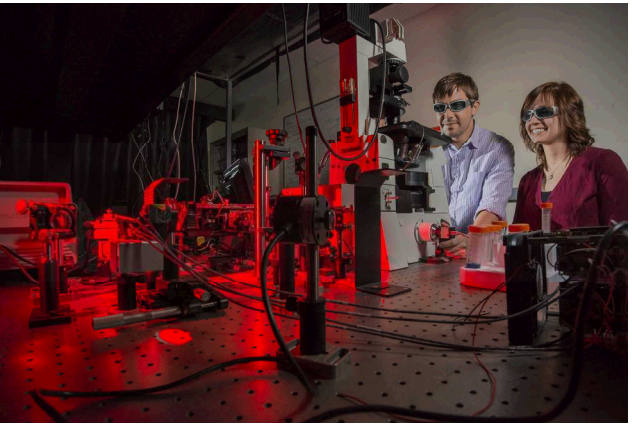
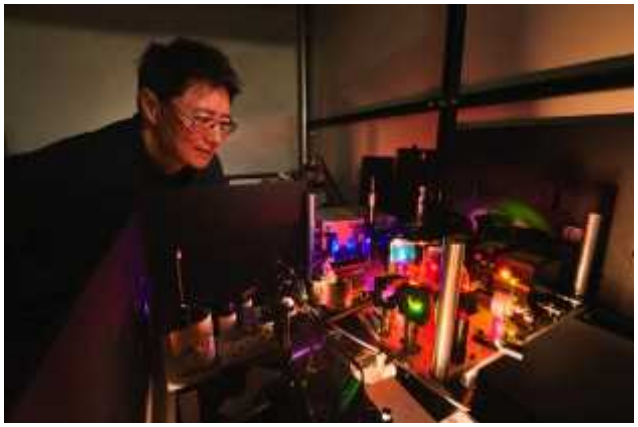
SAND2016-1550PE

Exceptional service in the national interest

Sandia National Laboratories





CTO Overview and Charge to the Board

Andy McIlroy
Director, Research Strategy & Partnerships
Deputy Chief Technology Officer

U.S. DEPARTMENT OF ENERGY | NNSA

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Sandia's history

Exceptional service in the national interest

- **July 1945:** Los Alamos creates Z Division
- Nonnuclear component engineering
- **November 1, 1949:** Sandia Laboratory established

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 the Sandia Laboratory at Albuquerque, New Mexico.

This operation, which is a vital segment of the atomic weapons program, is of extreme importance and urgency in the national defense, and should have the best possible technical 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.

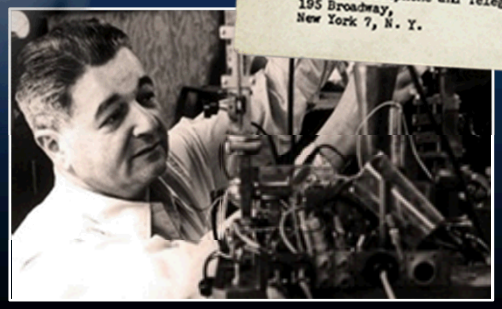
I am writing a similar note direct to Dr. O. E. Buckley.

Very sincerely yours,

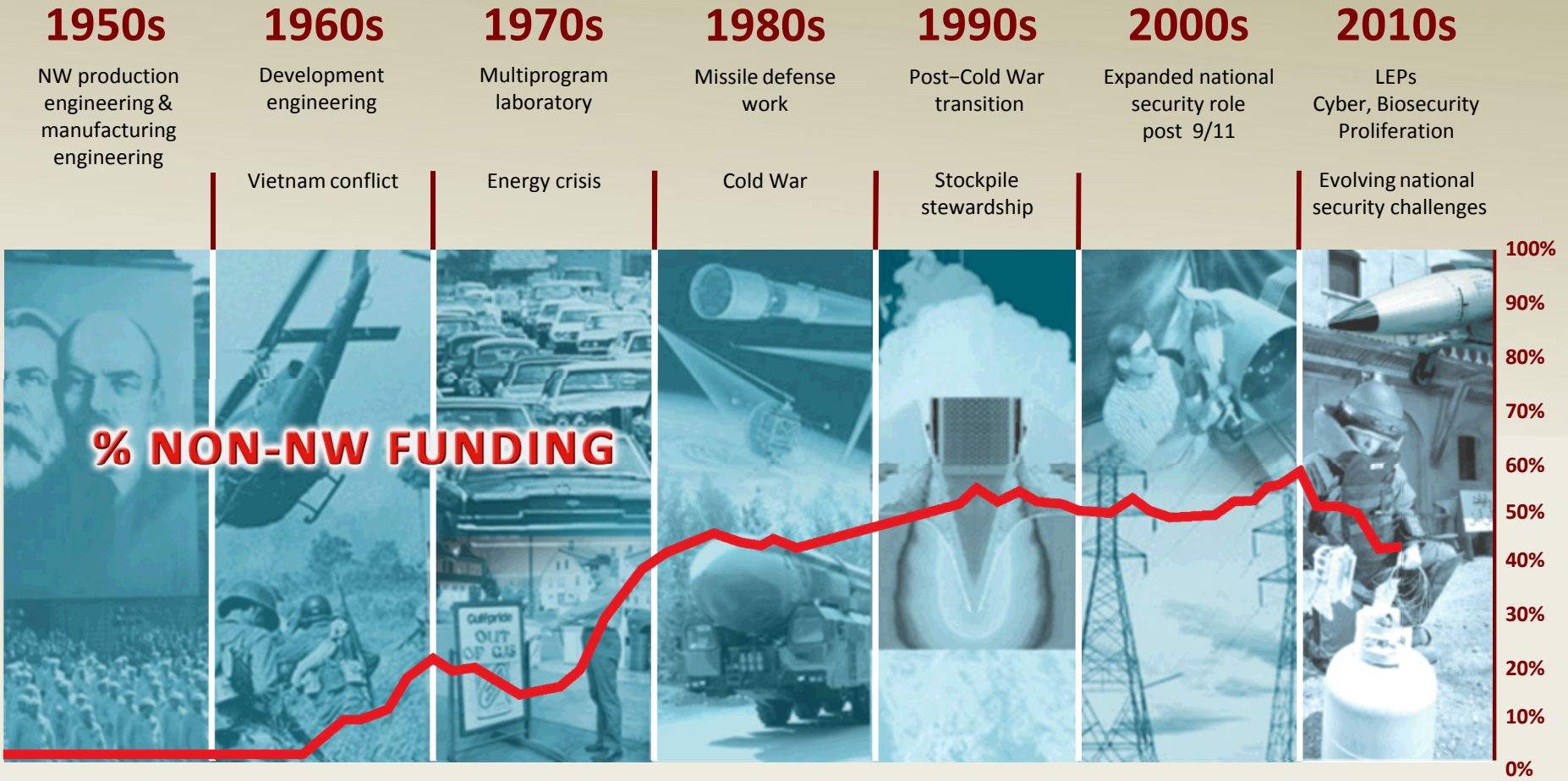
Harry Truman

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

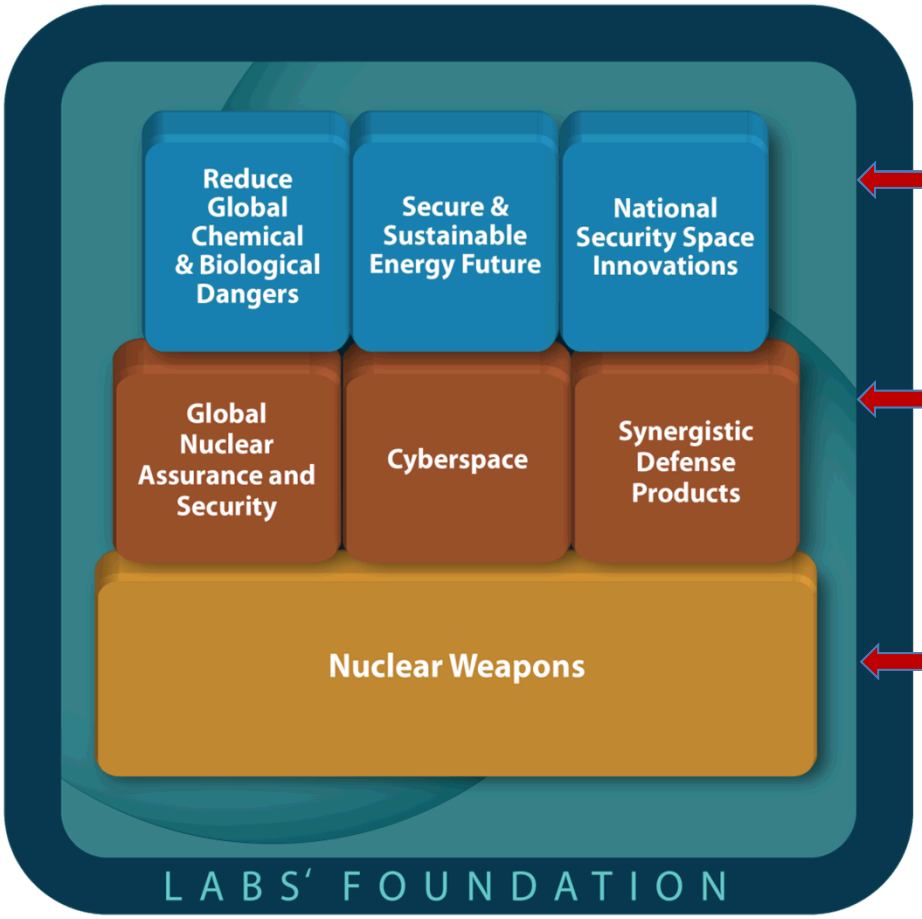
to undertake this task. In my opinion you have here an opportunity to render an exceptional service in the national interest.



Sandia's mission work reflects national security challenges



Sandia's Mission Areas



- Critical to national security
- Leverage, enhance, and advance Sandia's capabilities

- Strongly interdependent with nuclear weapons
- Essential to sustaining Sandia's ability to fulfill its NW core mission

- Nuclear weapons core mission is enabled by a strong scientific and engineering foundation

Sandia's Foundation enables and connects the mission areas

People, facilities & tools, and research generate the capabilities that support our national security missions:

- High-reliability engineering
- Sensors and sensing systems
- Cyber technology
- Reverse engineering
- Pathfinders
- Modeling & simulation and experiment
- Natural and engineered materials
- Micro & nano electronics and systems
- Safety, risk, and vulnerability analysis

Sandia's research strategy

Providing direction for our research enterprise

Sandia National Laboratories

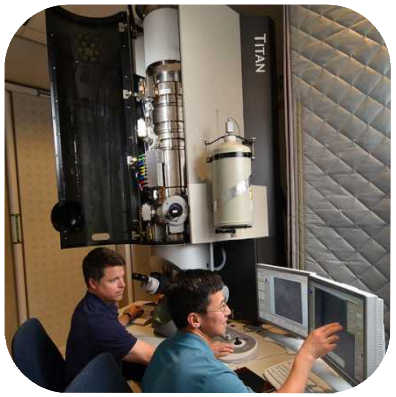
Strengthen our research portfolio

Research Foundation strategies and aligned LDRD investments sustain and strengthen the ST&E base

Address integrating Research Challenges

Research Challenges are "moon shot" research activities intended to drive integration of research and mission

Improve the research environment



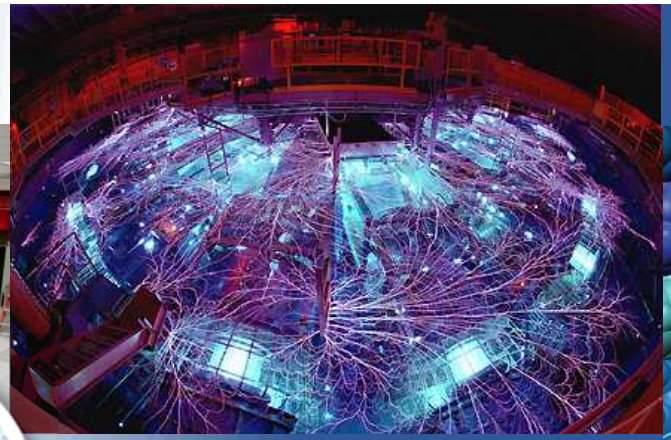
Research environment improvements facilitate strategy execution and increase attractiveness of the Lab

Sandia's Research Foundations

Enduring discipline-based competencies essential to our mission

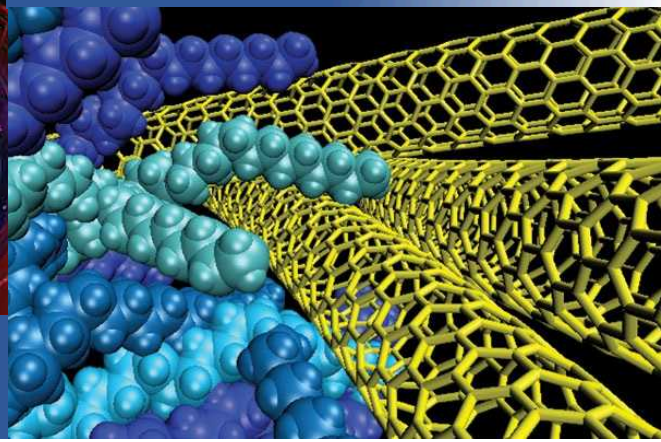
Sandia National Laboratories

Computing & Information Sciences

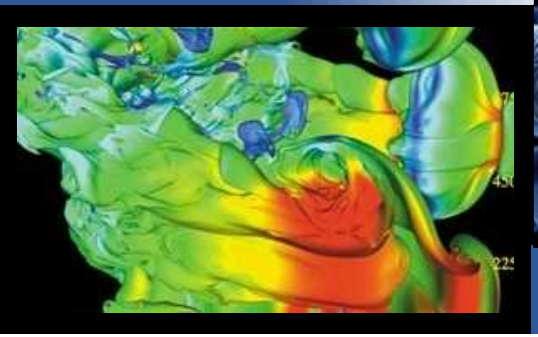


Radiation Effects & High Energy Density Science

Materials Sciences

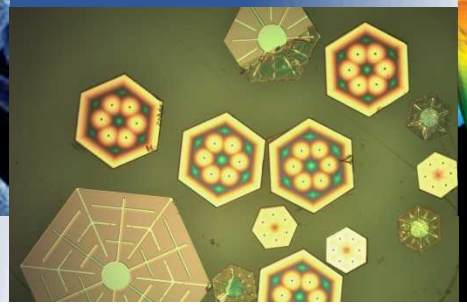


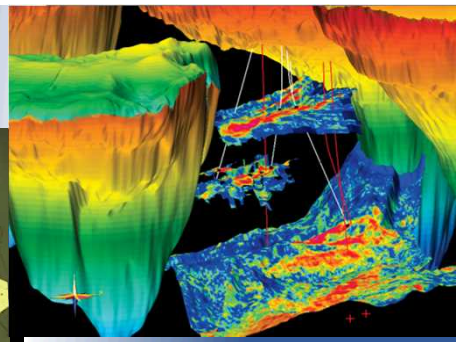
Engineering Sciences



Bioscience

Nanodevices & Microsystems





Geoscience

Research Challenges

Focused research campaigns that complement Research Foundations

Current mature Research Challenges:

- **Power on Demand**
- **Science & Engineering of Quantum Information Systems**
- **Trusted Systems & Communications**
- **Detection at the Limit**
- **Engineering of Materials Reliability**

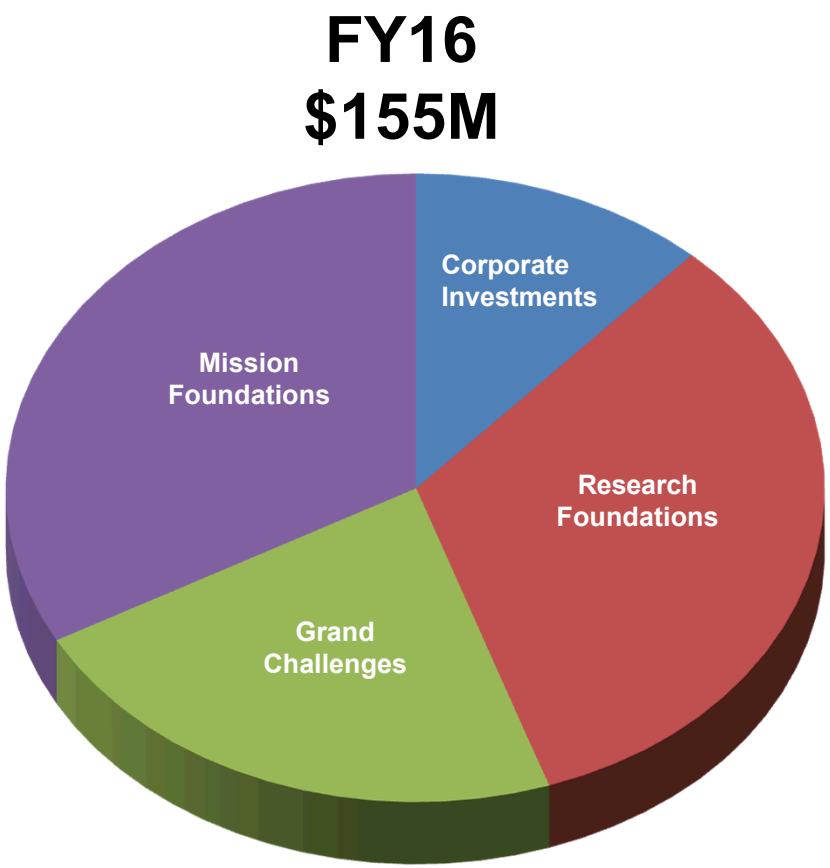
Under development

- Data Science
- Engineering Abiotic/Biotic Living Systems
- Pulsed Power Opportunities for Weapons & Effects Research
- Resiliency in Complex Systems
- Revolutionary Approaches to the Stockpile
- Beyond Moore Computing

Research Challenge attributes:

- Decade-scale “moon shot” efforts
- Targeted at technical breakthroughs necessary for mission areas
- Executed by Communities of Practice across the Labs
- Generate roadmaps that guide the broader R&D effort

Laboratory Directed Research and Development



- **Research Foundations** – Anticipate future research needs and capabilities through exploratory research critical to all Mission Areas.
- **Mission Foundations** – Strategic R&D to support NNSA, DOE, and Strategic Partnership Projects missions and their ST&E needs.
- **Grand Challenges** – Bold, high-risk R&D projects focused on Research Challenges with potential for significant impact on national security.
- **Corporate Investments**
  - **Strategic Partnerships** – Leverage external resources to solve mutual challenges.
  - **Exploratory Express** – Enable embryonic research ideas with high potential.
  - **Reserves and Program Management** – Support emerging research opportunities.

CTO charge to the board

The CTO expects the Research Foundations to strengthen mission-research integration, achieve bold outcomes, and develop and nurture effective internal & external collaborations.

- Given these overarching goals, what opportunities for improvement do you see in the articulation of the [name of RF] Research Foundation's strategy?
- What opportunities for improvement do you see in the execution of the [name of RF] Research Foundation's strategy as it relates to its overall research portfolio? Please comment in particular on strategy execution as it relates to leading edge research, capability development, relevance to mission, and impact (see five element framework).

Five elements of research assessment

Element	
Strategy	Execute a research strategy that is clear and aligns discretionary investments (e.g., LDRD) with the research strategy and supports DOE/NNSA priorities
Relevance	Ensure that research is relevant, enables the national security missions, and benefits DOE/NNSA and the nation
Quality	Ensure that research is transformative, innovative, leading edge, high quality, and advances the frontiers of science and engineering
Capabilities	Maintain a healthy and vibrant research environment that enhances technical workforce competencies and research capabilities
Impact	Research and develop high-impact technologies through effective partnerships and technology transfer mechanisms that support the laboratory's strategy, DOE/NNSA priorities, and impact the public good

External reviews are linked to
SNL Performance Objective 4: Science, Technology and Engineering Mission

Sandia National Laboratories

Backups

Sandia's mission, research objective

Our unique mission responsibilities in the nuclear weapons (NW) program create a foundation from which we leverage capabilities, enabling us to solve complex national security problems.

Research conducted at Sandia shall
enable mission delivery now and in the future and
advance the frontiers of science and engineering.