

PHYSICAL & COMPUTATIONAL SCIENCES

Pacific Northwest National Laboratory (PNNL) is advancing the frontiers of discovery science, laying foundations for new technologies in support of Department of Energy (DOE) missions in science, energy, environment, and national security.

CHEMISTRY & MATERIALS SCIENCE

PNNL has deep chemistry expertise in catalysis, chemical physics, computational chemistry, geochemistry, heavy element chemistry, physical biosciences, and separations. Our strengths in materials science include quantum and nanoscale materials synthesis, defect formation, and materials for extreme environments.

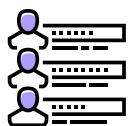
ADVANCED COMPUTING & DATA SCIENCES

Our research advances emerging computing technologies, including quantum information systems. We are designing new data analysis and visualization tools, developing artificial intelligence and machine learning algorithms, and optimizing system performance and energy efficiency.

NUCLEAR & PARTICLE PHYSICS

PNNL scientists explore fundamental questions about the nature and origins of the universe and contribute to the scientific community's efforts to characterize neutrinos. PNNL's dark matter detection technologies play key national security roles in detecting illicit nuclear materials and in treaty verification.

PNNL BY THE NUMBERS (2022 DATA)



5,702

Number of Staff



1,905

Peer-Reviewed
Publications



84

U.S. & Foreign
Patents

Where great minds meet great challenges.

Researchers at PNNL are tackling some of the world's greatest science and technology challenges in support of the DOE Office of Science.

SIGNATURE FACILITIES

PNNL is home to unique research facilities at the heart of efforts to discover new knowledge and develop technologies addressing national energy, environmental, and security needs.



Energy Sciences Center

This new \$90-million facility unites PNNL's capabilities in chemistry, materials science, and quantum computing to foster collaboration, drive innovation, and support the United States in maintaining global scientific and technological leadership in decarbonization and next generation energy materials.



Center for Advanced Technology Evaluation

CENATE is a unique computing proving ground focused on integrated evaluation of early-stage technologies to predict their performance, detect potential shortcomings, and guide system design.



Institute for Integrated Catalysis

The IIC explores and develops the chemistry and technology of catalyzed processes that enable a carbon-neutral future.

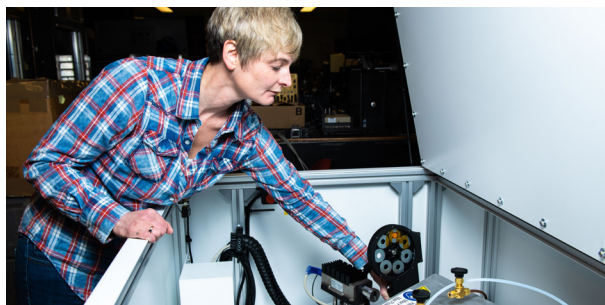
INSTRUMENTATION

PNNL's staff and partners draw on the laboratory's state-of-the-art scientific tools and instrumentation for research in many areas including:

- Spectroscopy
- Electron Microscopy
- Computation
- Data Visualization and Analysis

ENERGY FRONTIER RESEARCH CENTERS

PNNL leads two DOE Energy Frontier Research Centers (EFRCs). These bring together creative, multi-disciplinary teams from research institutions nationwide to tackle tough scientific challenges that hinder advances in energy technologies. EFRCs leverage powerful new tools for characterizing, understanding, modeling, and manipulating matter across scales. EFRCs also play a critical role in training the next-generation energy science workforce by attracting talented students and postdoctoral researchers.

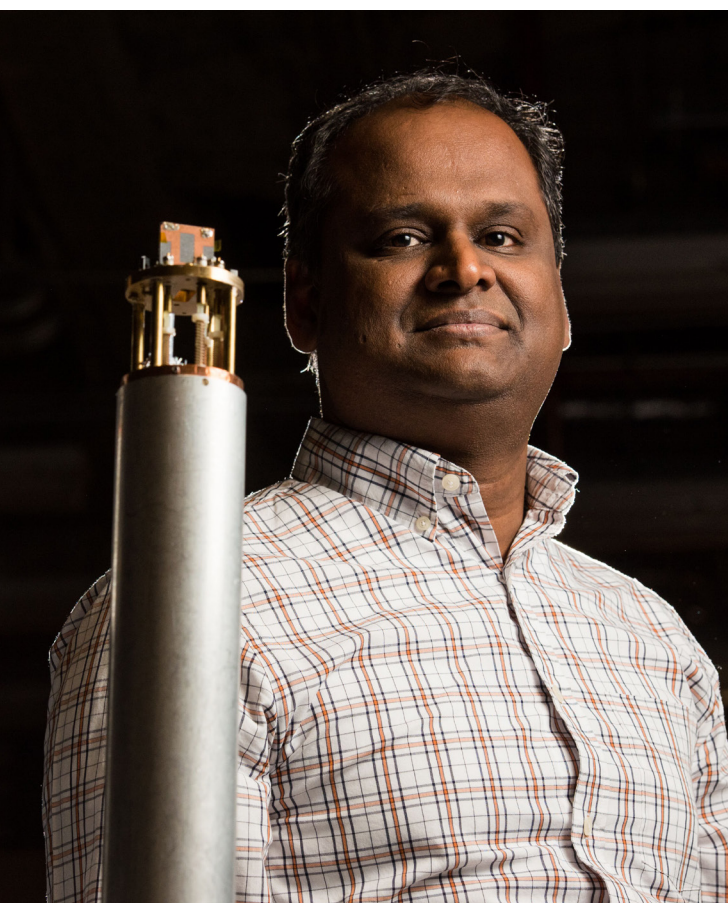


Center for Molecular Electrocatalysis

The CME seeks to design electrocatalysts that efficiently convert and store electrical energy in the chemical bonds of molecules, and that can convert energy stored in molecules to electricity.

Interfacial Dynamics in Radioactive Environments and Materials

IDREAM conducts fundamental science to support innovations in retrieving and processing high-level radioactive waste.



ENERGY INNOVATION HUBS

DOE's multi-institutional, interdisciplinary Energy Innovation Hubs combine basic and applied research with engineering to accelerate scientific discovery and address critical energy issues. DOE's five Energy Innovation Hubs, founded in 2010, are modeled on the approach to science management exemplified by the Manhattan Project and AT&T's legendary Bell Laboratories. PNNL is a core partner of the Joint Center for Energy Storage Research (JCESR), a DOE Energy Innovation Hub.

JCESR is dedicated to designing and building transformative battery materials for transportation, electric power systems, and electric flight.

Scientific Discovery with Global Impact.

Major Initiatives of the Physical and Computational Sciences at PNNL:
Strategic investments to push scientific frontiers.

RESOURCE EFFICIENT CHEMICAL CONVERSIONS AT CONTROLLED REACTION INTERFACES

Designing and synthesizing new catalysts and energy storage materials to help close the carbon cycle.

SCALABLE MACHINE REASONING FOR SCIENTIFIC DISCOVERY

Advancing computing and artificial intelligence to enable scientific discovery to accelerate autonomous science.

DATA FOR THE PHYSICAL SCIENCES

Developing robust, interpretable, domain-aware platforms for scientific discovery.

THE QUANTUM WORLD

Simulating chemicals and materials with greater accuracy and improving quantum device performance through advances in new materials systems.

THE SCIENCE OF THE UNIVERSE

Studying neutrino physics and searching for dark matter to reveal the universe's foundational constituents and principles.

Learn more: pnnl.gov

Explore Job Opportunities: www.jobs.pnnl.gov

PNNL BY THE NUMBERS (2021 DATA)



4

R&D100 & Federal Lab
Consortium Awards



\$1.34B

Annual Budget



1,200+

Active Science &
Technology Projects