Sandia National Laboratories – DOE FE Oil & Gas Capabilities

Erik Webb / Leigh Cunningham

SNL FE Program

2.3 mm x 4.1 mm

- 2 x 4 mm area
- 4 nm resolution
- Data collection time: 10 min.
- 11,529 images
  - 12.5 x 10.9 μm images
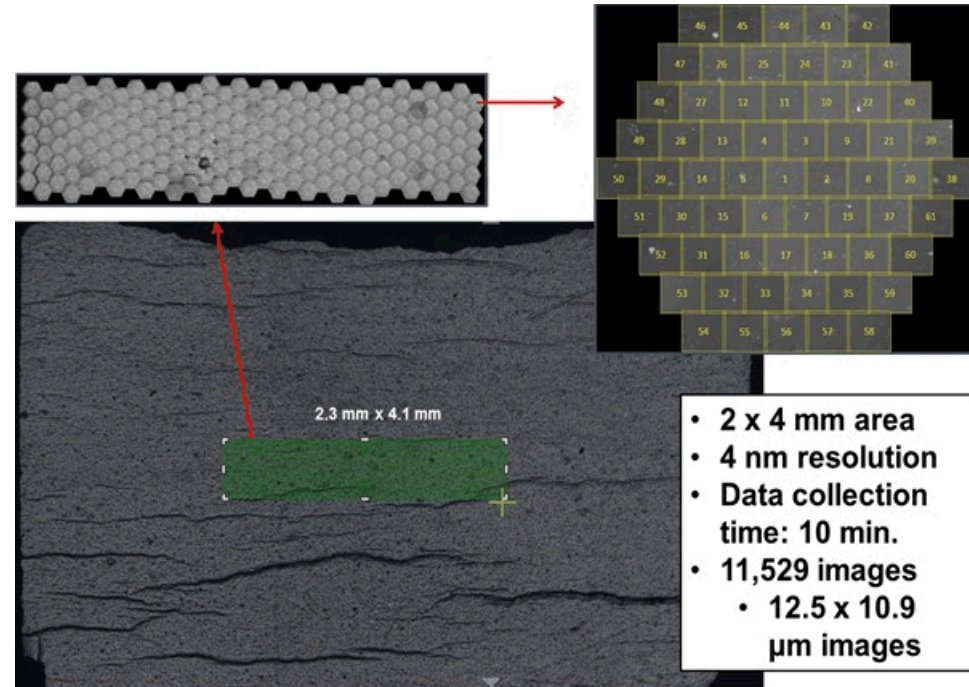
DOE Program and SNL Capabilities

Sandia National Laboratories Capability

| DOE FE O&G Challenges	Characterization, Sensing, & Imaging	Field & Pilot Scale Testing	Drilling Technology & Down Hole Tools	Robotics	Materials Design & Manufacture	Modeling & Simulation	Exascale & Data Analytics
Unconventional Efficiency	✓	✓	✓		✓	✓	✓
Produced Water Management		✓			✓	✓	✓
Midstream: Safe Transport, Infrastructure, Cyber, Integrity & Storage	✓	✓		✓	✓	✓	✓
Deepwater	✓	✓	✓	✓	✓	✓	✓

Unconventional Efficiency

Basic Research: Shale Poromechanics
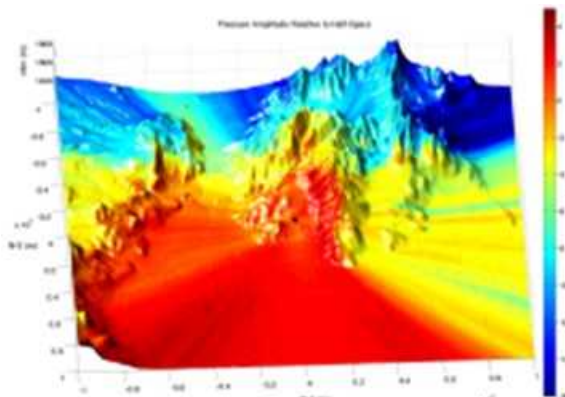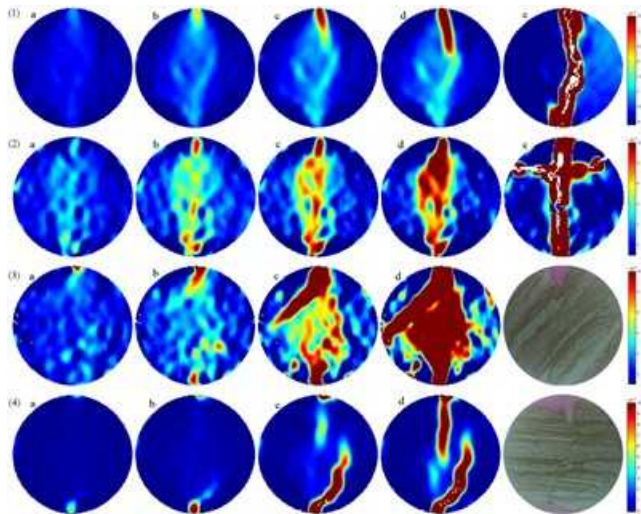
Seismic, Micro, EM, Infrasound Character & 4D analysis

Molecular, nano, micro, macro and field scale testing / modeling of integrated mechanical/chemical systems
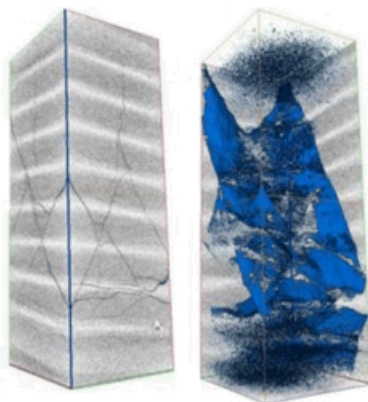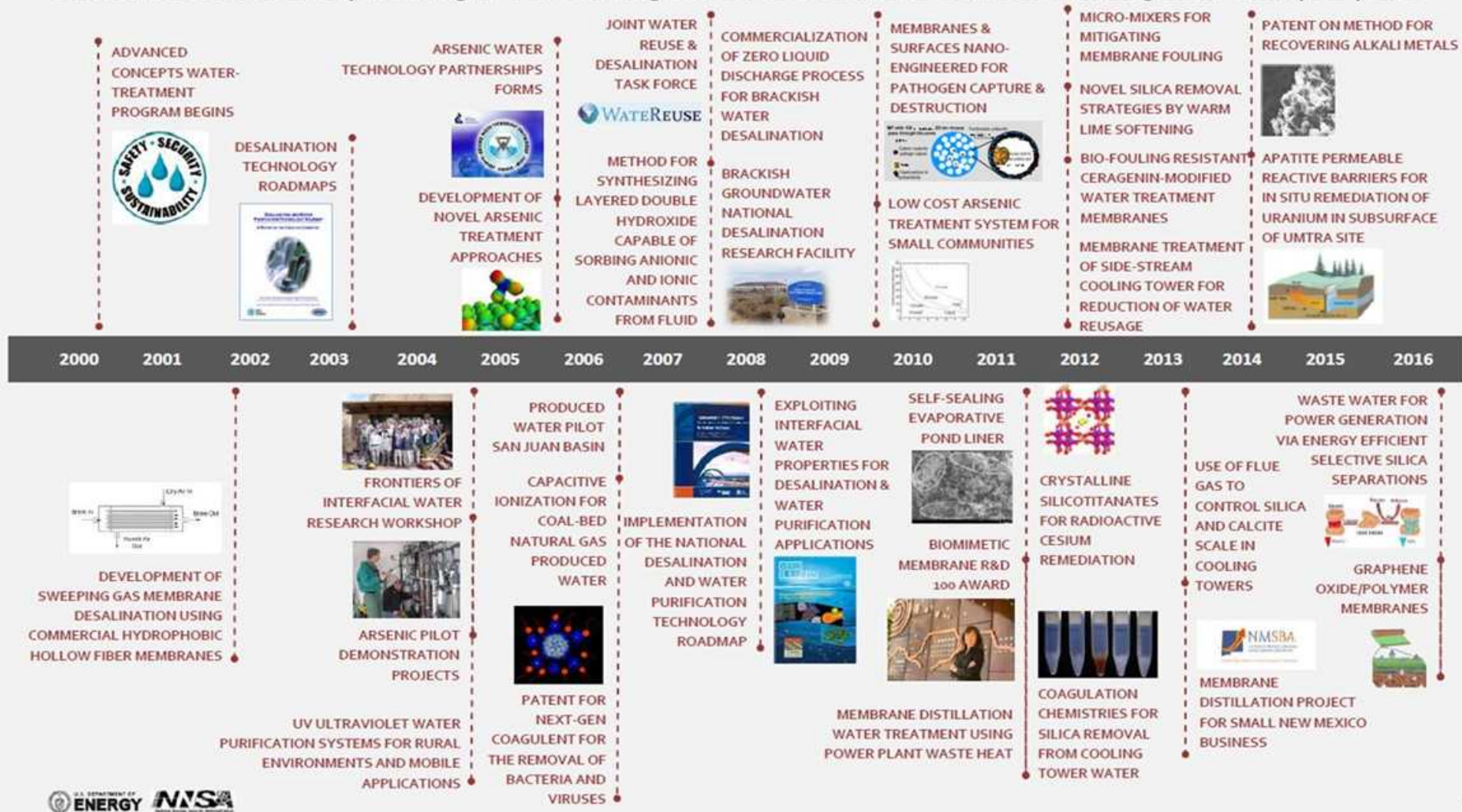
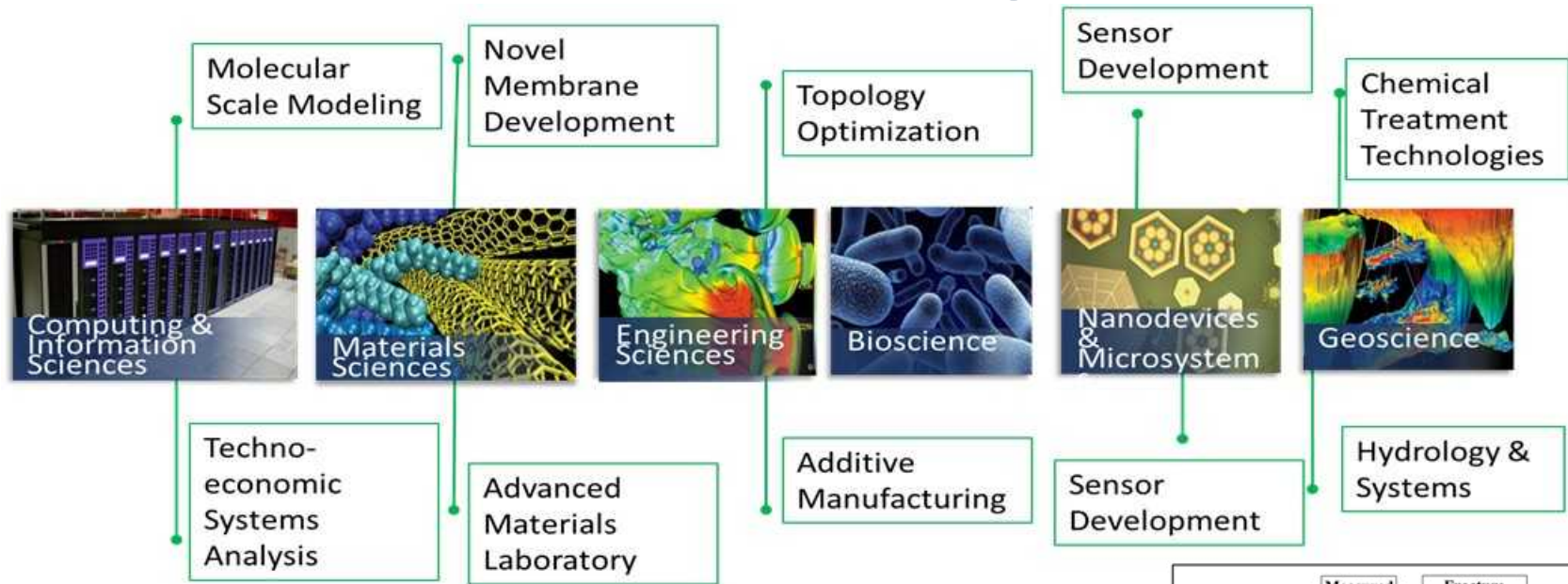**Subsurface Access, Fracking, downhole interrogation, micro/nano tools**

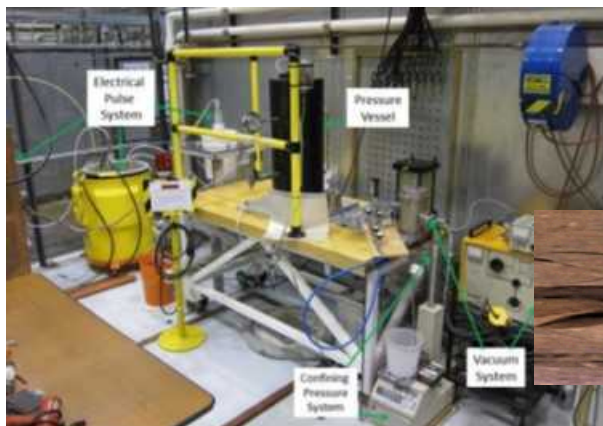# Produced Water Treatment and Analysis

Sandia has been actively working in a broad range of water treatment technical challenges for nearly 20 years
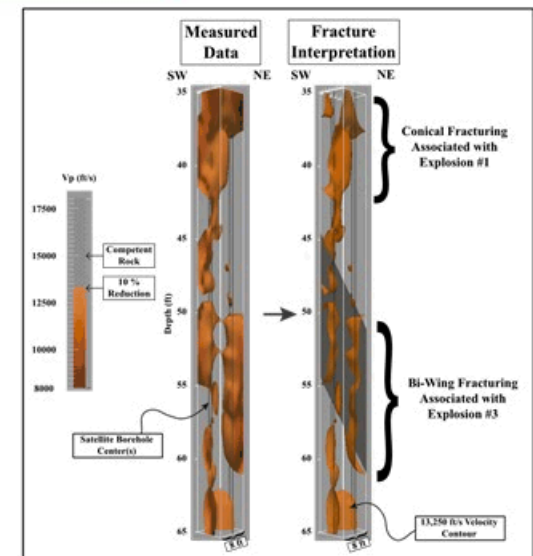
Produced Water Management

Water Treatment Technology

Efrac

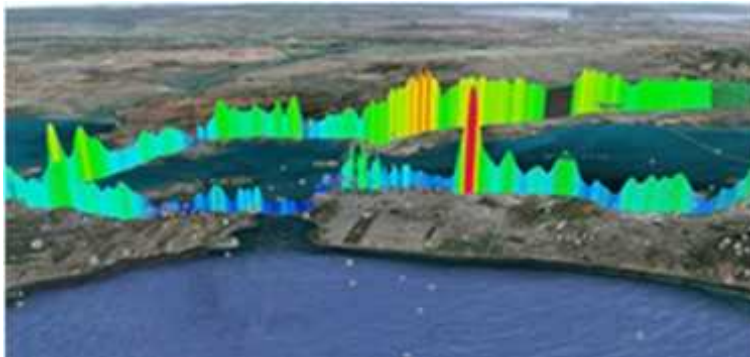**Waterless, High Energy Fracking**

Midstream:
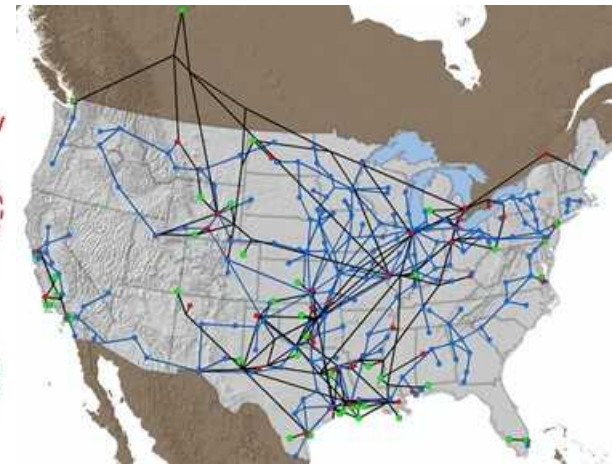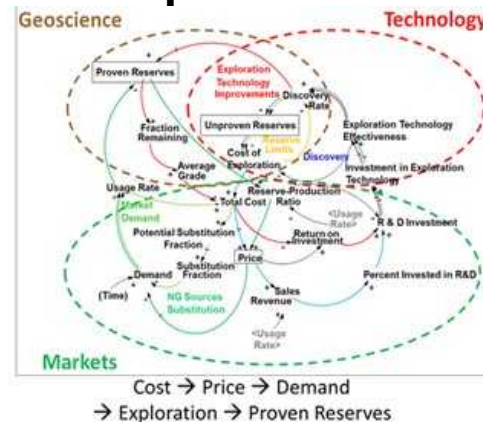## Safe Transport, Infrastructure, Cyber, Integrity & Storage

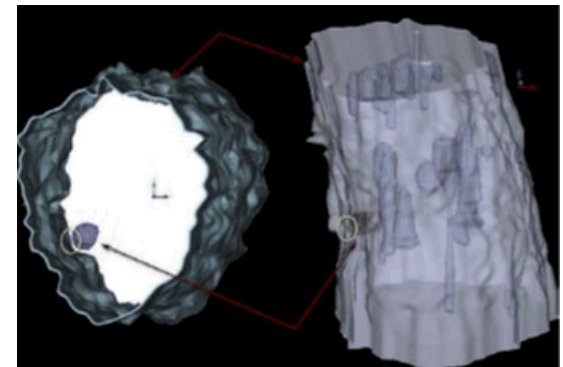**Trans liquids/gases, character, risk analysis, fire / mechanical test**

Value Chain, Nat Gas to Liquid Model

Cyber Security , Nat. Transp Fuel Model, TAP, State of Health, Risk, Systems

Methane, Black Carbon, CO2 Monitoring & Optimization

Subsurface storage of liquids/gases & Well integrity & seal materials

Deepwater

Engineered Collectives

Automation & Mobility

Embedded Analytics, Intelligence & Sensors

Logistics and Systems Optimization

Intelligent Machines & Optimized Manufacture