



**2013 Pulse Survey wants your voice**  
• See page 2

## DBIDS — the Defense Biometric Identification System — is here New Kirtland Air Force Base access requirements affect all Sandians



By Tim Santor

Beginning June 15, Sandia-issued local site-specific only (LSSO) badges — striped badges — will no longer be accepted to access KAFB. Anyone wishing to enter the base will need to have an HSPD-12 federal credential (badge with the gold square feature embedded on the front), a DBIDS pass, a DoD Common Access Card (CAC), or a military ID, or be escorted by an authorized individual.

If you have an LSSO badge and haven't enrolled in DBIDS yet, you should visit a DBIDS office to apply for a DBIDS pass right away. Cleared LSSO badge holders (i.e., those with an L, Q, S, or TS clearance) will receive their DBIDS pass when they visit the DBIDS office.

Uncleared LSSO badge holders will need to complete a criminal background check before being issued a DBIDS pass. Processing for passes that require a background check takes approximately 10 days.

The DBIDS pass does not replace a Sandia-issued badge. It only grants access to KAFB. A Sandia-issued credential (HSPD-12 or LSSO badge) is still required to

(Continued on page 4)

AIRMEN at the Kirtland Air Force Base gates will begin checking DBIDS enrollment status on June 15.

(Photo by Randy Montoya)



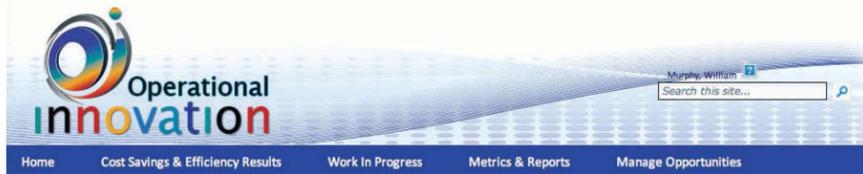
### Tough questions, smart kids, dedicated volunteers: that's DOE's 2013 National Science Bowl

See pages 6-7



## Stretch a dollar New website gives Sandians a place to share money-saving ideas

By Nancy Salem



It takes most Sandians about 15 minutes to get to the Steve Schiff Auditorium to hear a speaker. The return trip is another 15 minutes. Some can't get there at all, so a few years ago Sandia began webcasting events from Schiff.

There's been a surprise upside to those webcasts.

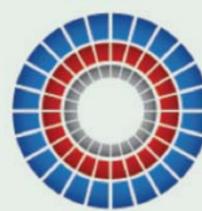
"The webcasting we do at Schiff has resulted in a documented efficiency improvement of more than \$8 million a year," says Pam McKeever, senior manager of Operational Innovation (710). "The webcasts have about 9,000 logins a year, and if you multiply that by a half hour of work saved per login, the productivity improvement is significant."

Webcasting is one of the many innovative ways departments across the Labs are saving money. But few people knew. The strategies had rarely been reported or shared.

"There wasn't one place where you could go to provide and get information on

(Continued on page 4)

## National Engineering Forum looks at impact of US engineering



### NATIONAL ENGINEERING FORUM

By Sue Major Holmes

For more than six decades, Sandia has believed it's a privilege to bring the highest standards to engineering and assure high-reliability systems for critical national security needs, Sandia President and Laboratories Director Paul Himmert told a group looking into the future of engineering in the United States.

"We anticipate emerging threats and assess vulnerabilities to technical surprise," Paul told the National Engineering Forum (NEF), which brought together about 70 people from industry, academia, and national laboratories May 29 for what was billed as a regional dialogue to discuss the impact of engineering on US security and prosperity and how to sustain engineering in the nation.

The event was one of a series of regional meetings scheduled this year in cities that play a prominent role in shaping engineering in the nation. The

(Continued on page 9)



### TRACER FIRE!

Students from several minority serving institutions (MSI) were at Sandia's Cyber Engineering Research Laboratory recently to participate in a week-long cybersecurity training exercise. The exercise followed on the heels of an MSI STEM education-related workshop. See page 8.

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### Ron McIntosh honored

Ron McIntosh (4250), "the epitome of a classification professional," has been named the recipient of the 2013 DOE Office of Classification Award of Excellence. Ron recently moved into a new role as Sandia's Corporate Classification Officer. See page 11.

## That's that

What is time?

Albert Einstein, who thought deeply about the subject, concluded, maybe only half-jokingly that, "The only reason for time is to keep everything from happening at once." Ernest Hemingway said, "Time is the least thing we have." Groucho Marx observed that "Time flies like an arrow. Fruit flies like a banana." Yogi Berra weighed in with "The future ain't what it used to be." Some of our deepest thinkers, in other words, have pondered the meaning of time. And while each offers insights into the subject, none really defines what it is, exactly. So, what is it, then?

Turns out Alan Alda and some colleagues have tried to come up with an answer. Alda, best known for his role in the TV series *M\*A\*S\*H*, has a passion for science. He was host for more than a decade of *Scientific American Frontiers*, a highly regarded PBS science program. In 2009, Alda was instrumental in working with the State University of New York at Stonybrook to establish the Center for Communicating Science, part of Stonybrook's School of Journalism. Earlier this year, in recognition of his central role in its founding, the center was renamed The Alan Alda Center for Communicating Science.

In 2012, Alda and the center issued the "Flame Challenge," asking scientists to come up with the best explanation for a flame for an intended audience of 11-year-olds. The contest went over so well that the center decided to make the competition an annual event.

This year's question was "What is time?" Some 400 scientists took a stab at an answer; submissions were judged by 20,000 school kids from around the world. Winners were selected in two categories, video and written. The video winner was a chemistry grad student from Canada, while the best written answer was submitted by Nick Williams, a retired engineer from Lawrence Livermore National Laboratory, almost one of our own.

Williams' explanation resonated with the 11-year-old judges.

"I think of time as Forward Movement," he wrote. "Think about it! Everything moves forward, from the universe to every second of your life. And because everything moves forward, man developed a way to keep track of this Forward Movement and called it time. . . . I also think of it as a Forward Motion that will never change, will never stop, and can never be reversed."

Never stopped? Never be reversed? An awful lot of people would beg to differ. Over the millennia - I'm sure this is nothing new - human beings have spent a lot of energy trying to do just that.

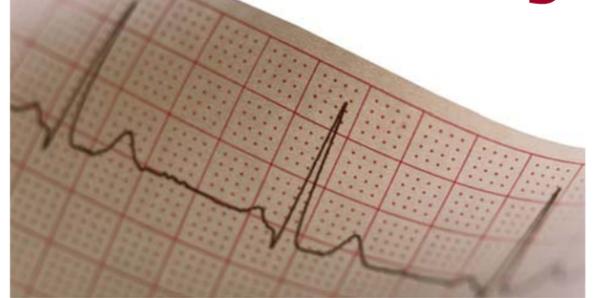
Be that as it may, I'm not sure Williams' definition totally works for me. He's clearly on the right track but he misses the subjective component. Einstein - again - offers insight here: His theory of relativity holds that when relatives visit, time slows waaaay down. And surely, time almost stops for an 8-year-old ticking off the days until Christmas. And as we age, the very years themselves bear down on us with pitiless insistence.

We live in subjective time, but even then, we only get so much of it. Despite Jay Gatsby's protestations to the contrary in F. Scott Fitzgerald's *The Great Gatsby*, we cannot repeat the past, old sport. We can't reverse time, or stop it. We don't get those minutes, hours, days, back. But then, despite Fitzgerald's assertion that "There are no second acts in American lives," I'd say, of course there are. We are, almost all of us, living second, third, fourth acts, exercising our most fundamental American right: to reinvent ourselves. To begin again. To be better. Kinder. More generous. (No one I know resolves to be meaner, in any sense of the word.) In America, we may not be masters of time; we may not be able to stop it or reverse it. Even Dick Clark grew old and left us. But we defy time, resolved to fit more life into the time we are given, and we do it with energy and creativity, paradoxically in a hurry for what's next and, as we get older, not in any great rush to get there.

See you next time.

- Bill Murphy (505-845-0845, MS 1468, wtmurph@sandia.gov)

## Pulse Survey



## 2013 Pulse Survey wants your voice

Got 5 minutes? Want to make a difference?

By Tim Santor

Beginning Monday, June 24, employees will have a chance to voice their thoughts about work at Sandia by taking the 2013 Sandia Pulse survey. The survey will remain open until July 15.

The survey, which will take about 5 minutes to complete, is a follow-up to last year's LM Voice. It is designed to help leaders assess progress on the Labs' commitments to focus on some key areas.

A majority of the workforce responded to the 2012 LM Voice survey, providing thoughtful, action-oriented comments. Results of the survey showed positive trends over the 2011 data in all categories; however, we scored the lowest in two key areas: performance management and rewards (3.4 on a 5 point scale), and career advancement and development (3.7 on a 5 point scale).

Labs leadership used the results of the 2012 survey to develop and initiate several actions that sought to improve those areas, says Human Resources Center 3500 Director Karen Gardner.

For example, Karen says, Sandia offered SMART objectives training to help employees understand line of sight — how their work is connected to Sandia's mission and strategic objectives.

"In addition, we asked managers to learn more about the career aspirations of their employees, and so we developed discussion aids and career development templates to help employees and managers have a more enriched development discussion," Karen says.

Another action was to deploy a mentoring tool on MySite, giving employees an opportunity to be both a mentor and a mentee, she says.

### Diversity and inclusion

The Pulse survey also renews focus on diversity and inclusion, in line with such recent initiatives as the Effective Leadership of Inclusive Teams (ELOIT) training, related ELOIT summits, and expanded Diversity Cinema offerings. Every division VP also has committed to hosting diversity awareness sessions, some based on the ELOIT training.

All of these actions, taken in response to the 2012 LM Voice survey, support Sandia's strategic objectives, specifically objective No. 5, "Commit to a learning, inclusive and engaging environment for our people."

She continues, "Labs leadership encourages all employees to take this opportunity to provide their insight and help us maintain momentum and gauge whether the efforts we've taken are making a difference."

Feedback from the survey will be analyzed and shared in an upcoming *Lab News* article and will be used to fine-tune efforts that are already under way, as well as to prompt new ideas for improvement.



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

**Sandia** CaliforniaNews

By Patti Koning

On May 22, Sandia/California presented its annual Math & Science Awards to 22 young women from area high schools. The event celebrates the academic accomplishments of the recipients as well as their great potential as they prepare for the next phase of their lives.

"Science, technology, and engineering are so important for this country as we move forward," said Bob Carling (8300), director of the Transportation Energy Center. "We hope every one of you continues to have the same enthusiasm you have today for these subjects."

Now in its 22nd year, the Math & Science Awards program is sponsored by the Sandia Women's Connection. The event was held in the Combustion Research Computation and Visualization building at the Livermore Valley Open Campus.

Teachers from 11 high schools in Livermore, Dublin, Pleasanton, Tracy, and Manteca each nominated two students, one for outstanding achievement in math and one for outstanding achievement in science. The award is given to young women in their junior year of high school so they can include it on their college and scholarship applications.

Before the recognitions began, the awardees and their families met their Sandia hosts, women with careers in math and science. Sandia researcher Donna Djordjevich-Reyna (8116) shared her Ground Truth Homeland Security training video game platform, which seeks to immerse first responders in an interactive gaming environment depicting high risk, high threat situations.



SCIENCE AWARD WINNER Arianne Coleto from Merril F. West High School in Tracy, stops for a photo opportunity in front of one of the many posters about site work that were on display at the Math & Science Awards event on May 22.

To start off the awards ceremony, mechanical engineer Patricia Gharagozloo (8365) and software engineer Karla Morris (8351) told their personal stories. While their paths were quite different, they started with something in common — in high school, neither saw herself becoming an engineer.

"My dad was an engineer and I didn't want to be like my dad," said Patricia. "I love my parents, but in high school I wanted to be independent and find my own path. This made it difficult, since I loved math and science and there weren't many other options."

Then, she had an epiphany about how the curvature of the hood of a car relates to calculus. "My high school calculus teacher explained how the hood could be described by an equation and how you could then use math to calculate fluid flow and drag force," she recalled. "I thought, this is amazing and maybe I do want to become an engineer after all."

She studied engineering at the University of Washington and earned a doctorate in mechanical engineering at Stanford University. "Sandia is the perfect place for me. I do research that impacts the world and is incredibly interesting," she said. "I work on projects studying algae for biofuels, innovative heat exchangers

for electronics, hydrogen storage, and even modeling cruise missiles in flight. I really love it, and this is from the girl who did not want to become an engineer."

Karla's path was less straightforward than Patricia's. A native of Costa Rica, she began college in her home country before moving to New York, where she took a year off from school to learn English. She excelled as an engineering student, finishing at the top of her class at City College of New York (CCNY), and landed a job at a power plant.

"Two days into the job, I was fired because of immigration issues. I was devastated. I had worked so hard to get my degree and for what?" she said. Karla persevered, returning to school and earning her doctorate in mechanical engineering at CCNY. She first came to Sandia as a visiting researcher and joined the staff two years ago.

"What I like most about Sandia is the wide range of expertise. You can find people doing everything under the sun," she said. "For me, there is no way to get bored in this place if you are willing to learn something new."

She had two key pieces of advice for the young women. "You have to teach yourself as much as you can from the detours that life throws your way and have the courage to fight so you can get back on track," she said, adding that "the support of your family, friends, and teachers is great, but you have to combine it with your talent, hard work, and passion. That is what it takes to achieve the success I know all of you are capable of."

Kelly Nykodym (8522), who leads Talent Acquisition and Talent Management for the California site, also discussed her career path. After living abroad twice as a college student, she decided she was interested in

people, culture, and communication. This realization led to a master's degree in international communication at American University in Washington, D.C., and a job at a consulting company managing the expatriate population.

After five years, Kelly and her husband returned to the San Francisco Bay Area, where she grew up. "I was looking for a job and Sandia really appealed to me," she said. "I learned about the work-life balance here and the mission, which was much different than [that of] the consulting company. The projects the scientists and engineers are working on really make a difference in people's lives, and that's something I can get really excited about."

She also spoke about internship opportunities at Sandia. Over the years, the Math & Science Awards has

become a mentoring program, as awardees stay in contact with their hosts, and a recruitment pipeline, as each year more awardees return to Sandia for internships.

Cathy Branda (8623), the event chair, explained another reason for recognizing high school juniors. "Studies show that high school is a time when many girls decide not to pursue math and science in college and in their careers," she said. "So many doors are open to you now. You have no idea what you can accomplish by excelling in math and science."

The words of the speakers resonated with many in attendance. "I think for high school juniors who are full of angst about choosing the right college and major, this is a good message to hear — that you don't have to have it all figured out right now," says Jocelyn Mork, mother of Granada High School science award recipient Kirsten Mork.

"The speakers were inspiring and entertaining," says Ariana Mancieri, math award recipient from Livermore High School. "It is reassuring that they didn't know exactly what they wanted to do in high school." She thinks she wants to become a pediatrician — or maybe not. What Ariana does know is that she loves science, and that is a good place to start.

## Sandia, SRI International sign agreement to advance hydrogen and natural gas research for transportation

By Mike Janes

Sandia and SRI International, an independent research and innovation center, will join forces to explore, test, and evaluate a broad range of hydrogen and natural gas fuel systems and components for transportation applications under a new agreement.

The five-year memorandum of understanding (MOU) is the first agreement in Sandia's new Center for Infrastructure Research and Innovation (CIRI), a facility whose goal is to accelerate the introduction of hydrogen and natural gas infrastructure technologies into the marketplace. The collaboration also will capitalize on research at Sandia's renowned Combustion Research Facility (CRF).



The MOU with SRI International is the first collaboration to be based within the Center for Infrastructure Research and Innovation (CIRI), located at the Livermore Valley Open Campus. Initial construction on CIRI started the week of May 27.

(Photo by Dino Vournas)

CIRI will be located at Sandia's Livermore Valley Open Campus, adjacent to the CRF. Initial construction on the new facility began in May. Through the MOU, Sandia and SRI International will focus on such research areas as:

- High-pressure system/component durability testing
- Destructive testing of components and systems
- Fire engulfment/impingement testing
- Life-cycle testing
- Risk assessments of hydrogen infrastructure
- Advanced storage technology
- Hydrogen and natural gas release experiments
- Evaluation of material/component/system failure modes



(Photo by Dino Vournas)

"Together, Sandia and SRI will address the most challenging barriers associated with alternative fuel infrastructure, including cost, performance, and availability of the fueling systems," says hydrogen program manager Daniel Dedrick (8367). "We're excited to kick off this collaboration with SRI and see it as a critical step toward a comprehensive gaseous-fuel research capability for the nation."

## Efficiencies

(Continued from page 1)

cost savings and efficiencies," Pam says. "Lab management knew efficiency improvements were taking place everywhere, but it wasn't always documented or reported. We want to capture those activities and give people the tools to push the thinking and culture on affordability."

Deputy Laboratories Director and Executive VP for Mission Support Kim Sawyer asked Pat Smith, Director of Mission Support and Corporate Governance, to create a Senior Management position to drive increased integration and efficiencies across Sandia. This position would serve as a catalyst and change agent for new ideas and ways of doing business, and provide enabling tools to track and report on improved efficiency and cost savings. Pam was selected to take on the challenge in March 2012.

One result of the effort is the recently unveiled Operational Innovation website, a repository of information on where money is being saved, how, and how much. Millions of dollars in savings have been documented on the website in FY13.

### Pulling in information

Pam started small at the beginning. "I had to get a handle on who the players were and what had been done in the past," she says.

Pam worked with Steve Rudisell, who was matrixed to 710 from Facilities. Pam and Steve began building the web-based Operational Innovation management system to pull together information, working closely with Ann Marie Ryder (10591), who was managing and reporting the Labs' savings and efficiencies to the Sandia Field Office. Pam wanted to be sure the infrastructure was in place. "I didn't want to find out too late that we couldn't handle the demand when a lot of people started submitting ideas," she says.

Pam created submission and evaluation processes, tapped organizations for data, and developed program, implementation, and training plans. Key collaborators have been the business and finance groups, who attend the kinds of meetings where cost-saving comes up. "We brought them into the project. There are lots of things going on around the Labs that contribute to this," Pam says. "If they hear about something, we want to make sure it gets into the OI system. We needed to gather it all up."

About 90 Sandia financial analysts have been trained to use the system, entering and reviewing ideas and doing cost-savings estimates. "We want the estimates verified by a financial analyst so they are valid and not just someone's guess on what a particular strategy will save," Steve says.

Operational Innovation offered other training. About 240 people have attended the Lockheed Martin Affordability Thinking workshops that were held several times during the past year. "It's more than just the web tool," Pam says. "It's about changing our attitudes and mindset, thinking differently."

### Check it out

**It's easy to enter a cost-saving idea.** Type "OPINNOVATION" in the Internet Explorer browser web address window to open the Operational Innovation SharePoint site. When the system homepage opens, click on the "Submit an Idea" icon, fill out three fields as best you can and send it on its way with "Submit." You will receive a confirmation that your idea has been received and the process has started.

The Operational Innovation address is [https://sharepoint.sandia.gov/sites/Ops\\_Innovation/Pages/Home.aspx](https://sharepoint.sandia.gov/sites/Ops_Innovation/Pages/Home.aspx).



ANN MARIE RYDER (10591), left, Steve Rudisell (710), and Pam McKeever (710) look over the Operational Innovation website displayed on the screen behind them. Pam, Steve, and Ann Marie worked together to develop the site as a place where Sandians can study and share cost-saving strategies.

### How it works

Steve says anyone can go to the website and enter a cost-saving idea that either has or hasn't been tried out. Once in the system, the idea is evaluated by Pam or Steve. Ideas with a track record or with potential become opportunities and are fully assessed. If the idea is untried, Pam and Steve enlist subject matter experts to do a feasibility study and come up with recommendations to management on going forward.

"With bigger ideas we put together an evaluation team and vet the idea from every angle," Pam says. "The best ideas are flagged and taken to management. The key thing is that the ideas are captured and in a single location. We can go back to the ones that might not have received a green light in the beginning and say now is the time."

Steve says ideas come in every week and there are about 40 so far. "We will follow up on all of them," he says. "We want people to put in new ideas as well as those things that have already occurred. We want a history. We know there are many creative approaches to reducing cost."

The website holds and tracks data on all feasible ideas. There are project and strategic plans, documentation, savings estimates and achievements, and historical data. Ideas are followed-up and updated. There are tools and templates to pull reports and study trends.

People can navigate the site and come away with ideas for their groups.

"It's all about cost saving," says Evan Ashcraft (10520), who works in pension fund and savings plan management and has used the site to enter strategies. "It's a user-friendly clearinghouse for all this information. It works as a communication tool, capturing ideas."

Big savings have been seen in health care, travel, energy reduction, and pension fund. But the site documents many smaller successes, such as the Schiff webcasting. A change in Sandia's inventory process saved \$268,000 in a year. Previously all items coming into Sandia with a value of \$5,000 or more had to be inventoried, tagged, and tracked. In consultation with DOE, the threshold was raised to \$10,000, reducing the number of items and saving administrative costs.



Tracking in the OI website isn't just for indirect savings. Significant savings have been realized on the direct-funded side as well.

### A work in progress

Pam says Operational Innovation is a work in progress, evolving all the time. "We want Sandia to be the leader in operational excellence for the entire complex," she says. "If there's a good idea in one area, maybe that's a good idea for all areas. We want to reach out to other labs, other companies, and share ideas."

"We are stewards of taxpayer dollars and want to show we provide value, and that will sustain us into the future. Right now there are a lot of people working on projects and making spending decisions. Everyone is challenged with making dollars go further and getting more bang for the buck. We want to know how people are actually making this happen."

Kim says the website is a positive for the Labs. "I especially like the innovation component where we can harvest the ideas of all the employees at Sandia National Laboratories," she says.

And the larger Operational Innovation project, which improves the effectiveness and efficiency of operations, is integral to Sandia's Strategic Objective 3: Lead the Complex as a model 21st century government-owned contractor-operated national laboratory, Kim says.

"The Operational Innovation initiative has played an important role in providing an integrated picture of how we achieve that objective," she says. "It also supports Strategic Objective 2: Amplify our national security impact, as we continue to strengthen our partnerships with key customers."

## KAFB implements new DBIDS base access requirement

(Continued from page 1)

access all Sandia security areas and facilities.

If you received your HSPD-12 federal credential prior to Sept. 30, 2011, you may have been enrolled in DBIDS automatically. Those who received their credential after that date should have been contacted and instructed to enroll. You can visit a DBIDS office to verify your enrollment; however, if you have an HSPD-12 credential, you will still have base access until July 15, even if you are not enrolled. Therefore, those with HSPD-12 badges should wait until after June 15 to verify enrollment in the DBIDS database, so the DBIDS offices can focus on those holding LSSO badges.

Some delays in entering KAFB during rush hour are expected initially due to

the process change; however, Kirtland and Sandia have spent the last two years preparing for this change and most people already have an approved credential.

Visitors who are not enrolled in DBIDS may be escorted on base by an individual who is enrolled in DBIDS and has escort/sponsor authority (e.g., someone who has an HSPD-12 or cleared LSSO badge).

Visitors who need unescorted access to KAFB need to apply for a DBIDS pass through a DBIDS office.

For further information, look up DBIDS on Sandia's Security Connection website, or contact Security Connection at 321 or 505-845-1321.

**Snapshot: Engineered Safety In Practice****Engineered Safety and Sandia's Advanced Materials Laboratory Department**

By Cathy Ann Connelly

**Note:** This is the first in a series of article snapshots about Engineered Safety in practice at Sandia. These summaries focus on how groups are using this model for work planning and control to shift away from a strong reliance on process to assure safety (such as checklists), to one based on safety by design intent in which assurance of safe operation comes from critical thinking in the design and the operation aspects of the system. New activity level work is now conducted under the Engineered Safety procedures and policies, which may be found in Integrated Laboratory Management System (ILMS) under Environmental Safety & Health for ESH100.1WPC.1 Plan and Control Work (<http://tiny.sandia.gov/nvq4q>). As part of the Engineered Safety implementation team, co-led by Charles Barbour, director of Physical, Chemical, and Nano Sciences Center 1100, and Sid Gutierrez, director of Radiation Protection, Waste Management, and ES&H Center 4100 and Sandia's Chief of Safety, Natalie Carter (4135) consults Labs-wide to provide guidance concerning the revised work planning and control framework and how to implement it. Her message is, "Call me with any type of Engineered Safety question. I can directly help and get specific about what you require." The Engineered Safety Repository (ESR), (<http://tiny.sandia.gov/zy5zb>), is also now available online — a repository for Division Implementation Plans, decision documents, and safety cases.

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**Background basics:** The Advanced Materials Laboratory (AML) staff uses a wide range of characterization techniques, including a diverse set of 1,500 or more chemicals from elements across the periodic table. The AML develops and tests new ways to get nano-scale particles and thin films, metal-particle inks, and ceramic slurries to stick or coat surfaces. Some materials may improve solar energy conversion, CO<sub>2</sub> sequestration or medical treatments. Located at a leased facility near the University of New Mexico Pit, AML staff work closely with students and faculty from high schools and universities nationwide. Tackling the concept of an Engineered Safety system initially seemed overwhelming.

**Focus:** Approach? Who was involved? Bill Hammetter, Advanced Materials Laboratory Dept. 1815 manager, served as mentor, helping staff step back and look broadly at potential approaches instead of focusing on



REINA BUENCONSEJO (Pomona College) and Colin McGlinchey (Albuquerque High School) complete work at Sandia's Advanced Materials Laboratory where its unique learning environment is strengthened by including student input, including the development of safety approaches and systems as part of Engineered Safety. When Reina was asked, "Are you suited up like you should be?" by Sandia's Randy Montoya for his photograph, Reina immediately responded, "Yes, we're not just doing it for you." (Photo by Randy Montoya)

individual chemicals or processes. They examined classes and categories of procedures and chemicals and gradually developed an outline of general lab operations and concerns, comprising pre-experiment, experiment, and post-experiment scenarios.

What issues were solved? Once they worked out general processes for a light chemistry lab, each scenario was investigated on the basis of four potentially bad consequences. Avoiding these outcomes drove development of the following guiding principles:

1. No individual (or the public) will be exposed to chemicals.
2. No individual will be harmed while conducting an experiment.
3. Our laboratory equipment shall not be damaged.

4. Our building shall not be damaged or deemed unfit for use.

For each step in the general process, they considered how the operation could fail, what steps and controls they might put in place to prevent failure, and how they could mitigate harm should the system fail anyway.

**Additional details:** The AML team used a National Fire Protection Agency (NFPA)-graded approach to improve the safety of chemical operations or experiments, based on four grades of chemical properties — Red/Flammability, Blue/Health, Yellow/Reactivity, White/Special. Within these grades are ranks from 0-4. The AML Engineered Safety system requires manager authorization to use chemicals ranked in the 0-3 category, but does not require additional consultation beyond the laboratory chemist. Using chemicals from the level-4 category requires authorization from the senior manager (Terry Aselage, 1810) and consultation with an outside subject matter expert (SME) to evaluate the risks, along with discussion of what engineered safety protocols are required. This helps minimize the potential negative consequences of these higher-risk chemicals and brings outside perspectives to those using them.

**Benefits of Engineered Safety:** As Bill says, "There are benefits in having the staff develop their own Engineered Safety work processing controls that fit into the already established behaviors exhibited by the AML staff and students."

The AML's unique learning environment is strengthened by including student input. "Our students made significant contributions in identifying areas of concern to them," he says. This approach reinforces and invigorates all researchers to practice engineered safety in their everyday activities, Bill says, adding that further, positive assurance is addressed in "routine" work activities. Among sample controls are requirements that "closed glass systems are not heated," "the fume hood is working properly," and for "weekly/monthly maintenance on Schlenk lines" prior to starting reactions.

"As new Engineered Safety protocols are discovered and developed, they are presented in a number of systematic ways — through individual discussions, at weekly group meetings, and at biweekly operations meetings that include line operations, ES&H and Industrial Hygiene personnel for broad dissemination of information," says Bill. The AML staff sees the protocols as an evolving, continuously improving process for safety of the chemists who work there as well as all researchers at the AML, its visitors, and nearby members of the public.

**Acknowledgements and resources:** This case summary for Engineered Safety uses content from a video completed by writers Timothy Boyle, Richard Kemp, Carol Ashley, and Bernadette Hernandez-Sanchez, and produced by Brent Peterson, Sandia Creative Services Department. It may be viewed at <http://tiny.sandia.gov/gka0s> as part of the Engineered Safety online resources.

**Engineered Safety featured at Safety Fair**

JAMES BRYSON, manager of Radiation Effects Research Dept. 1344, talks with Natalie Carter (4135) about Engineered Safety at the successful Sandia Safety Fair 2013, hosted by Centers 1300, 1600, and 5400 in Tech Area 4. As part of the Engineered Safety implementation team, co-led by Charles Barbour, director of Physical, Chemical, and Nano Sciences Center 1100, and Sid Gutierrez, director of Radiation Protection, Waste Management, and ES&H Center 4100 and Chief of Safety (4100), Natalie consults Labs-wide to provide guidance concerning the revised work planning and control framework and how to implement it. Her message is, "Call me with any type of Engineered Safety question — I can directly help and get specific about what you require." The Engineered Safety Repository (ESR), a repository for Division Implementation Plans, decision documents, and safety, is also now available online at <http://tiny.sandia.gov/zy5zb>. Other Safety Fair highlights included displays and staff discussing Emergency Management, the Slip Simulator, rattlesnake awareness training, LiveSafe, HBE health screenings and walk, Traffic Safety, Ergonomics, Corporate Travel, Sun Safety, Environmental Programs, Electrical Safety, Technical Library, the Lockout/Tagout Program, Explosives Safety, Industrial Hygiene, Fire Protection, Pressure Safety, Aerial Lift Safety, Radiation Protection, vendor displays, and more.

(Photo by Randy Montoya)

# The DOE National Science Bowl - an event like no other

Stories by Patti Koning

You couldn't ask for a more exciting conclusion. At the second-to-last question of the championship round of the DOE National Science Bowl (NSB) for high school, two teams from opposite ends of the country — Mira Loma High School from Sacramento, Calif., and North Carolina School of Science and Mathematics from Durham, N.C. — were tied at 52 points each.

Mira Loma buzzed in first on the final question and gave the correct answer about which damaged cranial nerve would account for a list of specific symptoms, including facial muscle paralysis and an inability to wrinkle the forehead. Then Mira Loma answered the bonus question correctly, making the final score 66-52.

In the middle school competition, Creekside Middle School from Carmel, Ind., defeated Takoma Park Middle School from Silver Spring, Md., to take the national title. Both matches were come-from-behind victories, with Mira Loma and Creekside each coming into the final round with one loss. Both teams handed their opponents two straight losses (the NSB final is double-elimination, so a team must lose twice to be out) to emerge as the victors.

While the championship rounds are certainly the most visible aspect of the NSB, the entire event is about much more than just the four teams that get to compete for the national title on the big stage. The NSB brings together 46 middle school teams and 69 high school teams from 43 states, the District of Columbia, and Puerto Rico for five days of learning, competition, and fun.

I arrived at the 4-H Center in Chevy Chase, Md., on the afternoon of Thursday, April 25, along with many of the Science Bowl teams. For the next five days, the 4-H Center would be transformed into its own Science Bowl universe inhabited by some 575 kids, 150 coaches, and 135 volunteers.

## Don't expect much sleep

As a first-time volunteer at the NSB, it was hard to know what to expect even after talking to Science Bowl veterans like Tim Shepodd (8220) and Martha Campiotti (8310). Tim's description was "controlled chaos." He also warned me repeatedly not to expect much sleep and that if I was going to enjoy myself, I needed to be flexible.



LILY TURASKI, captain of the Blount Home Education Association team, smiles as she reads the program during opening day. The Blount team won the Electric Car Design Competition and met their goal of making it into the double elimination rounds for the academic competition. Teammate Colleen Riley looks on.

(Photo by Jack Dempsey, DOE Office of Science)

Days before the teams began to arrive, volunteers were busy unpacking boxes, setting up tables and rooms, and organizing. Each volunteer was given a 30-page schedule, color-coded for middle school activities, high school activities, behind-the-scenes activities, and instructions for 4-H staff. We also had a smaller version of the schedule, with all of our activities highlighted, that fit inside our name tag holder.

Jan Tyler, science education manager at Jefferson Lab and NSB coordinator, is the genius behind this organization. In the months leading up to the national event, she's busy planning every detail of those five days and coordinating travel, courtesy of DOE, for 115 teams from myriad cities across the country.

It pays off. At any given moment during the NSB, there might be up to 30 simultaneous events happening. The academic competition takes place on two of the five days; on the other days, the teams take a night tour of the national monuments, visit the Smithsonian museums at the National Mall, attend science day seminars and Advanced Placement test prep sessions, compete in the model electric car race, and work on competitive science experiments.

Between 7 a.m. and 9 a.m. on Saturday, April 27, volunteers were staffing the NSB information and middle school volunteer check-in desks; managing breakfast traffic in the cafeteria; setting up competition rooms; reviewing questions with moderators and scientific judges for that morning's middle school academic competition; practicing timing and scorekeeping; loading high school students on the buses for



THE HIGH SCHOOL (top) and middle school (bottom) teams pose for a group photo during the 2013 National Science Bowl in Washington, D.C. (High school photo by Dennis Brack, DOE Office of Science) (Middle school photo by Jack Dempsey, DOE Office of Science)

their National Mall trip and serving as bus monitors; and photographing the top teams from the Electric Car Competition Design Document presentations.

## Volunteers are key

The key to making it all run smoothly, besides extensive planning and organization, is the volunteers. "It's pretty amazing that all of these volunteers give up their normal lives for five days to eat, breathe, and sleep Science Bowl," Tyler says. "Somehow, it all gets done."

Most of the volunteers are regional coordinators from across the country, hailing from national laboratories, utility companies, universities, other government agencies, and civic organizations. Another 30 or so are Science Bowl alumnae. Sandia was well-represented with five volunteers — myself, Martha, Cheryl Garcia (3652), and Danielle Oteri (8242), another first-timer — along with Greg Ng, the son of Sandia retiree Ray Ng and a former summer intern.

The NSB is addicting, as any repeat volunteer will tell you. "I just love the kids," says Martha. "They are so smart and every year they seem to get smarter."

Tim enjoys the energy and sportsmanship of the kids. Cheryl says the diversity of the students puts a smile on her face — especially when she heard one team speaking Spanish this year.

"I enjoyed contributing to an activity that I believe contributes in a positive manner to the science education of the nation's youth," says Ray, who's been to the NSB more times than he can count (his best guess is 15 to 20 times). "I enjoyed working with a great group of volunteers from across the nation with the same focus."

What the kids like best varies widely. According to Anja Crickmore, coach of the Hopkins Junior High School team, the boys on her team thought the food was the best thing about being at the nationals, especially the cheesecake. Barbara Gilmore, coach of the Albuquerque Academy middle school team, says her team enjoyed visiting the National Mall and the model electric car competition.

Karen Metcalf, coach of the Blount Home Education Association middle school team, says each member of her team enjoyed something different — the plane ride, meeting hundreds of other kids their ages with similar interests, playing sports during downtime, and visiting Washington, D.C., for the first time.

The highlight of Blount team captain Lily Turaski's NSB experience was being asked to sing the National Anthem before the model electric car race, although winning first place in the Electric Car Competition Design Document competition was a close second.

## To interrupt or not to interrupt, that is the question

"One of my favorite things was meeting so many other people with similar interests," Lily says. "I also really like buzzing in, especially buzzing in early."

In the academic competition, participants take a risk when they buzz in early, or "interrupt," before the moderator has finished reading the question. If the participant then answers the question incorrectly, the other team is awarded four points and has the opportunity to answer after the moderator re-reads the question.

To interrupt or not is a calculated risk. Technically, a team could win a match without answering a single question correctly on interrupt points. As far as I know it has not happened, but that doesn't mean it won't.

The NSB is full of the unexpected, like when a moderator misread the word "kingdom" as "Klingon." The room burst into laughter and we stopped the clock while everyone regained composure.

I can't pick a single thing that I liked most about the NSB. Over the five days, I learned a few theories on why there is no J Street in Washington, D.C., and that there is a nearly etched out mistake on the Lincoln Monument; reminisced about my hometown of Oak Ridge, Tenn., with volunteers who live there now; hung out with amazing teachers and coaches from all across the country; heard fascinating stories about places like Boise, Idaho, Maryville, Tenn., and Wasilla, Alaska; picked up a few tips on the AP calculus test during a review session; and was blown away by the intelligence, maturity, and enthusiasm of the 575 kids. I think the best thing about the NSB is the hope it gives you for the future of this country.



HOPKINS JUNIOR HIGH SCHOOL team captain Catherine Zheng hugs teammate David Hsu after winning the Sandia/Los Positas College Regional Science Bowl for middle school.

(Photo by Dino Vournas)



THOR LARSON FROM ALBUQUERQUE ACADEMY places the payload on the team's race car during the Electric Car Competition. His team finished in third place.

(Photo by Jack Dempsey, DOE Office of Science)

## The art of the question

A lot goes into putting on the DOE Office of Science National Science Bowl (NSB) each year — dedicated volunteers, weeks of planning, a fleet of 17 buses, meals for more than 800 people each day — but nothing is more crucial than the questions.

“The questions are, without a doubt, the biggest challenge,” says Jan Tyler, NSB coordinator. “Getting the questions right takes countless hours of review and revision and then even more review and revisions. But the questions are what make the DOE National Science Bowl special. They are what keep the students coming back year after year.”



NATIONAL SCIENCE BOWL DIRECTOR Jan Tyler, shown here at the finals awards ceremony, is the organizational genius behind this complex event.

(Photo by Dennis Brack, DOE Office of Science)

There are two kinds of NSB questions: toss-up and bonus questions. Either team can answer toss-up questions within a 5-second time limit. A bonus question is then given to the team that gives the correct answer. The team can confer on the question, but only the team captain can answer and there is a 20-second time limit. Both toss-up and bonus questions can be multiple choice or short answer.

Because the questions cover such a breadth of topics —

chemistry, physics, biology, math, earth science, general science, astronomy, energy — they influence how coaches build their teams. The more successful teams have members that specialize in different areas.

Questions from previous years also guide many teams in preparation. Lily Turaski, team captain for the Blount County Homeschool team from Tennessee, says she and her teammates reviewed thousands of questions to get ready.

“When we didn’t know the answer to a question, one of us would research the answer and share it with the rest of the group,” she says. “It was hard work, but it really paid off.”

A good NSB question needs to be clear and unambiguous; worded so that it makes sense verbally, since only the moderator sees the written question; and with enough information presented in the right order to be answered in 5 or 20 seconds. Questions must be challenging yet appropriate for middle or high school students and increase with difficulty as the competition progresses.

“It’s not a trivia contest,” says Tyler. “The questions need to demand critical thinking and test a student’s breadth of knowledge.”

Tim Shepodd, who has a PhD in chemistry, says the chemistry questions in the final rounds of the NSB are at the level of third year of college to graduate school. As an example, here’s a high school round 17 sample bonus question to solve in 20 seconds.

**Question:** Calculate the one-atmosphere boiling point elevation, in degrees Celsius to the 2nd decimal place, for a solution made by dissolving 1 gram of solute in 0.1 kilograms of water. Assume the formula weight of the solute is 300 and the boiling point depression constant is 2.0°C per molal.

**Answer:** 0.07 (ACCEPT: 0.06)

(Solution: moles solute = 1g/300g/mol = 0.0033m; m = 0.0033 moles solute / 0.1kg = 0.033m;  $T_b = K_b(m) = (2.0^\circ\text{C}/\text{m})(0.033\text{m}) = 0.066^\circ\text{C}$ )

The entire NSB, from the regional competitions to the final rounds of the national event, requires about 5,500 new questions every year. There are up to 18 rounds of competition in a regional event, and each round requires 25 toss-up questions and 25 bonus questions. Because some regional events are geographically near one another, there are two different sets of questions. An additional 1,800 questions are needed for the national event, for up to 20 rounds of competition for both middle and high school teams. And that’s just what is used if everything goes according to plan — there are also backup questions and the questions that are tossed out during the review process.

The process of developing questions for the 2014 Science

Bowl will be underway soon. Contractors spend several months writing rough cuts of thousands of questions, which are then reviewed by regional coordinators and other question experts that include professors at top universities and leading scientists at national labs. The second draft of the questions goes out to regional coordinators and moderators in mid-December. They continue reviewing and revising the questions right up to the day of competition.



MODERATOR TIM SHEPODD (middle) consults with scientific judge Greg Wagner (on right) (8365) in one of the final rounds of the Sandia/Los Positas College Regional Science Bowl for middle school. To his left is timekeeper Denielle Wiese-Smith.

(Photo by Dino Vournas)

As coordinator for the Sandia/Los Positas College regional competitions and a moderator at regionals and the national event, Tim spends a lot of time reading questions.

“In reviewing the questions, you have to look for every nuance and every possible interpretation,” he says. “The questions cover such a breadth of knowledge, it really takes a team of experts to check for technical errors and typos, which can be quite subtle.”

Multiple choice questions are simpler because the student must supply the best answer from the four given; they also are more time-consuming to create and to read in the competition. With short answer questions, the moderator has some leeway in determining a correct answer. In either case, students can challenge the scientific content of a question.

“The students don’t hesitate to raise scientific challenges so the questions need to be very precise and the answer must truly be the best possible answer,” says Tim. “If something is not quite right, they’ll call you on it.”

One year at the finals of the National Science Bowl for high school, a student raised a successful challenge to then-Secretary of Energy and Nobel laureate Stephen Chu, who was serving as the scientific judge.

## What it takes to win

What does it take to win the DOE National Science Bowl? James Hill, coach of the Mira Loma High School team for the past 14 years, should know better than anyone. In the past six years, his team has finished in third place or higher with three national titles in 2013, 2011, and 2009.

One challenge of the NSB is that it covers everything science — biology, chemistry, physics, math, earth science, general science, astronomy, and energy. It follows that a good team needs to be very knowledgeable in all of those disciplines.



THE MIRA LOMA HIGH SCHOOL Science Bowl team consults on a bonus question in the final rounds of competition in the 2013 National Science Bowl. left to right: Daniel Shen, Jacob Gurev, Siddharth Trehan, and Saaket Agrawal.

(Photo by Dennis Brack, DOE Office of Science)

“You need team members who specialize in different areas, like math and biology,” Hill says. “And you need members who can use the buzzer system, think under pressure, and react quickly. All the knowledge in the world won’t help if you can’t answer before the other team.”

The best teams are composed of kids who love the acquisition of knowledge. “They need to love competition and learning,” says Hill. “The team members will become experts in their area of specialty and for many, that becomes their college major.”

The team members agree with this. “Sometimes when we give interviews, it comes across like we are just workhorses who practiced and studied consistently,” says high school senior Saaket Agrawal, a member of the Mira Loma team. “But to do well, you really have to love it. We all really enjoy the subjects we study and just playing the game.”

About 75 or more students turn out for the Mira Loma



MYRA BLAYLOCK (8365) updates the score during a late round of the Sandia/Los Positas College regional Science Bowl for middle school. Shown behind her are members of the Hopkins Junior High School team, which won the regional tournament and finished in third place in the National Science Bowl. (Photo by Dino Vournas)

High School Science Bowl club each year. The weekly practices are devoted to mock games using the same buzzer system used at the national event. Members study and research answers on their own time.

As the end of the calendar year approaches, Hill begins trying out different team combinations in his head. Much like the US Olympic gymnastics teams had to balance all-around athletes with specialists, Hill says he looks for the strongest possible combination. A critical component is the “math genius,” someone who can do complex calculations in seconds.

Along with hard work and a balanced team, there is an element of luck and circumstance. The Mira Loma High School team has won its regional tournament 14 times in the last 20 years, but didn’t break into the top until 2008 when it finished in second place.

“We ended up taking our B team that year, because the National Science Bowl conflicted with some college placement tests,” says Hill. “Everything clicked for them and they won match after match. It was an incredible combination of students.”

That 2008 team consisted of two freshmen, one sophomore, and one junior, so all four of the members were on the 2009 Mira Loma Science Bowl team that took the national title that year. With younger team members, Mira Loma was able to retain experience at the national event. This year was the second trip to the national event for Agrawal and Siddharth (Sid) Trehan’s third trip (and second national title). Team members Daniel Shen, a sophomore, and Jack Gurev, a freshman, will likely be on next year’s team.

Since the round robin groupings are created by a random

draw, there is an element of luck in the teams that face each other early in the competition. According to Karen Metcalf, coach of the Blount Home Education Association middle school team, math is not her team’s strongest area.

“The team members can do the math, but not always as fast as other teams,” she says. “We lost our only round robin match to Treasure Valley, a very strong math team.” The Blount team faced the Treasure Valley Math and Science team from Boise, Idaho, again in double elimination. Sure enough, Treasure Valley defeated Blount to knock them out of the tournament. Treasure Valley finished in fourth place overall.

For the Hopkins Junior High School team, it was tough finishing third this year after winning the national title in 2012. “Our team captain was on the winning team last year so she was particularly disappointed at coming in third,” says coach Anja Crickmore. “It’s hard for the kids to grasp the rather large amount of luck that is involved and that luck did not just affect us, but all the other teams as well.”

For Mira Loma, it may have been lucky that the final, match-deciding question was in biology.

“When I heard the question was about biology, I knew the match rested in Sid’s hands because that’s his area,” says Agrawal. “I glanced over at Sid, trying to tell him telepathically that his answer would decide who won.”

But Trehan didn’t need any telepathy. He knew that the fate of the match hung on who answered the question correctly. He also knew that it would be a biology question before it was even read because he recognized a pattern in the order of subjects.

“It was a long question, and at first it sounded really hard,” he says. “Then as the moderator kept reading, I was pretty sure I knew the answer. I waited until the moderator was finished reading because I didn’t want to lose the match over an interrupt. When I buzzed in and was correct, I breathed a sigh of relief. And then I just felt tired.”

**Note:** an interrupt occurs when a player buzzes in before the moderator finishes reading the question. If the player is incorrect, the other team is immediately awarded four points and given the opportunity to answer the question. Had Sid interrupted and given an incorrect answer, North Carolina School of Science and Math would have been awarded four points and would have won the match at that point.





## Sandia's CERL facility hosts students, staff from Minority Serving Institutions

*Photos by Randy Montoya*

Approximately 30 staff, students, and faculty from Sandia, Lawrence Livermore National Laboratory, and several minority serving institutions (MSI) gathered at Sandia May 28-31 for the MSI K-20 Workshop. Participants included students and staff from Morgan State University, Claflin University, Clemson University, Coastal Carolina University, Fayetteville State University, Jackson State, Norfolk State, North Carolina A&T, South Carolina State, Texas A&M Corpus Christi, and members of the Charleston County School District.

Workshop attendees, meeting at Sandia's Cyber Engineering Research Laboratory (CERL), focused on potential solutions and ideas to stimulate STEM education efforts to meet the growing need for experts in computer science and other STEM-related fields, with a particular focus on cybersecurity. Participants brainstormed possible new educational activities to attract and develop K-12 students for post-secondary STEM education, as well as the associated curriculum and faculty development needs and potential supporting roles for the national labs.

The workshop was part of a larger DOE/NNSA initiative to strengthen partnerships between the DOE labs and the nation's minority serving institutions, ultimately leading to a more productive pipeline of technically qualified students who are motivated to pursue careers in DOE and the national laboratories.

The week after the MSI K-20 conference, approximately 15 students from several MSIs participated in a week-long cybersecurity training exercise in CERL's RECOIL lab using Sandia's established Tracer FIRE program. The students, seen in the photos here immersed in the exercise's challenges, were taken through an accelerated cybersecurity curriculum covering topics in forensics and other areas before receiving hands-on training in various cybersecurity analysis tools. The event culminated in competitive exercises simulating real-world incident response scenarios, with the students competing against one another in small teams similar to what might be found in typical operational setting.

The workshop and the training exercise were funded out of NNSA's minority serving institution partnership program overseen by NNSA Chief Scientist Dimitri Kusnezov.



# New Faces in Engineering

## Honoree Greg White finds Sandia a good fit

By Sue Major Holmes

Greg White says that when he started college, he was romanced by the idea of becoming a professor. But along the way to an advanced degree, he realized his interest had veered toward working for a national laboratory.

"It's important for me now, and it was at the time, to have an impact on our national security," says Greg (1835), who researches the aging of polymers and the resulting changes in how they perform.

The National Action Council for Minorities in Engineering selected him this year for New Faces in Engineering, a recognition program the National Engineers Week Foundation began in 2003 to highlight the work of engineers ages 30 and younger.

Greg's first glimpse into engineering came when he was in high school and attended a precollege initiative weekend at Virginia Tech sponsored by the National Society of Black Engineers (NSBE).

It was his first exposure to a large university and engineering students, and the weekend was made all the better by the engineering projects the students got to do, he says. He recalls a Rube Goldberg device that created a domino effect.

"There was a lot of fun involved in that weekend," Greg says.

Since he enjoyed math and science and liked solving problems, the precollege initiative program and his contact with NSBE "kind of lit that fire for engineering," he says.

Greg went to Virginia Tech for his undergraduate work, starting out in computer engineering.

"Then I started doing programming, and that was awful," he says. He turned to chemical engineering instead and earned his bachelor's in 2006.

He was debating graduate school or a full-time job when one of his Virginia Tech professors intervened. As Greg sat in the office, the professor picked up the phone and called a former graduate student who had gone on to become chairman of Clemson University's chemical engineering department. "I've got a student in my office," the professor said, and handed Greg the phone.

"That was awkward. I didn't know what to say," Greg recalls. But with his professor's urging, he applied to Clemson. He drove from Virginia to South Carolina for an interview and to meet faculty and students.

"It felt like the right place to be, so I took that opportunity and went to Clemson," he says.

On the advice of another professor, he skipped a master's degree and went straight to a doctorate, doing his dissertation on nanomaterials synthesis and processing.

Greg began questioning his idea of staying in academia when he was in his last year or so of graduate school. He had married by then, and he and his wife, also a PhD student, had the first two of their three sons while in graduate school.

"At the end of your grad school tenure, you're tired, and being young parents was



SANDIA'S GREG WHITE (1835) has been selected by the National Action Council for Minorities in Engineering for New Faces in Engineering, a recognition program the National Engineers Week Foundation began in 2003 to highlight the work of young engineers. (Photo by Lloyd Wilson)

also difficult," Greg says.

At the same time, he says, he was watching his adviser go through the labyrinth of the tenure process, "and I didn't know if I wanted to go through that rigor."

He had worked for the defense contractor Battelle as an undergraduate and did research on his dissertation at Oak Ridge National Laboratory in Tennessee and the National Institute of Standards and Technology near Washington, D.C. When he began looking into post doc programs, those experiences influenced him to consider the national laboratories as a path between industry and academia, he says.

Greg came to Sandia as a postdoc in May 2011 and joined the staff in August 2012.

Sandia, he says, was an excellent fit because of his interest in the high impact work of polymers.

"Whether it's for nuclear power or assistance to the Department of Energy, those are all high consequence and I enjoy that," he says.

## Engineering

(Continued from page 1)

forums will culminate next year with a gathering in Washington, D.C., to bring together ideas from the regional events to emphasize the importance of engineering to the nation's economic security. Lockheed Martin Corp., the Council on Competitiveness, and the National Academy of Engineering launched the National Engineering Forum in 2012.

Sandia was proud to host the forum and to help raise the national consciousness about engineering's critical role "in driving US productivity, prosperity, and competitiveness in a global context," Paul told the meeting at the National Museum of Nuclear History & Science.

He quoted President Herbert Hoover, who also happened to be an engineer, as saying engineering is a great profession. "There is the fascination of watching a figment of the imagination emerge through the aid of science to a plan on paper," Hoover said. "Then it moves to realization in stone or metal or energy. Then it brings homes to men or women. Then it elevates the standard of living."

Julia Phillips, Div. 7000 VP and chief technology officer, outlined the course of engineering in New Mexico, beginning before written history with "significant engineering" by early Native Americans to build the impressive structures at Chaco Canyon and deal with a harsh, dry climate to control water and realize a reasonable way of life.

She described the engineering history of the state's mining industry beginning in the mid-1800s; the state



ENGINEERING FORUM — Sandia President and Laboratories Director Paul Hommert speaks with a participant at a National Engineering Forum dinner May 29 at the National Museum of Nuclear History & Science. The forum is one of a series planned this year around the country to develop ways of emphasizing the importance of engineering to the nation's economic security. (Photo by Norman Johnson)

engineer's office established before statehood to deal with water issues; the completion of Elephant Butte Reservoir in 1916; and the Manhattan Project that built the first atomic bombs in World War II. What are now Sandia and Los Alamos national laboratories formed

the foundation around which much of New Mexico's science and engineering community grew, she said. Julia also cited engineering at the state's universities, particularly the three in the Rio Grande corridor, and the growth of high-tech companies in the state.

New Mexico had more than 49,000 technical workers in 2010, the 5th highest percentage of private sector technical workers in the US, she said.

Jeff Wilcox, vice president of engineering for Lockheed Martin, said the nation's technical revolutions — the steam engine, transportation, communications, the Internet — were all related to engineering.

"Engineering is fundamentally the act of creation," Wilcox said. "It's about having a thought, having something you want to see come to fruition."

He stressed the importance of science, technology, engineering, and math, or STEM education. But while people understand what science and math do and see technology in their pockets, "the E is silent." People must understand that "engineering is the wellspring that takes science to technology," he said.

Ray Johnson, Lockheed Martin's senior vice president and chief technology officer, said the US is competitive not

because its workers are smarter, more innovative, or more creative. Rather, he said, the nation is competitive because of its diversity.

He urged the NEF participants to "accept diversity, think innovatively, and celebrate engineering."

# Sandia's Ron McIntosh honored with DOE Classification Award of Excellence

Ron McIntosh (4250) has been named the recipient of the 2013 DOE Office of Classification Award of Excellence. Ron led Sandia's Classification Office for six years as both the manager and classification officer for Sandia/New Mexico before recently moving into a new role as the corporate classification officer.

In a letter nominating him for the award, Edith Chalk, director of the Office of Technical Guidance in DOE's Office of Classification, said, "Mr. McIntosh has been the epitome of a classification professional and a valued asset to both the Department of Energy and the National Nuclear Security Administration."

Ron, a Chicago native who came to Sandia in 1983 after graduating from Morrison Institute of Technology, expressed his appreciation for the award.

*"This role poses a never-ending challenge. As a national security lab, Sandia has a very significant role on the national security stage. As the classification officer, I'm in a unique position to be able to engage in some aspect of each of these activities to ensure our national security assets are protected."*

"DOE has by far the best classification program in the government," he says. "Given this and the fact this is the highest recognition that an individual can receive from the agency for their contributions to the program, I am truly grateful. Although this award has my name on it, it is the result of the contributions and efforts of numerous individuals in Sandia's Classification Department who make our program outstanding. I am humbled and very appreciative to have been selected for this award."

During his 30-year career at Sandia, Ron was involved in a wide range of programs, including Nuclear Weapons and other mission areas, before moving to the Classification Department in 2001.

It was in that capacity that Ron found the sweet spot suited to his experience, his training, his temperament, and his interests.

"This role poses a never-ending challenge," Ron says. "As a national security lab, Sandia has a very significant role on the national security stage. As the classification officer, I'm in a unique position to be able to engage in some aspect of each of these activities to ensure our national security assets are protected."

At Classification, Ron was responsible for ensuring development and keeping up to date 16 local Sandia classification guides that Chalk characterizes as "models for local classification" throughout NNSA.

In a bid to keep the classification office current with evolving technologies, Ron implemented a process to scan all technical reference material in the Classification vault. The effort resulted in a notable reduction in the amount of paper holdings and in turn the security footprint at the Labs. The process was a major undertaking: Almost 70 years' worth of paper-based documents were mapped and methodically scanned into an electronic database accessible to the entire Classification staff, resulting in a user-friendly system that has tremendously increased staff efficiency.

During his tenure as classification officer, Ron has been responsible for appointing, training, and maintaining technical currency of some 500 derivative classifiers. Additionally, he has been a leader in the electronic distribution of classification guides to derivative classifiers. His approach has been adopted by many other field classification officers across the weapons enterprise.

Ron's innovative and proactive leadership of the Classification Office, Chalk wrote, as well as the customer service approach he instilled in his staff, elicited praise from all levels of management at Sandia and from his peers across the nation's nuclear weapons enterprise.

According to Chalk, Ron's "influence, sound advice, and technical expertise are sought after" from classification professionals throughout DOE.

"Above all," Chalk wrote, "Mr. McIntosh is a team player, one whom everyone in the Classification community enjoys working with. He never fails to tackle a problem and provide a meaningful, workable solution. He is respected by his staff, his peers, and his superiors for his excellent character and sound judgment."



CLASS(IFICATION) ACT — Sandia Corporate Classification Officer Ron McIntosh has been awarded the 2013 DOE Office of Classification Award of Excellence. Ron has been described as "the epitome of a classification professional." (Photo by Randy Montoya)

## Ron McIntosh: Notable current activities

- **Co-chairman of the Neutron Generator Evaluation Group (NGEG)**

Co-chairman of the Neutron Generator Evaluation Group (NGEG) with the DOE Headquarters Office of Classification. This group is responsible for evaluating new neutron generator technologies and associated classification policy and making recommendations to DOE/NNSA as to what information should be classified, declassified, or otherwise made available.

- **Technical Evaluation Panel (TEP) support (2003-present)**

Serves to support DOE's Technical Evaluation Panel (TEP), a group of senior national laboratory experts in nuclear weapon design tasked to review specific requests for declassification of weapon design information and make recommendations to DOE. DOE considers TEP recommendations as part of its overall process for declassification. Responsible for providing technical support and input to Sandia's representative to the panel and the panel itself. Have provided this support over the past 10 years.

- **Chairman of Weapon Contractor Classification Committee (WCCC) from 2004-2006; member of the WCCC**

The WCCC is an association of DOE and NNSA

weapon contractor classification personnel. It was established in the early 1960s as a forum for the exchange of information of mutual interest to: 1) ensure consistent interpretation of approved classification guidance; 2) share and coordinate opinions on classification operational and policy matters; 3) provide better understanding of technical classification problems and coordinate efforts to solve them; and 4) make recommendations to DOE/NNSA on relevant matters after independent and/or joint study. This committee meets twice a year and is attended by classification officers from throughout the Nuclear Security Enterprise, and the director, DOE HQ, HS-60 Office of Classification and the NA-71 classification officer, and their staff. While serving as the deputy classification officer for Sandia, was elected by the membership to chair the WCCC. Successfully served in this role for a two-year term and was the only non-classification officer to ever be elected to this position.

- **US Navy Classification Management Working Group**

Member of the US Navy Classification Management Working Group. Key participant in the establishment of the entity at the request of classification officials from the US Navy Strategic Programs Office and Lockheed Martin.

## In the club

# Sandia manager joins New Mexico's 40 Under Forty



By Nancy Salem

Louis Griego says a little stress can be a good thing if it means he's busy, challenged, and balancing the many activities in his life. "I really enjoy new opportunities at work, spending time with my family, and giving back to the community," he says. "We all get busy. We have to make time to fit all the pieces together."

Louis (10672) is a manager at Sandia, the father of a 2-year old, and actively involved in charitable organizations. He was recognized for his professional and community accomplishments by being named to the 2013 class of *Albuquerque Business First's* 40 Under Forty, a prestigious program that honors young professionals who are making an impact on the state. They will be recognized at a gala event June 28 at Sandia Casino.

*"I've always been involved in charitable work outside my job. I hope that I'm doing my part to help fulfill a major need in New Mexico. I want to give back to the community. That's an important part of my life."*

Louis says he is honored to join the 40 Under Forty club, which has included some of the state's most influential people. "I felt very excited and humbled looking through the names of the honorees, reading about their accomplishments, and knowing previous honorees and the important work they're doing professionally and in the community," he says.

### Growing up with the railroad

Louis's parents are from Belen. His father worked for the BNSF Railway, starting as a clerk at age 18 and continuing through retirement. The family moved around, from Southern California to Texas to Illinois. "Every time my father was promoted it required a move," says Louis, who was born in Clovis, later lived outside Belen in Los Chaves, and went to high school in El Paso.

Louis returned to his home state in 1999 to attend the University of New Mexico in Albuquerque, where he earned a bachelor's degree in accounting in 2003.

He interned at Sandia his senior year doing financial reporting for solar programs. He was hired as a limited-term employee after graduation and worked as a financial analyst on the W76-1 Life Extension Program matrixed to Center 2100, the New Mexico Weapon Systems Engineering center. "I learned a lot about Sandia's core nuclear weapons mission," Louis says.

### 'It just made sense'

In 2004 he completed a master's in business administration at UNM and became a full-time Sandia employee. He also prepped for and passed the test to become a certified public accountant (CPA).

Louis says he chose accounting as a career after earlier considering law. "What I liked about accounting

was it was a system laid out with certain transactions happening certain ways, and it just made sense," he says. "The numbers tell the story behind what's going on in business. I definitely made the right decision."

Louis was selected for the Lockheed Martin Financial Leadership Development Program and rotated into three jobs over three years. The first was in the W76-1 program where he had been working. He moved to the Energy Resources and Non-Proliferation SMU.

"It gave me a perspective on how money comes into the Laboratory, processing work authorizations and working project funding," Louis says. "I also worked in the Division 6000 business office on projects at the division level."

His third rotation was to Org. 10508, Indirect Financial Management, as the corporate center support analyst. He stayed in that job several years then made a move to the international group as a matrixed financial analyst and business partner to Org. 6821, International Nuclear Threat Reduction.

"I went to Qatar, Egypt, and Kenya," he says. "It was an eye-opening experience and really enjoyable working with people from different cultures and parts of the US government. It was a great job."

### Helping hand to children

Louis's goal was to become a manager. In 2010 he was named business manager for Center 2500, Energetic Components. Since July he has managed the Nuclear Weapons SMU Business Office Dept. 10672.

He says he enjoys being a manager and his work at Sandia. "Leading a team is fun. I really enjoy the relationship-building and working with others," he says. "I've been able to do a lot in my Sandia career. I like learning and being challenged, and each assignment has been a new opportunity. Our national security mission is very important, and the people at Sandia are the smartest, brightest, and just nicest I've ever met."

Louis's senior manager, Ernie Limon (10670), says he knew he wanted Louis on his team when he first met him in 2008. "What impresses me is his willingness and ability to seek external interest as a corporate and community citizen by volunteering for various boards and charities," Ernie says. "I am extremely pleased to have him on our management team."

Louis's community involvement includes membership in the Active 20/30 Club of Albuquerque, a group of young professionals who do fundraising and hands-on work to benefit children's charities throughout



LOUIS GRIEGO (10672) does volunteer work that helps children's charities. "It fulfills a major need in New Mexico," he says.

*"I've been able to do a lot in my Sandia career. I like learning and being challenged, and each assignment has been a new opportunity. Our national security mission is very important, and the people at Sandia are the smartest, brightest, and just nicest I've ever met."*

central New Mexico.

He also volunteers with the adaptive ski program at the Sandia Peak Ski Area teaching disabled kids to ski, is on the supervisory committee at the Sandia Laboratory Federal Credit Union, and has sat on United Way Community Fund panels as the CPA.

"I've always been involved in charitable work outside my job. I hope that I'm doing my part to help fulfill a major need in New Mexico," says Louis, who is married to his college sweetheart and enjoys spending time with his parents, who after several moves retired to Albuquerque's South Valley. "I want to give back to the community. That's an important part of my life."