



**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 2003

PNNL supercomputer achieves full operations

Pacific Northwest National Laboratory is home to the United States' fastest operational unclassified supercomputer. PNNL's 11.8 teraflops industry-standard HP Integrity system came to full operating power in late August.

Based on peak performance, the PNNL machine is the fifth fastest system in the world. The supercomputer will enable scientists to solve scientific problems that are more complex, and do so more quickly, than other architectures.

"Computational resources such as the PNNL supercomputer are essential to DOE's commitment to provide the most innovative solutions to critical energy and environmental problems," said Secretary of Energy Spencer Abraham.

Scientists from around the country can access the supercomputer for research through a competitive proposal process.

Study explores viability of Tango vehicle

A bright red Tango, billed as the commuter car of the future, was the star attraction at Pacific Northwest National Laboratory earlier this month. Tango's developer, Rick Woodbury of Commuter Cars Corporation of Spokane, Wash., visited PNNL to demonstrate the car's capabilities and to participate in a seminar for staff. As part of the seminar, Patrick Balducci, a PNNL economist, discussed his analysis of Tango's impact on traffic and parking in Seattle. Balducci's report was conducted through PNNL's Technology Assistance Program, which provides free technical expertise to businesses.



The Tango delivers 80 miles of range with one battery charge, has zero emissions, and zips from zero to 60 miles per hour in only four seconds. With room for a driver and a passenger (seated behind the driver), the Tango requires half the road room of the average car and could significantly increase current freeway capacity in the U.S. while reducing the need for additional parking lots in downtown areas. For more information on the Tango see www.pnl.gov/main/news/commutercars.pdf and www.commutercars.com/. For more information on PNNL's Technology Assistance Program see www.pnl.gov/edo/Techassist.stm.

Biosentinels reveal what's in the water

Researchers at Pacific Northwest National Laboratory's Marine Sciences Laboratory in Sequim, Wash., are studying the feasibility of using bivalves—marine animals with two shells—as a tool for monitoring the manufacture of chemical weapons.

While bivalves can regulate certain contaminants that are biochemically important to their survival, such as zinc and copper, their systems can't metabolize persistent organic chemicals, such as PCBs or certain pesticides, so these contaminants stay in their systems for a long time. The advantage of using bivalves is they may have already preconcentrated chemicals 1,000 times more than what would be in a water sample.

Researchers at the Sequim facility have designed an experiment to test bivalves' ability to accumulate chemical contamination in fresh water, marine water and estuary conditions. The experiment will test chemicals that may be used in chemical weapons processing or storage. For more on PNNL's bivalve work visit www.pnl.gov/breakthroughs/summer03/special_report2.stm#biosentinels.

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Classes instruct U.S. border inspectors on weapons detection

Scientists at Pacific Northwest National Laboratory recently began the second year of a program to train U.S. Customs and Border Protection inspectors to identify and halt smuggling of weapons of mass destruction. The training, offered in Richland, Wash., is conducted by PNNL with the newly created Department of Homeland Security's Bureau of Customs and Border Protection.

In a three-day course, U.S. border inspectors receive comprehensive training to detect, identify, interdict and investigate the illicit movement of materials, commodities and components associated with the development or deployment of weapons of mass destruction.

The course is the first government-sponsored program that educates U.S. border inspectors specifically about weapons of mass destruction. About 25 inspectors participate in each course, which is modeled after a training program targeted to inspectors from other countries.

For more information on weapons detection training offered by PNNL see www.pnl.gov/news/2003/03-35.htm.



Customs agents use radiation detectors to check a small sample of uranium during a mock exercise in which the agents interviewed a suspicious man trying to cross the border and searched his vehicle. The uranium ingot was found hidden in an emergency light.

MSL's fungal work leads to new research directions

PNNL researchers at the Marine Sciences Laboratory in Sequim, Wash., are looking at diverse ways to use fungi. With a collection of more than 200 strains of fungal species—some of which have been used to perform environmental remediation and other tasks—and a staff experienced in fungal research, scientists are studying how natural products may be harvested from marine fungi. They also are looking at how previous fungal work could apply to detecting biological pathogens and other contaminants in marine systems with respect to environmental and coastal security issues.

Scientists recently completed a study on using fungi to degrade livestock manure and reduce the waste-related odors commonly associated with dairy farms and feedlots. The treatment, using native fungi, was natural and not harmful to the environment. In addition to degrading the manure, scientists are experimenting with using the fungi to grow a beneficial byproduct—mushrooms—that could be used as livestock feed. For more information on PNNL's fungal research see www.pnl.gov/breakthroughs/summer03/special_report4.stm#fungal.

Battelle, DOE sign new operating contract

More autonomy and scientific "stretch goals" are among the hallmarks of the new operating contract at Pacific Northwest National Laboratory.

U.S. Department of Energy and Battelle representatives gathered Aug. 26 at PNNL to sign the document, which allows Battelle to continue managing PNNL through Sept. 30, 2007. The new contract builds on performance-based contracting used by DOE for the past several years. The pact includes three stretch goals in biological and environmental research, basic energy sciences and advanced scientific computing research. Overall, the new contract provides more autonomy in Laboratory operations and greater potential for earning fee, counterbalanced by Battelle accepting greater accountability and risk.

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