Center for Advanced Energy Studies

A research partnership between Boise State University, Idaho National Laboratory, Idaho State University and University of Idaho.

Center for Advanced Energy Studies

LINE Commission Panel

Ray Grosshans, Ph.D., Deputy Director

June 29, 2012

Vision: Develop Secure Sustainable Energy Solutions to 21st Century Challenges

A public/private partnership - BSU, ISU, INL, UI

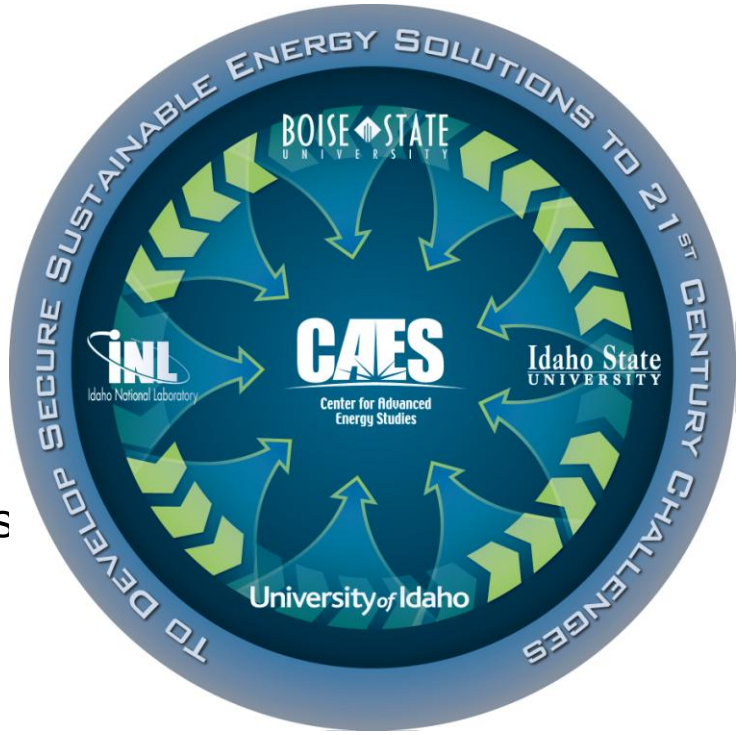
- Energy research
- Education
- Policy studies

Maximize resource utilization

- Expand researcher-to-researcher collaborations
- Improve access to research facilities & equipment
- Enhance student educational opportunities

Foster technology-based economic development

- Facilitate government, university, and industry collaboration (includes international)

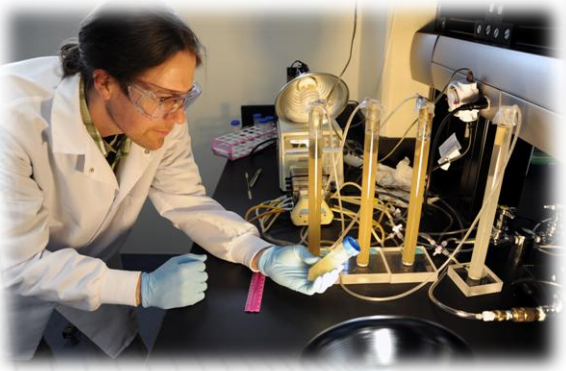


CAES Research Initiatives

Energy Efficiency

Nuclear Science & Engineering

Geofluids Energy Science



Bioenergy

Advanced Materials

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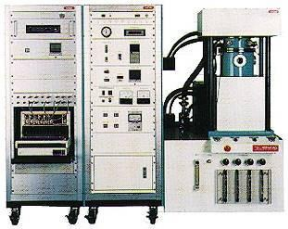
Providing state-of-the-art tools to develop the economy

Local Electrode Atom Probe
Creates 3-D images of atoms in solids

Focused Ion Beam
Sections materials at micro- and nano-scales for TEM and LEAP microscopy.

Transmission Electron Microscope
Images nano-scale material structures



Spark Plasma Sintering
Creates fully dense metals, ceramics and metal-ceramic composites

Atomic Force Microscope
Measures mechanical properties on very small scale samples

Automated Hardness Tester
Measures and evaluates the micro-hardness of materials

Scanning Electron Microscope
Images material surfaces at the nano-scale

Fabricate novel metals, ceramics and composites optimized for energy applications including fuels, vessels, piping, cladding, cellular solids and waste forms

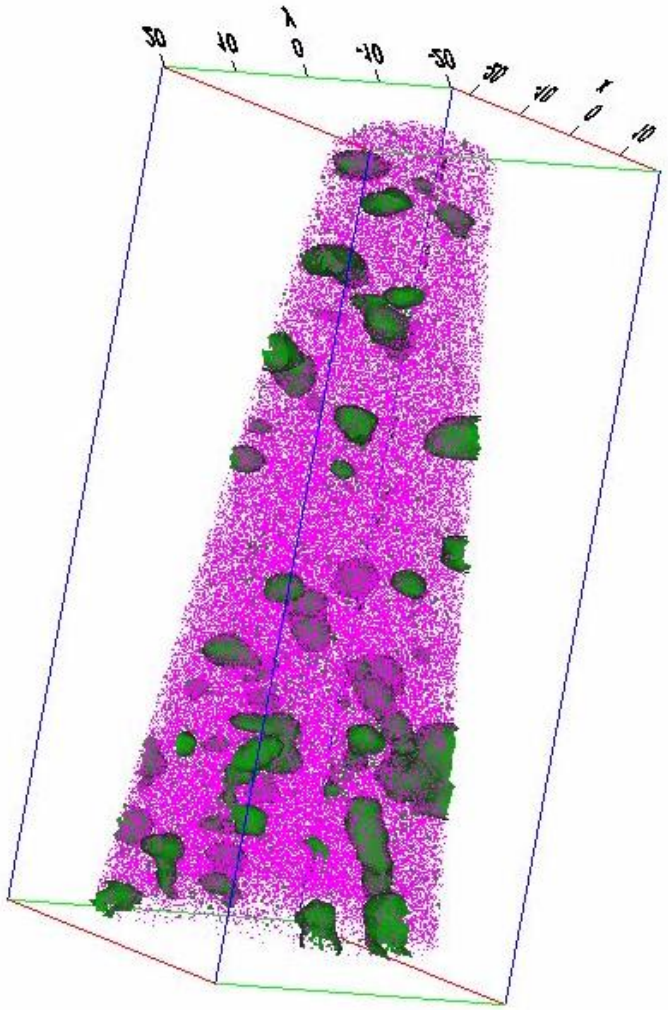
Condition materials with mechanical stress, heat and radiation (ATR)

Test material properties by destructive and nondestructive means

Characterize materials with state-of-the-art microscopy

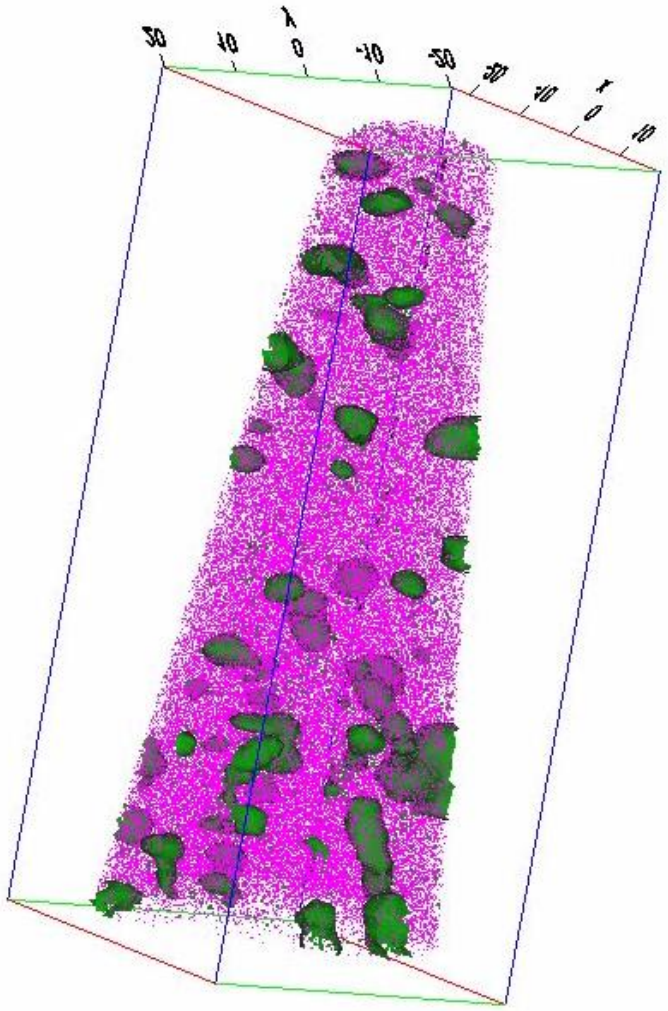
CAES Research Initiatives

Oxide-dispersion-strengthened steels (ODS alloys), containing nanosize oxide clusters.



CAES Research Initiatives

ODS alloys are very strong at very high temperatures and promise to enable new generations of energy technology



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Providing state-of-the-art tools to develop the economy

- **CAES four-wall 3D CAVE enables transformative research:**
  - **Biology**
  - **Chemistry**
  - **Physics**
  - **Material Science**
  - **Architecture**
  - **Engineering**
  - **Geology**

Providing state-of-the-art tools to develop the economy

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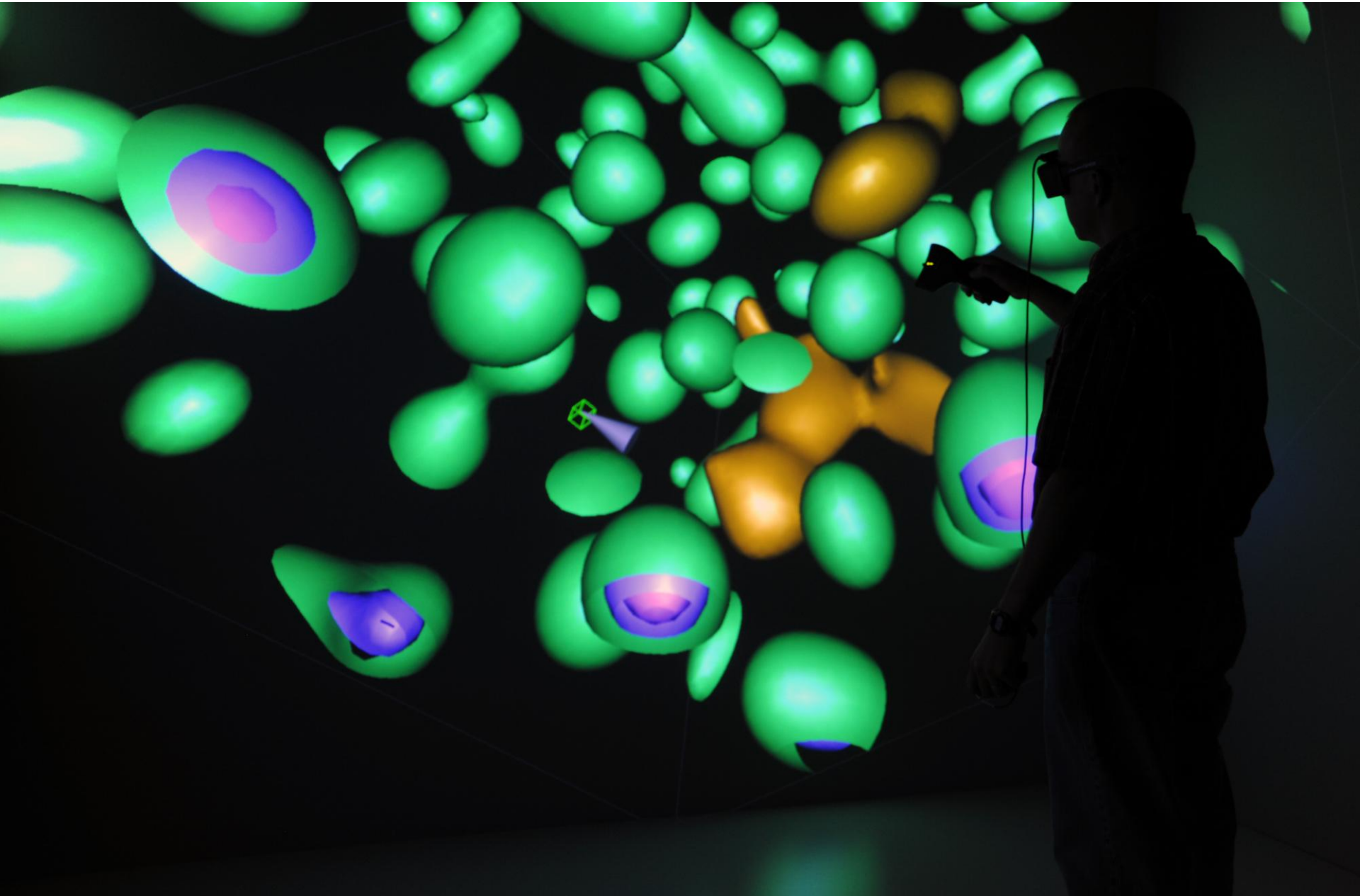
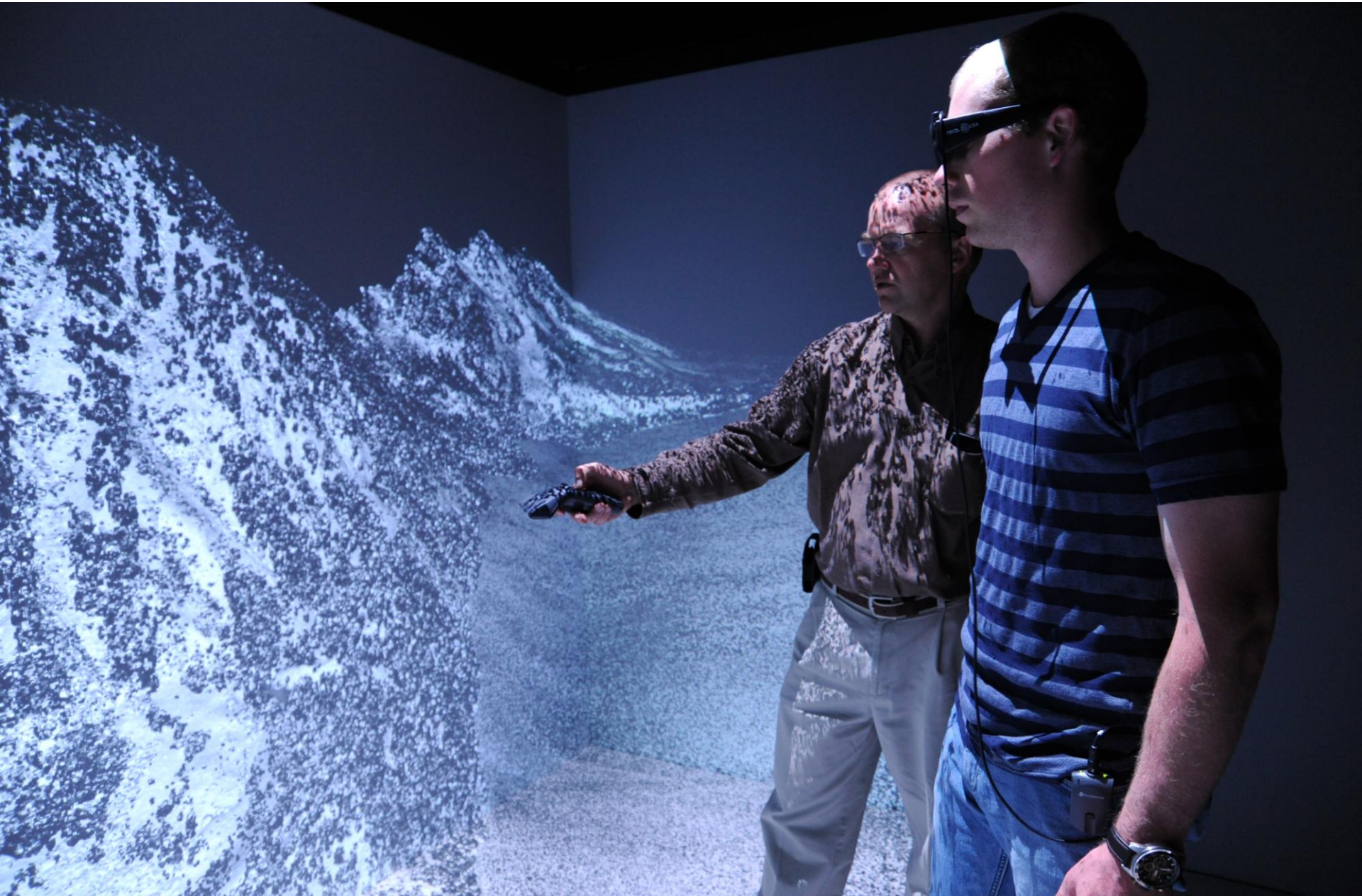


Providing state-of-the-art tools to develop the economy

CAES Center for Advanced Energy Studies



CAES Update

- **Over $45M won by CAES Affiliates :**
- **NS&E enrollments are up from a few dozen to near 500**
- **Industrial energy assessment: CAES Energy Efficiency Research Institute**
- **Leadership in energy siting and SMR analysis: CAES Energy Policy Institute**
- **Over 90 peer-reviewed publications in 2011 alone**