Environmental Sciences

The Environmental Sciences Division is an interdisciplinary R&D organization with more than 60 years of achievement in local, regional, national, and international environmental research. Researchers focus on complex challenges such as clean and available water and biological carbon dioxide capture and storage in soils. Our vision is to expand scientific knowledge and develop innovative strategies and technologies that will strengthen the nation's leadership in creating solutions to help sustain Earth's natural resources.

Addressing Fundamental Challenges

Our scientists conduct research, develop technology, and perform analyses focused on biodiversity and sustainable systems, Earth systems science, and informatics and data discovery for the environmental sciences.

Atmospheric Radiation Measurement (ARM) Data Science and Integration—Providing data and computing capabilities to advance understanding of atmospheric radiation and cloud physics

Biodiversity and Ecosystem Health—Developing methods to quantify and mitigate threats to biodiversity and ecosystem services

Biogeochemical Dynamics—Increasing understanding of how biogeochemical cycles contribute to broader environmental patterns

Bioresource Science and Engineering—Creating tools to advance understanding of bioresource sustainability and utilization

Earth Systems Modeling—Advancing predictive understanding of interactions among Earth's physical, biological, ecological, and human systems

Ecosystem Processes—Improving predictive understanding of Earth's changing ecosystems through experiments and integrated modeling

Environmental Risk and Energy Analysis—Examining human health, economic, and environmental dimensions of energy alternatives

Plant–Soil Interactions—Understanding and predicting dynamic interactions among plants, microbes, and the surrounding soil in response to environmental change

Remote Sensing and Environmental Informatics—Providing integrated data products, analytics, and systems to advance environmental sciences

Water Resource Science and Engineering—Using multidisciplinary research and engineering to advance water resource science and solutions

Watershed Systems Modeling—Developing integrated models for water and waterborne constituents in watersheds

12,500
Atmospheric and biogeochemical data products

95
Scientists and engineers

1 billion
Tons of potential sustainable biomass resources identified

814
Publications in the past 5 years

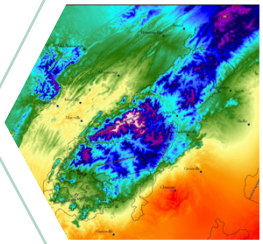
40-year
Mystery solved with mercury methylation gene discovery

"Our researchers advance understanding of the natural world from the molecular to the global scale in Earth system science."

Eric Pierce, ***Director, Environmental Sciences Division***

Unique Research Capabilities

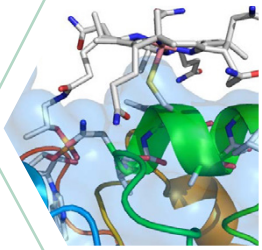
ARM Data Center—Delivering integrated computing and data on atmospheric radiation to inform climate research models



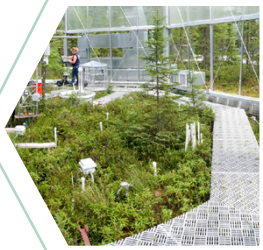
ORNL Distributed Active Archive Center (ORNL DAAC) for Biogeochemical Dynamics—Providing scientists and stakeholders with access to biogeochemical and ecological data and models

Aquatic Ecology Laboratory—Understanding aquatic ecosystem interactions to develop technologies and solutions that will sustain energy and water resources

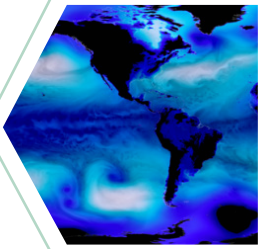
Next-Generation Ecosystem Experiments (NGEE Arctic)—Advancing predictive understanding of the structure and function of the Arctic terrestrial ecosystems in response to climate change



Biogeochemical Transformations at Critical Interfaces—Examining exchange and feedback processes occurring at critical interfaces that control mercury biogeochemical fate and transformation



Spruce and Peatland Responses Under Changing Environments (SPRUCE)—Assessing the response of northern peatland ecosystems to increases in temperature and exposures to elevated atmospheric CO_2 concentration



Climate Change Science Institute—Integrating expertise in measurements, data, and simulation to improve understanding and prediction of a changing climate

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January 2021