Accelerating Scientific and Technological Breakthroughs

PNNL’s role in advancing research in emerging fields

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Tracing the roots of PNNL

Albert Einstein
“Miracle Year” of 1905

His groundbreaking work vastly changed our notions about the universe

Though a pacifist, he wrote letter to FDR about U.S. atomic weapons research in 1939

Manhattan Project leads to creation of Hanford site and forerunner labs of PNNL
Pacific Northwest National Laboratory

W.R. Wiley Environmental Molecular Sciences Laboratory

The Guest House at PNNL

Research Operations Building
PNNL at a glance

- 4,000 staff
- $638 million in R&D expenditures (FY ’04)
- Science, computational capabilities serve as foundation
- More than 1,200 patents and 200 active licenses
DOE’s overarching mission:

“To advance the national, economic and energy security of the United States; to promote scientific and technological innovation in support of that mission; and to ensure the environmental cleanup of the national nuclear weapons complex…”
PNNL is the DOE Office of Science’s most diversified laboratory

### Business Volume ($M)

<table>
<thead>
<tr>
<th>Department</th>
<th>FY04</th>
<th>Est. FY05</th>
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<tbody>
<tr>
<td>Dept. of Energy</td>
<td>410</td>
<td>428</td>
</tr>
<tr>
<td>DHS</td>
<td>67</td>
<td>153</td>
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<tr>
<td>Other Agencies</td>
<td>82</td>
<td>93</td>
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<tr>
<td>Battelle Private</td>
<td>79</td>
<td>85</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>638</strong></td>
<td><strong>759</strong></td>
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Department of Energy
FY05 Est. 57%
(FY04 Actual 64%)
PNNL’s role as a regional asset: Catalyze R&D growth

Be a conduit that links the region’s R&D assets to national needs

Catalyze R&D growth in the Northwest

Creation of high-tech jobs and a sustainable economy
Resources available at PNNL to enhance strategic partnerships

- EMSL User Facility
- National Visualization and Analytics Center™
- Coastal Security Institute
- Internships and fellowships
- Joint institutes, programs, and projects
Examples of regional use of EMSL

• Haluk Beyenal, Montana State University, performed transmission electron microscopy imaging and analyses of biofilms and their biomineralization products.

• Julia Kotler and Laura Strumness, University of Montana, used the 300-MHz spectrometer to run samples for the study, "TRAPDOR Experiments on Siliceous Sinters from Thermal Springs."

• Jiji Antony, University of Idaho, used the electron microscopy suite to investigate the oxidation of zero valence iron in iron-nanostructures synthesized using sputter deposition.

• Rafail Khairoutdinov, University of Alaska, Fairbanks, used the sputter deposition capability to investigate the growth of metal layers on carbon nanotubes.

• EMSL and University of Wyoming researchers analyzed the structure of hematite (α-Fe2O3) (001) surfaces in aqueous media.
The ONAMI connection in Oregon
Washington collaborations

Joint Institute for Nanoscience and Nanotechnology (UW)

Bioproduts, Sciences, and Engineering Laboratory (WSU)
Generating ideas at MSU

- High Temperature Electrochemistry Center (HiTEC) established in 2002
- PNNL, National Energy Technology Laboratory, and Montana State University serve as principal contributors
- HiTEC supports FutureGen Initiative
Questions?

http://www.pnl.gov