

## PNNL is building bridges to the future



The 9.4 Tesla Fourier transform ion cyclotron mass spectrometer is the latest addition to research instrumentation at the William R. Wiley Environmental Molecular Sciences Laboratory located at PNNL. The device weighs peptides, a key capability in determining the roles proteins play in cells and living systems.

At Pacific Northwest National Laboratory, 2001 has been a year of visionary planning, new partnerships, prestigious recognition and impressive progress in science and technology.

Laboratory leaders have been putting the final touches on “PNNL 2010,” a comprehensive plan designed to sharpen the laboratory’s vision, mission and strategy through the decade. PNNL 2010 builds upon PNNL’s science base, better defines research missions and roles, and enhances intellectual property development. Other parts of the plan address workforce and workplace issues, facilities and infrastructure and PNNL’s role in the region and community. Elements of PNNL 2010 have been incorporated into fiscal year 2002 business plans.

Over the past year, PNNL established three new research partnerships with:

- The University of Maryland, forming the Joint Global Change Research Institute in College Park, Md. to investigate the scientific, social and economic implications of climate change.
- The University of Washington to establish the Joint Institute for Nanoscience and Nanotechnology, a collaborative effort to study the “world of the very small,” an area of science that could dramatically change the way we live.
- The Oregon University system and the Oregon Health and Science University for several joint projects focused on human health, sustainable industrial practices and promotion of high-tech businesses in the Northwest.

In June, the *Discover Magazine* Innovation Award in the Health category was presented to PNNL for its combined optical and magnetic resonance microscope. In addition, as part of the *Discover* awards program, researcher Dick Craig received a \$100,000

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## PNNL is building bridges to the future, cont.

Christopher Columbus Foundation fellowship for the development of the Timed Neutron Detector, which offers improved approaches for locating metal and plastic landmines.

PNNL won four R&D 100 Awards for:

- A plasma-catalysis technology that significantly reduces oxides of nitrogen from the exhaust of next-generation energy-efficient vehicles
- A suite of analysis procedures, software and hardware that can reduce life-cycle operations and maintenance costs by as much as 25 to 50 percent
- A long-range, semi-passive radio frequency system that can identify, locate and even determine the condition of any item to which a tagging device is attached, a capability useful for assorted inventory applications
- A high-temperature viscosity measurement technology for process monitoring of hot molten materials such as those in glass manufacturing and metals refining.

During the year, three research initiatives were launched to strengthen PNNL's science base and provide the foundation for innovative, 21st century contributions to DOE missions.

- The Biomolecular Networks Initiative will explore new technologies and approaches to the study of important biological problems in the post-genomic era.



**The fight against bioterrorism is gaining a new ally. The Biodetection Enabling Analyte Delivery System, or BEADS, is a sample preparation system developed at PNNL that will play an important role in putting bacteria detectors into the field. BEADS breaks apart environmental samples, such as soil, into a form for use by pathogen detectors. It can be used in chemical, protein, nucleic acid or whole-cell detectors.**

- The second initiative is focused on the exciting new research field of nanoscience and nanotechnology, and will benefit from the partnership with the University of Washington.

- The third initiative, Computational Sciences and Engineering, recognizes that computation is integral to every aspect of research and will seek to develop PNNL into one of the world's premier computational science institutions.

PNNL researchers continued to assist with Hanford Site activities, including development of a system comprising sensors and wireless communications to monitor plutonium products that will be stored in individual, protective canisters. In the area of energy efficiency, progress continued in the development of fuel cell systems and vehicle emissions applications.

The September terrorist attacks focused the spotlight on PNNL's substantial national security capabilities and expertise. National Security Division staff members were interviewed by members of the media about potential threats of bioterrorism, technologies being developed to detect biological and chemical attacks and counter-terrorism measures. ♦