Pete V. Domenici National Security Innovation Center

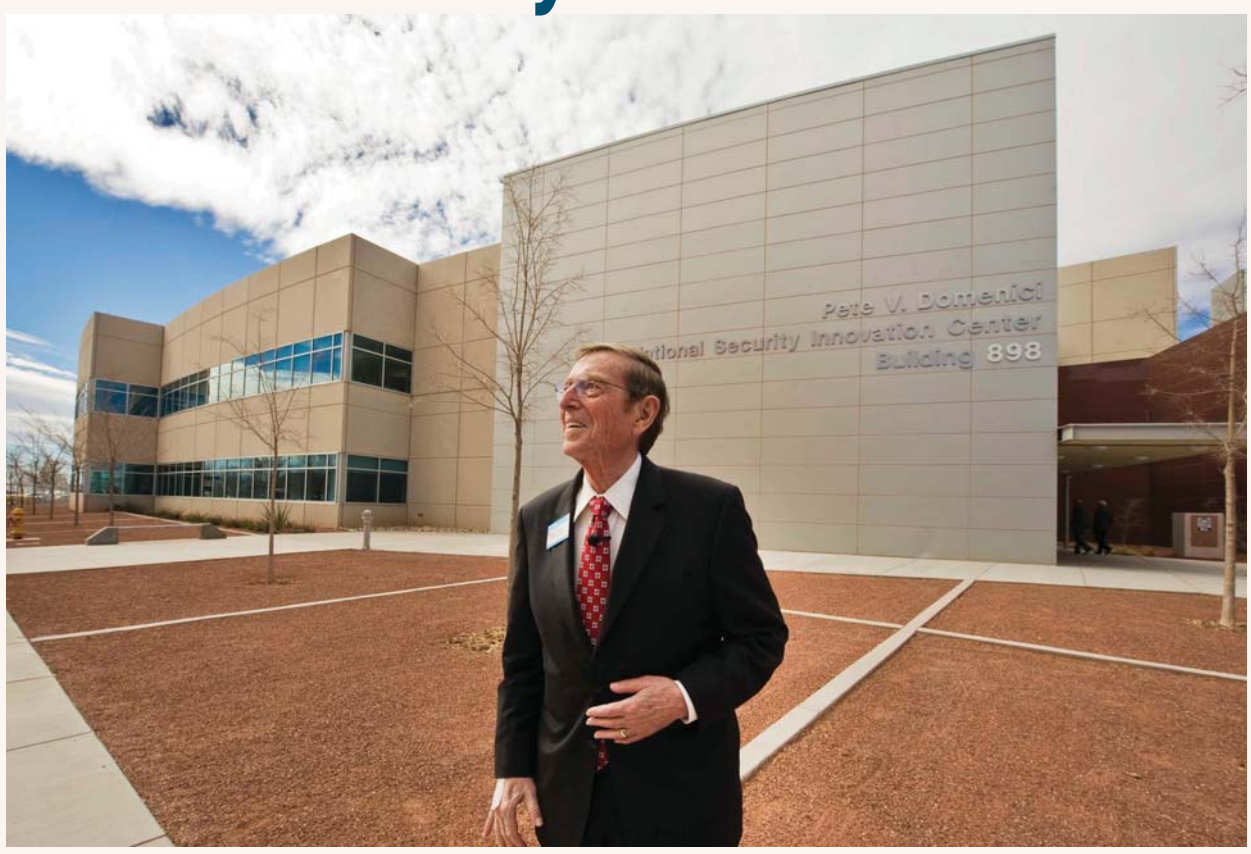
Sandia honors former senator for years of unparalleled support

In an outpouring of affection and appreciation, an audience of enthusiastic Sandians, along with elected officials and representatives from NNSA and the community, gathered last week in Sandia's Tech Area 1 to honor the service of former US Sen. Pete Domenici.

In recognition of his decades of advocacy and support for the role the national laboratories play in protecting the nation's security, officials at Sandia rededicated the still relatively new Weapon Integration Facility building as the Pete V. Domenici National Security Innovation Center.

(Continued on page 5)

PETE DOMENICI, second from right, is joined by Labs Director Paul Hommert, right, New Mexico Gov. Susana Martinez, and NNSA Deputy Administrator Don Cook during an event held in his honor.



BUILDING A LEGACY — In a quiet moment amid the festive hubbub of the day, former New Mexico Sen. Pete Domenici pauses in front of the building named in his honor. Domenici, joined by members of his family, received plaudits from Sandia and NNSA for his longtime support for the nuclear weapons program and NNSA's national security enterprise. (Photos by Randy Montoya)

Sandia LabNews

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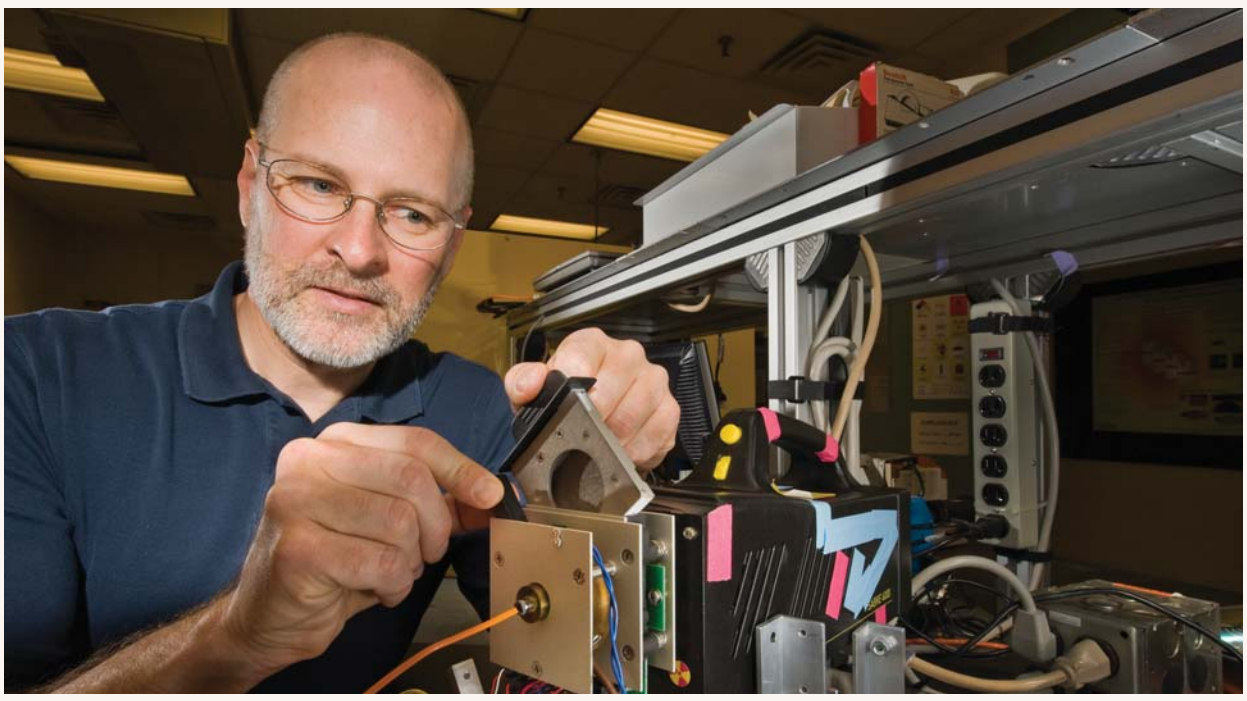
Sandia National Laboratories

Explosives experts blowing the lid off traditional ETD technology

Next-generation devices advance explosive trace detection technology



EXPLOSIVE DETECTION SPECIALIST Chuck Rhykerd snaps into place the metal screen at the heart of the next-generation explosive trace detection technology under development. (Photo by Randy Montoya)

By Renee Deger

For many, explosives detection these days brings to mind fuzzy images of air travelers and long lines at the airport. But the serious hunt continues for better tools to detect explosives and the expanding range of compounds that can be used as explosives, with veteran Sandians creating more precise and elegant solutions for detection.

Sandia's Contraband Detection Dept. 6633, a key contributor to the aviation and border security programs in the International, Homeland and Nuclear Security Strategic Management Unit, is working on the next generation of explosives detectors. Their work significantly advances existing explosive trace detection (ETD) technology and elevates their ability to help secure borders and transportation systems.

Though much of the recent attention on explosives screening at airports has emphasized the millimeter-wave imaging technologies for bulk detection of explosives, the use of ETD machines has expanded in the past year. The Transportation Security Administration (TSA) announced last year that it was purchasing 1,200 ETD machines to add to the 7,000 already in use in US airports. TSA screeners use trace detection technologies to look for the wispy residue of explosives left accidentally during the bomb-making process. They typically examine a person's hands, shoes, hair, clothing, or baggage.

Working on a project for DOE, the Contraband Detection group is building a better ETD machine that

(Continued on page 4)

Nevada Test Site marks 60th anniversary

To mark National Engineers Week, observed this year Feb. 21-26, the *Lab News* asked Sandia corporate historian Rebecca Ullrich to write a brief history of the Neveda Test Site, which this year celebrates its 60th anniversary as a key component in the nation's nuclear weapons complex.

The engineering accomplishments at NTS were unparalleled in the history of technology. The challenges were big — huge — and the engineering solutions had to be likewise. Not surprisingly, the Labs' deep involvement at NTS led to the emergence of some bigger-than-life leaders and helped shape a field test culture that is embedded in Sandia's corporate DNA. Read Rebecca's story on **pages 6-7.**

Inside

SANDIA COLLEAGUES Reggie Tibbetts and Matt Torres put on the state's coolest custom car and hot road show, the Supernationals, every year. 8

and . . .

That's that

"I for one welcome our new computer overlords." With that tongue-in-cheek rejoinder, legendary *Jeopardy* contestant Ken Jennings conceded defeat to the IBM-developed Watson supercomputer. IBM, which has been developing its advanced Question Answering technology for several years, teamed with Jeopardy to showcase the fruits of its labor. The two-game match, shown over three nights last week, pitted Watson (named after IBM founder Thomas Watson) against Jennings and fellow Jeopardy superstar Brad Rutter. The outcome, in retrospect, seemed foreordained: Watson blew away his puny human opponents, winning a cumulative total of $77,147, compared to $24,000 for Jennings, and $21,600 for Rutter.

I don't know if Watson would pass a Turing Test (a widely accepted measure of whether a machine has actually attained human-level intelligence), but I must say, it was a bit discomfiting to watch the computer march inexorably toward victory over two very smart, very quick human challengers. Jennings and Rutter, after all, have proven themselves to be the very best we have to offer in this particular arena, and they just couldn't touch Watson.

Jeopardy strikes me as a very human game; many of its questions are based on wordplay, puns, arcane word association, and a lot of pretty obscure trivia. Watson, in other words, beat us at our own game. Easily. Granted, *Jeopardy* is just one small thing, but "solving" *Jeopardy* is a much more complex and nuanced challenge than solving chess. These tools are getting smarter, folks, and smarter in ways that appear to be increasingly human-like.

Is this good news for humanity? It hardly needs to be said, does it, that computers are profoundly useful and powerful tools. We rely on them in every aspect of our lives and work. A very large part of what we do at Sandia would be impossible today without access to some of the planet's most powerful machines. But is a computer with human-level intellect and beyond an unmitigated good? I don't know. I can think of reasons to be concerned. What will their values be? Where will humans fit into a universe where we aren't the smartest kids on the block? These aren't trivial questions. And they are questions that are rushing at us headlong, questions that will demand answers, and maybe sooner rather than later.

Artificial intelligence guru and polymath Ray Kurzweil has written extensively about what he calls a coming technological singularity, a point at which machines become smarter than humans in every single way. He estimates — and he's been right about a lot of other things — that the singularity will occur around 2045, give or take a decade. He doesn't know what happens after the singularity, just like we can't know what happens on the other side of a black hole; the post-singularity world would be unpredictable to humans because we can't imagine, are incapable of imagining, the intentions or capabilities of superintelligent entities.

Science fiction has dealt with this issue. We all know about the *Terminator* series, which, to borrow Kurzweil's language, pits a pre-singularity humanity and a post-singularity intelligence against each other via the mechanism of time travel. In the *Dune* cosmos, the societies of the galaxy, in the wake of the so-called Butlerian Jihad, have banned computers. "The target of the Jihad," explains one of the characters in *God Emperor of Dune*, "was a machine-attitude as much as the machines. Humans had set those machines to usurp our sense of beauty, our necessary selfdom out of which we make living judgments. Naturally, the machines were destroyed."

I'm no Luddite, was a so-called "early adopter" of computing technology, and have carried on a lifelong love affair with science and technology. But the power of these machines is seductive in the extreme and it's going to be very hard to decide how smart is smart enough. Some wisdom beyond anything I possess needs to be brought to bear on this issue.

Are we thinking about it at all at Sandia? Or am I totally off base? I really don't know.

See you next time.

— Bill Murphy, (505-845-0845, MS0165, wtmurph@sandia.gov

Catalyst Networking Group event features speech on accelerating economic growth through innovation

Sandia employees interested in entrepreneurship are invited to a Catalyst Networking Group event March 15 featuring Thom Ruhe, director of entrepreneurship for the Ewing Marion Kauffman Foundation, at the National Museum of Nuclear Science & History in Albuquerque.

The Catalyst Networking Group, sponsored by Intellectual Property Management, Alliances & Licensing Dept. 1931, Technology Economic Development Dept. 1933, and Technology Ventures Corporation, provides a venue for professionals from across the Labs to share ideas in a relaxed atmosphere and helps inspire new ways of thinking. The group is one of several mechanisms designed to strengthen the culture of innovation at Sandia.

Ruhe's speech is titled "Accelerating Economic Growth through Innovation and Entrepreneurship." Ruhe manages a joint venture with the US Commerce Department's Office of Innovation and Entrepreneurship and oversees collaborative projects with innovative groups such as Invent Now, the Angel Capital Education Foundation, and the Entrepreneurial Learning Initiative.

The event starts with networking at 5 p.m., the speech will begin at 5:30 p.m., and additional networking will be from 6:30-7 p.m. Hors d'oeuvres and drinks will be provided. Space at the event is limited to 50 attendees, so RSVP to Natalie Carter (1931), 844-0165 or nacarte@sandia.gov. *— Heather Clark*

Retiree deaths

Arthur L. Savage (age 88)	Oct. 7
Vera M. Chandler (83)	Oct. 8
John P. Suttman (89)	Oct. 13
Gerald L. Fowler (85)	Oct. 21
John James Strascina (63)	Oct. 24
Elmer Geza Borbely (90)	Oct. 26
Lyle W. Kruse (65)	Oct. 30
Joseph Ben Losinski (76)	Oct. 31
Rose M. Griffin (77)	Nov. 1
Eva R. Silva (88)	Nov. 1
Richard K. Strome (90)	Nov. 2
Margaret J. York (71)	Nov. 2
Jose M. Romero (86)	Nov. 4
Fenner D. Jones (90)	Nov. 6
James T. Henderson (71)	Nov. 7
Don P. Vandyke (78)	Nov. 8
Garland P. Tilley (76)	Nov. 13
John C. Mitchell (79)	Nov. 15
William J. Stokes (82)	Nov. 17
Maurice M. Dillon (87)	Nov. 18
Naomi A. Gallegos (84)	Nov. 23
Albert D. Ford (90)	Nov. 24
Charles R. Farmer (86)	Nov. 26
Rose A. Hainlen (96)	Nov. 29
Leroy Henderson (85)	Dec. 1
Lucile E. Dunlap (89)	Dec. 2
Donald A. Bower (80)	Dec. 4
Peggy Leona Bondurant (66)	Dec. 15
Cleavord N. Giles (84)	Dec. 15
Ray B. Powell (90)	Dec. 16
Bertha L. Grant (95)	Dec. 17
Queento Leon Vandi (88)	Dec. 18
Carlton Miles Furnberg (74)	Dec. 23
David W. Braudaway (78)	Dec. 25
Walter B. Howerton (90)	Dec. 25
Johnny L. Hartley (82)	Dec. 29
Grover W. Edwards (93)	Dec. 31
Miguel Montoya (86)	Jan. 1
Fermin Nieto (97)	Jan. 8
O. B. Crump Jr (71)	Jan. 9
Clarence Robert Mehl (85)	Jan. 9
Jerry Clay Powell (70)	Jan. 12
Forest L. Baker (88)	Jan. 12
Gladys G. Olguin (88)	Jan. 16
Rudolph C. A. Sadler (94)	Jan. 26
Richard R. Precit (78)	Jan. 27
Donnie D. Glidewell (62)	Jan. 29

Sandia LabNews

Sandia National Laboratories

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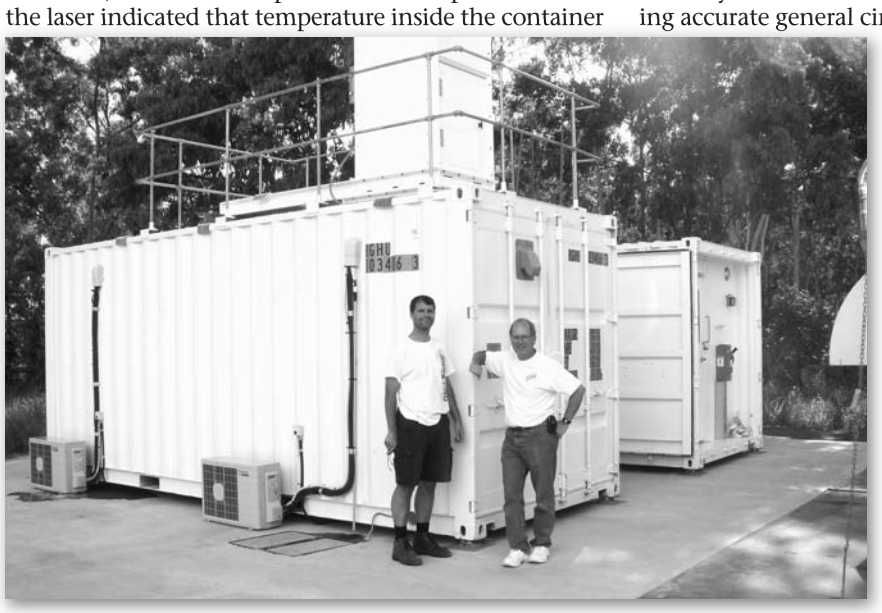
Smooth sailing for LIDAR down under

By Patti Koning

The waters must have been calm for the container ship that transported the Raman LIDAR system from the Port of Oakland to Darwin, Australia, last fall. "The system made it there in perfect shape," says project manager John Goldsmith (8131). "There was no indication that it had even been transported."

In fact, shock and temperature sensors packed with the laser indicated that temperature inside the container got up to 90 degrees but there was very little shock. John admits he had no idea what to expect — he had no experience transporting such a system half a world away. The only other Raman LIDAR system of this kind is located in Oklahoma and was transported by truck.



LONGTIME ARM SCIENTIST Dave Turner, now affiliated with the National Oceanic and Atmospheric Administration (NOAA), left, and John Goldsmith with the containers that transported the Raman LIDAR from California to Australia and now permanently house the system at the ARM Tropical Western Pacific site.

Raman LIDAR is an active, laser remote sensing instrument used primarily to measure atmospheric water vapor. The system has two laser heads, one for operation and another for backup, a telescope, and a complicated optics system of mirrors to direct the lasers and receive backscattered laser radiation.

John was the project manager in 1995 when Sandia developed the Oklahoma Raman LIDAR system, early in the Labs' involvement in DOE's Atmospheric Radiation Measurement (ARM) program. He has had minimal involvement with the system since then, only supporting a few upgrades. Except for routine maintenance, the Oklahoma system practically runs on autopilot.

In August 2009, John was given the chance to return to Raman LIDAR, which he describes as one of the most satisfying projects of his career. For 15 years, the Oklahoma system has been providing data critical to creating accurate general circulation models for climate study. The idea was to replicate the Oklahoma system in a completely different environment, the Tropical Western Pacific site (see *Lab News*, Aug. 28, 2009).

The new Raman LIDAR system was assembled and tested over the course of last year (see *Lab News*, Oct. 8, 2010). On Sept. 13, the system left California, reaching Australia in mid-November. John flew out on Thanksgiving Day and arrived in Darwin to find the system in perfect condition.

"I was delighted to see that the Darwin crew already had done most of the unpacking. They'd mounted the light baffle and, most importantly, hooked up the air conditioner," he says. "By the time I arrived, we were already ahead of schedule."

By the end of John's first week in Darwin, the optics were mounted and aligned. On Monday, Dec. 6, the Raman LIDAR began generating data, already with some interesting results.

"The very first data set really surprised people in terms of the structure in the atmosphere," John says. "There has never been an instrument to measure anything like this here. With these different climate conditions, I think the scientific impact will be significant."

Raman LIDAR measures atmospheric water vapor, which is important for studying climate change, as well as temperature, clouds, and aerosol particles. The instrument identifies water vapor by pulsing laser light for billionths of a second, then recording the light scattered back, some of it slightly shifted in wavelength by the molecules of water and nitrogen in the atmosphere.

The only issue so far has been some CPU usage problems with the computer that runs the system. The LabVIEW program requires a daily restart, unlike the Oklahoma system, which runs for more than a week at a time without any operator interaction. Once this issue is resolved, John expects the Darwin system to operate, like the Oklahoma Raman LIDAR, with minimal service. The Darwin system will generate slightly less data than Oklahoma because of the overhead sun in Australia. "We have some redundant fail-safe mechanisms in place to protect the system in the middle of the day when the sun is directly overhead. Otherwise, the sunlight focused by the receiver telescope could do a great deal of damage," John says. "So for a good part of the year, the system won't operate 24 hours a day."

The installation and setup went so well that John had some free time on the weekends to sightsee. He took a cruise on the Adelaide River to see the saltwater jumping crocodiles, visited the Darwin Military Museum, and spent a sultry day hiking in Litchfield National Park, famous for its spectacular Tabletop Range, permanent spring-fed waterfalls, cascades, and magnetic termite mounds.

THE SET UP AND INSTALLATION of the Raman LIDAR system in Darwin, Australia, went so well that John Goldsmith had some time to sightsee and meet some native animals, like this wallaby at Territory Wildlife Park.

"This was a great ending to this project," says John. "I really couldn't have asked for a smoother installation. The crew in Darwin did a superb job of setting up and supporting this system."

Sandia CaliforniaNews

Chuck Mueller receives SAE's 2011 Forest R. McFarland award

By Karen McWilliams

Sandia engines and fuels researcher Chuck Mueller (8362) will be presented with a 2011 Forest R. McFarland award at the 2011 Society of Automotive Engineers (SAE) World Congress awards ceremony on April 12 in Detroit.

This award recognizes individuals for their outstanding contributions toward the work of the SAE Engineering Meetings Board (EMB) in the planning, development, and dissemination of technical information through technical meetings, conferences, and professional development programs, or outstanding contributions to the EMB operations in facilitating or enhancing the interchanges of technical information.

CHUCK MUELLER

Chuck is being recognized for organizing technical sessions and other meetings at the international and US Powertrains, Fuels, and Lubricants meetings held in recent years. He has been chairman for many of these meetings and other sessions.

Chuck is a regular reviewer of technical papers, having reviewed an average of about eight per year over the past seven years.

Established in 1979, the McFarland award is administered by the EMB and honors the late Forest R. McFarland, who was himself an outstanding session organizer, a chairman of the Passenger Car Activity, and a member of the EMB. Funding for the award is through a bequest by McFarland to SAE and consists of a framed certificate presented at the SAE World Congress.

Chuck is an engineer at the Combustion Research Facility (CRF). He received a doctorate in aerospace engineering from the University of Michigan in 1996 and also holds an master's degree in aerospace engineering from the University of Michigan and Bachelor of Science degrees in aeronautics and engineering physics from Miami University. He has authored or coauthored more than 40 technical papers in the field of engine combustion and fuels and is the recipient of a number of awards.

Area mayors visit Sandia/California

ON JAN. 12, MAYORS AND VICE-MAYORS from six nearby cities met with Div. 8000 VP Rick Stulen and Buck Koonce of Lawrence Livermore National Laboratory at the Combustion Research Computation and Visualization building. At the meeting, Rick and Koonce shared their vision for the Livermore Valley Open Campus and learned from the mayors about Innovation Tri-Valley and i-GATE, two programs led by the Livermore Chamber of Commerce and City of Livermore, respectively, to spur economic development in the Tri-Valley and beyond. Pictured, from left, are: Rob White, City of Livermore; San Ramon Mayor Abram Wilson; Koonce; Tracy Vice Mayor Michael Maciel; Danville Mayor Karen Stepper; Rick; Dublin Mayor Tim Sbranti; Dale Kaye, Livermore Chamber of Commerce; Pleasanton Vice Mayor Cheryl Cook-Kallio; and Livermore Mayor Marshall Kamena. (Photo by Kelly Doty)

Truman lecture: The day of the 'desktop fab' comes closer

A dash of humor salts meaty talk by world's most cited chemist

By Neal Singer

Northwestern University professor Chad Mirkin, the world's most cited chemist, last month delivered Sandia's first Truman lecture of 2011, titled "Molecular Printing: A Chemist's Approach to a 'Desktop Fab.'"

The hourlong lecture focused on Mirkin's invention and subsequent explorations of the technique known as dip-pen nanolithography, but not before Sandia Fellow Jeff Brinker (1002), Mirkin's nominator and host for the lecture, humorously revealed a lighter side of the highly accomplished researcher.

Six or seven years previously, Jeff related in his introduction, he had been listed by the Web of Science search engine as the most cited chemist for the past quarter. "Chad sent me a congratulatory comment," Jeff said. "'Brinker,' he said, 'you're going down.'"

Mirkin handled the audience laughter gracefully — it was something of an icebreaker, as well as confirmation of the competitive nature of top scientists — and went on to show just why he has earned the honors showered upon him. Among his other accolades, he is one of very few people to be a member of all three US national academies — science, engineering, and medicine.

First, he described the concept and process of dip-pen lithography.

Gutenberg's conceptual underpinning

Traditional lithography of silicon devices uses light to define areas in which material will be retained or removed. Additionally, the Gutenberg printing press led conceptually to the idea of the additive use of inks, he said. The two methods gave rise to so-called soft lithography (pioneered by Harvard's George Whitesides) where silicone stamps are used to transfer molecular-based materials to substrates — in effect, to print them from chip-sized carriers. However, the lower size limit of definition of these structures is generally restricted to a few microns.

To make large numbers of still-smaller sized features, Mirkin proposed extending the Gutenberg technique. He used silicon mass-fabrication MEMS techniques to produce, instead of a final product, another production phase: A large number of (in one case, five million) tiny deformable pyramidal tips, which he described as the equivalent of an array of massively parallel quill pens. Using the holes as tiny ink pots in the master from which the tips were extracted, his team inked the tips by dipping them all using a single immersion step in the multiple inkpots — all tips exactly the same size and aligned by the very process of their production. The method produced an array of inked pens ready to do nanolithography. By contacting the dip-pen array with the substrate of choice, he achieved 10-nanometer-wide lines, and spots with 5-nm spatial resolution.

CHAD MIRKIN at the Steve Schiff Auditorium during a Truman Distinguished Lecture presentation. (Photo by Randy Montoya)

A thin layer of water surrounding each tip meant that the deposited hydrophobic ink didn't blur, ordinarily a function of ink leaking or migrating.

By very slightly changing the angle of the substrate on which the ink was printed, he could change the shape and dimensions of the dots from nanometers to microns due to deformation of the tip

"Changing the [receptor surface] by 1/100 of a degree can cause catastrophic consequences, but also useful [results]," he said.

Massively parallel atomic force-microscope-style tips have, he said, "marked a step toward the realization of a desktop fab" that could produce particles with nanoscale to microscale features, printed rapidly with excellent resolution and at low cost.

Works with organic, inorganic particles

The technique apparently works with organic and inorganic particles, depositing sub-10-nanometer metal particles on a surface as well as arrays of multiple bioactive proteins.

Inks used by Mirkin's team have contained relatively hard materials like silver, silicon, and gold, as well as sol-gels and single-walled carbon nanotubes, and ligands so complex they could substitute for proteins, viruses, and other chemical or biological species in ultrahigh-density DNA arrays, protein nanoarrays, protein nanostructures, and bionanoelectronics.

Mirkin's multicomponent templates have the possibility of recognizing larger biological structures and organisms like proteins (8.5 nm), viruses (120 nm), spores like anthrax (20 microns), and living cells (approximately 15 microns).

The technique's success in deposition does not involve applying equal force to all styluses, he said, because that would be impossible. Instead, the only factors in deposition are length of time in contact with the surface, and miscibility of the ink.

Rather than making products out of the destructive use of energy by subtractive top-down approaches, as fab lithography achieves, the idea of dip-pen lithography is to constructively deliver materials to a surface and build it from the bottom up.

"While this might sound like an academic exercise," he said, "22 countries now use dip-pen lithography."

The Truman lectures are supported by Div. 1000, whose VP, Steve Rottler, warmly welcomed attendees. Steve was appropriately attired for Sandia casual-dress Friday in black polo shirt and brown sport jacket. The Truman lectures, he said, are held irregularly, "reserved for speakers pre-eminent in their field, whose talks are highly relevant to our mission, and important for us to hear."

Explosive detection

(Continued from page 1)

will increase the number of detectable compounds. The current project builds on the group's history of using preconcentration techniques to improve the chances for a detector to find explosives.

The result of the new research will be a more powerful and precise instrument for guiding first responders, customs officials, border guards, and others in their search for hidden danger in innocuous-looking containers or clinging to seemingly innocent people.

"We're struggling with getting tools out into the field that are reliable, useful, and robust, taking into account the ideal size, weight, and performance for someone on the move as well as the challenges they face."

— Researcher Chuck Rhykerd

'Reliable, useful and robust'

"Our aim is for this technology to be useful in the field," says Charles (Chuck) Rhykerd Jr., (6633), a lead researcher on the project who is also the principal investigator for a related Laboratory Directed Research Development (LDRD) endeavor (see story at right). "We're struggling with getting tools out into the field that are reliable, useful, and robust, taking into account the ideal size, weight, and performance for someone on the move as well as the challenges they face."

The basis for Sandia's ETD innovation is a heated metal screen and a process called temperature-stepped desorption. Currently, commercial trace detection technologies that use heat apply a small blast of heated air to a cloth swab that was rubbed on a suspect surface such as a briefcase, a shipping container, a truck bed, or a person's hands or clothes. The heat causes explosive compounds to detach from the swab; a vacuum sucks the explosive particles into an ion mobility spectrometer, where they're ionized and those charged molecules are then recorded.

Part of the problem with this approach is that explosive compounds compete for ionization loads, with some grabbing a greater charge than others. The ion mobility spectrometer interprets the ionization loads like a smoke detector that goes off whether it's sensing a steamy shower or a candle-fueled curtain fire; it reports an imposing presence but it cannot differentiate the actual cause.

Replacing the cotton swab with a metal screen and the single blast of heat with a steady increase in temperature over time, creates a more differentiated environment for the compounds. The result is that different compounds, desorbing at different temperatures, lift off the screen and enter the chamber at different times, which then affects how they're ionized and ultimately, how they're interpreted. The process, which involves several new patents, was designed for and will be housed in commercially available ETD units. However, it builds on more than twenty years of trace explosives detection R&D, the kind of work that helps define Sandia as a national laboratory.

"This is part of an ongoing dialogue about the ability to detect broader ranges of compounds," Chuck says. "With this project, we're seeking ways to better utilize existing methods of detecting explosives."

Ion mobility spectrometry to offer roadside assistance

Explosives detection experts at Sandia don't plan on stopping their efforts at improving existing technologies for detecting trace amounts of dangerous compounds. They're also keeping an eye on improving underlying processes for exploiting new and more powerful technologies.

Already underway is the exploration into next-generation detection technology, as evidenced by the LDRD project titled "Desorption Electrospray Ionization Differential Mobility Spectrometry (DESI-DMS) for Homemade Explosives Detection." Charles "Chuck" Rhykerd Jr. (6633) is working on the project with fellow explosives detection veteran Kevin Linker (6630). Their project seeks to advance the underlying methods of reading explosives by exploring a handheld, roadside, and portable approach to leveraging a more robust way of analyzing ionized compounds.

The LDRD's objective is to address how the compounds become ionized in the first place so that field agents can use the more nimble differential mobility spectrometry (DMS) approach. Ion mobility spectrometry requires a bigger framework and is fine for stationary uses. But to leverage DMS for a wider variety of explosives, the process of ionization needs to be more flexible. Currently, the swab used in the process must be soaked in water or a solvent and then that liquid is shot through a cylinder whose inner skin is charged, thus creating ions during the journey.

The DESI approach flips the ionization process around. Instead of preparing a sample in the liquid, the user simply sprays a gaseous mixture of water and air or nitrogen through the cylinder onto the sample itself. The spray then plucks molecules from the sample, charging them at the same time while prompting the water to evaporate so that a purely ionized compound is then sucked into the DMS chamber for analysis. The idea here is to increase the accuracy of ETD technologies for field applications and provide inspectors with more information.

"The nice thing about DESI is that it's really small and really cheap, and for detection in the field, smaller and cheaper is better," Chuck says. *— Renee Deger*

Honoring Pete Domenici

(Continued from page 1)

With the long-serving, now retired senator and members of his family looking on, Sandia Labs Director Paul Hommert said, "Today is an extra special day because a visionary leader, a steadfast supporter, a dear friend is going to be honored by Sandia for Sandians and for people throughout our state and nation. Henceforth, the Weapons Integration Facility of the MESA complex at Sandia National Laboratories will be known as the Pete V. Domenici National Security Innovation Center. . . ."

'You believed in us'

"Sen. Domenici, by dedicating this building to you, we are celebrating your long-term vision for the security of our nation, your vision for a safe, secure, and reliable nuclear deterrent; your vigorous push intended to stimulate creativity and innovation; your staunch belief in sharing the knowledge with industry, universities, and other partners; your genuine delight at the advancements of science and engineering that would ultimately benefit the local and national economy. To a great extent, the entire MESA complex came into being because you believed in us. You asked us to demonstrate what we could do and what was needed in order to carry out our mission, and then you transformed a vision into reality for the benefit of our country and the world.

"Sen. Domenici, in your typical unassuming way, you once told us, 'You do your best, and I'll do what I can.' It is now our turn to say to you, 'We did our best, but you did the very best,' and for that, we thank you."

In his own remarks, Domenici connected with his audience with the same easy and distinctive style that made him a perennial favorite at Sandia whenever he conducted one of his almost annual colloquia during his years as a US senator. Domenici reiterated his conviction that the national laboratories have a vital role to play in securing the nation's future.

SEN. PETE DOMENICI, in characteristic fashion, establishes a warm bond with his audience during remarks at the dedication of the Pete V. Domenici National Security Innovation Center. Looking on are, from left, Executive VP and Deputy Labs Director Jerry McDowell, Sandia President and Labs Director Paul Hommert, New Mexico Gov. Susana Martinez, and NNSA Deputy Administrator for Defense Programs Don Cook. (Photo by Randy Montoya)

Grateful for support

Don Cook, NNSA's deputy administrator for Defense Programs, also spoke of Domenici's efforts on behalf of the national laboratories.

"In the same week we released a budget that provides the resources to invest in NNSA's future and implement the president's agenda, we have the opportunity to honor one of the true champions of investing in the people, the science and engineering capabilities, and the facilities that underpin our nuclear security," Cook said. "We are all grateful for support we at NNSA received from Sen. Pete Domenici, and for his lasting commitment to modernizing the nation's nuclear security enterprise."

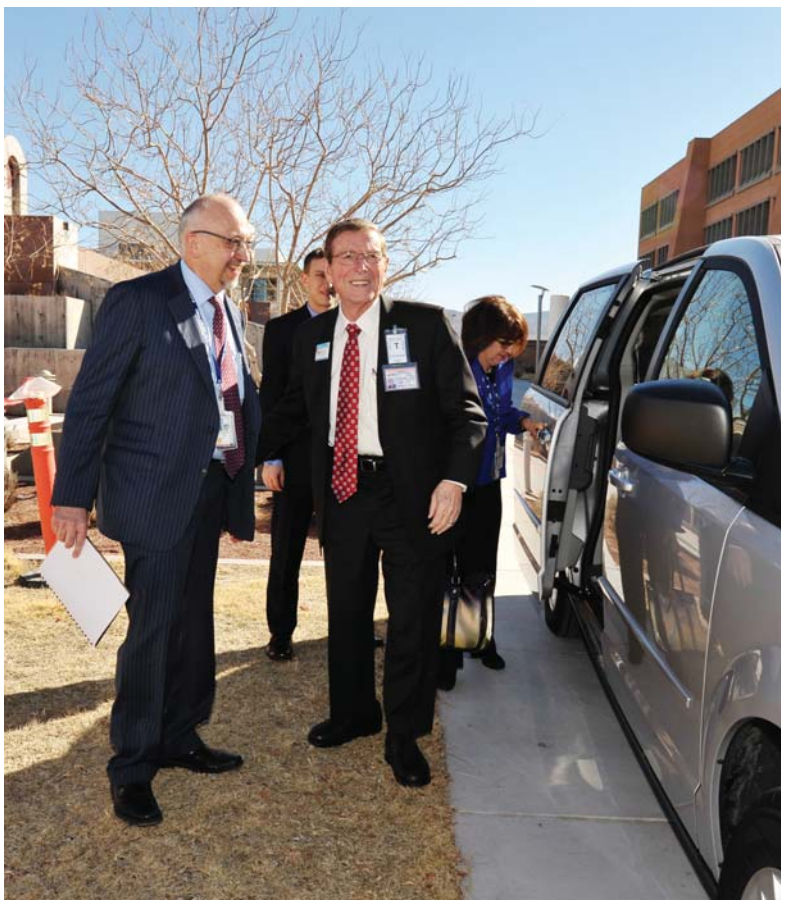
LIKE OLD TIMES — Retired New Mexico Sen. Pete Domenici, right, shares a light moment with Labs Director Paul Hommert before a colloquium for Sandia employees held the day before the dedication of the Pete V. Domenici National Security Innovation Center. Over the years, Domenici addressed all-hands meetings of Labs employees many times; last week his subject was "The Debt: America's Gravest Problem." (Photo by Randy Montoya)

Domenici, Cook, and Paul were joined by New Mexico Gov. Susana Martinez and by representatives from the offices of Reps. Martin Heinrich, D-N.M., and Steve Pearce, R-N.M.

The dedication ceremony took place at the southeast corner of Sandia's MESA complex, of which the Pete V. Domenici building is a key facility. MESA stands for Microsystems and Engineering Sciences Applications. Domenici was a long-time champion and ardent supporter of the MESA complex, and played a key role in securing funding for the best-of-class microsystems research, development and fabrication complex.

The Domenici Center houses 350 Sandia staff, most of whom work on weapon subsystem engineering and modeling and simulation or engineering sciences.

A FAMILY AFFAIR — Pete Domenici and members of his family — wife Nancy (second from left), sister Thelma (second from right), and daughters Claire (left) and Lisa (right) — pause in front of the Pete V. Domenici National Security Innovation Center in Sandia's MESA complex. (Photo by Randy Montoya)



WELCOME TO SANDIA — Former Sen. Pete Domenici is greeted by Sandia Labs Director Paul Hommert on Friday, Feb. 18, in advance of a ceremony to name a key building at the Labs in the senator's honor. (Photo by Randy Montoya)

Nevada Test Site marks 60th anniversary

When testing went to

'We got real good at improvising whatever was needed for these tests'

In the wee morning hours of Jan. 27, 1951, an Air Force B-50D carrying an assembled nuclear device lumbered down the runway at Kirtland Air Force Base in New Mexico, clawed its way into the dark sky, and headed west toward Frenchman Flat, a remote area at the just-established Nevada Test Site. As the aircraft neared its target, at about 3:50 a.m., personnel on board inserted a nuclear capsule into the device and armed it for detonation. After a series of practice bombing runs over the drop site, test officials radioed a message: Proceed. Just prior to 5:45 a.m., with dawn just kissing the horizon to the east, a bombardier released the nuclear device. It exploded at a height of 1,060 feet over the desert. The Able Shot was a success and the Nevada Test Site was open for business.

Now, to mark the 60th anniversary of the site — recently renamed the Nevada National Security Site — Sandia corporate historian Rebecca Ullrich has written a brief history of Sandia's involvement there. Rebecca's story focuses on the personnel in the field, the engineers and technicians who made the tests happen, who were on the ground, encountering and solving problems no one had ever heard of before. Theirs is a story to remember.

The images are familiar: Mushroom clouds rising, flaming in orange and red above the desert floor, shockwave and wind roaring over test structures as they disappear into fire, the earth lifting and leaving a trail of dust in the air before subsiding as cables snap and trailers rock near an underground detonation. This was nuclear testing through the Cold War years. The bulk of US testing was done at the Nevada Test Site, beginning 60 years ago with the Able shot of Operation Ranger on Jan. 27, 1951, and extending through 904 nuclear tests until 1992.

As pressure to expand the US stockpile increased after the Soviet Union tested a nuclear device and the Korean War began, President Harry Truman authorized creation of the Nevada Proving Grounds within the Nellis Air Force Bombing and Gunnery Range to supplement nuclear testing in the Pacific. The site was selected because it was already under government control, was large, had a low population density, and would be reasonably easy to protect.

Renamed the Nevada Test Site (NTS) in 1955, the facility expanded to more than 1,300 square miles by the mid-1960s. Its activities grew as well, as the Plowshare program conducted tests in pursuit of peaceful uses for nuclear devices and Project Rover developed a nuclear rocket. The nuclear tests themselves served a range of purposes, providing insight into weapon design, weapon effects, civil effects, seismic detection, safety, storage, and transportation.

A single nuclear test series involved thousands of people from a variety of organizations, including Sandia. Responsible for weapon assembly and component design for nuclear weapons, Sandia provided device assembly, arming and firing support, instrumentation, and data collection and analysis for the Pacific tests. When testing went to Nevada, so did Sandia.

Independence and ingenuity

From the beginning, Sandia's field test organizations maintained a decidedly do-it-yourself culture of independence and ingenuity. NTS did not offer much in the way of comfort or convenience. Ben Benjamin summarized, "We got real good at improvising whatever was needed for these tests."

Preparing to record Ranger's five air-dropped shots, Benjamin's team set up cameras in desert winter cold. To be sure the cameras were working properly they needed to process film from test runs, but did not have a darkroom.

EVERY UNDERGROUND TEST was supported by a massive aboveground infrastructure. In the photo here, instrumentation trailers are hard-wired to the test hole.

MEN TO MATCH MY MOUNTAINS — Robert Bunker, H. Swartzbaugh, and Shorty Whitlow during preparation for 1953's Operation Upshot-Knothole. It's not easy work.

"So we went downtown and bought a prefab building from Sears." Designed for grain storage, the building was converted to a darkroom. Staff borrowed wooden mop buckets from the janitor in the Control Point to hold chemicals for processing the test film.

After Ranger, Sandia turned to support for Operations Buster and Jangle in the fall of 1951. Gordon Miller supported Jangle, which included the first underground nuclear shot, a cratering experiment moved from Amchitka in the Aleutian Islands to NTS after much of the instrumentation was already designed.

"At times it seemed impossible to get enough relay contacts cleaned of dust to even envision an operation. . . . Power supplies that had no heating problem outdoors on Amchitka became heat-sensitive and unreliable in the desert — some simply blew up." But, Gordon noted, "whining simply wastes time."

80-hour weeks routine

Conditions were rough at the site and, while they improved over the years, the grindingly hard work remained consistent. During the 1951 tests, Gordon indicated they

OPERATION BIG SHOT in 1952. Note the observers in the foreground of the photo.

"stuck to a 14- to 16-hour work day, using mealtimes to talk over our plans, revise plans, re-revise plans. . . ."

A decade later, on Operation Nougat, Carter Broyles and his weapon effects team worked 80-hour weeks in the month leading up to the tests. And, a decade after that, when Matt Roach was doing drafting and experiment setup for Diamond Sculls, he worked 93 hours in the final week of test preparation.

Not everything was successful. Luke Vortman noted that they "had one underground effects test in 1958 in which we got one measurement. All the radiation measurements we fielded were wiped out."

Gordon described the effect of two desert tortoises collected by a colleague. One chewed through a control cable; once it was found and put outdoors the second one bit into an extension cord.

"The sparks, the beaker that popped, the lights going out, and the tortoise going wherever dead tortoises go ended a morning that had started out bright and full of promise."

A disarming experience

Much more frightening were experiences with atmospheric shots that did not go off. Walt Treibel and Bob Burton ended up disarming the first shot in 1951's Buster series and 1957's Diablo shot, respectively. Both had arming and firing responsibilities for their shots and so ended up on the teams sent out once the countdown ended with no detonation. Both described climbing the tower as terrifying, with Walt saying, "We stopped a lot on the ladder to catch our breaths because of the anxiety and because of our awareness that each step could be our last." Bob remarked that, "Climbing that ladder was the worst part of the whole thing. It took us 30 minutes or so." Both devices were disarmed and used later.

Increased testing expanded capability. In 1957, Sandia's growing involvement in radiation effects studies and the consequent concern about exposures garnered Harold Rarrick the task of forming a health physics group. He was assigned in March and was associated with a test group at NTS in April. "And I had the radiation safety, fallout trays, and air samplers for that project; it's kind of a way to learn health physics real fast."

A very tender subject

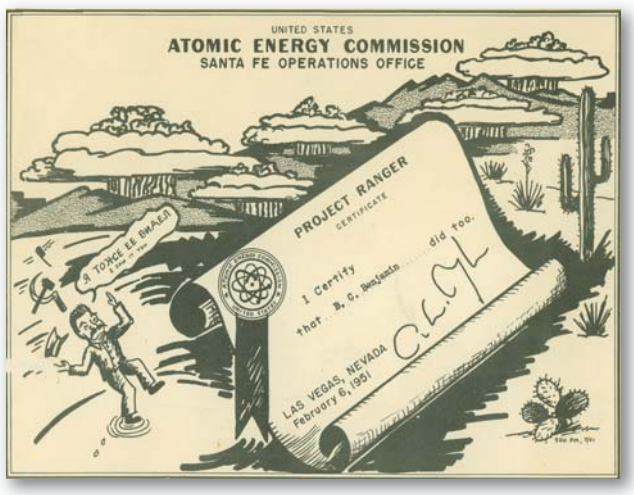
Also in 1957, balloons were introduced as alternatives to towers for atmospheric tests. Employed to reduce both costs and fallout, they were perceived as difficult to handle. Gordon described the downside: "Talk about frustration; in the test biz, it's hard to find a more tender subject than balloons. . . . The best way to handle tests involving balloons is to find somebody else willing to tackle the business and offer your best wishes."

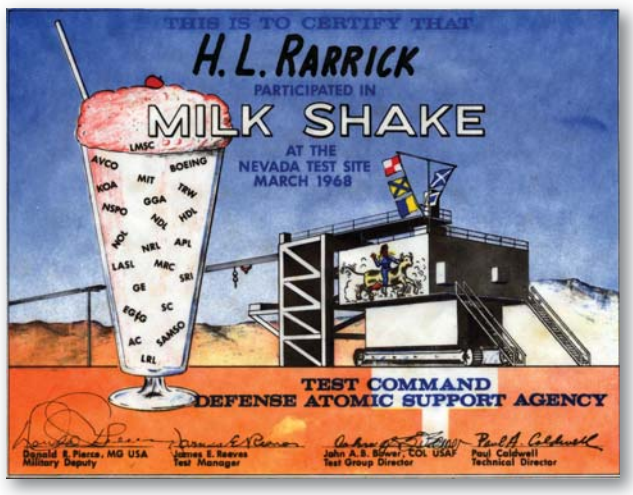
The 1958-1961 test moratorium meant a lull in activities at NTS, but when testing resumed, it was voluminous

Nevada Test Site marks 60th anniversary

Nevada, so did Sandia

Story by Rebecca Ullrich • Photos courtesy Sandia Archives





EACH NUCLEAR WEAPONS TEST at the Nevada Test Site involved hundreds of personnel, all of whom worked long hours to meet Cold War-driven deadlines. Test participants were rewarded for their efforts with certificates, each one custom designed to convey some unique aspect of the test. The certificates became coveted keepsakes for two generations of Sandians.

and predominantly underground; 1963's Limited Test Ban Treaty subsequently brought atmospheric testing to an end. Underground testing in vertical shafts and horizontal tunnels posed challenges for setting up instrumentation. But, line-of-site pipes leading from the detonation allowed for multiple experiments, and, relying on unprecedented engineering creativity, testers found ways to fit as many experiments as possible into the cramped spaces of drifts and mined rooms. Sandia introduced fast-acting closures to contain blast debris and protect instrumentation.

Moratorium and evolving missions

Dorris Tendall and Leo Brady established a series of seismic stations extending out beyond the test site to evaluate ground motion propagation from nuclear detonations. Don Shadel developed the Sandia TV system to document underground testing. He designed cameras, cable, reel, and a deployment truck, allowing views of the post-shot cavity or tunnel several thousand feet underground.

Similarly, the limited real estate for experiments and the increasingly sophisticated diagnostic instrumentation invoked Sandia's drafting organization. Matt Roach described working with the PhDs to convert their ideas into "workable underground test assemblies." For Diamond Sculls, the layouts, detail drawings, and assemblies for the experiments were completed in "approximately 10 weeks and burned nearly 11,000 drafting man hours."

In 1992, President H.W. Bush declared a unilateral moratorium on nuclear testing and NTS has hosted no full-scale nuclear tests since. On Aug. 23, 2010, NNSA announced the site was renamed the Nevada National Security Site, to reflect its evolution from nuclear testing into other research and training activities.

'Colors I didn't know existed'

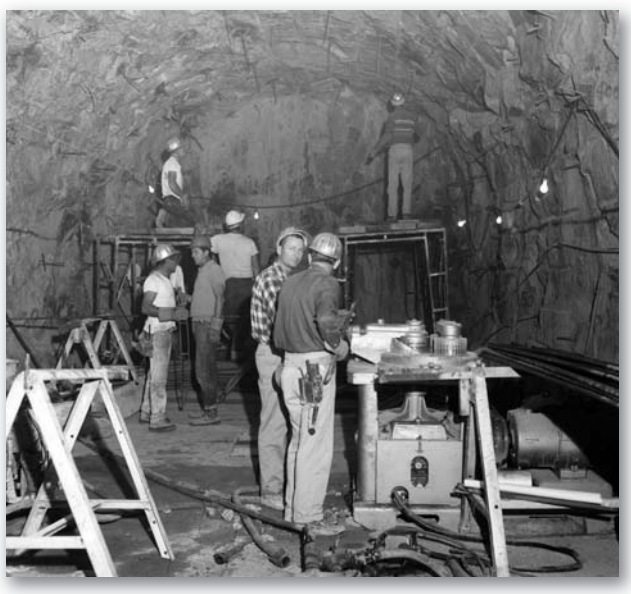
Observers Program: In the 1950s, Sandians who were not participating in a test could apply to attend as observers, space and other concerns permitting; time and travel costs were covered by the employee. In 1953, Andy Lieber drove Tessie Wright and Dorothy and Leah Cohen to Nevada to observe a shot in Operation Upshot-Knothole.

"We sat in a cafeteria and sipped coffee until the wee hours of the morning, then boarded buses for the observation point," where they were issued dark goggles.

When Andy removed his goggles, he was awed: "I'm partially color blind but I've never seen anything as colorful as that fireball; colors that I didn't know existed. And, in the pre-dawn light, yuccas in the surrounding basin lit up like birthday candles."

"About the time I thought we should be bracing for the shock wave, I saw it literally racing up the rise toward us — a vague sense of something optical and a line of dust at ground level. I had expected a "boom" like in the movies. But the sensation was a very loud "crack" as if a pistol had been fired in our ear."

A WORKER PREPARES INSTRUMENTATION before the Ranier shot of Operation Plumbbob in 1957.



THE PREPARATION for a big test required a major mining operation. Here, Sandians prepare a tunnel for the Piledriver test in 1965.

SANDIANS work on line-of-site pipe in preparation for underground shot, Operation Midi Mist, in 1966.

SuperNationals

Love of cool cars brings together Reggie Tibbetts and Matt Torres to run ever-popular Supernationals event

By Bill Murphy

CAR GUYS — Reggie Tibbetts, left, and Matt Torres, have been putting together the annual Supernationals custom car show for 20 years now. (Photo by Randy Montoya)

What this town needs, thought Matt Torres in 1992, is a really primo hot rod and custom car show. Matt, a security police officer in Sandia's ProForce and a car nut since before he could walk, isn't the kind of guy to just talk and dream; when he sets his mind on something he does it. So he found a business partner and launched the Desert States Rod and Custom Show.

Getting that inaugural event off the ground in 1992 required lots of decisions, none of which turned out to be more momentous than Matt's decision to hire fellow Sandian and car nut Reggie Tibbetts (4232) to be a judge.

Soon after the 1992 show, Matt's original business partner pulled out to promote rodeos and bull riding events. Matt wasn't about to give up on the car show, but he knew it was too big a job for one man to handle.

"Reggie's focus and energy were unmatched and I asked him if he would like to become my new business partner in the show," Matt recalls. "He said yes. The next year — 1993 — Reggie and I decided to rename the show the Custom Automotive Supernationals, which it remained for several years, and now is known as the Supernationals."

With this year's show, held Jan. 28-30 at Expo New Mexico, Supernationals marked its 20th anniversary.

Under Matt and Reggie's loving, meticulous, and indefatigable attention, Supernationals has become an Albuquerque institution, hardly surprising in a town where people love their cars the way people in Kentucky love their horses.

Best, newest, most original cars

Over the past 20 years, the Supernationals has displayed the top hot rods, custom cars, trucks, muscle cars, and motorcycles from all over the country. Matt and Reggie use their own vacation time to scour the nation, going to car shows in . . . well, everywhere, looking for the best, the newest, the most original, coolest cars they can find. They actively recruit the very best car guys in America — which is, after all, the greatest car country on the planet — to display their vehicles in Albuquerque. It's the quality of the cars, and the freshness of the exhibits each year, that have made the Supernationals the go-to car show in the region, Reggie says.

"Every year," Matt says, "we try to surpass the previous year's show. That is always the goal, to find that 'WOW' car and convince them they need to come to Albuquerque."

Just as opera lovers have Puccini and Verdi, true car aficionados speak with reverence and awe of Big Daddy Don Garlits, Carroll Shelby, and Big Daddy Ed Roth. All those legends have attended Supernationals, met fans, and signed autographs. Other celebrity visitors Matt and Reggie have secured over the years to help boost the profile of the show have included Cindy Williams (from *Laverne and Shirley* and *American Graffiti*), Bo Hopkins and Candy Clark (both from *American Graffiti*), and Kevin Major Howard (from *Full Metal Jacket*).

Big Daddys go one-on-one

The interaction with celebrity guests has made for some memorable moments.

Reggie remembers the year that both Big Daddy Ed Roth, king of custom cars in the 1950s and '60s, and Big Daddy Don Garlits, the drag racing legend, were guests at the show.

"We took them to several radio stations for interviews," Reggie recalls. "If you could have heard their conversations on the way to the stations, it was like they were fighting, but each was expressing stories of the old days of custom cars and drag racing and trying to one-up each others' stories. It made for one of the most memorable times I have ever experienced with celebrities, as they were both-big time characters."

Matt and Reggie agree that the ladies from *American Graffiti*, Cindy Williams and Candy Clark, were the absolute nicest guests they've ever had. Clark was this year's celebrity guest, by the way.

"These two were outstanding individuals, friendly and kind; they'd spend all their time greeting fans, hugging everyone, taking pictures, and supplying autographs," Reggie says. "Our families are fortunate to be able to say that we have stayed in touch with these most famous folks and they are as kind years later when they see us as they were at the event."

Speaking of families, Matt and Reggie emphasize that pulling off the Supernationals each year requires a concerted family effort.

"Our families are a large part of this event and each person pitches in. Although sometimes we wonder how we get it done, it always seems to get better each year," Reggie says. "Each family member has an outlined responsibility to work on and monitor, and without them, the show would be very difficult if not impossible to fully manage with just Matt and me."

Working the show each year, in addition to Reggie and Matt, are Reggie's wife, Margret Tibbetts (4241); daughters Tiffany Pegues (3511) and her husband, Clarence; RuthAnn Tibbetts (9343); and Krystal Gaffney and her husband, Jason. On Matt's side, pitching in are wife Annette, daughter Sarah, son Christopher, brother John, and father Charlie.

'A question for a supercomputer'

Reggie estimates that putting on the show takes "probably upwards of several thousand hours each year," adding that planning is already under way not just for the 2012 Supernationals, but the 2013 event as well. Matt is hesitant to estimate the number of hours he puts in, saying, "That's a question for a supercomputer."

DETAILS, DETAILS — The cars on exhibit at the Supernationals sparkle like fine jewels — and cost just as much! (Photo by Randy Montoya)

Matt says that for all of the fun (and yes, hard work) the show has been over the years, "the thing we are most proud of is our relationship with Ronald McDonald House Charities. Over the past 15 years, that has been our favorite charity. Reggie and I have seen and know how devastating traveling to another city for healthcare for one for your children can be. Having a nice comfortable place to stay close to your children while they are receiving care such as the local Ronald McDonald House can be one less thing that a parent needs to think about when dealing with a situation that involves their children's medical issues."

Reggie agrees that the relationship with Ronald McDonald House is a perennial highlight of the event, noting that the show raises a substantial contribution each year for the charity.

The absolute coolest car ever

As close as Matt and Reggie have been to the car business, they've never gotten bored, never lost their lifelong love affair with juiced-up hot rods and one-of-a-kind custom jobs. Both agree that perhaps the coolest car ever at the show was a vehicle called the "Ground Fighter."

"With a 1000-horsepower blown hemi and a cockpit straight out of a fighter jet, it was truly one of the most memorable and popular cars ever to display in our event," Reggie says.

While that car may have been the greatest, most unforgettable ever at the show, it wasn't the most memorable car Matt ever saw. No, no, no. The coolest car ever for Matt? That's easy: "My Dad's two-tone blue '56 Plymouth!" Of course.

LOOKIN' LIKE A MILLION BUCKS — One of many cars at the annual Supernationals show, this vehicle is estimated to be worth a cool million dollars. (Photo by Randy Montoya)

Global Security team launches new Mideast genie

By Renee Deger

Even in the oil-rich Persian Gulf region, nuclear energy is seen as a go-to technology. That's the conclusion experts in the United Arab Emirates came to in 2008 as they considered the demands their expanding economy would place on long-term energy capacity. Nuclear energy, they decided, must be considered a critical element in the UAE energy supply mix to meet projected demand.

And the UAE wasn't alone in its thinking; it wasn't long before a handful of other Middle Eastern nations signaled their interest in nuclear energy as well.

Sandia's Amir Mohagheghi (6821), who travels to the region extensively, had seen this coming. The nuclear scientist began to sketch out ideas for establishing a responsible nuclear energy culture in the region to ensure that proper safety, safeguards, and security policies were adopted along with the technology.

Nearly three years later, the most visible milestone in the program that eventually unfolded around Amir's ideas was achieved in Abu Dhabi, UAE. The Gulf Nuclear Energy Infrastructure Institute (GNEII — pronounced "genie") opened last Sunday with a pilot class of 11 professionals and the signing, by Div. 6000 VP Jill Hruby, of the official agreement naming Sandia an institute sponsor. GNEII is a cornerstone development in the global nuclear security initiatives under the International, Homeland, and Nuclear Security Strategic Management Unit, which Jill oversees.

"The opening of the institute represented more than just the hard work and long hours by the team to make this idea a reality. It is also a first major step forward in the safe and responsible expansion of an energy source more and more nations are finding compelling to ensure sustainable economic growth," Amir says.

RESPONSIBLE NUCLEAR DEVELOPMENT — Div. 6000 VP Jill Hruby signs a memorandum of understanding with Raymond Juzaitis, head of the nuclear engineering program at Texas A&M University, left, and Tod Laursen, president of the Khalifa University of Science, Technology and Research in Abu Dhabi, that establishes the Gulf Nuclear Energy Infrastructure Institute.

GNEII represents a three-way sponsorship by Abu Dhabi's Khalifa University of Science Technology and Research, Sandia, and the Nuclear Security Science and Policy Institute (NSSPI) at Texas A&M University. Recognizing the value of such an institute almost immediately, the government of the United Arab Emirates and Khalifa University signed on to serve as host. Financial sponsorship of GNEII comes from Khalifa University, NNSA's Office of Nonproliferation and International Security (NA-24), and the Department of State's Office of Partnership for Nuclear Security. The Texas A&M connection came via Adam Williams (6812), the GNEII project lead. A Texas A&M graduate, Adam was intrigued by Amir's proposals and signed on in mid-2008 to assist in the effort. As he began to understand the project even more, it became clear to him that his alma mater would be a terrific project partner on this side of the globe.

Three core principles

Adam, who participated in many of the exploratory conversations throughout the Middle East, says the GNEII team started out with three core principles that had to be met for the project to be a success:

1) Demand-driven — Regional governments and institutions had to support this program financially and with encouragement;
2) Indigenous — The program would have to transition to local control within five years; and,
3) Regional — Professionals from across the Middle East would be able to participate in the program regardless of where the physical institute was based.

"Nuclear energy programs are complex and there are many steps to establishing a responsible nuclear program," Adam says. "Among the local ranks in the Middle East, few understood all facets. Our goal is to provide a solid start for a comprehensive, complete, and coherent introduction to a responsible nuclear energy program so the idea of a 'Middle Eastern nuclear energy program' won't keep people up at night."

The idea took off like a rocket, and the biggest stumbling block in establishing GNEII was balancing the UAE's desired aggressive pace of development with the realities of conducting a complex program. Adam says he spent most of 2010 traveling to and from the Middle East — as well as around the US — advertising and marketing the program as well as discussing the curriculum, the logistics, the student enrollment, the management and oversight structure, and other operational project details.

While the work was daunting, the project represented significant new opportunities for nuclear energy education, Adam says. In the US — and in other more mature nuclear energy programs — safety, safeguards, and security represent discrete disciplines and it's sometimes a challenge to convince specialists to work together. Developing a brand-new program from the ground up was a chance to build awareness and integration of these disciplines into the foundation of nuclear energy programs.

Nonproliferation a key element

"We wanted to weave the theme of integration throughout the curriculum," Adam says.

Working together, Sandia and NSSPI developed a 12-week academic program — covering nuclear energy basics (systems thinking, basic nuclear-related physics, the nuclear fuel cycle, nonproliferation issues, power plant operations, radiological materials management, and nuclear energy safety, safeguards, and security) — followed by an independent research project that will provide graduates with a professional certificate from Khalifa University. It seeks entry- and mid-level policymakers, government officials, and energy program executives and emphasizes broad concepts in nuclear energy safety, safeguards, and security culture; it does not attempt to train plant operators. Ultimately, the curriculum will provide the initial credits toward a master's degree from Khalifa University, which is developing GNEII into a broader, research-based institute. Personnel from Sandia and NSSPI will teach the classes, staying for up to several weeks at a time.

A key element to the program is nonproliferation, Adam adds. Typically the word has a negative connotation with many foreign countries that see it as a means for the US to deny access to technologies, Adam says. GNEII represents an opportunity to examine the concept outside of the political arena and offer a better understanding of the underlying principles to future regional nuclear energy decision-makers.

Ultimately, Adam says, what GNEII may provide to the rest of the world is a fresh take on nuclear energy policy. He adds, "This program should ideally develop a cadre of Middle Eastern nuclear energy experts who can further contribute to the international conversation on nonproliferation."

While Adam was the lead, the program team included many contributors from Sandia and Texas A&M and Khalifa University. The project management team included Patricia Dickens (4031), Geoff Forden (6821), Faraj Ghanbari (6821), Scott Struve (4031), David Boyle (Texas A&M), and Phil Beeley (Khalifa). The curriculum development and instruction team included Shawn Burns (6231), Matthew Dennis (6231), Randy Gaunt (6232), Marvin Hadley (4128), John Matter (6833), Riyaz Natha (6613), Ashley Nilsen (6821), Brian Thomson (4128), Ryan Whalen (6821), Timothy Wheeler (6231), and from Texas A&M, Mike Schuller, Bill Charlton, Charles Kurwitz, and Alex Solodov, who is also affiliated with Oak Ridge National Laboratory.

Favorite Old Photo My season with Stan the Man

THE LEGENDARY STAN MUSIAL, left, shared outfield duties during his 1941 minor league season with Ollie Vanek, middle, and Roy Broome. Ollie was the great-uncle of Sandian John Zavadil.

Note: In one of our most optimistic annual rituals, ballplayers — grizzled vets and bright-eyed kids, alike — returned this month to their spring training camps in Florida and Arizona. As we read up on the off-season trades and watch for the early successes of the hot young prospects, we, like the ballplayers, tell ourselves that this is the year . . . this *is the year we get our batting average up and earn a gold glove for the fewest errors in our career.*

* * *

In the spirit of the season, we're happy to print this photo and accompanying account submitted by John Zavadil (4856)

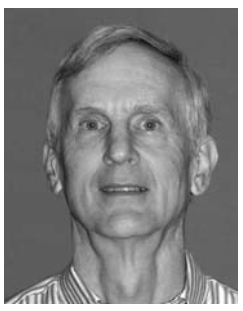
I first met my great-uncle, Ollie Vanek, in 1992. He immediately showed me his crooked right index finger and announced, "This is the finger that kept Stan Musial with the St. Louis Cardinals." Ollie had been a good prospect as a catcher in the St. Louis farm system, but a foul tip had broken his finger badly and he was demoted to the lower-level teams. In 1941, Ollie was playing for and managing the Springfield, Mo., Cardinals, then a farm team for the St. Louis Cardinals. I think they were equivalent to today's A- or AA-level teams.

A young phenom, 20-year-old Stan Musial had started the season at Springfield after suffering an injury the previous year. According to Uncle Ollie, Stan the Man got off to a rough start and was just about ready to hang up his spikes and go home to Pennsylvania. Ollie claimed he convinced Stan to stick around. The photo here was taken about seven weeks into the season and shows the starting Cardinals outfield: Stan in left field, Ollie in center, and Roy Broome in right. As you can see by the batting averages under each player, Stan had turned things around and was batting .439. After 87 games in Springfield, he moved up to the Rochester Red Wings, and then was sent up to St. Louis, where he batted .426 for the last 12 games of the season. And the rest, as they say, is history.

By the way, neither Ollie nor Roy ever played a game at the major-league level. But Ollie was still reminiscing about his season with Stan 50 years later. Ollie died in 2000, and Stan attended his funeral, so their friendship lasted for six decades. Stan just marked his 90th birthday, having lived most of his life as a legend. Through a combination of skill, grace, and sportsmanship, Stan Musial for decades has been one of the most beloved sports heroes in St. Louis and around the country.

Mileposts

New Mexico *photos by Michelle Fleming*



Doug Brown
35 9312

Tom Lutz
35 1658

Larry Predika
35 6812

Steve Sanderson
35 6623

Kyle White
35 5946

John Brockmann
30 1532

Butch Cox
30 280

Victor Rimkus
30 5954

Mark Smith
30 1830

Mary Clare Stoddard
30 6831

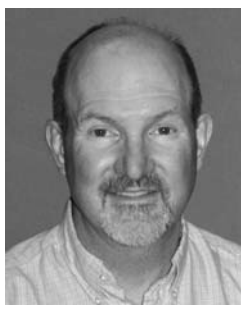
Recent Retirees

Ami Peterson
26 1011

Tan Hu
25 5627

Dan Porter
25 5741

Geneva Sachs
25 2553



Bradley Smith
25 245

Daniel Barela
20 4241

Michele Lesher
20 9538

Mason Blaich
22 414

Vanessa Miles receives Minority in Research Science Trailblazer Award

By Iris Aboytes

Vanessa Miles (2951) received the Minority in Research Science Trailblazer of the Year at ceremonies held during the Annual Black Engineer of the Year Science, Technology, Engineering, and Math (STEM) Global Competitiveness Conference held in Washington, D.C., Feb. 17-19.

Photo by Randy Montoya

VANESSA MILES

Trailblazers are described as minority men and women actively creating new paths for others in science, research, technology, and development. Some are experienced executives who continuously seek innovative products or lines of thought, some are breaking new ground at the midpoint of their careers, and others are recent grads who show pioneering promise. Trailblazers distinguish themselves by constantly setting their sights higher, striving to innovate, and opening doors for others.

> ***"I am very grateful to the outreach programs, especially the Black Outreach Committee, whose members played an instrumental role in recruiting, mentoring, and retaining staff like me to the Labs."***
>
> **— Vanessa Miles**

In *Black Engineer and Information Technology* magazine, one of the sponsors (along with Lockheed Martin and others) of the annual Black Engineer of the Year Awards program, Trailblazers are described as "making great advancements in our quality of life. They are motivated by the spirit of inquiry and by a passion for inclusion. Their work furthers developments in healthcare and space exploration, information technology processes, and national security. Their work also ensures that every voice is heard and every perspective is considered."

Vanessa is the lead B83 Stockpile Evaluation Engineer. "She is a role model in the areas of transformation and innovation," says Corey Cruz (2950). "Vanessa is the heart and soul of the B83 laboratory surveillance team. She moves them forward by example and quietly goes about the business of teaching, managing, organizing, and inspiring."

Vanessa came to Sandia in 1989 from Prairie View A&M University after two years as a summer intern. She completed her master's degree at Purdue University as part of Sandia's One Year on Campus program.

"I am very grateful to the outreach programs, especially the Black Outreach Committee, whose members played an instrumental role in recruiting, mentoring, and retaining staff like me at the Labs," Vanessa says. She is currently involved with the Labs' recruiting efforts at Prairie View A&M and Purdue University.

Vanessa's past 17 years have been spent at the Pantex Plant in Amarillo, Texas.

"In the beginning I felt somewhat disconnected from the real mission of the Labs," she adds. "Today, I believe that Pantex is the place to be for surveillance activity. My colleagues and I at Pantex are on the front line of the effort to ensure the safety and security of the nation's stockpile."

Thinking about what this award means to her, Vanessa reflects on her younger days being raised by a single mother and an older sister.

"My mother worked in the campus laundry at Prairie View until she retired," she says. "She encouraged my sister and me to go to college. My older sister cleared the path and literally foolproofed it for me."

In addition to her work, Vanessa believes in giving back to the community and supporting the growth of minorities in science and engineering. She has served as an adjunct professor of mathematics at Amarillo College. She also volunteers with the Texas Alliance for Minorities in Engineering, the Mt. Zion Baptist Church, Amarillo High School, and St. Andrew's Episcopal School and Par for the Course Academy for Children.

> ***"We must all slow our pace and simply take the time to listen to the dreams of the younger generation."***
>
> **— Vanessa Miles**

Vanessa believes there are many more trailblazers among our youth today. "We must all slow our pace and simply take the time to listen to the dreams of the younger generation," she says.

"Many kids feel entitled and believe that the world owes them something. America is a beautiful place, yet in order to get a piece of the dream, each of us must do our part.

"Our mother would say, 'There is no money like your own money,' as she encouraged our independence," she adds. "My mom's nurturing hands and my free-spirited sister started it all for me."

FORMER NEW MEXICO SEN. PETE DOMENICI, second from left, is joined by Labs Director Paul Hommert, left, New Mexico Gov. Susana Martinez, and NNSA Deputy Administrator Don Cook in front of the new Pete V. Domenici National Security Innovation Center. The building was rededicated in Domenici's honor during ceremonies Feb. 18 at Sandia. (Photo by Randy Montoya)

Awards recognize environmental excellence at Sandia

The annual Environmental Management System Excellence Awards, presented Feb. 8, recognize achievements that benefit the environment by those at Sandia whose jobs do not specifically include environmental work.

Now in its sixth year, the awards program has drawn more than 150 nominations from throughout the Laboratories.

Some of the Sandia EMS nominations have received national recognition from the White House Closing the Circle Awards and more recently the E-Star Awards.

For the 2011 EMS Excellence Awards, a total of 16 nominations were submitted in five categories:

- Energy Reduction and Water Conservation
- Risk Mitigation/Environmental Protection
- Recycling
- Waste Minimization
- Environmentally Preferable Purchasing (EPP)

The 2011 winners

Energy Reduction and Water Conservation winners (tie)

Heating System Modernization Project at Tech Area 1

Installation of small package boilers to provide space heat and process steam in buildings throughout TA I, resulting in a significant decrease in emissions, dramatic cost savings, and an impressive recycling initiative.

Team members: Jim Smith and Christy Simmons (4826); Kelsey Curran, Joanna Eckstein, Joe Bonaguidi, Chip Roma, Doug Vetter, Stacie Evelo and Terry Cooper (4143); Israel Martinez, Nick Durand, Lucille Roybal and Larry Smith (4821); Tim Stirrup (4126); Chris Evans (4853); M. Anthony Chavez of 48271); Abran Trotter (48444); Jerry Wright of 48421); Andrew Gough (4144); Amy Blumberg (11100); Darrell Rogers (4824); Jim Rush (retired); Su Hwang (retired); Mike Quinlan (4840); Lynwood Dukes (4820); Mike Allred (48474); Stanley Harrison (4850); Barry Watson (48426); Jeff Quintenz (168); William Tierney (4827); Kelly Garcia (2732); and Carolyn Holloway and Susan Lacy (DOE-SSO).

Distributed Energy Technologies Laboratory (DETL) 9300/6100 Renewable Energy Collaboration

Photovoltaic panels owned by Center 9300 were installed at the DETL, run by Center 6100. The DETL site will use the panels to support programmatic research projects while Center 9300 will reap the renewable energy credits generated by all the solar arrays on the site.

Team members: David J. Martinez and Kathye Chavez (9324); Sigifredo Gonzalez and Nelson Opell (6112); Carol Bicher, Erika Barraza and Jerry Montoya, (4821); Rod Justus and Bryant Reeves (4826); John Rathbun (4824); Preciliano Narvaiz (4842); and Jose D. Martinez and Ivan Watchman (48271).

RECYCLED STEAM? — A team of Sandians and contractors successfully recycled much of the solid waste generated during the decontamination and demolition of the steam plant (Bldg. 605), earning them one of the 2011 Environmental Management System (EMS) Excellence Awards.

Risk Mitigation/Environmental Protection winner

Div. 10000 Green Team

Comprised entirely of volunteers, this environmentally conscientious working group strives to raise awareness on a variety of environmental topics among their co-workers.

Team members: Sandy Paolicchi (10691); Margaret Casbourne (10648); Colin Hallahan (10503); Dave Keiss (10243); Jeffrey Miller and Jeanne Wallace (10248); David Moran (10545); Patricia St. John (10612); and Jean Totten (9700).

Recycling winner (tie)

Plastics Recycling Process Improvements

Sandia is creating new plastics recycle streams and improving the quality of existing streams. By minimizing contamination in each recycle stream, more plastics can be reused as a like material instead of a lower quality material. Revenues from recycling are reinvested in Sandia/New Mexico's recycling infrastructure.

Team members: Solid Waste Transfer Facility & Hazardous Waste Management Facility (4139); Property Reapplication Team (10267-1); Center 2700 Green Team via Building 702; Receiving & Mail Services and Material Movement Teams (10263-1/2); and the Center 1800 MESA Building 858 Labs.

Recycling/Steam Plant (Bldg. 605) Decontamination & Demolition Project

This project successfully recycled 68 percent of the solid waste generated by emphasizing the "reduce, reuse, recycle" waste management hierarchy throughout the decontamination and decommissioning phases.

Team members: Nick Durand (4821); Chris French, Brian Dempsey, Luis Olague, Justin Kerby and Doug Tapps (48426); Tito Vigil (4843); Eugene Romero (48251); Phil Rivera (Cross-Connection); and Loran Sanchez (Coronado Salvage).

Waste Minimization winner

Composting Pilot Project at the Thunderbird Café

The Thunderbird Café, run by Sodexho, started composting in March 2010 and within seven months collected 15,000 pounds of food waste for composting, diverting the waste from going to the landfill.

Team members: John Davis (33331 - Sodexho), project leader; Steve Lassiter and Danny Francia (33331); Ralph Wrons and Samuel McCord (4144); and John Shaski (4144 and Soilutions, Inc.)

Environmentally Preferable Purchasing winner

Radiation Protection Sample Diagnostics Program Waste Minimization Project

The project team successfully developed a program to eliminate the use of 1,800 liters of toluene annually.

Team members: Sonoya Shanks, project leader; Ken Sansone, Robert Reese, Brenda Maes, John Kilbane, Rose Preston, Luis Valdivia, John McCulloch, Sean Fournier, Nicole Zayas, Nina Poppelsdorf, Karen Schoendaller and Denise Fleming, (4121); and Phyllis Peterson (4139).

Visit the EMS website to read details on these and all nominations. Groups interested in getting a head start on next year's EMS Excellence Awards should consult the EMS website for guidance and nomination forms at http://info.sandia.gov/esh/ems/excellence.shtml online.

HPC 'Rock Star' comes home

Dona Crawford gets reacquainted with Sandia Women's Connection

By Patti Koning

DEDICATION — Among Dona Crawford's many career accomplishments is her leadership of the Advanced Strategic Computing Initiative (ASCI), a national effort that signified a paradigm shift in science from test-based to modeling- and simulation-based validation. She is shown here in November 2005 at the dedication of the ASC Purple and BG/L machines. (Photo by Jacqueline McBride, Lawrence Livermore National Laboratory)

The Sandia Women's Connection (SWC) kicked off 2011 with a rock-star brown-bag lunch — a rock star of high-performance computing (HPC), that is. In early January, Dona Crawford, associate director of computation at Lawrence Livermore National Laboratory, returned to Sandia/California, where she began her career, to share her thoughts on balancing work and family, being a woman in a male-dominated field, and the amazing changes in her field of HPC.

Dona worked at Sandia for 25 years, starting as a member of the technical staff and rising through the ranks to become a director. She has had many firsts in her career: She was the first mid-level and then top-level technical female manager at Sandia, the first technical female staff member to work part-time, and the first female Rock Star of the HPC, a series on InsideHPC.com that profiles people who are changing the HPC landscape.

"That article inspired the SWC to invite Dona here for a brown-bag," says Susanna Gordon (8101). "The interview was inspirational, and so was Dona's much-appreciated visit back to Sandia. She has never let obstacles stand in the way of her career, and she is an amazing role model for what can be achieved while balancing all of life's demands."

Dona also was a director-champion of the SWC (known then as the Sandia Women's Committee).

"My math adviser told me I could become a teacher, which I thought was a noble profession. He didn't tell the guys they could be teachers; he told them other things, but I didn't know that at the time."

— Dona Crawford

Dona, the youngest of three girls, was the first member of her extended family to attend college. "I attributed that to the fact that I was the 'boy' in the family, which also has a lot to do with my approach to being one of few women in the field of mathematics," she said. "Dona with one 'n' stands for Donald, my father's name."

In college, she studied math and German, but the impact on her future came from two seemingly unrelated events. First, she and her fiancé called off their engagement, so rather than getting married after graduating from college, she realized she needed to get a job.

"My math adviser told me I could become a teacher, which I thought was a noble profession," she recalled. "He didn't tell the guys they could be teachers; he told them other things, but I didn't know that at the time."

She studied in Germany for one year, earning a master's degree in German. When she returned to the US, the market for teachers was oversaturated. "I couldn't get a job, which ultimately was the best thing that could have happened to me because it sent me down a different path," she said. "I applied to the three-letter agencies, Sandia, and Lawrence Livermore because who wants someone who loves math and can speak German?"

She began working at Sandia in 1976 and the following year entered the One Year on Campus program, earning a master's degree in operations research at Stanford. "While we often focus on the challenges of being a woman in science and technology, there were also benefits. One of them was the One Year on Campus opportunity, which was not being offered to the men at that time," she said.

After her second child was born, Dona broke new ground at Sandia by asking for a part-time schedule. "I was still working about 40 hours a week, but I had Fridays off and that was a big part of keeping things in balance then," she said.

Among her career milestones, Dona lists being one of the original leaders of the Advanced Strategic Computing Initiative (ASCI) and co-founding the National Information Infrastructure Testbed (now known as InfoTEST). One of the biggest challenges of her career, she said, was not having a doctorate.

"To me that was very difficult, because I worked with many people who had PhDs. I assumed I needed one to get ahead," she explained. "I always said I would go back and get one, so maybe that's a project for when I retire."

Several of Dona's former co-workers, including Rob Armstrong (8961), Frank Bielecki (8949), Donna Blevins (8953), Jim Costa (8950), David Evensky (8966), Diana Gomes (8944), and Rose Ketchum (8531), attended the luncheon to share memories with her, such as her really, really open door policy and the holiday parties she hosted each year at her home. "Dona hired me into Sandia, for which I am eternally grateful," Donna says. "I'm really not surprised by her accomplishments because I've always felt Dona is amazing both in her personal and professional life."

DONA CRAWFORD shared highlights of her career and offered advice for women trying to balance family with career at a brownbag lunch hosted by the Sandia Women's Connection. Shown here in front of the Distributed Information Systems Laboratory — a building for which Dona's leadership at Sandia laid the groundwork — are Susanna Gordon (8101), Donna Blevins (8953), Dona, Pat Smith (8500), Donna Edwards (8114), Kathryn Hughes (8133), Rose Ketchum (8531), and Diane Gomes (8944).

"It's a marathon, not a sprint. You can do many things in a lifetime and in a career. I've been a professional for 34 years, raised my family, and have done a lot of really fun things. Finally, at this stage of my life, my work and life have come into balance — in fact, they are almost one and the same. You can do anything you want, that you set your mind to, just not all at once."

— Dona Crawford

Technical staff members with young children attended to hear how she managed to balance a successful career with a strong family. "I enjoyed hearing the words of wisdom from someone who blazed a path for the rest of us," says Cathy Branda (8623). "As a technical manager with young children, a lot of Dona's points really resonated with me."

Dona said the amount of travel required for her job was the most difficult part of being a working mom, especially during the ACSI era, which required her to travel 48 to 50 weeks of the year.

"Everyone struggles in a different way and there are many different solutions, but it's not always what you think it should be," she said.

She summarized her remarks by saying, "It's a marathon, not a sprint. You can do many things in a lifetime and in a career. I've been a professional for 34 years, raised my family, and have done a lot of really fun things. Finally, at this stage of my life, my work and life have come into balance — in fact, they are almost one and the same. You can do anything you want, that you set your mind to, just not all at once."