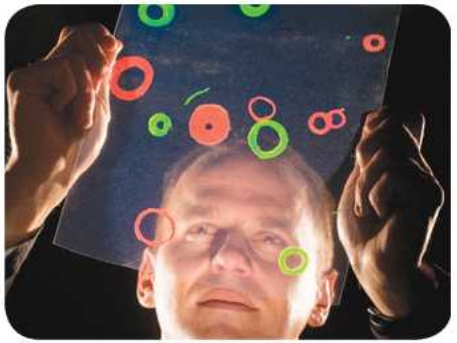
SAND2013-1967C

Exceptional service in the national interest

Sandia National Laboratories



Sandia National Laboratories

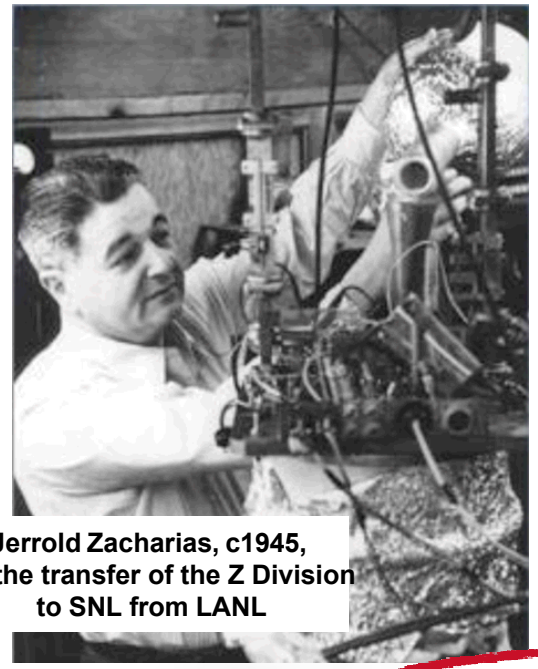
J. Stephen Rottler, PhD
Vice President of Division 8000, California Laboratory

U.S. DEPARTMENT OF ENERGY

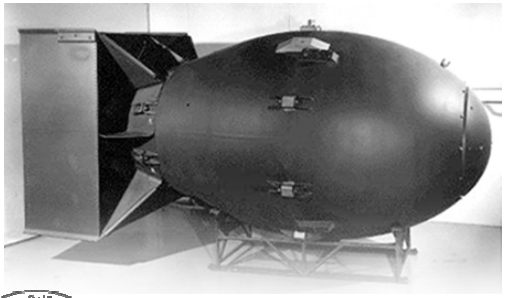
NNSA National Nuclear Security Administration

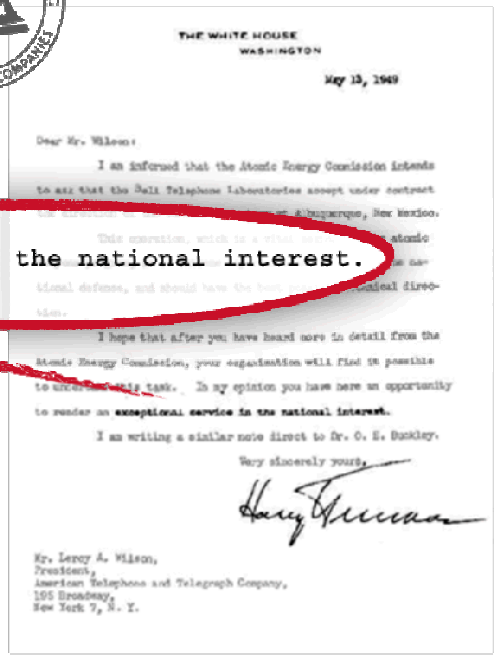
Sandia National Laboratories is a multi-program laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000. SAND#####-######

Sandia's History



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





THE WHITE HOUSE
WASHINGTON

May 13, 1949

Dear Mr. Wilson:

I am informed that the Atomic Energy Commission intends to ask that the Bell Telephone Laboratories accept under contract the direction of [illegible] at Albuquerque, New Mexico.

This operation, which is a vital [illegible] atomic [illegible] national defense, and should have the [illegible] Federal direction.

I hope that after you have heard more in detail from the Atomic Energy Commission, your organization will find it possible to undertake this task. In my opinion you have here an opportunity to render an **exceptional service in the national interest.**

I am writing a similar note direct to Mr. C. E. Buckley.

Very sincerely yours,

Harry Truman

Mr. Leroy A. Wilson,
President,
American Telephone and Telegraph Company,
195 Broadway,
New York 7, N. Y.

exceptional service in the national interest.

Sandia's Governance Structure

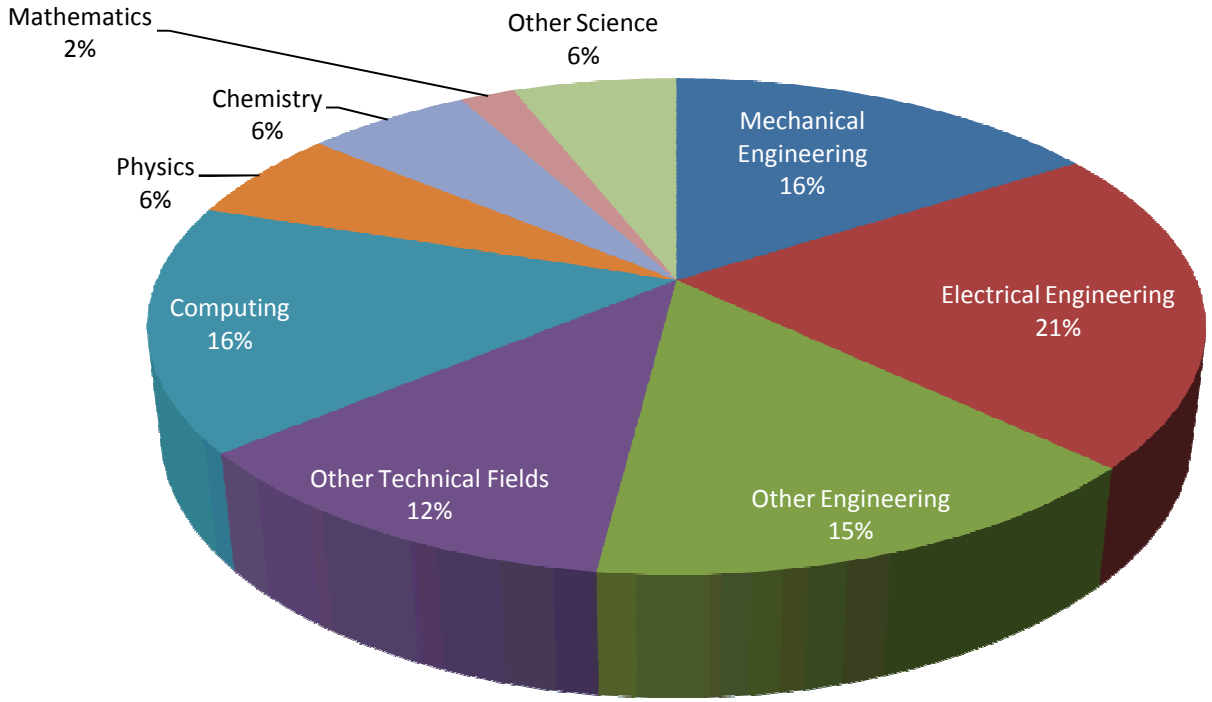
Government-Owned, Contractor-Operated

Sandia Corporation

- AT&T: 1949–1993
- Martin Marietta: 1993–1995
- Lockheed Martin: 1995–present
- Existing contract expires 9/30/12

Federally Funded
Research & Development Center

Sandia's Workforce

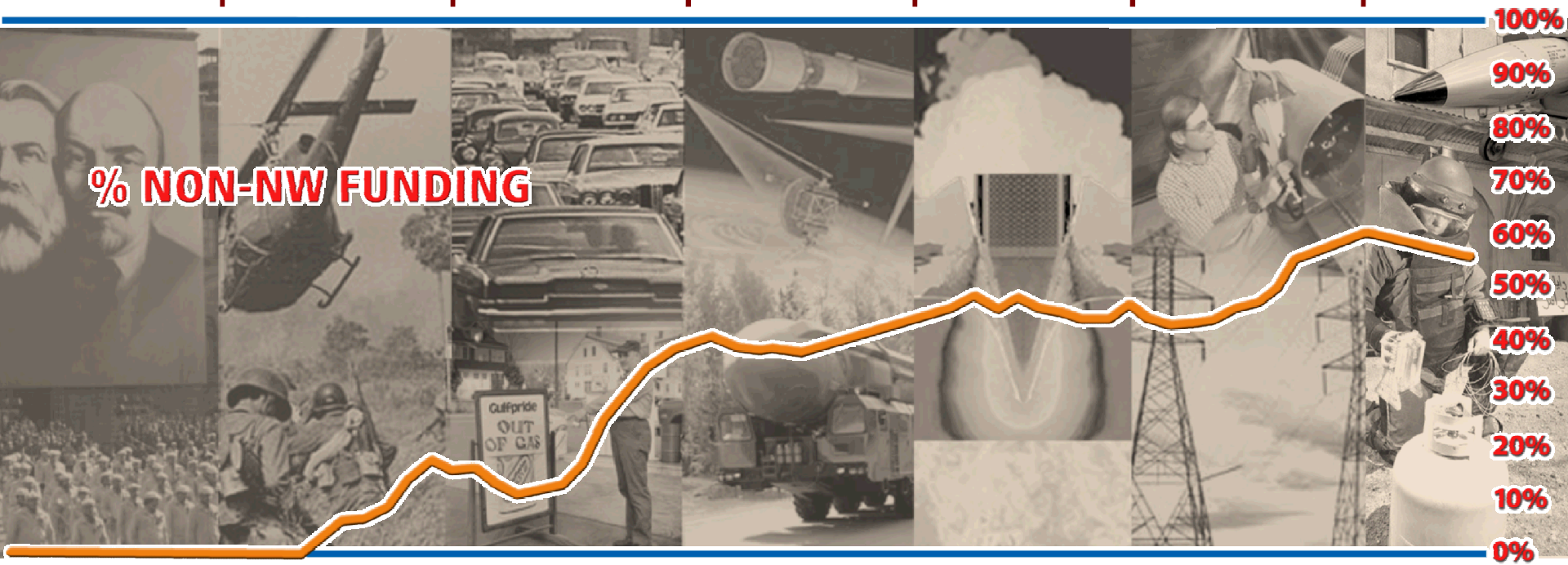


- **On-site workforce: 10,934**
- **Regular employees: 9166**
- **Technical Staff: 4522**

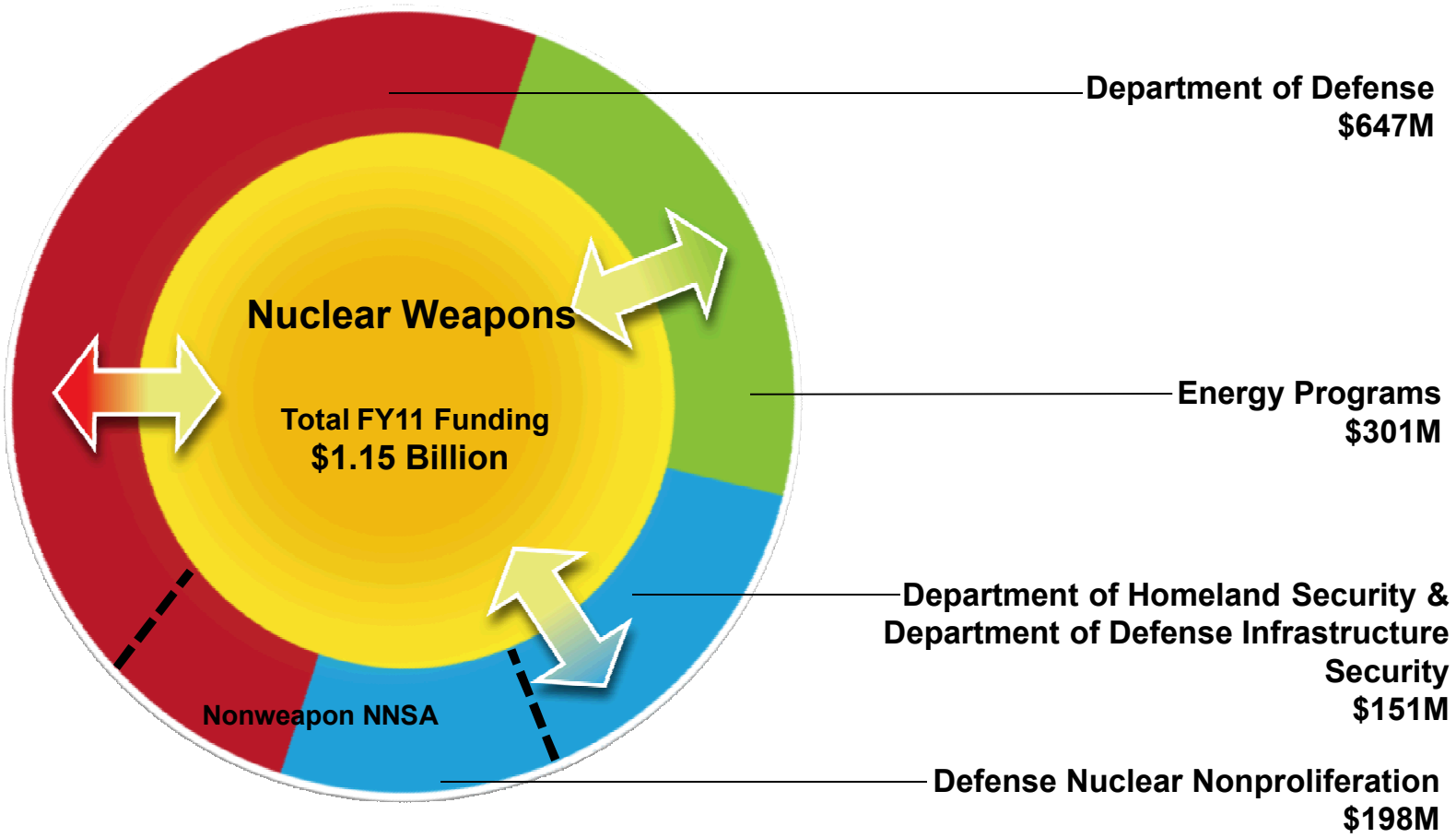
Sandia's Mission Work Reflects the Nation's Security Challenges

Sandia National Laboratories

1950s	1960s	1970s	1980s	1990s	2000s	2010s
NW production engineering & manufacturing engineering	Development engineering Vietnam conflict	Multiprogram laboratory Energy crisis	Missile defense work Cold War	Post–Cold War transition Stockpile stewardship	Expanded national security role post 9/11	LEPs New START Evolving national security challenges



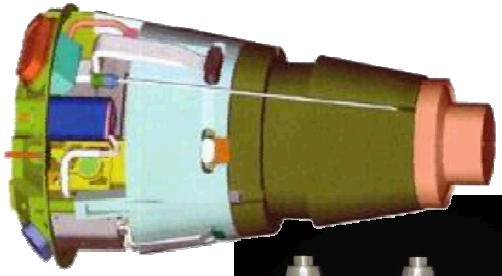
Our Diversified Customer Portfolio



High reliability, high consequence of failure, challenging environments, and technology solutions

Nuclear Weapons

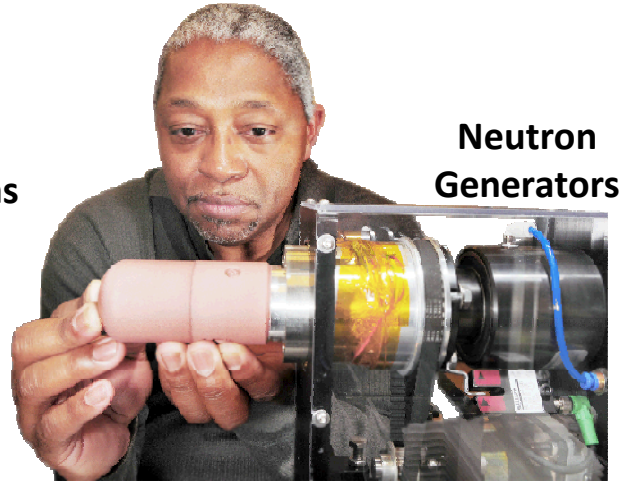
Integrated, Engineered Warhead Systems



Arming, Fuzing, and Firing Systems

Surety Systems

Gas Transfer Systems



Neutron Generators

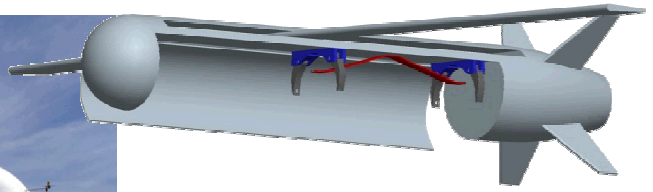
Sandia's core products for nuclear weapons stockpile management

Defense Systems & Assessments (DSA)

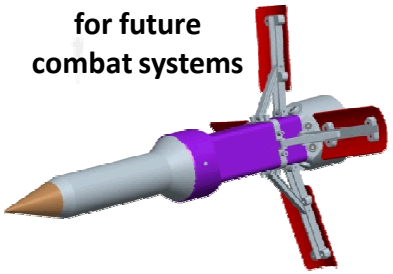
Materials International Space Station Experiment

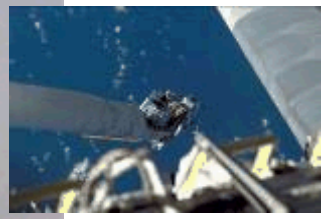
Real-time SAR images

Predator UAV with SAR



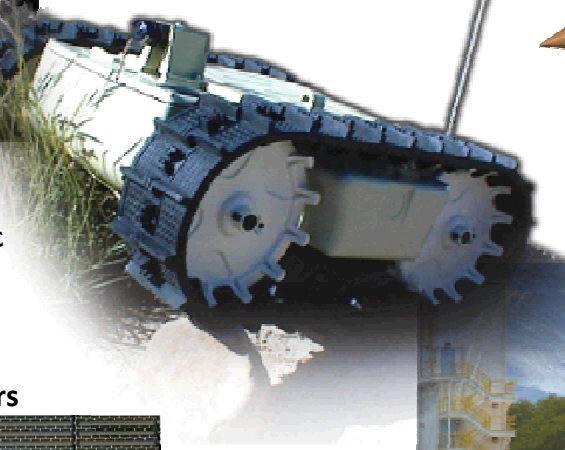
Ground sensors for future combat systems



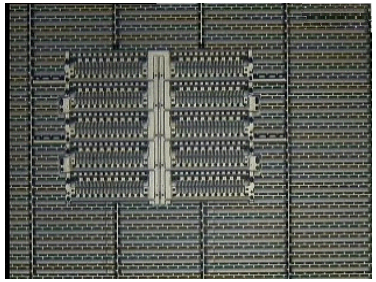


Shuttle return to flight

Small robotic vehicle



MEMS louvers



Target launch for Ballistic Missile Defense

Energy, Climate, & Infrastructure (ECIS)

Sandia National Laboratories

Energy Supply, Energy Efficiency, & Environmental Stewardship

Safe, Secure, Reliable Energy; Water Supply & Infrastructure

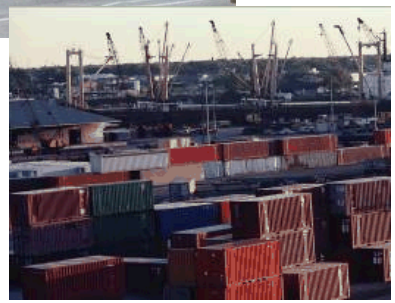
Climate Change- Mitigate and Adapt to Changes

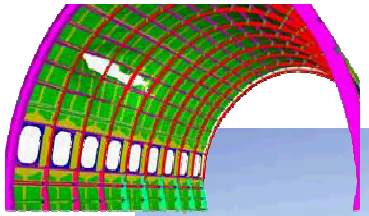
International, Homeland, and Nuclear Security (IHNS)

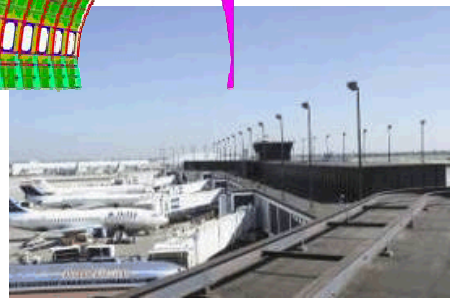
Bio/Chemical Security

Emergency Response

Border and Maritime security





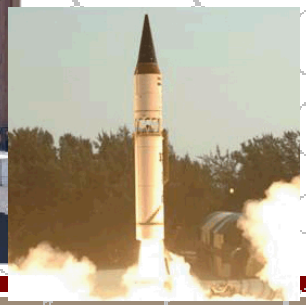


Aviation and Explosives security

Weapon Security

Physical Security

Nuclear/Radiological Threat Reduction

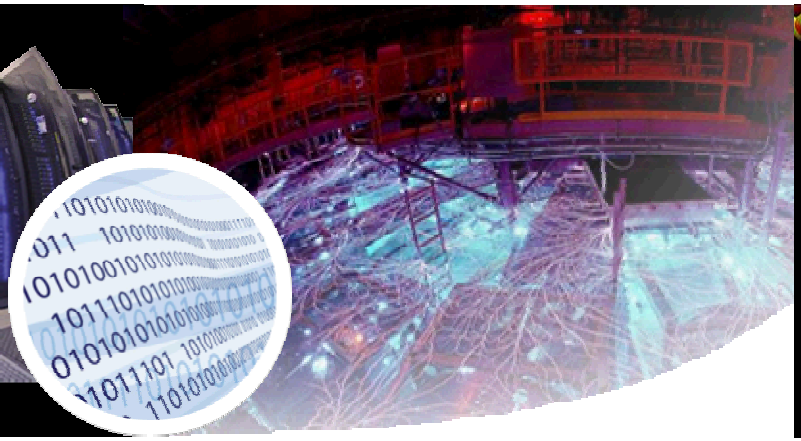


Strong Research Foundations Enable Mission Performance

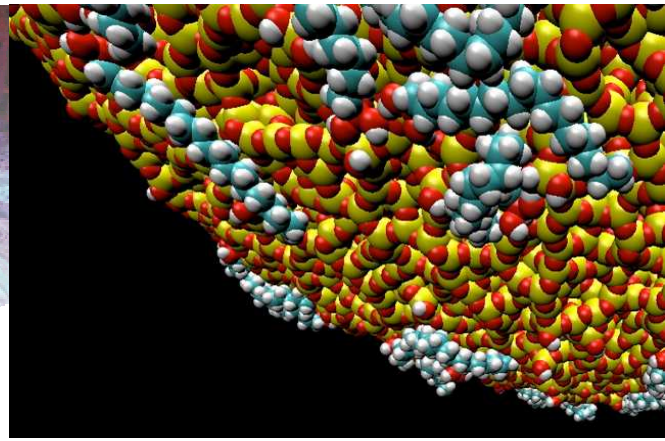
Sandia National Laboratories

Computing Science

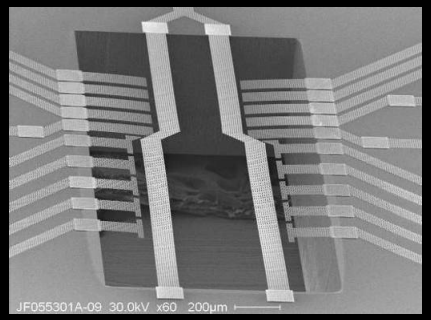
High Energy Density Physics



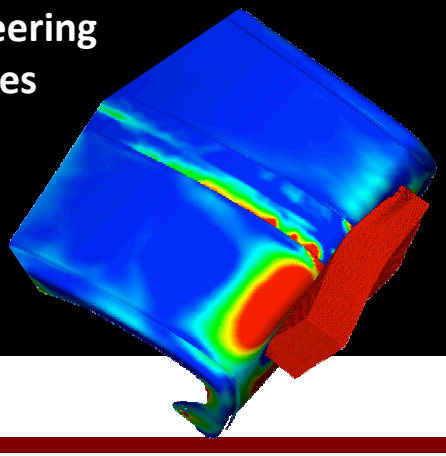
Materials

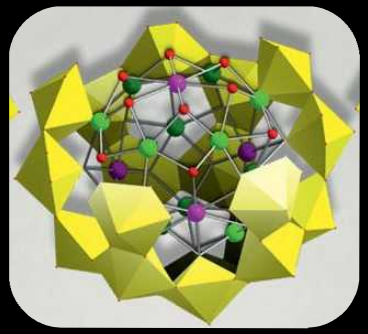


Microelectronics

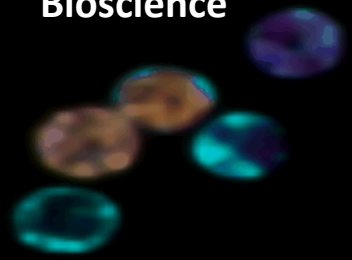


Engineering Sciences





Bioscience



Geoscience

Investments in Research are Made Across the Spectrum

Sandia National Laboratories

Office of Science

NNSA

NIH

BES

DOE/Energy

DoD/Research

DHS

DARPA

Other Government Agencies

Industry Partners

LDRD

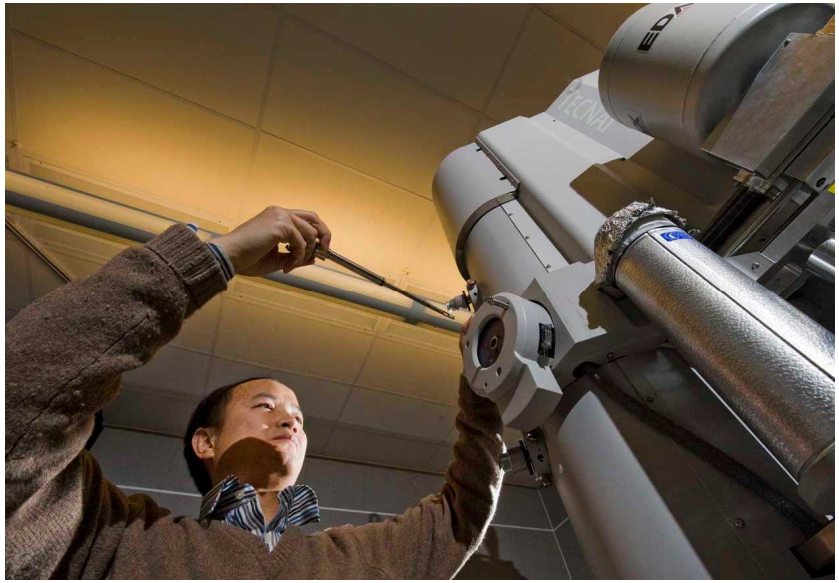
Advancing the Frontiers for National Security

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

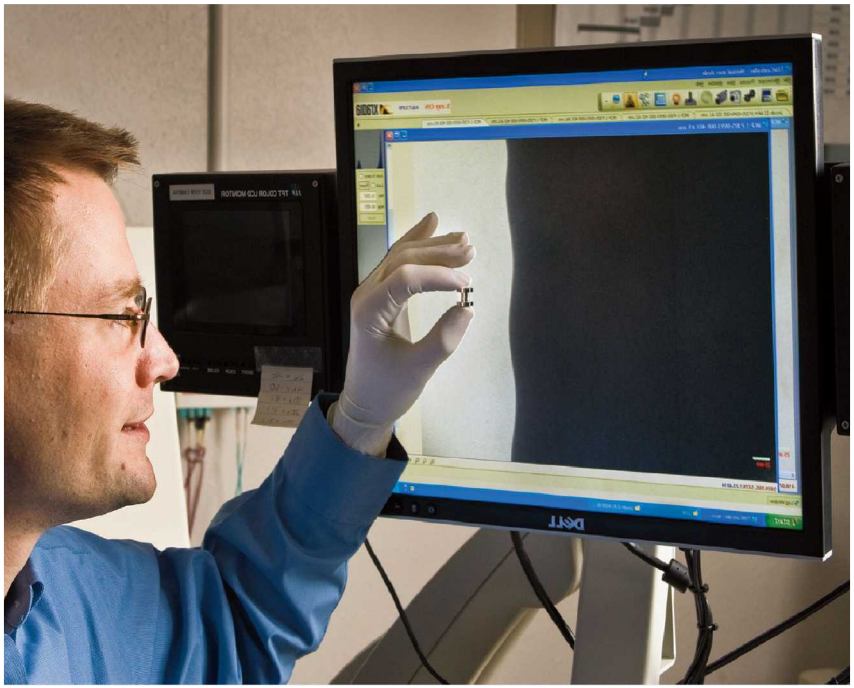


Jianyu Huang

World's smallest battery

- A tiny rechargeable lithium-based battery formed in a transmission electron microscope with an anode that is a single nanowire only one seven-thousandth the thickness of a human hair.
- Nanowire-based materials in lithium ion batteries offer significant improvements in power and energy density over bulk electrodes.
- The research observations of structural kinetics and amorphization have important implications for high-energy battery design and mitigating battery failure.

Advancing the Frontiers for National Security

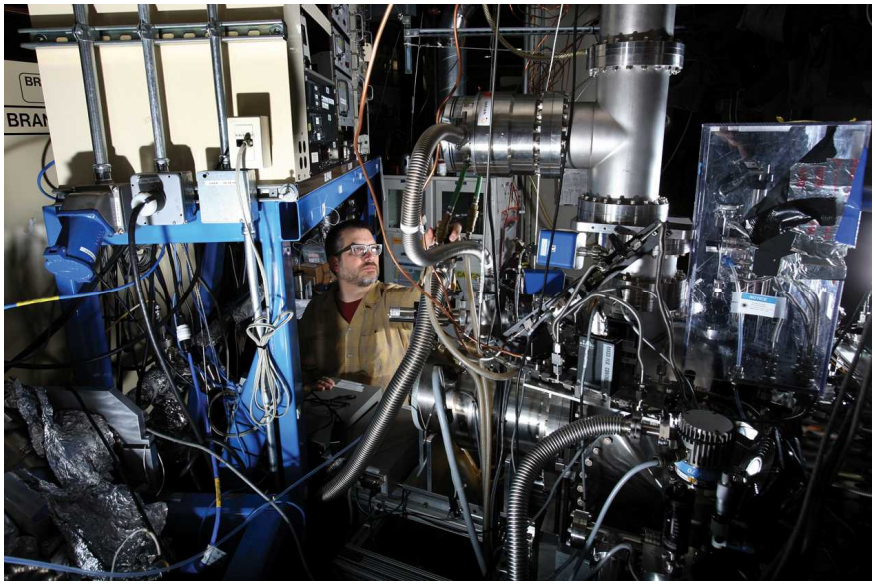


Dan Sinars

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.

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

Sandia National Laboratories

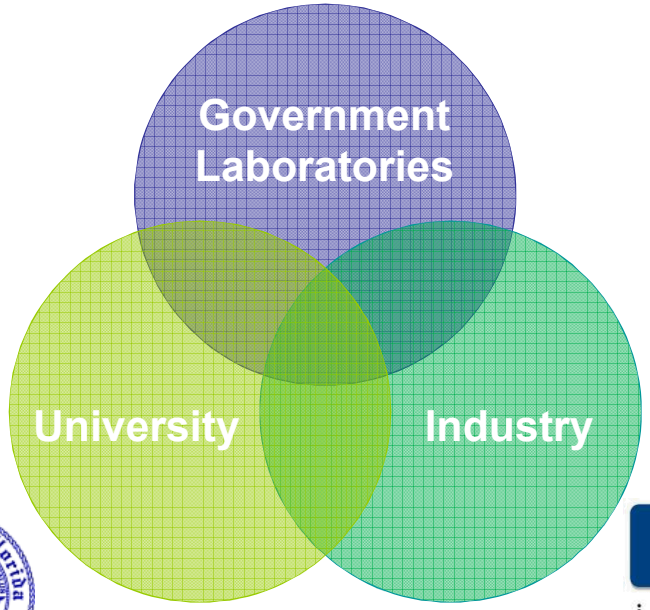
Glitter-sized photovoltaic cells

- 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

Strategic Partnerships Accelerate Innovation

Sandia National Laboratories



LVOC - A Platform for Collaborative Programs and Mission Success

Sandia National Laboratories

Infrastructure

- Campus-like environment with collaborative space
- Ready access for all partners, including foreign nationals
- Joint effort of SNL and LLNL

Inaugural Programs

- Combustion Research Facility (CRF)
- Cybersecurity Technologies Research Laboratory (CTRL)
- Center for Infrastructure Research and Innovation (CIRI)
- Institute for Translational Biomedicine (ITB)
- Solar energy technology demonstration with Cool Earth