

## **News Wire from Idaho National Engineering and Environmental Laboratory – Home of Science and Engineering Solutions**

**Welcome!** This is the latest edition (2<sup>nd</sup> for 2004, 12<sup>th</sup> since June 2003) of the **INEEL News Wire**, which delivers news about key issues and current advances in both research and technology at the multiprogram Department of Energy's Idaho National Engineering and Environmental Laboratory (INEEL), located in Idaho Falls, Idaho and operated by Bechtel BWXT Idaho for the U.S. Department of Energy.

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Content of January 30, 2004, INEEL News Wire:

January 30, 2004 – **“INEEL Honors 100 Inventors at the Annual Recognition Banquet”**

**Special Website Honor “INEEL Hall of Fame” Recipients – visit** <http://www.inel.gov/techtransfer/halloffame/> (after 4 p.m. MST on Jan 30, 2004) for Video News Release, standard news release and special presentation of 9 inventors who are members of the INEEL Hall of Fame

January 8, 2004 – **“INEEL scientist demonstrates nuclear materials detector”**

### **INEEL Honors 100 Inventors at the Annual Recognition Banquet**

Idaho Falls, Jan. 30, 2004 – One hundred inventors were recognized for their patents and inventions at the eighth annual Inventors' Recognition Banquet held by the U.S. Department of Energy's Idaho National Engineering and Environmental Laboratory on Jan. 30 in Idaho Falls.

The inventions offered technological advances in many areas, including environmental protection and cleanup, energy, medical research, industrial welding and more.

Three inventors were recognized for generating ten or more inventions, while six inventors were admitted to the INEEL inventors “Hall of Fame” for creating five or more inventions.

“Our scientists, engineers and researchers produce some of the most remarkable advances in America,” said INEEL’s Acting Laboratory Director Paul Kearns.

“This year we recognized 100 inventors and 39 patents with \$50,000 in special awards. We are the only national laboratory to recognize our people with a tiered

lifetime Hall of Fame achievement award for producing 5, 10, 15, and 20 inventions.”

An innovative way to spur performance, the INEEL “Hall of Fame” was established last year and includes public recognition and monetary awards based on levels of productivity. So far, INEEL has recognized 25 inventors who have amassed more than 150 inventions. Along with scientific and engineering peer recognition, about \$117,500 in special awards from licensing agreements that provide royalty income have been made.

Among the contributions recognized this year are a dozen patents for environmental technologies, more than half a dozen in energy technologies, research in selective cell destruction of AIDS virus, supercritical fluid coatings for fibers used in many products, and a new method of ultrasonic weld inspection, which is accomplished as the weld is made. All of these and many other patents have exceptional potential for application in health, manufacturing, environmental cleanup, national security, nuclear and fossil-fuel energy systems, renewable energy systems, and more.

The three decathlon level life time achievers received special recognition and \$10,000 each for their superb performances. They are Dennis Bingham, an accomplished researcher in liquid natural gas technologies; Joel Hubbell, who has been instrumental in subsurface probe and measuring equipment; and James B. “Buck” Sisson, who partnered with Hubbell on probe and other equipments.

Among the six pentathlon achievers, who received \$2,500, are:

Brent Detering, who has five inventions, mainly in hydrogen, carbon, and fast reactor research methods.

Daniel Ginosar, who has five inventions, mainly in supercritical fluid research.

David Meikrantz, who recently rejoined INEEL and has five inventions, mainly in material separation methods.

John Svoboda, who has five inventions, mainly in agricultural materials research.

Arthur Watkins, who holds five inventions, mainly in measurement and materials development for fossil fuel systems.

Bruce Wilding, who has five inventions, mainly in fossil fuel systems research.

A very promising patent generated by William Keener and Thomas Ward may make significant contributions to understanding the AIDS virus and producing new treatments for it. Entitled “Selective Destruction of Cells Infected with Human Immunodeficiency Virus,” this approach could be used in combination with existing therapeutic strategies to keep the AIDS virus in a state of remission more effectively. Much more testing and investigation is needed to determine its application and success.

Another promising patent reflects the collaborative efforts of Charles Allen, Mark Argyle, Robert Fox, Daniel Ginosar, Stuart Janikowski, David Miller, W. Alan Propp and William Toth. They earned two patents in fiscal year 2003 to enable a continuous process that uses supercritical fluids, instead of hazardous solvents to apply coatings onto fibers and filamentous materials. Among many potential applications are applying lubricating, water resistant, and protective coatings to poly/cotton threads and yarns, protective coatings to cables, abrasion resistant visible coatings to fishing line, and protective or conductive coatings onto composite fibers. The second patent describes the equipment necessary to apply these coatings.

Quality control capabilities for welding operations in various industrial settings could benefit significantly from a patented technology that presents a method for ultrasonically inspecting the quality of an arc weld on a pass-by-pass basis, as the weld is being made. This technology permits inspection of welds at high temperatures without requiring a liquid couplant. It increases productivity of fabricating welds in products such as offshore oil and gas pipelines. Five people worked on this effort, including John Johnson, Eric Larsen, Karen Miller, Herschel Smartt and Timothy McJunkin.

This year, 100 inventors will be recognized representing 39 patents issued during fiscal year 2003. These patents represent the INEEL's continuing success in applying scientific solutions to meet the grand challenges of industry and government.

The patents generated during 2003 will benefit industries in such varied fields as nuclear energy, agriculture, hydrogen fuel research and environmental cleanup.

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### **INEEL scientist demonstrates nuclear materials detector**

*Taking direct aim at terrorism: INEEL scientist demonstrates nuclear materials detector*

Idaho Falls, Jan. 27, 2004 – A cutaway of a commercial cargo container sits on the concrete floor of a laboratory at the Idaho Accelerator Center in Pocatello, Idaho. Hidden deep inside, under thick blocks of wood and layers of polyethylene and lead, is an innocent-looking vial, about the size of an aerosol can. Physicist James L. Jones of the U.S. Department of Energy's Idaho National Engineering and Environmental Laboratory aims an accelerator beam at the huge container and in less than 120 seconds, reveals the vial contains uranium.

An audience of scientific peers and representatives from Department of Homeland Security and the Defense Threat Reduction Agency is on hand to witness the INEEL-developed technology's ability to rapidly and accurately detect

shielded weapons-grade materials hidden within the container - the same type of cargo containers that daily enter U.S. borders by the thousands.

"Nuclear smuggling is a real threat," said Jones. "I've demonstrated just what this technology could do against it." For several years, DOE's National Nuclear Security Administration has funded research projects to address nuclear smuggling. Jones and others had been working under the auspices of DOE, until program oversight was transferred to the newly formed Department of Homeland Security.

Jones teamed with DOE's Los Alamos National Laboratory and a commercial company to develop the system that could be deployed at the nation's ports of entry. The technology Jones demonstrated has the added benefit of being adaptable to a variety of commercial inspection platforms.

DOE's National Nuclear Security Administration also has a major program to enhance the ability of foreign partners to detect and deter illicit trafficking of nuclear and other radioactive materials at international land border crossings, airports, and seaports. Technology such as the one demonstrated at INEEL may one day improve our global capabilities in the fight against terrorism.

Jones uses a transportable electron accelerator - not much bigger than automobile diagnostic equipment - to produce energetic photons. These photons interact with the interrogated object, in this case, the cargo container. This process, which occurs in less than the blink of an eye, induces fission - divisions in the atomic nucleus - in nuclear material. Other materials do not fission. Jones has designed a patent-pending cylindrical detector that can pick up and characterize this fission event. The pulsed photonuclear neutron detector detects the presence of shielded nuclear material and can differentiate between highly enriched uranium, depleted uranium or thorium when a second beam at a different energy level is directed at the object.

Sonya Bowyer from Homeland Security attended the demonstration in her role as active interrogation program manager.

"Nuclear smuggling isn't just a Homeland Security issue, it's a global issue," said Bowyer. "One of the jobs I have is evaluating the best technologies to address it. James' is one."

Bowyer plans on identifying the technologies with the best chance of solving real problems and then testing them methodically. Jones agrees on the need for independent testing along with consistent test and demonstration criteria.

"There are thousands of ways to configure a cargo container," said Jones. "We've picked a couple of challenging ones to demonstrate. We are developing standard testing configurations so we can compare our results with other

technologies."

The pulsed photonuclear detection system that Jones demonstrated evolved from nonproliferation research that he had been conducting. Jones optimized the technology to address smuggling of nuclear materials and explosives. Earlier in the year, Jones demonstrated the technology's ability to detect explosives hidden in the trunk of a car at a stand-off distance of three meters, in a time rivaling that of bomb-sniffing dogs.

Jones' research contributes to the INEEL's overall national security mission and its critical infrastructure assurance program, in which technologies, systems and policies that protect the nation's core systems - such as energy, communications and transportation - are developed, tested and validated under real-world conditions.

This demonstration took place at the Idaho Accelerator Center on the Idaho State University Campus. The Idaho Accelerator Center is operated by ISU in collaboration with the INEEL. Jones is the Center's associate director.

<http://newsdesk.inel.gov/contextnews.cfm?ID=493>

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