A revolution is quietly going on that promises to change the way we light our homes, offices, and world. And Sandia is at the forefront.

Some 20 Labs researchers are working on a Grand Challenge project in the Laboratory Directed Research and Development Program (LDRD) that will establish the fundamental science and technology base to replace the country’s primary lighting sources, incandescent bulbs and fluorescent tubes, with semiconductor light-emitting diodes (LEDs) — solid state lighting.

Senior Scientist James Gee (6200), together with Department Managers Jerry Simmons (1123) and Bob Biefeld (1126), head up the project.

“In some ways the revolution in lighting can be compared to the revolution in electronics that began 50 years ago and is only now reaching maturity,” James says. “Just as for electronics, glass bulbs and vacuum tubes are giving way to semiconductors. And as in the microelectronics revolution, many of the possible applications for solid-state lighting will occur in ways that have not yet been envisioned.”

LEDs are already found in toys, electronics, traffic lights, automobile signals, and large outdoor displays — devices that require durability, compactness, and cool operation. In some applications they also enable significant cost savings due to their lower consumption of energy: LED-based red traffic lights, for example, consume one-tenth the energy of their incandescent counterparts, enabling them to pay for themselves in as little as one year.

As LED technology matures, revolution leaders envision. (Continued on page 5)

DON COOK at MESA site.

By Chris Burroughs

Sixty-eight million dollars will come in this year from the NNSA to push further forward a $423 million project expected not only to renovate much Sandia physical plant and equipment but also revive any flagging Sandia spirit (if any still remains to be energized post-9/11).

“This is where the Weapons Integration Center will be — three stories, with 181 weapon engineers,” Don says. Gesturing to the east of the Microelectronics Development Lab, he says, “There is where the microfab will be, with new cleanrooms and equipment to replace CSRL (the Compound Semiconductor Research Laboratory).

“The pedestrian walkway will be here where we’re standing. We’ll have a Starbucks and maybe a cafeteria.”

Pointing north of MDL, he indicates the site of the new MDL the installation of the latest equipment for producing radiation-hardened circuitry.

“We’ve already paid $9 million for rad-hard

(Continued on page 7)

NEW WHITE LIGHT — Art Fischer (1123) holds a sapphire substrate with indium gallium nitride layers. This is the base material for one type of semiconductor light-emitting diodes (LEDs). (Photo by Randy Montoya)

Z-Beamlet lab wins R&D Magazine ‘Special Mention’ award

The Z-Beamlet facility in Sandia’s Area 4 has won a special mention for engineering in R&D Magazine’s 36th annual competition for the renovated laboratory of the year.

The award was announced on March 20 at the Pittcon Conference in New Orleans. A description of the project will be included in a Lab-of-the-Year section of the May 2002 issue of R&D Magazine.

The panel of judges included architects, researchers, equipment suppliers, lab design consultants, and editors of the magazine.

“I’m very pleased,” says John Porter (1673), manager of the Z-Beamlet facility. “It always feels good to be recognized for hard work.”

Mike Hurst (1673), Z-Beamlet operations coordinator, will journey to New Orleans to receive the award, a plaque. “It’s a public recognition of his hard work in helping to bring it all together. He was kind of the glue,” says John.

Says VP Al Romig (1000), who first suggested entering the lab in the competition, “It was such a significant achievement — to take one of the world’s most powerful lasers from Lawrence Livermore and move it to Sandia to provide important diagnostic capabilities for the Z machine. With a near-miraculous team effort led by John Porter, our folks in Area 4 were able to take what had formerly been a warehouse and turn it into a high cleanliness facility to house this large, complex laser. We’re delighted the renovated lab won the special mention.”

— Neal Singer

DON COOK at MESA site.

On a cold day in February, MESA program director Don Cook (1900) stands with his hands in the pockets of his black overcoat, looking through a chainlink fence at two huge front-end loaders digging up the field west of Bldg. 897 at the southeast corner of Area 1.

By Neal Singer

By Neal Singer

By Neal Singer

By Neal Singer

By Neal Singer

By Neal Singer

By Neal Singer

By Neal Singer

By Neal Singer
Diversity and Sandia — Some Thoughts
A letter from Labs President C. Paul Robinson

I had the chance to speak to all of you during the Diversity Standdown. Please let me have a few more minutes of your time to share some additional thoughts.

Sandia’s diversity focus began in the early 1990s and took a significant step forward when more than 300 Diversity Champions (a grass roots effort) pressed Sandia’s management to wake up to the problems in our lab and recognize the opportunities for improvement if we all embraced diversity. This month in its lab, Sandia is initiating a renewed emphasis on diversity, as well.

I think we really “got it” when we heard the shocking and sad stories which some among us had experienced within our own workplace. Some individuals had been mistreated and made to feel uncomfortable by thoughtless acts by coworkers and some that must have been intentional. We were motivated then — and are still today — to achieve an environment where no one is made to feel uncomfortable.

Diversity is not just about equal employment opportunities (although I must tell you I take pride in the fact that Sandia has been steadily improving our demographics of women and minorities as employees and in our career ladders). Nor is diversity only about realizing the strong lesson nature provides us — that within each species, including humans, diversity is a strength in advancing the species and ensuring its prospects for long-term survivability.

In my view, the strongest reason why we should embrace diversity and try hard to model inclusive behavior in our workplace is because no one — I repeat, no one — should ever be mistrated or made to feel uncomfortable because they are different from someone’s view of the norm. On the contrary, we should each respect and take pride in our coworkers, lifting them up rather than putting them down. Involuntary and hurtful acts toward others make no sense for bright, thoughtful people; and you are possibly the smartest workforce ever assembled.

Thus, I urge you to model the best human behaviors in your dealings with your colleagues, not just to end any discrimination or thoughtless acts which cause offense, but to help fuel a warm and caring atmosphere wherein no one ever doubts that they are welcomed and valued.

Thanks for the chance to get this off my chest, and thanks for your exceptional service.

——–

Perry speaks April 1 in Distinguished Lecture Series
Former Defense Secretary William Perry will speak at Sandia California Monday, April 1, in a talk titled “National Security Implications of September 11th.” He’ll give his perspectives on current international military efforts in the war on terrorism and other current issues of interest to a national lab audience.

Perry will speak in the Bldg. 904 Auditorium from 11 a.m. to noon PST as part of Sandia’s new Harry S. Truman Distinguished Lecture Series. His talk will be video-linked to Sandia/New Mexico’s CNSAC (Bldg. 810) Auditorium from noon-1 p.m. MST and will be shown live on the Video Sandia monitor network around the New Mexico site.

Those who want to watch the speech from the CNSAC Auditorium (seats numbered 1 to 90) should contact Traci Parsons (12111) at 844-9078.

Retiree deaths
Arthur W. Barth (age 82) .................................. Dec. 23
Edward D. Herring (age 81) .......................... Jan. 3
Charles H. Carlson (78) .................................. Feb. 13
Thomas N. Earp (84) .................................... Feb. 16
Allan E. Assemeier (72) ................................. Feb. 17
'Graduates' praise site's first biotechnology class

By Nancy Garcia

A cross-section of highly credentialed researchers, management, and staff has been spending afternoons each spring semester in a classroom, learning the intricacies of life science.

The on-site class, overenrolled during its first session, was a convenient and enlightening introduction into the biotechnology field, according to some of the 46 Sandians who attended the 28-week session that recently ended. Another session of weekly three-hour classes started in March and is being taught again by instructors from the University of California, Berkeley.

"After this session, roughly one fourth of the team at the California site will have taken the course," says Len Napolitano, deputy director of Exploratory Systems and Development.

"We think we work on complex issues with nuclear weapons. Many people did not realize how complicated even relatively 'simple' things are in biology."

"Our mantra is to 'measure everything. Interfere with nothing.'" says Curt Nilsen, head of managers of the two joint test assembly telemetry organizations (Depts. 8232 and 8333). The goal is a wireless network of sensors that gather the right information in a joint test assembly in which each unit must perform an important function.

Curt says there can be benefits in other national security applications. "If you get the right information to the right person at the right time, you can save money and better utilize resources."

Part of the push to develop good, small instrumental comes from Sandia's mission to ensure the safety, security, and reliability of the nuclear stockpile. As weapons age, "doing surveillance well is going to be extremely critical," he says, "as the stockpile is reduced in size and there are fewer flight opportunities."

The vision is to use distributed intelligence to send back the most relevant information to the ground. This conserves bandwidth, since the capacity of the data pipeline to the ground is fairly fixed. With modeling and simulation (assisted by the Accelerated Strategic Computing Initiative), normal conditions of vibration and temperature can be predicted. Remote sensors can be designed to send back more information if the status differs from the expected baseline. Filtering of what data is transmitted will make use of dynamic bandwidth allocation.

"Sensors, microprocessors, and communication algorithms will be the enabling glue to allow this transition to wireless data transmission," Curt says.

Also has security applications

There are other diagnostic applications at the Labs. On the security front, a new initiative has been championed by Materials and Engineering Sciences Center 8700 Director Rick Stulen to develop three hybrid microsystems, including an emergency radiation detector that incorporates wireless communication, a global positioning system, and radiation sensing. To characterize a threat from, say, a "dirty" bomb dispensing radioactive materials, many of these detectors would be scattered in an area where they would employ their built-in ability to 'think and communicate' to quickly relay an accurate, real-time description of the contaminated area.

"We want them small and inexpensive," Curt says. "We want them to be dropped from a plane, scattered from a vehicle, or deployed in several ways. The first prototype is expected as early as this summer."

"By using distributed wireless intelligence for sensing over an area — especially a system that can be rapidly deployed — we think we can contribute to homeland defense," Curt says.

At the Combustion Research Facility, a scanning sensor for monitoring the moving engine piston has been sending out pressure information wirelessly for researching into engine efficiency. The Labs' jµChemLab can also integrate small, wireless sensors to provide more complete information when assessing chemical "fingerprints." The Embedded Reasoning Institute is helping refine the quality of processors used at each node. And overall, the effort fits well with the newly formulated stmission to advance hybrid microsystems.

— Nancy Garcia

Wireless data transmission will be new wave in test flights

Vision is to use distributed intelligence to select relevant information

Wireless communication is moving beyond personal data assistants like Palm Pilots and other consumer electronics into warheads, as Sandia develops more compact and versatile ways to gather flight test information. The developments are also being adapted to other applications.

"Our mantra is to 'measure everything. Interfere with nothing.'" says Curt Nilsen, head of managers of the two joint test assembly telemetry organizations (Depts. 8232 and 8333). The goal is a wireless network of sensors that gather the right information in a joint test assembly in which each unit must perform an important function.

Curt says there can be benefits in other national security applications. "If you get the right information to the right person at the right time, you can save money and better utilize resources."

Part of the push to develop good, small instruments comes from Sandia's mission to ensure the safety, security, and reliability of the nuclear stockpile. As weapons age, "doing surveillance well is going to be extremely critical," he says, "as the stockpile is reduced in size and there are fewer flight opportunities."

The vision is to use distributed intelligence to send back the most relevant information to the ground. This conserves bandwidth, since the capacity of the data pipeline to the ground is fairly fixed. With modeling and simulation (assisted by the Accelerated Strategic Computing Initiative), normal conditions of vibration and temperature can be predicted. Remote sensors can be designed to send back more information if the status differs from the expected baseline. Filtering of what data is transmitted will make use of dynamic bandwidth allocation.

"Sensors, microprocessors, and communication algorithms will be the enabling glue to allow this transition to wireless data transmission," Curt says.

Also has security applications

There are other diagnostic applications at the Labs. On the security front, a new initiative has been championed by Materials and Engineering Sciences Center 8700 Director Rick Stulen to develop three hybrid microsystems, including an emergency radiation detector that incorporates wireless communication, a global positioning system, and radiation sensing. To characterize a threat from, say, a "dirty" bomb dispensing radioactive materials, many of these detectors would be scattered in an area where they would employ their built-in ability to ‘think and communicate’ to quickly relay an accurate, real-time description of the contaminated area.

"We want them small and inexpensive," Curt says. "We want them to be dropped from a plane, scattered from a vehicle, or deployed in several ways. The first prototype is expected as early as this summer."

"By using distributed wireless intelligence for sensing over an area — especially a system that can be rapidly deployed — we think we can contribute to homeland defense," Curt says.

At the Combustion Research Facility, a scanning sensor for monitoring the moving engine piston has been sending out pressure information wirelessly for researching into engine efficiency. The Labs' jµChemLab can also integrate small, wireless sensors to provide more complete information when assessing chemical "fingerprints." The Embedded Reasoning Institute is helping refine the quality of processors used at each node. And overall, the effort fits well with the newly formulated mission to advance hybrid microsystems.

— Nancy Garcia
A system developed by Sandia and the New Mexico Department of Health to detect disease outbreaks deployed in southern New Mexico has demonstrated one of the goals of the Bi-National Sustainability Lab (BNSL) concept—the application of new technologies for economic development and better public health along the US-Mexican border.

In late January, the Rapid Syndrome Validation Project (RSVP), informed on FluType-A and RSVP—"a children's respiratory ailment" to physicians using the system even before a major upswing in patient visits in Las Cruces, had overcome the traditional notification of outbreaks such as those from the Department of Health.

Since then, various state and federal agencies and private companies have attempted to develop and exploit US and Mexican technology as a way to realize sustainable economic development and lessen the trade deficit among border states. In particular, a number of areas, from El Paso to Las Cruces, have developed and implemented a stable, user-friendly, Internet-based disease reporting system. The system allows medical practitioners, and nurses exchanging up-to-the-minute information is our single best defense, and we could not have it without the network.

RSVP's success is the result of a number of factors:

1. The system is easy to use and deploy: it can be operational in a matter of hours.
2. The system is affordable: it costs only $500 to set up and run.
3. The system is scalable: it can be adapted to any number of medical practitioners or nurses.
4. The system is reliable: it operates 24 hours a day, seven days a week.

The success of RSVP has been recognized by various organizations at the federal, state, and local levels. The system has been adopted by a number of organizations, including the New Mexico Department of Health, the New Mexico Office of the Governor, and the New Mexico Department of Education. The system has also been adopted by a number of private companies, including the New Mexico Health Insurance Exchange and the New Mexico Medical Association.

The success of RSVP has been recognized by various organizations at the federal, state, and local levels. The system has been adopted by a number of organizations, including the New Mexico Department of Health, the New Mexico Office of the Governor, and the New Mexico Department of Education. The system has also been adopted by a number of private companies, including the New Mexico Health Insurance Exchange and the New Mexico Medical Association.

The success of RSVP has been recognized by various organizations at the federal, state, and local levels. The system has been adopted by a number of organizations, including the New Mexico Department of Health, the New Mexico Office of the Governor, and the New Mexico Department of Education. The system has also been adopted by a number of private companies, including the New Mexico Health Insurance Exchange and the New Mexico Medical Association.

The success of RSVP has been recognized by various organizations at the federal, state, and local levels. The system has been adopted by a number of organizations, including the New Mexico Department of Health, the New Mexico Office of the Governor, and the New Mexico Department of Education. The system has also been adopted by a number of private companies, including the New Mexico Health Insurance Exchange and the New Mexico Medical Association.
Protecting sensitive information through OPSEC

Program teaches that the whole can be greater than the sum of the parts

By Bill Murphy

Poker players have figured it out. Don’t throw the baby out by how you grin or frown, by how you raise your eyebrows or wrinkle your nose; not by how you rearrange your cards, place your bets, or clear your throat. And if you must, smile, enigmatically.

Any or all of those things could be an indicator of a cooler head across the table that you either do — or don’t have something of interest fanned out in front of you.

The successful poker players, the Amarillo Slims of the game, are nothing if not masters of OPSEC. They don’t call it that, of course, but that’s what it is. OPSEC, short for “Operations Security,” is a way of thinking and acting in such a way as to protect critical and sensitive information from inadvertent compromise.

The operative phrase here is “inadvertent.” says Reggie Tibbetts, Sandia’s OPSEC program manager.

In the wake of real and perceived information compromises at the DOE/NNSA labs over the past few years, all aspects of security have been ramped up. The most visible programs — counterintelligence efforts, cybersecurity measures, and various forms of physical security — share a common purpose, Reggie notes: to foil, preclude, or otherwise prevent proactive attempts by adversaries to steal sensitive and critical information.

OPSEC is different.

“You might think of us as the other side of espionage,” Reggie says. “Spies try to take sensitive information out of the labs; we’re trying to help Sandians avoid inadvertently releasing it.”

What’s an “inadvertent” release of information?

Some examples: Old papers with sensitive data thrown in the trash instead of shredded or burned. An off-hand comment at a social gathering. An inappropriate mention of travel plans.

“We’re not just talking about classified information here,” Reggie says. “A lot of people think that’s what OPSEC is about. It’s broader than that. Sensitive unclassified information and proprietary information need be handled with care, too. Those little bits and pieces of otherwise insignificant information can add up to a pretty big picture, one you’d perhaps rather not paint. As Reggie notes, a trained operative can glean a lot from a little. “The adversary is going to go after the easy stuff, the soft stuff, any time they can. With OPSEC, our approach is to make it as hard on the bad guys as we can... let’s not give anything away.”

OPSEC is one component of the overall security approach at Sandia designed to protect the information the Labs is entrusted with.

Says Barry Schwartz, Integrated Safe- guards and Security Management (ISSM) system project manager: “ISSM strives to integrate security into management and work practices at all levels so that Sandians can accomplish their mission securely.

OPSEC applies the ISSM approach by providing Sandians tools and several forms of assistance so that the organizations can protect sensitive information as they plan, perform, and check their work. OPSEC is providing people tools, not more rules.

Americans have recognized the value of OPSEC in trying times since the very beginning. Here’s something George Washington said in 1776: “Even a minute savings in time is valuable to the nation.”

By the time World War II came around, the concept of OPSEC had become ingrained into habits across the entire society. Everyone was reminded: “Loose lips sink ships.”

OPSEC audits available

Reggie and OPSEC Administrator Juanita Archuleta have put together an OPSEC program to help organizations throughout the Labs understand the OPSEC implications of the way they handle sensitive information. To accomplish this, Reggie and Juanita are available to conduct organizational-level OPSEC audits, in which they’ll identify the critical information a group generates, analyze the threats and vulnerabilities to that information, assess the risks associated with losing control of the information, and to recommend countermeasures to protect the information from adversaries. “Those countermeasure suggestions might be as simple as acquiring a shredder, or they might be something more extensive. Mostly, what we offer is a common-sense perspective on how to do the right thing with sensitive information.”

Reggie emphasizes that his OPSEC team doesn’t issue demands; rather it offers recommendations. As he puts it: “We’re here to help, not to write up [citations]. We’re looking to find facts, not fault.”

In addition to the on-site reviews and assessments, Reggie and Juanita offer presentations for Sandia’s OPSEC groups of all sizes, from departmental staff meeting to Center and Divisional all-hands gatherings. The presentation lasts from 15 to 30 minutes, features a couple of brief OPSEC-related videos, and provides a review of OPSEC concepts, concerns, and countermeasures. They can also supply information that can be used within staff meetings around the labs.

Any or all of those things could be an indicator of a cooler head across the table that you either do — or don’t have something of interest fanned out in front of you.
MESA funding  
(Continued from page 1)

tools for MDL, with another $30 million to be spent this year," he says.

To the west, almost to the Technolo-
gy Transfer Center, will be the Joint Computational Engineering Laboratory building, a construction project managed separately from MESA but integrated functionally, where facilities and equipment for computational research and engineering will be located.

After several years of occasionally frustrating, line-by-line budget discus-
sions with staff of the Senate, House, DOE, and NNSA, Don — a flexibly strong person who is calm on the outside but driven on the inside — has developed so intense and unwavering a belief in this project that he can make listeners almost see buildings otherwise invisible already standing on bare earth.

He points out the contributions of others as he itemizes the varied achievements of the massive project as it moves from paper to physical reality:
- $68 million allotted this year by NNSA for MESA engineering design completion, recouping of MESA site utilities, upgrading of the MDL major support systems, and retrofitting of the equipment for producing radiation-hardened microelectronics.
- "[Nuclear Weapons Senior VP] Tom Hunter’s vision and leadership for the nuclear weapons program has been invaluable," says Don. "[Chief Technol-
yogy Officer] Al Romig’s drive for science and engineering integration to assist all the SBU is also unwavering." The work proceeds under the direction of project manager Bill Jenkins (1920). The site utilities work is under the direction of deputy project manager Dave Bai-
ley (10810). In upcoming work, there will be upgrades to the deionized water system, acid exhaust system, chilled water system, and the specialty gas sys-
tem (toxic gases used for microcircuits and microsystems). The last is under deputy project manager Jim Beals (10810). The face of the ground is changing at the southern end of Area 1.

A contract, under the supervision of Erlinda Silva (10253), has been signed with a local company, Albuquerque Underground Inc., to move utilities. The company did excellent work on Albuquerque’s Big I highway project, says Erlinda, as well as on a previous san-
itation project at Sandia.

An in-house video of the MESA project won the 2001 Telly Award (which offers recognition to outstanding non-network and cable TV commercials) for portrayal of a computerized flyby of the complex as it will look when built.

The video was made under the leadership of K-Tech contractor Dan Fleming (1900) and Video Services’ Myra Edaburn and manager Lana Everett (both 12610).

The point of the huge pro-
ject is to combine microsystems, advanced materials, and engineering design to create 21st century weapons and sensors for the United States, as well as to provide capability for joint work with researchers from universi-
ties and business. “Ten years from now, we’re hoping very few weapons engineers who aren’t using microtechnologies and new, high-speed computational techniques in their design work,” Don says.

Don nevertheless commends those Sandia engineers who have asserted that current control sys-
tems are more than adequate to direct nuclear weapons and that microtechnologies are as yet too unproven to control weapons of mass destruction. “Those are the right questions at this time. You need such folks to keep saying, ‘It’s not proven,’ to keep us working on improving the technolo-
gies.”

On the other hand, he says, “People don’t often point out that we can’t use vacuum tubes in these systems, even if we could buy them, because new hires don’t know how to design circuits using tubes anymore. Technologists and engineers do not use vacuum tubes but microelectronics. The question is the amount of work we need to do to get new technologies ready for prime-time, high-conse-
quence applications.”

To this end, the design teams are working together programmatically to integrate nanotechnologies and microsystems.

Another project that runs in parallel, Don says (returning mentally to the paper chase as he stands in the cold air at the MESA site), is the work author-
ization process within NNSA. “Under that process, the part for computational engineering design has been freeing up nicely.”

As Don turns for a last look at the far reaches of MESA’s rising domain, he looks in profile strikingly like a hawk. “We recently got approval from NNSA to begin final engineer-
ing of all for MESA,” he says.

Technologies for solid-state lighting also benefit national security

Much of the technology being developed for solid-state lighting (SSL, see stories on next page) involves the growth of higher quality gallium nitride (GaN) and aluminum gallium nitride (AlGaN) materials. It turns out that this same mat-
erials and physics and growth chemistry underlies not only SSL, but a whole host of technologies vital to national security interests.

“Fundamental understanding of GaN materi-
als is a legacy from earlier work achieved in these systems, even if we

..." says Jerry Simmons (1123), the program manager for all of Sandia’s SSL activities.

High-power electronics play an important role in synthetic aperture radar (SAR). Electronics made from gallium nitride enable the heavy, bulky traveling wave tubes and gimbaled antennas to be replaced by arrayed antennas, resulting in dramatic reductions in weight. This in turn allows SARs to be placed on smaller unmanned aerial vehicles (UAVs) that can fly longer and far-
ther and present a smaller target to any enemy. Centers 1100 and 1700 are working together to develop this gallium nitride high power electronics technology. Gallium nitride is also important for solar blind detectors of missile launches.

Even more closely related to solid-state light-
ing is an approach to detection of chemical and biological warfare agents. When illuminated with deep ultraviolet (UV) light, bacteria, including anthrax, will fluoresce — emit light at a slightly longer wavelength. This can be used to detect anthrax.

However, at present the sources of UV light are heavy tabletop-sized instruments. The technolo-
gies Sandia is using to further solid-state lighting are also being developed for LEDS and laser diodes. In February the solid-state lighting team, along with the bio-detection sys-
tem team headed by Phil Hargis and Randy Schmitt (both 1118), were awarded a $4.5 million grant from the Defense Advanced Research Projects Agency to develop UV LEDs and lasers, and demonstrate their use in a compact proto-
type anthrax detector.
LEDS

(Continued from page 1)

expect solid-state lighting to also rapidly outdistance conventional lighting sources in both performance and cost.

“This new white light source could change the way we live, and the way we consume energy,” James says. “LEDs are 10 times more efficient than incandescent bulbs and two times more efficient than fluorescents. Clearly, LEDs’ replacement of conventional light sources would significantly reduce worldwide energy consumption.”

LEDs were first demonstrated in 1962 by General Electric. The first products were introduced in 1968 — indicator lamps by Monsanto and an electronic display by Hewlett-Packard. LEDs were limited to small-signal applications until 1985 when LED power was increased, resulting in new applications. In 1993 researchers at several universities in the US and Japan developed a fairly efficient blue light LED based on gallium nitride. Efficiency improvements followed quickly. Today, efficient LEDs are available from red to green to blue light, and making it possible to generate white light for illumination.

However, James says, LED-based light sources are expensive — more than two orders of magnitude more expensive than commercial incandescent light bulbs — and will not be practical until their costs are reduced and efficiency is increased.

As part of the LDRD Grand Challenge, some 20 Sandia researchers are exploring ways to do exactly that — make LEDs more efficient and less costly. They are working on the fundamental science and technology challenges where Sandia has unique capabilities. Among those challenges are:

• Developing an improved understanding of the physics of the gallium nitride-based materials that are the base materials of the LEDs.

• Improving optoelectronic devices and materials for high photon generation and extraction efficiency.

• Improving wavelength conversion and color mixing technologies for generation of white light.

• Improving packaging technologies for high power LEDs.

• Developing an improved understanding of the physics of the gallium nitride-based materials used in LEDs.

“Those are exciting challenges that will engage our scientists over the next several years,” James says. “Our work will position Sandia to become a leading developer of the science and technology for this revolution in lighting.”
By Janet Carpenter

Sandia's Jackie Kerby Moore (14004) has been honored as one of 12 community women to receive a 2002 YWCA Women on the Move award. The award honors women from all walks of life who have an impact on the growth of others through their leadership and public service.

The YWCA of Middle Rio Grande established the Women on the Move Awards Program in 1985 to recognize women who have made significant contributions to the scientific, social, business, and organizational communities.

Recipients must demonstrate outstanding professional achievements and/or outstanding volunteer contributions, and the qualities of a leader.

Other Sandians nominated for the 2002 award were Brenda DeLaurentis (10502), Merri Lewis (12660), Chris Morgan (9323), Julia Phillips (11001), Rebecca Spine (10310), and Amy Tapia (12650).

The Sandia Women's Program Committee (WPC) has participated in the WOMM Awards program since its inception and continues to sponsor and coordinate Sandia/New Mexico's involvement.

“Though I am honored to receive this award, what I feel good about is that I have a job that is making a difference in the community where we all live and work,” says Jackie. “And, giving back to the community through volunteer service is just part of the culture at Sandia. There are thousands of us doing it.”

Four years ago, Jackie was asked by Sandia executive management to create a research park adjacent to the Labs. She now runs the Park on behalf of a nonprofit organization — the Science and Technology Park Development Corporation. As the executive director, Jackie has been responsible for all aspects of bringing the Park to reality. Land that used to be just “dirt and tumbleweeds” in the southeast part of Albuquerque now serves as the home for 10 companies employing more than 500 people in technology-based jobs. She assembled teams and worked with the community to create a public/private partnership that could create an additional 6,000 to 12,000 high-tech jobs in the Park in the next 10 to 20 years.

Jackie and the Park have won awards for excellence from the New Mexico State Land Office, the Middle Rio Grande Council of Governments, and Quality New Mexico that recognize the impact that Jackie and the Park are having in the community. She has been featured recently on CNBC Television, KFOX Radio, and at numerous conferences and events touting the success of New Mexico and the Park. At the international level, Jackie was recently elected to the Board of Directors for the Association of University Research Parks.

She has been recognized as an “Up-and-Comer” by the UNM Anderson School of Management and was recognized with a “Smart, Savvy, and Successful” award by the Albuquerque Women in Business Directory. She was elected Vice President of the Board of Directors for Camp Fire USA, selected as an Advisory Board Member for the Assistance League of Albuquerque, and selected as the presiding sponsor for Beta Sigma Phi’s City Council, a group of more than 250 women engaging in community service.

Jackie received the “Outstanding Keyperson” award from United Way of Central New Mexico for her leadership in the 1997 Sandia Employee Contribution Plan campaign, which raised over $1.6 million for the community.

“My first involvement in the community was through Sandia,” she says. “My boss asked me to lead our center’s ECP/United Way campaign, and I have been working with social service organizations ever since.”

**About Sandia Science & Technology Park**

The Sandia Science & Technology Park (SSTP) is a 200-plus acre technology community. Located adjacent to Sandia, tenants have easy access to world-class facilities, technologies, scientists, and engineers. Tenants in SSTP include Sandia industry partners and critical suppliers, as well as companies providing services to other high-tech companies in the Park.

Under the direction of Lockheed Martin’s Technology Ventures Corporation, the Science and Technology Park Development Corp. manages all aspects of Park development, from marketing to master planning. The staff at STPDC, including contract personnel and loaned employees from Sandia, enlists a variety of resources to ensure professional, competent Park management.

**ATA building dedicated in Sandia Science & Technology Park**

The fifth new building in the Sandia Science & Technology Park, east and north of the Eubank Gate area, is now completed and officially dedicated.

Applied Technology Associates (ATA) had a ribbon-cutting ceremony Feb. 21 dedicating its new 15,000-square-foot building at 1300 Britt St. SE (at Gibson) there. Rep. Heather Wilson, R-N.M., was the keynote speaker. The facility will house ATA’s 50 employees.

ATA, founded in 1975, is a precision measurement, sensing, and control company that provides services and products to government and commercial customers, Sandia among them. It has engineering experience developing technology and products for systems in directed energy, laser, and vibration, sensing, scientific data processing, point stabilization, and vibration characterization and control.

ATA President and CEO Anthony Tenorio says locating the new facility in the Sandia Science & Technology Park will allow the company to more aggressively introduce its products and services to a wider array of customers.

With the inclusion of ATA, the Sandia Science & Technology Park now employs almost 600 people from 10 different companies, says Jackie Kerby Moore (14004), executive director of the Park.

**Lockheed Martin survey results indicate Labs ‘Total Rewards’ package is on track**

No showstoppers — not even any real surprises — emerged out of the Sandia-specific data extracted from the 2003 Lockheed Martin Employee Preferences Survey, says Karen Gillings, Manager of HR Strategies and Services Dept. 3050.

“The survey was very useful,” says Karen, “in that it gave us a great deal of feedback about the value of continuing to reinforce our entire Total Rewards package.

Sandia’s Total Rewards — the overall combination of pay and benefits, work/life policies, work environment, and career development opportunities — has evolved over the years to reflect preferences indicated by Sandians in previous in-house surveys.

Sandia’s “Total Rewards” — the overall combination of benefits, work/life policies, work environment, and career development opportunities — has evolved over the years to reflect preferences indicated by Sandians in previous in-house surveys.

In previous in-house surveys, Corporation-wide, more than 46,000 Lockheed Martin employees participated in the April-May 2001 survey process. Sandia’s own response of 2,300 constituted about one-third of all participants, leading to create a public/technology Services Business Unit. Because of the way the survey was conducted, Karen says, Sandia was able to get a Sandia-only “cut” of the results.

“The survey, Karen says, indicated some areas where more emphasis will be placed, specifically in the realm of enhanced learning and career development opportunities.

One particularly gratifying result from the survey, Karen says, was the fact that many respondents had cited pension plan equity with other company pensions as a major consideration. Since the survey was conducted, Sandia and Lockheed Martin have won DOE and NNSA approval for a new more equitable pension formula (Lab News, Feb. 22).

“The activities we’re pursuing under our Total Rewards program are consistent with what this survey and previous surveys are telling us,” Karen says. “We’re on track — and surveys like this one serve as a useful mid-course correction for us from time to time.”
New Mexico students explore careers at ‘School to World’

More than 500 volunteers, including many Sandians, participated in the third annual “School to World” career exploration event for New Mexico 8th and 9th graders at the Albuquerque Convention Center on March 9.

More than 1,500 New Mexico students and their families attended this event sponsored by Sandia, Lockheed Martin, area businesses, government agencies, and educational institutions. Sandia’s Community Involvement Dept. 12650 organizes School to World.

The event gives students an opportunity to look at various career and educational opportunities and get started on their path in life. One student reported, “I really liked being able to talk with people who have had experience in the careers I am interested in.”

At School to World, students meet people established in their careers and discover what kind of educational courses they need to pursue careers of their own. “They learn why school is critical for students to prepare for any career or job they choose,” says Mike DeWitte (12650), event organizer.

This year, more than 150 careers in fields ranging from medicine to art and social work to business were included. Volunteers from the various career fields explained their job duties, told what educational skills and training are needed for their occupations, and shared why they chose their specific career or job. Most important, volunteers showed students the link between school subjects they are learning today and the work skills needed for the future.

Representatives from colleges, universities, and vocational schools, along with community agencies that promote citizenship and hands-on skills development, were also on hand to speak with students.

Among the sponsors of this year’s School to World were Philips Semiconductors, the New Mexico Commission on Higher Education/GEAR UP, the Central Area Workforce Investment Board, Albuquerque Public Schools, and Public Service Company of New Mexico.

— Janet Carpenter

Two Sandians author new book on Monte Carlo theory


According to a listing of the book that first appeared recently on Amazon.com, “It [the book] is suitable for advanced undergraduate and graduate students and researchers who wish to expand their knowledge of the Monte Carlo technique.” And it says, “Because Monte Carlo methods are closely linked to the use of computers, from the beginning the reader is taught to convert the theoretical concepts developed in the text into functional software for use on a personal computer.”

“The book is quite an accomplishment,” says Jim Yoder, Manager of Systems Technologies Dept. (5914), where Steve works. “It is useful to both practicing engineers and students. In fact, the theory presented in the book provides underpinning for some of the radiation detection and materials interdiction part of Sandia’s current counterterrorism effort.”

“Although we started the book in 1991,” Steve tells the Lab News, “we didn’t begin a serious, concentrated effort to finish until 1998. We finished it in the summer of 2001, ten years and one month after we began.”

Stan says it was gratifying to get advance copies of the book over the counterterrorism effort. “Although we started the book in 1991, we didn’t begin a serious, concentrated effort to finish until 1998. We finished it in the summer of 2001, ten years and one month after we began.”

Stan and Steve say they want to thank friends and colleagues who helped with the review of the manuscript. “Kevin O’Brien (9815) and Jim Renken [ret.] reviewed the entire manuscript,” Stan says. “Eleanor Wadhwa (5914) reviewed the appendix, and we especially thank Len Connell (9815) and Tom Laub (15341), who not only reviewed the text but also devoted considerable effort to checking and using the Monte Carlo routines given in the book.”

— Kim Frazier

Feedback

Whatever happened to the Harvard Health publications? Renewal costs were ‘prohibitive’

Q: What happened to the Harvard Health publication that we have been able to obtain previously? Will they be available again soon?

A: Prior to the onset of the information age, Harvard Health Letters were provided to all Sandia employees in print and then morphed into web-based periodical subscriptions in 1997. The web-based subscription to Harvard Health expired in October 2001. In considering renewal, we examined cost and reader feedback. The cost proved to be prohibitive. Interestingly, in reviewing years of feedback, a pattern of web user expectations for the delivery of online health content emerged. As web usage increased, we saw an increase in request for Harvard’s articles to be indexed by topic rather than by issue date and to make the content searchable enabling future reference (common practice with web periodicals). We passed all Sandia readers request to Harvard but were unable to influence the enhancement of Harvard’s periodicals to meet our user expectations of the web media.

Recognizing that current, authoritative, consumer-oriented and easily accessible health information plays an important role in helping consumers make preventive, proactive, and informed health care decisions, we continue to fund the Harvard Health Letters in printed form at the Technical Library and in the Health Services Waiting Room (Bldg. 831). Moreover, we negotiated a 25 percent discount for Sandia on individually purchased printed Harvard subscriptions. This equates to $12 per annual subscription or $1 per issue. We then carried a link to Harvard’s Sandia discounted subscription for three months on our most popular web, the UPDATE homepage. This link was migrated to the Health Services homepage on Jan. 7, 2003. From Oct. 1, 2001, through Jan. 10, 2002, Harvard has received only 31 subscription orders, 13 for the Health Letter, 9 for the Men’s Health and 9 for the Women’s Health Letters. We will continue to carry Harvard’s link at http://www.nlm.sandia.gov/HR/health/ while the discount offer is in effect.

Furthermore, we migrated the monies that were no longer sufficient to procure Harvard Health to the purchase of Reuters Health Topic Wires. Reuters Health is a consumer-oriented health news content service provider that delivers clinically relevant healthcare information. You might have already noticed that Reuters Health is often the source of the local and national media’s coverage of the health news. We hope that by providing Reuters Health articles directly to you, Sandia’s readers will become the most informed and knowledgeable health consumers by enabling readers to view the actual source of the current week’s health news prior to it being sensationalized through television and other media. UPDATE has purchased rights to publish five Reuters Health articles per week on our intranet and 50 to start an archive with the rights to maintain each article for two years on our site. UPDATE publishers are able to view the topic wires on a daily basis and publish the articles that are most relevant to our population and to the mission of the Health Services Center. Because Reuters resides on Sandia’s server it is searchable, and the UPDATE publishers will soon release a reader’s specific search as well as a topical index to include the Reuters news articles.

— Larry Cleaver (3300)
Senate confirms Chu’s appointment to head DOE waste management office

Margaret Chu is now officially a top DOE official in Washington. Sandia’s former director of Nuclear Waste Management was confirmed by the US Senate March 6 as director of DOE’s Office of Civilian Radioactive Waste Management. The office is responsible for evaluating the suitability of Yucca Mountain in Nevada as a permanent repository for high-level civilian and military nuclear waste.

To take the new position, Margaret retired from Sandia this week, effective March 19.

“Dr. Chu now has a monumental job before her, but I believe she will serve her country well in this post,” said Sen. Pete Domenici, R-N.M., who strongly recommended her for the position last year. “It has taken longer than it should have, but the Senate’s endorsement of her nomination is a confirmation of her abilities to help move the nation toward meeting the challenges posed by nuclear waste,” said Domenici. “I believe she has the talent, education, and professional qualities to be a positive force for helping resolve some of the complicated and controversial issues surrounding the nuclear waste issues in this nation.”

Sen. Jeff Bingaman, D-N.M., chairman of the Senate Energy and Natural Resources Committee, which oversaw the Chu nomination, agreed. “Margaret Chu has a long and distinguished history managing nuclear programs at Sandia Labs,” he said. “She will be a tremendous asset to the Department of Energy’s Yucca Mountain program, which has been without a leader for more than a year. There are many complicated issues involved with the nuclear waste issue and Yucca Mountain, and I know Margaret’s leadership is much needed and will be much appreciated.”

Margaret has worked in various nuclear waste management positions since she first came to Sandia. She has a bachelor’s degree in chemistry from Purdue University and a doctorate in physical chemistry from the University of Minnesota.
MISCELLANEOUS

Evening CRB, penny Ori, freshly cut, excellent condition, $30. Sensible. 275-0060.

Kentucky Club, 977-7521, picture at top.

Exercise bicycle, Tunturi Recumbent, great condition, smooth, even riding, 100. Kock, 391-2299.

BRUNSWICK BILLIARDS TABLE, wall-hung, 9 mos. old, cost $1,100, asking $800. Hays, 868-4386.

Spinert piano, oak, excellent condition, includes bench and stool, new, perfect condition, 199. Miller, 323-4388.

EQUIPMENT RACK, 19-in. panels, 71-in. high, 35-in. deep @ $20. Williams, 230-6992.

IBM ELECTRIC TYPEWRITER, long unused, $40. Furry, 281-1024.

KENMORE UPRIGHT FREEZER, 30 in. W x 24 in. D x 67 in. H, brand new, $800 OBO. Don, 867-6374.

WHIRLPOOL ELECTRIC DRYER, brand new, $400 OBO. Johnson, 291-6262.

EQUIPMENT RACK, 19-in. panels, 71-in. high, 35-in. deep @ $20. Williams, 230-6992.


PORTRABLE KENMORE DISHWASHER, excellent condition, all hardware included, $200. O'Brien, 967-3678.

CHIPPER/SHREDDER/VACUUM DUMP, Yard waste collection, $75. We'll deliver. 303-472-4111.

SOUTHWEST AIRLINE TICKETS, 3, $399 each. 294-3043.

280 DIGITAL CAMERA, extra lens, flash, charge, ready to go, $250. Hays, 868-4386.

2-TWO good used 5 Gallon buckets, $100 stock, tank w/heater, $50; 70 gal. brass/graffa record player, $150. Contiutz, 282-601. 230-2181.

CRIBS, 2 nice, double queen headboard, 5-drawer chest, 2 tel., a very nice 6-drawer armoire, $150. Harykson, 865-7366.


NORDICTRACK, good condition, $25 OBO. Shurr, 294-2624.

SOUTHWEST AIRLINE TICKETS, 3, $399 each. 294-3043.

brush, available at Sears, free. Hayes, 869-6469.

Rogers, 263-9459.

298-2624.

$800 OBO. Shoemaker, 869-2775, ask

smooth, even riding, $100. Keck, 293-4503.

antique desk, $250; oak end tables, 2, $15 ea. Kaiglo, 825-9236.

3-P bubble w/mattress, dresser w/mirror, nightstand w/bedside table. Dugger, 298-2624.

$35; dark wood-veneer entertainment center, w/lamp, $400. Sansone, 296-7945.

$75; dark wood-veneer entertainment center, w/lamp, $400. Sansone, 296-7945.


ENGLISH CHINA, antique, white/blue, w/matching dishes, $400. Carter, 239-4005.

HARNETTE, 70-in., with stand, $400. Loeber, 821-3674.

$150, Harykson, 865-7366.

DESK, large L-shape, w/hutch on one side, $450. Helmers, 282-9366.

KITCHEN CABINETS, full set, dark solid wood maple, $650. Talandis, 239-4005.

294-3528.

$350; dark wood, w/mattress, dresser w/mirror, nightstand w/bedside table. Dugger, 298-2624.

$35; dark wood-veneer entertainment center, w/lamp, $400. Sansone, 296-7945.

$75; dark wood-veneer entertainment center, w/lamp, $400. Sansone, 296-7945.

$150, Harykson, 865-7366.

DESK, large L-shape, w/hutch on one side, $450. Helmers, 282-9366.

$350; dark wood, w/mattress, dresser w/mirror, nightstand w/bedside table. Dugger, 298-2624.

$35; dark wood-veneer entertainment center, w/lamp, $400. Sansone, 296-7945.

$75; dark wood-veneer entertainment center, w/lamp, $400. Sansone, 296-7945.

$150, Harykson, 865-7366.

DESK, large L-shape, w/hutch on one side, $450. Helmers, 282-9366.

$350; dark wood, w/mattress, dresser w/mirror, nightstand w/bedside table. Dugger, 298-2624.

$35; dark wood-veneer entertainment center, w/lamp, $400. Sansone, 296-7945.

$75; dark wood-veneer entertainment center, w/lamp, $400. Sansone, 296-7945.

$150, Harykson, 865-7366.

$350; dark wood, w/mattress, dresser w/mirror, nightstand w/bedside table. Dugger, 298-2624.
Sandia targets play key role in missile defense test

Sandia again provided the target reentry vehicle (RV) and decoys in support of last Friday’s successful US Missile Defense Agency flight test over the Pacific, known as Integrated Flight Test #6 (IFT-8).

During the March 15 test an exoatmospheric kill vehicle (EKV) launched from the Ronald Reagan Missile Site, Kwajalein Atoll, intercepted a mock RV launched 30 minutes earlier aboard a modified Minuteman II intercontinental ballistic missile from Vandenberg Air Force Base, Calif.

Labs-designed target RV and decoys

Sandia designed the test’s target RV as well as three inflatable decoys that were released near the RV prior to intercept. The RV-mimicking decoys were designed to test the EKV’s ability to distinguish between the target vehicle and decoys, says Sandia IFT-8 project leader Bob Stearley of Targets Dept. 15415.

The statement says the test was the most complex missile defense intercept yet. The EKV, with the help of ground- and space-based sensors and ground-based radar, successfully located, distinguished, tracked, and intercepted the target vehicle, resulting in destruction by body-to-body impact, the statement said.

Only system-generated data were used for the intercept after the EKV separated from its booster rocket, it said.

Twenty Sandians supported Friday’s launch from Vandenberg, monitoring the target vehicle’s health in the hours prior to liftoff and reporting to customers telemetry data from sensors on board two of the decoys and the RV during the flight, says Bob.

“Everything on our end appears to have worked well,” he says.

Many Sandia organizations contributed to success

“Sandians from across the Labs contributed to the success of this project,” says Jerry McDowell, Director of Aerospace Systems Development Center 15400. “Thanks and congratulations to all for your hard work and dedication.”

Contributing organizations included Centers 15400, 2600, 14100, 12600, 9100, and 2300.

Friday’s test was the fourth successful intercept for the Ground-based Midcourse Defense test program out of six intercept attempts. Sandia targets have been aboard all 11 IFT flight tests so far (the other five were fly-by or demonstration flights), and the Labs already is working on a target payload for IFT-9, planned for this summer, says Bob.

The Long Range Targets Program Office manages the targets program for the Missile Defense Agency. — John German

SUCCEED — Sandia target vehicle leaves the launch pad atop an ICBM as part of a successful March 15 missile defense test, Integrated Flight Test #6. (Photo by Diana Helgesen)

‘Your Thoughts, Please’ employee comment program gets mixed reviews for its first year

By Rod Geer

Employees have offered their thoughts about “Your Thoughts, Please” and although almost half of them offered a lukewarm to strong thumbs up there’s clearly room for improvement in this program, which one Sandian called the first forum in his 24 years here “where gripes can be aired at the Labs level.”

“Your Thoughts, Please,” which has been in operation a little more than a year, poses questions any Sandian can respond to anonymously or with signature. All responses then are published on the internal web as part of the Newscenter (http://www-im.sandia.gov/newscenter/news-frames.html).

It emerged as a way to increase “interactive” communications, which Sandians at all levels have said the Labs need. It complements the long-established Feedback program, which permits employees to ask questions that are answered by subject-matter experts, often management. Finally, it responds to messages employees deliver in a variety of ways, such as attitude surveys. That message is to have an avenue through which employees can speak respectfully but with candor about the Labs.

The program’s birthday gut-check took the form of a question about itself — basically thumbs up, thumbs down, or neutral on the first year’s operation? Twenty-nine Sandians responded, ten, or 47.6 percent, were positive eight (38.1%) were neutral; three (14.3%) were negative.

“I think it’s great,” wrote Jeff White (9517). “I wish you would venture into more controversial areas.

In fact, questions generally being too benign was one of the two common themes in responses, whether the writer’s overall impression was positive or negative.

One person wrote, “None of the questions has yet touched a nerve with me.” Another said, “The first few questions were substantive and gave Sandians a chance to... give some possible real solutions. After that the questions became what I call ‘fuh-rah.’”

The other common theme — expressed in one form or another on 10 of the responses — focused on whether Labs’ management has been, as one employee wrote, “listening” to messages “Your Thoughts, Please” responses have carried.

Albert Reichmuth (8243) wrote, “If senior management would really look at and interpret these thoughts... then Sandia would truly be the work place that everyone would like it to be.”

Some other employee comments:

- “The answers have ranged from humorous to amazingly insightful. They have always been interesting to read, even when I disagreed with the answer.”
- “I only vaguely remember that there is a thing called ‘Your Thoughts, Please’...
- “Questions that appear to me to be fishy... (some have struck me that way) will certainly get no response.”
- “I believe it is important to continue to ask for employee feedback even if employees’ suggestions are not used.”
- “‘Your Thoughts, Please’ gives both a good and a very bad impression after its first year.”
- “I’d like to see the employees have more of a part in forming the questions that are discussed.”
- “If future questions were chosen with less concern about managerial sensibilities, I think ‘Your Thoughts, Please’ would be of much greater value.”

Answer the current ‘stressful’ question

The “Your Thoughts, Please” question currently open for comment was designed with some of the first-year feedback in mind — to spark conversation.

It is: “Given the level and pace of activity at Sandia, please offer whether, in your opinion, talk around Sandia about increased stress reflects reality or is simply isolated anecdotes. Feel free to express your thoughts about any or all of these (1) whether your level of stress is greater today than it has been in the past and why, (2) if your colleagues’ stress levels seem greater today and why, (3) what, in your view, are indications of too much stress, (4) if you believe it exists, how pervasive you believe it is, (5) what the sources could be, and (6) what remedies would be helpful.”

***

Responses will be accepted through April 5. Go to the web site to respond or simply write your response to thoughts@sandia.gov.