

Exceptional service in the national interest



# SANDIA KOGAS COLLABORATION

Erik Webb and Moo Lee

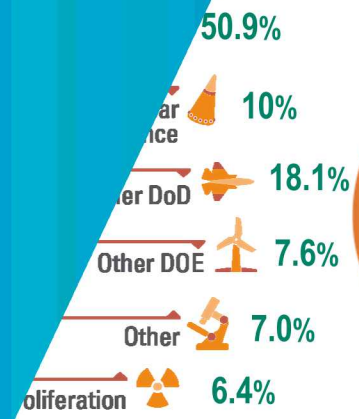
Sandia National Laboratories is a multimission laboratory managed and operated by National Technology and Engineering Solutions of Sandia LLC, a wholly owned subsidiary of Honeywell International Inc. for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-NA0003525.  
SAND 2018-4900 PE

### Locations

- Hawaii
- Resolution
- Plant,
- oad, New Mexico
- tex Plant,
- narillo, Texas
- onopah, Nevada



### WORKFORCE



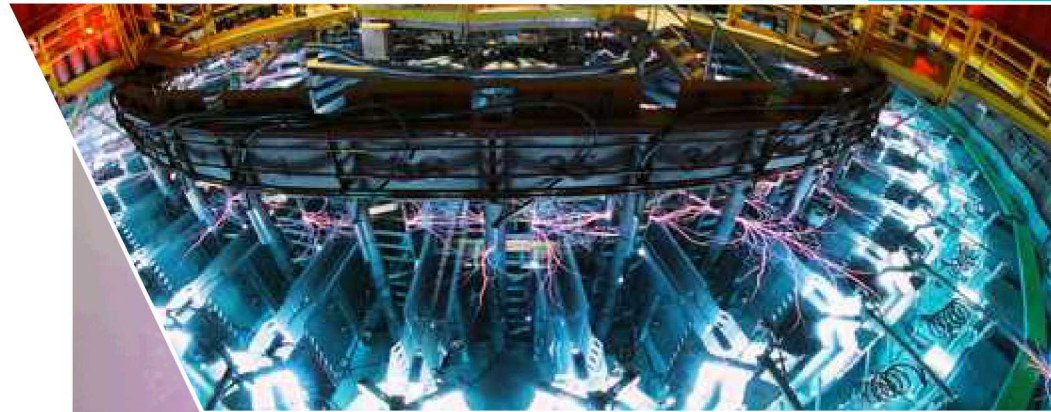
10,940 New Mexico  
1,316 California



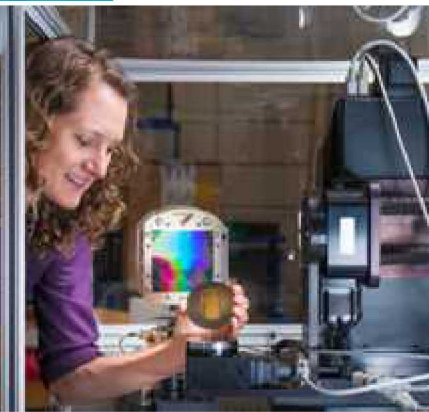
# ADVANCED SCIENCE & TECHNOLOGY

Research & Technology Development - Integral role in mission delivery

Nanodevices & Microsystems



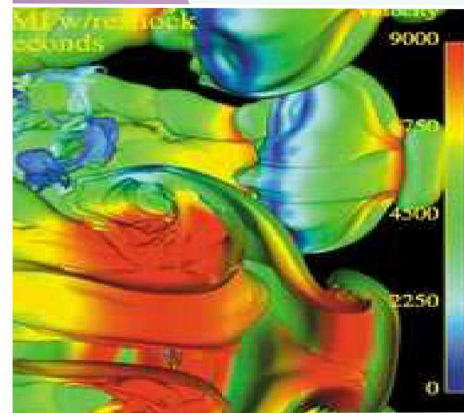
Radiation Effects & High Energy Density Science



Materials Science



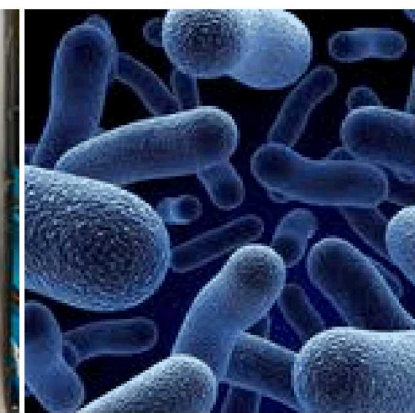
Computing & Information



Engineering Science

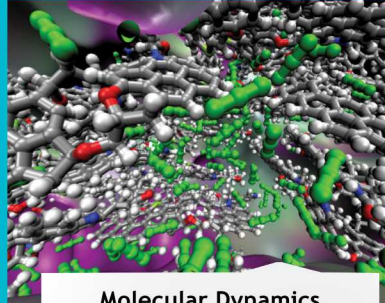


Geoscience

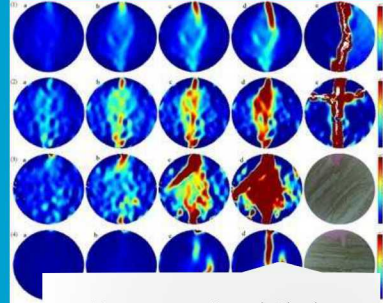


Bioscience

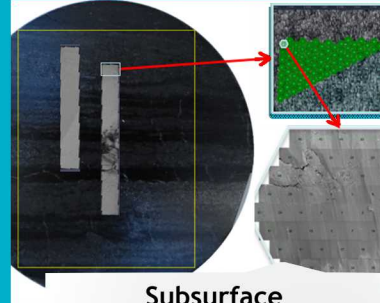
# FOSSIL ENERGY RESEARCH & APPLICATIONS



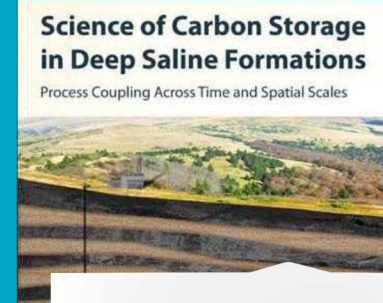
Molecular Dynamics  
Modeling & Experiments of  
Clay Materials



Unconventional Shale  
Science



Subsurface  
Characterization &  
Engineering



Science of Carbon Storage  
in Deep Saline Formations

Process Coupling Across Time and Spatial Scales

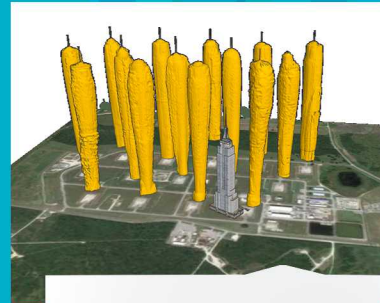
CO<sub>2</sub> Sequestration



Subsurface Integrity



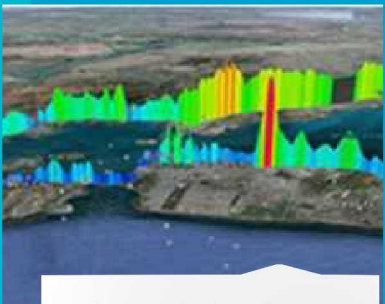
Drilling Technology &  
Downhole Tools



Strategic Petroleum Reserve



Physical and Cyber Security  
for Midstream



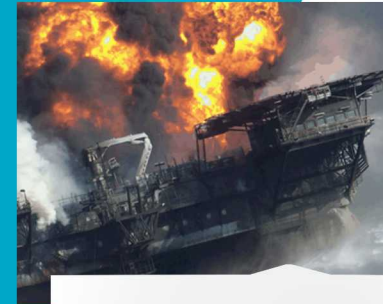
Methane, Black Carbon, CO<sub>2</sub>  
Monitoring & Optimization



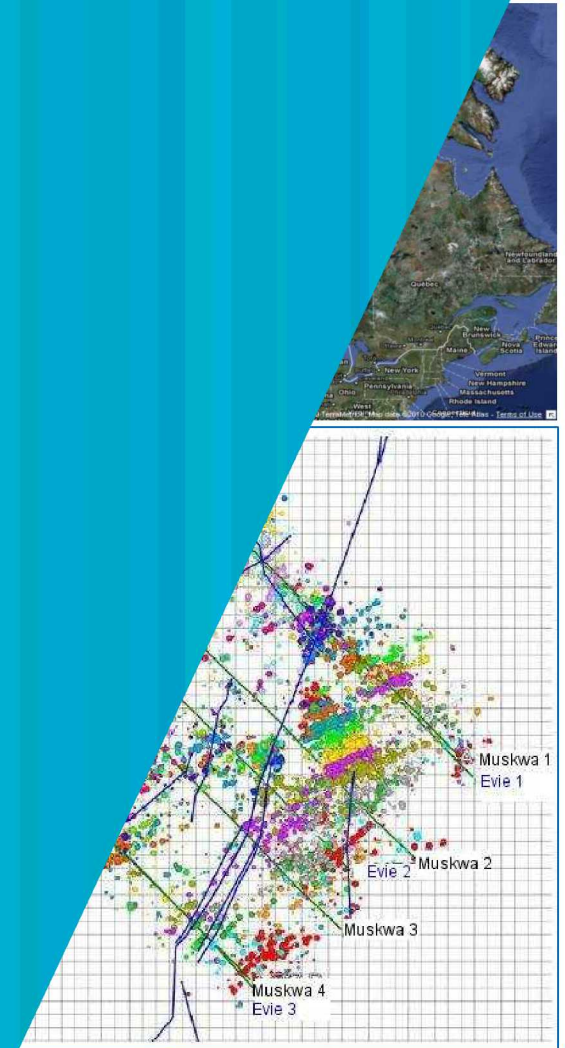
Safe Oil & Gas Transport



Consequence and regulatory  
analysis for midstream and  
downstream



Emergency Response



Well locations and production data at multiple stages in a shale gas field in the River formation, British Columbia, Canada (Data provided by KOGAS)



# ama

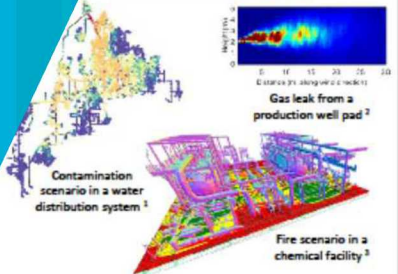
... changes in the  
... sensors can be deployed.  
... operating conditions,

... simulations to determine  
... sensor network.

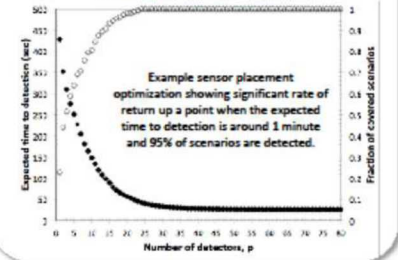
## ama

SENSOR PLACEMENT OPTIMIZATION

... software framework integrates simulations or  
... assessment from third party software



Cost benefit analysis showing detection time (black circles) and scenario coverage (open circles) for an increasing number of detectors.



<sup>1</sup> Water Network Tool for Resilience, <http://www.resilientdocks.io>  
<sup>2</sup> Modified Gaussian plume simulation  
<sup>3</sup> Kenosis Efficacy, <https://www.kenosis.com/software/efficacy/>