



Sandia
National
Laboratories

SAND2019-10613PE

Sandia National Laboratories - University of Puerto Rico-Mayaguez Collaborations: Past, Present and Future



PRESENTED BY

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Senior Manager
Sandia National Laboratories

Industrial Advisory Board Meeting
College of Engineering, UPR-Mayaguez
September 19, 2019

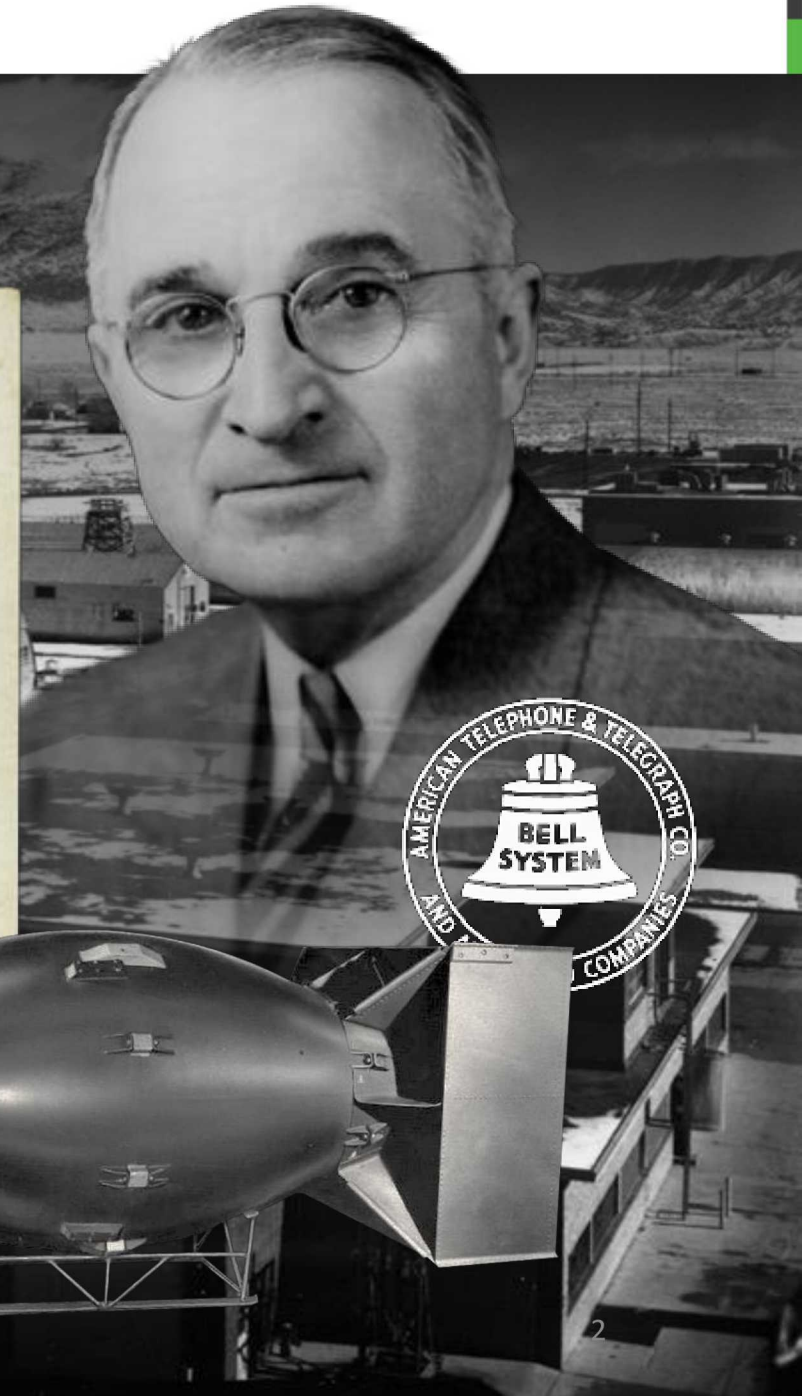
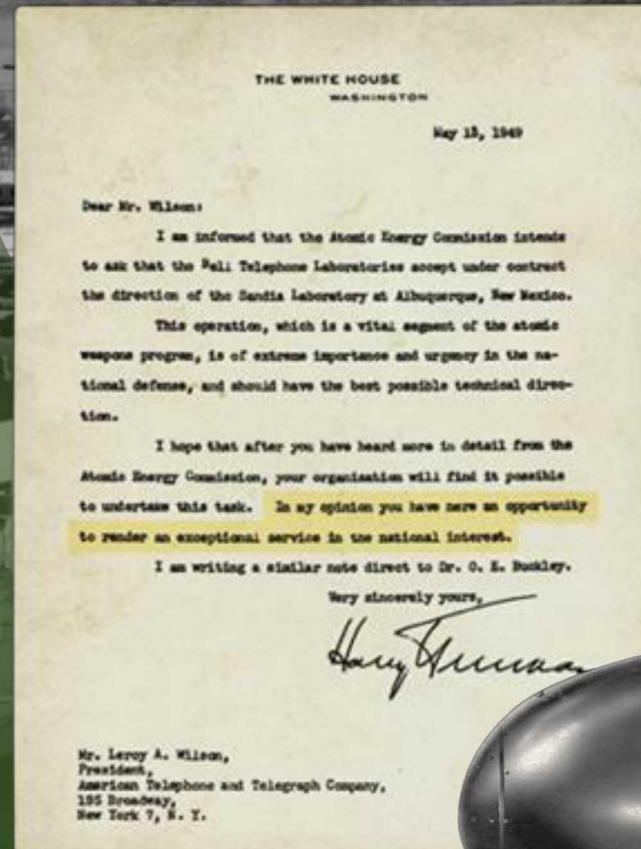


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SANDIA'S HISTORY IS TRACED TO THE MANHATTAN PROJECT

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

- July 1945
Los Alamos creates Z Division
- Nonnuclear component engineering
- November 1, 1949
Sandia Laboratory established
- AT&T: 1949–1993
- Martin Marietta: 1993–1995
- Lockheed Martin: 1995–2017
- Honeywell: 2017–present





SANDIA IS A FEDERALLY FUNDED RESEARCH AND DEVELOPMENT CENTER MANAGED AND OPERATED BY

National Technology & Engineering
Solutions of Sandia, LLC, a wholly
owned subsidiary of Honeywell
International Inc.: 2017 – present

Government owned, contractor
operated



SANDIA HAS FACILITIES ACROSS THE NATION



Activity locations

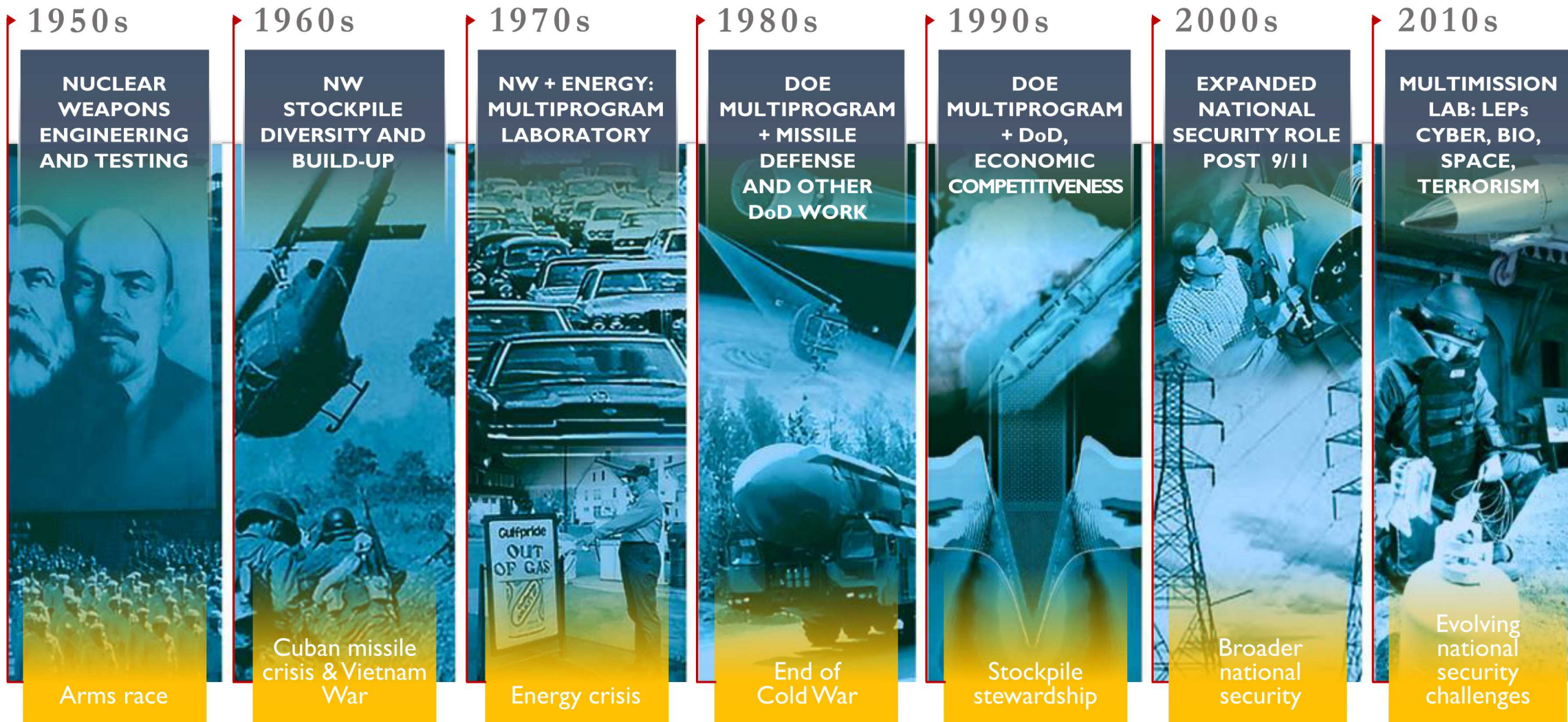
- Kauai, Hawaii
- Waste Isolation Pilot Plant, Carlsbad, New Mexico
- Pantex Plant, Amarillo, Texas
- Tonopah, Nevada

Main sites


- Albuquerque, New Mexico
- Livermore, California



SANDIA ADDRESSES NATIONAL SECURITY CHALLENGES



ENERGY IS INTEGRAL TO NATIONAL SECURITY



After Hurricane Maria, Puerto Rico's
Grid Needs a Complete Overhaul
(Science, September 2017)

Ukraine's Power Outage Was a Cyber
Attack.
(Reuters, January 2017)

Russian Hackers Are Attacking the U.S. Energy Grid
(Time, March 2018)

China Making Aggressive Moves in the Arctic
(U.S. Naval Institute News, April 2018)

U.S. Electrical Grid on the Edge of
Failure (Scientific American, August 2013)

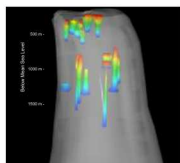
HISTORY OF SANDIA ENERGY PROGRAM



SANDIA WAS BORN AS A NUCLEAR WEAPONS ENGINEERING LABORATORY WITH DEEP SCIENCE AND ENGINEERING COMPETENCIES



ENERGY CRISIS OF THE 1970S SPAWNED THE BEGINNING OF SIGNIFICANT ENERGY WORK



STRATEGIC PETROLEUM RESERVE



SYNTHETIC DIAMOND DRILL BIT

WASTE ISOLATION PILOT PLANT (WIPP) EVALUATION



NUCLEAR REACTOR SAFETY & RELIABILITY



CRF & CUMMINS PARTNERSHIP



SANDIA TAPPED TO HELP NRC LICENSE NEW GENERATION OF POWER PLANTS



SCALED WIND FARM TECHNOLOGY (SWIFT) FACILITY COMMISSIONED



CRUDE OIL CHARACTERIZATION RESEARCH STUDY



3-D PRINTING, ADDITIVE MANUFACTURING, AND PROCESSES TO CREATE MOLDS FOR WIND TURBINE BLADES.

1950s

1960s

1970s

1980s

1990s

2000-2010

2010-2017



ATMOSPHERIC RESEARCH (SALTON SEA TO TONOPAH) TO PERMIT AG TESTING



SOLAR TOWER OPENS

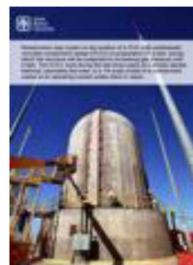


BATTERY SAFETY & RELIABILITY PROGRAM



COMBUSTIONS RESEARCH FACILITY (CRF) OPENS

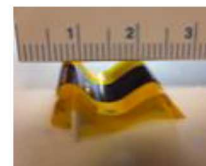
SOLAR TOWER OPENS



MELCOR COMPUTER CODE RELEASED



IDENTIFIED AS LEAD LAB FOR YUCCA MOUNTAIN



MICROSYSTEMS ENABLED PHOTOVOLTAICS



LARGE-SCALE POOL FIRE TESTS OF LIQUEFIED NATURAL GAS (LNG) ON WATER

COMBUSTION RESEARCH COMPUTATION & VISUALIZATION (CRCV) OPENS IN LIVERMORE, CA.



SANDIA WINS FUNDING FOR HIGH TEMPERATURE FALLING-PARTICLE SOLAR RECEIVER



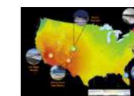
REGIONAL TEST CENTERS ESTABLISHED



SANDIA WINS THREE R&D 100 AWARDS FOR SOLAR



ROAD, RAIL, BOAT: SANDIA SPENT NUCLEAR FUEL TRANSPORT TRIATHLON



CLOUD RESEARCH & MONITORING INNOVATIONS TO PLAN HIGH ALTITUDE BALLISTIC TESTS

OUR ENERGY FACILITIES



ARM Facility
Utqiagvik, Alaska



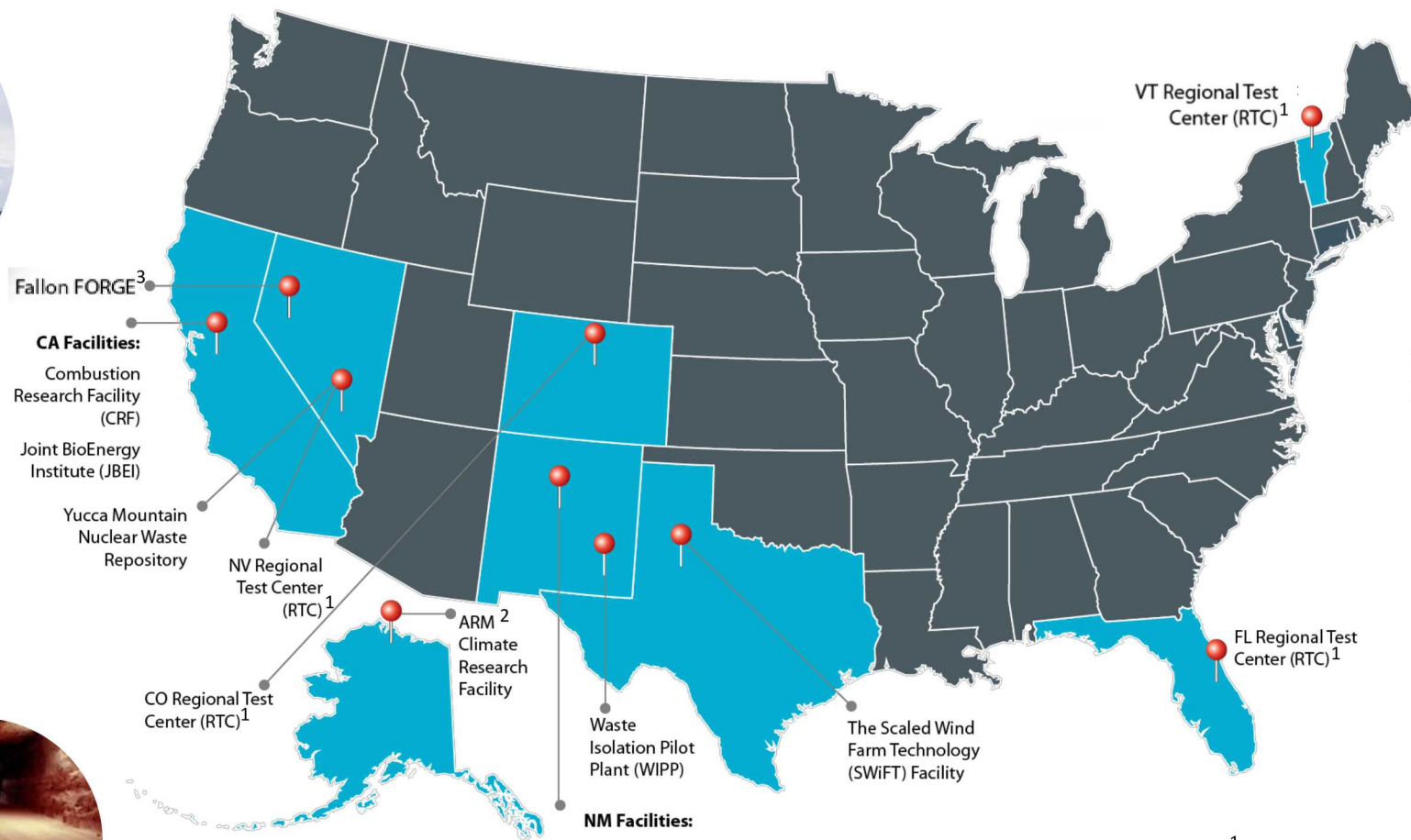
National Solar
Thermal Test
Facility (NSTTF)



Geomechanics
Lab



The Scaled
Wind Farm
Technology
(SWiFT) Facility



Brayton
Cycle Lab



Waste Isolation
Pilot Plant (WIPP)

NM Regional Test Center (RTC)¹
National Solar Thermal Test Facility (NSTTF)
Geomechanics Lab
Brayton Cycle Lab
National Infrastructure Simulation & Analysis Center (NISAC)

¹ Regional Test Centers (RTCs) provide high fidelity testbeds for US solar companies to evaluate their technologies in varied climates.

² The Arctic Radiation Measurement (ARM) Climate Research Facility supports climate modeling, search & rescue operations, and other national security work.

³ Fallon Frontier Observatory for Research In Geothermal Energy (FORGE) will enable cutting-edge geothermal energy research, and drilling and technology testing.

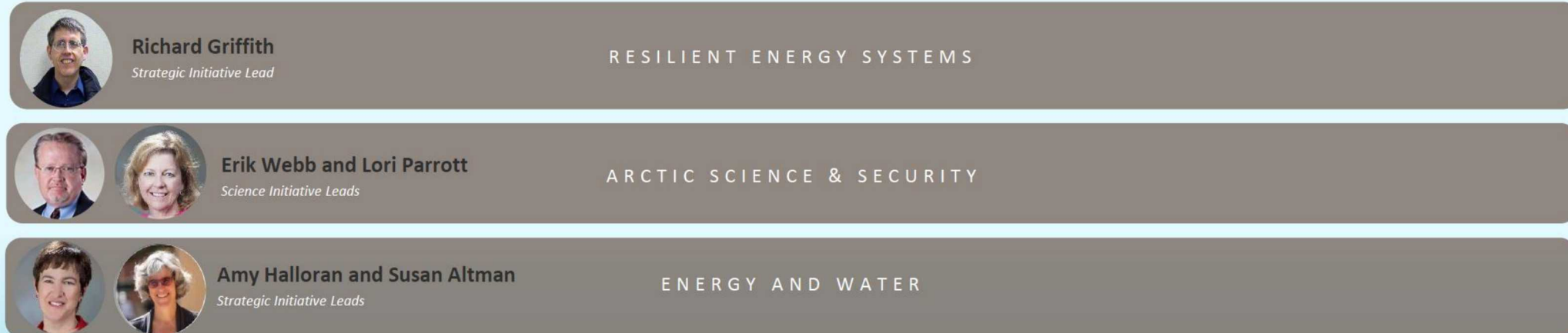
SECURE ENERGY & EARTH SYSTEMS



SUB-PROGRAMS



STRATEGIC INITIATIVES



PAST/RECENT SNL-UPRM COLLABORATIONS



- Collaborations date back more than 20 years.
 - UPRM Faculty Fellowships/Summer Internships at SNL
 - Invited SNL Seminars at UPRM
 - SNL Recruiting at UPRM thru Lockheed Martin
- Consortium for Integrating Energy Systems in Engineering and Science Education (CIESESE) (2017 – 2019)
 - Funded by NNSA Minority Serving Institutions Partnership Program
 - CIESESE Partner Institutions: Ana G. Mendez University-Turabo (lead), UPRM, University of New Mexico, University of Texas El Paso and Miami Dade College, SNL and the National Energy Technology Lab
 - Student Interns from UPRM at SNL: 10 (5 with multiple summers)
 - Four are working on their respective PhD thesis based on SNL projects (two are currently resident at SNL)
 - Faculty Fellows from UPRM at SNL: Eduardo Ortiz (2017, 2018, 2019) and Erick Aponte (2018, 2019)

PAST/RECENT SNL-UPRM COLLABORATIONS (Continued)



- Proposal Writing Workshop (March 2019)
 - Full-day workshop on (a) proposal preparation process and (b) how to write winning proposals
- Contract Purchase Agreement (March 2019 – March 2024)
 - CPA placed by SNL (NTESS) at UPRM that allows any organization within SNL to obtain qualified personnel, equipment, material and facilities to perform work described in each Statement of Work (SOW) as specifically called for on research and development type Task Orders

Sandia/UPRM Proposal Writing Workshop Overview



Sandia Proposal Writing Workshop March 27, 2019

Purpose

Share proposal best practices with university leadership, administrators, faculty, and students focused on:



Sandia's proposal management process



Techniques for writing compelling proposals



Writing Successful Technical Proposals



Making Your Proposal Stand Out From the Crowd

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University of Illinois at Urbana-Champaign
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With thanks to the fabulous Physics Faculty at Illinois!



Speakers

Elizabeth Hillman

Sandia National Laboratories'
Energy and Science Proposal
Management Team Lead

Celia Elliott

Director of External Affairs and
Special Projects at the University
of Illinois at Urbana-Champaign



FUTURE COLLABORATIONS



- Cooperative Research and Development Agreement (10 Years)
 - ... collaboration to leverage and enhance both institutions' capabilities to address and provide practical solutions to national security issues involving sustainability, acceptability, security and resiliency of energy and environment. The collaboration will focus on Applied Engineering and Sciences – Physical, Natural and Social – as well as Research and Development with potential application to tropical and subtropical regions of the world and beyond. The collaboration under this Agreement will further enhance both institutions' ability to develop joint and collaborative proposals, publications and personnel exchanges. ”
 - First collaboration: Strategic Planning project regarding Safe and Secure Energy and Environment for Resiliency and Reliability issues that are unique to Puerto Rico, Tropical and Sub Tropical regions; identify the current state, challenges, gaps and barriers in areas related to energy and environmental, as well as reliability and resiliency issues; and provide information and analysis to support programs and projects for improved energy security and safety.
- COOP Program for UPRM students at SNL