



**Pacific Northwest
National Laboratory**
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U.S. Department of Energy

Sharing THE Excitement OF Science AND Technology

Breakthroughs
for the
Northwest

Richland, Washington

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PNNL orders supercomputer from HP



An artist's rendering of the HP super-computer in the Molecular Sciences Computing Facility.

It is roughly 8,300 times faster than a current personal computer, it will complete calculations that now take a month in a single day and it is on its way to the U.S. Department of Energy's William R. Wiley Environmental Molecular Sciences Laboratory (EMSL) at Pacific Northwest National Laboratory.

PNNL and Hewlett-Packard announced on April 16 that the Laboratory has ordered a \$24.5 million HP Linux-based supercomputer that will allow researchers to apply computational science to answer fundamental questions

relating to radioactive waste processing and protein behavior. The supercomputer is expected to be fully operational in 2003 and should be the world's most powerful Linux-based supercomputer at that time.

"As we try to use computational results to replace difficult and expensive experiments, increased computational power is essential," said Dave Dixon, EMSL associate director for theory, modeling and simulation. "The advanced architecture of the HP supercomputer provides the computational power that will permit us to attain close to peak performance on our key computational chemistry problems." (www.pnl.gov/news/2002/computer.htm)

Modeling system assesses building contaminants

Researchers at Pacific Northwest National Laboratory have developed a sophisticated modeling system that assesses the health and safety impacts of indoor air contaminated with toxic chemicals—including deliberate contamination from terrorist attacks. The Health Modeling and Assessment System (HMAS) uses several different software programs and analytic capabilities to predict what will happen and how people will be affected in a building with contaminated airflow. The system involves several steps, including analyzing building vulnerability, modeling contaminant dispersion in the building, assessing risk to humans, suggesting alternative exposure management plans and providing remodel information for building managers. (www.pnl.gov/breakthroughs/win-spr02/special3.html#breath)

Clinical trials to demonstrate telehealth on reservations

Pregnant women living on South Dakota Indian reservations where infant mortality rates are more than twice the national average will receive specialty care under the first commercial test of a telehealth system called MUSTPAC-3, which stands for version three of the Medical Ultrasound, Three-dimensional and Portable with Advanced Communications.

Researchers at Pacific Northwest National Laboratory developed MUSTPAC-3, a state-of-the-art portable ultrasound system, and have installed the system on two Indian reservations. The installation was made possible by a grant aimed at determining if telehealth could improve treatment of pregnant women. Avera McKennan Hospital & University Health Center in Sioux Falls, S.D., received the grant from the Department of Agriculture Rural Utility Service. The MUSTPAC-3 systems will be deployed at clinics operated by Indian Health Service, which works with Avera McKennan to provide health care to women living in the reservation communities of Pine Ridge and Rosebud. Information obtained through these studies will be used in the FDA approval process for MUSTPAC-3. (www.pnl.gov/news/2002/02-05.htm)

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Climate monitoring goes mobile

Pacific Northwest National Laboratory scientists now can document atmospheric and climate change at locations nearly anywhere in the world, thanks to a new mobile atmospheric monitoring system developed at the Laboratory. The Pacific Northwest National Laboratory Atmospheric Remote Sensing Laboratory, called PARSL, is a complete climate-measuring system that can be taken to nearly any site quickly and easily. Scientists can conduct research wherever the need exists by simply loading the equipment on a flatbed trailer or placing it in a cargo container for ocean travel. Within 48 hours of arrival, PARSL's instrumentation can be set up and operational at a remote site.

PARSL also allows scientists immediate access to newly gathered information. Data can be downloaded directly onto a compact disc or to a web site where it can be made available to scientists around the world. The PARSL suite of instruments will allow researchers to focus closely on key elements that contribute to climate change. In particular, scientists are interested in the amount of solar energy collected at the earth's surface and the atmospheric conditions influencing that change. (www.pnl.gov/news/2002/02-10.htm)



PNNL partners with local high school on dust collection project

Pacific Northwest National Laboratory is working with a high school chemistry teacher and her students on a dust collection and analysis project. As part of the project, PNNL researchers will give a presentation to chemistry classes at Southridge High School in Kennewick, Wash., and place dust samplers outside the classroom windows. After a month of replacing the samplers with different versions to test sample design, researchers will analyze samplers using a scanning electron microscope that automatically locates, analyzes and saves images of about 10,000 individual particles per sample.

Laboratory researchers will give the teacher a CD with particle analytical results that students can discuss in class and use for various projects. The CDs will contain a spreadsheet listing each particle, its size, shape information, elemental composition and a link to an image of the particle. Based on this data, students will be asked to recognize each particle and try to identify its origin.

This project gives local students an opportunity to participate in a real-life science project that helps them better understand their environment. At the same time, it also helps PNNL researchers test sampler techniques that they will use for a study on traffic-related dust exposure in New York City school children next fall in collaboration with Columbia University.

Celebrating a powerful arrival

Washington Governor Gary Locke and U.S. Senator Maria Cantwell (D-Wash.) helped Pacific Northwest National Laboratory celebrate the arrival of the world's largest, highest-performance nuclear magnetic resonance spectrometer on March 28. During the celebration, Locke remarked on the Laboratory's role in supporting research in cellular biology while Cantwell addressed the Laboratory's scientific contributions and importance to the regional economy.

The 900 megahertz wide-bore nuclear magnetic resonance (NMR) spectrometer is a powerful scientific instrument that may enable scientists to make new discoveries in the chemical, physical, biological and life sciences. When operational, this unique system could enhance understanding of basic molecular and cellular processes and how those relate to damage or repair to DNA, disease development and protein interactions. (www.pnl.gov/news/2002/02-08.htm)



From left, Carl Kohrt, Battelle President and CEO; Governor Gary Locke; Keith Klein, DOE Richland Operations Office manager; U.S. Senator Maria Cantwell; Ari Patrinos, Associate Director for Biological & Environmental Research, DOE; Lura Powell, PNNL director.

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

Pacific Northwest National Laboratory
P.O. Box 999, K1-39, Richland, WA 99352
Toll-free: 1-888-375-PNNL
Web address: <http://www.pnl.gov>

