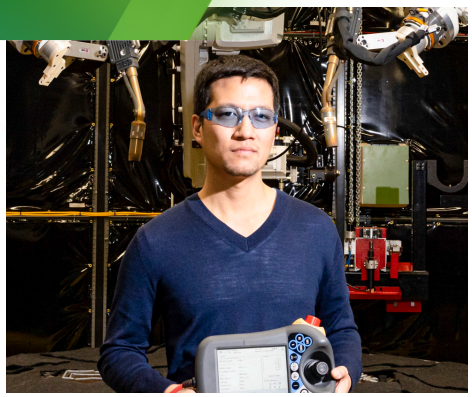
Energy and Environmental Sciences



Oak Ridge National Laboratory's energy and environmental research plays a pivotal role in America's clean, efficient energy future. Our researchers deliver breakthroughs in support of Department of Energy missions, offering a unique culture of entrepreneurship for translating science into solutions for the most critical problems facing society at the nexus of energy, environment, and security.

Our scientists and engineers work with many of America's best innovators and businesses to research, develop, and demonstrate cutting-edge technologies and to break down market barriers in sustainable transportation, renewable power, and energy efficiency for homes, buildings, and manufacturing.

We bring a multidisciplinary focus to resolve some of the biggest challenges in energy and the environment. We are identifying how gene functions affect vital ecosystem processes, creating better crops for biofuels, developing new materials for automobiles and wind turbines, and devising controls for a secure, resilient power grid.

Clean energy innovations are indispensable to effective long-term solutions in a changing environment. Accelerating their widespread application will help provide affordable, reliable energy to support a thriving economy.

630
Staff

4
Research divisions

$323 million
FY 2019 revenue

4
National user facilities

1,073
Research guests

8
Governor's chairs

"Our scientific breakthroughs push the boundaries of what's possible to provide clean, reliable, and secure energy to support a strong US economy."

Moe Khaleel, ***Associate Laboratory Director***

OAK RIDGE National Laboratory

U.S. DEPARTMENT OF ENERGY

Our Research

Biosciences—Advancing science and technology across interdisciplinary research themes in genomics, artificial intelligence, microbiology, biophysics, biosecurity, biomedical, structural biology, and plant sciences to better understand complex biological systems and their relationship with the environment

- **Center for Bioenergy Innovation**—Leading breakthroughs for a new generation of cost-effective, sustainable bioproducts and advanced biofuels

Environmental sciences—Providing solutions for society by expanding scientific knowledge and by developing innovative strategies and technologies across the environmental dimensions of energy, global and regional change, and sustainability

- **Next-Generation Ecosystem Experiments Arctic**—Advancing predictive understanding of the structure and function of Arctic terrestrial ecosystems in response to climate change
- **Spruce and Peatland Responses under Changing Environments**—Assessing the response of northern peatland ecosystems to increases in temperature and exposures to elevated atmospheric CO_2 concentrations

Energy and transportation sciences—Encompassing research and development broadly focused on building technologies, advanced manufacturing, sustainable transportation, and low-cost carbon fiber

Electrical and electronics systems research—Translating the science and engineering of measurement, instrumentation, signal processing, and electric machines into technology solutions by addressing challenges in power grid security and resilience and the nuclear, national security, clean energy, and environmental sectors

- **Grid Research Integration and Deployment Center**—Developing solutions to advance the dynamic and efficient interaction of a secure, resilient electric delivery system, buildings, and vehicles

By the Numbers
2015–2019

2,780 journal publications

579 invention disclosures

157 patent applications

156 issued patents

45 patent licenses

6 copyright licenses

119 cooperative research and development agreements

109 strategic partnership projects

DOE National User Facilities

*The **Building Technologies Research and Integration Center** develops breakthroughs to improve the energy efficiency and environmental compatibility of residential and commercial buildings, focusing on building envelopes, equipment, building systems integration, energy storage and building-to-grid interactions, sensors, transactive controls, and data modeling and simulation.*

*The **Carbon Fiber Technology Facility** provides a platform for evaluating new processing technologies and identifying high-potential, low-cost raw materials including textile, lignin, polymer, and hydrocarbon-based precursors. Using the CFTF, ORNL is developing optimal mechanical properties for carbon fiber material, focusing on structural properties and process optimization.*

*The **Manufacturing Demonstration Facility** houses integrated capabilities that drive the development of new materials, software, and systems for advanced manufacturing. From 3D tomography to in situ monitoring to digitizing manufacturing, the MDF leverages a range of equipment and expertise designed to deliver results that generate energy efficiency improvements in the manufacturing sector, efficiently use domestic energy resources, and support the secure production of clean energy products.*

*The **National Transportation Research Center** helps industry, academia, and other agencies accelerate the development and deployment of efficient and secure transportation technologies. Research focuses on electrification, efficiency of combustion and emissions, data science and connected vehicles, and materials for future systems.*

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