Pacific Northwest National Laboratory
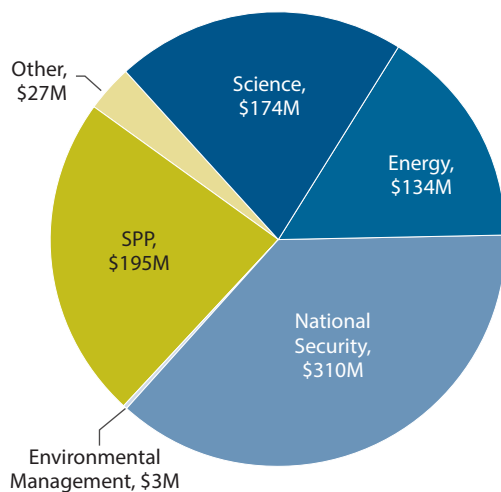## At a Glance

U.S. DEPARTMENT OF ENERGY

Pacific Northwest National Laboratory (PNNL), as the nation's premier chemistry, earth science and data analytics Laboratory, conducts world-leading research and development to address the nation's most challenging problems in energy resiliency and national security. In particular, our researchers provide national and international leadership in energy storage, grid modernization, nuclear non-proliferation and cyber security – all for the purpose of keeping the U.S. safe, secure and strong. Our deep technical capabilities enable us to make scientific breakthroughs, deliver leading-edge technologies and drive innovations to market that support U.S. prosperity, job creation and economic competitiveness.

FY 2016 Funding by Source

- Other, $27M
- Science, $174M
- Energy, $134M
- SPP, $195M
- National Security, $310M
- Environmental Management, $3M

Lab operating costs: **$842M**
DOE/NNSA costs: **$250M**
SPP costs (non-DOE/non-DHS): **$195M**
SPP as % total Lab operating costs: **23%**
DHS costs: **$60M**

Facts

Location: Richland, Washington
Type: Multiprogram Laboratory
Year Founded: 1965
Director: Steven Ashby
Contractor: Battelle Memorial Institute
Responsible Site Office: Pacific Northwest Site Office

Physical Assets

582 acres and **77** buildings
2,309,553 GSF in buildings (total)
Replacement plant value: **$772,028,671**
962,119 GSF in leased facilities

Human Capital

4,183 full-time equivalent employees (FTEs)
55 joint appointments
259 postdoctoral researchers
469 undergraduate students (cumulative)
433 graduate students (cumulative)
1,814 facility users
100 visiting scientists

Core Capabilities

- Advanced Computer Science, Visualization and Data
- Applied Materials Science and Engineering
- Applied Mathematics
- Biological and Bioprocess Engineering
- Biological Systems Science
- Chemical Engineering
- Chemical and Molecular Science
- Climate Change Science and Atmospheric Science
- Computational Sciences
- Condensed Matter Physics and Materials Science
- Cyber and Information Sciences
- Decision Science and Analysis
- Earth Systems Science and Engineering
- Environmental Subsurface Science
- Large Scale User Facilities/Advanced Instrumentation
- Nuclear Engineering
- Nuclear and Radio Chemistry Particle Physics
- Power Systems and Electrical Engineering
- Systems Engineering and Integration
- Environmental Molecular Sciences Laboratory
- General Purpose Chemistry Laboratory
- Marine Sciences Laboratory (Sequim, Washington)
- Radiochemical Processing Laboratory
- Systems Engineering Building, which includes the Electricity Infrastructure Operations Center

Mission Unique Facilities

- Atmospheric Radiation Measurement (ARM) Climate Research Facility
- Applied Process Engineering Laboratory
- Bioproducts, Sciences and Engineering Laboratory

Pacific Northwest
NATIONAL LABORATORY

Pacific Northwest National Laboratory
Accomplishments

U.S. DEPARTMENT OF ENERGY

Unique Facility
### At EMSL, Team is in our DNA

The Environmental Molecular Sciences Laboratory (EMSL) is a national scientific user facility located at PNNL and sponsored by DOE's Office of Biological & Environmental Research. EMSL draws together the global scientific community and assembles the people, instruments and resources for molecular-level discoveries and predictive understanding to accelerate solutions for national energy and environmental challenges. The nearly 800 scientists who use EMSL's 150 experimental instruments and high-performance supercomputer each year are gaining a deeper understanding of molecular-level processes needed to advance predictive, systems-level understanding of climate, biological, environmental and energy systems.

Research Highlight
Creating Tomorrow's Efficient, Affordable Electric Vehicle Batteries
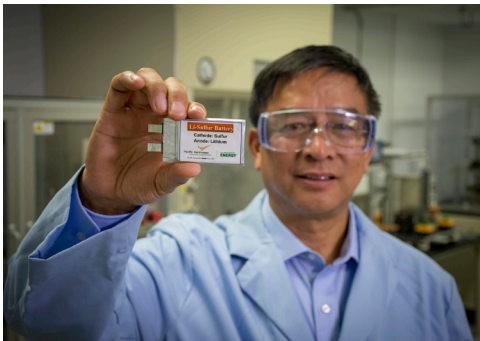
The PNNL-led Battery500 consortium aims to significantly improve the batteries that power today's electric vehicles by nearly tripling the amount of "specific energy" in lithium batteries, that is, the amount of energy packed into a battery based on its weight. Higher specific energy reduces cost and enables electric vehicles to be driven farther without adding battery weight. The multidisciplinary research group includes leaders from DOE national labs, universities and industry. The team is focusing on advancements to lithium-metal batteries in three specific areas: materials and interfaces, architecture of electrodes and improved cell design. The team has already made progress in improving the stability of the electrode materials and has discovered new approaches to protect the lithium metal. The ultimate goal of the consortium is to deliver smaller, lighter and less expensive batteries that can be seamlessly adopted by manufacturers.

Technology to Market Highlight
Protecting Consumers from Cyber Attacks

Drawing on data analytics and computational modeling capabilities, PNNL developed analytical software to protect consumers and retail companies from cyber attacks in near real time. The innovation addresses a growing need to analyze huge amounts of data efficiently and effectively to spot threats in time to thwart an attack. PNNL licensed the award-winning technology to Champion Technology Company, whose resulting Darklight® software automates the understanding and decision-making processes that are typically performed by a security analyst for cyber defense and information sharing. The artificial intelligence system is customizable and continuously learns based on contextual data from the company it's protecting. The versatile software is also capable of analyzing financial services and health care data.