

Pacific Northwest National Laboratory

EPSCoR Conference

16 June 2005



Kelly O. Sullivan, Ph.D.
Director, University Partnerships

Battelle

PNNL-SA-45521
**Pacific Northwest
National Laboratory**
Operated by Battelle for the
U.S. Department of Energy

Pacific Northwest National Laboratory



**W.R. Wiley
Environmental Molecular Sciences
Laboratory**



The Guest House at PNNL



Research Operations Building

**PNNL-SA-45521
Pacific Northwest National Laboratory
U.S. Department of Energy**

PNNL in the Northwest



Battelle: A Leader in Technology Development and Lab Management



Battelle Corporate Headquarters
Columbus, Ohio



Pacific Northwest National
Laboratory
Richland, Washington



Brookhaven National Laboratory
Long Island, New York



Oak Ridge National Laboratory
Oak Ridge, Tennessee



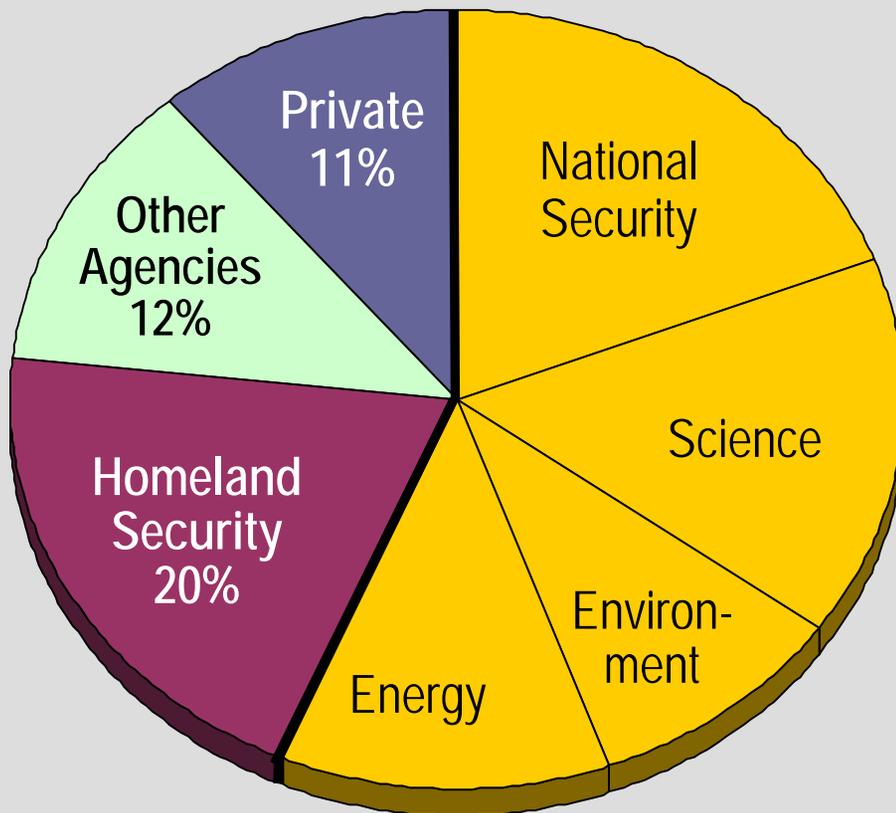
Idaho National Laboratory
Idaho Falls, Idaho



National Renewable Energy
Laboratory
Golden, Colorado

PNNL-SA-45521
Pacific Northwest National Laboratory
U.S. Department of Energy

PNNL is the Office of Science's Most Diversified Laboratory



Business Volume (\$M)

	<u>FY04</u>	<u>Est. FY05</u>
Dept. of Energy	410	428
DHS	67	153
Other Agencies	82	93
Battelle Private	<u>79</u>	<u>85</u>
Total	638	759

Department of Energy
FY05 Est. 57%
 (FY04 Actual 64%)

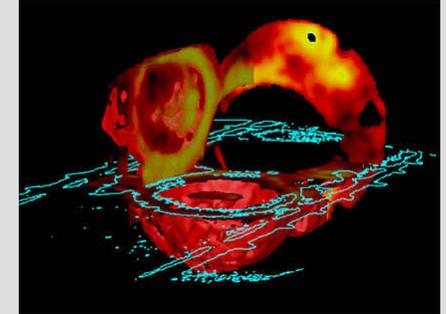
Delivering High-Impact Science



Leading the emergence of Systems Science

PNNL's science foundation:

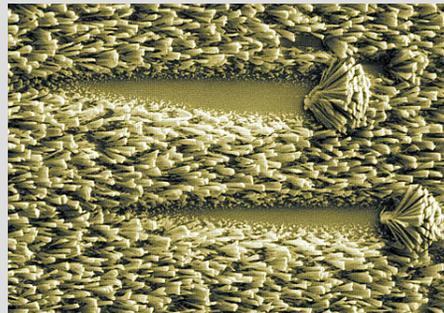
- Systems Science
- Expert research teams
- High-performance computing
- Unique, powerful research instrumentation



Creating an infrastructure for understanding complex cellular networks



Applying high-performance computing across science signatures

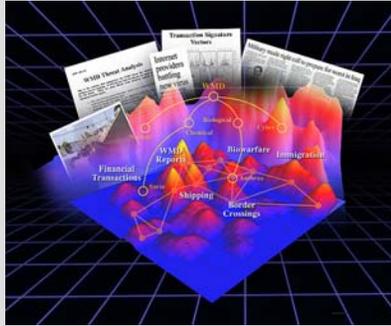


Exploring nanoscience and interfacial chemical catalysis



Expanding knowledge of climate change

National and Homeland Security



Visual analytics tools for intelligence, counter-intelligence, counter-terrorism and cyber security

Science-based solutions for:

- Protecting U.S. homeland, international borders, air and sea ports
- Monitoring nuclear treaties, preventing and detecting proliferation, countering WMD terrorism.



High-sensitivity, high-precision instrumentation for proliferation detection



Training border agents to detect smuggling of weapons of mass destruction



Facilitating military transformation with innovative technologies

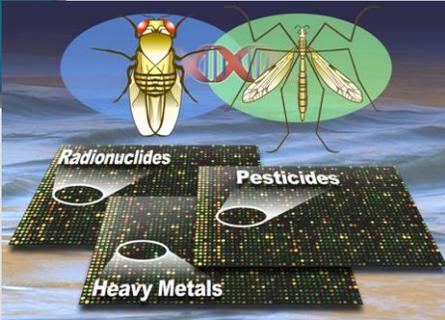


Field-deployable tools for early detection of chemical and biological weapons attacks

PNNL-SA-45521

Pacific Northwest National Laboratory
U.S. Department of Energy

Environmental Quality and Security



Environmental biomarkers for early warnings

Science-based solutions for:

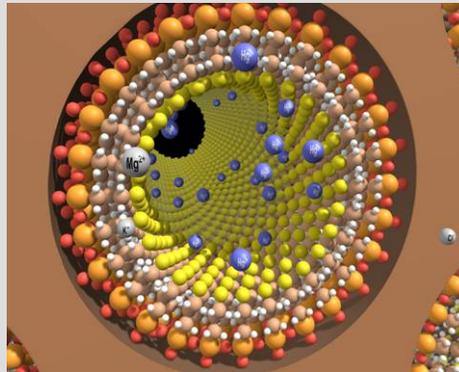
- Preventing environmental damage before it occurs
- Preventing or recovering from environmental attacks
- Lowering the environmental cost of energy production and economic development
- Cleaning up and safely storing legacy waste.



Standards for radiation detection instruments



Advanced catalysts and fungal bioreactors for biomass conversion



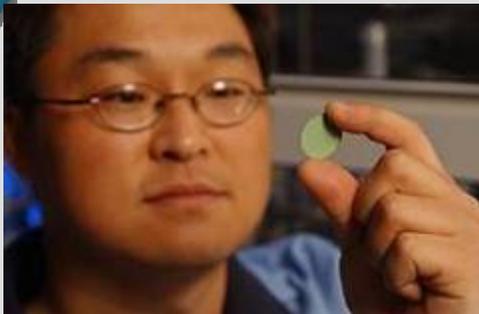
Nanogetters for radioactive materials



Technical solutions for waste vitrification

PNNL-SA-45521

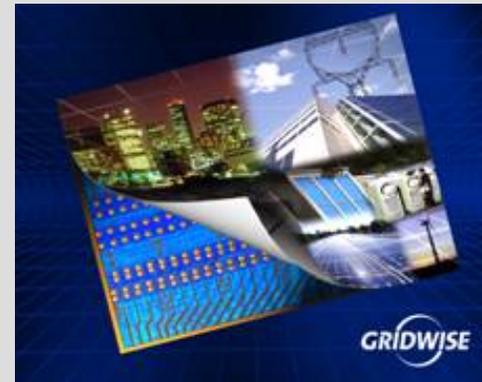
Clean, Secure and Affordable Energy



Developing low-cost, high-efficiency solid oxide fuel cells

Science-based solutions for:

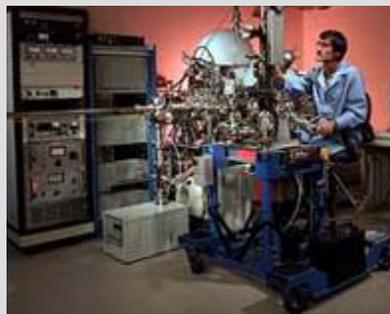
- Reducing dependence on foreign oil
- Minimizing the energy system's effect on the environment
- Improving efficiency, security and reliability .



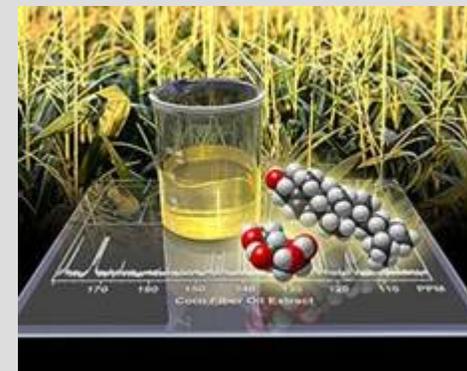
Moving the energy system into the information age



Increasing efficiency and reducing emissions in vehicles



Addressing hydrogen storage and hydrogen safety



Converting agricultural byproducts into high-value chemicals

PNNL-SA-45521

Pacific Northwest National Laboratory
U.S. Department of Energy

Computational and Information Sciences



High-performance, data-intensive computing and world-class computational resources

Enabling discoveries through:

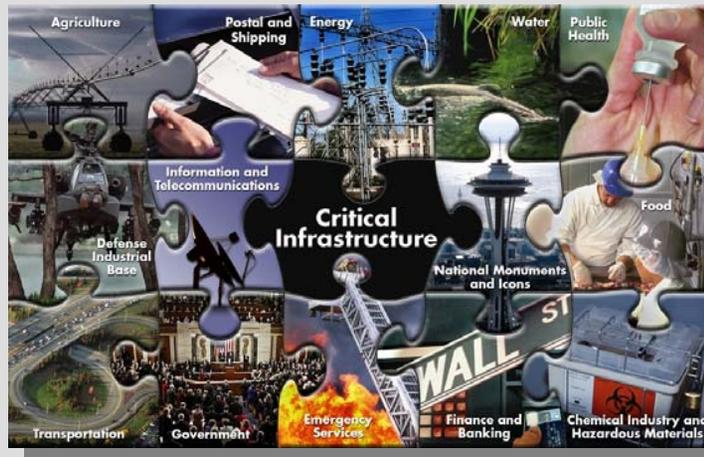
- R&D in science-driven computing
- Integration of computational and information sciences, statistics and mathematics



National Knowledge Centers



High-bandwidth networking that links science and technology resources



Intrinsically secure computing



Information Technology Services

EMSL: A Key Research Facility at PNNL

- ▶ National User Facility
- ▶ Apply for time online at <http://www.emsl.pnl.gov>
- ▶ Full listing of instrumentation and key contacts online
- ▶ Grand challenges issued for major instrumentation allocations



Environmental Molecular Sciences Laboratory

PNNL-SA-45521

Pacific Northwest National Laboratory
U.S. Department of Energy

New Grand Challenge Projects

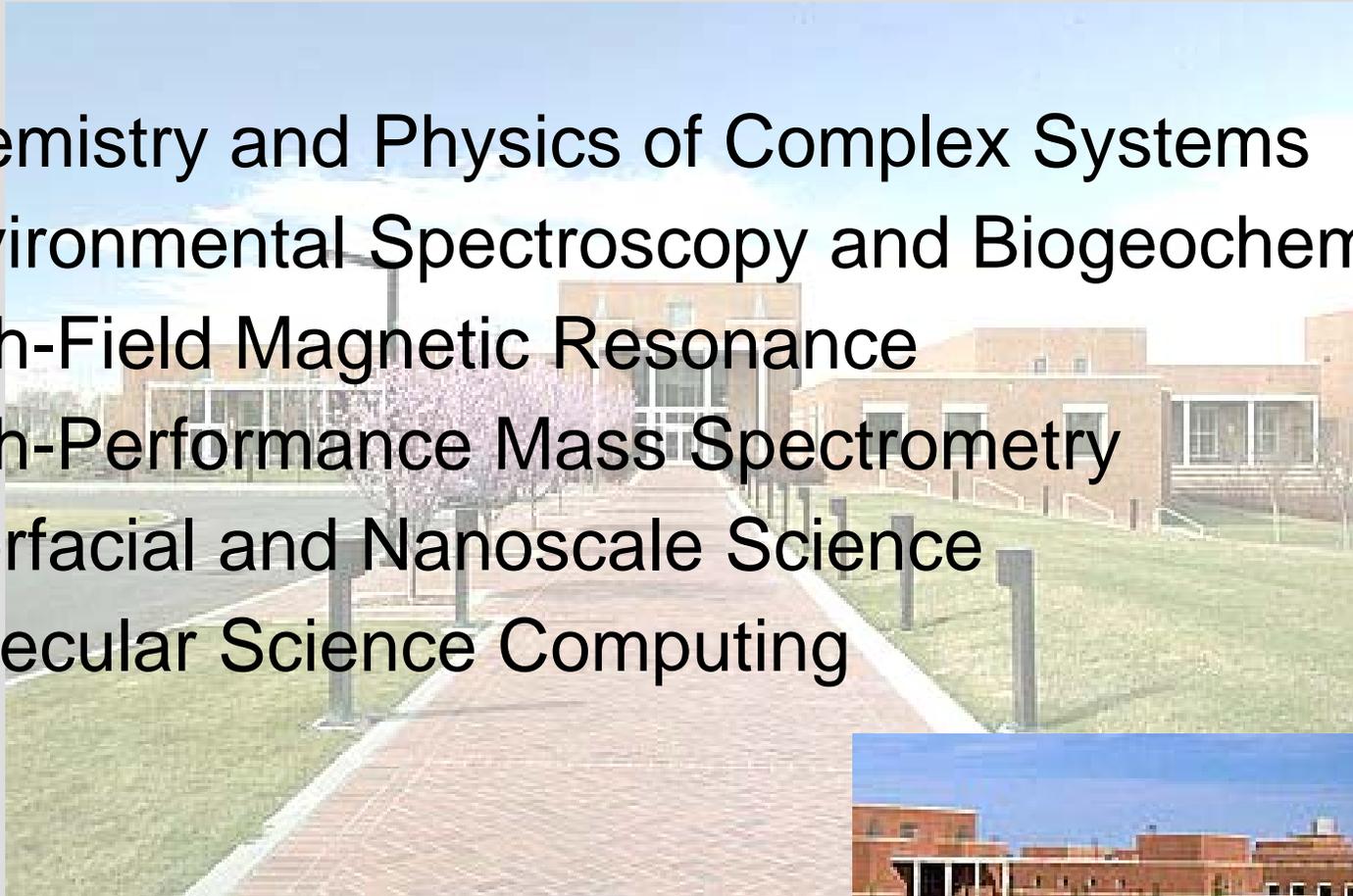
- ▶ Scientists team up for multiyear studies of microbial mysteries - more than two dozen researchers from 16 institutions will participate in the three-to-five-year studies
 - Investigations of the biology of membrane proteins in cyanobacteria, important microorganisms involved photosynthesis in the world's oceans.
 - Probing the fundamental question of how subsurface metal-reducing bacteria interact with and transfer electrons to the mineral surfaces on which they live.
 - Potential applications of the knowledge gained include groundwater remediation, carbon sequestration and energy generation.

EMSL is already one of the Department of Energy's most successful national user facilities, so it is a fitting place to attempt such ambitious grand challenges, where we can pair large groups of our most talented scientists with our most sophisticated analytical tools to look at very specific and vexing scientific problems.

-- Dr. Raymond Orbach, Director of DOE's Office of Science

EMSL Facilities

- ▶ Chemistry and Physics of Complex Systems
- ▶ Environmental Spectroscopy and Biogeochemistry
- ▶ High-Field Magnetic Resonance
- ▶ High-Performance Mass Spectrometry
- ▶ Interfacial and Nanoscale Science
- ▶ Molecular Science Computing



PNNL-SA-45521

Pacific Northwest National Laboratory
U.S. Department of Energy

Questions?



Pacific Northwest National Laboratory

Operated by Battelle for the
U.S. Department of Energy

<http://www.pnl.gov/>