Nishioka Stoddard Goes From Designing Libraries To Waste Repositories.

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DOE Pulse

Science and Technology Highlights from the DOE National Laboratories

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Research Highlights . . .

Early-Warning Test of Steel for Metal Fatigue

The structural failure of steel in bridges, buildings, highway overpasses, etc., is a problem of potentially catastrophic magnitude. The first practical, non-destructive means of testing steel and other metals for pending trouble long before any visible cracks appear has been demonstrated by researchers at DOE's Lawrence Berkeley National Laboratory. Through the combination of a unique SQUID microscope that can be used for on-site inspections, and an equally unique transmission electron microscope, a Berkeley Lab collaboration has shown that stress-induced changes to the microstructure of steel can be correlated to subtle changes in the steel's magnetic properties. (http://www.lbl.gov/Publications/Currents/Archive/May-15-1998.html)

[Lynn Yarris, 510-486-5375, lcyarris@lbl.gov]

'Peregrine' Aims at Improved Radiation Therapy

Improved radiation treatment for cancer may be on the horizon based on technology from DOE's Lawrence Livermore National Laboratory. PEREGRINE is a computer-based system that predicts radiation dose to body tissue during radiation therapy. It graphically displays predicted dose to various parts of the body, helping doctors direct more radiation to tumors, with less damage to surrounding, healthy tissue. PEREGRINE appears to have the potential to save thousands of lives each year. It was developed using radiation physics expertise gathered over four decades of nuclear weapons research.

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Putting INEEL Technology in Park

DOE's Idaho National Engineering and Environmental Laboratory will team up with Yellowstone National Park less than 150 miles north to tackle environmental and energy issues under an interagency agreement completed May 14. The agreement was signed by the National Park Service and DOE's Idaho Operations Office during the Greening of Yellowstone Conference at Montana State University in Bozeman, Mont. "This agreement will allow both the Park Service and the INEEL to make more efficient use of federal resources in resolving common problems," said John Wilcynski, manager of the DOE office.

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"This Project Is Ready to Go!"

International high-energy physics passed a major milestone on May 22 with the "thumbs-up" from an experts' review of the U.S. contribution to a huge new multinational particle detector. The review, held at DOE's Fermilab, scrutinized the $167 million US/CMS project that will help build CMS, one of two huge particle detectors for the Large Hadron Collider, a new particle accelerator to begin operating in 2005 at CERN. Scientists applauded the announcement of approval of the scope, cost and schedule for the high-profile project. Fermilab serves as host laboratory and project manager for US/CMS, a collaboration of 320 physicists from 40 U.S. universities.

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DOE Pulse highlights work being done at the Department of Energy's national laboratories. DOE's laboratories house world-class facilities where more than 30,000 scientists and engineers perform cutting-edge research spanning DOE's science, energy, national security and environmental quality missions. ***DOE Pulse*** is distributed every two weeks. For more information, please contact Jeff Sherwood (jeff.sherwood@hq.doe.gov, 202-586-5806).

Arctic Research Yields Climate Change Information

The Arctic is Earth's radiator. It cools the atmospheric heat engine and fuels the major pumps for global ocean currents. Despite the Arctic's importance to climate, little is known about the interaction between sea, ice, and air at high latitudes.

To better understand the role of the Arctic in global climate change, scientists and engineers from DOE's Atmospheric Radiation Measurement program (www.arm.gov) are taking part in the multi-agency SHEBA project. SHEBA, for Surface Heat Budget of the Arctic, is sponsored by the National Science Foundation and coordinated by the University of Washington.

Home base for SHEBA participants is the 322-foot Canadian ice breaker, Des Groseilliers, which was frozen into the ice about 300 miles north of Prudhoe Bay, Alaska, in October and has been drifting westward with the ice pack since then (http://sheba.apl.washington.edu/database/shebapos.gif). It will be freed when the ice breaks up this summer.

For SHEBA, ARM is collecting data on the transmission, absorption, and reflection of the sun's energy in the Arctic and on the role of clouds in this process. Other organizations are looking at the freezing and melting of the ice surface and the ability of snow and ice to absorb the sun's energy.

The ARM staff comes from across the DOE laboratory system and universities. Researchers from Sandia, Pacific Northwest, Argonne and Ames laboratories; the University of Alaska Fairbanks; and University of Wisconsin have faced many challenges during their seven-week shifts. In addition to keeping instruments running under frigid conditions, they've dealt with buckles in the ice surface that raise once-level instruments onto slippery slopes, cracks that open in the ice floe stranding instruments on one side and the ship on the other, and wandering polar bears.

ARM is using specially hardened instruments to give highly accurate measurements needed to model climate processes:

- A cloud radar instrument produces detailed information about Arctic clouds and their internal composition. It detects particles as small as individual insects at 2 kilometers (1.24 miles) high and thin clouds at 15 kilometers (9.3 miles) high.
- An AERI, a very high-resolution interferometer, provides profiles of water vapor and temperature in the lower 3 kilometers (1.9 miles) of the atmosphere.
- Passive radiometric instruments observe the sun's incoming and outgoing energy and the earth's heat emissions.

ARM also provides support from its land-based site near Barrow, Alaska.

Gathering the data is only the first part of the five-year SHEBA project. Once the 13-month field experiment ends, modelers will use the data to improve general circulation models that predict global climate change. These data will augment the ARM data set, which comes from ARM sites in Alaska, the Tropical Western Pacific, and the U.S. Southern Great Plains.

ARM is an ongoing DOE research program to improve understanding of the processes and uncertainties related to global climate change, with emphasis on improving the performance of global climate models. ARM was established in 1991 as DOE's major contribution to the U.S. Global Change Research program. For more information, contact Jeff Sherwood (jeff.sherwood@hq.doe.gov) or Kathryn Lang (kathryn.lang@pnl.gov).

Submitted by DOE's Pacific Northwest National Laboratory

Nishioka Stoddard Goes From Designing Libraries To Waste Repositories

When Dianne Nishioka Stoddard joined DOE's Idaho National Engineering and Environmental Laboratory (INEEL) 10 years ago, she was fresh from experience designing any number of city facilities the average person uses often, from libraries at Idaho State University, Idaho Falls and Blackfoot, Idaho, to the Idaho Falls Aquatic Center to courthouses. Those same architectural skills she used to create public buildings came in handy in her new assignment in waste management, although it took some time.

Born in Idaho Falls and with a bachelor's degree in architecture from the University of Idaho, Nishioka Stoddard began with INEEL in cost estimating. She cultivated expertise and contacts in environmental remediation and waste management, gradually marrying that experience with the new and challenging world for her of CERCLA and RCRA requirements.

She then transitioned to her current assignment as an architectural designer in the Mechanical, Civil, Industrial and Engineering group. She's currently working on design of a fire station at the site, 50 miles west of Idaho Falls.

And what was it like transitioning from designing libraries to other more mundane enterprises? "It was a good challenge," said Nishioka Stoddard. "Your work is what you make out of it, but a lot depends on the project."

As with many who work at the INEEL, the benefits of living in Southeast Idaho make the challenges life throws at us easier to handle. Nishioka Stoddard enjoys many of the outdoor activities this area is known for, including downhill skiing, fishing, camping and gardening. Other hobbies include piano playing, singing and sketching. She has two sons; Lewis, who attends Utah State University; and Grayson.

Submitted by DOE's Idaho National Engineering and Environmental Laboratory