



**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

July 2002

Detecting and monitoring harmful blooms

Scientists at Pacific Northwest National Laboratory's Marine Sciences Laboratory in Sequim, Wash., are working with the Olympic Region Harmful Algal Bloom (ORHAB) project to investigate mechanisms driving harmful algal blooms.

Harmful algal blooms (HABs), a common occurrence on the Washington Coast, have led to closures of commercial, tribal and recreational shellfish harvest which have resulted in millions of dollars in losses to oyster farmers in Washington State in recent years. Not enough is known about how HABs spread to predict the possibility of coastal shellfish contamination. PNNL scientists are using satellite imagery of sea surface temperature and chlorophyll concentrations, and monitoring data to understand where and when blooms occur. Their goal is to develop a forecast tool that can advise coastal resource managers and tribes of HAB events.

ORHAB is sponsored by the National Oceanic and Atmospheric Administration (NOAA) and led by the National Marine Fisheries Science Center.

In this issue

- **Researchers study harmful algal blooms**
- **Analysts make rangeland monitoring manageable**
- **PNNL wins R&D award**
- **Education opportunities**
- **Nanoscience awards announced**
- **A video for the business community**

Technology on the range

Pacific Northwest National Laboratory researchers have developed a unique way of applying remote sensing capabilities and other technology to monitor Western rangelands for the Bureau of Land Management and help locate areas of concern.

Because the BLM must sample 262 billion acres, remote sensing was the logical choice for cost and efficiency; however remote sensing can capture millions of acres in one image, making it difficult to analyze. Ultimately, PNNL analysts created a different context for remote sensing that simplified analyzing and managing imagery. Analysts stratified rangeland imagery by dividing the landscape into similar components, such as soil type, vegetation and slope. Then they used statistical techniques to analyze the spectral information from individual sections to detect anomalous areas or "hot spots."

Analysts envision the ultimate product to be a web-based system where BLM land managers and ranchers could view maps of current land conditions and areas of concern. Looking at these areas through time will show trends, such as invasive weeds increasing. PNNL's approach, which includes satellite imagery, stratifying sections of rangeland and developing algorithms to interpret imagery has other potential applications, including landscape-level assessments for areas being considered for oil exploration. Expanding these methods can provide timely data for restoration planning after wildfires.

R&D Magazine recognizes PNNL innovation

Researchers at Pacific Northwest National Laboratory and at OmniViz Inc., a Battelle subsidiary, have been recognized by *R&D Magazine* for developing one of the 100 most significant innovations of 2001.

The winning technology is a data mining and visualization software tool, called OmniViz™, commercialized by OmniViz Inc. (www.omniviz.com). The software analyzes and graphically displays large collections of numeric, categorical, genomic sequence and text data, primarily for life and chemical science research. The powerful OmniViz™ visualization tool finds and displays relationships that were neither specified nor suspected by the user and seamlessly mixes and links input data of various types and formats.



R&D Magazine holds this competition annually to honor the most promising new products, processes, materials or software developed throughout the world. PNNL has received 59 R&D 100 Awards since 1969, including 52 since 1988. For more information, see www.pnl.gov/news/2002/02-17.htm

PNNL offers real life experience to students

More than 300 students and teachers are working at Pacific Northwest Laboratory this summer. PNNL's Science & Engineering Education program offers nearly 20 opportunities for elementary, secondary and college students, and teachers. Some of the programs include:

- Student Research Apprenticeship program, a partnership with school districts in the Yakima Valley and Tri-Cities to provide high school students historically underrepresented in mathematics, engineering and science with summer research appointments at PNNL
- Partnership for Arid Lands Teacher Project, a professional development project for K-12 teachers that focuses on the arid lands of the Columbia Basin
- DOE Community College Institute (CCI) of Science and Technology, a program that places students from community colleges in paid internships in science, engineering and technology at DOE labs.

The Science & Engineering Education program represents PNNL's commitment to supporting mathematics, science and technology from grade school to graduate school. For more information see <http://science-ed.pnl.gov/index.stm>.



Heather Brown, a student at Columbia Basin College, is working with mentor Tim Hubler to learn how to synthesize and characterize materials for separating complex waste components and for developing smart material coatings for highly selective sensors.

Joint nanoscience research awards announced

The Joint Institute for Nanoscience and Nanotechnology (JIN), a collaboration between the University of Washington and Pacific Northwest National Laboratory, recently announced 11 JIN Awards designed to encourage activities in nanoscience and nanotechnology. The awards are presented to graduate students and post doctorate fellows based on applicants' research proposals. Proposals should enhance collaboration between PNNL and UW and include mentors from both institutions. Twelve PNNL staff members serve as mentors for this year's winners.

Nanoscience and nanotechnology deal with building new materials and extremely small machines by manipulating individual atoms or molecules. Such devices measure in the billionths of a meter— 1,000 times smaller than the thickness of a human hair. Potential nanotechnologies include computer chips that could store trillions of bits of information in an area the size of a pin's head and biologically compatible devices that could attack disease at the sub-cellular level.

JIN has developed 14 joint research topics as well as enhancing PNNL/UW interactions on projects, presentations and workshops since its formation in 2001. For more information on JIN, see www.pnl.gov/nano/institute/index.html.

Online video helps Mid-Columbia business community

Pacific Northwest National Laboratory recently created a video of the workshop, "Rainmaking in a Capital Drought: Everything You Need to Know About Raising Capital in This Dry Climate."

The PNNL-hosted workshop was held in Richland last fall and included prominent equity capital experts from Seattle whose goal was to help entrepreneurs learn how to find investor money. PNNL's Economic Development Office funded the video production under PNNL's Technology Assistance Program at the request of local economic development stakeholders.

The video is available to the Mid-Columbia business community online at www.pnl.gov/edo/rainmaking.stm. People within a 50-mile radius of Richland (map at www.pnl.gov/edo/jobs.stm) can view the workshop at no cost, but must get a user name and password from Gracie Downard at gracie.downard@pnl.gov or 509-375-2803.

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, K1-39, Richland, WA 99352
Toll-free: 1-888-375-PNNL
Web address: <http://www.pnl.gov>

