Exascale computing project awards $39.8 million for application development

First investments made by recently formalized project

By Neal Singer

Improved computer climate models of the Earth’s clouds and more accurate simulations of the combustion engine are goals for two projects led by Sandia that were funded in the first round of grants from DOE’s break-out $39.8 million Exascale Computing Project (ECP).

Sandia also will conduct research with other laboratories on three exascale projects whose goals range from developing physics models for more efficient wind energy production to improving understanding of materials at the molecular level, and simulating quantum mechanical effects in materials.

The 22 projects chosen by the ECP were selected for their societal significance and their ability to advance through exascale computing.

Jackie Chen (8351) leads one of 15 fully funded projects: Transforming Combustion Science and Technology with Exascale Simulations. Mark Taylor (1446), chief computational scientist for DOE’s Accelerated Climate

(Continued on page 4)
That's that.

I read a book years ago about Skylab, the early-1970s follow-on to the Apollo program, and some parts of it have stuck with me for decades. Skylab, the first American space station, was built around the voluminous third stage of the Saturn V rocket, used in Apollo missions. Skylab was rotating into Skylab for one- two- and three-month missions in 1973 and 1974. Technically, Skylab was a great success. Astronauts proved human crew members could work through the problems in the vacuum and space and scientists and engineers learned a lot about long-duration missions, which would be essential knowledge for planetary exploration.

That's why I was so interested when the program was not without its hiccups. In Skylab 4, the three-month mission, there was a famous crew “strike.” Here’s how Wikipedia describes it:

“The crew’s initial task of unloading and storing the thousands of items needed for their lengthy mission proved to be more difficult. . . . the crew soon found themselves tired and behind schedule. . . . [T]he astronauts complained of being pushed too hard. Ground crews disagreed; they felt that the astronauts were not working long enough or hard enough.”

Skylab 4 Commander Jerry Carr at one point, “We would never work 16 hours a day for 84 straight days on the ground, and we should not be expected to do it here in space.” Ground Control disagreed, strongly, and basically told the crew to quit complaining and get back to work.

In protest, the crew literally cut off communications with Earth and spent a full day relaxing and doing things at their own pace. NASA wasn’t happy but the “strike” led to mission changes and played a big role in shaping the way NASA dealt with workload planning on subsequent human-crewed missions.

That story is in my mind because Skylab book, during the preparation for my book, one of the program planners said the only real problems with the mission stemmed from “analogies” to Apollo. If you’re a human mission crew member, of course, the “biological interface” was the whole point of the program.

That brings the Skylab program to mind is a news story I read the other day about a NASA/University of Hawaii experiment that has just come to an end. After a year in a mock-up of a Mars habitat, six volunteer crew members with astronaut-like qualifications emerged back to planet Earth. And it seems that once again, there were issues with the biological interface.

“One of your biggest enemies is boredom,” said German physicist and biologist Heinicke with a laugh. But clearly, it was a laugh with an edge. Asked if she planned to keep in touch with her crewmates now that the mission was over, Heinicke replied carefully, “Oh, well, three of them I definitely going to stay in very close contact with.”

Sounds like the way I feel after a big family reunion at Thanksgiving, although I might not go as far as to say “three.”

NASA has announced its intention to land a human crew on Mars as early as 2030 — just 14 years away — an ambitious goal. As in all forward-looking research programs, NASA’s Mars teams will be breaking a lot of new ground.

Among key unknowns: How well can a crew function for months at a time in a real Martian outpost? Because of the Mars habitat experiment, some of the human issues are more clearly understood now. Thanks to those volunteers, “astronauts,” planners for upcoming Mars missions have a better handle on that pesky biological interface.

Another enemy is human error. That’s where the need is to keep in mind that a lesson goes all the way back to Skylab: Whatever else they do, planners must need to make sure to include big wins that are far from the other command. If you ask most Skylab crew members to gazed out the window, looking down on their home planet and surely — contemplating their place in the scheme of things.

See you next time.

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

---

* * *

Lab News Reader Service

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

Retirees (only):
To notify of changes in address, contact Benefits and Social Security, at 505-844-4237, or Mail Stop 1021, Sandia National Laboratories, Albuquerque, NM 87185-1021.

For Employees:
To receive the Lab News or to change the address, call 505-844-4045, or mail to Sandia National Laboratories, Albuquerque, NM 87185-1021.

Employees:
To notify of concerns regarding delivery of the Lab News, call Mail Services at 505-3796. At Sandia/ Albuquerque contact the Mail Room at 529-24-2472.

Web users:
The Lab News is available online at www.sandia.gov/LabNews.

Materials society names Sandia’s Don Susan Fellow

By Sue Major Holmes

Don Susan, a researcher in Sandia’s Metallurgy and Materials Technologies Dept., has been named a Fellow of ASM International in recognition of outstanding contributions to materials science and engineering.

The society’s citation says Don received the honor, one of the highest in the field of materi- als, for “sustained contributions in the areas of physical metallurgy and join- ing research, material characteriza- tion, and failure analysis.”

The 22 members of ASM’s 2016 class of Fellows will be honored at the soci- ety’s annual awards dinner Oct. 25 in Salt Lake City during the Materials Science & Technology 2016 conference.

“It’s a big honor for me, especially knowing the fellowships who preceded me,” Don says. “It’s a big honor to follow in their footsteps.”

Don, who joined Sandia in 2000, says the award recog- nizes a broad range of work during his career. His areas of expertise include hermetic connector technology, tin-lead and lead-free soldering, alloy brazing alloys, elec- trical contact alloy metallurgy, high- temperature ceramics, high strength steels, metallography and quantitative image analysis, and failure analysis. He is a co-inventor on work that led to a patent on glass-ceramic to metal sealing for high-temperature, high-pressure applications.

Sandia National Laboratories

http://www.sandia.gov/LabNews

Albuquerque, New Mexico 87185-1636

Livermore, California 94551-0903

Traverse, New Hampshire 03271-2658

San Antonio, Texas Carroll, New Mexico 87108-2634

Sandia National Laboratory is a multimodal laboratory operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corp., for the U.S. Department of Energy under contract DE-AC04-94AL85000.

Bill Murphy, Editor
(505) 845-0845

Randy Mentzel, Photographer
(505) 844-4635

Patience Koning, Retiree Information
295-243-9101

Lanigard Production
(505) 844-2207

Cowden-Moore Photographic
(505) 844-2297

Natalie Barger, Design and Editorial
mjbarger@sandia.gov

Sep-13, 2017

Shane Kaye, Production
(505) 844-4704

Michael Padilla, Public Information Specialist
(505) 844-4205

Shawnda Neely (505) 844-4704

Hippocrates had poor mechanical properties, but the team found a way to increase its strength by two to three times through a process called Equal Channel Angular Extrusion, which extrudes a bar of metal in a way that can be described as rolling around a corner. “We were all skeptical at first, but it works,” Don says. “This was a very satisfying project because it was a surprise to all of us.”

Fellows serve as advisors to ASM International to enhance its standing as a leading organization for materials and provide a resource to serve the worldwide community of materials scientists and engineers in the years ahead. The society established the honor in 1969 to recognize fellows’ contrib- utions and to develop a broad forum of technical and professional leaders to be advisors. ASM International was founded in 1913 as the American Society for Metals. Today, it has more than 30,000 members worldwide and is the world’s largest association of metals-centric materials scientists and engineers.

Open Enrollment is your annual opportunity to review and update your benefit elections.

Active Employees: Oct. 31-Nov. 17

PreMedicare Retirees: Oct. 15-Nov. 18

Medicare Retirees: Oct. 15-Dec. 7

Find out more at hbe.sandia.gov.

DON SUSAN

Interest in materials science came from dad

When Don was young, his father worked in a Honeywell facility that made plastic film, and “I guess the mate- rials science aspect rubbed off on me, except it was met- als, not polymers,” Don says, who holds a doctorate in materials science and engineering from Lehigh University.

He also worked on shape-changing alloys and was principal investigator for a three-year project to create high-temperature memory alloys. In addition, over the years he worked on numerous teams conducting materials research and component evaluations to ensure the safety, security, and reliability of the nation’s nuclear weapons stockpile.

Don recalls a project on an iron cobalt-based alloy called Hiperco that turned out to be satisfying for him and his col- leagues because they were a problem in an unexpected way.

Hiperco had poor mechanical properties, but the team found a way to increase its strength by two to three times through a process called Equal Channel Angular Extrusion, which extrudes a bar of metal in a way that can be described as rolling around a corner. “We were all skeptical at first, but it works,” Don says. “This was a very satisfying project because it was a surprise to all of us.”

Fellows serve as advisors to ASM International to enhance its standing as a leading organization for materials and provide a resource to serve the worldwide community of materials scientists and engineers in the years ahead. The society established the honor in 1969 to recognize fellows’ contrib- utions and to develop a broad forum of technical and professional leaders to be advisors. ASM International was founded in 1913 as the American Society for Metals. Today, it has more than 30,000 members worldwide and is the world’s largest association of metals-centric materials scientists and engineers.

2017 Open Enrollment coming soon

Open Enrollment is your annual opportunity to review and update your benefit elections.

Active Employees: Oct. 31-Nov. 17

PreMedicare Retirees: Oct. 15-Nov. 18

Medicare Retirees: Oct. 15-Dec. 7

Find out more at hbe.sandia.gov.
A commitment to national security, enhancing partnerships, and a strong focus on research and development were the primary themes highlighted at a recent 20th anniversary celebration for Sandia’s biological sciences program. The event also commemorated the fifth year of Sandia/California’s Applied Bioscience Laboratory. On Tuesday, Aug. 30, Div. 8000 VP Marianne Walck and former Center 8600 director Malin Young, now deputy director for Science and Technology at Pacific Northwest National Laboratory, led the event.

Marianne highlighted the work conducted at Sandia to provide biological solutions to critical challenges in energy and homeland security. She acknowledged the world-class researchers and thanked everyone who has been involved in biosciences at Sandia.

“Sandia could not have done all the great things without the technical staff, technologists, postdocs, and student interns who demonstrate the talent, innovation, and determination to forge this exciting research area,” Marianne said.

“Biology’s special requirements are very different from our nuclear weapons work. I am thankful to our mission support for making this new capability happen at Sandia,” she said.

Marianne read remarks by former 8000 VP Mim John, who was unable to attend the event. Mim wrote that Sandia first began bioscience work in the 1992-93 timeframe.

“With the end of the Cold War, our historic missions were certain to decline,” Mim wrote. “We had started a small effort in computational biology. At that time, the nation was taking a nuclear holiday with the fall of the Soviet Union. Just as we had started to see some worrisome events in the chemical and bioweapons world.”

During that time Sandia explored how the California site could contribute to chemical and biological weapons defense.

Since then, the biological sciences program has grown to include some 120 researchers located in Livermore and Emeryville, California, and Albuquerque. The work is primarily funded by DOE, DoD, DHS, and NIH. The Laboratory Directed Research and Development program was a major source of funding in the early days of bioscience work at Sandia, and LDRD continues to play a significant role today. Bio funding from DOE’s Office of Energy Efficiency and Renewable Energy is at an all-time high. External partnerships include multiple national laboratories and universities. Inventions have led to start-up companies and licensing with many others.

Bioscience work is strongly aligned with Sandia’s Energy and Climate and Global Security Program Management Units. Various projects support the Labs’ Nuclear Weapons and Defense Systems & Assessments programs.

Young reminisced about joining the bio program in 1999 during the microChemLab era, a Grand Challenge LDRD project that had a distinct focus on biodefense. Bioengineering and bioscience at Sandia soon led to research in medical diagnostics and host-pathogen interactions. During the mid-2000s, the program expanded into algae, diatom (a group of algae), and genomes-to-life projects. New Mexico brought biomaterials and bioimaging strengths to the program.

Center 8600 Director Anup Singh, who first joined Sandia as a post-doc, said he looks forward to the continued success of Sandia’s bio program, including new projects such as Co-OPTIMA (continuation of both tools and engines), agile biofoundry, and the NanoCRISPR Grand Challenge project, which exploits new gene editing capabilities.

“Sandia will soon be in the forefront of gene editing technologies both in constructive applications and in countering the threats enabled by gene editing,” he said. “We have ushered in a new era in biological engineering and Sandia will continue to focus on these areas.”
FLC regions meet in Albuquerque

(Continued from page 1)

SANDIA LAB NEWS • September 30 2016 • Page 4

tion is important among the many government and pri-

vate-sector groups trying to build the economy. “We’re all

working on stuff across a large spectrum,” he said. “We

need to set up environments where it is easy to collabo-

rate, communicate, and connect.”

He said technology transfer from national labs has been

strengthened by giving business people access to scientists,

engineers, and intellectual property (IP). “Tech transfer is

absolutely doable,” he said. “I encourage you to keep
doing what you’re doing and work together.”

Opender, a self-described serial entrepreneur who commercialized two Sandia technologies, said the labs should encourage entrepreneurs. “These are people with ideas who look at a situation, know there’s an opportunity to improve it, and pursue it despite obstacles,” he said. “Let’s establish an entrepreneurial mindset and try new things. We can make it happen, make big changes, and see growth. We can stay ahead in the world.”

IP for the marketplace

In a panel on creating entrepreneur-friendly communi-
ties, Lisa Kuolla, chief economic development officer for the University of New Mexico (UNM), said it takes many people to build an entrepreneurial ecosystem. She said business incubators, investors, skilled management, and service providers are needed to get baby compa-
nies off the ground. Collaboration results in critical intellectual property for the marketplace. Kuolla
tila said. “We work with Sandia, Los Alamos, the Air
Force Research Labora-
tory,” she said. “Agreement
ments are in place. It’s a
well-oiled machine.”

Jackie Kerby Moore, manager of Technology and Economic Development Dept. 1933, said Sandia has played a major role in Albuquerque’s economic development as one of the city’s biggest employers. It began in 1998 with the Sandia Science & Technology Park, which has grown into a 500-plus acre master-planned business community affiliated with Sandia and adjacent to Kirtland Air Force Base. The park houses 42 companies and organizations, 2,163 employers, and has created, directly and indirectly, almost 6,000 jobs.

REPRESENTATIVES from federal laboratories in the Mid-Continent and Far West regions gathered in Albuquerque recently for a Federal Laboratory Consortium meeting.

Sandia continued down the economic development road with the New Mexico Small Business Assistance Pro-
gram, which lets small companies with a technical chal-

lange work with Labs scientists and engineers; Entrepreneurship Separation to Transfer Technology, which lets Sandia employees leave the Labs to start or help expand technology companies; Small Business Vouchers, a DOE pilot that gives small, clean-energy companies access to national laboratory expertise and resources; and the Entrepreneur Exploration Fund.

“Our goal through this program is to invigorate an entrepreneurial culture at Sandia and to inspire entreprene-

urship,” Jackie said. “We want to stimulate collaboration and commercialization.”

Sandia’s own People magazine hot off the press

The latest Sandia Research magazine is focused on one
thing — people. In a follow-up to an issue earlier this year that highlighted Laboratory Directed Research and Develop-
ment (LDRD), the Labs’ research magazine staff turned to the people behind that groundbreaking scientific and engineer-
ing work.

Get to know 10 of the Labs’ most interesting researchers, not just their accomplishments but what makes them tick. They share their photos, backgrounds, hobbies, and passions in research and life. You’ll also read about the impact LDRD has on building the skillset and career of a scientist or engineer. Andy McIlroy, deputy chief technology officer and director of Research and Partnerships Center 1900; Jackie Kerby Moore, manager of Technology and Economic Development Dept. 1933; Jetta Wong, director of the DOE Office of Technology Transitions; and Mary McIlroy, senior manager of Industry Partnerships Dept. 1930 discussed DOE tech transfer programs and their impact on the economy at the FLC meeting. (Photo by Linda van Boeijtch

Fireside Chat — Jackie Kerby Moore, left, and Jetta Wong discussed DOE tech transfer programs and their impact on the economy at the FLC meeting. (Photo by Linda von Boeijtch

A suite of commercialization tools

Mary McIlroy, senior manager of Industry Partnerships Dept. 1930, in a panel on the role of federal labs in creating entrepreneurs and commercializing technolo-
gies, said Sandia focuses on putting people behind the Labs’ mission and capabilities. She said Sandia has 700 active tech-transfer partnerships in the region. “We want to help improve the local, state, and national economies,” she said. “We have a whole suite of tools and use all of them.”

Sandia said a particular focus is allowing scientists and engineers to engage in business at levels that make them comfortable, from training and getting a feel for entrepre-

neurship all the way to leaving the Labs to start or expand a company. “We have a responsibility to the community to help stimulate the economy,” she said.

Joel Sikora, manager of Business Development and IP Management Dept. 1932, in a panel on federal lab/university partnerships, said a longstanding Sandia partnership with UNM through the joint Advanced Materi-
als Lab has produced 33 patents, 22 licenses, and 10 R&D 100 and two FLC awards. “We have a successful Memorandum of Understanding that defines the roles of each partner, how we work together, and how we manage IP,” he said. “Research partnerships are vital to educating the next generation of scientists and engi-

neers. They get access to world-class facilities, and the Labs get a top-notch student workforce.”

The conference concluded with remarks by Wong in a Fireside chat moderated by Jackie. Wong said Energy Secretary Ernest Moniz is a strong supporter of tech trans-

fer and is engaged in the national conversation. “In 2015 he wanted to see our technology transfer game and expand and enhance the commercial impact of the DOE research and development portfolio,” she said. “How do you tie those portfolios together to accelerate the com-
mercialization of new technology and in so doing create more impact?”

That question led to establishment of OTT, which was given responsibility for the Technology Commercialization Fund, authorized by the Energy Policy Act of 2005. Both are working to bring more lab technologies to market.

Wong urged the group to think about what’s next. “Where is the technology and what does the market need?” she said. “We want to know what’s going on and best serve the stakeholders.”
A wide-ranging analysis of water vulnerability across the Pacific — including the US, China, Russia, and Japan — has identified hundreds of locations where energy production depends upon scarce water supplies. The Sandia study, “Mapping Water Consumption for Energy Production Around the Pacific Rim,” was published in Environmental Research Letters.

Prepared for the Asia-Pacific Economic Cooperation (APEC), a regional economic forum, the first-of-its-kind report maps out every power plant, refinery, and mine in 21 Asia-Pacific economies that rely on fresh water for energy. Simultaneously, it shows the data in context to regions at high to extreme risk of drought and dwindling natural water supplies.

“This is the first time we have worked on a project of this scale to illustrate how much fresh water is used for energy development,” says Sandia hydrologist Vince Tidwell (6926), who co-authored the report with technologist Barbie Moreland (6926). “The purpose was to lay out a foundation to raise awareness in these economies about energy-water issues and vulnerabilities they are facing.”

The report compares demand in 10 energy sectors where fresh water is consumed to produce energy — including thermoelectric and hydroelectric power production; coal, uranium, natural gas, and oil extraction; refining of biofuels, oil, and natural gas; and production of biofuel feedstocks.

Among the 21 APEC economies are some of the world’s biggest energy users, where economics, population growth, and other factors contribute to mounting water demands. The US alone has more than 1,200 thermoelectric power plants, more than 500 refineries, and 800-plus mines.

Vince says he was surprised by the number of energy facilities across Asia-Pacific economies in locations facing water risk. The study identified 32 percent of the 2,511 watersheds consuming fresh water for energy are also characterized as being at high to extreme risk of running out of fresh water. For six of the economies, watersheds at risk represented half or more of all basins consuming water for energy.

“Where we have energy growth and demand in regions with high or extreme water risk, we start to worry. Our hope is the hard data in this publication will get people to pay attention,” Vince says.

APEC’s Energy Working Group recently established an Energy Resilience Task Force co-chaired by DOE for the US and the Philippines. One major work stream under this new task force is to address energy-water nexus challenges. This Sandia report helps develop a baseline understanding of challenges across the APEC region so additional activities may be developed.

The study also supports DOE’s Water-Energy Nexus program, generated from the 2014 report, The Water-Energy Nexus: Challenges and Opportunities, outlining the interdependence between energy and water. It was funded for APEC by DOE’s Office of International Affairs.

Sandia based the Asia-Pacific study on its decades of experience analyzing water data and developing water models, along with expert research in water technology and development. Sandia’s core mission to solve complex national security problems includes safeguarding resilient and sustainable energy-water systems.
2016 Employee Recognition Awards program honors teams, individuals for exceptional contributions

Sandia’s Employee Recognition Awards are presented to individual employees and teams nominated by their peers and chosen by a division selection committee with final approval by the division VP for their accomplishments during the past year. ERA awards underscore the importance placed on individual and team contributions to Sandia mission success. ERA categories include, for individuals: exceptional service, leadership, technical excellence, safety, and Sandia values, ethics, and integrity. Teamwork awards recognize technical, administrative, and support accomplishments and team safety accomplishments. Sandia this year recognizes 42 individuals and 82 teams for their outstanding contributions to mission success.

Individual honorees

- Georgio Racelli 6122
- Leah Barker 3510
- Michael Bazile 2688
- Thomas Bauer 8226
- Ross Burchard 6531

Team honorees

Division 1000

- Division 1000 Non-NREL Assessment Coordination and Inspection Team
  - This team completed over 5,100 equipment inspection entries for non-NREL equipment from May to December 2.
  - HERMES III Source Region Effects Experiment Team
  - In recognition of outstanding teamwork during the planning, setup, and execution of first of kind experiments on 00001 at SPring-8/CX Thermal Titanium Critical Experiment Team
  - The team developed an innovative critical experiment with titanium to improve actinically safety analysis for spent fuel processing in a manner to ensure safety, while reducing processing costs.

- Full Waveform Inversion (FWI) Full-Physics Development and Implementation Team
  - For the development and implementation of forward modeling and adjoint gradient for viscous anisotropic physics.

- Encalab: Quantum Computer Benchmarking Team
  - For groundbreaking research developing and applying methodologies for forward modeling novel computer technology against conventional classical computers, including an evaluation of the D-Wave 2 computer.

- Dropkinson Bar Development Team
  - Invented a new “Dropkinson bar” apparatus for intermediate-scale mechanical testing that advances in depth understanding of material behavior under a broad range of mechanical environments.

- B61-12 FEAD Impact Radiography
  - Delivery of technical base in opinion proper assembly as well as in production-based condition of a safety test unit.

- Discovery of Metallic Hydrogen Under Compression Team
  - Groundbreaking discovery of an abrupt transition of hydrogen from an insulator to a metal at high pressure, as first hypothesized in 1931.

- Sierra Diagnostics Development Team
  - Design, development, and fielding of a new suite of diagnostics on F and SRS.

- NOVA Award winner
  - The B61-12 Flight Test Team — For technical excellence demonstrated through successful execution of these B61-12 F-15E Flight tests.

Programmable Acoustic RF Filter Team

- Programmable Picoelectro RF Filter Team and innovative approaches to realize the first suitable countermeasure resonator and demonstrate a path toward high-Q responsive RF filters.

Predictive Tribology of Metals Team

- For outstanding effort to create a general, science-based, predictive model of friction in metal contacts.

Energetics and Climate (PMU) Proposal Team

- The proposal team partnered with the technical and financial line staff to manage the preparation, submission, and tracking of 190 proposals in FY15.

Division 2000

- Mk5/W88-0 ALT 940 Team
  - The Mk5/W88-0 ALT 940 team completed two product development phases in less than a year to realize leveraging opportunities with the ALT 940 program.

- NOVA Award winner
  - The Mk5/W88-0 ALT 940 team completed its two product development phases in less than a year to realize leveraging opportunities with the ALT 940 program.

- Programmable Acoustic RF Filter Team
  - Programmable Acoustic RF Filter Team and innovative approaches to realize the first suitable countermeasure resonator and demonstrate a path toward high-Q responsive RF filters.

Predictive Tribology of Metals Team

- For outstanding effort to create a general, science-based, predictive model of friction in metal contacts.

Energetics and Climate (PMU) Proposal Team

- The proposal team partnered with the technical and financial line staff to manage the preparation, submission, and tracking of 190 proposals in FY15.

(Continued on next page)
The EBA Program has seven nomination categories. Two team categories recognize 1) technical, administrative, and support team contributions and 2) team safety initiatives. Five categories recognize individual achievements.

- **Team Technical, Administrative, Support** category recognizes teams whose exceptional contributions are critically enabled by teamwork, and model the values of people working together toward a common goal, proactively looking for, and acting upon, opportunities to improve, while being fully accountable for their performance.

- **Team Improves Workplace Safety** category recognizes teams whose passion for safety has positively influenced and matured safety culture, fortified Sandia’s physical safety infrastructure, or created or improved safety programs. Examples: Safety as an essential Sandia value.

- **Individual Technical Excellence** — The Technical Excellence category recognizes individuals whose innovative science and predictive, science-based engineering capabilities contribute to the transformation of Sandia’s business practices and provide solutions to National Security problems.

- **Individual Exceptional Service** — The Exceptional Service category recognizes commitment and efforts to implement and proactively seek improvements to the organization, and/or Sandia’s reputation while enabling others to succeed.

- **Individual Leadership** — The Leadership category honors employees who have demonstrated exceptional creativity, courage, and integrity in leading others to the successful accomplishment of Sandia’s work. This is also the category to acknowledge an individual for demonstrating exceptional people skills, modeling and reinforcing key behaviors and attitudes which are aligned with Sandia’s organizational values.

- **Individual Sandia Values, Ethics, and Integrity** — The Sandia Values, Ethics, and Integrity category recognizes individuals who have exemplified Sandia’s values and demonstrated the highest standards of integrity and business ethical conduct.

- **Individual Safety Leader and Change Agent** — Recognizes individual’s demonstrated commitment to influence immediate or sustainable improved personal and organizational safety performance or physical workplace safety improvements.

---

**CL-20 Morphology Performance Team**

(Continued from preceding page)

- Sustained support for DDT and HTR Thermal battery programs with changing needs and aggressive schedules.

---

**CL-20 Morphology Performance Team**

The effort of CL-20 morphology on expediting program performance was characterized through preparation of unique CL-20 formulations incorporated into EBWs and evaluated through functional testing.

**Circuit Resistance Investigation Team**

The team’s investigation of a new insulation mechanism and creative problem solving has provided a profound understanding of the impact to series mechanisms.

**Production Crypto Facility (PCF) Development Team**

For exceptional teamwork in the development of the Production Crypto Facility in coordination with the GPS Directorate, Hughes Design Group, and the Aerospace Corporation.

**Center 2600 Electrical Safety Committee**

To provide enhanced guidance for laboratory electrical work, the team developed principle-based policies and procedures for use in Center 2600 when conducting electrical testing.

**ALMOND Design Team**

The ALMOND design team solved several long-standing DIII-D technical challenges in their successful replacement of vacuum-vision cables directly in significant follow-on work.

**Partial Fill Lightning Arrester Connector (IAC) Analysis Team**


**Rocket Motor Disposition Campaigns Team**

Successful disposal of 917 rocket motors. 100 for the Gas Generators, 181 Mighty Mouse rocket motors, 420 Zen rocket motors, and 12 Titan rocket motors.

**ROCKET MOTOR DISPOSITION CAMPAIGNS TEAM**

Rocket Motor Disposition Campaigns Team

Successful disposal of 917 rocket motors.

---

**Division 3000 GPA SWAT TEAM**

With the significant growth at SNL, the SWAT team has provided a SWaT approach to support the SNL mission.

---

**Division 4000**

Sanda Committee on Electrical Safety (CES)

The Sandia Committee on Electrical Safety has significantly improved the usage awareness and safety of electrical operations across the Lab.

---

**Facilities Construction Safety Excellence Team**

---

**Facilities Construction Safety Excellence Team**

---

**SANDIA LAB NEWS   September 30, 2016   Page 7**

---
Division 5000

MICA Data Link Team

The MICA Data Link team has enabled JP/OPN communications for 20+ sources in various domains, allowing continuous remote monitoring of locations of national interest.

Division 5000


The team’s overall performance has resulted in the successful deployment and operation of the MICA Data Link system at multiple overseas sites, supporting critical national security missions.

Division 6000

High Temperature Fulling Particle Receiver Team

For planning, designing, constructing, and successfully testing the world’s first continuously operating high-temperature particle receiver with adherent and integrated safety, quality, and technical excellence.

The team demonstrated that the receiver was capable of transferring data at rates not previously achieved.

DWR WANDERER Team

The team demonstrated significant improvements in efficiency and effectiveness in the deployment and operation of the receiver, leading to the successful deployment of the WANDERER system.

Trailer Communications Systems (TCS) Development Team

Developed the next generation communication systems for the Joint Base San Antonio and used in the transportation of military vehicles by DOE.

Program Accomplishments Team

For your contributions and team work that led to several important deliverables in 2015. Thanks to everyone for your dedicated service to this program.

Division 9000

Therm Field Campaigns Team

For exceptional teamwork to successfully complete the GBD III Prime SIGHTS Subsystem Preliminary Design Review.

Norwegian Fire Lizard (NFL) Team

For outstanding responsiveness and effectiveness in the face of urgent, changing scope.

The Telemetry team delivered quality product that was critical to the successful deployment of the GSP teams’ effort.

For exceptional work in support of the GBF Program.

W88ALT370 Telemetry PRT Team

In recognition of the outstanding work in surety risk analysis, in particular for support of the GBF Program.

The Mixed Waste Landfill (MWL) Permit Hearing culminates 11 years of effort, ensuring the long-term sustainability of Sandia’s processes.

The Subcontract Labor Law Compliance Team

In recognition of the outstanding work in surety risk analysis, in particular for support of the GBF Program.

Cost Savings Implementation Team

Loss and Stolen Property Enhancement Team

For your contributions and team work that led to several important deliverables in 2015. Thanks to everyone for your dedicated service to this program.

For exceptional teamwork in the designing/deployment of a TRUST Environment that will significantly improve the protection around critical data for the Nuclear Security Enterprise.

High Performance Computing Infrastructure Monitoring Team

For exceptional work in support of the GBF Program.

The team demonstrated significant improvements in efficiency and effectiveness in the deployment and operation of the receiver, leading to the successful deployment of the WANDERER system.

Trailer Communications Systems (TCS) Development Team

Developed the next generation communication systems for the Joint Base San Antonio and used in the transportation of military vehicles by DOE.

Program Accomplishments Team

For your contributions and team work that led to several important deliverables in 2015. Thanks to everyone for your dedicated service to this program.

Division 5000

High Temperature Fulling Particle Receiver Team

For planning, designing, constructing, and successfully testing the world’s first continuously operating high-temperature particle receiver with adherent and integrated safety, quality, and technical excellence.

DWR WANDERER Team

The team demonstrated significant improvements in efficiency and effectiveness in the deployment and operation of the receiver, leading to the successful deployment of the WANDERER system.

Trailer Communications Systems (TCS) Development Team

Developed the next generation communication systems for the Joint Base San Antonio and used in the transportation of military vehicles by DOE.

Program Accomplishments Team

For your contributions and team work that led to several important deliverables in 2015. Thanks to everyone for your dedicated service to this program.

Division 9000

Therm Field Campaigns Team

For exceptional teamwork to successfully complete the GBD III Prime SIGHTS Subsystem Preliminary Design Review.

Norwegian Fire Lizard (NFL) Team

For outstanding responsiveness and effectiveness in the face of urgent, changing scope.

The Telemetry team delivered quality product that was critical to the successful deployment of the GSP teams’ effort.

For exceptional work in support of the GBF Program.

W88ALT370 Telemetry PRT Team

In recognition of the outstanding work in surety risk analysis, in particular for support of the GBF Program.

The Mixed Waste Landfill (MWL) Permit Hearing culminates 11 years of effort, ensuring the long-term sustainability of Sandia’s processes.

The Subcontract Labor Law Compliance Team

In recognition of the outstanding work in surety risk analysis, in particular for support of the GBF Program.

Cost Savings Implementation Team

Loss and Stolen Property Enhancement Team

For your contributions and team work that led to several important deliverables in 2015. Thanks to everyone for your dedicated service to this program.
Paving the way

Sandia researchers earn top Hispanic science and engineering honors

By Rebecca Brock

Two outstanding Sandia innovators have been recognized nationally for their technical achievements and contributions within the Hispanic community. Bernadette Hernandez-Sanchez (1815) has won Outstanding Technical Achievement, and Tim Boyle (1815) has been awarded two patents.

Bernadette Hernandez-Sanchez is a professor of chemistry at Colorado State University and a bachelor’s degree in chemical physics. She has contributed significantly to the field of perovskite materials, which are important for the chemistry of lithium-ion batteries and ferroelectric materials.

In addition to her academic pursuits, she is a principal investigator on Sandia’s Marine & Hydrokinetic Advanced Materials Program — a lively, interactive outreach program she designed with Tim Boyle to show kids that science is fun. Her MANOS curriculum evolved the CSI: Dognapping Forensics program for Hispanic youth, where she volunteered in the middle school youth. She has at least taught chemistry classes. From her student interest, she says, “I like to give back, because I look at them and see myself. I understand the importance of being introduced to new concepts and role models in order to encourage students to succeed.”

“Bernie’s expertise in solving complex materials problems is on the cutting edge of many fields,” says Tim. “In addition to her technical nical work, she is dedicated to increasing the number of students entering science by tirelessly donating her time and effort.”

Bernie has mentored more than 50 student interns in her lab, many of whom have gone on to pursue graduate degrees in chemistry. She is helping the business improve bioLime®, through the New Mexico Small Business Assistance program. She is helping the business improve bioLime®, through the New Mexico Small Business Assistance program.

Vincent Urias: “Just do it”

Vincent was raised by his grandparents, who immigrated to the U.S. from Guatemala in the 1960s, fleeing persecution. He says they instilled in him a love of the United States and the value of service. His grandfather died at a young age, and his mother Josephine today, Vincent says, “I can’t slow down. She is in her 80s, volunteering four days a week in a first grade classroom, and walking to work every day.”

Vincent, too, is a non-stop force of energy. He has achieved notable success in Sandia’s cyber defense programs, supporting national security for partners including the U.S. Department of Defense. His research includes large-scale cyber modeling and simulation environments at Sandia, called Emulytics®, that have allowed for the testing of software systems at the scale of large enterprises. From that work came a striking innovation that earned him a patent — an advanced security technology called Deception.

SANDIA LAB NEWS   September 30, 2016   Page 9

BERNADETTE HERNANDEZ-SANCHEZ (1815) is the first woman at the Labs to receive the prestigious HENAC award for Outstanding Technical Achievement. (Photo by Randy Montoya)

“Bernie is one of the most dedicated volunteers at Sandia,” says Amy Tapia (3652), Community Involvement manager. “She has lived the journey herself and is eager to help others. What she’s done over the years is incredible.”

Bernie and Vincent have been recognized nationally for their technical achievements and contributions within the Hispanic community. Their efforts are a testament to the importance of diversity in science and engineering, and the impact it has on our community and the world.
Exascale computing

(Continued from page 1)

Modeling for Energy executive council, will lead a project titled “Understanding the Time-Resolved Climate Modeling of the Earth’s Water Cycle.” Other projects supported by Sandia computer scientists, engineers, and other researchers include Exascale Predictive Wind Plant Flow Physics Modeling, led by the National Renewable Energy Laboratory, with Oak Ridge National Laboratory and the University of Texas, Austin, as partners; Molecular Dynamics at the Exascale: Spanning the Accuracy, Length, and Time Scales for Chemical Problems in Materials Science, led by Los Alamos National Laboratory, with the University of Tennessee and OAKFEM: A Framework for Predictive and Systematically Improvable Quantum Mechanics-Based Simulations of Materials, led by Oak Ridge National Laboratory and five partners.

A billion billion calculations per second

Exascale refers to the next challenge in high-perfor-

mance computing systems: machines capable of at least a billion billion calculations per second, 50 to 100 times faster than the most powerful supercomputers in use today.

All 15 fully funded projects and seven others that received seed funding involve partners from a total of 45 universities, national labs, and private companies.

Says Bruce Hendrickson, director of Sandia’s Center for Computing Research (1400), “We are excited by the opportunity to lead DOE’s efforts in these critical areas of science and technology. Sandia is committed to the ECP’s goal of enhancing the impact of advanced computing through breakthroughs in computer science, software, and algorithms as well as hardware.”

Says Jackie, “The development of an exascale high-

fidelity combustion engine simulation capability has tremendous potential scientific, technological, and societal impact. Due to the untapped energy density of liquid hydrocarbon fuels, combustion will continue to provide much of the world’s energy for at least the next 50 years. Combustion needs to be understood and optimized to prevent further climate change, to reduce emissions harmful to human health, and to ensure US energy security.”

Multi-decade climate simulations

Says Mark, “Our project team will develop a cloud-

resolving Earth system model for multi-decade climate simulations that realistically treat storms. This will improve our ability to understand the impacts of climate change on the water cycle that directly affect multiple sectors of the US economy to the unrivaled energy density of liquid hydrocarbon fuels, and to ensure US energy security.”

The ECP’s multiyear mission is to maximize the benefits of high-performance computing for US economic competitive-
tiveness, national security, and scientific discovery. In addition to applications, the ECP addresses hardware, software, platform, and workforce development needs critical to the effective development and deployment of future exascale systems.

The ECP will fund projects in energy security, economic security, scientific discovery, climate and environmental security, and healthcare. It is led by six DOE national laboratories: the Office of Science’s Oak Ridge, Argonne, and Lawrence Berkeley national labs, and NSG’s Lawrence Livermore, Los Alamos, and Sandia national labs.

Developing a broad set of models and simulation applications that support the DOE’s scientific, engineering, and nuclear security programs is one of four primary ECP goals. Its other major goals are to develop productive exascale computing (hardware and software); prepare two or more DOE facilities to house exascale machines by 2023; and to maximize the benefits of high-performance computing to US science and commerce.

The full list of application development awards follows:

Full Funding:

- Computing the Sky at Extreme Scales, Salmaan Sabih (ANL) with LANL, LBNL
- Exascale Deep Learning and Simulation Enabled Precise Medicine for Cancer, Rick Stevens (ANL) with LANL, LBNL
- Exascale Lattice Gauge Theory Opportunities and Requirements for Nuclear and High Energy Physics, Paul Mackenzie (PNNL) with LANL, LANL
- Exascale Multiphysics Coupled Urban Systems, Charlie Catlett (ANL) with LBNL, NREL
- Exascale Predictive Win...
**MISCELLANEOUS**

CONVERTIBLE CRIB, wood, natural, 3 level mattress support, Simmons mattress, excellent condition, paid $150, asking $120. Lang, 505-823-1699.

DOG CRATE, furniture quality, cherry, used only 3 times, very good condition, photo available, $75. Evans, 292-2367.

KÖKEN BARBER CHAIR, works, porcelain base intact, black & aluminum, $750. Altman, 505-463-6999.

COACH PURSES, small & medium sizes, great condition, $5 & up. Eber, 417-4390.


**RECREATION**

02 TOYOTA SEQUOIA SUV, 4x4, V8, 8ft., passenger, beige, 163K miles, good condition, $6,000. Fernandez, 505-280-6151.

RENTAL

05 HONDA CRF 450 X DRIT BIKE, $2,800. Dixon, 505-977-8281.

04 HONDA SHADOW VT600C, low miles, new seat, saddle bags, bike cover, excellent condition, $2,400. Jenkins, 505-908-1553.

HARLEY-DAVIDSON SPORTSTER XL, 883 cc, red, controls forward, buddy seat, saddle bags, 13k miles, $4,000. Thadhammer, 298-8521.

02 HONDA SEVIER WING, SCOOTER, 600 cc, 3,500 miles, adult driver, garaged, like new, $1,800. Baca, 505-980-1169.

10 COLEMAN TRAVEL TRAILER, 1 side out, motorized awning, full bath & kitchen, w/generators, $16,500. Fitzgerald, 505-918-1706.


07 HARLEY-DAVIDSON SPORTSTER, $9,900. Stubblefield, 263-3468.

163K miles, good condition, $4,000. Podgorski, 505-688-2632, ask for Jason.

CLOTHES, women size 6-8, good condition, for friend who lost everything due to life transition. Greene, 802-578-2056.

ROOMMATES: Volterra, 5 mins. to base, WiFi, no pets, $475/month. Cauffman, 505-385-8189.


EXCHANGE DOG-SITTING, looking for family interested in exchanging dog sitting on occasional weekend trips. Singer, 298-5141.

ROOMMATES: 3-bdr. home, 1/2 baths, gated community, near Juan Tabo & Control. $600/month. utilities/internet included. Healy, 505-804-4738. TAKE OVER LEASE, 2-bdr. apt., move in Nov. 7, no deposit required. Academy/Locar, La Mirage, lease ends in Feb. but you can renew, $1,940/month. Baca, 505-730-9123.
By Valerie Larkin

A manager of Nuclear Security Enterprise Integration (NSEI), Mike Gomez and his team develop technical solutions that equip Sandia executives and other partners across the NSEI with the models and information they need to make critical decisions and optimize their operations.

It seems fitting, then, that Mike is a dedicated member and chair elect of the United Way of Central New Mexico’s (UWCNM) Community Impact Council (CIC), a group of volunteers whose task is decision-making and optimization. The CIC ultimately decides where UWCMN’s Community Fund dollars are allocated, and it formulates the strategic vision and selection criteria that inform those decisions.

A huge need

Mike became involved with the UWCNM Community Fund in 1999, the same year he came to Sandia. Before then, he ran Albuquerque City Council subcommittee that approved the city’s information technology purchases. Through his involvement with the subcommittee, he became acquainted with Jerri Esch, a Sandian involved with the UWCMN’s Community Fund who shared Mike’s passion for ensuring allocation decisions resulted in a strong return on investment.

Mike has been a United Way contributor since 1984, and he met his wife Doña at a UWCMN awards dinner that featured a program run by the March of Dimes. “We had personal meaning to her, and then we discovered the support of United Way,” he says. “I saw first-hand the difference they make in people’s lives and the impact that United Way has had on our community.”

United Way Info Fair Oct. 3

Sandia’s 2016 Employee Caring campaign kicks off Monday, Oct. 3, at an information fair from 11 a.m. to 1 p.m. in the Steve Schiff Auditorium lobby and all are invited.

Representatives from the United Way of Central New Mexico will be on hand to answer questions about the Community Fund, Mission Graduate, and other programs made possible through the Community Fund. Come learn about the work of Sandia’s affinity groups, including Guys Go! Women in Philanthropy, Hispanics Philanthropic Society, the Tocqueville Society, and the Young Leaders Society.

Each attendee can select a United Way of Central New Mexico focus area (education, health, or basic needs/financial stability) to receive a $20 donation. Attendees also earn 1,000 Virgin Health Points just for attending.

Learn more at give.sandia.gov.

A community-driven award process

Community Fund grant money is distributed to agencies by a community-driven process. First, a group of volunteers, the CIC, is instrumental in ensuring the funding goes where it’s needed most. By pooling resources, the Community Fund is able to fund those most in need, which is difficult to do as an individual donor.

Impact on the council

Mike’s tenure as chair of the CIC will begin next fall. As council chair, his aim is to improve the overall experience for agencies that submit grant applications and for the volunteers who support the Community Fund. He wants to tailor a volunteer experience that recognizes individuals’ desired engagement level and interests. He also intends to further streamline the application and decision-making process for funding awards.

“United Way is a huge need for support from UWCMN in our community. You wind up seeing so many people in dire situations that it can be easy to get discouraged. But when you’ve seen enough of it, it really inspires you to try to do something about it,” he says.

Employee sees United Way impact from front lines

By Valerie Smith

Going back to others has been part of Cheryl Atkins’ life for as long as she can remember. “I remember my mother handing my sisters and me March of Dimes cards and encouraging us to turn in every one down the block collecting donations,” she recalls.

“Having lived in urban and rural areas of New Mexico, Mike has seen that the needs of the state are vast and often urgent. As a manager who has moved from United Way work in one focus area to another, he’s been surprised by the level of need he’s seen each time. “The economic downturn caused a lot of government funding for many programs to be drastically reduced or outright zeroed. The recession was devastating to the most vulnerable populations,” he says.

“I’ve seen that United Way has been a catalyst to help bring back the funding for many programs – especially those that go to the United Way Community Fund,” Mike says.

Mike’s tenure as chair of the CIC will begin next fall. As council chair, his aim is to improve the overall experience for agencies that submit grant applications and for the volunteers who support the Community Fund. He wants to tailor a volunteer experience that recognizes individuals’ desired engagement level and interests. He also intends to further streamline the application and decision-making process for funding awards.

“United Way is a huge need for support from UWCMN in our community. You wind up seeing so many people in dire situations that it can be easy to get discouraged. But when you’ve seen enough of it, it really inspires you to try to do something about it,” he says.

Employee sees United Way impact from front lines

By Valerie Smith

Coming back to others has been part of Cheryl Atkins’ life for as long as she can remember. “I remember my mother handing my sisters and me March of Dimes cards and encouraging us to turn in every one down the block collecting donations,” she recalls.

“Having lived in urban and rural areas of New Mexico, Mike has seen that the needs of the state are vast and often urgent. As a manager who has moved from United Way work in one focus area to another, he’s been surprised by the level of need he’s seen each time. “The economic downturn caused a lot of government funding for many programs to be drastically reduced or outright zeroed. The recession was devastating to the most vulnerable populations,” he says.

“I’ve seen that United Way has been a catalyst to help bring back the funding for many programs – especially those that go to the United Way Community Fund,” Mike says.

Mike’s tenure as chair of the CIC will begin next fall. As council chair, his aim is to improve the overall experience for agencies that submit grant applications and for the volunteers who support the Community Fund. He wants to tailor a volunteer experience that recognizes individuals’ desired engagement level and interests. He also intends to further streamline the application and decision-making process for funding awards.

“United Way is a huge need for support from UWCMN in our community. You wind up seeing so many people in dire situations that it can be easy to get discouraged. But when you’ve seen enough of it, it really inspires you to try to do something about it,” he says.

Employee sees United Way impact from front lines

By Valerie Smith

Coming back to others has been part of Cheryl Atkins’ life for as long as she can remember. “I remember my mother handing my sisters and me March of Dimes cards and encouraging us to turn in every one down the block collecting donations,” she recalls.

“Having lived in urban and rural areas of New Mexico, Mike has seen that the needs of the state are vast and often urgent. As a manager who has moved from United Way work in one focus area to another, he’s been surprised by the level of need he’s seen each time. “The economic downturn caused a lot of government funding for many programs to be drastically reduced or outright zeroed. The recession was devastating to the most vulnerable populations,” he says.

“I’ve seen that United Way has been a catalyst to help bring back the funding for many programs – especially those that go to the United Way Community Fund,” Mike says.

Mike’s tenure as chair of the CIC will begin next fall. As council chair, his aim is to improve the overall experience for agencies that submit grant applications and for the volunteers who support the Community Fund. He wants to tailor a volunteer experience that recognizes individuals’ desired engagement level and interests. He also intends to further streamline the application and decision-making process for funding awards.

“United Way is a huge need for support from UWCMN in our community. You wind up seeing so many people in dire situations that it can be easy to get discouraged. But when you’ve seen enough of it, it really inspires you to try to do something about it,” he says.

Employee sees United Way impact from front lines

By Valerie Smith

Coming back to others has been part of Cheryl Atkins’ life for as long as she can remember. “I remember my mother handing my sisters and me March of Dimes cards and encouraging us to turn in every one down the block collecting donations,” she recalls.

“Having lived in urban and rural areas of New Mexico, Mike has seen that the needs of the state are vast and often urgent. As a manager who has moved from United Way work in one focus area to another, he’s been surprised by the level of need he’s seen each time. “The economic downturn caused a lot of government funding for many programs to be drastically reduced or outright zeroed. The recession was devastating to the most vulnerable populations,” he says.

“I’ve seen that United Way has been a catalyst to help bring back the funding for many programs – especially those that go to the United Way Community Fund,” Mike says.

Mike’s tenure as chair of the CIC will begin next fall. As council chair, his aim is to improve the overall experience for agencies that submit grant applications and for the volunteers who support the Community Fund. He wants to tailor a volunteer experience that recognizes individuals’ desired engagement level and interests. He also intends to further streamline the application and decision-making process for funding awards.

“United Way is a huge need for support from UWCMN in our community. You wind up seeing so many people in dire situations that it can be easy to get discouraged. But when you’ve seen enough of it, it really inspires you to try to do something about it,” he says.