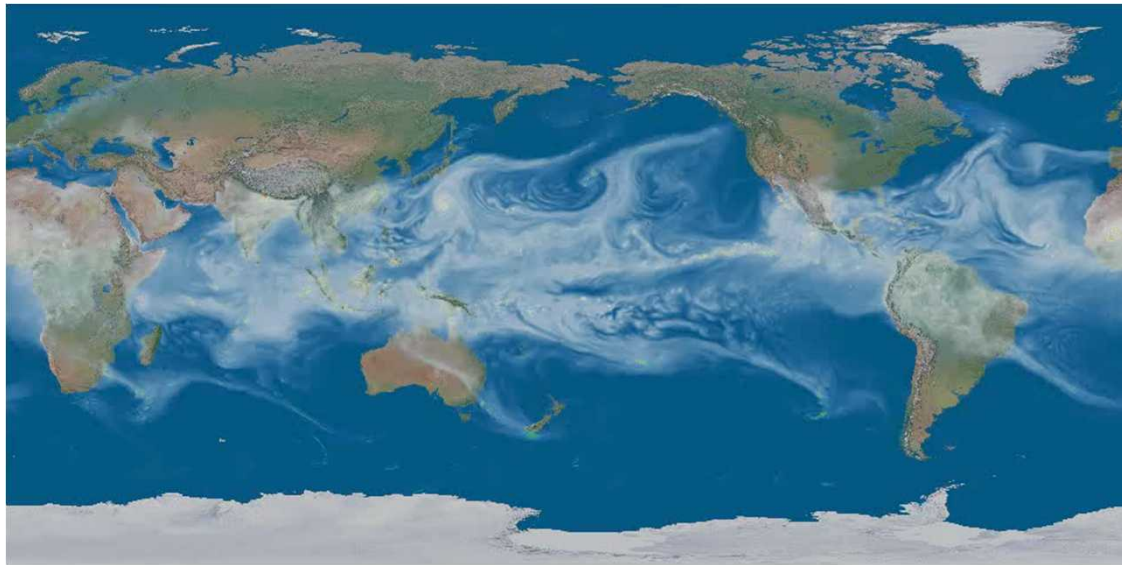


Sandia National Laboratories



Peter Davies

Director, Geoscience Climate and Consequence Effects

BERAC Meeting

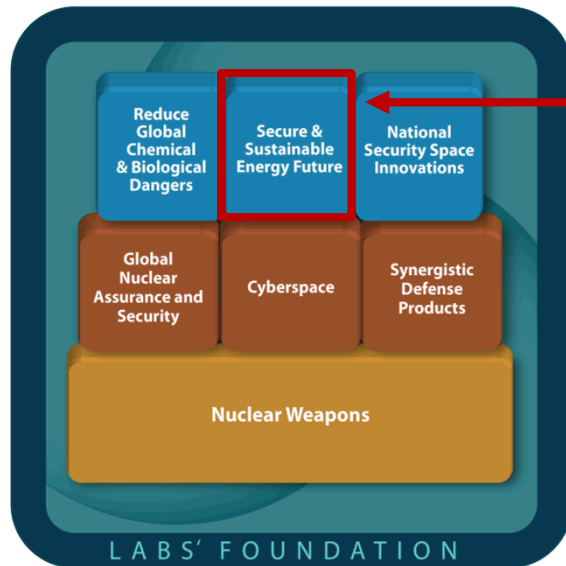
March 22-23, 2016



Sandia National Laboratories

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

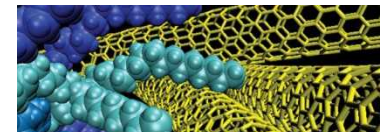
Lab's Foundation -- Seven Research Foundations, Office of Science Research and major computational and experimental capabilities



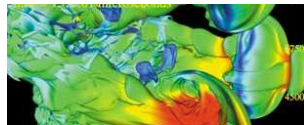
Computing & Information Sciences



Radiation Effects & High Energy Density Science



Materials Sciences



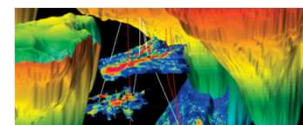
Engineering Sciences



Bioscience



Nanodevices & Microsystems

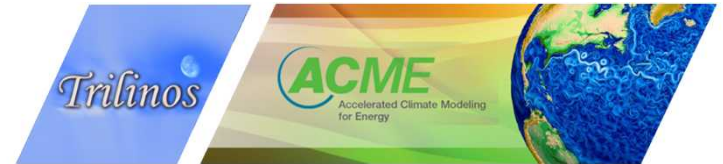


Geoscience

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

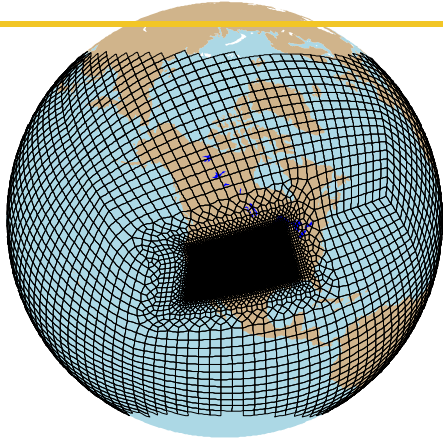


Arctic ARM Sites



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

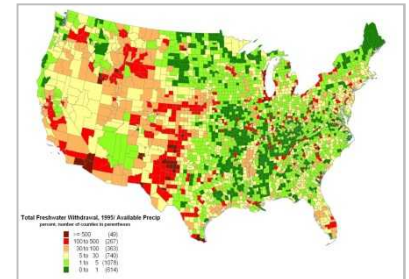
Develop innovative methods to measure and integrate multi-scale air/sea/ice/land processes and parameters, including GHG emissions



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 partnership

National Labs

Universities

Agencies

Industry

International



Present example – JBEI Biomaterials



Present Example – Arctic ARM
Climate Research Facilities



Present Example – ACME Climate Model