DOE Secretary Bodman taps Sandia as lead lab for national center for solid-state lighting R&D

Sandia will get $2.6 million in DOE funds for research projects; will coordinate work of other labs

By Bill Murphy

Secretary of Energy Samuel Bodman traveled to Sandia last week to announce that the department has selected the Labs to be the new home of the National Laboratory Center for Solid-State Lighting Research and Development. In that capacity, Sandia will conduct vital solid-state lighting research and coordinate related research efforts at several other national laboratories.

DOE will provide funding of $5 million for seven research projects in solid-state lighting, including $2.6 million for four Sandia projects, Bodman said. The funding comes from DOE's Office of Energy Efficiency and Renewable Energy.

"The research will be conducted at the new nanotechnology centers at our national laboratories," he said, including the just dedicated Sandia/Los Alamos Center for Integrated Nanotechnologies. "This is part of nearly $20 million we are committing this year to support research and development efforts in this rapidly emerging technology."

Bodman's remarks came during an Oct. 5 news conference at Sandia's International Programs Building. Also in attendance were NNSA Administrator Linton Brooks, Labs Director Tom Hunter (who served as host), Sens. Pete Domenici, R-N.M., and Jeff Bingaman, D-N.M, Rep. Heather Wilson, R-N.M., and LANL Director Michael Anastasio.

Before the announcement, the entourage got a tour and briefing about the CINT facility and its capabilities. On Oct. 4, Bodman addressed an all-hands meeting of Sandians at the Steve Schiff Auditorium. (See "Safety remains a top priority, Secretary Bodman tells Sandians at all-hands meeting " on page 4.)

SOLID-STATE LIGHTING RESEARCH — From left, Jerry Simmons, senior manager of Sandia's Energy Sciences Department, briefs DOE Secretary Samuel Bodman, Sen. Pete Domenici, R-N.M., Rep. Heather Wilson, R-N.M., Los Alamos National Laboratory Director Michael Anastasio, Sandia President and Director Tom Hunter, and Sen. Jeff Bingaman, D-N.M. at the Center for Integrated Nanotechnologies. Shortly after, Bodman announced that Sandia is the new home of the National Laboratory Center for Solid-State Lighting Research and Development. (Photo by Randy Montoya)

SPARTAN ROCKET MOTOR burn goes as planned. Project lead Steve Yesner tells the story of the year-long effort that ended with a bang and a tall column of smoke. **Pages 8-9.**

DISABILITIES AWARENESS MONTH is observed each October. This year, *Lab News* writer Iris Aboytes talked to several Sandians about their personal experiences. **Pages 10-11.**

Sandia, UT System renew vows, establish goals for next phase of relationship

The University of Texas System and Sandia have forged strong ties in the year since an initial memorandum of understanding formalized the relationship between the two entities. That relationship stands to grow more valuable, relevant, and rewarding to both parties — and to the nation — as a wide range of collaborative initiatives take shape and matures in the years ahead.

That was the high-level message that came out of a meeting between Sandia and UT System officials last month.

Labs Director Tom Hunter and VP and Chief Technology Officer Rick Stulen led a Sandia delegation to the UT System offices in Austin to meet with UT Chancellor Mark Yudof and members of his team to talk about issues related to the budding relationship, with an underlying goal of identifying ways to create a national agenda together.

Rick, presenting for Sandia, summarized peer review activities that have occurred over the past year, including reviews of pulsed power sciences, computational and information sciences, microelectronics, biosciences, and engineering sciences. A review of Sandia's materials science work is slated for early next year.

Attendees talked about ways to enhance the peer-review process to bolster Sandia's science, technology, and engineering programs and enhance the national reputation of both Sandia and the UT System.

The presentation noted a number of current collaborations with UT researchers, including:

• A collaboration with UT-Austin's Institute for Advanced Technology on a $12 million, two-year, DARPA-funded electromagnetic mortar demonstration project

• A collaboration with the UT-Austin LBJ School of Public Affairs to use agent-based methods to model health care delivery in the US

• A collaboration in which UT researchers have

DOE Office of Science awards grants to Sandia computational science projects

Projects tapped because of Sandia's unique experience with high-performance computers

By Chris Burroughs

Eight Sandia computational science projects have been awarded a total of $2.9 million annually over the next five years by the Office of Advanced Scientific Computing Research (ASCR) within the DOE Office of Science. The announcement of the awards was made last month after a competitive, peer-reviewed proposal process.

The Office of Science's "Scientific Discovery through Advanced Computing" (SciDAC) program is making the funding available to 30 projects of which Sandia is involved in eight. Participating in the 30 projects are 70 institutional partners and hundreds of researchers and students.

All of the projects involve several partners and large-scale collaborations. The projects of which Sandia is a part all entail large-scale computer simulations aimed at accelerating research in a wide range of areas including the design of new materials, developing future energy sources, studying global climate change, and understanding physics from the tiniest particles to the massive explosions of supernovae.

"Among the reasons the Sandia projects were awarded funding is our unique experience using high-performance computers," says Scott Collis (1414), point of contact for Sandia's ASCR research. "Our ongoing work in both designing and using state-of-the-art supercomputers such as Red Storm and Thunderbird [computers] has provided us expertise in supercomputing that is respected around the country."

He adds that "this expertise cross cuts Sandia sites in New Mexico and California as does the SciDAC funding."

SciDAC computational work will be done on new DOE petascale computers that are planned to

MARK TAYLOR, left, and Bill Spotz will spend the next five years trying to figure out what the future might hold for the Earth's atmosphere by collaborating on a large-scale computer model. (Photo by Chris Burroughs)

Benefits Choices

The Open Enrollment period to make changes to benefits for the 2007 calendar year is Oct. 20-Nov. 9. On **page 13**, read about the rules regarding Reimbursement Spending Accounts (RSAs) and Sandia's Vacation Buy Plan.

Also inside . . .

• Retired Sandia VP Pace VanDevender talks about his research into mysterious ball lightning phenomenon . . . . **Page 2**

• Collaboratory: Data-sharing web portal is designed to change how chemical science is done . . . . **Page 3**

• Team wins OPNETWORK award . . **Page 6**

Star Wars . . .

. . . the Strategic Defense Initiative: It dominated the geopolitical landscape at the twilight of the Cold War. Now, Sandia retiree Nigel Hey has written the definitive book on the subject. Neal Singer reviews it on **page 12**.

What's what

Most of us are at least a little more health conscious these days, and you can see one manifestation of that greater awareness by noting the number of people who pick a package or can of something off a grocery store shelf and immediately turn it around to read the nutrition facts and ingredients.

This made the news recently as a sort of sidebar to the continuing story about obesity and its effects on health. A lot of people, it seems, read all of the "nutrition facts" information except the part about serving size and number of servings in the container. As in: Those Double Stuf Peanut Butter Crème Oreos have only 140 calories. Wow!

But hold on. That's 140 calories per serving. And the serving size is _two_ — not two _handsful_!

Anyway, I'm one of those nutrition facts/ingredients readers and I know there's a lot of stuff in prepared foods that's really not "food." The list of ingredients in those Oreos, for example — little chocolate cookie and peanut butter sandwiches — takes up a little over nine lines of small type in a space about as wide as a typical newspaper column.

One of the ingredients is cocoa "processed with alkali." Part of the cookie, I guess. But, alkali? Isn't that something we try to remove from water so we can use the water? And there's "vanillin — an artificial flavor." What is that?

There's other strange stuff, too. A can of Healthy Choice Zesty Gumbo waiting in my office pantry has "natural smoke flavor," and a can of Healthy Choice Chicken & Dumplings soup lists separately in the 14 lines of its ingredients "chicken broth . . . chicken breast with rib meat . . . (and) cooked chicken." Since it lists the "chicken breast with rib meat" and the "cooked chicken" separately, does that mean the "chicken breast with rib meat" is not cooked? And a can of Campbell's Select New England Clam Chowder in my pantry contains "clam extract powder" along with actual clam meat.

In the process of looking at all those labels, I found that the Hatch brand green chile stew I like has all the ingredients you'd expect — chile, pork, potatoes, tomatoes — but also "natural flavor." I'm not sure what that is, but it sounds better than "artificial flavor."

* * *

A rose may be a rose may be a rose, but yoga's not just yoga.

I found that out from a colleague who has a chart on her wall with drawings of people in various contorted poses. I can't remember how the conversation came around to that — which is no surprise — but it did. She was going to try hot yoga, she said, and I immediately thought "hot cars = very fast cars" and, accordingly, visualized people folding and unfolding themselves into pretzel positions very fast.

That's not it. Hot yoga is just that — yoga in a room that's a sweltering 105 degrees F. Very fast yoga, she says, is "power" yoga, which she's also tried.

So, I wondered, if hot yoga and power yoga are both hot (so to speak) right now, how about combining them into hot power yoga? — rapid, serpentine stretching and folding in a sweltering room?

I wouldn't want to do it, but I'd like to have the towel concession.

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

★ Congratulations

To Brian (5356) and Katelyn (5053) Mileshosky on the birth of their first child, a daughter, Audrey Meredith, on Sept. 25.

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.

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Mysterious ball lightning phenomenon is focus of Oct. 23 Technology Symposium

When Sandia VP Pace VanDevender retired a year and a half ago he said he planned to spend quality time researching a longtime passion of his, ball lightning, an unexplained and sometimes controversial phenomenon that is neither a ball nor lightning.

Just a year ago, Pace made a Technology Symposium presentation on the subject, in which he laid out his research plans for answering fundamental questions about this mysterious phenomenon. He called that presentation "Ball Lightning — New Physics, New Energy Source, or Just Entertainment."

Now, Pace is back with another Technology Symposium presentation. This report, which is the latest in what promises to be an ongoing saga, is called "Ball Lightning: A Primordial Black Hole."

In the presentation, Pace will discuss his continuing pursuit of extreme ball lightning as a new energy source and what this exploration shows about the importance of peer review at the "bleeding edge" of scientific research.

Pace's presentation is Oct. 23, noon-1 p.m., in the Steve Schiff Auditorium.

Among discussion topics Pace will address:
• New geomorphological and carbon dating results that support the reported displacement of more than 100,000 kg of water-saturated peat in 20 minutes by extreme ball lightning — probably by magnetic induction from a very compact source.
• Peer review on the hypothesis of a gravitational equivalent of an atom (GEA) — a primordial black hole with an unstable orbiting plasma — which will be discussed for the first time.

Ball lightning Part 1 . . . (if you missed it last year)

Pace VanDevender's 2005 ball lightning presentation: If you missed the first installment of Pace's anticipated 20-year journey to discover if ball lightning requires new physics, or could lead to a better energy source, you can see it — if you have access to Sandia's internal web — at the Technology Symposium's Past Talks 2005 page (http://wwwirn.sandia.gov/organization/div2000/ctr2900/techsym/pasttalks/2005/100305.htm).

Sandia News Brief

Make a Difference Day

As Christmas is our nation's biggest giving day of the year, Make a Difference Day is the biggest volunteer day. Sandia volunteers, contractors, family members, and friends will spread "the day" over several days, completing projects on Oct. 7, 20, 21, 27, and 28. Some of the projects include: baking cookies for a holiday cookie walk for Community Health Charities of NM, folding T-shirts for the Animal Humane Society, stuffing packets for NM Cancer Center Duke City Marathon Defined Fit Fest, or preparing overnight bags for children taken into emergency custody by NM Youth and Families Department.

For a complete list of projects, and to get a sign-up form, go to http://www-irn.sandia.gov/hp-elements/announce/make-adifference06.html.

All volunteers will receive a Make a Difference Day T-shirt. Questions to Patty Zamora (3652) at 844-2146 or pgzamor@sandia.gov.

For the record

The chart accompanying the Benefits Choices 2007 article "Steps for retirees to take" on page 7 of the Sept. 29 *Lab News* contained an error. The table was headed "Action Required." In that chart, the bullet that reads "To enroll if you are currently covered under a medical plan on an after-tax basis" applies to EMPLOYEES ONLY and does not apply to retirees. Retirees are NOT required to re-enroll in a medical plan because they pay the premium share after-tax.

Data-sharing web portal is designed to change how chemical science is done

By Nancy Garcia

Although fire has been successfully exploited for millennia, a mastery of combustion is more critical today than it has ever been. A deep understanding of the science of combustion is vital to maximizing the efficiency of current and future energy production.

New tools, including lasers and computers, have greatly expanded scientists' ability to unveil new knowledge about the complex phenomena occurring over space and time within a burning flame. Now, additional ways to share that information and those tools with colleagues are ushering in a new era for how combustion science is conducted.

A $10 million effort that involved researchers from nine organizations over five years has created an online prototype portal for data sharing. Its creators' vision is to speed access to richly detailed observations and simulations, rather than requiring scientists to wait for conferences or journal publications to learn about new results. They can then more quickly build upon what their peers have uncovered.

The team called the project and the online portal the Collaboratory for Multi-scale Chemical Science (CMCS, http://cmcs.org). The term "collaboratory" was coined about 15 years ago to describe a center without walls, where geographically separated collaborators might share information, analysis tools, or applications through high-performance networks.

The idea continues to grow

Nils Hansen's (8353) research group is part of an international team that is working to identify chemical species in low-pressure flames probed with light from the Advanced Light Source at Lawrence Berkeley National Laboratory. The data are automatically captured and can be analyzed and graphically displayed in a number of ways using CMCS.

"We have so much data that it's sometimes hard to keep up," he says. "We thought it would be nice to have this data as part of the user facility and make it widely available to the user community."

The CMCS work builds upon an earlier effort at the Combustion Research Facility. Software tools were developed for the Diesel Combustion Collaboratory from 1997 to 2000. Larry Rahn (8350) was involved from the start.

"Our plan was to take that to the next level," Larry says, "so that it would be broader than a particular community and span all chemical science related to combustion. It's a great vision driven by the broad spectrum of physical scales in combustion, and it could have an impact on the nation's energy concerns.

"It's a challenge for scientists to make this information flow better across these scales and their related disciplines. If they can, it channels research into challenges a neighboring discipline faces, and promotes research that is more useful toward the ultimate mission. It provides additional tools and approaches to facilitate a strong coupling among interdisciplinary scientists, allowing them to pursue research in a 'systems science' approach."

The CMCS team included scientists to set requirements and explore prototype tools, as well as researchers to develop and build the infrastructure. Christine Yang (8116, formerly 8964) has been a coprincipal investigator and contributor to this and related projects, creating software frameworks the team members call knowledge grids.

She says scientists sometimes have a surfeit of data. For instance, Jackie Chen (8351) and her postdoctoral researchers perform terascale simulations of turbulent combustion to investigate fundamental turbulence-chemistry interactions in flames. Jackie has employed CMCS prototype software, FDTools developed by Wendy Doyle (8963), to track in space and time localized regions where fluid parcels auto-ignite. Recent simulations in three dimensions have produced tens of terabytes of data. Feature detection and tracking of salient regions of interest would greatly facilitate interpretation of large sets of simulated data.

A treasure trove of data

Rob Barlow (8351) also produces what collaboratory researcher David Leahy (a former Sandian now at Stanford University) calls a "treasure trove of data" through six-laser experiments that measure many complicated flame properties simultaneously.

Christine says that normally researchers work on a cycle of two to five years in which they produce and evaluate information to be presented in peer-reviewed papers and at conferences. She believes they see value in speeding up that process through collaboratories. Doing so takes advance coordination, both in agreeing upon standards, and preparing data by adding information that facilitates its use by others.

"In the past," adds Leahy, "scientists didn't think about sharing the data they got in the lab. First, they didn't have the Internet. Second, they weren't used to the process of sharing data — they just obtained it and decided what they thought it meant and then shared that, the very tippy-top of the iceberg, the top one percent. The primary goal had been to successfully get peer-reviewed publications. That was the measuring stick for success."

Larry suggests that another yardstick may emerge, perhaps by counting data downloads in addition to publications and citations. "There's kind of a data revolution happening in science," he says, where data are becoming recognized as an end product in their own right.

A new measure of success

Leahy agrees, saying, "If a biologist figures out a structure of a protein and it is downloaded 1,000 times, that could be a new measure of success, a feather in the cap of the biologist."

He was coprincipal investigator with Carmen Pancerella (8964) on an ongoing project funded by the National Institutes of Health and National

Sandia CaliforniaNews

Science Foundation, the Data Portal Enabling New Protein Structure Collaboration (Collaboratory for MS3D, http://ms3d.org/), now in its third year.

This project has benefited by using open-source software developed by the CMCS project team. The software framework is called the Knowledge Environment for Collaborative Science (KnECS) and is an enabling glue that knits together software collaboration tools, scientific applications, and data management tools. The framework allows team creation, workflow management, and subscriptions. The primary interface is a web portal enhanced with such interactive features as chat and announcements. The environment integrates data management software, most notably Scientific Annotation Middleware (SAM), for encoding, storing, searching, and controlling access to data. The data are tagged with information through creating metadata in XML, which can be viewed on any computer platform.

"The idea is to enable small research communities to tackle innovative ideas by using a shared, integrating infrastructure," says Larry. An advantage is that the data will be accessible for years, and not become outmoded, like, for example, the magnetic tapes or even chart recordings of the past. He says the application to combustion was important since it is involved in 85 percent of global energy use.

There are also other related collaboratory efforts underway at Sandia. Outside Sandia, researchers who share access to rare instruments, such as telescopes, or produce vast amounts of genomic data, are already far along the path of data-sharing.

"It's just a matter of time before the ideas are adopted broadly through all corners of the scientific community," Leahy predicts.

Toward that end, KnECS is being released on SourceForge.net as open-source software for further development. The hope is that enhancements will be added for use in a variety of research communities, Christine says, and that it one day may be adapted for commercial release.

NILS HANSEN still uses a traditional laboratory notebook in addition to the collaboratory data-sharing portal. Here, as Christine Yang looks on, he displays Java tools that allow the team to compare experiment and model predictions. On his computer screen, the experimental acetylene profile is compared with the flame model in a fuel-rich propane flame. (Photo by Randy Wong)

CMCS contributing organizations and funders

The Collaboratory for Multi-scale Chemical Science involved nine organizations: Sandia, Pacific Northwest, Argonne, Lawrence Livermore, Los Alamos national laboratories; National Institute of Standards and Technology; Massachusetts Institute of Technology; the National Center for Supercomputing Applications; and the University of California, Berkeley.

It was initiated in 2001 in response to a call by the Department of Energy's Scientific Discovery through Advanced Computing (SciDAC) program to develop more collaborative, team-based approaches to science. Funding was provided by the DOE's Office of Advanced Scientific Computing Research in the Mathematical, Information, and Computational Sciences (MICS) program within the Office of Science.

Donations for Emily Keyes memorial

For those who may not know, Emily Keyes, the victim of the Sept. 27 Colorado high school shooting was the niece of Dept. 8125 Manager Mary Clare Stoddard. Rachel Sowell (8125) has set up a memorial fund as a separate account in which all donations will go toward a memorial for the family on behalf of Sandia. To donate toward the Emily Keyes Memorial, you can make a deposit to Sandia Credit Union account #1098720 0002 or, in California, you can personally see Rachel. For more information please contact Rachel at (925) 294-4525.

Safety remains a top priority, Secretary Bodman tells Sandians at all-hands meeting

Secretary of Energy Samuel Bodman, visiting the Labs last week to reiterate his commitment to safety and to thank Sandians for the consistently excellent work they do, struck a chord with those in attendance at an all-hands meeting at the Steve Schiff Auditorium.

"I am often called upon," he told a nearly full house, "to describe what we do in the Department [of Energy]. And I have boiled it down to a simple phrase: that is, we are the nerds of the federal government. And I am the chief nerd. And lest anybody doubt it, we are very pleased with that, are very proud of it. And you should have been there as I was trying to explain to a delegation of people from Russia how one defines a nerd. It was an interesting time."

Bodman, who used the trip to Albuquerque to announce a major new DOE initiative in solid-state lighting (see "Secretary Bodman taps Sandia as lead lab . . ." on page 1), reminded Sandians that when he first visited the Labs, he emphasized that safety would be a priority during his tenure as secretary. Now, a year and half later, he said, "I'm pleased with the preliminary report I've seen on the work you're doing and the effort you're putting into it [safety in the workplace]."

To illustrate the importance he places on the issue, he added, "I have put the safety of the people in this department and our contractors in the hands of the person [Glenn Podonsky] I deem to be the best career manager that we have in the home office.

"I have become a devotee of career civil servants, which I was not before I came here [to government service] five and half years ago. But I am now."

"I have boiled it down to a simple phrase: that is, we are the nerds of the federal government."

Photo by Randy Montoya

Bodman said he has been criticized, sometimes from high quarters, for the emphasis he places on the issue, but is unapologetic about his passion.

"I've explained to my critics — in Congress and elsewhere — that I have always been clear that my priority is safety; it is my highest priority. That is to say, everybody who works in this department or works for the contractors to this department deserves to go home safely at the end of the workday. That is something that I feel very strongly about."

Bodman also used the occasion to thank Sandians "for the great work you are doing."

He said the administration has placed a new emphasis on investment in the physical sciences, which in recent years have not been funded at the level of the life sciences. That investment in the kind of work done at Sandia will serve the nation well, he suggested.

"Times are changing rapidly," he said. "You all know that. You know that this organization is undergoing change. I don't know what the nation's priorities or challenges will be five years from now, or ten years from now. But I am confident of this: the people of this laboratory will be critical to meeting those challenges and in answering the scientific, security, and energy needs of this great nation."

In other areas, Bodman said:

• The "customer satisfaction" level of DoD (which is DOE's primary customer) has improved over the past year or so and is getting better still.

• The US Competitiveness Initiative can play a vital role in addressing issues related to graduating more engineers and scientists from American colleges and universities.

• A sustainable US energy supply will rely on several factors over the long term. In the more immediate timeframe, increased ethanol production and solar energy hold promise, with other renewable energy sources also playing increasingly important roles. "To me, the thing I'm most encouraged by," said Bodman, a former corporate CEO, "is that the private sector is putting big money into renewable energy. Big money — billions of dollars. They're doing it for the old-fashioned reason: not because they think Sam Bodman is a nice guy. They're doing it because they think they can get rich."

— *Bill Murphy*

Solid-state lighting

Bodman laid out the case for investment in solid-state lighting R&D, noting that 18 percent of all US energy generated — valued at some $55 billion — goes to lighting homes, offices, and factories.

"We believe a set of revolutionary new technologies called solid-state lighting," Bodman said, "offer excellent prospects for meeting our future lighting needs in a less costly, more efficient way than today's incandescent and even fluorescent fixtures. . . we at the Department of Energy want to see it fully developed as quickly as possible.

"We also believe that solid-state lighting pre-

DOE SECRETARY Samuel BODMAN announces solid-state lighting initiative. (Photo by Randy Montoya)

sents an excellent opportunity for the US to assume a leadership role in an emerging industry that can generate thousands of high-paying, high-quality jobs in the years ahead and help maintain the US economy's strong record of global leadership in growth and jobs creation."

Regarding jobs creation, Bingaman in prepared remarks said he hoped the tens of thousands of high-paying jobs that will emerge in this budding industry in the next few years will stay in the US — and in New Mexico — rather than go overseas. Bingaman, an early and ardent supporter of investment in solid-state lighting R&D, said in a news release distributed in conjunction with Bodman's announcement, "It makes sense that this research will be done right here at Sandia, where scientists are already hard at work developing this technology."

During the news conference, Bingaman singled out Jerry Simmons, senior manager of Energy Sciences Dept. 1130, for his "many years of working in the vineyards" of solid-state lighting research.

Domenici praised DOE for making the investment in solid-state lighting research. He said there are many ways the nation can address the issue of the overconsumption of crude oil from overseas. He said the investment in solid-state lighting R&D is a tangible demonstration that the current adminis-

tration cares about the issue and is funding research that can actually help reduce energy use.

Domenici predicted a bright future for solid-state lighting. "There will be spin-offs" from this research, he said, and the labs involved will find "the longest waiting list they've ever seen" for partners from industry and academia eager to collaborate on research projects. "It is going to be rather exciting to watch," he said.

Wilson noted that at just one intersection in Albuquerque where the traffic signals have been changed to use LED lights the city saves about $1,000 a year.

Bodman used the occasion of the news conference to announce that DOE is renewing its "Change a Light, Change the World" challenge to Americans to reduce energy consumption by changing out at least one incandescent light bulb in their homes for a more efficient Energy Star-rated alternative.

"This is something simple that every American can do that will not only reduce their utility bills but the nation's overall use of electricity," Bodman said.

"If every household in the US replaced the five light bulbs they use the most with Energy Star models, they would save $60 a year on their utility bills and the nation as a whole would save $6 billion in energy costs."

UT & Sandia

been able to conduct some 75 experiments using Sandia's Z-Beamlet device.

• A collaboration with UT Medical Branch and University of California, San Francisco, to build a microengineered platform that integrates cell manipulation, imaging, and proteomic analysis for studying molecular mechanisms of host-pathogen interaction at single-cell resolution.

Other broad areas for future collaboration were identified, including the Global Nuclear Energy Partnership, high-performance computing, bioscience and biotechnology, and nano-engineering.

Additionally, discussions during the meeting focused on identifying new areas for collaboration

SANDIA VP RICK STULEN, right, discusses goals of the Sandia/University of Texas System relationship as it enters its second year. Rick and Labs Director Tom Hunter (at far end of conference table beside UT System Chancellor Mark Yudof) traveled to Austin to meet with UT System officials. (UT System photo)

between UT and Sandia researchers. Opportunities for collaboration were identified by creating a detailed map of science showing areas of research

where both UT researchers and Sandia researchers have published papers, but not jointly. The map pinpointed 68 potential collaboration areas, including 14 in physics and 12 in chemistry.

Meeting attendees talked about enhancing educational collaboration and educational outreach efforts, primarily focused on identifying ways to enable Sandians to take fuller advantage of UT System's educational opportunities.

Sandia officials and their UT System counterparts renewed a commitment to work an aggressive and visionary national agenda, with an emphasis on advancing the American Competitiveness Initiative (*Lab News*, Feb. 17, June 9), advancing the transformation of how science and engineering are done, and emphasizing the importance of a lifelong learning culture.

A team led by Rick will head back to Austin this month to further flesh out some of the high-level objectives set during the meeting.

Computing

(Continued from page 1)

go into operation at Oak Ridge and Argonne national laboratories by the end of the decade. Petascale computing refers to petaflops, a million billion calculations per second, and petabytes, a million billion bytes of data. This level of computing power will enable researchers to study scientific problems at an unprecedented level of detail. For example, current models allow scientists to design materials with thousands of atoms, while petascale computing will allow models with millions of atoms, yielding more accurate simulations that will promote fundamental scientific discovery.
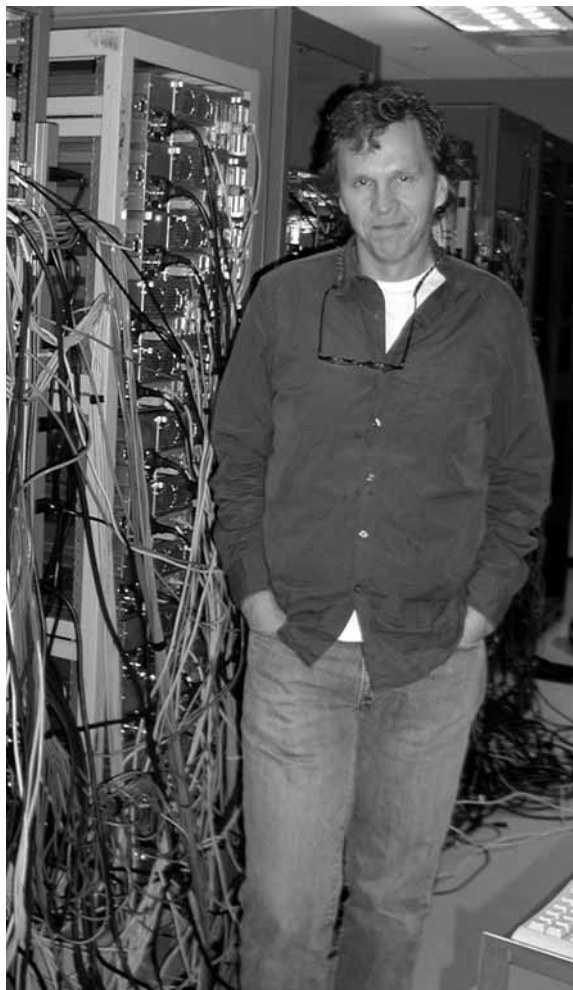
Sandia projects awarded funding for the petascale computing include:

• **Center for Interoperable Technologies for Advanced Petascale Simulations (ITAPS)**. Sandia's principal investigator is Pat Knupp (1411). The goal of this center is to deliver interoperable and interchangeable mesh, geometry, and field services that are of direct use to science applications including accelerator modeling and design, fusion energy science, groundwater reactive transport modeling and simulation, and nuclear energy. The lead laboratory is Lawrence Livermore National Laboratory. Sandia/New Mexico is receiving $725,000 a year for five years. Total funding to all participating institutions is $2.5 million per year for five years.

• **Center for Technology for Advanced Scientific Component Software (TASCS)**. Sandia's principal investigator is Rob Armstrong (8961). This project will make possible software and programming language interoperability so that simulations can be turned on and off as needed. The lead laboratory is Oak Ridge National Laboratory. Sandia/California is receiving $540,000 a year for five years. Total funding to all participating institutions is $3 million per year for five years.

• **Towards Optimal Petascale Simulations (TOPS)**. Sandia's principal investigator is Mike Heroux (1414). The heart of many scientific applications is known as the "solver," which is responsible for simultaneously solving large numbers of coupled linear equations. Unfortunately, the solver is often the chief bottleneck in utilizing supercomputers and the TOPS center is focused on developing new solver algorithms that break this barrier, thereby enabling effective use of petascale computers. Sandia/New Mexico is receiving $310,000 a year for three years for this research, which will leverage Sandia's highly successful Trilinos solver framework. The lead institution is Columbia University. Total funding to all participating institutions is $3.1 million per year for five years.

• **Combinatorial Scientific Computing and Petascale Simulations (CSCAPES)**. Sandia's principal investigator is Erik Boman (1415). This institute will accelerate the development and deploy-

ment of fundamental enabling technologies in high-performance computing by providing advanced new capabilities in load balancing and parallelization toolkits for petascale computers, and advancing the state of the art in software tools that will enable larger and faster simulations. The institute will also organize workshops, host visitors, and reach out to the academic community. Sandia/New Mexico is receiving $400,000 a year for five years for the research. The lead institution is Old Dominion University. Total funding to all participating institutions is $1.3 million per year for five years.

• **Petascale Data Storage Institute.** Sandia's principal investigator is Lee Ward (1423). This project will educate the scientific computing community on best practices for efficiently using large-scale storage systems and jump-start the community to prepare for effectively using peta-

ROB ARMSTRONG (8961) received funding to do "Plug-and-Play" supercomputing. (Photo by Nancy Garcia)

"And the most exciting aspect of this funding is that it will result in new discoveries that we can't yet predict."

scale systems. To reach out and engage the scientific computing community in petascale storage, the institute will chair an annual petascale storage workshop in conjunction with a major scientific computing conference. The lead institution for the project is Carnegie Mellon University. Sandia/New Mexico is receiving $240,000 a year for five years. Total funding to all institutions is $2.2 million per year for five years.

• **SciDAC Institute for Ultrascale Visualization.** Sandia's principal investigator is Ken Moreland (1424). Understanding the science behind ultra-scale simulations and high-throughput experiments requires scientists to understand information coming from massive datasets. The institute will put together a comprehensive parallel visualization suite that can move across platforms to allow scientific discovery at large scales. The lead institution is University of California, Davis. Sandia/New Mexico is receiving $180,000 a year for five years. Total funding to all participating institutions is $1.6 million per year for five years.

• **Modeling the Earth's climate system.** Sandia's principal investigator is Mark Taylor (1433). The goal of this project is to predict future climates based on scenarios modeled on a petascale computer. The lead laboratory in this research effort is Oak Ridge National Laboratory. Sandia is receiving $300,000 a year for five years. Total funding to all participating institutions is $4.8 million per year for five years.

• **Chemistry Framework using Common Component Architecture.** Sandia's principal investigator is Curt Janssen (8961). The development of emerging technologies such as molecular computing, nanotechnology, and next-generation catalysts will continue to place increasing demands on chemical simulation software, requiring more capabilities and more sophisticated simulations. This project will enable development of such software by providing common interfaces and infrastructure that permit the capabilities from multiple quantum chemistry codes to be easily employed in new applications. This will allow development of novel modeling approaches that can run efficiently on large-scale parallel machines. The lead institution for the project is Ames Laboratory. Sandia/California is receiving $167,000 a year for three years. Total funding to all participating institutions is $500,000 per year for three years.

Scott says an important aspect of these projects is that they will allow Sandia to develop even more collaborations in the high-computing world both in the DOE laboratory complex and throughout academia.

"We'll gain additional experience and capability in using supercomputers that will have impact far beyond the individual SciDAC projects," he says. "At the same time, we will be able to pursue cutting-edge collaborative science in a wide range of areas. And the most exciting aspect of this funding is that it will result in new discoveries that we can't yet predict."

Sandians to spend next five years figuring out the future of the Earth's atmosphere through computer modeling

Mankind is making a tremendous impact on the atmosphere by burning fossil fuels at unprecedented levels, causing carbon dioxide to spew into the air, says Mark Taylor (1433), who is heading up a Sandia project to model climate change. Most scientists believe that these emissions are causing the world to warm to dangerous levels. How that will affect the Earth's future remains to be seen.

Mark and Bill Spotz (both 1433) will spend the next five years trying to figure out what the future might hold for the Earth's atmosphere by collaborating on a large-scale climate model. They were recently awarded $300,000 a year over the next five years as part of the DOE Office of Science's Scientific Discovery through Advanced Computing (SciDAC) program.

Bill and Mark will be working with Oak Ridge National Laboratory and the National Center for

Atmospheric Research (NCAR) using a petascale computer at Oak Ridge to extend the capabilities of an atmospheric model. Other participating institutions will work on different climate components, including the ocean, sea ice, and land use/land cover change that together make up the Community Climate System Model (CCSM).

"After the first three years we expect to have an atmospheric model operating on a petascale platform, which means it will have the capability of running a million billion calculations per second," Mark says. "And at the end of five years we hope to be modeling the carbon cycle at high-fidelity [extremely accurate] rates."

The CCSM already simulates dynamics, thermodynamics, moisture, chemical, and aerosol processes. Mark and Bill anticipate that over the next five years they can help make this model more efficient on large computers while

other researchers will make it more comprehensive by adding biological, ecological and other processes.

Eventually, the new petascale CCSM will be used to model various atmospheric scenarios. The first would be business as usual — no change in how the world burns fossil fuels. Other models would determine what the world would look like if the burning of fossil fuels is reduced at varying rates.

"We don't know the answer right now, due to the many complex feedbacks that the petascale model will help us figure out," Mark says. "For example, plants absorb carbon dioxide through the photosynthesis process, but then release it back to the atmosphere when they decay. What is the net effect of a warming world on the type and amount of vegetation and its ability to absorb carbon dioxide?"

Sandia team 'DRIfTs' into major award

Labs network experts win distinguished briefing award at the 2006 OPNETWORK Conference

By Erin Gardner

Joseph Maestas (4334), Adrian Chavez (5616), and Jimmie Akins (4334) put Sandia in the spotlight at the recent OPNETWORK Annual Technology Conference in Washington, D.C., when they won a distinguished briefing award for their presentation, "Creating a Graphical Network Browser Using OPNET's Virtual Network Environment Server."

The conference each year brings together modeling, simulation, and networking specialists from industry, government, and academic communities worldwide.

The Sandia team's briefing focused on an application it developed for automatically creating detailed schematics and diagrams of Sandia's networks. However, the application, Dynamically Rendered Infrastructure Topology, or DRIfT, yields more than just a simple network diagram. It also provides a multipurpose platform for visualizing network health in near real-time and quickly performs numerous analytical tasks via advanced data derivation and correlation techniques that are difficult and time-consuming when done manually.

ADRIAN CHAVEZ, Jimmie Akins, and Joseph Maestas (left to right) with their award for presenting the most distinguished briefing at the annual OPNETWORK Annual Technology Conference in Washington, D.C.

"With DRIfT, our department is able to establish the impact of outages of one or more network systems," says Joseph, who is the principal investigator for the DRIfT project and project lead for the network modeling and simulation team efforts in Network Systems Design and Implementation Dept. 4334.

"When the network data [compiled daily by the modeling and simulation team] is combined and correlated with the data compiled by the Cyber Enterprise Management team," Joseph says, "useful state information is derived within DRIfT that helps the department manage its network and customer needs by providing essential views into the network that are otherwise difficult or time-consuming to achieve."

For example, says Joseph, "In modern IT infrastructures such as Sandia's, corporate applications are multi-tiered, meaning that a single mouse click can set off a number of transactions across the network to multiple servers and back-end databases."

Immediate situational awareness

A problem occurring in any of these components will appear as a service outage or a degradation of service to the network user. DRIfT provides immediate situation awareness for critical, major, and minor alarms and in a matter of seconds can calculate and visualize the network dependencies or critical paths for these servers and databases so they are easier to identify and understand by network maintenance personnel, Joseph says.

The critical path is defined as the minimum set of network elements (servers, switches, routers, and links) that are necessary for communication to occur. Hence, a failure of any of the elements in the critical path will affect the ability to communicate with the hosts or the services, applications, and resources resident in those hosts.

When the performance of a corporate application degrades below a noticeable level, with nearly 500 links and devices in Sandia's Restricted Network, it is important to quickly home in on the critical path between the application servers and the customer's workstation so that troubleshooting can commence.

"DRIfT makes it easy to map network dependencies given a list of servers and hosts, which is the first step," says Joseph. "Deriving the list of servers that support a given application is a much more difficult problem to solve, but such capabilities are slated to be included in future DRIfT releases."

DRIfT team clicks and customers are interested

In addition to the OPNETWORK delegation of Joseph Maestas (4334), Adrian Chavez (5616), and Jimmie Akins (4334), the DRIfT team consists of Will Atkins (5616), a co-op graduate student in computer engineering from the University of Missouri–Rolla, Burke Webster (4318), Diana Eichert (4318), and Jonathan Whetzel (6341). Will has already made significant contributions to DRIfT, including the ability to create custom network reports. Burke was instrumental in developing a network health event feed and codifying the processes for dynamically maintaining the events within the DRIfT environment.

"Diana was our sounding board, offering encouragement, opinions, and ideas about creating some of the capabilities and using certain technologies appropriate for Sandia's information technology environment," says Joseph.

Jonathan, a student intern at the time, performed the original proof of concept, using XSL Transformations to represent XML data in an SVG format.

"The entire team and its partners have performed remarkably well," said Joseph. "I've never seen a team with more synergy."

"There is no commercial application out there like DRIfT," says Joseph, adding that "there has been commercial interest in DRIfT for its 'lightweight' aspects as well as for its visualization strengths."

Agencies within DoD and the Department of State have shown interest in DRIfT and have requested it for use at their sites. Currently, Joseph is working with the Sandia legal team to set up the Government Use Notice, which will allow all US government agencies to use the software.

Retiree picnic draws hundreds to visit, remember, laugh out loud

MORE THAN A THOUSAND SANDIA RETIREES and guests turned out for the recent retiree picnic, held this year at the Rio Grande Botanic Garden near Old Town in Albuquerque. The picnic, for decades a fixture and high point of the Sandia year, was not held in 2005. A picnic had been planned to coincide with Family Day last year but was cancelled due to safety and security concerns. Organizers say they hope the picnic will again become an annual event. (Photo by Bill Doty)

Feel the burn: Rocket motor burn puts on weekend show

High-stakes operation goes exactly as expected

Note: On Saturday, Sept. 23, a joint team from Sandia, Kirtland Air Force Base (KAFB), and the NNSA's Sandia Site Office (SSO) successfully destroyed a Spartan rocket motor that had become unsafe for future use. In doing so, the team produced valuable information for the US Army Defense Munitions Center. The booster's final cautious trek along closed roads, from a bunker in Manzano Mountain to the southernmost reaches of KAFB, and subsequent destruction by burn-off of its solid fuel rocket propellant was by all accounts a risky operation. More than a year of planning, however, helped ensure the operation went off without a hitch. Steven Yesner (5020) tells the story of the Spartan's destruction from his perspective as the Sandia project lead.

Photos by Charles Eberle (5402), Martin Jinzo (5434), and Roger W. Smith (10322) caught the action during the Spartan rocket burn. Photo captions, beginning clockwise with the photo directly above, are:
• Motor container being delivered by the Sandia Logistics team. (Photo by Martin Jinzo)
• Spartan motor during burn on Thunder Range. (Martin Jinzo)
• Logistics team members prepare the motor inside the burn enclosure. (Martin Jinzo)
• The Unified Command, Rescue Recon, and EOD teams prepare for reentry following the burn. (Charles Eberle)
• Martin Jinzo connects the remote firing set. (Roger W. Smith)
• A member of the Thunder Range support group examines the motor's remains inside the enclosure following the burn. (Charles Eberle)
• A Kirtland Explosives Ordnance Disposal squad member places cutting charges on the motor prior to burn. (Martin Jinzo)
• Dave Crutchfield (KAFB, left) and John Wallace (Army) examine a fragment of the motor casing thrown from the enclosure. (Charles Eberle)

A crack in the rocket's solid propellant had retired the old Spartan booster from flight status years ago, and now we were hauling it to Thunder Range on a flatbed truck to test a disposal technique the Army hoped to use on 46 other retired motors in its inventory. The radio relayed the transport truck's position at Checkpoint 4, the halfway point along the nine-mile journey from Manzano Mountain. Now there was no going back.

For me, arranging to dispose of the rocket motor had been an arduous personal journey of research and analysis, planning and revisions, presentations and negotiations, notifications, cancellations, and rescheduling.

Burning the motor's 12,000 lbs of propellant (equivalent to 7,500 lbs of TNT), which if accidentally detonated would affect everything within a mile, was a high-visibility, high-stakes operation in every respect. I had stayed up late the night before going over the details, and I had arrived at the meeting spot before dawn, eager to get started.

At a safe distance, two miles east of the range, our escort convoy of emergency response vehicles broke off to form a command post, from which the operation would be directed. Incident Commander Bill Wolf (10336), Deputy Fire Chief Don Ballard (KAFB), Safety Officer Charlie Eberle (5402), and I ticked off tasks in the test procedure as the teams called in their reports.

The motor was unloaded by forklift into an enclosure made of huge concrete blocks. The Kirtland EOD (Explosives Ordnance Disposal) team then placed the explosive charges along the length of the motor and retreated to a safe distance. We were ready.

It reminded me, a former theater stage hand, of opening night, standing backstage in the wings, following the script to prompt for lines, actors ready for their entrance and exit cues. The audience, including 5000 VP Jerry McDowell and SSO Team Lead Gary Schmidtke, listened and watched as the finale approached.

Problems with monitoring equipment and contacting air traffic control held things up briefly. As we waited, winds shifted to a more favorable direction, and the cloud cover broke — near-ideal conditions for the burn-off.

When the sensors were ready and all personnel were safe and accounted for, meteorologist Gina Deola (10333) confirmed that conditions were "go." Range supervisor Bill McKinley (5916) and his outstanding team came through again with a direct number for the Albuquerque Sunport's air traffic control tower just as a commercial flight came in over the Manzanos on final approach. A few seconds later, the jet banked sharply to the south and started to climb. With the airspace cleared, we began the 10-second countdown.

The initial fireball caused by the explosives charges resembled a large fireworks ground display. It quickly morphed into a strong fire and column of smoke that lasted just two minutes and was visible, we heard later, from Rio Rancho.

When the firing team — explosives safety officer Roger Smith (10322), explosives specialists Ray Peabody (5434) and Martin Jinzo (5434), Kirtland EOD lead SSgt Joseph Biberston (KAFB) and his squad, range safety officer David Crutchfield (KAFB), and munitions specialist Reggie Smith (Anniston Army Depot) — returned from their forward position, you could see the awe and relief in their faces.

STEVEN YESNER, Spartan Project Lead, Defense Systems and Assessments Division, Operations, Planning, and Integration (5020)

On Sunday, following a 24-hour cooling-off period, the EOD and Rescue/Recon teams suited up for reentry, aided by KAFB Fire Department, Incident Command, and medic support. As the teams made their way to ground zero, they reported no toxicity or unburned propellant and very little debris or residue outside of the enclosure. The burn had performed better than expected; it would be up to the Army Defense Munitions Center to stage the sequel.

I had a sudden craving for BBQ and a beer, and a night off.

Story by Steve Yesner • Photos by Martin Jinzo, Charles Eberle, and Roger W. Smith

More than 140 people were involved in planning the Spartan destruction operation, and some 75 people supported the field operations. The following groups were involved:

Sandia

3300	Medic Support
3600	Media Relations and Communications
4200	Protective Force
5000	Project Management
5400	Explosives Applications
5900	Range Operations
10200	Logistics
10300	ES&H and Emergency Management
10800	Facilities Support

Kirtland AFB

377 MSG/CED Explosives Ordnance Disposal
377 MSG/CEF Fire Department
377 ABW/SFS Security Force
NWC/SEW Weapons Safety

NNSA/SSO

Safety and Health
NEPA and Environment
Waste Management
Explosive Safety
Public Affairs

'An amazing ability to think outside the box' characterizes Technologist of the Quarter Benjamin Thurston

By Darrick Hurst

When you ask Ben Thurston (1715) about the philosophy behind his work ethic, he simply tells you, "It's about doing the very best job you can . . . being able to go home at the end of the day and be proud of what you've accomplished with the other people on your team."

That straightforward philosophy is evident in the accomplishments of Ben's team and unquestionably played a role in his selection as the technologist of the quarter.

"He is a versatile worker who doesn't back down from challenges," says Ben's coworker Javier Gallegos (1715). "But most of all, everyone enjoys working with Ben. I know that if I have to work with Ben, it'll be enjoyable and we'll get the job done."

BENJAMIN THURSTON

Ben has been at Sandia for five years. He began working in Emerging Technology and Products Dept. 1715 nearly two years ago as an electromechanical technologist on the Mesovalve project.

"Ben has really done an outstanding job on our Mesovalve project, as well as several new technical projects," says Ben's manager, Thomas Fischer (1715).

In addition to his project responsibilities, Ben took on the role of coordinating the relocation of his organization's lab from MESA TOP to Bldg. 867. Guiding three students and three technologists, he assigned daily tasks for his team members and taught them about working with other organizations to accomplish project goals.

"He didn't move the equipment into a new building that had appropriate facilities prepared,"

"He's good at encouraging people and pointing out the things they do correctly while also being gentle in correcting people — he finds ways to teach them instead of criticizing them."

says Thomas. "Ben had to move the lab into one of the oldest buildings in the tech area. This means that he not only had to coordinate safely moving equipment and chemicals, but he had to also organize all of the facilities modifications that needed to be completed before the equipment could be relocated."

Ben was able to coordinate electrical facilities work, modify the cooling water system, and supervise exhaust modifications, Thomas says.

Among the accomplishments Ben is most proud of is a complex deionized water system he installed in the lab.

"I was able to work with my former mentor, Mike Hurst [5353], to locate a system that wasn't being utilized and arrange its installation here, saving my team a lot money and time in the process," says Ben.

Ben worked to design several vacuum systems for the lab's many vacuum-powered tools. He also coordinated with external experts to oversee the disassembly and reassembly of two delicate pieces of equipment.

What makes Ben's accomplishments all the more impressive is that he completed the entire relocation in less than two months while still staying on-schedule with his regular projects, learning manual wire bonding, designing and ordering components for six additional projects, and continuing Pro-E software training.

Ben also had the lab's class 100 and class 1000 clean rooms relocated, certified, and operational in less than two weeks. He obtained clean room garments, set up a garment maintenance contract, and organized the students on the team to ensure that all equipment was free of contaminants before being reinstalled in the lab. He was also instrumental in developing clean room procedures and performing clean room training for the building's occupants.

When coordinating the move of a wafer saw from 858 to 867, Ben found a previously hidden drain and obtained the permissions to use the drain in conjunction with the equipment, saving the project more than $20,000.

"Ben shows an amazing ability to think outside the box," says David Galdony (1715). "He's fun to work with, and he knows how to work hard and get the job done.

"When problems arise, he presents them to the group only after brainstorming possible solutions on his own. This not only saves valuable time, but also allows the group to focus on solutions instead of problems. When things do go wrong, he doesn't focus on mistakes, he focuses on getting the job done correctly. I'm glad he works here now. He makes it easier for me to do my job."

"Ben is very talented at making people feel as though they are part of the team and are doing a good job," says Blake Jakaboski (1715). "He is good at explaining what needs to be done, and tries to spread out the fun jobs and the undesirable jobs in order to make things fair. He's good at encouraging people and pointing out the things they do correctly while also being gentle in correcting people — he finds ways to teach them instead of criticizing them."

"I really just try to find ways to improve and make it a good place to work," says Ben. "I think it's important to be able to be both an independent worker and a team worker. Sometimes that means being a leader, sometimes that means being a follower. My mentor tried to instill those ideas in me, and I keep those in mind as I do my best to do a good job."

Air Force Institute of Technology certifies four Sandians

Four Sandians have received their graduate certificates in systems engineering from the Air Force Institute of Technology.

Talbot Smith (5443), Michael Vickers (5702), Martha Charles-Vickers (5745), and Jeff Alexander (5443) completed the program's curriculum, which lasted more than a year and focuses on the implementation of systems engineering and the advancement of systems-engineering principles.

"It was Jeff Alexander who brought up the idea of going through the certificate program, mainly to get educated about systems engineering," says Talbot. "What was most appealing about the program was that it wouldn't impact your work schedule."

The course curriculum was particularly relevant to these Sandians because of the changing needs of the Department of Defense and the Air Force, says Jeff.

"Our customer base is rapidly ramping up to systems engineering," he says. "Getting certification in that field allows us to speak our customers' language, you might say."

The classes were web-based video lectures, with satellite classes from around the country meeting for a videoconference once a week. The last class was a "capstone project," which is like a group thesis based on an actual program or project, says Talbot.

"The certificate program credits can also be used to complement a graduate program through many other colleges, if, for example,

the person wanted to finish out a master's in electrical engineering, or in another discipline in engineering," says Talbot.

The AFIT is in the process of creating resources to allow students to finish their master's degree in systems engineering using the same class format as the graduate certificate program, says Talbot.

"The master's program could start up in a couple of months, and take about one and a half years to complete," says Jeff.

Jeff is the project manager and lead engineer

PROUD GRADS — Michael Vickers (5702), Martha Charles-Vickers (5745), Jeff Alexander, and Talbot Smith (both 5443) have earned graduate certificates from the Air Force Institute of Technology. (Photo by Michelle Fleming)

in Directed Energy Special Applications Dept. 5443. He received his associate's degree in electrical engineering from Oklahoma State University and his BS in electrical engineering from the University of New Mexico.

Talbot graduated with a BS in mechanical engineering from UNM in 1986, and began working at Sandia researching radiation effects and as support for the PROTO II accelerator. He was a member of the crew at Saturn before working on the development of a smart accelerometer. Talbot was responsible for developing the first paperless plastic accelerator component. He now works in the Directed Energy Special Applications group designing, developing, building, and testing compact pulsed power machines.

Martha is the payload and integration test lead for Payload Integration/Operations Dept. 5702. She earned her master's in nuclear engineering from Texas A&M University and her Executive MBA from UNM.

Michael's work history includes missile systems, reliability assessment and human factors, neutron generator design, logistics, and facilities. He holds an Executive MBA and a BS in electrical engineering, both from UNM. Michael received an associate degree in electronics and refrigeration from Central New Mexico Community College, formerly TVI, in addition to In-Hours Technical Education Courses at Sandia.

— Darrick Hurst

October is Disabilities Awareness Month

Sandians bypass the chair and see only Mitzi

By Iris Aboytes

"I have time for just one more dismount," Mitzi Bower (3654) thought to herself before wrapping up gymnastics practice to teach a class of intermediate gymnastics students. "That was the last dismount I would ever do," she says.

Lying on the ground, she knew immediately something was wrong. Her gymnastics coach would not let her move. He would not even let her straighten her limp body. Total silence echoed through the gym as frightened students clung to each other. "I was scared," says Mitzi. "It was hard to breath, but I felt no pain — in fact, I felt nothing."

MITZI on the parallel bars during gymnastics practice in 1974.
(Photo courtesy of Mitzi Bower)

That was 30 years ago. "In my dreams, I still glide on the uneven bars and leap on the beam," says Mitzi, "but I wake up to reality — I am a quadriplegic. This is certainly not the lifestyle I had in mind for myself. I have only two options. Live it or leave it. The latter is not my decision to make. So, with the grace of God, I live, I love, and I learn."

Mitzi attended the University of New Mexico and received a degree in fine arts. "Arts and creativity are my passions and my motivations to move on," she says (see *Lab News*, March 19, 2004). When she got her degree, people suggested she submit a résumé to a place called "Sandia."

"To tell you the truth, I didn't have a clue what a Sandian was, but I found out and became one. I have been at Sandia 23 years."

Currently Mitzi is in Creative Arts Dept. 3654, but is matrixed to the Engineering Sciences Center providing graphic support. "The people I work with are very rapid-paced intellectuals, but I don't sense the presence of intimidation," says Mitzi. "They look after my needs without smothering me. They relate to me as though my chair did not exist. I am afforded the same respect given any Sandian, not a disabled Sandian.

"Had I successfully executed the last dismount from the balance beam, I believe I would still be an athletic individual — still pushing my limits, of course, and suffering the same aches and pains that any person would be experiencing," says Mitzi. "But, I might be more aggressive in my artistic endeavors, much like I was in gymnastics. However, it would be my only competition."

"I don't need to be number one," she says. "I just need to be true to myself and to those that I love."

MITZI AT HOME with her dog Kahlua, surrounded by some of the creative works she has accomplished. (Photo by Bill Doty)

'Lameness is an impediment to the leg, but not to the will' is a guide to live by

By Iris Aboytes

Gordon Joseph Detry is 93 years old. He was born Feb. 21, 1913, in Green Bay, Wis. He has cerebral palsy that crippled his legs. His knees and toes turn inward. Gordon is the father of 4000 VP Ron Detry.

Disabled employees make the best problem solvers

"I solved my first problem when I was in kindergarten," says Bobby Baca (2712) "I had to learn to tie my shoes. Normally this wouldn't have been a problem, but I had to do it with one hand. The 'tricks' that we were taught didn't really work for me, but I was able to figure out what did.

"To function successfully, a disabled individual has to be able to adapt to his disability and figure out how to accomplish a task," says Bobby. "Because we do this on a daily basis, we have learned to become excellent problem solvers. We bring a very unique problem-solving skillset to the workplace."

"I am comfortable with my disability and can function in any environment," he says (see *Lab News,* Nov. 26, 2004). "We are all normal but have different limitations. So when you look at a disabled individual, appreciate his abilities as you appreciate your own."

He grew up in a time when it was customary to assume children with cerebral palsy were "dumb" because of their difficulty in speaking. People would say anything in front of Gordon. The doctor advised his mother he would not live to age 21.

Gordon learned to ride a bicycle. He played catcher in baseball, and walked to and from school. Instead of beginning school at age six, he began school at age seven because it was hard for him to walk.

He finished high school and attended St. Norbert's College in Green Bay on a rehabilitation stipend, but the money ran out.

Gordon's father lost his job with the railroad and moved to a farm to support his family. Gordon helped. He was able to toss hay up onto the wagon, pasture the cows, and wheelbarrow manure.

He went back to school and was trained as a teacher. That was in 1936 during the Depression. He had a hard time finding a job. He looked younger than his age and was lame.

In late 1936, again on a Rehabilitation grant,

GORDON DETRY stands behind the counter of his pharmacy in Manitowoc, Wis., in the early 1950s. Gordon ran the pharmacy until his retirement.
(Photo courtesy of Ron Detry)

he went back to school at the University of Wisconsin and got a pharmacy degree three years later. He was one of five in a class of 13 to pass his boards on the first try. He got a job the very next day. He was offered $100 a month, but he negotiated that to $125.

"My father got a draft notice from the Selective Service every month during WWII despite his disability," say Ron. "The draft board had a quota to fill, and he was part of that quota."

Gordon worked at that pharmacy and others until 1947 when he bought his own pharmacy. "Dad's store was very small and should have gone out of business in the 1950s," says Ron. "He survived because of hard work, long hours, and his interpersonal skills."

Gordon Detry

Being on his feet all day took its toll; Gordon's knees failed when he was about 60. He got a Social Security disability retirement at age 61, but he kept busy teaching genealogy at the senior center and making rosaries. Over time he went to a cane, a walker, a regular wheelchair, and then to an electric wheelchair. "He was a demon on the electric wheelchair," says Ron. "We would go down the street to check things out, and I would have to run to keep up with him."

"I learned much about people, work, and means to and meaning of success from him," says Ron. "He taught me the importance of education, learning, responsibility, ethics, and he gave me confidence. He couldn't run with me, or play ball very well, but he took me fishing."

"My father has lived 72 years longer than the doctor said he would. He raised a family, provided well for his own early retirement, and despite cerebral palsy has lived life to the fullest in his own special way. I asked him once how he was able to overcome his cerebral palsy — was it through strong support from his parents, for example? He said, 'No, I just decided to do it.' He is a living demonstration of what was said by the Greek stoic philosopher Epictetus: 'Lameness is an impediment to the leg, but not to the will.'"

RON DETRY stands beside his father, Gordon, 93.
(Photo courtesy of Ron Detry)

Refuse to be a victim

Flavia Figueroa is 88 years old. She is the mother of 10000 VP Frank Figueroa. She has severe arthritis. "Her hands are gnarled and her back is bowed," says Frank, "but she still washes her car and cleans her house, all by herself. She does not feel sorry for herself and insists pity parties are not for her. She has a life to lead."

"We all have disabilities . . . we become whole only when we overcome our disabilities and move on."

Frank Figueroa

"We all have disabilities," says Frank. "I have color blindness. If the yellow traffic signal light was not always in the middle position, I would not be able to drive. We become whole only when we learn to overcome our disabilities and move on. Disabled individuals refuse to be victims. Their tenacity reaches a level that is unknown to most of us."

"My mother enjoys life, and she leads it her way, setting an example for her family and friends," says Frank. "Her gnarled hands and bowed back hold the heart and spirit of a very special lady."

ᛘᛟ Feedback

Break-even times for powering down PC's; EAL Electronic Access List to enter the base

Q: *In a recent feedback there is a question and answer about the break-even time for when to turn off your office lights (see "At what point do you gain an energy savings in turning your lights out? — www.irn.sandia.gov/corpdata/feedback/ energy-conservation/light-savings.html). Gary Hoe, the author of the response, wrote that 30 minutes was the break-even time. I posted that number right above the light switch to my office as a reminder to cut off the lights when leaving for more than 30 minutes. Could a similar number be determined for my office PC?*

A: The easily remembered 30-minute figure for fluorescent lights operated in Sandia's flex time environment is meant to balance energy savings against maintenance minimization. When applying this to computers, however, a bit of technological history is needed.

Back in the days of DOS, dual floppy-disk drives, dot-matrix printers, and 13-inch monochrome CRT displays (less than 20 years ago!), maintenance and component failure were a larger part of computer operating costs than they are now. We learned to install screen savers to avoid burning an unchanging image into the screen's phosphor, we learned to park the disk drive heads to avoid dropping them on the disk during powerdown (that's where "crash" came from), and we learned to turn the machine off when we weren't using it so as to lengthen the calendar time between other failures. The whole setup drew maybe 250 watts.

Now we have remarkably robust hardware and gigantic memories, screen savers are only a form of entertainment on LCD monitors, and most failures are software- or network-related. But a dual Pentium-IV workstation with dual monitors and lots of accessories and a laser printer can draw almost a thousand watts when printing at high speed, and 400 watts or more when idle. Now the cost of energy far outstrips the cost of maintenance.

Fortunately, Windows XP-based machines with the Energy Star sticker can be programmed to power themselves down after a period of inactivity. Here's how you set that feature up:

• On the desktop screen, right-click in an unused space to open a small window, and click on "Properties."

• Then, select the Screen Saver tab, and on that screen select the Power . . . button.

• Select the Power Schemes tab, and on that screen select the Home/Office Desk power scheme.

• On that same screen, select some convenient times in the windows for turning off the monitor and hard disk, standby, and hibernation. For my machine, I turn the monitor off after an hour, the disk off after 30 minutes, and let it go into standby after two hours. (I never let it go into hibernation because I always shut it down each night, and returning from hibernation isn't a true reboot operation. If your machine serves as a shared resource or is updated through the SRN, you too may have to avoid hibernation.)

• Select the Advanced tab and check the box that prompts for a password when coming out of standby.

• Click Apply, and then click OK until all the windows close.

Now when I'm gone to a long meeting, or to lunch, my computer's power requirement drops from about 400 watts down to about 170 watts — and most of that is my old laser printer's keep-warm circuit.

Which is a segue into the final piece of advice: In standby, the laser printer is the largest power load. There are three things you can do to reduce that power usage:

• Dump the laser and get an ink jet; they use about 10 percent as much power, or

• Order through JIT a WattStopper® motion-sensing power strip, model IDP-3050-A or equivalent, and plug your printer and task lights in the switched side and your computer and accessories in the un-switched side, or

• Untangle the mess under your desk and yellow-tape your plain power strip where you can easily reach it after your computer turns itself off when you shut it down at the end of the day. Mine is taped along top of the computer chassis at the side of my desk.

When I leave each night, the only thing drawing power is that pesky message light on my phone. So instead of running all 168 hours/week, my computer avoids drawing any power at all for maybe 115 of those hours. This saves over $2/week at PNM's current rates, or about $110/year with the Christmas shutdown. That is more than the cost of the motion-sensing power strip.

— Gary Hoe (10864)

* * *

Q: *Sandia travelers from California must use the EAL Electronic Access List to enter the base. They can enter only at the Eubank gate. This system is cumbersome and time-consuming. Those of us who travel for the company frequently already have enough issues to deal with. Please make this a priority and fix this issue with KAFB command so that we get a card or badge that will allow frequent travelers a way to get into the base without having to use the EAL.*

A: The Sandia Badge Office personnel have developed a generic badge for our California and other nonresident employees and frequent visitors to allow ease of access to KAFB. The Kirtland Security Forces commander has agreed to the use of this badge and the new process is in place for non-resident Sandians. For details on the process, see the document at www-irn.sandia.gov/iss/depts/badgeoffice_personnel_sec/docs/NRVP%20Site-Wide%20Announcement.doc.

— Ed Tooley (10855)

Facts about ECP and United Way

Sandia has contributed 20 percent of United Way of Central New Mexico's total budget for the last 25 years.
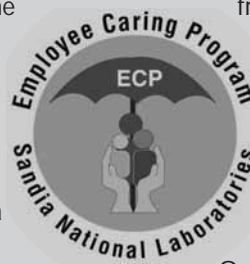
United Way's Corporate Cornerstone Program pays all United Way's administrative costs. All your contributions go to the programs you have designated. Two dollars per pay period provides screenings for breast cancer, heart disease, and osteoporosis for one woman with limited or no health insurance, or a backpack filled with weekend meals for one underprivileged child.

United Way of Central New Mexico has been the top United Way in the nation the past two years. It set a record with an 18 percent increase over the previous year.

Each year, more than 200 volunteers (many from Sandia) provide a rigorous, informed, and onsite review for programs that seek United Way funding. Programs are examined for need, efficiency and effectiveness, and fiscal accountability. This process, unique to United Way, provides quality assurance on behalf of all donors.

Sandia's ECP campaign continues through Oct. 27. To sign up or for more information, go to https://ws31snlnt.sandia.gov/ecp/start.do.

Employee Caring Program — ECP — Sandia National Laboratories

A book review
The Star Wars Enigma: Behind the Scenes of the Cold War Race for Missile Defense, by Sandia retiree Nigel Hey

Reviewed by Neal Singer

"Star Wars" — more formally known as the Strategic Defense Initiative — was a major project in the 1980s for American science, and a major problem for Europeans and the Soviet Union. It involved the commitment of billions of dollars by the US government to (among other amazing acts of wishful '80s defense) place lasers in space to shoot down intercontinental missiles in their boost phase.

Proposed by a president with no background in science as a defensive umbrella that would shield the entire United States from ICBM nuclear attack, SDI was vigorously attacked as unscientific, a waste of money, and destabilizing to world peace in speeches and articles by Russian, European, and even top US scientists.

Yet the political reality was far more complicated than most realized, and former Sandian Nigel Hey has written a historical volume that weaves together the voices of politicians and scientists of that time to present a fascinating behind-the-scenes view of events as they unfolded.

Reporting from published works, letters, and his own interviews in Washington, England, Europe, and the former Soviet Union, Hey tells the story of an American president who hated nuclear weapons so much that he thought the whole concept of Mutually Assured Destruction immoral. Philosophically and practically, President Reagan was willing to spend any amount to protect Americans against nuclear holocaust, rather than launch a counter attack after one happened. This made him vulnerable to verbal attacks by Russians, Europeans, and Americans of causing a new arms race by trying to annul the deterrent value of Russian ICBMs. To counter this charge, Reagan flummoxed his opponents further by offering — with apparently simple good fellowship — to share whatever results US scientists came up with, so the Soviet Union too could be safe against surprise nuclear attack. Could the Russians believe him?

What made the Russian position doubly complicated — as Hey describes in interviews with a number of Russian scientists and political figures — is that the Soviet Union had previously spent billions on secret work by Russian scientists to accomplish exactly Reagan's task during the previous decade. They failed.

This left Russian leadership with an interesting problem. Though Americans tend to be keenly aware of their country's faults, Hey paints

NIGEL HEY, author of *The Star Wars Enigma: Behind the Scenes of the Cold War Race for Missile Defense.*
(Photo by Randy Montoya)

a picture of America as seen by Russian politicos that was quite a different matter. Though Russian scientists had failed in extended attempts to utilize lasers as weapons, Russian leaders could only wonder why the practical Americans were committing so much money to a project if they didn't believe it would work. The Americans had invented the atom bomb, landed on the moon, and started the Internet. Perhaps they would come up with something that would render Russian ICBMs impotent, or — equally bad — some side result that would radically change the face of warfare. What else, after all, did the Soviet Union have that made it a world power except ICBMs? Could the Soviet Union afford to ignore the Star Wars challenge?

Hey details the efforts by various Russian leaders to derail SDI, which included not only political appeals but even, apparently, assassination attempts by terrorist groups on scientists and industrialists working on the project in Europe.

He describes the tentative offer by an increasingly intent Gorbachev to sign a treaty that would scrap Russian and US nuclear weapons — if only Reagan would give up the Star Wars project. When, despite his known hatred of nuclear weapons, Reagan refused, the Russians were more convinced than ever that the Americans had found something viable in the project.

Hey quotes the Russian academician Evgeny Velikhov, a leader of Russian nuclear research: "Some people in the Ministry of Defense, and some people in the Ministry of Foreign Affairs — and I think in Intelligence — were captivated by their impression of the Americans' drive to get the job done. Some were absolutely convinced that America had the capacity to install the space-based antiballistic missile defense by 1990. They remained convinced from 1983 to 1990, during the time of Gorbachev. I tried to convince them otherwise, but they did not believe us [SDI skeptics]."

Other Russians postulated darker motives. "Even some military spokesmen thought it was obvious that SDI would not work for the purpose for which it was advertised," says Roald Sagdeev, former director of the Soviet Space

Institute. "So they reasoned that those who were trying to push it forward probably were planning to use the cover of SDI to deliver nuclear weapons from orbit."

But why, in the land of the free, wasn't the fraud — if it was one — publicly exposed and squelched? Hey writes, "The [American] detractors had an image problem. They were detached 'academics seeking to expose the truth'; they had a 'liberal,' 'left-wing,' even 'commie' agenda. And so the majority of the American public was unsure about taking them seriously."

To Moscow, Hey writes, the question was: "Could they crank up their directed-energy-weapons program and compete successfully with the United States in this new department? . . . . The answer was a bleak 'no,' not even if they wanted to."

Broadening Hey's story further is British Prime Minister Margaret Thatcher, not interviewed but spoken for by close associates. The "Iron Lady" apparently believed that Europe's best defense was nuclear weapons, and she played a complicating behind-the-scenes role in the Gorbachev-Reagan talks, advising the Great Communicator (as Reagan was sometimes called) on that basis.

The book is made more interesting to Sandians by its population of figures known at

Robert McFarlane on Nigel Hey's 'Star Wars Enigma'

"After a fifty-year struggle under a nuclear sword of Damocles, Western civilization triumphed over the Soviet Union and ended the Cold War. In the most rigorous scholarship yet to appear on this climactic period of history, Nigel Hey defines the critical role played in this historic victory by President Reagan's Strategic Defense Initiative. The Star Wars Enigma traces the origin, the proponents and opponents, and the drama that accompanied the overturning of forty years of American defense strategy, and in so doing, removed the threat of an East-West nuclear holocaust."
— *Robert C. McFarlane, national security advisor to President Ronald Reagan, 1983–1985*

least by reputation by many here, including former DOE administrator Vic Reis, Edward Teller, and Sandia VP Gerry Yonas. It may be local pride, but Gerry seems far and away the most interesting character in the book, or at least the most willing to reveal his doubts and enthusiasms about the project. He questions, but acts. He is always aware of the conflict between scientific truth and political reality, and the quandary for scientists involved in a technical project they are unsure will work, yet that has a higher national purpose and that might be characterized, quite simply, as a bluff. He has no trouble agreeing to serve as chief scientist and "acting deputy director" of the Star Wars project and pushes the project forward with energy and skill to consider kinetic "kill" weapons – the concept of intercepting a missile with a missile, a more practical method of interception than lasers at that time. But later, standing in effect knee-deep in the rubble of the former Soviet Union, brought down by a combination of misrule and mismanagement of which the "sting" of Star Wars may have played a role, Gerry says, "The course of history is determined by the evolution of circumstances that are controlled by nobody."

The most authoritative voice in the book remains Hey's, as he unravels step by step the enigma of how a program with little basis in reality went forward unchecked to ultimately help achieve — perhaps ironically — its original objective: to protect the US from a massive Soviet ICBM attack.

Paul Robinson's perspective

"Nigel Hey has beautifully captured the untold story of the technology race between the United States and the USSR. A tale of secret science at its best and at its worst, it tracks both nations' efforts to achieve defensive superiority. Whether Reagan's Strategic Defense Initiative was a legitimate effort to find ways to defend against ballistic missiles, or whether it was a devilishly clever ploy to cause the Soviets to spend themselves into bankruptcy, we will likely never know. But whatever the motives, SDI became the dominant theme of military research and development in the '80s and early '90s, until it became the finale of the Cold War competition."
— *Ambassador C. Paul Robinson, president emeritus of Sandia National Laboratories and chief negotiator for US–USSR nuclear testing talks in Geneva, 1988–1990.*
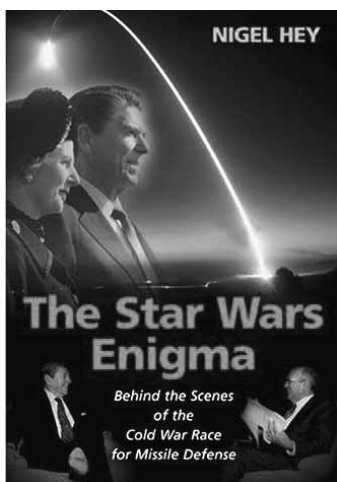
Benefits Choices 2007 — Open Enrollment is Oct. 20-Nov. 9

What you need to know about Reimbursement Spending Accounts

RSAs can be created for health care and/or day care expenses

Will you be paying for out-of-pocket medical (health, dental, vision) or day care expenses of $100 or more next year? If so, you can take advantage of Sandia's Reimbursement Spending Account (RSA) benefit that allows you to set aside money on a pretax basis through payroll deductions.

The RSA allows you to reduce your reportable income for the purpose of federal, Social Security (FICA), and, in most cases, state taxes.

All regular, limited-term, postdoctoral, and full-time, year-round faculty sabbatical employees may participate in the RSA Plan in 2007 by enrolling during the Benefits Choices 2007 Open Enrollment period (Oct. 20 through Nov. 9). Changes at other times during 2007 may be allowed for qualifying events if the change is consistent with and on account of the event — for example, a birth or marriage to increase the amount of contribution and divorce or loss of eligible dependent to decrease the amount.

Be conservative in determining your annual election amount because any amount remaining in your RSA at the end of the plan year must be forfeited per IRS rules.

Flex facts

• Your flexible reimbursement account plan can help reduce your taxes and increase your take-home pay.

• On average, people save 23 percent in taxes, (assuming federal, state, and Social Security taxes), by paying their out-of-pocket health care and child care expenses on a pretax basis through a flex plan. Actual tax savings depend on several variables, including state and local tax rates and the tax bracket of the participant:

- 15 percent tax bracket can save up to 22.65 percent
- 27 percent tax bracket can save up to 34.65 percent

• You may participate in the flex plan even if you do not enroll in Sandia's medical or dental plans.

• Financial planners and tax advisors advocate participation in flexible spending accounts.

• You can pay your work-related daycare expenses, and your out-of-pocket medical, dental, and vision expenses on a pretax basis through a flex plan.

Health care RSA

Your annual election amount in the Health Care RSA (HCRSA) can be any whole dollar amount from $100 to a maximum of $4,000 per employee. Your total HCRSA annual election amount is available for your use at the beginning of the 2007 plan year. The money in the account may be used to pay for eligible out-of-pocket health care expenses for you and your eligible dependents. Out-of-pocket health care expenses include over-the-counter medicines and drugs to alleviate or treat (current or imminent) sickness or injuries; doctor or prescription drug copays; medical or dental deductibles; amounts over the dental Type B Schedule coverage; or expenses for additional eye exams, extra pair of prescription glasses, or prescription contact lenses.

The IRS and the Treasury relaxed the "use it or lose it" rule. Now known as the "grace period," employees have an additional two months and 15 days following the end of the plan year in which eligible expenses may be incurred. The grace period will apply to the health care reimbursement account only. The grace period allows active participants $2\frac{1}{2}$ months longer to incur eligible health care expenses before the account is closed. In other words, if you enrolled as of Jan. 1, 2007, and are an active participant as of Dec. 31, 2007, you have until March 15, 2008, to incur eligible health care expenses.

Examples of eligible expenses include, but are not limited to, deductibles, coinsurance (your 15 percent or 20 percent share of claim costs),

amounts over usual and customary, pharmacy co-pays, dental, and amounts over plan maximums, etc. You may also claim some over-the-counter medications, such as antacids, pain relief, cold remedies, and allergy medications as eligible expenses for the HCRSA. A complete listing of eligible and ineligible expenses may be found at: www.payflex.com/mypayflex/default.asp?c=eligibleexpenses.

How to estimate your out-of-pocket medical expenses for the plan year:

• Be sure to include your deductibles and co-insurance amounts for your medical and dental services.

• If you have predictable expenses for prescribed medications, eligible over-the-counter medications, contact lens solutions, chiropractic visits, or other routine care, add the amount not covered by insurance to the total.

• Review your prior year's medical history for ideas of health care expenses you have had.

Day care RSA

Your annual election in the Day Care RSA (DCRSA) can be any whole dollar amount from $100 to a possible maximum of $5,000 (per family per calendar year). The $5,000 maximum is available to single employees or to married employees filing joint federal tax returns. Married employees who file separate federal tax returns are limited to an annual maximum of $2,500 each.

In either case, your election cannot exceed your or your spouse's earned income. If your spouse is attending school full time you can deem his or her income to be $240 a month if you have one eligible dependent, or $500 a month if you have two or more eligible dependents. You can be reimbursed for expenses incurred for services rendered only up to the current balance in your DCRSA. With the DCRSA, you are reimbursed for expenses incurred to have your child (under age 13), your spouse or other eligible dependent (who is physically or mentally incapable of self care and resides with you at least eight hours each day) cared for while you are at work. The caregiver may be a licensed day care center, a relative whom you don't claim as an exemption on your federal income tax return, or your child who is at least age 19.

The Tax Credit Wizard (www.payflex.com/mypayflex/default.asp?c=taxcreditwizard) is a tool to help you determine:

• If you qualify for a Dependent Care Reimbursement Account

• If it is to your advantage to elect a Dependent Care Reimbursement Account

Even if you qualify for a Dependent Care Reimbursement Account, it may not be to your advantage to make an election. There are several factors to consider and detailed knowledge of the

federal tax laws is required in order to make an accurate determination. In an effort to simplify this issue, we have developed this tool to help you make this decision.

Due to the complexity and local variation of tax laws, the result of this process cannot be considered absolute and may not address your individual circumstances. Only a qualified financial or tax consultant can make an absolute determination with regard to any advantage or disadvantage to your participation in a Dependent Care Reimbursement Account.

To use this wizard, click the Next button on each screen and answer the questions that follow.

The Savings Calculator (www.payflex.com/mypayflex/default.asp?c=savingscalculator) will help you:

• Itemize unreimbursed health and dependent care expenses

• Estimate your annual increase in spendable income if you should choose to participate in the Flexible Spending Account plan.

PayFlex debit card

All enrollees will receive a new PayFlex debit card in January 2007 for the plan year. This debit card is an alternative reimbursement method. You may also file paper claim or an EXPRESS claim online for reimbursement. Use whichever method is most convenient for you. You should retain all RSA claims documentation with your tax records as PayFlex may request substantiation for your claims according to IRS guidelines.

Please read carefully the agreement that accompanies your debit card. The agreement describes your responsibilities when using your debit card, the immediate notification requirement for lost or stolen cards, and the reporting of unauthorized usage or errors to PayFlex Systems.

More RSA info

For more information on the HCRSA and DCRSA, refer to Sandia's RSA Summary Plan Description (SPD). The RSA SPD can be found at www.sandia.gov/benefits/spd/pdfs/RSA2003.pdf or by calling the Benefits Customer Service Center 844-HBES (4237).

Instructions for enrolling in the RSA are available in your Benefits Choices 2007 Open Enrollment HR Self-Service website.

Vacation Buy Plan — buy up to 44 hours

Every year during Open Enrollment, employees have the option to buy vacation. The Vacation Buy Plan (VBP) is an optional plan that allows employees to purchase vacation on a pretax (before federal, state, and Social Security taxes are deducted) basis. Why would you want to purchase vacation as opposed to taking time off without pay? The vacation hours you purchase are deducted evenly from your biweekly paychecks throughout the calendar year rather than having a financial impact all at once.

Employees may purchase a minimum of eight hours up to a maximum of 44 hours of vacation. The cost of each vacation hour is determined by dividing your full-time annual base pay as of the beginning of the calendar year by 2,080.

Purchased vacation can be used once carry-over, accrued/posted, and convertible vacation have all been depleted. Unused elected vacation hours will be sold back in the last paycheck in December at the same rate as purchased. Upon termination or retirement, elected vacation hours not used but paid for will be sold back at the same rate as purchased.

For more information on the Vacation Buy Plan, refer to Sandia's VBP Summary Plan Description (SPD). The VBP SPD can be found at www.sandia.gov/benefits/spd/pdfs/VacationBuy.pdf or by calling the Benefits Customer Service Center 844-HBES (4237).

Instructions for enrolling in the VBP are available in your Benefits Choices 2007 Open Enrollment HR Self-Service website.

Mileposts

Photos by Michelle Fleming
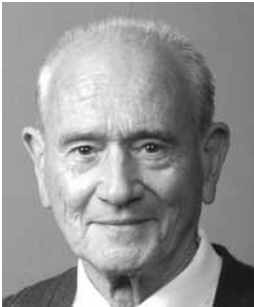
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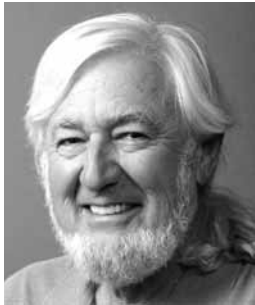
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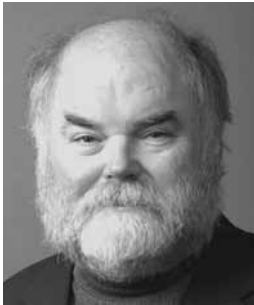40   5736

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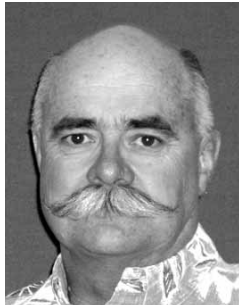36   5624

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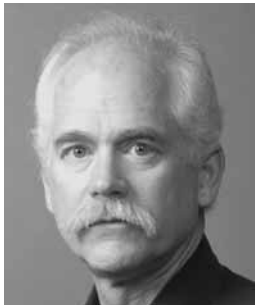Charles Ringler
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Joyce Hope
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Ken Ystesund
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Naomi Christensen
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Ernest Correa
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Robert Cutler
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Richard Farwell
25   10844

John Garcia
25   10862

Barry Hess
25   4610

Louis Malizia
25   2523

Vernon Dale Marsh
25   10848

Marcos Martinez
25   10864

Robert Mattison
25   25411

Robert Paulsen
25   2118

Clifford Renschler
25   2720

Adrian Romero
25   27221

Paul Shoemaker
25   210

William Slosarik
25   5520

Neil Sorensen
25   1823

Evan Ashcraft
20   10520

Fred Dickey
20   2626

Sheryl Hingorani
20   2901

Alvin Lang
20   5731

Daniel Segalman
20   1525

Darrick Jones
15   10853

Angela Ortiz
15   2027

The lights of Albuquerque

The City of Albuquerque went to great heights to close out its Tricentennial celebration — to the ridge along the top of the Sandias from Sandia Crest to the Tram House. The ridge was strung with 200 battery-powered LED arrays on the night of Oct. 6. Several Sandians, including Alice Kilgo (1822, left), helped with the setup. Lab News photographer Randy Montoya captured the event. Randy, standing near the Elena Gallegos Open Space area for the photo above, used a 30-second exposure to photograph the LED lights along the ridge. The long exposure meant the camera also recorded the light from a full moon as it cast a haunting glow on the landscape and lit up the clouds. With the naked eye, the sky was much darker than the photo would suggest, and the landscape was not nearly as illuminated as it appears here.

At last — Sandian makes dream come true by recording first CD

By Iris Aboytes

Lavender Fernandez (12850) comes from the old Portuguese colony of Goa, India, where she was singing by the age of four. Recently her childhood dream of recording a CD came true.

The CD, *At Last,* is an eclectic mix of jazz and Latin music. "I think the title is very appropriate, because at last I have fulfilled my dream," says Lavender.

Her parents encouraged her to sing in church choirs and in school plays, but it was her brother Tony who turned her on to jazz when he listened to Voice of America radio. By age 17 while still in India, she was singing with several local bands in area clubs.

LAVENDER FERNANDEZ

"Singing has always been my passion," she says. "I love jazz, contemporary, rhythm and blues, folk, classical, and Latin music." In addition to English, she sings in Portuguese, Spanish, French, and Hindi.

Her father, Elvin Fernandez, worked for the Remington Rand Typewriter Company. Her mother, Rosalind Noronha, was a housewife. Lavender is the youngest of six children.

After graduating from St. Joseph's Convent High School in India, she worked for Air India as an air hostess for seven years. "It was a wonderful experience," says Lavender. "I traveled to Europe, Australia, UK, Africa, and America. During lay-overs I found opportunities to sing in lounges. That was such a thrill. I was known within Air India as the singing hostess."

She moved to New York and ran a family-owned company, specializing in exporting US products to West Africa and the Caribbean. Her trips to the Caribbean and Africa put her in contact with rich musical rhythms. It was always the music that made her heart dance.
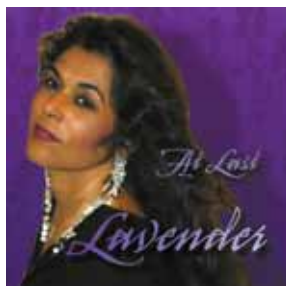
LAVENDER'S first CD.

Lavender came to Albuquerque to visit one of her sisters, fell in love with the mountains and sky, and decided to stay. "It was a turning point in my life," she says. "I realized that I did not have the talent, time, or money to launch a musical career, so I put my musical career on hold and pursued an education."

She became a US citizen, earned her bachelor's and masters degrees, and came to work at Sandia in 1992. She is currently the Sandia Audit Liaison.

Longtime friend Phil Lenk helped

Two years ago, Lavender ran into her longtime friend, musician Phil Lenk, at the Albuquerque Hilton Ranchers Club. He was playing the piano with his band. They had lost touch for a few years. Her dream to release a CD surfaced during their conversation, and he offered to help her get her voice back in singing shape.

She began to sing with Phil on Tuesdays, and later with his band on Friday and Saturday nights. "Singing enriches my soul like nothing else," says Lavender. "I am so pleased to have recorded a CD. It was a lot of work, but I made my dream come true."

She sings in Indian saris as a tribute to her supportive and loving family and her rich Indian heritage. The little four-year-old girl, who once sang along with the radio, hopes that someday someone will be singing along with her.