



**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

March 2002

Powell's passion for science and business featured in Washington CEO



According to *Washington CEO*, Dr. Lura Powell, director of Pacific Northwest National Laboratory, brings good science to life. Powell and the Laboratory are featured as the cover story for the magazine's February 2002 issue.

In addition to telling the story of Powell's leadership, the feature captures her determination to introduce PNNL's scientific tools and services to the region's business world. The article also describes the Laboratory's partnerships in the region and its role as a resource that is focused on moving scientific and technological advances into everyday life. (www.pnl.gov/news/inthenews/waceo.pdf)

With \$540 million worth of research in fundamental sciences, energy, environment, national security and health, PNNL was acknowledged as the major science facility in the Tri-Cities area in the *Washington CEO* March 2002 "Tri-Cities Report." The section recognizes PNNL's contributions to the local economy as an employer of 3,500 people, provider of free technical assistance to private businesses and partner with regional universities. To request copies, call 509-375-4506 or send an e-mail to pamela.harrington@pnl.gov.

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Powerful 16-ton magnet delivered for scientific research

A powerful magnet developed for chemical, biological and materials research was placed ever so gently by a crane into the William R. Wiley Environmental Molecular Sciences Laboratory (EMSL) at Pacific Northwest National Laboratory on March 13. Built in England, the 16-ton superconducting magnet will be part of a 900 megahertz wide-bore nuclear magnetic resonance spectrometer that will be put into operation at EMSL over the next several months.

The NMR will serve as a tool that allows scientists to look at much larger molecules than other spectrometers and to understand how large molecules interact with each other. Scientists using the NMR are particularly interested in larger proteins and proteins in combination because they believe most proteins work together in groups to carry out cell functions. This study of biological molecules includes studying damage to DNA. As part of a national scientific user facility, the 900-megahertz NMR system will be available through a competitive proposal process to scientific users from around the country and the world. (www.pnl.gov/news/back/magnet.htm)



WSU and PNNL join in building biosciences programs

Washington State University Tri-Cities and Pacific Northwest National Laboratory have jointly hired a new scientist to help create a postgraduate molecular biosciences program at WSU Tri-Cities, while contributing to PNNL's biological programs. Diana Bigelow comes to Tri-Cities from the University of Kansas, where she directed the Biochemistry and Biophysics group for the University's Department of Molecular Biosciences. Hiring Bigelow represents the first step in a new partnership that will leverage the educational strengths of the branch campus and the scientific research proficiency of the Laboratory. WSU Tri-Cities is creating a program that offers new education opportunities to local residents and could potentially draw students from around the region. Bigelow will lead the design of this program, which will provide unique training to young scientists who will work in post-genomics biology. (www.pnl.gov/news/2002/02-03.htm)

PNNL wins three awards for excellence in technology transfer

The Federal Laboratory Consortium honored PNNL with three 2002 Excellence in Technology Transfer Awards for technologies that are improving inventory management, semiconductor materials and electronic flat panel displays.

- **Radio frequency tags** are inexpensive tags that can be used to identify, inventory and track assets. In late 2000, Battelle, which operates PNNL for DOE, created a new company called Wave ID to manufacture, market and distribute the RF tags developed at PNNL. Within a year, Wave ID merged with Alien Technology, a fast-growing California company with a patented technology that dramatically reduces the cost of manufacturing electronic products.

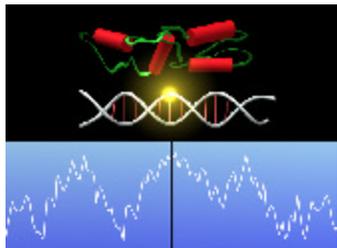
- PNNL helped Motorola Labs obtain an advanced **Molecular Beam Epitaxy deposition and analysis system** and then collaborated with Motorola researchers to understand the basic science underlying the challenge to create the next generation of semiconductor wafers. In September 2001, Motorola announced that the MBE system and interactions with PNNL staff, combined with their own significant research, provided them with the information necessary to successfully combine properties of silicon with the speed and optical capabilities of high-performance compound semiconductors.

- **Ultra-barrier coatings for flat panel displays** make plastic virtually impermeable to water vapor and oxygen—addressing a major obstacle standing in the way of using plastics instead of glass in electronic displays. The technology gives plastic necessary levels of protection without affecting clarity or other qualities. In November 1999, Battelle created a subsidiary to commercialize these products. Vitex Systems Inc. soon attracted a \$15 million investment from Mitsubishi Corporation and is bringing two products to market.



The Laboratory has won a total of 51 FLC Awards since the program began in 1984, more than any other federal laboratory. (www.pnl.gov/news/2002/02-06.htm)

Scientists see vivid picture of DNA repair



Two scientists at Pacific Northwest National Laboratory have successfully applied single-molecule spectroscopy to study the interactions of proteins and DNA to better understand how DNA is repaired. They are developing advanced chemical physics tools to study how damaged DNA is recognized, one of the first steps of this process.

It is estimated that each human cell must repair anywhere from tens of thousands to one million damaged sites in its DNA every day. By better understanding how the repair mechanism works and why it occasionally fails, PNNL scientist H. Peter Lu hopes researchers will be able to assist repair proteins to make them more effective. “Research may one day augment the repair process and possibly lead to new ways to prevent cancer and other abnormalities,” he said.

Scientists have been doing single-molecule microscopy for only about five years and this is the first research focused on the interactions between DNA and DNA repair proteins. “Instead of seeing an average of how large numbers of molecules of DNA and repair proteins interact, we are now able to see how a complex consisting of single-molecules interacts. This gives us a much better understanding of the range of interactions that are possible,” said staff scientist Eric Ackerman.

New leader named for Energy Science and Technology

Laboratory director Lura Powell selected Mike Lawrence as Associate Laboratory Director for Pacific Northwest National Laboratory’s Energy Science and Technology Directorate. Lawrence has been responsible for PNNL’s nuclear energy portfolio for the past two years as the business leader of international nuclear programs. His new role begins April 1.

Lawrence joined PNNL in 2000, coming from British Nuclear Fuels, Inc. He has more than 30 years of experience in the international nuclear business and was a former Hanford Site manager for the U.S. Department of Energy.

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