

# Three PNNL inventions win R&D 100 Awards

Three Pacific Northwest National Laboratory inventions recently made the 2003 list of the world's 100 most important scientific and technical innovations, according to an annual competition conducted by *R&D Magazine*.

PNNL was recognized for PASS, a handheld tool that enlists ultrasound pulses to assay the contents of sealed containers without having to open them; for Starlight, an information visualization system—software that graphically depicts connections among disparate pieces of information from large, complex and dynamic collections; and for FT-MS Proteome Express, an instrument that may trim years off the time required to analyze a proteome, or the entire protein set of an organism.

Including these three inventions, PNNL has received 62 R&D 100 Awards since the contest's inception in 1969. PNNL received 55 of the awards since 1988. R&D 100 Awards honor the most promising new products, processes, materials or software developed throughout the world and put on the market the previous year. Awards are based on each achievement's technical significance, uniqueness and usefulness. The winning inventors will be recognized in October at *R&D Magazine's* 41st annual awards banquet held in Chicago, where the magazine is based.



Customs inspectors and international border agents learn to use the Product Acoustic Signature System to identify contents within sealed containers. This tool was one of three technical innovations that earned Pacific Northwest National Laboratory R&D 100 Awards this year.

## PASS

Customs inspectors and international border agents are using the PNNL-developed Acoustic Inspection Device to identify contents within sealed containers. PASS, or Product Acoustic Signature System, works by bouncing sound off a container's contents, then collecting a telltale echo from what's inside. An official can run PASS, which looks like a power drill crossed with a blow-dryer, over a tanker truck or barrel to distinguish crude oil from vegetable oil or chemical weapons agents. The device can also unmask hidden packages, reveal secret compartments and determine a container's fill level.

PASS can save time and protect law-enforcement and border inspectors from potentially hazardous materials. Aaron Diaz, PNNL senior research scientist, led the development of the PASS technology, which is licensed to Mehl, Griffin, & Bartek Ltd. of Crystal City, Va. MGB shares the award.

## Starlight

Starlight was originally developed for the U.S. intelligence community to identify terrorist threats. That same technology can elicit relationships in a diverse array of arenas, from competitive intelligence and fraud detection to epidemiology and bioinformatics. In one application, a Global 100 company is using Starlight to identify new research or products appearing in open literature that relate to a potential competitive threat or opportunity at a very early stage.

The technology has even been used to retrieve the top 100 pages in a Google search of the term "information visualization," plus all pages that linked to or from the pages in the query. The search yielded 1,500 pages

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that, mapped out in Starlight, showed the detailed hyperlink structure of the various information visualization groups' Web pages. A glance at the map could enable anyone to see instantly who was who in the information-visualization universe at the time of the query. John Risch, PNNL senior research scientist, led the software development team.

### **Proteome Express**

FT-MS Proteome Express is an automated, ultra-high-resolution combined separation and mass spectrometer-based system that measures the large and complex proteins in any organism at any time. FT-MS stands for Fourier-transform ion cyclotron resonance mass spectrometer. PNNL researcher and Battelle Fellow Richard D. Smith was the principal investigator in its creation.

Measuring proteins and their abundances at different times, and especially the proteins present in only tiny amounts, is the key to understanding molecular-level cell function and disease progression, treatment and prevention. In experiments at PNNL, the Proteome Express has demonstrated more than 100-fold improvements in speed and sensitivity over previous methods, and demonstrated its applicability in projects that range from how microorganisms absorb atmospheric carbon to how certain viral proteins cause blindness. This is Smith's seventh R&D 100 Award. ■