Pacific Northwest National Laboratory
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Sharing THE Excitement OF Science AND Technology

Breakthroughs for the Northwest

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OSU, PNNL form microproducts institute

Oregon State University and Pacific Northwest National Laboratory have formed a research and education center, the Microproducts Breakthrough Institute, to develop and market advances in microtechnology.

The institute will advance the science of microtechnology as well as provide educational opportunities through OSU and promote regional development by commercializing new products. "We're not working on technologies that are 20 years away from deployment," said Ron Adams, dean of the OSU College of Engineering. "Our goal is to develop breakthrough products that lead to new businesses immediately."

The two institutions have been working together in this and other fields since 1998, already teaming on more than $7 million in microsystems research and development. Within five years, the new institute could include a facility with 50-60 staff and a research budget of $20 million annually. For more information, see **http://www.pnl.gov/news/2002/02-37.htm**.

Fuel cells help reduce pollution, oil dependence

Pacific Northwest National Laboratory is continuing to develop a technology that may help reduce our nation's dependence on fossil fuels and greatly reduce air pollution. Solid oxide fuel cells (SOFC) have applications in commercial power plants, the military, and as auxiliary power units for automobiles.

For example, fuel cells could be used to power the refrigeration units in semi-trucks during rest stops, instead of idling engines, which is responsible for about 90 percent of a semi's emissions. Urban areas typically face greater pollution risks and the Pacific Northwest is no exception. *The Seattle Times* recently reported that the Seattle area is ranked in the worst 5 percent for air pollutants in the country and that cancer risk from diesel emissions may be as much as 500 times higher than the Environmental Protection Agency's acceptable level.

Similar to batteries, SOFCs convert chemical energy into electrical energy. However, fuel cells never require charging and don't run down as long as a fuel supply is available.

Russian delegation visits PNNL on economic diversification mission

Pacific Northwest National Laboratory recently hosted the mayor of Zheleznogorsk, a Russian city located in Central Siberia, as part of an effort to help Russia transform its economy.

Zheleznogorsk is one of 10 "closed" Russian cities specifically built to design, develop, test and produce nuclear weapons. Zheleznogorsk and other closed cities are facing potentially large unemployment as a result of downsizing the weapons complex. "Both the U.S. and Russian governments are afraid of the consequences of these layoffs," says Ron Nesse, who manages the Nuclear Cities Initiative program, "especially that these scientists and technicians could end up in Iraq, Iran or elsewhere. NCI is designed to reduce the threat of this brain drain by helping with economic diversification."

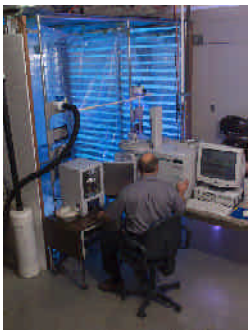
The mayor of Zheleznogorsk and his delegation met with PNNL and Tri-Cities community representatives and toured local facilities such as incubators and technoparks.

PNNL wins $5.2 million in research grants

The U.S. Department of Energy has awarded Pacific Northwest National Laboratory $5.2 million to fund research projects aimed at resolving some of our country's most challenging environmental cleanup issues. The awards are part of DOE's Environmental Management Science Program (EMSP) and are highly competitive among national labs and universities. PNNL is involved in 24 percent of this year's EMSP projects, leading seven and collaborating on two projects.

Most of the Lab's awards are targeted at research involving residual contaminants in groundwater and subsurface soil. The pathway for these contaminants is from soil to groundwater to river, where they may become a potential threat to humans and the environment. PNNL's work will help scientists understand how chemical and radioactive contaminants behave in groundwater and subsurface soil and is likely to provide the scientific basis for a final remedy for some of Hanford's groundwater plumes and other contaminated sites. For more information see **http://www.energy.gov/HQPress/releases02/octpr/pr02223_v.htm**.

PNNL develops chemical testing chamber



Scientists at Pacific Northwest National Laboratory are testing an atmospheric reaction chamber that may be used to solve problems related to pesticide drift, automobile emissions and national security.

The PNNL Chemical Testing Chamber (PCTC) tracks and measures volatile and semi-volatile chemicals in a controlled environment. Scientists simulate atmospheric conditions in the PCTC, which is constructed of Teflon, using black lights in the ultraviolet range to mimic the sun and adding ozone and photo oxidants in quantities found outdoors.

PNNL's development of the chemical testing chamber is a logical one given the Laboratory's extensive experience with chemical sensors and detectors developed for national security purposes. By understanding how chemicals move through the air and react with the atmosphere, scientists are able to enhance sensor performance by identifying specific chemical signatures that can be matched to optimize the proper sensing technique.

The PCTC is different from other chemical testing chambers in that it gives scientists the capability to work with the very low concentrations characteristic of semi-volatile organophosphates as well as volatile chemicals. Semi-volatile chemicals are used to produce pesticides and herbicides but also can be used in chemical weapons made by terrorists.

Patents for PNNL-developed technologies cross the 1,000 mark

Pacific Northwest National Laboratory celebrated its one thousandth patent this year. One thousand U.S. and foreign patents have been granted for technologies developed at PNNL in the past 37 years.

Coming in at number 1,000 was the U.S. patent for ultrabarrier substrates, specially coated materials that can protect sensitive electronic displays from oxygen and moisture in the atmosphere. Developments related to this patent received the prestigious R&D 100 Award in 2000 presented by Research and Development Magazine and a Federal Laboratory Consortium Award for excellence in technology transfer in 2002. This intellectual property contributed to the formation of Vitex, a Battelle spin-off company created to commercialize ultrabarrier coatings and substrates for flat panel displays and devices.

PNNL reached this milestone even though attaining patents is not the Laboratory's main goal. "Our primary purpose is to conduct research and development for our clients," says Bill Farris, who manages the Intellectual Property Development and Licensing group at PNNL. "Our patents are a positive byproduct of that work."

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