



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

# Sharing the Excitement of Science

Breakthrough  
Science and  
Technology for  
the Northwest

Richland, Washington

April 2001

## Joint institute thinking big about small science

Two formidable players in the field of nanotechnology—the University of Washington and Pacific Northwest National Laboratory—have joined together to create the Joint Institute for Nanoscience and Nanotechnology. Created under an agreement signed April 17, the joint institute is focused on a promising new area of science that deals with building new materials and extremely small machines by manipulating individual atoms or molecules.

“Together we can leverage our research capabilities to assemble a stronger scientific team than either of us would have individually,” said Bill Rogers, associate laboratory director of PNNL’s Fundamental Science Division and director of its Nanoscience and Nanotechnology Initiative.

While this is the first such partnership with the University, it could set the stage for other joint institutes centered on other themes. “The resources of the two institutions are very complementary, and this sort of collaboration is a powerful tool in meeting the broad challenges of our time that are important to the nation and to society,” said Alvin Kwiram, vice provost for research at the UW. For more information see <http://www.pnl.gov/news/2001/01-15.htm>.

## In this issue

- **Joint institute for nanotechnology formed**
- **National Corn Growers Association visits PNNL**
- **PNNL delivers Hanford Site cleanup report**
- **Oh boy, what a buoy!**
- **Rebuild America supports Richland**
- **Portable power source**

## National Corn Growers Association looks to PNNL for crop products



When the Business Development Action Team of the National Corn Growers Association visited Pacific Northwest National Laboratory in March, the two institutions finalized plans to launch a cooperative agreement that will offer new uses for corn, the nation’s largest crop.

Researchers at PNNL are working on methods to turn agricultural commodities, byproducts and wastes into higher-value products, such as energy and chemicals. In addition to ongoing projects with the National Corn Growers Association, the cooperative agreement involves developing a new process that will produce a new organic acid by fermenting agriculturally derived sugars. The resulting organic acid can be used in industrial and consumer products.

## Hanford Site cleanup report assesses challenges, opportunities

In early 2001, Pacific Northwest National Laboratory delivered *Hanford Site Cleanup—Challenges and Opportunities for Science and Technology* to the U.S. Department of Energy’s Richland Operations Office. The report will provide the foundation for detailed planning to ensure that science and technology priorities are incorporated into DOE’s national science and technology program. It is an extension of the strategic planning underway to refocus Hanford cleanup and was requested by DOE Headquarters. The report’s evaluation of the entire cleanup life-cycle, estimated at more than \$24 billion through 2046, identifies the greatest technical uncertainties and the science and technology investments that provide the maximum benefit. PNNL led the assessment with support from a multi-contractor team. The study features 11 strategic closure challenges. It also highlights four areas of immediate opportunity, including remote handled waste retrieval and disposition processes, groundwater subsurface technology, surface barrier development and performance monitoring, and massive facility disposition options development.

## Portable buoy charters promising voyage



Although most buoys are permanent fixtures serving a single purpose, researchers at Pacific Northwest National Laboratory's Marine Sciences Laboratory in Sequim, Wash, have developed a lightweight portable buoy complete with cell-phone technology and interchangeable sensors.

The Aquatic Bio-optical and Environmental Assessment Monitoring Buoy is designed to validate satellite signals recorded and relayed from space while simultaneously monitoring water quality parameters in coastal, estuarine and inland waters. It can provide quick-response data gathering for natural resource assessment in these waters. For example, it may one day help detect and predict harmful algal blooms.

During its maiden voyage in Sequim Bay, a prototype demonstrated that it could communicate with researchers and provide customized data in near real-time. The buoy promises to be more cost-effective than conventional shipboard data collection methods that are more labor-intensive and expensive.

## PNNL helps city of Richland with energy efficiency

When the city of Richland, Wash., began designing a new police station and community center, staff from Pacific Northwest National Laboratory were there to help with considerations for energy-efficiency. PNNL provides technical assistance and coordinates the products and services for Rebuild America, a \$7 million national program.

PNNL experts took a holistic view of Richland's new buildings as they reviewed conceptual designs and offered energy-efficiency suggestions. For example, they considered each building's purpose and mission, occupant comfort and operating and maintenance costs. Many of the Laboratory's recommendations were implemented in the final design. In addition to the new building projects, PNNL also assisted with an energy-efficient lighting project for the city's library.

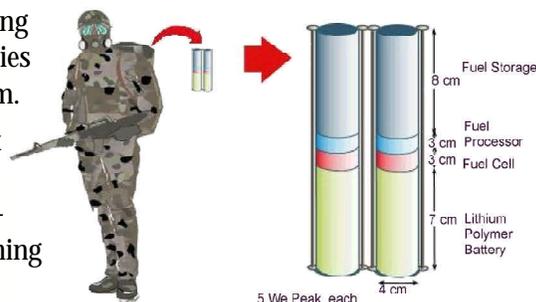
The U.S. Department of Energy created Rebuild America to establish self-sustaining community partnerships that pursue opportunities to save energy. The city of Richland is one of more than 300 partnerships across the country, 22 of which are in Washington and Oregon. Rebuild America supports communities with access to DOE regional offices, state energy offices, national laboratories, utilities, colleges and universities and nonprofit agencies. For more information, see <http://www.eren.doe.gov/buildings/rebuild/>.

## Lightweight power generation solution for soldiers of the future

When 21st century soldiers suit up for the battlefield in helmets featuring image displays and laser range finders, one of their most important accessories may be a new power generator so lightweight that it can be carried with them.

The "man-portable generator" is being developed at Pacific Northwest National Laboratory for the U.S. Army's Communications-Electronics Command. It would supply power for advanced technologies such as global-positioning systems by generating 15 to 25 watts of power in a system weighing 10 times less than batteries soldiers currently carry.

In March, PNNL engineers reached the first major milestone in development when they demonstrated a full-size, advanced design fuel processor that converts methanol into hydrogen. Not having to store and carry hydrogen reduces the weight and risk associated with portable power systems. After more development and testing, PNNL engineers will face the challenge of integrating the fuel processor with other components of a complete power system, including a micro-scale fuel cell, a fuel storage and a delivery unit, and a battery for peak power. They hope to have the complete power system ready for testing by 2003.



### For more information about these items or about Pacific Northwest National Laboratory, contact:

Pamela Harrington, Editor  
Phone: 509-375-4506  
Fax: 509-375-6550  
E-mail: [pamela.harrington@pnl.gov](mailto:pamela.harrington@pnl.gov)

Pacific Northwest National Laboratory  
P.O. Box 999, Richland, WA 99352  
Toll-free: 1-888-375-PNNL  
Web address: <http://www.pnl.gov>



