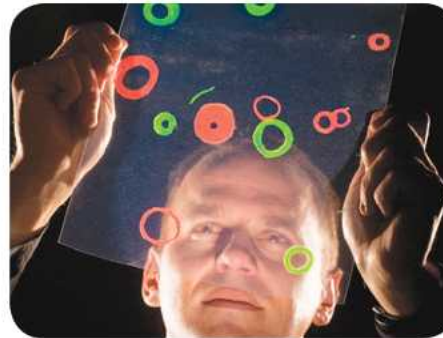


Exceptional service in the national interest



Sandia National Laboratories

J. Stephen Rottler, PhD

Vice President, California Laboratory

Vice President, Energy, Climate, & Infrastructure Security

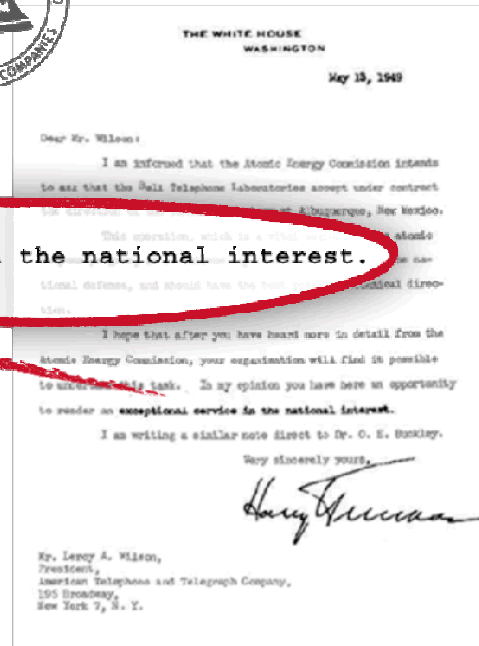
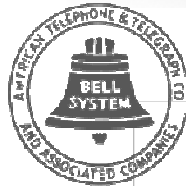
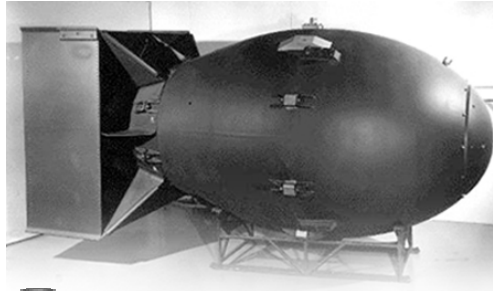


Sandia National Laboratories is a multi-program laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000. **SAND203-XXXXX**

Sandia's history



Jerrold Zacharias, c1945,
led the transfer of the Z Division
to SNL from LANL



Sandia's sites

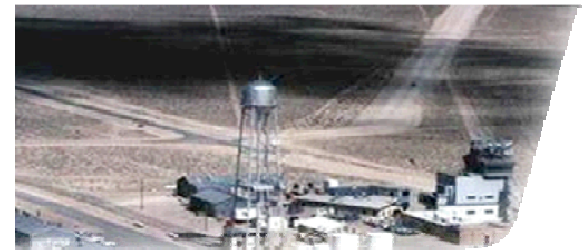
**Albuquerque,
New Mexico**



**Livermore,
California**



Tonopah, Nevada



**Waste Isolation Pilot Plant,
Carlsbad, New Mexico**



Pantex, Texas



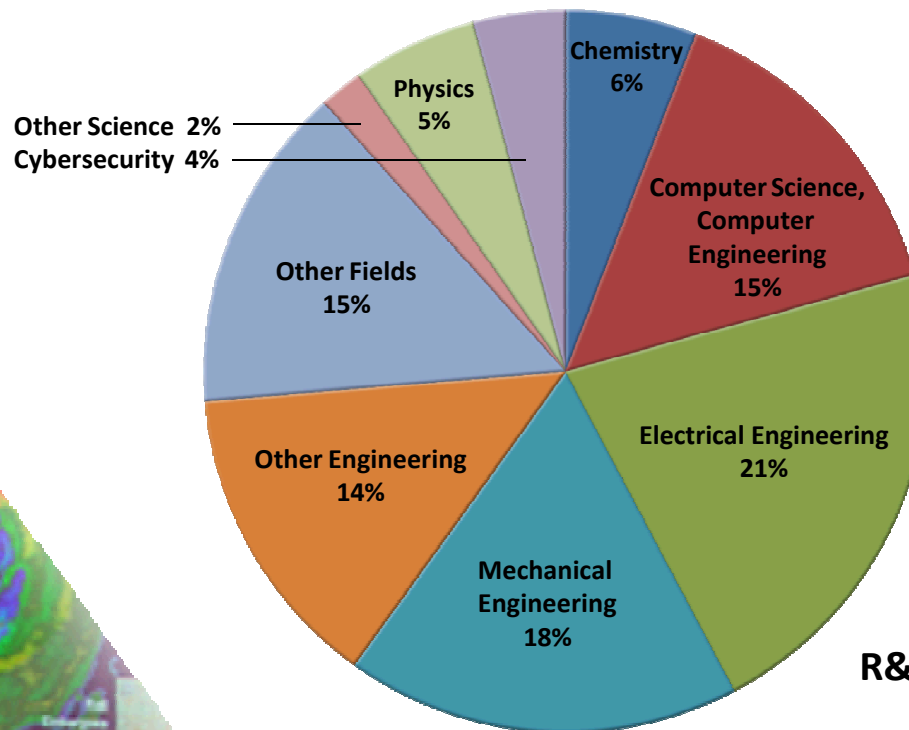
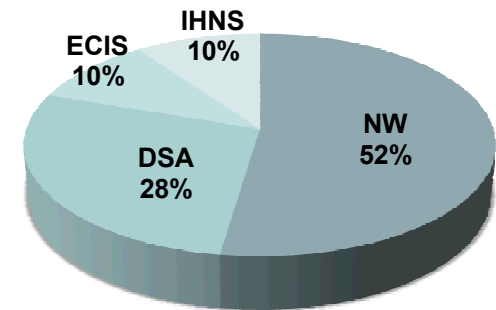
Sandia's people and programs

(As of November, 2013)

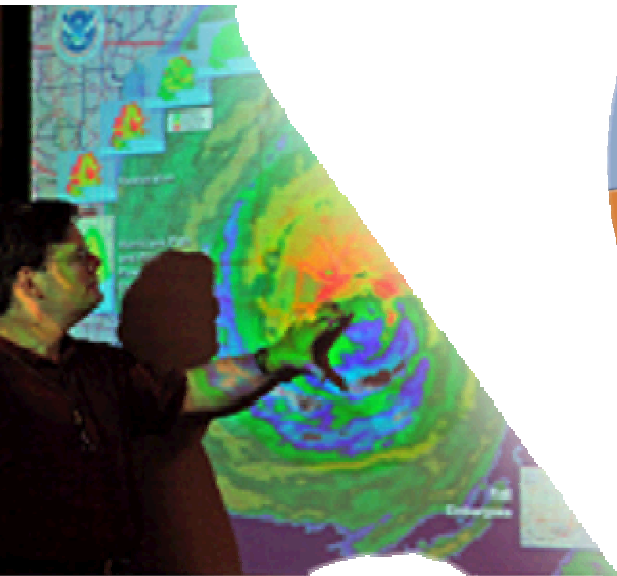
- On-site workforce: 12,002
- Regular employees: 9,841
- Advanced degrees: 5,327

FY13 Costing by SMU

Total FY13 Direct Costing = \$2.5B
(additional \$2.0B of indirect work)



R&D staff (4,961)
by discipline



Sandia's mission work reflects the Nation's security challenges

1950s

NW production engineering & manufacturing engineering

1960s

Development engineering

Vietnam conflict

1970s

Multiprogram laboratory

Energy crisis

1980s

Missile defense work

Cold War

1990s

Post-Cold War transition

Stockpile stewardship

2000s

Expanded national security role post 9/11

2010s

LEPs
New START
Evolving national security challenges

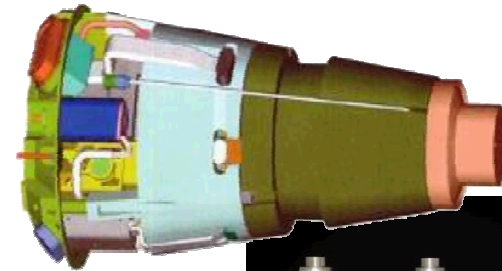
% NON-NW FUNDING

100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%

Nuclear Weapons



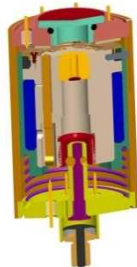
**Integrated,
Engineered Warhead
Systems**



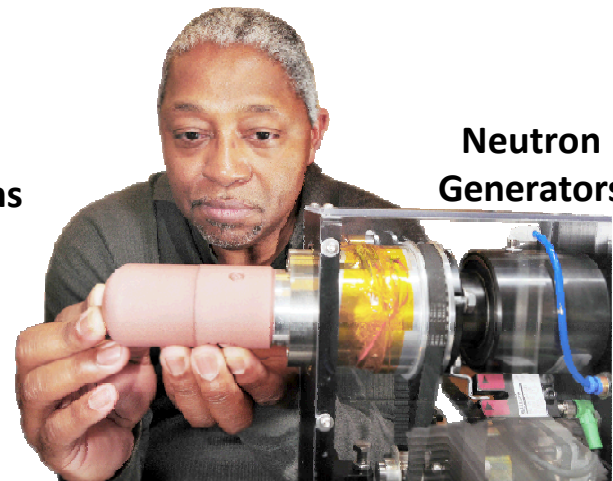
**Arming, Fuzing, and
Firing Systems**



Surety Systems



Gas Transfer Systems



**Neutron
Generators**

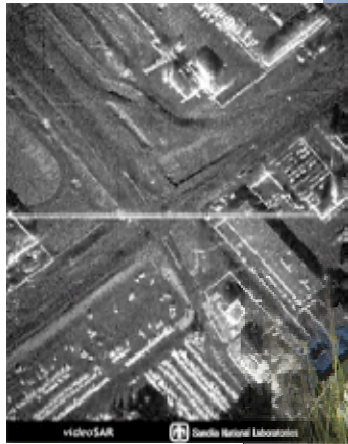
Sandia's core products for nuclear weapons
stockpile management

Defense Systems & Assessments (DSA)

Materials International Space
Station Experiment



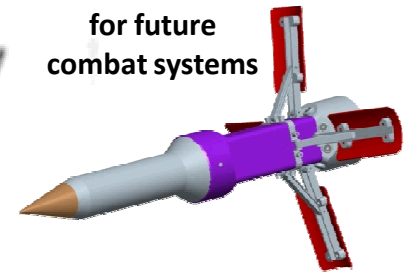
Real-time SAR images



Predator UAV with SAR



Ground sensors
for future
combat systems



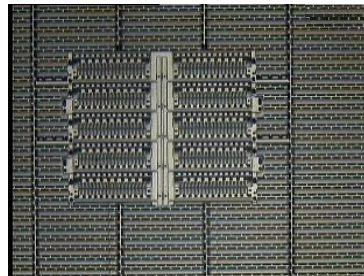
Target launch for
Ballistic Missile Defense



Small robotic
vehicle



MEMS louvers



Shuttle return
to flight



Energy, Climate, & Infrastructure (ECIS)

**Energy Supply, Energy Efficiency,
& Environmental Stewardship**

**Safe, Secure, Reliable Energy;
Water Supply & Infrastructure**



**Climate Change-
Mitigate and Adapt to
Changes**

International, Homeland, and Nuclear Security (IHNS)

Lab on a Chip



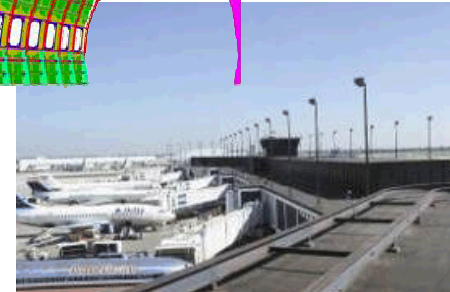
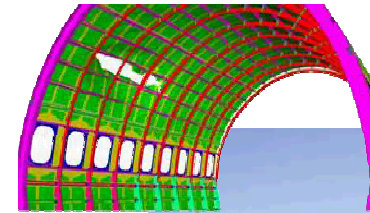
RSC Publishing | Point-of-care Microfluidic Diagnostics



Bio/Chemical Security



Border and Maritime security



Aviation and Explosives security

Emergency Response

Weapon Security



Nuclear/Radiological Threat Reduction

Physical Security

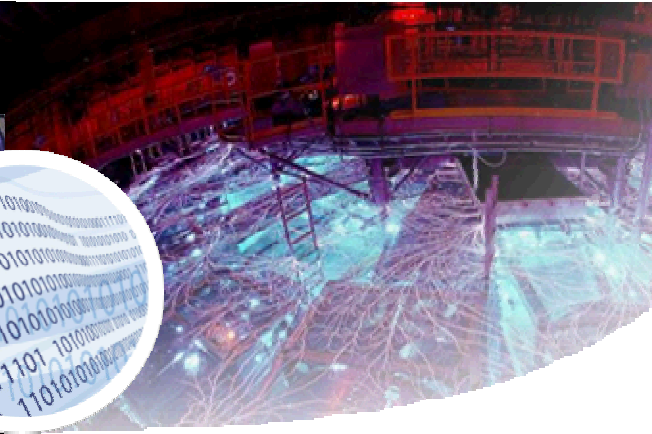


Strong Research Foundations enable mission performance

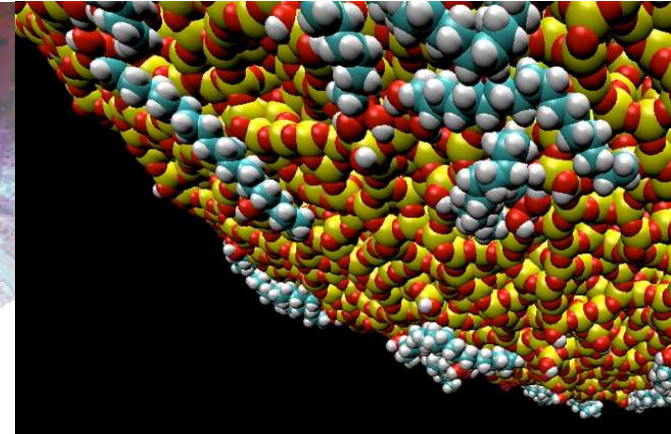
Computing Science



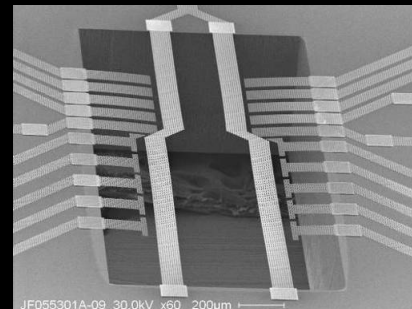
High Energy Density Physics



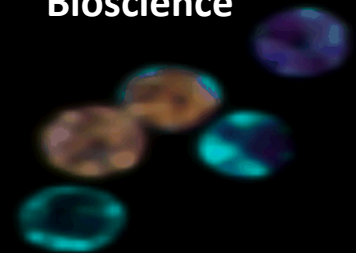
Materials



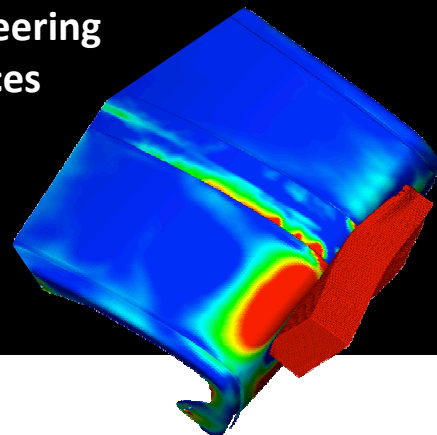
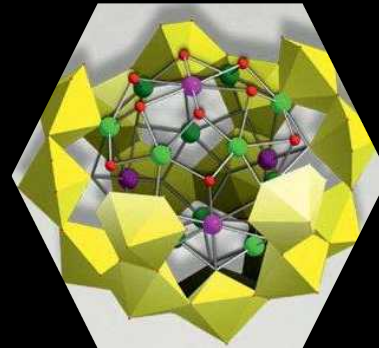
Microelectronics



Bioscience



Geoscience



Engineering Sciences

Advancing the frontiers for national security



Truman Fellow Carlee Ashley
and Sandia Fellow Jeff Brinker

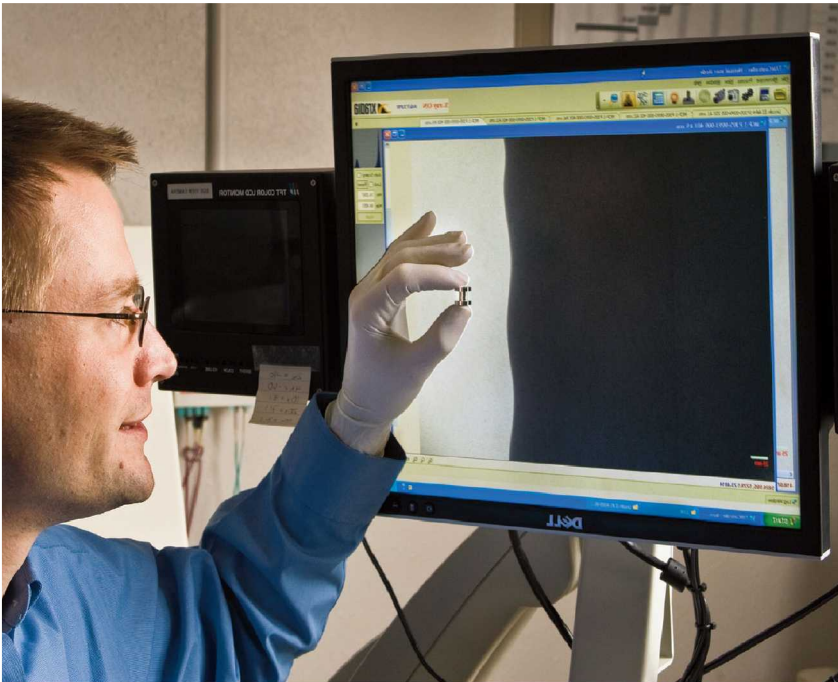
One-dose killing of cancer cells through targeted drug delivery

- By melding nanotechnology and medicine, research has produced an effective strategy to target a cancerous cell and deliver a mélange of killer drugs into it
- This new delivery system results in 106-fold higher therapeutic efficacy when compared with other state-of-the-art liposomal delivery systems
- These findings promise to mitigate the side effects of conventional chemotherapy

Advancing the frontiers for national security

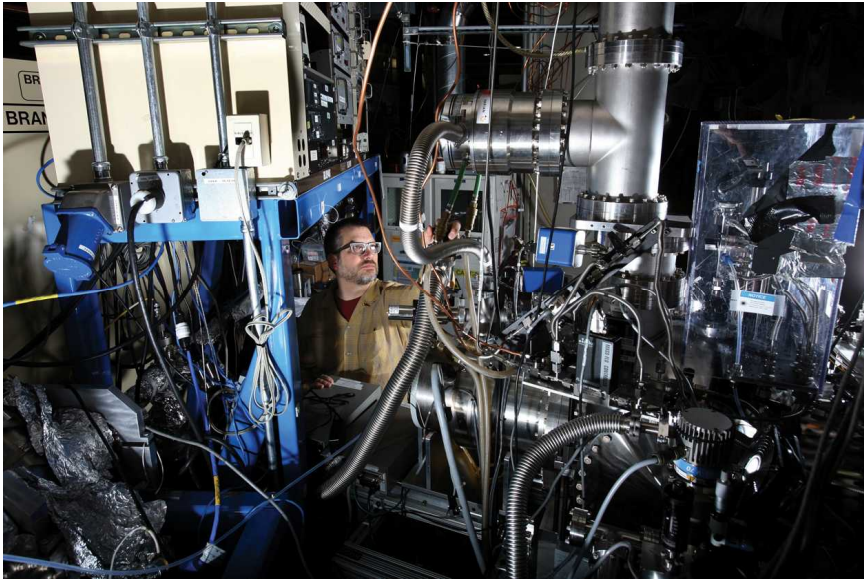
Measuring fundamental instabilities in magnetically driven Z-pinch explosions

- This research addresses the important but poorly understood phenomenon of Magneto-Rayleigh-Taylor (MRT) – the damaging instability in Z-pinch magnetic fields – and conditions that could mitigate the problem
- The results will significantly impact high energy density plasmas, inertial confinement fusion, and related fields



Dan Sinars

Advancing the frontiers for national security



Craig Taatjes

Tailoring biofuels to work with vehicles of today and tomorrow

- Biofuels being investigated are produced by a fungi that grow on cellulose and digest it, forming fuel-type hydrocarbons as a by product of their metabolic processes
- This material can be converted into compounds that are similar to those found in petroleum-derived fuels
- Combustion experts are working directly with biofuels researchers to understand from the start what will work best for existing and future internal combustion engines

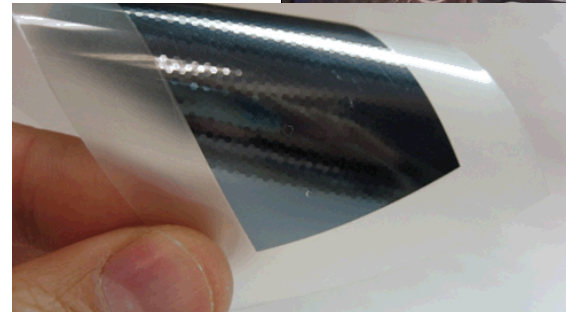
Advancing the frontiers for national security

Glitter-sized photovoltaic cells

- Tiny crystalline silicon photovoltaic cells 14 to 20 micrometers thick, 0.25 to 1 mm across
- Formed on silicon wafers, etched, and released in hexagonal shapes with electrical contacts prefabricated on each piece
- Achieved 15% efficiency for 14 micron thick silicon cell
- Goal is to perform at greater than 50% efficiency



Greg Nielson



If these challenges interest you...

- Focus on academic excellence
- Obtain an advanced degree
- Seek opportunities beyond the classroom to become more well-rounded
- Obtain internships or summer positions that will allow you to experience practice of engineering



Lessons I did not learn in college

- Leadership skills \neq management skills
- The power of good communication skills
- The importance of relationships
- The effectiveness of multi-disciplinary teaming
- The utility of a well-rounded education
- The necessity of continuous learning
- Excellence in engineering as an ethical imperative
- The satisfaction of investing in community activities



Closing remarks

- SNL has helped maintain an effective US nuclear deterrent for over 60 years
- We provide timely solutions to a vast array of national security problems
- We rely on world-class science and engineering, and the capability to develop product that meets rigid specifications
- A broad spectrum of technical talent is essential to meet national security challenges
- Sandia provides opportunities to change career fields and encourages continuing education

