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

Sharing THE Excitement OF Science AND Technology

Breakthroughs for the Northwest

Richland, Washington

September 2002

Gov. Gary Locke kicks off energy collaborative

Washington Gov. Gary Locke launched the Northwest Energy Technology Collaborative (NWETC) last month. The Collaborative is a joint, voluntary effort of business, government, nonprofit, industry and educational institutions in the Pacific Northwest, who share the goal of positioning the region as a leader of innovative research education and product development for energy technology markets around the world.

Members include Pacific Northwest National Laboratory, Avista Corp., Bonneville Power Administration, Spokane Intercollegiate Research and Technology Institute and Washington Technology Center.

NWETC believes the U.S. energy infrastructure must incorporate innovations in operating strategies, technologies and business models to remain economically viable in a global economy and will invest financial and in-kind support to accelerate growth of the region's energy technology industry. "Washington State has the potential to become a world leader in the development and marketing of clean energy technologies," Locke said. "The Collaborative will help us ensure that the state's entrepreneurs, researchers and policymakers work together on a strategy that allows us to realize this vision and, ultimately, improve people's lives.

In this issue

PNNL researchers spark idea to help students on career path

The U.S. Army, the University of Washington-Tacoma and Pierce County business groups signed an agreement in August that will make it easier for military recruits to get an education and to find jobs afterward.

An idea from two Pacific Northwest National Laboratory staff members led to a plan that allows recruits to choose career paths in the Army related to high-technology. When recruits leave the military, they can enter the computer and software program at the University of Washington-Tacoma's Institute of Technology. In addition, the Pierce County business community, including the Tacoma-Pierce County Chamber of Commerce, the Tacoma-Pierce County Economic Development Board and the Tacoma News Tribune, has agreed to help graduates get jobs in the high-tech industry.

The PNNL employees had conducted recruitment studies for the Army and saw the military-education-business connection as a win-win situation, attracting recruits to the army and providing experienced students and workers to the university and businesses.

Mass spectrometer weighs in as proteomics breakthrough

A faster, more thorough mass spectrometry method for identifying proteins may significantly advance scientists' ability to comprehend the role proteins play in cellular function and disease development. The one-of-a-kind system, developed at Pacific Northwest National Laboratory, is providing new insights into how microorganisms gobble carbon from the atmosphere and the role proteins play in a virus known to cause blindness.

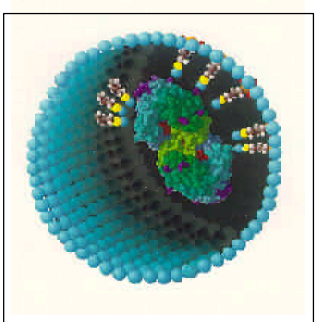
Researchers have constructed the first-ever high-throughput, or extremely fast Fourier-transform ion cyclotron resonance mass spectrometer. The system will provide an unprecedented ability to thoroughly identify and characterize proteins. Measuring protein abundance levels at different times is key to a molecular-level understanding of cellular function and disease progression, treatment and prevention. The new spectrometer will allow scientist to find answers to major scientific questions, such as how a disease progresses and what can be done about it, more efficiently and knowledgeably.

New material discovery to benefit homeland security, industry

Scientists at Pacific Northwest National Laboratory have successfully immobilized enzymes in a way that enhances their stability and activity. This discovery opens the door to new possibilities for using tailored nanoporous materials. The discovery could also enable the development of novel sensor and decontamination systems for homeland security, environmental protection and energy generation as well as new industrial chemicals and separations.

Scientists have been trying to immobilize soluble enzymes for decades, but the results have been disappointing because only small amounts of the immobilized enzymes show any biological activity. In lab tests, PNNL scientists nearly doubled the activity levels of one enzyme known for its potential for bio-sensing and decontaminating poisonous agents. Different highly active and stable immobilized enzymes could potentially be used to make enzymatic systems that inactivate certain chemicals or bio-weapons, thus serving as a protective barrier in air filtration systems.

Fabrication of a more stable and active enzyme delivery method could also benefit food processors, such as cheese, beer and soft drink makers that use enzymes as catalysts. More stable enzymes could facilitate more efficient chemical processes.



PNNL scientists have created a nanoporous silica that increases enzyme activity and stability by binding part of an enzyme to the walls of the tiny pores on the silica.

New company to produce technology that detects hidden weapons

A technology designed to rapidly identify hidden weapons, explosives and other contraband—even plastic, ceramic and other non-metallic weapons—through clothing is the cornerstone of a new company formed to commercialize the technology for a variety of security applications.

The technology, which uses harmless millimeter waves to generate holographic images, was developed by Pacific Northwest National Laboratory for the Federal Aviation Administration to scan airline passengers as they pass through airport security checkpoints.

Battelle, which operates PNNL for the U.S. Department of Energy, has licensed the technology to SafeView Inc., a new corporation based in Menlo Park, Calif. Under terms of the licensing agreement, SafeView will establish and maintain a product development office in Tri-Cities, Wash.

The holographic imaging system is distinctly different from current surveillance systems that rely on metal detectors, X-ray imaging and in some cases, strip searches. Metal detectors cannot screen for plastic or ceramic weapons or explosives or other non-metallic contraband, while X-ray imaging subjects people to potentially harmful ionizing radiation.

PNNL scientists win prestigious ACS awards

Two Pacific Northwest National Laboratory scientists have been honored by the American Chemical Society (ACS) with national awards.

David Dixon, a Battelle Fellow, has received ACS's 2003 Award for Creative Work in Fluorine Chemistry. The award honors Dixon for "advancing the use of computational chemistry to bring unique understanding to the field of fluorine chemistry, especially chlorofluorocarbon (CFC) replacements, organofluorine molecules and inorganic fluorides." Dixon is known for his work in computational chemistry with specific emphasis on predicting the thermochemistry and rates of chemical reactions with a focus on solving complex environmental problems.

Richard D. Smith, chief scientist and Battelle Fellow, has been awarded the 2003 ACS Award in Analytical Chemistry. Smith's accomplishments include developments that integrate two analytical disciplines: separation science and mass spectrometry. Smith's leading role in applying these combined techniques to modern bioanalytical problems and biological systems characterization has led to numerous advances in analytical chemistry, and most recently, to major new capabilities for large-scale protein studies.

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

Ginny Sliman, Editor
Phone: 509-375-4372
Fax: 509-375-6550
E-mail: virginia.sliman@pnl.gov

Pacific Northwest National Laboratory
P.O. Box 999, K139, Richland, WA 99352
Toll-free: 1-888-375-PNNL
Web address: http://www.pnl.gov

This publication is available online at http://www.pnl.gov/sharingscience RL-P00-007 Sept. 26, 2002