

HOTLINE

The Princeton Plasma Physics Laboratory is a United States Department of Energy Facility



DOE's Orbach Addresses Troops

Raymond L. Orbach (at left), Director of the Department of Energy's (DOE) Office of Science, offered encouraging remarks about PPPL and the development of fusion energy during an "All Hands" meeting for PPPL staff at the MBG Auditorium at the end of July. "Without you, the U.S. would not be in a position to provide leadership for fusion [research]," Orbach said.

Orbach was at PPPL for the DOE's Office of Science and Office of Fusion Energy Sciences FY2002 Institutional Planning On-site Review of PPPL. He led the DOE delegation, which also included Toni Joseph, N. Anne Davies, John Willis, Mike Roberts, Ehsan Khan, John Metzler, David Michlewicz, Van Nguyen, Jerry Faul, and Greg Pitonak. The visit included briefings on Laboratory experimental and theoretical projects, as well as on science education and Laboratory infrastructure, maintenance, and safety. ●

PPPL's Science Education Lab Opens Its Doors



PPPL Science Education Program Lead Scientist Andrew Post-Zwicker (left) works with students at the new Science Ed Lab.

The new Science Education Laboratory bubbled with activity this summer as students and teachers alike descended upon the bright, wood-floored space in S-109. Movable lab benches, wireless internet access, office space, and a chance to build plasma sources beckoned them, as well as the guidance — and the ears — of a scientist or two.

"We had a spectacular fusion of physics and education. Each of the research projects paired an undergraduate student majoring in physics with an advanced high school student. This was novel, but worked well and reflected wonderful teamwork, from both physics and pedagogical points of view,"

Continued on page 2

Lab

Continued from page 1

said Andrew Post-Zwicker, PPPL Science Education Program Lead Scientist and the force behind the creation of the lab.

Those using the space this summer, which opened June 10, included three master teachers, a handful of undergraduate students, a student teacher, and five local high school students. The Science Education group held a couple of two-week workshops, Plasma Camp and Plasma Academy — the first geared toward high school physics teachers and the second for high school students — at S-109. The lab also was the site of additional workshops and provided a space for program and workshop participants to conduct their research.

“Some of the best features of the lab are its flexibility and adaptability,” noted Post-Zwicker. “We could rearrange things to work with groups of varying sizes and levels of expertise.”

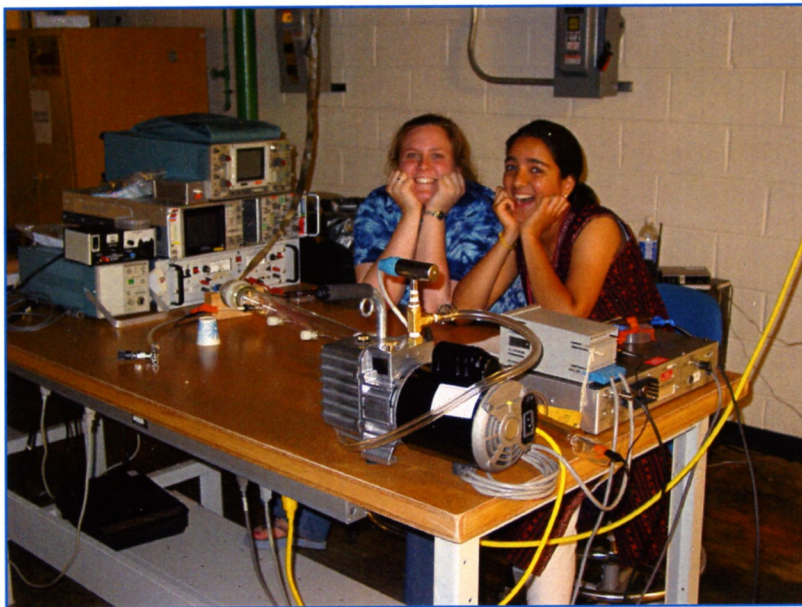
The lab has two small rooms for advanced projects, as well as office areas for students and a storage space for the Science Education demonstration “toys” and gadgets.

Projects undertaken at the lab include the comparison of a double layer in a DC glow discharge and ion transport across a cell membrane; high-speed video imaging of plasma filaments and arcs; creation of a DC glow discharge visualization code; development of a computer-controlled interactive plasma source museum project; and development of a simple, inexpensive, and safe plasma source for classroom use.

So what’s next for the lab? “This fall we will continue several of the summer projects, as well as begin a few innovative ones,” said Post-Zwicker.

Three undergraduates will continue projects at the lab that focus on the comparison of a plasma to a biological system; the integration of hydrogen fuel cells into a high school chemistry curriculum; and the completion of a computer-controlled touch-screen plasma display. The last is being done through a new PPPL partnership with The Franklin Institute in Philadelphia. Work will also include a collaboration with Auburn University on dusty

plasmas, and on developing partnerships with Douglass College at Rutgers University and with The College of New Jersey. In addition, PPPL is a partner, along with Princeton University, Rider University, and Bristol-Myers Squibb, on a National Science Foundation grant for a new Center for Science Education. The grant application is expected to be submitted this winter. Finally, lab activities will include working with teachers from the Lewis



From left are Science Ed Lab users Jennifer Gimmell, a Hiram College student, and Aditi Sriram, a West Windsor-Plainsboro High School North student.

School in Princeton to develop a new high school physics curriculum. It will provide the structure for activities that will take place at the lab, since the Lewis School has limited space.

Post-Zwicker said the lab will also be the center for PPPL’s Science Education Program physical science activities at the kindergarten through twelfth-grade level.

“Thanks go to everyone who supported the creation of the lab, from the Department of Energy and PPPL management, to staff from the Environment, Safety & Health and Infrastructure Support and the Engineering and Technical Infrastructure groups,” said Post-Zwicker. ●

Hotline

Editor/Writer: Patti Wieser
Photography: Elle Starkman

Graphic Artist: Greg Czechowicz
Layout: Patti Wieser

The **HOTLINE** is issued by the Princeton Plasma Physics Laboratory, a research facility supported by the United States Department of Energy. It is primarily an internal publication. Correspondence and requests to reprint material should be directed to the Editor, PPPL **HOTLINE**, P.O. Box 451, Princeton, NJ 08543; Interoffice correspondence should be addressed to MS-38, LSB Bldg., C-Site; fax 609-243-2751; telephone 609-243-2757; e-mail pwieser@pppl.gov.

Miniature Nuclear Detector System Draws Interest



In August, representatives from state and local government, industry, and Federal laboratories came to PPPL for a Miniature Nuclear Detector System (MINDS) demonstration. During the demo, the system, which would be employed for counter-terrorism purposes, illustrated its ability to detect and identify a small amount of nuclear material inside of an inter-modal shipping container. Individuals from Picatinny Arsenal, the New York Port Authority, the New Jersey Commission on Science and Technology, the Rutgers Center for Advanced Information Processing, Amtrak Police, and the New York City Metropolitan Transportation Authority-Bridge and Tunnel Authority, as well as from small businesses, attended. Above, at right, PPPL's Lewis Meixler talks to the group during follow-up discussions. ●

Science Demonstrations



PPPL engineer Ronald Hatcher (left) and Energy Research Undergraduate Laboratory Fellowship student Cory Rupp gave a demonstration of thermal expansion properties of metals to a group of pre-college students touring the Lab this summer.

DACW Spearheads Cereal Drive for HomeFront



From left are DACW Chairperson Lena Scimeca, Regina Worthy and Barbara Sarfaty, with some of the donated cereal.

The PPPL Director's Advisory Committee for Women (DACW) recently collected more than 68 boxes of cereal for area charity HomeFront. DACW sponsored a drive at PPPL after hearing that HomeFront was in desperate need for cereal.

HomeFront supports the homeless families of Mercer County through nourishing meals, housing assistance, employment location services, tutorial programs, back-to-school clothing drives, and other services.

"Thank you to all who donated cereal boxes to HomeFront. They were truly grateful," said Regina Worthy, who delivered the donations, along with Barbara Sarfaty. "This was definitely a wonderful cause and PPPL came through with flying colors." ●

PPPL's New Colloquium Committee

The Lab's Colloquium Committee for the 2002-2003 colloquium series consists of Hantao Ji, Jay R. Johnson, and Phyllis Roney. If you have suggestions for speakers for the series, please contact one of the committee members via e-mail. ●

PPPL: The Hottest and Wettest Place on Earth

By Jonathan Zatz

On the evening of July 8, a broken 40-year-old water line underneath the Lab's Mechanical Equipment Room flooded the first floors of both the Engineering Wing and L-Wing. Central Steam Plant Operator Bill Stanton noticed water pouring out from under the Lab's southeast exit door while driving past on his way home. Security staff contacted PPPL engineer Art Wise at home at 10:30 P.M. When Wise arrived at the scene, he was amazed at the extent of the flood.

"I expected a leaky ceiling, not a deluge," he said. He encountered a sea of water, one to two inches deep, that stretched from the far end of the Engineering Wing to the far end of the L-Wing. Wise estimated it to be 200-300 feet, one way, and guessed that the flood had been underway for about an hour before anyone noticed it. Closed doors helped to halt the spread of the flood.

Throughout that night, PPPL's Maintenance Division, as well as the Plainsboro and Monmouth Junction fire companies, vacuumed up all of the initial water. Henry Carnevale, Carl Potensky, Bill Slavin, James Taylor, Al von Halle, Mike Williams, and others held a 3 A.M. meeting to come up with controls and procedures.

On completion of his initial rescue activities, Wise was too tired to drive home and decided to sleep in the Lobby for two hours. During that time, employees not yet acquainted with the flood strolled into work.

When he awakened, Wise called fellow engineer Dave O'Neill. "I knew I was coming to an unpleasant situation," said O'Neill. Wise had already moved O'Neill's G3 computer after three inches of water devoured its bottom electronic board. Soon after, Wise, O'Neill, and Dick Debonis systematically went through the buildings for what Wise called "Triage" — shutting down and saving the computers and power strips on the floor. "In spite of the water, we found that computers were still running," said Wise.

Engineer Wayne Reiersen found out about the incident when he received a flyer at the PPPL gate the next morning on his arrival to the Lab. While Wise was napping, Reiersen was coming to terms with damage from the flood. He said the flood "looked liked the

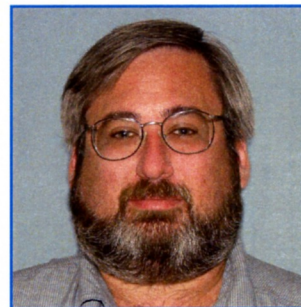
Mississippi." Despite this comparison, he said he was "amazed that computers were still saving things."

Although the engineers were surprised by the amount of water, they were even more shocked at the amount of mud. Wise, who did not get home until that afternoon, remarked, "My carpet was brown."

The Maintenance Division spent most of Tuesday setting up pumps and motors and flushing out the water. Rosemarie Fuchs-Smith, Bob Herskowitz, and Dori Barnes picked up where Wise and O'Neill left off. Fuchs-Smith, Herskowitz, and Barnes were allowed into the flood zone and made a list of rooms that had computers on the floor. They then salvaged those computers and hosed them down with distilled water. Before they began saving the surviving computers, Fuchs-Smith noticed the same miracle that Reiersen and Wise had witnessed. "The computers were still running under water. I was amazed that computers were not damaged even though they were swimming in water," she said.

While the three engineers expected less damage, Fuchs-Smith expected more. She was relieved that everyone's data was retrieved and that almost 90 percent of the affected equipment was saved. She and Herskowitz agreed that only two hard drives and three motherboards could not be rescued. All data was retrieved in about a week, according to Fuchs-Smith.

Slavin arrived on the scene shortly after midnight the night of the flood, expecting a lot of water, but less mud. He concentrated on ensuring safe working conditions. Slavin's initial concerns included the presence of "lots of electrical outlets" and mold growth, he said.



Bill Slavin

The next day, a company specializing in flood and fire restoration came in to remedy the situation. Immediately, company staff sprayed fungicide to prevent mold growth and did a complete cleaning and drying operation. A large desiccant-type air dryer was trucked in to dry the area as soon as possible. One or two



Wayne Reiersen



Art Wise

L-wing labs that contained asbestos tiles became off-limits.

"It was important that the areas be restored as soon as possible, but more important that personnel return to safe working conditions," said Potensky, who was put in charge of the restoration. A measure of acceptability was the amount of moisture inside the buildings, which became difficult to predict because of high outside temperatures and humidity.

"All divisions pulled together to make a bad situation livable. It was rewarding to see what PPPL'ers can do when the chips are down," said Potensky. He said both pipes that ran under the buildings have been removed from service and the water lines will be rerouted in September. A temporary water line from the RF Building presently supplies the water.

Slavin lauded the handling of the situation. "Everyone was following directions and the situation was handled appropriately. There was no panic. People responded effectively and handled cleaning up a nasty situation very well," he said. Slavin noted that the Lab's administration kept people well informed. Fuchs-Smith also shared Slavin's sentiments that the clean-up process went smoothly.

Wise praised the high degree of cooperation in a high-pressure situation. He said, "When you consider the amount of damage and the necessary recovery, many people had to do their part." O'Neill added, "The maintenance staff did lots of hard work moving heavy equipment. The Lab handles these problems in stride — no one gets upset. A great deal of humor was displayed during this incident."

All The Data Was Saved

O'Neill was even more excited about the computer "Triage" as the Computer Help Desk personnel replaced his electronic board, which was swimming in three inches of water. He was "tickled" all the data was saved. Reiersen shared in O'Neill's enthusiasm and exclaimed, "The Computer Division was remarkable at getting computers running very quickly."

Reiersen, who was temporarily relocated to the Theory wing, pointed out positive aspects to the incident. "It was

remarkable how people opened up their offices all around the Lab, including the Control Room and trailers. People were very helpful in making space available," he said. Wise fled to the trailers in D-site with fellow refugees Debonis and Ray Camp. The third floor of LSB became O'Neill's "temporary home." He described his experience in his new surroundings as "very pleasant."

Being away from home, however, was not without hardship for the engineers. Some could not get to their offices or had to run back and forth between two locations. O'Neill observed that many were frustrated by not knowing when they could return to their regular workstations. For most, it was about a week.

In terms of work, Wise and O'Neill agreed that time



Arc flash protective clothing hangs on a clothesline after PPPL's "flash flood."

was the only major loss by staff and project operations. For example, the Current Drive Experiment-Upgrade and Magnetic Reconnection Experiment could not run without water for their cooling systems.

"I didn't imagine that so many offices would be affected," said Reiersen, adding optimistically, "It provided a good opportunity for people to clean out their offices."

O'Neill humorously suggested at the Emergency Operations Center meeting the installation of a raised floor in the Engineering Wing to protect computers from future floods. He added, "I will not put my computer on the floor anymore!"

Asked how to prevent something like this from happening again, Wise commented, "The next time a building is constructed over pipes, you might want to reroute them." ●

PPPL Group Charters Boat for Fishing Expedition

A group of PPPL'ers held its 2nd Annual Fishing Trip on July 12. The group of 30, including PPPL staff, summer students, and term employees, left Belmar Marina about 5 P.M. and returned at 1 A.M., with 250 blue fish in tow. Scott Gifford won all three contests during the trip — catching the first, biggest, and most fish. Those who participated in the expedition included Mike Anderson, John Boscoe, John Carisdeo, Bob Carnevale, Andy Carpe, Lloyd Ciebiera, Bob Ellis, Charlie Gentile, Scott Gifford, Greg Guttadora, Jason Hartfield, Bob Hitchner, Charlie Hughes, Don Hyatt, Garry Karluk, Buddy Kearns, Bill Laffey, Steve Langish, John Parker, Marvin Payen, Al Planeta, Denis Shaltis, Charles Skinner, Patrick Skinner, Reggie Thomas, Bob Tucker, Jr., Bob Tucker, Hudson Wise, Dick Yager, and Irving Zatz. ●

At right, Scott Gifford holds the catch that made him the winner of the "Biggest Fish Award." At far right, Andy Carpe (left) and Charles Skinner take a breather from fishing. At top, from left, are Jason Hartfield, Steve Langish, and Bob Tucker, Jr.



Herrmann Receives Presidential and DOE Awards

In July, former PPPL graduate student Mark Herrmann, now at the Lawrence Livermore National Laboratory, received the Presidential Early Career Award for Scientists and Engineers (PECASE) and the DOE's Office of Science Early Career Award in Science and Engineering.

Herrmann was among 60 researchers supported by eight federal agencies to be honored with the PECASE and one of four scientists from a DOE national lab to receive the DOE award. Each PECASE winner received

a citation, a plaque and continued funding of their work for five years. This presidential award is the highest honor bestowed by the U.S. government on young professionals at the outset of their independent research careers. Herrmann was honored for his "contributions to fundamental studies of implosion and ignition physics in inertial fusion and for identifying approaches to cooling fusion by-products using radio frequency waves in magnetic fusion."

Becoming Rocket Scientists at PPPL



Plasma Academy participants, from left, Ramadan Kelly, James Siplin, and Patrick Alvarado test the water rockets they designed and built in an area next to PPPL's lower parking lot.

About a dozen Trenton area students came to PPPL for two weeks this summer to learn about energy and future energy sources. As participants in the second annual Plasma Academy, the ninth through twelfth graders studied the energy of motion and flight by designing, building, and testing water rockets. Other hands-on experiments include constructing model cars powered by a hydrogen fuel cell and designing, building, and racing solar-powered LEGO cars. In addition, the teens learned about concepts like momentum and velocity during a trip to Six Flags Great Adventure in Jackson, N.J.

Recreate the Power Source of the Sun

"The students learned about the Sun and how PPPL is working to recreate the power source of the Sun to provide electricity in the future. Then they studied two ways to power cars in the future," said Watchung Hills High School physics teacher Sophia Gershman, who led the workshop at PPPL through the Lab's Science Education Program. Gershman was assisted by student teachers from The College of New Jersey, Princeton University, and the University of Maryland, Eastern Shore.

The academy was coordinated through the Mercer County Community College Upward Bound Program in partnership with PPPL. ●

Take a Hike!



PPPL's Raffi Nazikian donned a unique hiking outfit to hit the trails during a break at the 2002 Fusion Summer Study in Snowmass, Colorado this summer. "The utility of the outfit protected me from the elements," commented Nazikian. Hats off to Raffi on unofficially being named the wearer of the most interesting sports-wear! ●

PPPL's Raffi Nazikian has been chosen as one of six APS 2002/2003 Distinguished Lecturers in Plasma Physics. The award comes with travel money to visit campuses around the U.S. Nazikian's talk is titled, "The Scientific Frontiers of Fusion Energy Science." ●

Was
it you
who saved
my life?



Every minute of every day, donated blood saves lives.
Accident victims, cancer patients—someone's child,
someone's parent, someone's friend.

PPPL BLOOD DRIVE

Friday, October 11, 2002

8:00A.M. - 1:00P.M.

PPPL FIREHOUSE



**American
Red Cross**

Together, we can save a life
1-800-GIVE LIFE • www.redcross.org

To Sign Up Call: Lee Tucker, RN
Charlotte Howard **x3200**