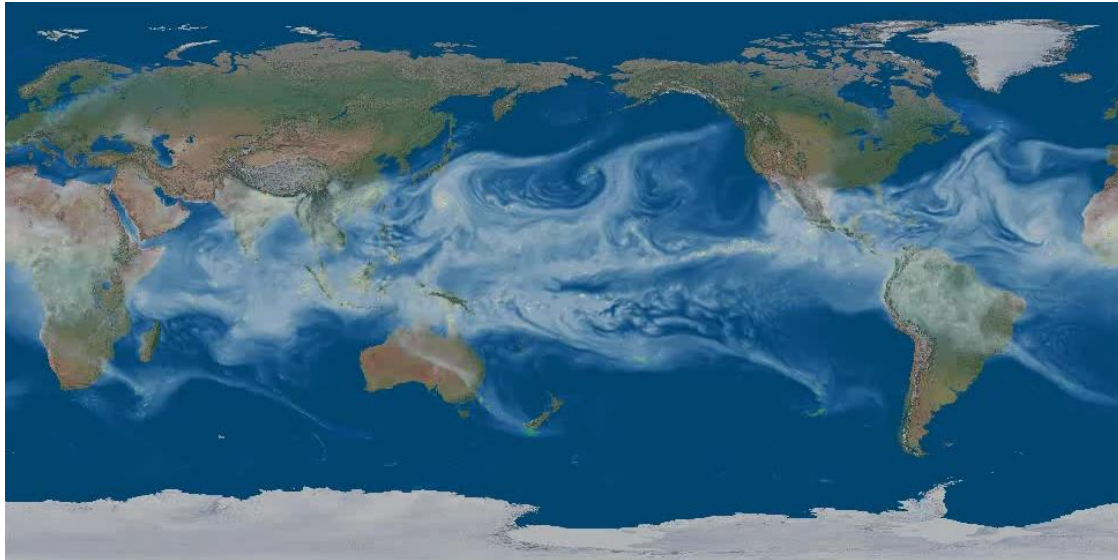


Sandia National Laboratories



Peter Davies

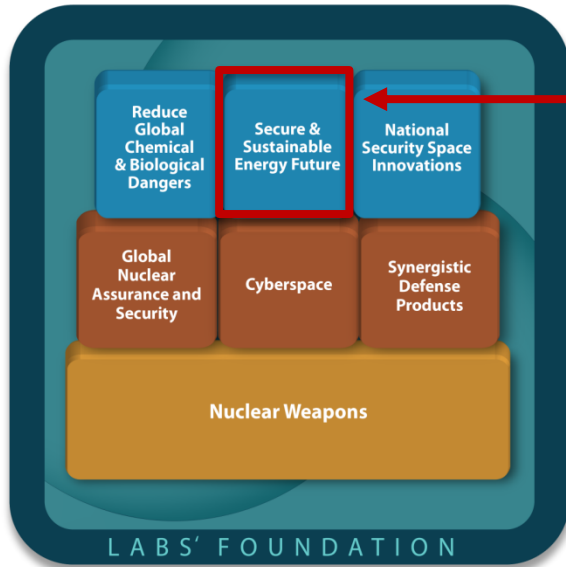
Director -- Geoscience, Climate and Consequence Effects

BERAC Meeting

March 22-23, 2016

Sandia Mission/Research Framework

Seven Mission Areas draw from and contribute to Lab's Foundation

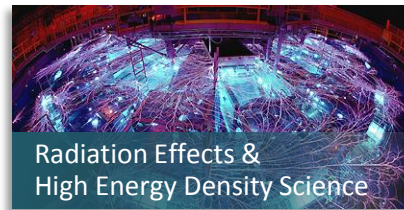


Secure & Sustainable Energy Future -- Science-based understanding of the complex interdependencies between energy and climate

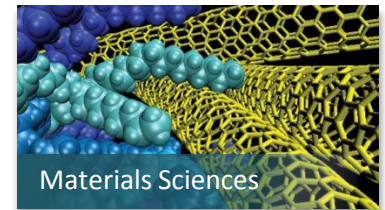
Lab's Foundation -- Seven Research Foundations, Office of Science Research and major computational and experimental capabilities



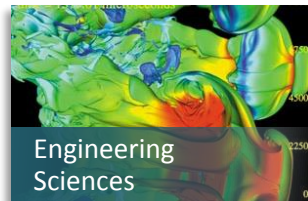
Computing & Information Sciences



Radiation Effects & High Energy Density Science



Materials Sciences



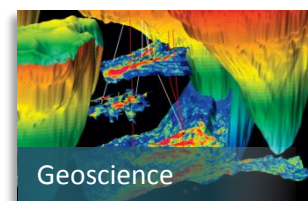
Engineering Sciences



Bioscience



Nanodevices & Microsystems



Geoscience

BER Related Research Capabilities & Facilities

BER-related core research capabilities

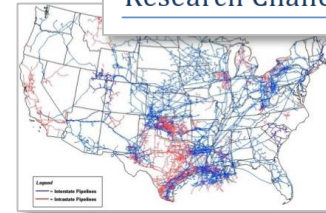
- **Computer Science, Future Computing Environments & Uncertainty Quantification**
- **Geo and Atmospheric Science**
- **Complex Systems, Energy-Water Systems, Infrastructure Interdependency**
- **Biosciences**



Computer Science

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Resiliency in Complex Systems (RCS)
Research Challenge Roadmap 2016



Complex Systems & Infrastructure Interdependency

BER-related core facilities



Joint Bioenergy Institute



Center for Integrated Nanotechnologies



Combustion Research Facility

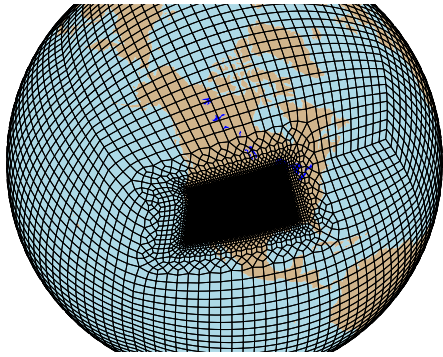


Arctic ARM Sites



Microsystems & Engineering Sciences Applications (MESA)

Major Strategic Science Priorities

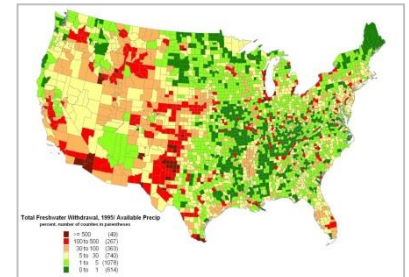


Enable ultra high resolution climate models with tightly coupled uncertainty quantification, local scale models of infrastructure impacts, and calibration with global and local scale air/sea/ice/land measurements

Develop innovative methods to measure and integrate multi-scale air/sea/ice/land processes and parameters, including GHG emissions



Develop integrated data sets, tightly coupled models of complex climate, energy and infrastructure systems (including uncertainty quantification)



Develop systems-level understanding of microbes and communities, leading to cost-effective biomass conversion technologies

Future Strategic Partnerships

Grand challenge scale problems intrinsically require multi-institutional scale partnerships – future research challenges will require even deeper cross institutional partnerships

National Labs

Universities

Agencies

Industry

International



Present example – JBEI Biomaterials



Present Example – Arctic ARM Climate Research Facilities



Present Example – ACME Climate Model