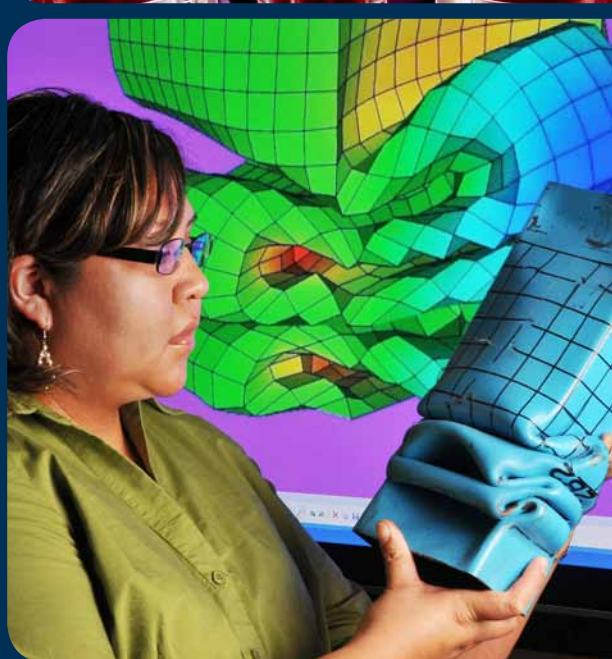


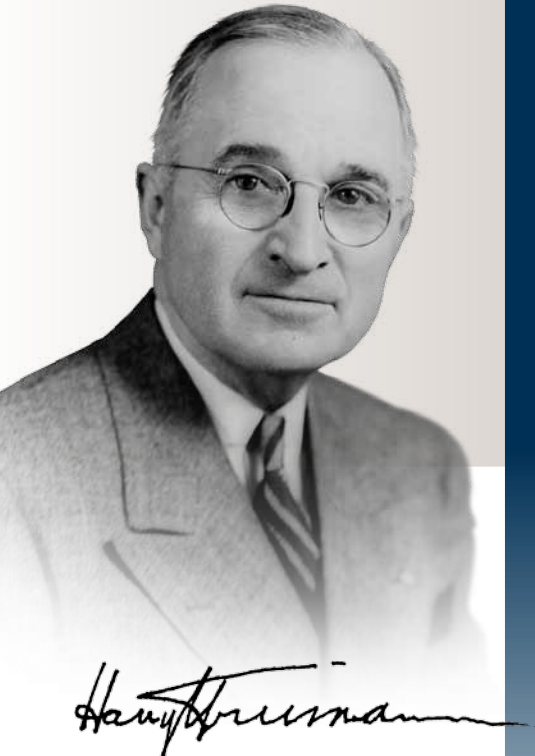
*Exceptional service in the national interest*



SANDIA NATIONAL LABORATORIES » 2012

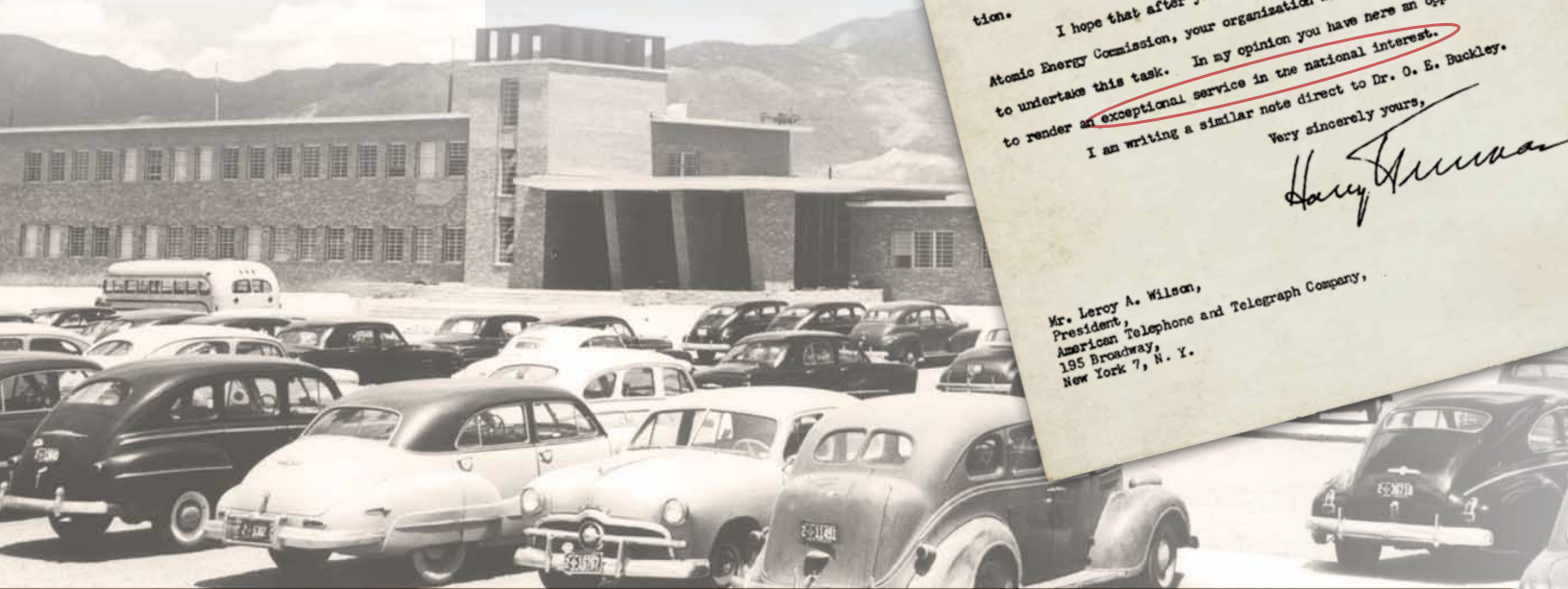
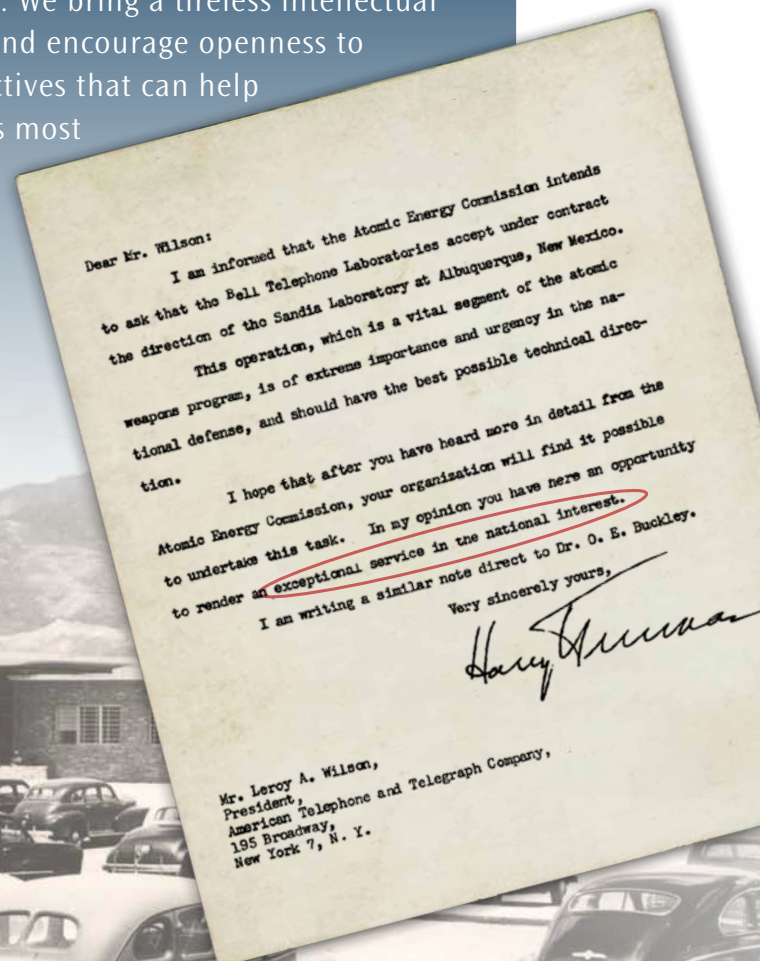
# PERSPECTIVES

*“...exceptional service in the national interest.”*



## A History of Exceptional Service.

Sandia originated during the Manhattan Project of World War II as a single-purpose engineering organization for non-nuclear components of nuclear weapons. Today, it is a multiprogram lab engaged in creating solutions for a broad spectrum of national security issues. Our history reflects the evolving national security needs of postwar America. It was named Sandia Laboratory in 1948 and, a year later, Sandia Corporation was established to manage the lab. Congress made Sandia a Department of Energy national laboratory in 1979, and Sandia Corporation became a wholly owned subsidiary of Lockheed Martin Corporation in 1993. While we have a bold heritage, we focus on the future. We bring a tireless intellectual curiosity to our work and encourage openness to new ideas and perspectives that can help us address the nation's most daunting challenges.





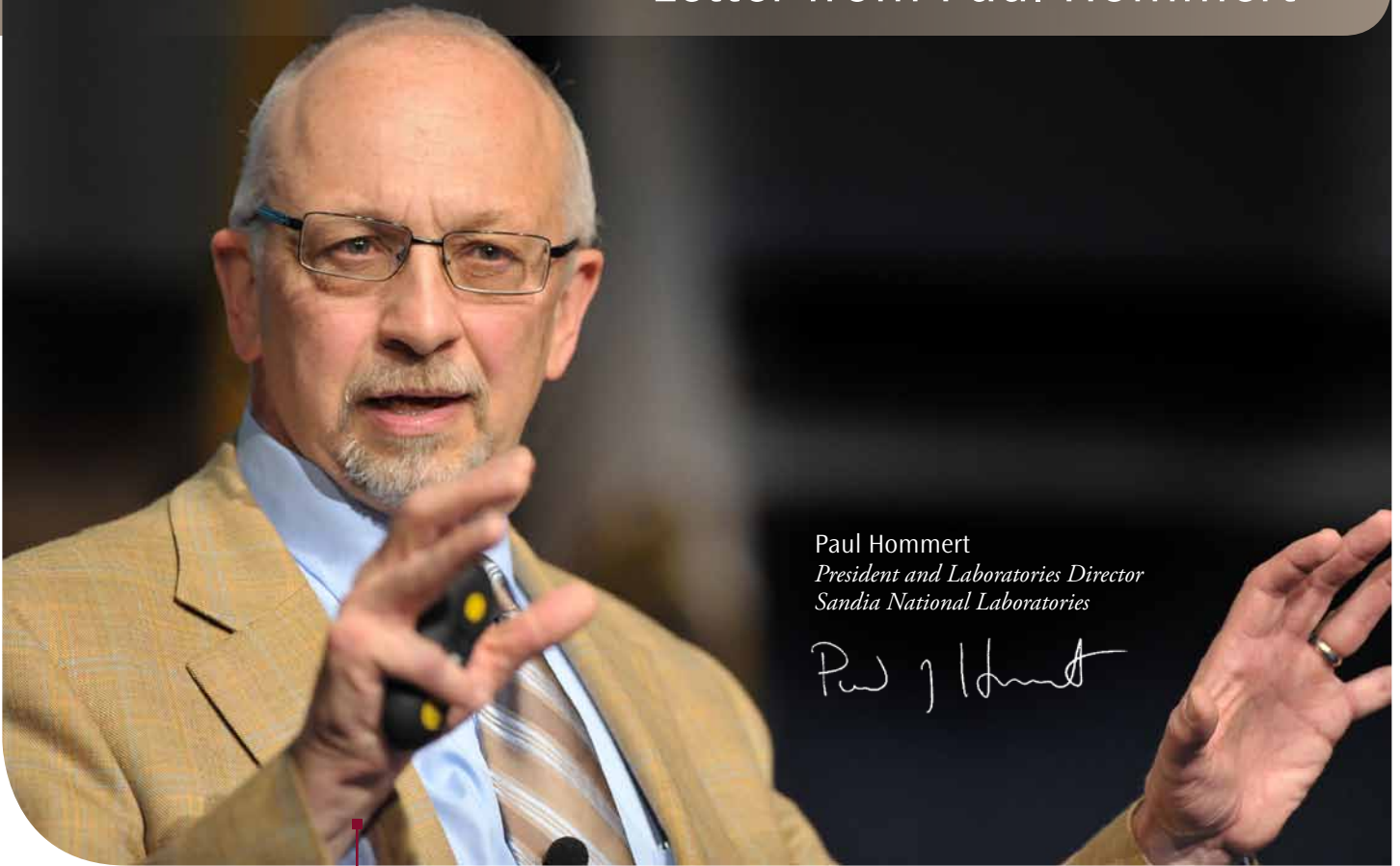
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Jerrold Reinach Zacharias (shown during a lab experiment), who had been active in the radar group at the Massachusetts Institute of Technology, was brought in during the final days of the Manhattan Project to direct the newly formed division in Albuquerque. The group was named Z Division, after the first letter of Zacharias' name.

## Letter from Paul Hommert



Paul Hommert  
President and Laboratories Director  
Sandia National Laboratories

*Paul Hommert*

“*Today’s security environment is infinitely more complex and greater technological innovation is needed...*”

When Sandia was established 64 years ago, the overarching national security challenge facing the United States was stark and clear: Develop, deploy and maintain a nuclear weapon stockpile to counter the arms buildup of the Soviet Union, which at that time was emerging as a global superpower.

In this new Cold War environment, President Harry S. Truman challenged Sandia to render “an exceptional service in the national interest” as the engineering laboratory and systems integrator for America’s nuclear weapon enterprise. The urgency of that mission was unmistakable: The nation’s very survival might depend on work done at Sandia and the other laboratories, plants and testing grounds of the rapidly expanding weapons complex.

In fulfilling that presidential charge, Sandia over the years developed a unique suite of capabilities drawn from virtually every science and engineering discipline.

Today’s security environment is infinitely more complex and greater technological innovation is needed to address challenges in the areas of energy, homeland security, nonproliferation, support for the warfighter, critical infrastructure, cybersecurity and the continuing maintenance of the nuclear stockpile. Sandia will continue to answer these challenges, applying its unique technical capabilities that served the nation so well throughout the Cold War.

As you review this document, view the images and read the accounts of our engagement with the toughest challenges facing America today, I think you’ll agree that we remain true to our original charge from President Truman, to provide exceptional service in the national interest.



## Our Mission



The national laboratories of the Department of Energy's National Nuclear Security Administration have a core mission of nuclear weapons. This unique, demanding mission is central to U.S. national security and obliges that the laboratories be second-to-none in science and engineering. Because of these distinctive capabilities sustained for the nuclear weapons mission, other federal agencies depend on the labs to perform work for a wide spectrum of national security missions.

### SANDIA MISSIONS

- Modernizing the U.S. nuclear deterrent
- Accelerating innovation for the warfighter
- Protecting against the world's most dangerous events
- Securing America's energy and environmental future
- Trailblazing in scientific research

As a multidisciplinary national laboratory and Federally Funded Research and Development Center (FFRDC), Sandia accomplishes tasks that are integral to the mission and operation of our sponsoring agencies by

- anticipating and resolving emerging national security challenges;
- innovating and discovering new technologies to strengthen the nation's technological superiority;
- creating value through products and services that solve important national security challenges;

- cultivating strategic partnerships to educate and build advocacy for our national security missions; and
- informing the national debate where technology policy is critical to preserving security and freedom throughout the world.

As a FFRDC for the National Nuclear Security Administration, we have a long-term relationship with our sponsor. This creates an environment that supports maintenance of our fields of expertise, enables us to maintain our objectivity and independence, and allows us to have a familiarity with our sponsor's mission. We bring the FFRDC culture to all our federal sponsors to provide long-term support, solutions to existing problems and emerging threats, and quick-response capabilities. As an objective, independent and trusted adviser we draw from our deep science and engineering bases to anticipate, innovate, create and inform the policy debate for decision makers.



# Sandia *Core Values*

Sandia has five core values, which are used to inform our daily decisions, shape our performance and enable us to achieve success as one lab with one national security mission.

- ***We serve the nation*** by responding to the requests of our customers and by anticipating our country's future needs. We complete our mission even in the face of challenges and ambiguity and seize every opportunity to "render exceptional service in the national interest."
- ***We deliver with excellence*** by meeting our commitments, hiring the best, working collaboratively and committing ourselves to continuous improvement to advance the frontiers of science, engineering and technology.
- ***We respect each other*** by cherishing the intellect, skills, diversity, flexibility and passion of our coworkers. We cultivate the development of all members of our workforce and commend their world-class accomplishments, which enable Sandia's mission.
- ***We act with integrity*** by living consistently within our principles, by telling the truth and complying with the law.
- ***We team for great results*** by sharing a common vision and by fostering an attitude of mutual respect with all our partners. We combine our talents to benefit each other and our customers, working to ensure that everyone gains from our collective achievements.



**Paul Hommert**  
*President and  
Laboratories Director*



**Kim Sawyer**  
*Deputy Laboratories  
Director and Executive VP for  
Mission Support*

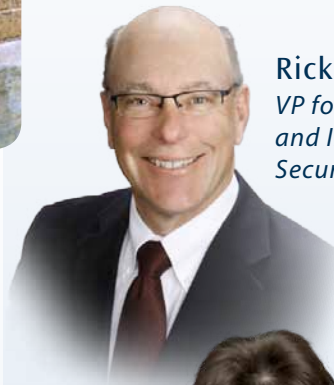


**Jerry McDowell**  
*Deputy Laboratories Director  
and Executive VP for National  
Security Programs*





*We combine our talents to benefit each other and our customers, working to ensure that everyone gains from our collective achievements.*



**Rick Stulen**  
*VP for Energy, Climate and Infrastructure Security*



**Jeffrey A. Isaacson**  
*VP for Defense Systems and Assessments*



**Bonnie Apodaca**  
*CFO and VP for Business Operations*



**Bruce Walker**  
*Chief Engineer and VP for Weapons Engineering and Product Realization*



**Michael Vahle**  
*CIO and VP for Information Technology Services*



**Jill Hruby**  
*VP for International, Homeland and Nuclear Security*



**Pamela D. Hansen Hargan**  
*VP for Human Resources and Communications*



**Michael Hazen**  
*VP for Infrastructure Operations*



**Becky Krauss**  
*VP for Legal and Corporate Secretary*



**J. Stephen Rottler**  
*CTO and VP for Science and Technology*

# *Anticipate* and solve the nation's most challenging national security problems.

Rendering “exceptional service in the national interest” has been Sandia’s core purpose since 1949. The Labs’ original mission, to provide engineering design, systems engineering and integration for the non-nuclear components of the nation’s nuclear weapons, continues today.

The nuclear weapons mission creates a foundation from which we leverage our capabilities and provide support to address other national security challenges.

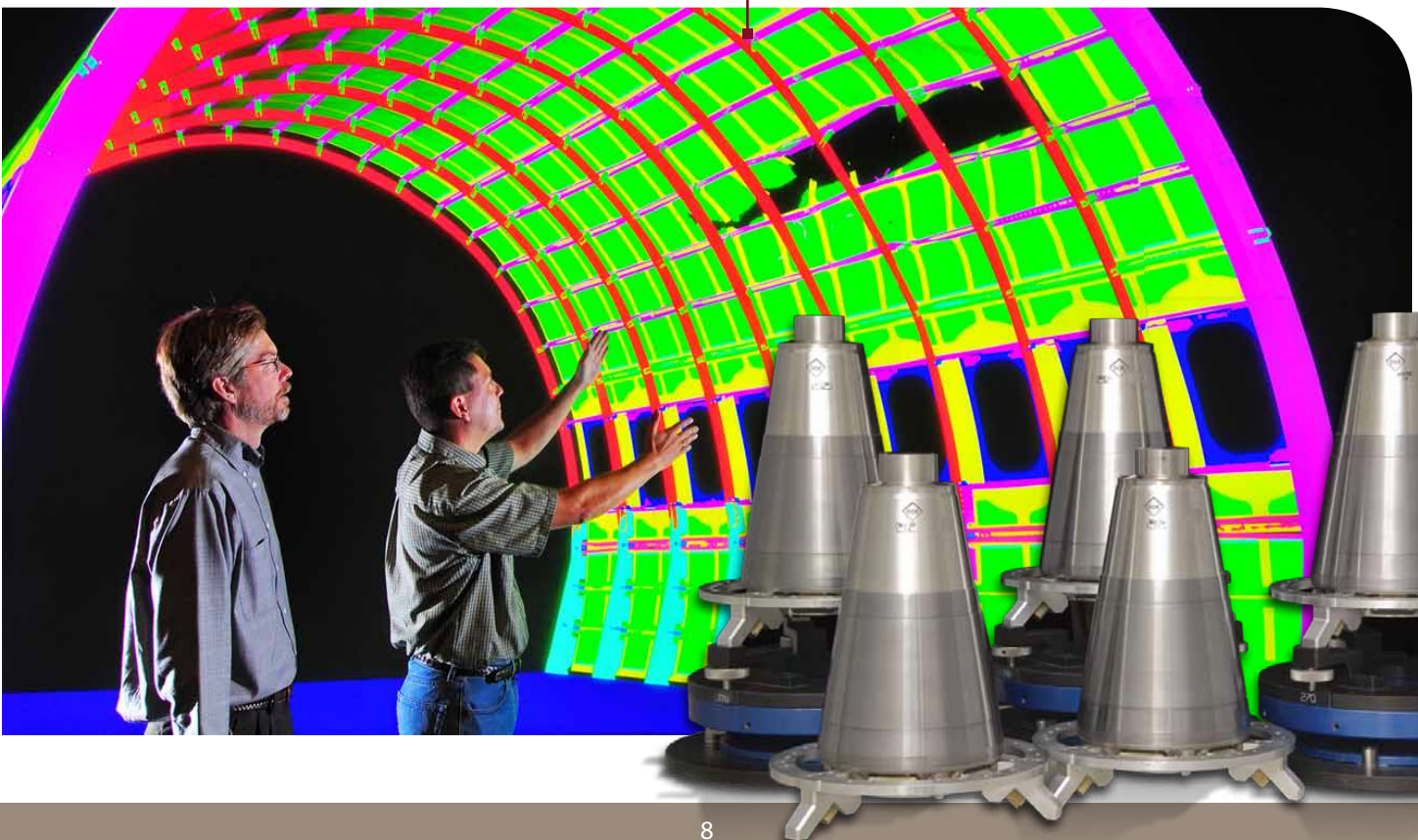
*On behalf of our nation, we anticipate and solve the most challenging problems that threaten security in the 21st century.*

When we achieve this vision, we are widely recognized as a national leader in preventing technological surprise, anticipating threats and providing innovative, science-based system engineering solutions to our nation’s most challenging national security problems.

*Our unique mission responsibilities in the nuclear weapons program create a foundation from which we leverage capabilities that enable us to solve complex national security problems.*

The excitement and importance of our work, our exemplary work environment, our partnerships with academia, industry, government and other partners and our record of historic contributions help us attract exceptional staff. Our employees are recognized by their professional peers for their outstanding contributions, and our Laboratories are managed in a way that inspires confidence.

Sandia researchers, leveraging computer modeling and simulation capabilities developed as part of the Labs’ nuclear weapons mission, are now using the same tools to anticipate and solve a wide range of challenges of urgent national concern. Here, researchers use Sandia’s Visualization Lab to examine the results of a computer simulation that models the effects of an explosion on an aircraft fuselage.





# Diversity and inclusion

“Inclusion is a conscious choice  
— it is Sandia’s choice.”

Diversity and inclusion are among Sandia’s core values. We are committed to attracting, retaining and developing the workforce needed for a 21st century national security mission. Our people are our most important asset, and we value and treat our employees with respect and dignity. Each individual is one small part of a learning, inclusive and engaging environment in which everyone matters. We bring our diverse talents to bear on our collective achievements, which benefit us and our customers alike.

Sandia’s commitment to diversity and inclusion and its culture of rendering exceptional service extends to the community that has been our home for more than 60 years. In the photo here, Sandia staff member Pam Losinski, left, joins Corporate Diversity and Inclusion Senior Manager Esther Hernandez, center, and Diversity and Inclusion Projects Lead Marie Capitan, in preparing food baskets for Albuquerque’s Roadrunner Food Bank.



Honoring a debt to the nation’s service members and veterans has long been part of Sandia’s culture. Sandia takes seriously its responsibility to provide a supportive environment for veterans and for National Guard and Reserve members. Pictured here is Cheston Bailon, the first hire under the Labs’ Wounded Warrior Career Program, which offers a variety of work options to combat-injured veterans.



Our unique work requires the collective minds of the nation’s top scientists, engineers and support staff. Each year, Sandians are recognized for developing a range of breakthrough technologies with commercial applications of global importance.



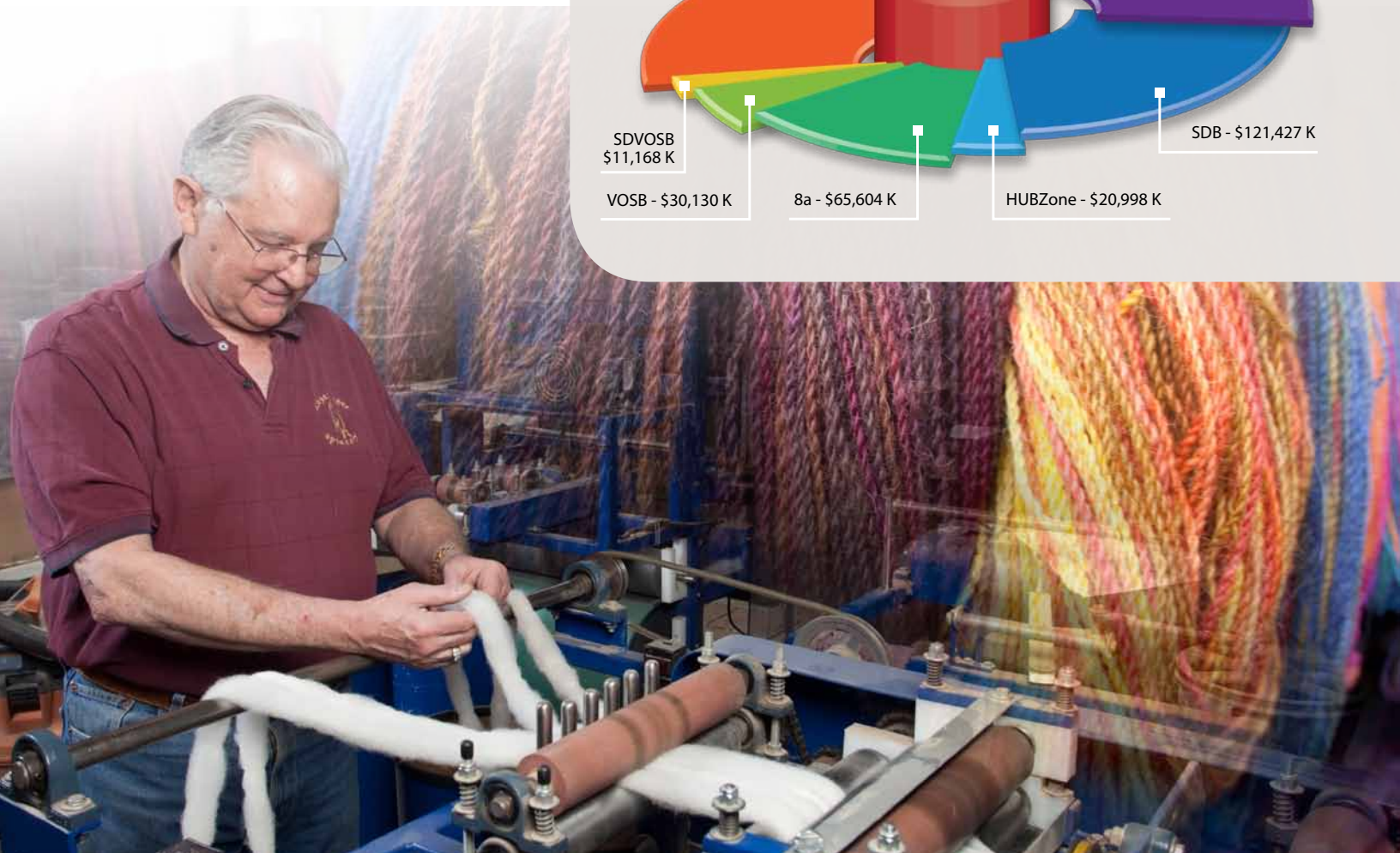
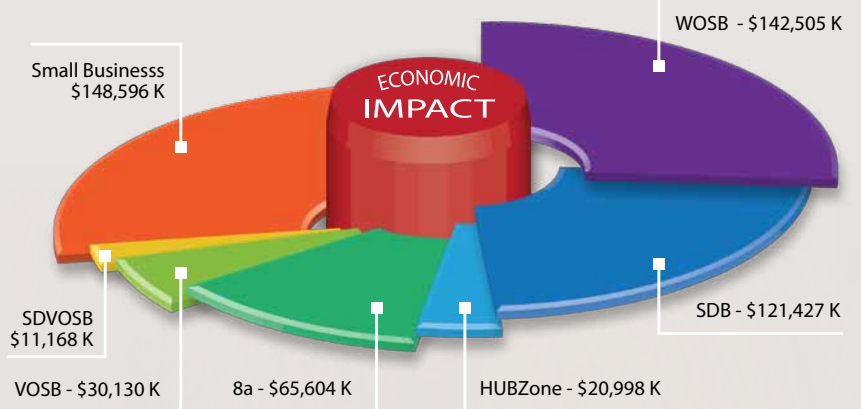
# Economic Impact

## Sandia's total contract-related small business expenditures for fiscal year 2011:

Sandia spent close to \$1 billion overall on the procurement of goods and services in fiscal year 2011, and small businesses across the nation were awarded more than half those dollars, \$540 million or 59 percent. In fiscal year 2011, companies secured nearly \$400 million in business with Sandia in New Mexico and nearly \$135 million in California.

Sandia reaches out to local businesses through a variety of programs. It holds public forums with the supplier community and civic leaders to discuss contracting opportunities, and lists contracts on its [Business Opportunities](#) website. It supplies small and diverse business owners with information on doing business with Sandia and seeks qualified potential suppliers.

	TOTAL
<b>TOTAL SMALL BUSINESSES</b>	<b>\$540,428,000</b>
Woman-owned small businesses (WOSB)	\$142,505,000
Small disadvantaged businesses (SDB)	\$121,427,000
Businesses in impoverished areas (HUBZone)	\$20,998,000
Businesses owned or co-owned by socially and economically disadvantaged person 8(a)	\$65,604,000
Veteran-owned small businesses (VOSB)	\$30,130,000
Service-disabled, veteran-owned small businesses (SDVOSB)	\$11,168,000
Non-minority, non-woman, non-veteran owned small businesses	\$148,596,000





Sandia saves taxpayers tens of millions of dollars each year through strategic efforts to identify and implement a broad range of efficiencies.

The Labs' cost-saving approach includes consolidating functions, services or capabilities; soundly managing benefit programs; using modern IT tools to streamline operations and reduce labor costs; and streamlining the buying and delivery of products and services.

Sandia is firmly committed to applying best business practices to daily operations system-wide, and continuously seeks new efficiency avenues. The Labs have targeted another 40 areas of potential cost efficiencies, including implementing greater standardization; space management; printers, copiers and data centers; office supplies; and training and records management.

## Here are some examples of Sandia's recent efficiency strategies and successes:



**HEALTH:** A consumer-driven plan, in which employees take an active role in staying healthy, has helped lower Sandia's health-care costs while ensuring employees

receive affordable, quality care. As the cost of health care rose nationally, Sandia's costs actually declined in FY09, FY10 and FY11 despite an increase in the number of employees enrolled. The savings were a result of a benefit plan redesign and employees being more engaged in healthy lifestyles.



**RETIREMENT:** Sandia has honored all the commitments it has made to its employees while going through an innovative redesign of its benefits

programs to ensure that our pensions will be viable into the future.



**TRAVEL:** Changes to travel policy are lowering costs substantially by consolidating meetings, considering meeting methods that don't require

travel, sharing ground transportation, increasing the number of tickets purchased in advance and booking tickets online.



**PROCUREMENT:** Buyers with Sandia's Supply Chain Management Center save millions of dollars annually on about \$1 billion in total purchase orders through

negotiated price reductions, such as volume discounts. The center's procurement systems save an additional millions of dollars every year through reduced administrative costs.



**ENERGY:** Sandia's Facilities Center saves the Laboratories money every year by reducing energy consumption in buildings. During the past six years,

the Labs have lowered energy use by about 30 billion BTUs annually, or the amount of energy used in 300 households. Energy efficiency has been upgraded through conservation and sophisticated controls on lighting, air flow, heating and cooling.



**RECYCLE:** Each year, Sandia recycles more and throws away less. The Labs recycle scrap metal, cardboard, paper, electronics, wood, plastics, concrete and

asphalt. Some of the recycled material is re-used at Sandia while much is sold to vendors. Waste reduction also saves on landfill fees. Together, throwing less away and recycling save the Labs hundreds of thousands of dollars annually.

# Modernizing

## THE U.S. NUCLEAR DETERRENT

As America's nuclear weapons systems engineering Laboratory, we weaponize the nuclear explosive package to create a militarily effective and logistically sustainable U.S. nuclear deterrent.

The nation's nuclear weapons meet the highest reliability requirements: They must always work when needed and authorized. They must meet equally stringent safety and security requirements: They must never detonate when not authorized. Nuclear weapons must survive extremely complex and often harsh environments. They must remain dormant for up to 30 years, yet be immediately available when they are on high alert/readiness levels.

The utmost confidence in the nuclear weapons enterprise is required for presidential command and control. These challenges require systems engineering underpinned by deep science along with demonstrated product delivery.

The foundation of Sandia's work is science-based engineering, in which fundamental science, computer models and unique experimental facilities come together so researchers can understand, predict and verify weapon systems performance.

### Sandia's role in stockpile assessment

Sandia is responsible for nuclear weapons systems and components over their entire lifecycle, from original design through final dismantlement and disposition. On Sept. 30, 2011, the Laboratories president submitted a letter to the secretaries of energy and defense and the chairman of the Nuclear Weapons Council certifying that every active stockpile weapon type remains safe and reliable and meets performance requirements. That assessment becomes a key part of the annual formal report to the president of the United States on the overall condition of the stockpile; however, concerns about the aging stockpile were noted.



### B61 life extension program

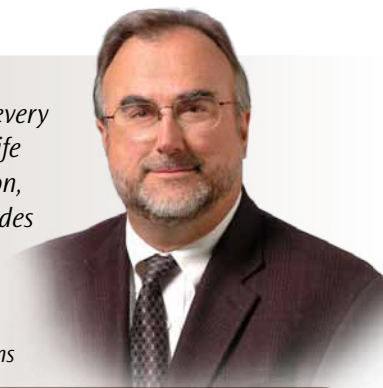
In 2009, President Barack Obama described his vision for the U.S. nuclear weapons stockpile in a speech in Prague, stating "...as long as these weapons exist, the United States will maintain a safe, secure and effective arsenal to deter any adversary, and guarantee that defense to our allies..." This vision was further elaborated in the 2010 Nuclear Posture Review and led to the ratification of the Strategic Arms Reduction Treaty with Russia, or New START. This treaty solidifies the nation's commitment to a smaller nuclear arsenal, which increases the importance of an effective deterrent.

A key element of the U.S. strategy is a set of Life Extension Programs for key nuclear weapon systems in the stockpile, including the B61 nuclear bomb. Sandia is the lead system architect for this highly complex weapon development program. In 2011, Sandia completed the detailed weapon system design and cost estimate and received the Nuclear Weapons Council's authorization to proceed with the next engineering development phase of the program.

*"Sandia's role is central in stewardship the U.S. nuclear deterrent over the life cycle of every weapon system, to ensure confidence in their safety, security and effectiveness. These life cycle responsibilities range from early exploratory concepts through design, qualification, deployment and ultimately, dismantlement and disposition. Over the coming two decades our focus will be on delivering a modernized nuclear deterrent for 21st century threats through life extension programs."*

— **Jerry McDowell**

Deputy Laboratories Director & Executive VP for National Security Programs







An F-15 releases a B61 Joint Test Assembly over the Tonopah Test Range in Nevada as part of the DoD/DOE Joint Flight Test program.



David York, left, shows fellow Sandia employee John Reynolds a simulation program designed to track illicit trade in fissile and nonfissile radiological material well enough to predict who is building the next nuclear weapon and where they are doing it.



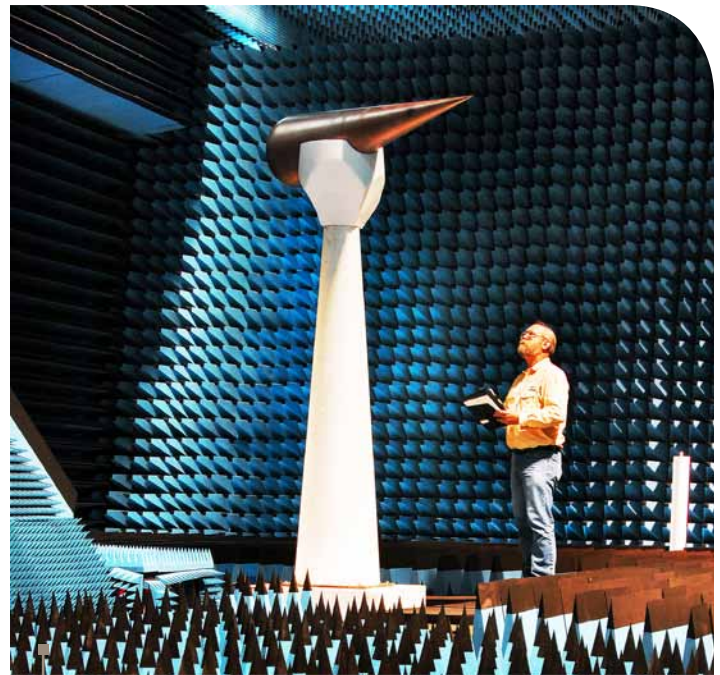
## Pulsed power sciences

Sandia is a world leader in the research, development and application of pulsed power science and technology. Through our unique experimental capabilities, Sandia measured, for the first time, key material properties of plutonium and uranium under extreme pressure conditions. These data are being used by the nuclear physics lab community to strengthen our understanding of nuclear explosives performance and provide confidence in nuclear weapon certification without the use of underground nuclear testing.

## Weapons safety and security

Nuclear weapons surety, with an emphasis on safety and security, is a key mission for Sandia, which applies science-based principles to underpin the design of the safety subsystems that prevent energy from unintentionally reaching the nuclear explosives components.

Weapons security relies on denying adversaries access to the weapon and its internal features so that nuclear detonation cannot be achieved. Sandia applies nuclear weapons design principles to achieve assured security in all situations, regardless of changes in the threat environment. Sandia's security role works in concert with the formidable physical security systems provided by the military and the National Nuclear Security Administration to deter adversaries.



A Sandia researcher examines a test object mounted inside an anechoic chamber. The chamber is part of Sandia's Facility for Antenna and RCS Measurement (FARM) where measurements of antenna characteristics and radar cross sections of materials, shapes and devices are performed. FARM contributes to programs for a variety of Sandia, DOE, military and government agency customers.





# Accelerating

## INNOVATION FOR THE WARFIGHTER

Sandia's Defense System and Assessments work supports the warfighter by accelerating the development of innovative systems, sensors and technologies for the national security community. The research and development performed in the effort to rapidly mature technologies for real-world applications is driven by four cross-cutting initiatives: integrated domain awareness and precision response; space; cyber; and technology surprise. Sandia's accomplishments in these areas are numerous, but among them are these noteworthy successes.

### Advanced Hypersonic Weapon test flight

In the early hours of the morning on Nov. 17, 2011, Sandia conducted a highly successful first test flight of the Advanced Hypersonic Weapon (AHW) concept for the U.S. Army Space and Missile Defense Command. Designed to fly within the earth's atmosphere at hypersonic speed and long range, the first-of-its-kind glide vehicle launched from Sandia's Kauai Test Facility in Kauai, Hawaii, using a three-stage booster system developed at Sandia. The hypersonic glide vehicle, which was also designed and developed by Sandia, successfully flew at hypersonic speed to the planned impact location at the Reagan Test Site, U.S. Army Kwajalein Atoll. The test flight allowed researchers to collect data on hypersonic boost-glide technologies and test range performance for long-range atmospheric flight

with emphasis on aerodynamics; navigation, guidance and control; and thermal protection technologies. The Department of Defense is using AHW to develop and demonstrate technologies for Conventional Prompt Global Strike (CPGS), which would allow the military to deliver a conventional weapon strike anywhere in the world within one hour.

### Global burst detector launch

Sandia's Global Burst Detector payload, incorporating an enhanced sensor, rode into space July 16, 2011, as part of the second Boeing GPS IIF satellite launch. This new sensor will provide the U.S. Air Force with next-generation capabilities in precise positioning, navigation and timing services for the detection of nuclear blasts. The GPS IIF-2 joins 24 existing satellites in the GPS constellation and will improve accuracy and performance for all its users.

On July 16, 2011, the next-generation of satellite sensor systems designed to detect atmospheric and space nuclear detonations was launched on a Global Positioning System satellite. These systems are designed to significantly enhance the nation's ability to monitor nuclear treaty compliance over the entire planet.



*"Unprecedented levels of uncertainty domestically and globally demand unprecedented innovation and effort. From the threats of cyberwar and terrorism to the military challenges posed by emerging strategic competitors, the demands on Sandia for reliable solutions to our country's toughest technical challenges have never been greater."*

— **Jeffrey A. Isaacson**

*Vice President for Defense, Systems & Assessments*







Sandia's "Materials on the International Space Station Experiment" (MISSE-7) launched on space shuttle Atlantis in November 2009. After a two-day chase, Atlantis caught up with the International Space Station, where the MISSE-7 passive experiment containers — or PECs — were deployed on a mount point on the exterior of the orbital research facility. Sandia has been receiving data from this research payload ever since.



Sandia has been working in partnership with Boeing since the beginning of the IIF program, with Sandia personnel stationed at Boeing's Space and Intelligence Systems site in El Segundo, Calif.

## Atlantis' final flight

In 2003, NASA turned to Sandia for assistance after space shuttle Columbia's debris-damaged heat shield failed, causing the tragic accident that took the lives of all seven astronauts on board. In response, a Sandia team developed the laser dynamic range imager (LDRI), which generates 3-D images from two-dimensional video. The LDRI Orbiter Inspection System was attached to the shuttle's boom, and scans the heat shield to ensure that no part of it was damaged during launch or orbit. Without that sensor system and its ability to detect minute anomalies, the shuttle might have remained earthbound. Instead, the program completed its 135th mission this year and Sandians were present for each of the launches since the shuttle's return to flight in 2005. This same Sandia sensor technology will continue to support NASA's missions in the future.

## Better battlefield communications

The next generation of mobile computing devices will require advanced radio frequency filter and oscillator banks capable of covering multiple RF bands. These microsystems will perform RF filtering and frequency synthesis functions in wireless handsets, cell phones and other wireless devices, offering higher performance and frequency diversity in a smaller package and at a lower price than current technologies. Among these applications are tags that allow tracking and locating individuals or items.

The Sandia-developed miniature acoustic resonators uniquely fill this emerging need. This innovation was recognized with an R&D 100 Award as one of the most outstanding advances in applied technologies in 2011. An Iowa company, Rockwell Collins, has partnered with Sandia to achieve the next generation of microresonator filters and frequency references.





# Securing

## AMERICA'S ENERGY & ENVIRONMENTAL FUTURE

Sandia principal investigator Greg Nielson holds a solar cell test prototype with a microscale lens array fastened above it. Together, the cell and lens help create a concentrated photovoltaic unit. To see the minds behind Sandia's microsystems enabled photovoltaics, [watch their short story](#).

The term “energy security” gained prominence during the 2007 gasoline price spikes, raising Americans’ concerns about profits going to oil-exporting countries—many of whose interests do not coincide with ours. This economically painful experience reminded Americans of the urgent need to develop both reliable domestic energy production and a secure, robust infrastructure to support a variety of energy sources.

Achieving a sustainable future requires solutions to some difficult national-scale problems. Sandia Labs supports the nation’s security by developing sustainable, transformative approaches to today’s most challenging energy, climate and infrastructure problems by working toward presidential objectives.

- Reduce dependence on foreign oil
- Increase deployment of low-carbon stationary power generation
- Understand risks and enable mitigation of climate-change impacts
- Provide the foundation for a future global climate treaty
- Increase security and resiliency of the electrical grid and energy infrastructure
- Assure energy security for critical installations
- Strengthen the nation’s science and technology base in energy, climate, and infrastructure

Many of the nation’s top engineering, science and security experts are working within Sandia’s energy security mission to resolve these pressing issues. With recognized expertise in systems engineering and analysis, Sandia plays a critical role in coordinating national research and

implementation efforts. Sandia’s established reputation and achievements in science, technology and security reinforce our responsibility—and our obligation—to help lead this important national effort.

Our future depends on balancing our increasing need for plentiful, low-cost energy with an inherent responsibility to steward the natural environment and an obligation to defend the sovereignty of our nation and its resources.

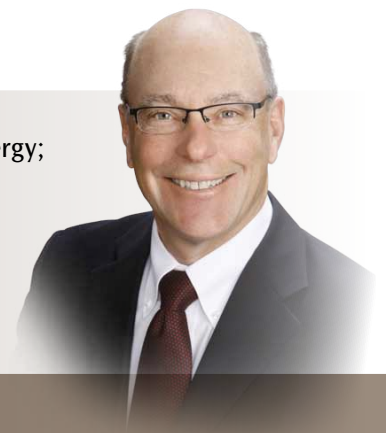
### Energy security

**Energy security research** at Sandia seeks to address key challenges facing our nation and the world. We work with the energy industry to improve current solutions and develop the next generation of technologies to extract or produce energy. We spearhead research into energy alternatives that will help the nation reduce its dependence on fossil fuels and to combat the effects of climate change. Sandia’s long history with **geothermal**, **solar** and **wind energy** research has grown and been supplemented recently with efforts in biologically based fuels: biomass from nonfood plant sources and algae—both of which can be grown on land unsuitable for farming. Sandia also maintains research into energy efficiency, a sure way to reduce consumption, through materials research to develop efficient lighting and power electronics and through combustion science to increase the fuel efficiency of vehicle engines.

“Sandia’s priorities are clear: to accelerate development of sustainable sources of energy; to be prepared for potential consequences of climate change; and to ensure a safe, secure and reliable energy delivery infrastructure. What we deliver in these areas will have a profound impact on the global economy and geopolitical stability.”

— **Rick Stulen**

*Vice President, Energy, Climate, and Infrastructure Security*





Bill Waugaman is the SPIDERS operational lead at Sandia National Laboratories. **SPIDERS, the Smart Power Infrastructure Demonstration for Energy Reliability and Security**, aims to create secure micro-grids on military installations.



## Climate security

National security requires not only military capability and infrastructure, but also stability and predictability in a host of other areas ranging from energy supply, communications and financial markets to the nation's preparedness for natural disasters and long-term changes in our environment, such as shifts in climate. Abundant scientific data point to Earth's present-day warming, and the nation must be prepared to deal with specific consequences of an evolving climate. The impacts may range from international instability, to the need for additional electricity for heating and cooling, to more frequent extreme weather events. Sandia's **Climate Security program** seeks to understand and address the impacts of climate change. Developing scientifically sound, reliable and economically reasonable mitigation technologies is central to our strategy for adapting to climate change.

## Infrastructure security

America's critical infrastructures provide the foundation for the nation's economic vitality, national security and high living standards. The systems, facilities and functions that comprise these infrastructures are sophisticated, complex and highly interdependent. They include physical, human and cyber assets and have evolved over time into economical and efficient systems. The increasing interconnections and complexity of these systems, subject to natural hazards and coupled with the new malicious threat environment, require a focus on interdependencies and the consequences they propagate.

Sandia's **Infrastructure Security program** supports the preparedness and protection of our nation and society by providing analyses of the technical, economic and national security implications of the loss or disruption of these critical infrastructures. It also develops technologies for infrastructure protection and infrastructure disruption mitigation, response and recovery options.

## Enabling capabilities

**Enabling capabilities** are activities designed to cut across Sandia's three problem-focused research and engineering programs in Energy Security, Climate Security and Infrastructure Security. Discovery Science and Engineering scientists and engineers pursue fundamental research that has applications in multiple program areas. The Regulatory and Policy activity interfaces between all three program areas, Laboratories management and national regulatory and policy bodies. This activity can either work with the policy/regulatory authority to understand how new technologies can meet energy/climate/infrastructure needs with some modification to the policy or regulatory structure, or work with researchers to modify the technology so it can still provide a workable solution with the modifications necessary to fit the existing regulatory/policy structure. The Systems Analysis activity looks from the top at project-team results and weaves them into coherent systems. Where two research areas may seem isolated, this activity—through a complex, adaptive, system-of-systems approach—seeks to forge meeting points between research efforts throughout the nation's energy/climate/infrastructure research enterprise.

Researcher Ron Pate with a vial of biomass and a vial of biomass-derived oil. Several projects at Sandia are examining renewable options for biofuel.



# Protecting AGAINST THE WORLD'S MOST DANGEROUS EVENTS

The national security environment poses high-level risks that are complex and changing at an ever-accelerating rate. Challenges exist in achieving international stability with existing and aspiring nuclear powers. Non-state adversaries have fundamentally changed our offensive and defensive postures, and rapid changes in the nature and availability of technologies provide tools that can have catastrophic consequences—including those that result from using chemical, biological, radiological and nuclear materials.

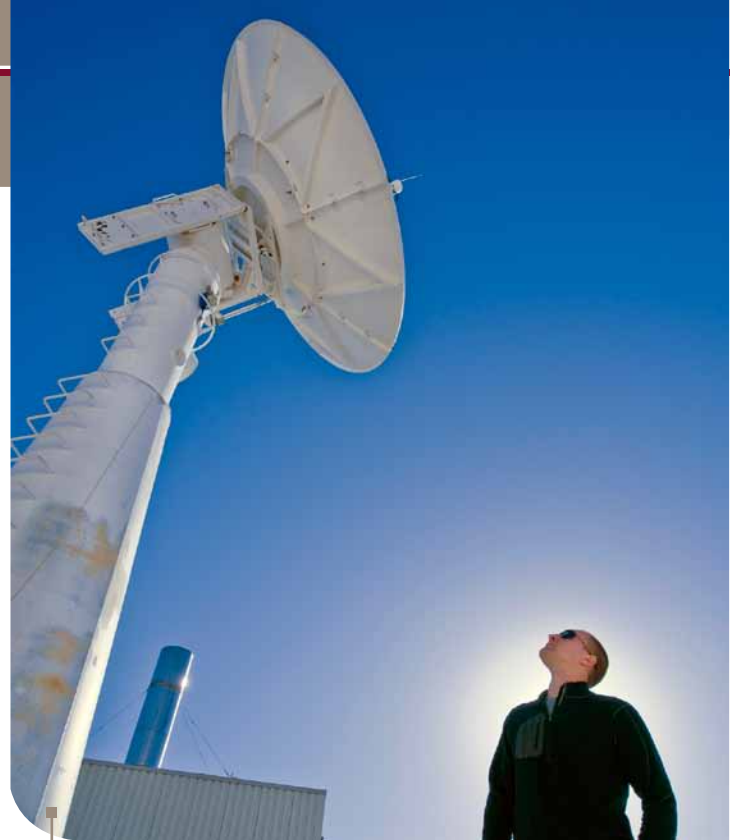
Large-scale natural disasters, global climate change, pandemics, economic crises, asymmetric resource demand and supply, changing geographic balances in populations and shifting global powers further add to our nation's overall risk. Our national welfare relies on a strongly interdependent global economy, where the effects of a major disruption at any point in the chain can result in large negative ripple effects. Thus deterring, preventing, absorbing and recovering gracefully from disruptions is key to ensuring a resistant and resilient nation. Further, the security goals of the domestic and international community, both public and private sector, are fundamentally intertwined. Therefore, developing a system of alliances and partnerships is a cornerstone principle upon which achieving our national security strategies are based.

The technical solutions Sandia develops to address national security must handle both the current security needs and adapt to and anticipate the changing security environment's next-generation risks. The solutions must also respond to our government's stewardship needs to gain efficiencies, work effectively across the entire national security enterprise, show sustained progress and value over the long term and demonstrate required levels of effectiveness for the tax dollars they spend.

"Sandia will remain a thought leader and solution provider in combating weapons of mass destruction, strengthening nonproliferation and arms control, protecting critical U.S. government assets and installations, supporting U.S. military mission assurance and reducing our nation's risk of terrorist threats and significant national incidents. Sandia seeks to achieve these objectives while maintaining and facilitating trade, travel and personal freedoms. Our impact will grow as we achieve these objectives—the nation demands no less of us."

— **Jill Hruby**

*Vice President, International, Homeland, and Nuclear Security*



A Sandia researcher stands under an antenna at the ground station at Sandia Labs. During a standard satellite ground contact, operators initiate software procedures that handle commands, configure the antenna control units and control the digital data recorder.

## Global security

Sandia's Global Security Program reduces proliferation and terrorism threats to U.S. national security through global technical engagement. We do this by securing vulnerable weapon of mass destruction (WMD)-usable nuclear material and detecting illicit nuclear-material trafficking at international border crossings including airports, seaports and other points of entry/exit. We provide technical support to U.S. government policymakers for arms control and international agreements. We develop sustainable bio-risk management technologies and create capacities to prevent misuse of biological and chemical materials. We protect at-risk WMD-usable nuclear and radiological materials from theft and sabotage. Sandia's work supports the National Nuclear Security Administration's (NNSA's) Office of Defense Nuclear Nonproliferation and the departments of State and Defense (Defense Threat Reduction Agency).







The Multispectral Thermal Imager satellite's data and imaging capabilities have proved useful to researchers studying the health of glacier ice, as well as the character of the permanent or seasonal ice pack in the Arctic or Antarctic, which can give climate scientists information they need to refine global climate models.

## Homeland impact

Sandia's Homeland Security Program aims to consistently and persistently reduce our nation's risk from terrorist threats and significant national incidents through technical leadership, unbiased expertise, mission-focused R&D and by delivering engineered solutions. We perform research and systems studies in major threat areas including nuclear, radiological, biological and explosives; create tools to support emergency-management training; conduct large-scale operations research and systems analysis for border security; test and evaluate technologies to be deployed in operational environments; perform trade-off analyses to support biological-detection acquisitions; and develop approaches to assess and improve resilience. Key sponsors for this work are the departments of Homeland Security and Health and Human Services.

## Homeland defense and force protection

Sandia's Homeland Defense and Force Protection Program provides technology and systems solutions to confront continuously changing threats at military bases—especially threats to nuclear weapons security from intruders and to base personnel from explosive, biological, chemical, radiological and nuclear devices. We design, develop, test and implement physical-security technologies and systems to protect nuclear weapons and other high-value assets, facilities and systems; create remediation capabilities to support chemical weapons demilitarization; create technologies to protect Department of Defense (DoD) personnel and operations from chemical and biological threats; and develop and apply innovative technologies to address emerging threats and respond to incidents and accidents impacting national security. Sandia's key partner for this program is the DoD.

## Protecting critical assets

Sandia's Critical Asset Protection Program aims to protect critical assets and infrastructure through systems analysis and design and developing and implementing effective technologies, systems and enterprise-level solutions and systems. We develop physical security standards, systems and technologies for nuclear-weapons materials and facilities; conduct specialized training to mitigate nuclear and explosive threats for warfighters and law enforcement; and assess technologies that evaluate airframe integrity. Sandia's program partners include NNSA, DoD and the Federal Aviation Administration.



Sandia's Ren Salerno, global expert on biological threat reduction, gestures before an enlarged illustration of molecules that have come to signify biological threats. Ren is championing efforts to gain greater recognition for Sandia's Countering Biological Threats programs, which provide the science, technology and technical policy solutions for confronting on a global scale the entire lifecycle of a biological threat.

# Trailblazing

## IN SCIENTIFIC RESEARCH

Sandia's core work demands science and engineering research of the highest order. The results translate into innovation and invention that support the Labs' national security mission and commitment to exceptional service and are recognized worldwide by academia, industry and government.

### Research Foundations: *Ensuring national security mission success*

Research considered vital to Sandia's mission success takes place in seven Research Foundations. Each represents a specific scientific area in which Sandia has a track record of excellence. The foundations achieve in the present and look to the future to adapt and evolve research to meet the needs of new generations.

Sandia's seven Research Foundations are Bioscience, Computing and Information Science, Engineering Science, Geoscience, Materials Science, Nanodevices and Microsystems, and Radiation Effects and High Energy Density Science. Each encompasses a wide range of disciplines, from life and physical sciences to microelectronics and information technology. And each works with academia and industry to accelerate innovation and ensure its work leads to entrepreneurship, economic opportunity and public benefit.

The Sandia Research Foundations produce a vibrant portfolio for mission accomplishment while advancing the frontiers of knowledge.

### **Bioscience**

The Bioscience Research Foundation is narrowly focused on developing tools to lessen two national security risks: biological threats and U.S. reliance on fossil fuels. Though seemingly disconnected from each other, both areas have similarities. For instance, platforms developed at Sandia to identify human pathogens can be set up to identify pathogens that cause algal pond crashes.

"The science and engineering breakthroughs made at Sandia produce results that fulfill our national security missions and enhance our quality of life. Sandia shares its technology through strategic partnerships with industry, academia and others. We extend our talent and ideas. And we push the frontiers of science and engineering for the U.S. public good."

— **J. Stephen Rottler**

*Chief Technology Officer and Vice President, Science & Technology*



Stefan Domino studies a rendering of a simulated jet fuel fire in a crosswind displayed at Sandia's Joint Computational Engineering Lab. The 400-million-variable simulation helped engineers prepare an experiment at Sandia's Thermal Test Complex.

Sandia's research into dangerous pathogens helps leaders better identify and understand agents that could put citizens, assets and armed forces in harm's way. It drives efforts to thwart attacks and outbreaks and to protect public health should a breach occur.

Biofuels research addresses serious national security and environmental problems by developing "drop-in" substitutes for gasoline, diesel and aviation fuels.

A foundation goal is to collect useful information about pathogens by defining and detecting indicators of infection in complex clinical samples. The strategy integrates advanced technology with a deep understanding of human health and immune response.





The results improve how public health officials address outbreaks of disease.

Biofuels researchers are working to unlock two powerful sources of energy: the plant biomass lignocellulose and algae. They aim to find efficient and economical methods to convert lignocellulose into fuels, understand factors that govern algal pond stability and identify molecular mechanisms that lead to increased lipid/fuel production.

The Bioscience Research Foundation brings to its tasks extensive scientific capabilities, equipment and facilities and Sandia's corporate strengths in nanosciences, high-performance computing, chemical imaging, microsystems and modeling and simulation of complex systems.

### ***Computing & Information Science***

Sandia's efforts to increase the speed of supercomputers and build more accurate predictive models of everything from nuclear weapons behavior to climate change pave the way to faster, more reliable delivery of the science and engineering results at the center of the Labs' national security work. The Computing and Information Science Research Foundation leads that challenge by advancing the state of the art in mathematics, computing and cybersecurity.

A foundation goal is to reduce space and power requirements for future supercomputing systems. Strategies include changing the nature of computing devices and their impact on computer architecture, software and algorithms and exploring low-power architecture and resilient hardware.

Researchers in computational engineering are advancing the math and science needed for predictive simulation, design optimization and quantifying margins and uncertainties. They are looking into new numerical methods and parallel algorithms to advance predictive modeling.

Cybersecurity work centers on shoring up U.S. cyber-defenses and providing a level of understanding that supports good decision-making by defenders. Researchers are developing graph and streaming algorithms and data analysis tools, taking into account human capabilities. A deeper understanding of the cybersecurity environment will guide U.S. decisions on how best to protect critical cyber assets.

The Computing and Information Science Research Foundation has world-class expertise in such areas as computational biology and mechanics, high-performance computing and algorithms and modeling, simulation and visualization. Its work is supported by Red Sky, a super-computer that provides extraordinary speed and power. And its resources and capabilities are leveraged throughout Sandia.



Sandia researcher Cy Fujimoto demonstrates his new flexible hydrocarbon polymer electrolyte membrane, which could be a key factor in realizing a hydrogen car.

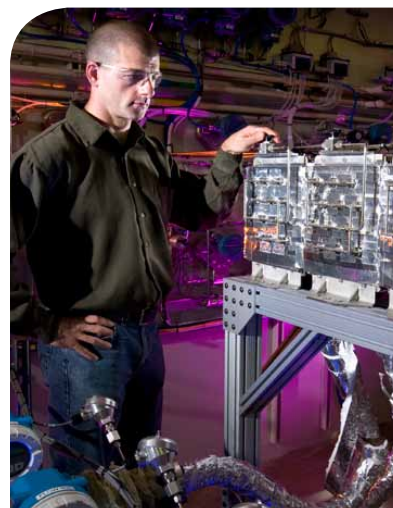
### ***Engineering Science***

The Engineering Science Research Foundation is revolutionizing and refining understanding of complex engineered systems. Theory development, experimental diagnostics, and computation and modeling improve systems and bolster national security.

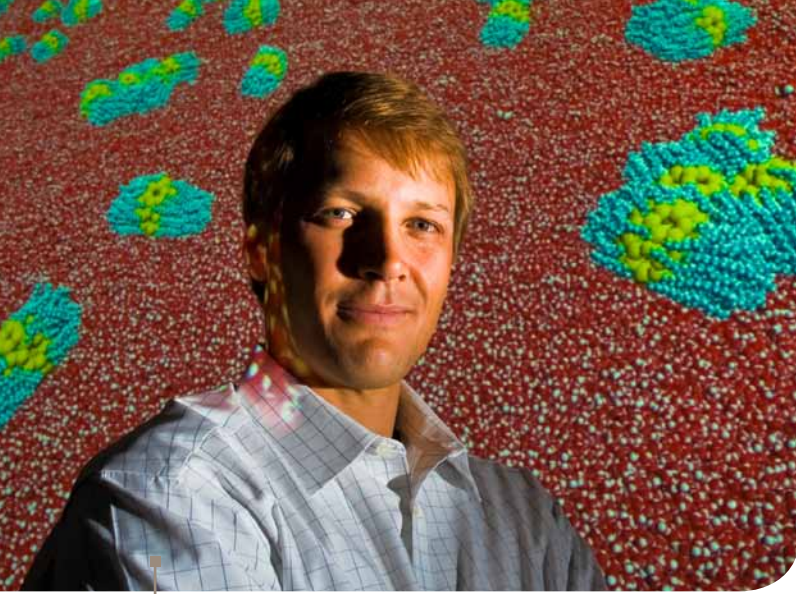
The foundation has a three-pronged approach to research. It works to increase the use and impact of computer simulation throughout the Labs. It delivers critical engineering analysis to meet design requirements. And it takes a national leadership role in advancing engineering sciences.

To do this, Sandia employs many strategies, such as addressing high-impact, coupled-physics simulations; integrating physical and computational simulation; and building partnerships with leaders in engineering sciences.

The Engineering Science Research Foundation fosters knowledge across multiple disciplines including solid mechanics, fluid mechanics, structural dynamics, thermal and combustion sciences, aerodynamics, shock physics and energetics and electromagnetic sciences.



It takes advantage of Sandia's large-scale test facilities, high-performance computing resources and sophisticated modeling, simulation and visualization capabilities. It leverages corporate expertise in material sciences, nanosciences and microsciences.



Matt Lane stands beside a large projection of a computer model depicting polymer-coated silica nanoparticles. Sandia researchers used molecular dynamics simulations to measure the forces between coated nanoparticles that were too small to measure experimentally. The observation of strongly asymmetric coatings led the team to further study the coating properties on very small particles.

## *Geoscience*

Engineered systems interact with Planet Earth in a variety of ways. The Geoscience Research Foundation focuses on those interactions and on earth and atmospheric sciences.

Sandia's knowledge of surface, subsurface and atmospheric properties helps solve problems in such areas as energy security, defense, intelligence, nuclear weapons, nonproliferation, disaster response and climate security.

Researchers advance understanding of the earth's subsurface by developing subsurface imaging at high resolution and reliability, detecting and characterizing underground formations and addressing such challenges as high-noise environments and instrumentation sensitivity and dynamic range.

A foundation goal is to improve how manmade systems intersect with the subsurface. Strategies include studying subsurface fluid flow, biological effects on geo-processes in the deep subsurface, and rapid, silent and environmentally friendly drilling systems.

Researchers also are working to reliably predict atmospheric and surface phenomena by developing exploratory tools such as climate models and geo-engineering instruments. They tackle cloud systems, sea and land ice models and monitoring of greenhouse gases. And they explore the effects of climate change on surface water and water chemistry.

The Geosciences Research Foundation has deep knowledge of energy production and carbon capture, and expertise in

geotechnical systems analysis and engineering. The research is supported by exceptional modeling, simulation and imaging capabilities and computational resources.

## *Materials Science*

The tiny realm of atomic-, nano- and micro-scale particles escapes the unaided eye. But that's where the Materials Science Research Foundation sets its sights, discovering phenomena and creating new classes of materials.

The research has major national significance; future security imperatives will depend on materials science breakthroughs. New materials will be vital to replacing obsolete technologies, meeting the latest system requirements and providing novel capabilities. As systems age, materials science will explain the chemical and physical mechanisms at work.

Sandia's research strengthens understanding and predictability of the structure, properties and behavior of existing materials by exploring a variety of size scales under a wide range of environmental conditions. It improves the function of critical systems by creating new materials with dramatically enhanced properties, functions and behaviors. And it develops diagnostic tools and techniques to reveal fundamental mechanisms and enable materials science research.

The Materials Science Research Foundation produces results by capitalizing on expertise in electronic and optical materials, thin films and coatings, nanostructures, ceramics synthesis and processing and catalysis and reaction processes. It taps into and informs the huge knowledge base that spans Sandia's science and engineering disciplines.

## *Nanodevices & Microsystems*

Microelectronic circuits have a long history of dramatically improving the performance of national security platforms. Adding microscale sensors, photonics and micro-electromechanical systems (MEMS) to the platforms spurs further improvements and a more robust national security profile.

The mission of the Nanodevices and Microsystems Research Foundation is to study physical phenomena across the nano- and micro-scales with critical national systems in mind. The foundation is creating more powerful microelectronics that are invulnerable to subversion, using new concepts, devices and diagnostic tools. It is developing advanced optoelectronics at the nano- and micro-scale, and improved, ultraportable sensor systems that detect chemical, biological, radiation, nuclear and explosives materials.



Sandia researchers have extensive expertise in material growth and process development for silicon and compounds, device and product design, advanced packaging technologies for 3-D integration and reliability and failure analysis.

Their work is bolstered by the Microsystems Engineering Sciences and Applications (MESA) Complex, a 400,000-square-foot suite of facilities designed to integrate the scientific, engineering and computational disciplines needed to produce robust microsystems. MESAFab fabrication sites provide custom integrated microsystem products and research and technology advancement for all areas of Sandia.

### ***Radiation Effects & High Energy Density Science***

Sandia's Radiation Effects and High Energy Density Science Research Foundation addresses the critical national concerns about nuclear security on many levels.

Radiation effects science ensures that engineered systems operate in harsh radiation environments. High-energy density science explores and strengthens concepts such as high-photon energy X-rays, intense X-ray environments for radiation physics and paths to high fusion yield. And pulsed-power science enables terawatt to petawatt systems that deliver electrical energy pulses that are flexible in shape and duration to a variety of loads.

Researchers are developing new radiation-resistant materials and technologies and creating technology to generate extreme radiation environments. They are advancing materials, switching, power flow and engineering to build reliable pulsed-power systems.

Sandia has state-of-the-art pulsed power and radiation effects research facilities. The research conducted in these facilities informs a variety of areas at Sandia. The Z Machine produces power soft X-rays and magnetic fields for high-density physics research in weapons science, materials science and energy. The Saturn X-ray source simulates the radiation effects of nuclear countermeasures on electronic and material components. The High-Energy Radiation Megavolt Electron Source (HERMES) III accelerator is the world's most powerful gamma simulator. The Annular Core Research Reactor (ACRR) handles reactor-driven laser experiments, space reactor fuels development, pulse reactor kinetics, reactor heat transfer and fluid flow, electronic component hardening and explosive component testing. And the Ion Beam Laboratory can generate ions of every element in nature to test the radiation sensitivity of integrated circuits.



Harry S. Truman Fellow Carlee Ashley introduces a buffer into a protocell solution to dilute it. Melding nanotechnology and medical research, Sandia, the University of New Mexico and the UNM Cancer Research and Treatment Center have produced an effective strategy that uses nanoparticles to blast cancerous cells with a mélange of killer drugs. In a parallel project, the method is also being used to counter biological threats.

### ***LDRD: Targeted investments to advance the frontiers***

The Laboratory Directed Research and Development Program stimulates creative, cutting-edge research and development and is a fertile proving ground for new ideas. LDRD sustains Sandia's scientific and technical vitality and strengthens its ability to meet future national security needs.

LDRD is the Labs' sole source of discretionary funding for high-risk, high-potential ideas. Although varying from year to year, LDRD investments total about \$166 million. LDRD funding supports R&D that may lack specific ties to ongoing program spending but which has broad potential application across all national security endeavors. That gives the program flexibility to quickly respond to new R&D needs and mission opportunities and to explore disruptive and revolutionary science.

Each year, Sandia's leaders define strategic investment areas critical to creating and maintaining expertise that will keep the Labs on the front lines of science and technology and help the nation move into the future.

# Community *Leadership*

## STRENGTHENING OUR COMMUNITIES

Sandia works to bring the same dedication and expertise to serving our local communities that we bring to solving the most challenging issues facing our country. Our commitment to our neighbors is part of our 60-year tradition and is an enduring part of our successful future.

### *Giving generously to our neighbors*

Sandia employees and retirees generously contribute more than \$4 million each year through the United Way of Central New Mexico and more than \$250,000 through the Tri-Valley Community Foundation in California.

For more than 50 years, the Shoes for Kids program has provided a new pair of shoes to 500 Albuquerque-area children each year. Other annual programs benefit local students by donating books and school supplies.

During the holidays, New Mexico employees enjoy providing gifts for more than 450 children living in foster care and contributing to our annual Roadrunner Food Bank drive and Take a Turkey to Work Day. California employees celebrate with the Holiday Spirit Campaign to distribute food to local food banks and provide gifts to nearly 500 needy families each year.

A unique giving program at Sandia is our on-site, weekly blood drives. These convenient drives facilitate the donation of more than 900 units of blood per year.

Lockheed Martin, on behalf of Sandia, invests more than \$1 million annually in our local communities. Lockheed Martin is committed to a program of philanthropy that invests in the quality of life in the communities where we work and live. Contributions include sponsorship of regional science fairs, math competitions, science and math teacher professional development, cultural programs, museum displays and support of employee volunteerism.

“As the Mission Support organization, it is important not only that we support the mission-critical work at Sandia, but also that we act as good citizens of our communities through our corporate giving. Sandians have a long tradition of extreme generosity and deep involvement in their home communities.”

— **Kim Sawyer**

*Deputy Laboratories Director & Executive VP for Mission Support*



“Employees at Sandia National Laboratories have been the backbone of the United Way of Central New Mexico annual fund drive since 1957,” says Kathleen Avila, chairwoman of the board for United Way of Central New Mexico. “We have relied on Sandia to provide many volunteers leaders in each of those years and they have consistently done so.”

### *Helping where we are needed*

Sandia National Laboratories' employees are passionate about volunteering. You'll find them judging science fairs, coaching sports teams, leading scout troops, sorting food, building houses and serving on boards of directors. In a typical year, Sandia employees and retirees log more than 120,000 hours of volunteer work. Nearly 300 employees each year receive the President's Volunteer Service Award for serving more than 100 volunteer hours annually.







The CSI: Dognapping workshop was developed by Sandia researchers to inspire 3rd through 5th graders to view themselves as “junior scientists” even before they enter middle school, where career decisions are often made. The workshop is also designed to give kids hands-on experience in fundamental concepts from the sciences — chemistry, mathematics, materials and engineering — that support nanoscience/microsystems initiatives. The fun CSI approach also affords kids a chance to interact with working scientists and engineers in a positive environment.

Each October, more than 200 employees join the community to complete projects at local non-profits as part of Make a Difference Day. Working together with a team of dedicated retirees, Sandia is proud to have completed more than 10 Habitat for Humanity homes for deserving families in the Albuquerque area. A special group of Sandia employees is dedicated to Project Linus, making hundreds of blankets for traumatized children and young adults.

## Inspiring *the next generation*

The declining number of American students who pursue science and engineering careers is a national concern. Encouraging students to pursue science, technology, engineering and math careers is the goal of Sandia’s education programs.

Our elementary school programs focus on providing inquiry-based activities that emphasize the fun of science and math.



Family Science Nights and Family Math Nights provide an evening of hands-on science or math activities for the entire family. Partnering with more than 70 schools in New Mexico and California, Sandia hosts more than 7,000 children and their families at local elementary schools for a night of learning, exploration and family fun.

Our middle and high school programs provide more in-depth science and engineering programs. Sandia’s outreach groups provide programs that encourage under-represented youth to explore science and engineering careers. Manos supports Hispanic students, Dream Catchers supports Native American students, Hands-On, Minds-On Technologies supports African American students and Expanding Your Horizons supports young women. The Department of Energy Science Bowls, New Mexico Hydrogen Fuel Cell Challenge and the Math and Science Awards for Young Women provide opportunities for students to compete and be recognized for their STEM achievements. The STAR Fellowship program provides an educational experience for selected high school students to participate in a summer project with a Sandia mentor.

Supporting science and math teachers is paramount to student success. Sandia sponsors a variety of professional development opportunities, including financial support for New Mexico teachers pursuing national board certification in science or math.

Sandian Aaron Brundage serves as a mentor and is on the Board of Directors of Big Brothers Big Sisters and helps to provide mentors to more than 1,400 children.



# Build a career at Sandia



## **YOU** can be the difference.

At Sandia National Laboratories we want people who share our dedication to Sandia's mission—serving the nation. Sandia offers many challenging and rewarding career opportunities for engineers, scientists, computer specialists, technologists, professional and administrative staff and students throughout our mission areas of defense, nonproliferation, energy and homeland security.

## Be a *Sandian*

Join a multidisciplinary team of stellar scientists, engineers and professionals and pursue fulfilling and challenging research at the leading edge of advanced technologies. You can be the difference.

[www.sandia.gov/careers](http://www.sandia.gov/careers)

## Our *Perks*

We model, support and reward healthy work-life behaviors and provide quality health services that enable employees to achieve their personal and professional best. We are committed to a learning, inclusive and engaging environment for our employees.

### CULTURE & VALUES

- Integrity
- Excellence
- Service to the Nation
- Our People
- Teamwork

### COMPENSATION

- Competitive base salary
- Non-base cash awards for significant achievements and performance

### CAREER & PROFESSIONAL DEVELOPMENT

- Educational assistance
- Internal training resources
- Leadership development programs
- Diversity network & resources

### COMMUNITY

- Volunteer opportunities
- Employee & corporate giving
- Education outreach

### EDUCATION

- Tuition assistance
- Masters Fellowship Program
- University part-time program
- Special masters program
- Doctoral study program

### WELLNESS PROGRAMS

- Onsite fitness center
- Smoking cessation program
- Nutrition services
- Online health resources
- Preventive healthcare screening programs

### RETIREMENT (401K)

- Employees contribute 2-25%
- Sandia match—2/3 of the first 6% of contributions
- Contributions vested immediately
- Sandia automatically contributes 6%, subject to 3-year vesting service requirement

### FLEXIBLE SCHEDULE

- 9/80 option (every other Friday off)
- Part-time
- Telecommuting
- Paid time off

### BE PART OF AN INCLUSIVE TEAM

- Employee diversity initiatives
- Diversity councils
- Awards & recognition
- Diversity events

### HEALTH

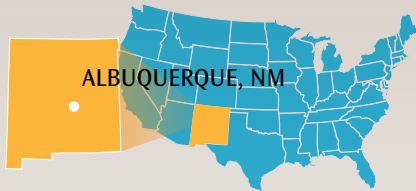
- Medical / dental / vision
- Same sex domestic partner benefits
- Onsite clinic
- Life / accident / disability insurance
- Healthcare and dependent care spending accounts
- Adoption assistance

\*These programs and benefits are offered at the discretion of Sandia and may be subject to modification or change at any time. June 2011



# Locations

Most of Sandia's 10,900 members of the workforce — regular employees, temporary employees and staff augmentation contractors — work at Sandia's headquarters location in Albuquerque, New Mexico, or at a second principal laboratory in Livermore, California. Others are scattered among dozens of sites in the U.S. and abroad, including in Washington, D.C.; Carlsbad, New Mexico; and Las Vegas and Tonopah, Nevada.



## The Great Southwest

New Mexico is known for its warm days and cool nights and its high desert landscape. The state offers high plateaus, numerous mountain ranges, hidden canyons, valleys, vast plains and desert lands.

- 278 annual days of sunshine
- Average temps between 78° and 40°
- Annual average rainfall, plus snowfall: 9.5 inches

The high-desert climate offers extraordinary scenery, mountain forests and colorful desert plants.



## ALBUQUERQUE, NEW MEXICO



Sandia/New Mexico is located in Albuquerque, a city immersed in the vibrant Southwest culture. The greatest strengths of the city are its diversity, its proximity to the great outdoors and year-round good weather. Outdoor enthusiasts take advantage of our sunny skies and go mountain biking, hiking and skiing, and take part in the world's largest hot air balloon festival.



## West Coast Life

California is located along the Pacific coast, which gives the state its diverse geographic regions and great climate. Livermore is close to mountains, forests, beaches and deserts, with recreational activities all year long.

- 260 annual days of sunshine
- Average temps between 73° and 46°
- Annual average rainfall: 14.8 inches

Livermore is located near the San Francisco Bay area, which is home to great attractions like Fisherman's Wharf, Chinatown, world-class theater, museums, restaurants, parks and the Golden Gate Bridge.



## LIVERMORE, CALIFORNIA



Sandia/California is uniquely situated at the edge of the San Francisco Bay area. Livermore enjoys close proximity to first-tier universities, Silicon Valley companies and other top research laboratories and facilities. Livermore is just a short drive from the beach, the mountains, the desert or wine country.

# PERSPECTIVES



## *Exceptional service in the national interest*

Sandia National Laboratories is a multiprogram laboratory operated and managed by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energy's National Nuclear Security Administration. With main facilities in Albuquerque, N.M., and Livermore, Calif., Sandia has major R&D responsibilities in national security, energy and environmental technologies, and economic competitiveness.

This year's Labs Accomplishments publication recognizes some of Sandia's best work during 2011.

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**Sandia National Laboratories**