

# CAN THE U.S. COMPETE *in Basic Energy Sciences?*



A new report by the Basic Energy Sciences Advisory Committee underscores the critical role of scientific discovery as a cornerstone of American prosperity and compares U.S. research output and capacity to those of global competitors in areas of fundamental research critical to the U.S. Department of Energy's mission in basic energy sciences. The report's findings, based on both empirical data and broad consultation, include:

## *Other nations are rapidly catching up and overtaking the U.S.*

- An overall downward trend in competitiveness in all research areas from 2010 to the present, driven by increased investment in the E.U. and China and flat U.S. funding.
- U.S. advanced research facilities are still world-leading, but no longer unique, with major increases in capacity overseas.
- Support for mid- and small-scale instrumentation in the U.S.—historically an important source of breakthroughs—is increasingly difficult to obtain.
- The U.S. is no longer the automatic winner in the global competition for scientific talent, as other countries offer more sustained support for careers and better access to advanced research facilities.

## ABOUT THE IMAGES

Researcher Eric Gibbs from St. Jude Children's Research Hospital uses neutrons at Oak Ridge National Laboratory's High Flux reactor to study proteins that suppress cancer tumors.

(CREDIT: GENEVIEVE MARTIN/ORNL)

Imaging at the level of atoms and molecules is critical to the area of nanoscience. The development of new laboratory-scale tools, including the scanning tunneling microscope in the Tufts University laboratory of Prof. Charles Sykes—pictured here with former graduate students April Jewell (NASA Jet Propulsion Lab) and Erin Isk (Associate Professor, University of Tulsa)—have played an important role in advancing basic energy research and in workforce development. Sykes' research provides key insights into the function of new nanoscale catalysts.

(CREDIT: TUFTS UNIVERSITY)

## *How to Compete: Recommended Strategies for Success*

*Increased investment in basic energy sciences research, including both advanced research facilities and laboratory-based instrumentation.*

- Additional investment in computation, data analysis methods, computer hardware and architecture as critical for all areas of research.
- Boost support for scientists at all career stages—especially early- and mid-career investigators—to create more sustainable career paths and to enhance U.S. competitiveness for research talent.
- Balance the need to develop world-leading advanced research facilities with the need for improved access to and technical support of existing facilities, both to increase research impact and to enhance opportunities for staff scientists—thereby increasing talent retention and unleashing their creativity for instrumentation development and facility improvements.
- Better integrate energy sciences research across the full spectrum from basic to applied to industrial research, to enhance both fundamental discoveries and technological advances.

*Summary of Can the U.S. Compete in Basic Energy Sciences? Critical Research Frontiers and Strategies, U.S. DOE, October 2021.*

Download the full report at: <https://science.osti.gov/bes/Community-Resources/Reports>