investment, LDRD manager Hank Westrich (1011) told attendees. Sandia LDRD projects are responsible for 40 percent of issued patents at the Lab and 30 percent of the Labs' total income for patent licenses, he said.

Both of the Labs' 2004 R&D 100 Award winners were based on LDRD research projects, Hank said. The program is also helping with Sandia's goal of attracting and retaining young and talented staff members. More than 50 percent of Sandia's postdoc staff were supported by the program, and almost half of the full-time employee hours spent on LDRD projects during the year were from staff with less than five years experience at Sandia.

The meeting was also an opportunity for Sandia to showcase the value of its LDRD program to other agencies. Representatives from the Department of Homeland Security, DOE, Department of Defense, and other organizations attended the tri-lab review. "Attendees felt the benefit of the LDRD program is clear," Hank said. — *Will Keener*

Working together helps W80 teams deliver quality products

This article was written by Monta Morris and originally published in Connections, the NNSA Kansas City Plant newsletter.

How do people in three different states work together to develop a new product or manage production of an existing product? With a lot of phone calls, teleconferences, videoconferences, and visits.

"Building parts for the weapons complex requires that facilities work together," says Steve Davis, technical manager in firing systems at the Kansas City Plant. Representatives from the laboratories and production facilities form product realization teams to ensure the integrity of products, from design through production.

Associates at the Kansas City Plant work with their counterparts at labs throughout the weapons complex to build products for national defense.

Kansas City Plant principal engineer Vic Pace is a core member of a team that works on the



COLLABORATIVE TRIO — Members of the W80 Firing Set product realization team include, from left, Vic Pace of the Kansas City Plant, Dan Hardin from Sandia/California, and Pat Smith from Sandia/New Mexico.

W80 Firing Set, part of the WES SubAssembly. The team has worked together for more than three years to ensure that the subassembly is produced problem-free.

Open lines of communication

Pace says the team works well together because the lines of communication are open. "The labs keep us informed and involved in design issues," says Pace. "Our team has worked together from the beginning to make sure the design is producible."

Pat Smith, principal member of technical staff at Sandia Albuquerque leads this team. He's

in Firing Set & Fuzing Systems Dept. 2612. He and other team members, including engineers from Sandia/California, typically visit the Kansas City Plant about once a month.

When asked what makes their team work well, Pat says good communication is the key. "We naturally talk several times a week to keep up to date with what's going on," says Pat. "That way, if we run into any difficulties, we're able to address them immediately."

Team members like each other

It doesn't hurt, points out Sandia Livermore team member Dan Hardin [8241], that members of the group like each other. "We definitely work well together and we enjoy working together," says Dan, a systems engineer. "When you work together on a project for several years, it's important to get along."

Pace agrees that "getting along" is a big factor in the team's success. "Our partners at the labs understand that we have a lot of experience, and they respect our input," says Pace. "The labs have ultimate design responsibility, but we don't battle over authoritative lines; we work together as partners."

According to Pace, the qualities of his PRT — teamwork, respect, and good working relationships — are what make the team successful. And a team that works well together is more likely to avoid problems and turn out high-quality products. "We do a lot of concurrent engineering, and the fact that we work well together helps us achieve our common goals."

Labs scientists publish book on applied dynamic programming

Three Sandia scientists and one former Sandian who is now a professor at Texas A&M University have recently published a book titled *Applied Dynamic Programming for Optimization of Dynamical Systems*.

The current Sandia authors are Rush Robinett III (6210), David Wilson (6634), and Richard Eisler (4547). The former Sandian is John Hurtado.

The book's publisher is the Society for Industrial and Applied Mathematics of Philadelphia.

Rush says the book presents a "broad cross-section of dynamic programming [DP] techniques applied to the optimization of dynamical systems based on the results of over 10 years of research and development at Sandia by the authors."

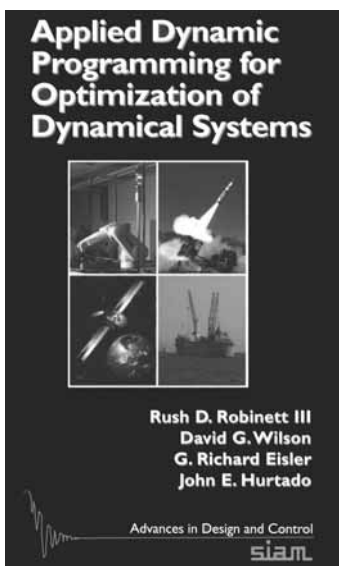
"The main goal of the research effort was to develop a robust path planning/trajjectory optimization tool that didn't require an initial guess," Rush says. "The goal was partially met with a combination of DP and homotopy algorithms."

The book started out as a single chapter in another book — *Flexible Robot Dynamics and Controls* — published in 2002 and co-authored by Rush, Richard, and David, as well as Clark Dohrmann (1524), John Feddema (6634), Gordon Parker, and Dennis Stokes.

Research scientists, practicing engineers, and engineering students with backgrounds in dynamics and controls will be able to develop and apply the DP algorithms in the book to their particular problems.

"The organization of the book makes it possible for readers to actually use DP algorithms even before thoroughly comprehending the full theoretical development," Rush says. "This should appeal to practicing engineers and professionals. The book is also suitable in engineering academia, as either a reference or supplemental textbook for graduate courses in optimization of dynamic and control systems."

— Chris Burroughs



Sandia/Lockheed Martin team again for their sixth Habitat home project



VP FRANK FIGUEROA (right) and Winnie DeVore, President of the Greater Albuquerque Habitat for Humanity Board (directly behind Frank), at the dedication of Sandia/Lockheed Martin's 6th Habitat for Humanity House. The house (inset photo) was built for the Galindo family (Antonio, Maria, Jose Antonio, Laura, and Genoveva). More than 275 Sandia Serves volunteers participated in building the house. Several Sandia retirees again served as job captains. (Photos by Amy Tapia)

Mileposts

New Mexico photos by Michelle Fleming
California photos by Bud Pellitier

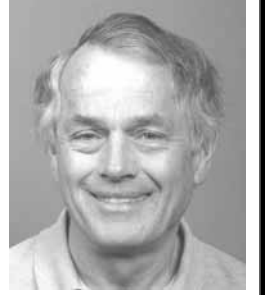


Jerry Villanueva
35 1734

Recent Retirees



Mary James
47 10501



James Metcalf
40 9000



Craig Olson
35 1600



James Van De Vreugde
30 8755



Gary Simpson
30 8226



John Mitchiner
30 6220



Deborah Linnell
30 8236



Toyoko Lee
30 2995



William Drotning
30 6632



Leonard Vigil
25 10267



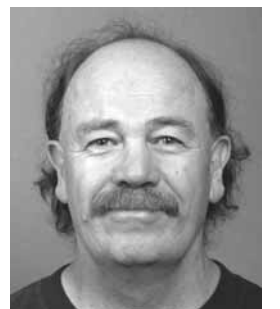
Barbara Roberts
25 1000



James Ringland
25 8112



Michael Mundt
25 12335



Isidro Molina
25 1645



John Kelly
25 6870



Scott Joyce
25 4516



Thomas Ferguson
25 4340



Guy Dahms
25 12342



John Chavarria
25 8516



Daniel Rader
20 1512



Imelda Quam
20 5923



Richard Pike
20 2951



Georgianne Peek
20 6521



Michael McDonald
20 6631



Cathy Houf
20 8945



Mike Firreno
20 8236



Robert Barlow
20 8351



Glenda Acosta
20 8948



Della Vieth
15 5997



Patricia Valles
15 4311



Cynthia Tenorio
15 5744



Gail Simon
15 Org. 301



Thomas Nash
15 1677



John Merson
15 6110



Frank Loudermilk
15 1740



Michael Hobbs
15 1516



Laura Charles
15 4515



Cynthia Acosta
15 6030

Education and learning focus of Sandia/Lockheed Martin gift

By Iris Aboytes

Sandia National Laboratories/Lockheed Martin recently presented the National Hispanic Cultural Center (NHCC) and its Foundation with a \$100,000 gift. Pam Catanach (3652) says that brings the total to \$432,125 over the last several years.

The \$100,000 will support the National Hispanic Cultural Center's education program, completion of the fresco in the Torreón (watchtower), and a naming in the future education building. Groundbreaking for the education building is slated for early next year.

The Torreón fresco is a masterpiece in the making. Images ranging from Mayan, Aztec, and Peruvian gods, to Anasazi and Christian religious saints, Celtic and Roman symbols, Phoenician and Moorish figures, Spanish missions in the Southwest, and historical icons grace more than 100 interconnected panels. When complete, the Torreón will have the distinction of containing the largest concave fresco in the United States, covering approximately 4,000 square feet.

New Mexico native Frederico Vigil (at the top of the lift in the photograph at right) is the creator of the fresco depicting the history of people of Hispanic origin in the Americas and the Iberian Peninsula.

2005 National Hispanic Heritage Month celebrated Sept. 15-Oct. 15

"Team Kirtland" — Members from DTRA, 377 ABW, DOE/NNSA, and Sandia National Laboratories have joined forces to make this year's National Hispanic Heritage Month an event to remember.

September 29 — Entertainment Day, Steve Schiff auditorium, 11 a.m. to 1 p.m. Entertainment by members of the Baila Baila Dance School, Pecos Pentero Mariachi Band, a youth speaker from Academy School, and a Salsa and Chile contest will be held. For additional information on the contests, contact Bertie Denman at 844-5050 or badenma@sandia.gov.

For more information on National Hispanic Heritage Month activities contact Julia de la Cruz at 844-9869 or jdelacr@sandia.gov.

"Each image will depict an event or a character in Hispanic history," says Vigil. "Before I began sketching, five PhD's in Hispanic history and I met to discuss people and events spanning more than 500 years. The sketches were reviewed for accuracy, and a final design was approved."

The ancient form of Buon Fresco dates back to 3000 B.C., with its popularity peaking in Italy with Michelangelo's work in the Sistine Chapel, and in Mexico with Diego Rivera's works in the last century. It was also used by Native Americans in their pottery. Fresco refers to the process of painting lime and inorganic pigment on wet plaster. The process of bonding plaster is time-consuming, as lime and paint mixtures are prepared and five coats of plaster are applied. Should mistakes be made, the plaster must be scraped off and the process begins again. Completion should take about three and a half years.

"What I paint today, tomorrow, and what I painted yesterday, will be here forever," says Vigil. He is now teaching the next generation, interns Adriana Felix and César Chávez, as he was taught by disciples of world-renowned artist Diego Rivera.

"Sandia/Lockheed Martin and its employees have been involved in the NHCC since its inception in 2000," says Katherine Archuleta, executive director of the NHCCF. "They have generously offered us human and financial resources." Even before that time, CFO Frank Figueroa played an instrumental role as the chair of the National Hispanic Culture Center Foundation Board of Trustees.

"Art, music, theatre, and performance are so important to provide opportunities for children to express themselves," says Mike DeWitte (3650). "We must enable and engage our children in the interconnectivity of the arts and science/math."

The Torreón is not open to the public so that Vigil can continue his work. There will be a reception on Oct 27, from 5:30 to 7 p.m. and the Torreón will be open for viewing. For more information on the Torreón contact Heather Norfleet at (505) 766-9858, or visit www.nhccnm.org.



PAINTING THE TORREON FRESCO • PHOTOGRAPH BY RANDY MONTOYA

About the National Hispanic Cultural Center

The National Hispanic Cultural Center (NHCC) is dedicated to the study, advancement, and presentation of Hispanic culture, arts, and humanities. Since its grand opening in 2000, the NHCC has staged over 20 art exhibitions and 400 programs in the visual, performing, and literary arts. Programs have featured local, national and international artists, scholars, and entertainers. The NHCC provides venues for visitors to learn about Hispanic culture throughout the world.

In 1998, a 16-acre site was chosen for the \$34 million project along the east side of the Rio Grande in the heart of the historic Baretas neighborhood in Albuquerque. Since then the project has grown to encompass over 50 acres with an estimated cost of over \$50 million. Baretas, a traditionally Hispanic neighborhood, has historically been a crossroads for New

Mexico's people. The community was settled for its proximity to a natural ford in the Rio Grande and to the Camino Real, the Spanish colonial era Royal Road used primarily for trade between Mexico and northern New Mexico.

The architectural design of the NHCC has been created to accommodate a wealth of cultural programs in the visual, performing, media, and literary arts. The various buildings and structures speak to the history and culture of hispanidad with features recalling styles from Spain, Mesoamerica,

and early New Mexico.

The National Hispanic Cultural Center enjoys the broad support of the New Mexico State Legislature as well as the federal government. The NHCC is part of the State of New Mexico's Department of Cultural Affairs along with seven other state museums and six state monuments.

