Sandia delivers first DOE sounding rocket program since 1990s

HOT SHOT to validate missile technologies more quickly, carry scientific experiments

By Troy Rummler

A new rocket program could help cut research and development time for new weapons systems from as many as 15 years to less than five.

Sandia developed the new program, called the High Operational Tempo Sounding Rocket Program, or HOT SHOT, and integrated it for its first launch earlier this year under NNSA direction.

The first HOT SHOT rocket launched from Sandia’s Kauai Test Facility in Hawaii in May, marking the first time DOE/NNSA has used rockets carrying scientific instruments, also known as sounding rockets, since the 1990s. Sandia is planning four launches next year.

HOT SHOT launches comparatively inexpensive sounding rockets carrying scientific experiments and prototypes of missile technology. The flight data help researchers improve technologies, validate that they are ready for use and deploy them faster than with conventional validation techniques. In turn, NNSA is equipped to respond quickly to emerging national security needs. The program also supports a tailored and flexible approach to deterrence, as outlined in the 2018 Nuclear Posture Review.

The flights prove whether a prototype rocket and its components — from an onboard computer to a structural bracket — can function in the intense turbulence, heat and vibration a missile experiences in flight.

Conventional vs. HOT SHOT

The Department of Defense also provides such confirmation with a conventional missile test following rigorous DOE studies and simulations on the ground. But by that point, the chance to significantly modify a component has largely passed. Until now, the DoD flight tests have been virtually the only way to get a clear picture of how new components fare in flight.

“It was a really difficult problem,” Sandia mechanical engineer Greg Tipton said. “It’s hard to imitate the same vibrations and forces a rocket experiences in flight on the ground.”

Sandia’s large-scale environmental testing facilities can mechanically shake objects back and forth and spin them at high speeds to mimic a flight experience. But like a 4-D amusement ride, these tests are imperfect analogs. For a stress-like vibration, HOT SHOT provides a much closer simulation. Other stresses, such as heat from re-entry or heat and vibration a missile experiences in flight.

Majority rules when looking for earthquakes, explosions

New Sandia software reduces false, missed detections of seismic activity

By Kristen Meub

A dormant volcano in Antarctica helped researchers at Sandia improve sensor data readings to better detect earthquakes and explosions and tune out everyday sounds such as traffic and footsteps.

Finding the ideal settings for each sensor in a network to detect vibrations in the ground, or seismic activity, can be a painstaking and manual process. Researchers at Sandia are working to change that by using software that automatically adjusts the seismic activity detection levels for each sensor.

Sandia tested the new software with seismic data from the Mt. Erebus volcano in Antarctica and achieved 18 percent fewer false detections and 11 percent fewer missed detections than the original performance of the sensors on Mt. Erebus.

Until now, the main way to ensure sensors were picking up unusual seismic activity and not reporting regular activity was to manually adjust the settings of each sensor to its specific surroundings. Unfortunately, getting those settings exactly right is difficult, especially because those ideal settings change with the seasons and weather patterns.
Quantum research gets a boost at Sandia
Science community gets access to nascent nanoscience technologies

By Troy Rumlter

The Department of Energy has awarded Sandia and Los Alamos national laboratories $8 million for quantum research — the study of the fundamental physics of all matter — at the Center for Integrated Nanotechnologies. The award will fund two three-year projects enabling scientists at the two labs to build advanced tools for nanotechnology research and development. Because of the collaborative nature of CINT, the award also will provide opportunities for researchers outside the labs to benefit from the new technologies.

"The science community has recognized that quantum-enabled systems are the new frontier for electronic and optical devices," said Sandia senior manager and CINT co-director Sean Heane. "At CINT, we are developing extraordinary new techniques to place single atoms where we want them and control how they interact with the environment around them so that the unique quantum phenomena at the nanoscale can be harnessed.

At the atomic scale, matter follows rules of physics, called quantum mechanics, that can seem bizarre compared to a person's everyday experience, such as seemingly being in two places at once. However, building technology is beginning to harness quantum mechanics to accomplish tasks impossible with conventional technology. Sandia and Harvard University, for example, previously collaborated to turn a single atom into an optical switch, the optical analog of a transistor, an essential component of all computer processors.

CINT, a DOE-funded nanoscience research facility operated by Sandia and Los Alamos, provides researchers from around the world access to expertise and instrumentation focused on the integration and understanding of nanoscale structure and function.

Quantum-based analysis for all

Both of the newly funded CINT projects will enable researchers to create and study new materials that accentuate their quantum nature at the nanoscale. Sandia physicist Michael Lilly is leading one of them to design and build the first quantum-based nuclear magnetic resonance instrument based at a U.S. shared user facility. Lilly is a mainstay in chemistry. It's often used to learn the molecular composition of a substance, and it's the same technology that is in MRI machines. But commercial NMR systems don't work on the very small samples that nanotechnology researchers generally produce.

"If you're studying individual properties of some nanomaterial, a lot of times it won't even be on your radar to do an NMR experiment, because it's just not possible," Michael said.

Using principles of quantum information science, collaborators will build an NMR instrument sensitive enough to work with extremely small volumes. The instrument will actually be sensitive enough to read information from individual atoms. This single-atom resolution will be valuable to Michael and his collaborators because it reveals more information than the conventional technique, which only looks at groups of particles together. For example, researchers will be able to study whether single nanoparticles change properties as they grow or when they get close to other nanoparticles.

"NMR is a powerful technique," Michael said. "If we can extend it to the nanoscale, I think that will benefit a lot of CINT users.

Engineering materials one atom at a time

Sandia also will enable nanoscience researchers to build new quantum devices by helping develop the first method to create what's called a defect center, or simply a defect, by design.

In this case, "defect" means a specific location in a material where an atom has been removed and, in some cases, substituted with a different element. Previous research has discovered that certain naturally occurring defects in materials have useful properties for quantum engineering. However, "if you want to make a real device, you have to be able to make these defects intentionally," said Han Hイトon of Los Alamos. "You cannot rely on the defects that occur naturally."

Hiton is leading the second project and is collaborating with Sandia's Ed Bielejec. They will explore how to systematically introduce single-atom defects into advanced materials in a way that lets them control the number, location and properties of the substitutions.

Ed will lead an approach using Sandia’s Ion Beam Laboratory, which uses ion and electron beams to study and modify materials and devices. He has successfully used such machines to precisely implant defects into a range of materials. However, quantum researchers want to use new materials, some that are only a single layer of atoms thick. This means Ed and his team have to develop a method to fire a particle that can knock an atom out of place and then come to a dead stop and take the original particle's place. "It's a complex task, but our incredible machines and our past success with external collaborators are what allow us to be confident that we can accomplish this," Ed said. "We're taking big steps forward, but we've already laid the paving stones ahead of us."

QUANTUM TOOLBOX — Ed Bielejec examines a material at the Ion Beam Laboratory with the Nano-Implanter, a machine that produces very precise material defects. A smaller, lower voltage version will enable Ed and his team to do the same for advanced materials that could be used in semiconductors and other applications.

(Continued from page 1)

HOT SHOT program

the simultaneous combined environments experienced in flight, simply don’t have accurate models or ground test methods researchers can use.

"HOT SHOT fills a hole between ground testing and missile testing," said Olga Spahn, manager of the department at Sandia responsible for payload integration for the program. "It gives researchers the flexibility to develop technology and see how it handles a flight environment at a relatively low cost."

The test data also will help engineers like Greg design more realistic ground tests, something industries from automobile to aerospace are also earnestly researching.

Flexible test drives innovation

HOT SHOT will not replace final DoD flight tests. However, it does use comparatively simple, two-stage sounding rockets built from surplus inventory motors to recreate the flight environment of their more expensive cousins, which can cost tens of millions of dollars to fly. The cost of a traditional flight test has made exploring some new ideas prohibitively expensive.

"By the time we’re flying with DoD, the technology had better work. There’s no room for failure," said Kate Helean, deputy director for technology maturation at Sandia.

Researchers from an NNSA facility or partner institution now can test their technology with HOT SHOT and risk much less if it fails. Sandia designed the program this way to encourage exploration and creativity, which further augments NNSA’s ability to adapt weapons systems to urgent needs.

"We really want to be leaning into new and innovative

Lab News Notes

Editor's Note: Lab News seeks guest columnists with observations on life at the Labs or on science and technology in the news and in contemporary life. If you have a column (500-750 words) or an idea to submit, please contact Jim Danneskiold, the acting editor.

Sandia National Laboratories
Albuquerque, New Mexico 87185-1668
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http://www.sandia.gov/default.html

Mission: Sandia National Laboratories is a multimission laboratory managed and operated by National Technology and Engineering Solutions of Sandia LLC, a wholly owned subsidiary of Honeywell International Inc. for the U.S. Department of Energy’s National Nuclear Security Administration. Sandia Labs has several sponsored international sites.

Notes

"The science community has recognized that quantum-enabled systems are the new frontier for electronic and optical devices." (Photo by Rebecca Gustaf)
Some like it cryogenic

Sanda helping design the first generation of fueling stations for hydrogen-powered cars to be as safe as conventional gas stations. Now, a Sandia team is working to do the same for the next generation of hydrogen stations.

To keep up with growing demand for hydrogen fuel, retailers need to build many more fueling stations. This expansion requires switching from gaseous to liquid hydrogen because liquid is denser than gas, enabling retailers to store more of it in the same amount of space. A new Cooperative Research and Development Agreement with Sandia will allow the largest hydrogen retailer in the U.S., First Element Fuel, to build a fleet of the cutting-edge liquid hydrogen stations. It will also help modernize the National Fire Protection Association safety codes for liquid hydrogen safety distances, which have not been updated in decades. The updated codes will in turn benefit hydrogen retailers and fire marshals in designing and permitting new, safer stations.

ASKING ‘WHAT IF’ — Sandia’s hydrogen safety modeling team (left to right) include risk analyst Brian Ehrtahrt, project co-leader Chris LaFleur and co-leader Alice Muna. (Photo by Lindsey Andereson)

Using Sandia-designed software, the Sandia research team is quantity the effect of hydrogen leaks from various system designs, and the safety measures used to detect and protect against the effects of leaks. “We can ask these ‘what if’ questions, such as ‘how could a leak happen here? and how can we mitigate the effects so that the leaks have less of a chance of a disaster, explained project co-leader Chris LaFleur. “This way, we can enable hydrogen fuelling of fuel cell vehicles in places it’s never been able to go before, like the busy downtowns of big, densely-packed cities.”

Growing demand for liquid hydrogen

Cars powered by hydrogen refill as quickly as those powered by gasoline and drive just as far. In addition, the only emission from their tailpipes is pure water, a factor in their growing popularity. A major obstacle to the growth of hydrogen-fueled transportation is lack of fueling stations.

“We need more stations and larger, faster, better equipment because we have more customers and demand than we’ve ever dreamed,” said Tim Brown, chief operating officer of First Element Fuel, the largest U.S. retail hydrogen company. First Element operates 19 stations in California, each with only one pump and one hose. Stations operated by other retailers are similarly limited. Even though there are only about 5,000 hydrogen fuel cell cars on the road today in the U.S. — Toyota Motor Corp., Honda Motor Company Ltd. and Hyundai Motor Company all sell them — the fuel supply is not enough to keep lines of drivers from accumulating at the stations, Brown said.

Once Mercedes-Benz and others bring their fuel cell cars, ensuring better air quality and energy security, “That is the part of the project right and so does everyone else. Sandia brings the professionalism, rigor and accuracy I don’t think I can get anywhere else,” Brown said. Sandia also benefits from the project because it allows the team to demonstrate its safety models on real-life system designs. Furthermore, Sandia works directly with the National Fire Protection Association, which will use the data from the project to inform and update its liquid hydrogen safety codes.

The new code will allow future fueling stations to be evaluated from a performance-based standard, rather than a prescriptive one. Chris shared a cooking analogy to explain the difference between the two types of codes. “A prescriptive code is like a recipe that calls strictly for 3 cups of flour, 2 ounces of chocolate and 3 eggs to make a cake. A performance-based standard says, ‘make a chocolate cake 3 inches high that tastes good,’ and you get to decide how to go about that,’ she said. The updated performance-based codes will make it easier for retailers in any part of the country to build safe stations, even if they can’t meet certain prescriptive code requirements. That in turn will encourage growth within the hydrogen vehicle industry.

“Our mission has always been to foster the adoption of these cars, ensuring better air quality and energy security,” Brown said. “That is the part of the project that will live on beyond the particular stations we’re building right now.”

The improvements in accurate detection rates are significant because sensor networks generate a lot of data. For example, the International Data Center analyst-reviewed bulletin for 2014 only included 8 percent of the more than 5.5 million international monitoring system seismic detections originally registered by sensors. This worldwide network helps verify compliance with the Comprehensive Nuclear Test Ban Treaty, which has been signed but not ratified by the United States, by detecting events that might show the treaty has been violated.

“A large portion, but not all, of the remaining 92 percent of detections were likely false positives, which indicates a large percentage of missed detections and wrongly measured detections by the sensors, which takes time and effort to amend,” Brown said. Additionally, 39 percent of the detections included in the bulletin were found or modified by a human analyst, which indicates a large percentage of missed detections and wrongly measured detections by the sensors, which takes time and effort to amend. “Some dynamic signal detectors exist, but until now none have used sensor networks to optimize detections of seismic events. The new approach to tuning data could also be applied to environmental monitoring, motion sensor monitoring with cameras, chemical monitoring, infrasound monitoring and more.”

This is a general-purpose idea,” Brown said. “It doesn’t have to be seismic data. This algorithm can potentially be used anywhere you have a network or collection of sensors to detect events.”
Optimize Sandia’s benefits to fit your life during this year’s Open Enrollment for active employees beginning Nov. 1. Open Enrollment is your annual opportunity to review and update benefit elections including medical, dental, vision, and flexible spending accounts and change dependent enrollments. Your 2019 Open Enrollment selections must be made by 5 p.m. MT/4 p.m. PT Nov. 15.

To learn more, visit hr.sandia.gov or attend an Open Enrollment event. Questions to HR Customer Service, 505-844-4237.

At our Open Enrollment Events, active employees can learn about:

- New Paid Family Leave
- $25 Virtual Visits
- Vacation Buy
- 4/10 Schedules
- Critical Illness & Accident Insurance
- Much more!

Attend the event at your location tor answers and expert advice from Sandia’s benefits team and vendors.

### 2019 OPEN ENROLLMENT EVENTS FOR ACTIVE EMPLOYEES

<table>
<thead>
<tr>
<th>LOCATION</th>
<th>DATE</th>
<th>FAIR TIME</th>
<th>AUDIENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sandia Labs (CA)</td>
<td>Monday, Nov. 5</td>
<td>12:00 – 2:00 p.m.</td>
<td>Employees and Spouses</td>
</tr>
<tr>
<td>Sandia Labs (NM)</td>
<td>Wednesday, Nov. 7</td>
<td>9:00 a.m. – 2:00 p.m.</td>
<td>Employees</td>
</tr>
</tbody>
</table>

### Changes to 2019 Benefits

The changes listed below are effective Jan. 1, 2019. Find details about each plan and the Open Enrollment newsletter at hr.sandia.gov.

- Sandia Total Health plan premiums will increase between $2 and $67 per month depending on health plan and tier level.
- Dental and Vision Care premiums will increase by $1 or less per month.
- For employees hired before Jan. 1, 2007 and not yet retired before Jan. 1, 2019, retiree life insurance will no longer be employer-paid. Employees can instead elect the voluntary life benefit. Additional retiree life insurance options will be available through the retiree health administrator beginning Jan. 1, 2019.
- Virtual Visits for BCBSNM and UHC members will now have a $25 copay per visit, decreasing the employee cost of the benefit.
- OPEIU-represented employees may now purchase coverage between eight and 80 hours of vacation.
- OPEIU-represented employees are now eligible for Sandia Extras.
- For OPEIU- and SIA-represented employees hired on or after Jan. 1, 2019, the Savings and Income Plan employer matching contribution will vest after the employee has three years of service. This does not affect current employees.
- The Tuition Assistance Program has increased tuition assistance maximums per calendar year as follows:
  - Regular exempt employees working 30 hours or more per week:
    - Undergraduate $4,000
    - Graduate $6,500
  - Regular non-exempt employees working 30 hours or more per week:
    - Undergraduate $4,000
    - Graduate $5,250 (When there is a business need and when the graduate-level coursework and academic area is relevant to the individual’s current Sandia employment, a full-time non-exempt employee can request funding up to $6,500 (additional approval required)).
- Regular exempt and non-exempt part-time employees working less than 30 hours per week:
  - Undergraduate $2,000
  - Graduate $3,250

### Voluntary Benefits

Open Enrollment is your chance to select the voluntary benefits most important to you, including Sandia Extras’ Critical Illness, Accident Insurance, and Prepaid Legal Insurance, available only during Open Enrollment. These Sandia Extras voluntary benefits are open to non-represented and MTC- and OPEIU-represented employees, and may be obtained without providing health information, though benefit payments are not made if conditions that occurred prior to the coverage effective date.

Other voluntary benefits you can elect during Open Enrollment are:

- Vacation Buy
- Voluntary Life
- Long-term Disability Buy-Up
- 401(k) Automatic Increase and Rebalancing
- Flexible Spending Accounts for dependent care, healthcare, and transportation (CA-only)

For more information about the voluntary benefits available during Open Enrollment, visit hr.sandia.gov and read the Open Enrollment newsletter.

### Reminder

Employees may opt to receive a 2018 electronic 1095-C form by December 22, 2018, which provides proof of health insurance coverage, in HR Self-Service in lieu of a paper form. By Jan. 31, 2019, all employees should receive a 1095-C form, which should be kept as supplemental documentation for your 2018 taxes.
Changes to time away from work benefits allow more flexibility for employees

The introduction of Paid Family Leave and the 4/10 work schedule demonstrate Sandia’s commitment to providing flexibility for employees to manage their family responsibilities and foster a healthy work-life balance. These changes will be effective for non-represented employees on Jan. 1, 2019.

Represented employees should reference their Collective Bargaining Agreements.

Paid Family Leave is a new resource for employees who need to care for a family member. Paid Family Leave will pay 70% of an employee’s salary for up to six weeks to bond with a newborn, following placement of a child for adoption or foster care, or to care for a parent, spouse, son or daughter who has a serious health condition. Employees have the option to boost this 70% salary replacement by coupling Paid Family Leave with Vacation or Vacation Buy.

Personal Leave allows up to 40 hours that employees can use — caring for an ill family member or taking them to medical appointments during work hours.

A death in the immediate family or the funeral of a close relative.

Legally required paid time off, for example, jury duty.

Sick Leave Guidelines:

- Sickness Absence, which employees may use when unable to work due to illness or to attend medical appointments, will provide six weeks off at 100% of their salary, and an additional 20 weeks off at 70% of their salary. Using Paid Family Leave reduces the employee’s available Sickness Absence on a one-to-one basis.

Employees may supplement their protection against unplanned time away from work situations with voluntary benefits available during Open Enrollment:

- Purchase up to 80 hours of Vacation Buy — unused Vacation Buy is sold back to employees at year’s end at its original value.
- Long term disability buy-up and critical illness and accident insurance can also provide financial relief, depending on circumstances.

With the changes to Time Away from Work benefits, employees will have flexibility to mix Vacation and Vacation Buy with long-term Sickness Absence or Paid Family Leave to make up to 70% of their salary. For example, mixing two Vacation days with three Paid Family Leave days would yield 82% of an employee’s usual salary for the week.

Employees who prioritize building up Time Away from Work benefits can schedule appointments on a 9/80 Friday off and exempt employees can shift their schedule to accommodate the appointment with manager consent, affording additional opportunities to meet personal obligations without using leave.

Learn how to get the most out of Sandia’s Time Away from Work benefits, including how they relate to other types of leave in California, at mytimeaway.sandia.gov.

To help employees achieve a work-life balance and meet the needs of a diverse and multi-generational workforce, Sandia is adding a 4/10 alternative work schedule to the list of available work schedule options. Managers may approve alternate work schedules when they meet the needs of the business and adhere to Sandia’s policies.

Available as an option in California on Oct. 26, 2018, the 4/10 schedule will become an option in New Mexico beginning Jan. 18, 2019. The 4/10 schedule will add the option for employees to work four days a week, 10-hours a day.

The schedule will be an option, with management approval, for non-represented exempt and non-exempt employees, OPEIU-represented employees, as well as student interns. MTC- and SPA-represented employees should reference their Collective Bargaining Agreements.

As 2019 approaches, check hr.sandia.gov for additional information, including tools to assist employees and managers considering whether a 4/10 schedule is appropriate for their situation.
Scientists, leaders take home five awards

(Continued from page 8)

Working to curb unconscious bias in the workplace

Blythe, who also won a Women Worth Watching Career Achievement Award, said that long before she discovered materials science, her first loves were art and music. A native of Nashville, Tennessee, Blythe grew up playing piano, listening to her dad perform in bluegrass and country bands and attending poetry readings with her mom. She credits her grandfather, who immigrated to the U.S. from Mexico and studied engineering, with setting an example of embracing diversity of talents. “He was an electrical engineer who ran his own practice, but he was also a watercolor artist and played piano,” Blythe said. “Although he died before I was born, I always imagined that I got my mix of skills from him. Somehow knowing that he existed in my family lineage made me feel like I wasn’t so weird.”

Blythe has a bachelor’s in materials science and engineering from Northwestern University, and a doctorate from the University of Illinois Urbana-Champaign. She also worked as a postdoctoral fellow for two years at the Max Planck Institute for Metals Research in Stuttgart, Germany, before taking a research position at Sandia. As a manager, Blythe said she strives to cultivate diversity and inclusion within her team and throughout the labs. She is co-chair of the Sandia Women’s Action Network, a group chartered to enrich and support the careers of all women at Sandia. Prior to becoming a manager overseeing work in materials characterization and forensics, Blythe led multiple research teams focused on nanomechanical behavior of metals and thermal stability of nanocrystalline alloys and the application of fundamental physical insights toward predictive simulation development. She holds multiple patents and has given dozens of invited presentations on her work.

Sandia manager Blythe Clark received a Women Worth Watching Career Achievement Award.
How to submit a classified ad

DEADLINE: Friday noon before the week of publication unless changed by holiday.

Submit by one of these methods:

• EMAIL: Michelle.Rieman.Flass@gmail.com
• FAX: 505-844-0649

INTERNET: Click on the News tab at the top of the Tech.

for classifieds. At the bottom of the Newswalker page, click the

“Submit a Classified Ad” button to complete the form. Submit your

ad to Michelle Rieman at 505-964-0502.

Due to space constraints, ads will be printed on a first-come, first-

served basis.

Ad rules

1. Limit words, including last name and home

phone (web or email ad-

dress counts as two or three

words, depending on

length. Include

organization and full

name with submission.

2. Submit ad in writing. No phone (web or email ad-

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4. List of items, services, etc. (web or email ad-

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organization and full

name with submission.

5. No “for rent” ads except for

housing listed for sale.

6. The same ad may not be

published more than twice.

7. No “for rent” ads except for

housing listed for sale.

8. No “for rent” ads except for

housing listed for sale.

9. For active Sandia members

and employees only.

10. Housing listed for sale.

11. Work wanted ads are limited

to student-aged children of

employees.

12. The name of a Sandia

member shall be considered

offensive or

inappropriate.

• INTERNAL WEB: Click on the

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By Janeen Miller

A

SANDIA LAB NEWS • October 26, 2018 • Page 7
Scientists, leaders take home five awards honoring their work

By Manette Newbold Fisher

Photos by Lonnie Anderson

F

ive Sandia female employees with significant accomplishments in science, engineering, management or diversity and inclusion were among the winners of two prestigious career achievement and leadership awards.

Three of the awards were presented to Sandia's Chief Information Officer Carol Jones, chemical engineer Rekha Rao and electrical engineer Ireena Ertzea at the annual Women of Color STEM Conference earlier this month.

Two Women of Color STEM Conference co-organizers were named for recognizing leading women in business, honored Employee Health Services Director Renee Holland and manager Blythe Clark of materials science.

‘A rare combination of ability, imagination, determination’

With 28 years of experience in developing computational models for complex fluids at Sandia, Rekha received a peer-reviewed Women of Color Career Achievement Award. This award was given by panel of leaders from industry, government and academia.

“I am so appreciative of my management for nominating me for the award, and am shocked that I won given the amazing women who were nominated,” she said.

Rekha is one of the founding developers of Goma, a multiphysics, open source software code developed for manufacturing, and a 2014 R&D 100 Award winner. She’s been working on Goma for more than 25 years and it’s been a rare honor to work with the same people on such a impactful project,” Rekha said, adding that Goma work continues with funding from the DOE and JM to design systems that use passive radiant cooling instead of electricity.

She also has been working on foam models to understand how polyurethanes fail. Her work on foam process models has had an impact at both Sandia and the Korean City National Security Complex, resulting in process improvements, higher yields in foam parts and shorter turnaround times for structural foam mold designs. Her effort recently led to a DOE-funded project with Dow Chemical Co.

Chemical engineer Rekha Rao received a Women of Color STEM Outstanding Achievement Award.

“Engineering is people-oriented. We work on teams, and I work with amazing people who help solve unique problems, and guarantee Sandia is always on the cutting edge of technology.”

Carol’s professional career spans more than 31 years at Sandia and IBM, and includes many leadership roles, she currently manages approximately 1,000 people.

Her work has broad impact not only at Sandia, but also across the DOE/NNSA. She led development of DOE’s cyber strategy, authoring a 2015 paper — in consultation with CIOs at all the national laboratories and plants — that describes a proactive, complex-wide approach. Former DOE Deputy Secretary Elizabeth Sherwood-Randall published Carol’s paper as an agency-wide cyber plan.

Director Carol Jones received a Women of Color STEM Outstanding Achievement Award as a Technology All-Star.

Carol also serves as chair of the National Security Enterprise CIO Council which coordinates implementation of cybersecurity and information management requirements from the DOE and NNSA.

“Carol’s achievements and managerial leadership set a powerful example for anyone wishing to pursue a career in IT or other STEM fields. She has earned the respect and admiration of those who work for and with her, and continues to be a strong role model and mentor for many other women and minorities at Sandia and in the IT industry,” said Scott Aebli, associate labs director, Mission Services.

A New Mexico native, Carol holds a bachelor’s in business administration and a master’s in management information systems from the University of New Mexico.

‘A New Mexico native, Carol holds a bachelor’s in business administration and a master’s in management information systems from the University of New Mexico.’

With 28 years of experience in developing computational models for complex fluids at Sandia, Rekha received a peer-reviewed Women of Color Career Achievement Award. This award was given by panel of leaders from industry, government and academia.

“Engineering doesn’t mean you’re stereotypical, isolated in a room with a computer,” she said, “Engineering is people-oriented. We work on teams, and communication is very important. In engineering we use math, science and engineering skills to make and build things, and we use it to solve important problems to help people and society. People who aren’t engineers don’t realize that there is a strong creative aspect to our work. Creativity and imagination are two of the most important parts of being an engineer.”

‘Always knew health was important’

Renee started her career at Sandia in 1995, was a founding member of Sandia’s Disease Management Clinic and has served in a variety of leadership positions. She received a Women Worth Watching Career Achievement Award.

Renee leads a multi-disciplinary team of healthcare providers who provide onsite medical, health and wellness services at Sandia’s clinic in New Mexico.

Renee, a registered nurse, earned a bachelor’s in health promotion from Minnesota State University and a master’s in community health education from the University of New Mexico.

For more than 15 years, Renee has been an advocate for the workforce, where she is part of the recruiting and student intern programs.

Ireena has a bachelor’s in electrical engineering from the University of New Mexico, and subsequently earned a master’s and doctorate in electrical engineering from Stanford University.

In 2016, she became a national Asian American Engineer of the Year, and has a Distinguished Alumnus Award from the UMN School of Engineering. She’s been working on SAR for more than 25 years to participate in their international radar campaign, as well as a number of other projects.

Rekha Rao received a Women of Color STEM Outstanding Achievement Award.

Ireena has a virtual Sandia female employees with significant accomplishments in science, engineering, management or diversity and inclusion were among the winners of two prestigious career achievement and leadership awards.

Three of the awards were presented to Sandia’s Chief Information Officer Carol Jones, chemical engineer Rekha Rao and electrical engineer Ireena Ertzea at the annual Women of Color STEM Conference earlier this month.

Two Women of Color STEM Conference co-organizers were named for recognizing leading women in business, honored Employee Health Services Director Renee Holland and manager Blythe Clark of materials science.

‘Director’s tech vision has ripple effect beyond Sandia’

Carol, who is also director of information technology services, leads the Labs’ information technology and information management strategies. She received a Women of Color STEM Outstanding Achievement Award as a Technology All-Star.

“Technology is always moving forward, and as it changes, Sandia continues to move forward and adapt to ensure we are meeting national security needs,” Carol said.

“Changes in technology present new challenges and opportunities, and I work with amazing people who help solve unique problems, and guarantee Sandia is always on the cutting edge of technology.”

Carol’s professional career spans more than 31 years at Sandia and IBM, and includes many leadership roles, she currently manages approximately 1,000 people.

Her work has a broad impact not only at Sandia, but also across the DOE/NNSA. She led development of DOE’s cyber strategy, authoring a 2015 paper — in consultation with CIOs at all the national laboratories and plants — that describes a proactive, complex-wide approach. Former DOE Deputy Secretary Elizabeth Sherwood-Randall published Carol’s paper as an agency-wide cyber plan.

Director Carol Jones received a Women of Color STEM Outstanding Achievement Award as a Technology All-Star.

Carol also serves as chair of the National Security Enterprise CIO Council which coordinates implementation of cybersecurity and information management requirements from the DOE and NNSA.

“Carol’s achievements and managerial leadership set a powerful example for anyone wishing to pursue a career in IT or other STEM fields. She has earned the respect and admiration of those who work for and with her, and continues to be a strong role model and mentor for many other women and minorities at Sandia and in the IT industry,” said Scott Aebli, associate labs director, Mission Services.

A New Mexico native, Carol holds a bachelor’s in business administration and a master’s in management information systems from the University of New Mexico.

Carol Jones received a Women of Color STEM Outstanding Achievement Award.

‘A New Mexico native, Carol holds a bachelor’s in business administration and a master’s in management information systems from the University of New Mexico.’

With 28 years of experience in developing computational models for complex fluids at Sandia, Rekha received a peer-reviewed Women of Color Career Achievement Award. This award was given by panel of leaders from industry, government and academia.

“I am so appreciative of my management for nominating me for the award, and am shocked that I won given the amazing women who were nominated,” she said.

Rekha is one of the founding developers of Goma, a multiphysics, open source software code developed for manufacturing, and a 2014 R&D 100 Award winner.

She’s been working on Goma for more than 25 years and it’s been a rare honor to work with the same people on such an impactful project,” Rekha said, adding that Goma work continues with funding from the DOE and JM to design systems that use passive radiant cooling instead of electricity.

She also has been working on foam models to understand how polyurethanes fail. Her work on foam process models has had an impact at both Sandia and the Kansas City National Security Complex, resulting in process improvements, higher yields in foam parts and shorter turnaround times for structural foam mold designs. Her effort recently led to a DOE-funded project with Dow Chemical Co.

Chemical engineer Rekha Rao received a Women of Color STEM Outstanding Achievement Award.

“Engineering is people-oriented. We work on teams, and I work with amazing people who help solve unique problems, and guarantee Sandia is always on the cutting edge of technology.”

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