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

Welcome! This is the **inaugural edition of the INEEL News Wire**, which is designed to deliver regular news about current advances in research and technology at the multiprogram Department of Energy's Idaho National Engineering and Environmental Laboratory (INEEL), located in Idaho Falls, ID. Published by the INEEL Communications Directorate, we offer to deliver each news summary to your desktop with links to the entire article at our website. Within two weeks the INEEL News Wire will be available at http://www.inel.gov, along with an archive of previous editions.

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Contents of June 4, 2003 INEEL News Wire include:

Doctoral degrees add to INEEL's scientific strength
Idaho Falls, ID May 19, 2003 – Employees at the Department of Energy's Idaho National Engineering and Environmental Laboratory are pursuing advanced degrees in greater numbers for personal success while adding to the INEEL's professional reputation and research capabilities.

Fifty-four INEEL employees are pursuing doctoral degrees - the most ever - and 18 postdoctoral researchers are working on INEEL projects. Also, seven additional postdoctoral researchers were hired full-time at the INEEL.

According to Paul Kearns, vice president and deputy Laboratory director, the INEEL has increased doctoral candidates by 59 percent during the past year. "A key measure of a national laboratory is the percentage of scientists and

researchers with advanced degrees on staff," Kearns said. "It's also significant that these employees are applying their knowledge to developing science-based solutions to the nation's grand challenges, such as energy and environmental issues, now being addressed at the INEEL."

Working at an experimental nuclear facility overseas motivated Richard Schultz, an INEEL consulting engineer, to enroll in Idaho State University's nuclear engineering doctoral program. "I'm excited about the resurgence of nuclear power and especially the possibility that Idaho may be the site for the first advanced nuclear reactor to be built in the United States in decades," he said. Schultz will use his advanced education in the design of nuclear safety systems at the INEEL.

One of the initial roles for the INEEL management team - comprised of Bechtel National, Inc., BWX Technologies, and the Inland Northwest Research Alliance (INRA) - was to find solutions to improve the educational profile of the INEEL staff. They did this by developing research and education programs that identify and encourage INEEL researchers to seek advanced degrees. Employees have responded in record numbers to the opportunity to further their educations.

Larry Cook, a biotechnologist who has worked at the INEEL for 12 years, believes Bechtel BWXT Idaho created a strong corporate climate at the Laboratory for pursuing a doctoral degree.

"That, coupled with my personal goal to earn a Ph.D., prompted me to enroll in the Subsurface Science Initiative doctoral program," Cook said. "I believe a doctoral degree is a valuable credential for a senior researcher. It's also personally enriching and well worth the required employment commitment to the INEEL."

Link to complete news story on the INEEL website:
http://newsdesk.inel.gov/press_releases/2003/05-19Increased_doctoral_candidates.htm
Story contact: Steve Zollinger, 208-526-9590, gaz@inel.gov

Enzyme could overcome industrial bleaching waste problems

Idaho Falls, ID May 14, 2003 – Taken from a microbe that thrives in the depths of a Yellowstone National Park hot springs pool, a newly discovered enzyme may be the key to transforming industrial bleaching from environmentally problematic to environmentally green.

Chemical engineer Vicki Thompson and biologists William Apel and Kastli Schaller from the U.S. Department of Energy's Idaho National Engineering and Environmental Laboratory discovered that the catalase enzyme from a Thermus brockianus microbe flourishes in both a high temperature and high pH (basic or alkaline) environment.

Catalase enzymes chemically alter hydrogen peroxide into natural products - water and oxygen. Industry is increasingly using peroxide in industrial bleaching processes and needs an environmentally friendly process to handle process wastes. The T. brockianus catalase works well in the hot, alkaline process wastewater where commercially available catalase enzymes do not, so it could be an answer.

Thompson will present this work at the American Society of Microbiologists annual meeting in Washington, D.C. on May 20, 2003. A paper on this research was recently accepted for publication in Biotechnology Progress and will appear in print this summer.

The work is part of the INEEL's efforts to support the DOE mission in environmental research and development.

Industries such as textile and pulp and paper have started shifting away from toxic, carcinogenic chemical bleaching processes to more environmentally friendly hydrogen peroxide-based bleaching. Until INEEL discovered the T. brockianus enzyme, there were only a few options for dealing with the wastewater.

Industry can chemically treat the water to break hydrogen peroxide down, but that practically cancels out the environmental benefit. Or they can heavily dilute wastewater with even more water, but that increases the volume of wastewater. Using catalase to break down hydrogen peroxide is a good alternative, but commercially available catalase enzymes require much cooler wastewater temperatures and lower pH conditions. This costs industry significant energy, time and money.

But the T. brockianus catalase likes these extreme conditions-performing best at temperatures around 90 degrees Celsius (194 degrees Fahrenheit) and in highly alkaline pH of more than 9. In laboratory tests, it functioned well for as long as 360 hours under these conditions compared to a mere 15 to 20 minutes for other, commercially available catalases.

Thus, the INEEL research will provide a chance for textile and pulp and paper companies to save significant energy and reduce environmental impacts.

Link to complete news story on the INEEL website:
http://newsdesk.inel.gov/press_releases/2003/05-14enzyme.htm
Story contact: Keith Arterburn, (208) 526-4845, artegk@inel.gov

INEEL names new Director for Nuclear Science and Engineering
Idaho Falls, ID May 12, 2003 – U.S. Department of Energy's Idaho National Engineering and Environmental Laboratory has created an additional nuclear energy directorate in response to the Laboratory's growing nuclear energy mission.

Kathryn McCarthy, Ph.D., has been promoted to the new position as director of Nuclear Science and Engineering within the INEEL's Nuclear Energy division. For the past five years, McCarthy has been the manager of the Nuclear Engineering Design and Research Department.

"Kathy's expertise, leadership and background make her an excellent choice for this important position," said James Lake, associate laboratory director for Nuclear Energy. "This is an exciting time for the INEEL as we respond to the opportunities presented by our nuclear energy mission. McCarthy and her staff will play a key role in conducting research and development in nuclear systems analysis and design, fusion, reactor and radiation physics, thermal fluids, and nuclear fuels and materials."

Last year, McCarthy was elected to the American Nuclear Society's board of directors. She received the ANS Women's Achievement Award in 2000 for outstanding personal dedication and technical achievement by a woman for work she performed in the fields of nuclear science, nuclear engineering, research and education. Last year, she also served as chair of the Idaho section of ANS.

McCarthy came to the INEEL in 1991 with a doctorate in nuclear engineering from the University of California, Los Angeles. She has worked in the INEEL Fusion Safety Program focusing on examining the behavior of materials in the plasma facing components of proposed fusion reactors. She also led a number of important experimental projects that have contributed to an understanding of the consequences of fusion reactor accidents.

She has worked at the Kurchatov Institute in Moscow, Russia, the Efremov Institute in Leningrad and the Latvian Academy of Sciences in Riga, and has participated in numerous national and international fusion energy conferences and symposiums and authored or co-authored more than four dozen journal articles.

Link to complete news story on the INEEL website:
http://newsdesk.inel.gov/press_releases/2003/05-12nuclear_energy_directorate.htm
Story contact: Teri Ehresman, 208-526-7785, ehr@inel.gov

Wireless Test Bed open for business
Idaho Falls, ID April 10, 2003 – America's only "city-size" wireless communication test facility is now open for business - and it's in Idaho.

The Bechtel/INEEL Wireless Test Bed resides within the U.S. Department of Energy's Idaho National Engineering and Environmental Laboratory, an 890-square-mile site, located 45 miles west of Idaho Falls, Idaho. The Test Bed offers large-scale, independent, end-to-end testing of wired and wireless next generation communication infrastructure including 3G/4G cellular, land mobile

radios and wireless local area network systems.

Bechtel Telecommunications, a unit of Bechtel Corporation, built the Wireless Test Bed in collaboration with the INEEL to take advantage of the Idaho Lab's continuous access to commercial and government spectrum, secure environment and world-class technical personnel, according to Jake MacLeod, Bechtel Telecoms' chief technology officer.

The Test Bed's opening is particularly timely since cell towers are sprouting up all over the American landscape like bean stalks in a well-tended garden, seeded by the enormous increase in numbers of users, minutes online and cell phone functions. Cell phones are no longer just used to call home or schedule meetings with prospective customers. Wireless communications and technologies can turn cell phones into futuristic offices, connecting users to the Internet, allowing them to download materials, play games, even shoot and send snapshots.

These increases in usage and capabilities are not without their growing pains, both for commercial vendors and the public. Problems range from interference and service interruption to troubles with network integration and handset interoperability. The costs and complications of solving some of these problems can be immense. Bechtel Telecommunications built the Wireless Test Bed in collaboration with the INEEL to create an environment where commercial carriers and equipment manufacturers can address these network deployment issues.

"We wanted to create an environment to allow carriers and manufacturers of next generation equipment to bring it in and test it end-to-end," said project engineer Lynda Brighton. "Test, characterize, and troubleshoot their equipment free from interference with current systems, free from disrupting current customers and free from competitors' eyes." Until now, no facility existed where wireless communications could be tested in a life-size, city-like setting. Laboratory and bench-scale testing, or limited-access to traffic-bearing networks had to suffice for carriers or manufacturers.

The Bechtel/INEEL Wireless Test Bed owes its existence, in part, to INEEL's status as a National Telecommunications Information Administration test station. This allows the Testbed to transmit at all - but a few - frequencies. Add to this INEEL's vast, remote and secure site, equipped with the complex infrastructure of a small American city with its communications, power and transportation, and you have all of the ingredients for a successful full-scale laboratory. INEEL's site also offers a virtually RF-clean environment - the purity of a true laboratory. And yet, researchers can add interference as another controlled variable in a test process.

"What really increases the value to a Test Bed customer is the flexibility we built into the infrastructure," said Brighton. "We have designed the system so that a

customer can just "plug-in" their equipment and go." Engineers can also run tests 24 hours a day, 7 days a week, if required.

Link to complete news story on the INEEL website:
http://newsdesk.inel.gov/press_releases/2003/04-10wireless_test_bed.htm
Story Contact – INEEL Kathy Gatens, 208-526-1058, kzc@inel.gov

Regional Students Again Having Fun With Physics
Farmington, UT May 12, 2003 – More than 5,000 students from 80 schools in Idaho, Utah, Nevada and Wyoming are expected to attend the 14th annual Utah State University Physics Day event May 16 at Lagoon Amusement Park in Farmington, Utah.

The daylong activity is designed to be an educational approach to teaching fundamental physics concepts to middle school and high school students, using an amusement park as a laboratory. More than 800 southeast Idaho students and teacher participated in events in 2002.

USU Physics Day is an education outreach activity run jointly by the USU Physics Department and the U.S. Department of Energy's Idaho National Engineering and Environmental Laboratory. Other sponsors include Boeing, Clark Planetarium, Lagoon Amusement Park, DuPont Holographic, Thiokol, U.S. Navy, USU College of Science, USU Office of Recruitment and Enrollment Services, Rocky Mountain NASA Space Grant Consortium and Idaho NASA Space Grant Consortium.

"It is great to see high school students having fun and becoming attracted to science and engineering. It is a great learning experience for everyone. As Leonardo da Vinci once said, 'Learning is the only thing that the mind never exhausts, never fears and never regrets,'" said Ali Siahpush, advisory engineer/scientist and coordinator of the event for the INEEL.

Students will participate in a Colossus Colossal G-Force contest; physics bowl competition, student workbooks, and contest in demonstration design, ride design and logo design. The rides will be open from 9:30 a.m. to 4:30 p.m. and Physics Day events are scheduled from 10:30 a.m. to 3:30 p.m. Winners will be announced at an awards ceremony starting at 3 p.m. at the Davis Pavilion inside the amusement park. Last year, an estimated $39,000 in prizes and scholarships were awarded to competition winners.

Physics Day is one of several programs at the INEEL that encourages science education for students, thus ensuring a future work force that will further the long-term mission of the INEEL.

The INEEL is a science-based, applied engineering national laboratory, dedicated to supporting the DOE's missions in energy, national security, science and environmental research. The INEEL is operated for the DOE by Bechtel

BWXT Idaho, LLC.

Link to complete news story on the INEEL website:
http://newsdesk.inel.gov/press_releases/2003/05-12Physics_Day_at_Lagoon.htm
Story contact - Teri Ehresman, 208-526-7785, ehr@inel.gov

Idaho Hispanic students learn that they have the power to shape the future
Sun Valley, ID April 21, 2003 – More than 300 Hispanic high school students from throughout Idaho will travel to Sun Valley this week to spend the weekend of April 25, 26 and 27 participating in the state's renowned 14th annual Hispanic Youth Symposium.

The theme of this year's symposium is "El Poder de Manana Esta En Tus Manos Hoy" - "The Power of Tomorrow Is In Your Hands Today."

As it has since 1989, this year's annual symposium has three primary goals: mentoring and drop-out prevention, pride in Latino culture and history, and encouraging students to pursue higher education.

Each year, the Hispanic Youth Symposium invites at-risk students and those seeking education beyond high school. By offering many opportunities for these students to demonstrate their strong academic and artistic talents in a supportive atmosphere of cooperation, the symposium fosters in its young participants important skills that they need to succeed in life.

"This event is one way that the U.S. Department of Energy encourages young people to develop the strong math and science skills necessary for the growth of our nation's economy," said Walt Sato, assistant manager for Technology Programs and Operations at the Department's Idaho Operations Office. "The symposium offers great opportunities for many of Idaho's brightest, hardest working high school students to demonstrate and further develop their academic and artistic talents in a supportive atmosphere."

The students represent high schools from throughout Idaho. At the symposium, the students learn about the importance of getting a good education and are offered information-packed opportunities to examine future career paths.

At 11:45 a.m. Friday in the Sun Valley Inn Indoor Skating Rink, Idaho Gov. Dirk Kempthorne, U.S. Sen. Larry Craig and Idaho Migrant Council Director L. Samuel Byrd are scheduled to deliver opening remarks to students attending this year's event. At 6:45 p.m. Friday, Idaho Court of Appeals Judge Sergio Gutierrez is scheduled to deliver a keynote address. At 7:45 p.m. Saturday, 2002 Winter Olympics gold and silver medalist Derek Parra is scheduled to deliver a keynote address.

During the symposium, students listen to motivational speakers and participate in

interactive workshops designed to enhance self-esteem, leadership and problem-solving skills. Some workshops are geared toward helping students examine productive ways to solve common challenges facing youth today. Other workshops feature intellectually stimulating interactive presentations by Idaho scientists and engineers, and career development specialists.

Link to complete news story on the INEEL website:
http://newsdesk.inel.gov/press_releases/2003/04-21Hispanic_Youth_Symposium.htm

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