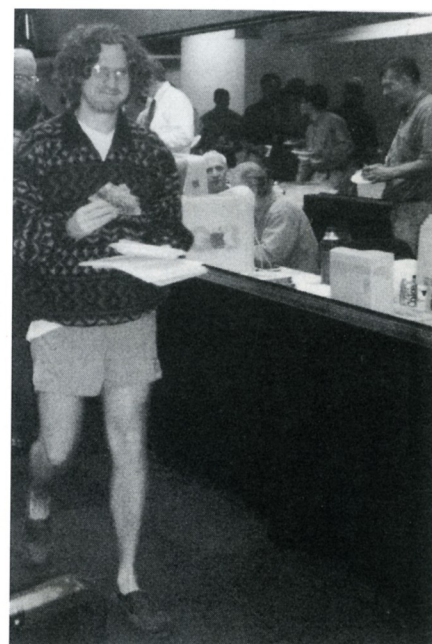
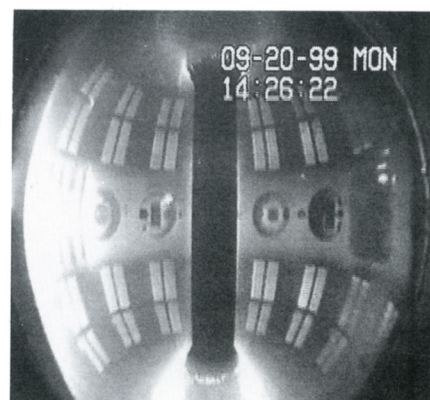


# HOTLINE

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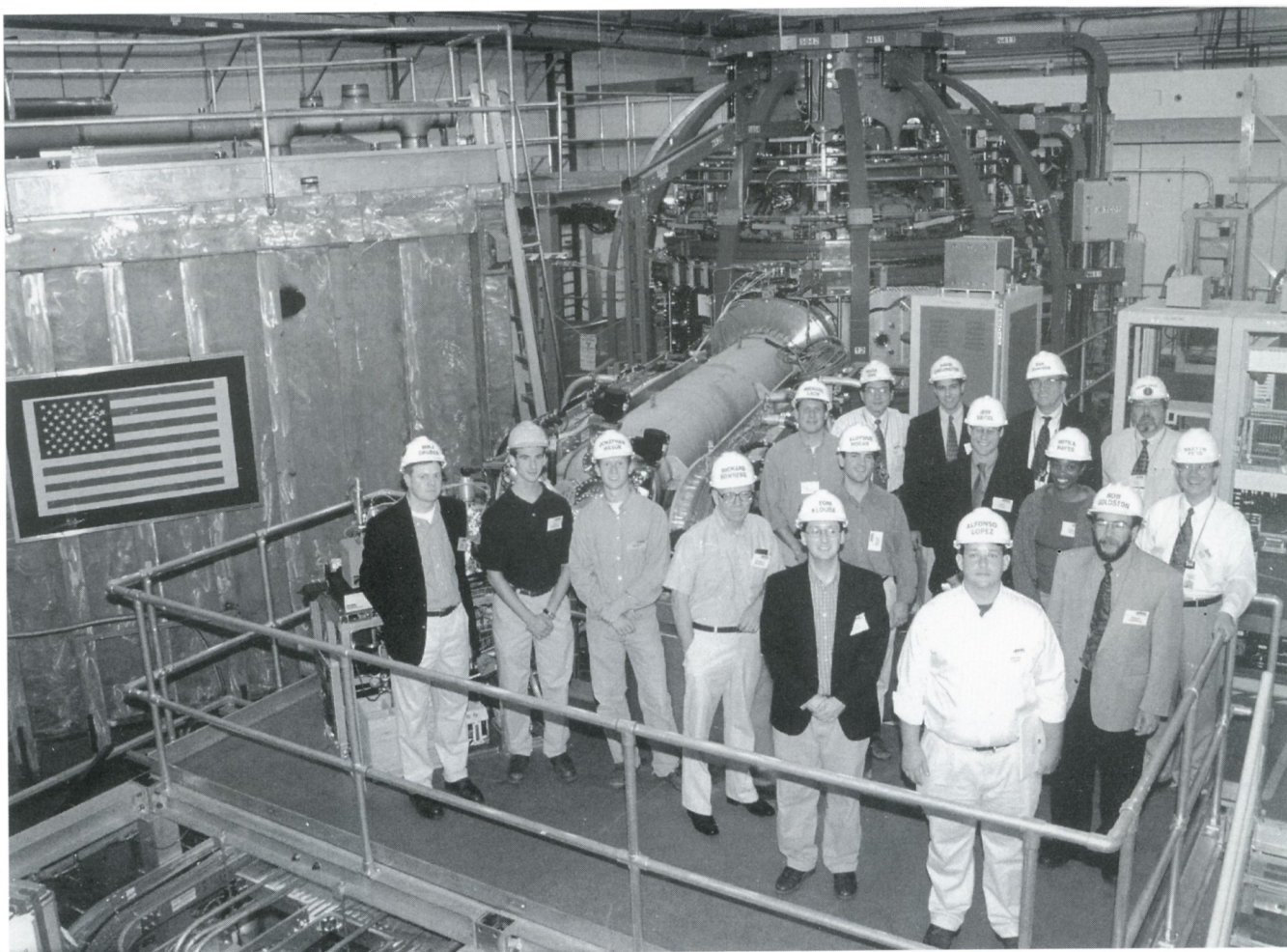
## NSTX Operations Underway



**The National Spherical Torus Experiment (NSTX) and Engineering and Technical Infrastructure Departments hosted a pizza party for all staff in the Control Room on September 16 to celebrate the successful completion of the NSTX construction tasks and the restart of plasma operations. At left everyone enjoys the pizza. At right, graduate student Sean Strasberg gets a slice during the lunch-time celebration. At top left, some members of the NSTX Operations team pose by the project display in the Lobby. From left are Mike Anderson, Bill Blanchard, Glenn Pearson, Ray Camp, Joe Winston, Colin McFarlane, Tom Czeizinger, Jerry Gething, and Bob Herskowitz. At top right is the interior of the NSTX during a plasma shot on September 20. The NSTX experimental campaign is underway!**



# Congressional Staffers See the Sights at PPPL



*The Congressional staffers join PPPL and Princeton University officials and students on the platform at the National Spherical Torus Experiment (NSTX) Test Cell during a tour of PPPL. NSTX is behind the group.*

**E**ight Congressional staff members visited PPPL on September 1, participating in hands-on scientific demonstrations and touring the National Spherical Torus Experiment (NSTX), the Tokamak Fusion Test Reactor (TFTR), and the L-wing experiments.

“This tour offers an excellent opportunity for you to get a good understanding about the research being conducted here and to take that knowledge back with you,” David Cherington told the group. Cherington is Associate

Director of Princeton University’s Office of Government Affairs in Washington, D.C.

PPPL Director Rob Goldston hosted the tour and made a presentation to the group during a bus ride from Washington, D.C., to the Laboratory. Describing the bus ride, Goldston said, “This was my first experience explaining fusion on a moving bus — particularly after

**Continued on page 3**

## HOTLINE

**Editor/Writer:** Patti Wieser  
**Photography:** Elle Starkman

**Graphic Artist:** Greg Czechowicz  
**Layout:** Patti Wieser

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## Staffers

Continued from page 2

getting up before 6 A.M. I believe I was moderately coherent, at least toward the end, and we did have a good time interspersing pictures of NSTX with views of the Chesapeake Bay.”

Members of PPPL Council and staff greeted the visitors upon their arrival. In the Lobby, PPPL External Affairs Associate Director John DeLooper and Science Education Senior Program Leader Andrew Post Zwicker showed the group science displays used by PPPL’s Science Education Program. One of the exhibits included lighting a fluorescent lightbulb as it touched the top of a covered table without plugging the lightbulb into a source of electricity. The secret: hidden underneath the table was a “plasma globe” whose external electric field was strong enough to ionize the gas inside the lightbulb, forming a plasma.

Then it was off to the L-wing, where graduate student Tobin Munsat explained the Current Drive Experiment-Upgrade and graduate student Troy Carter discussed research conducted on the Magnetic Reconnection Experiment. At the Hall Thruster, Project Head Nathaniel Fisch described the potential benefits of plasma-based thrusters over other types of thrusters. “A Hall thruster is a plasma-based propulsion system for space vehicles such as satellites. The amount of fuel carried by a satellite depends on the speed with which it can be ejected by the thruster. Chemical rockets have very limited fuel exhaust speed, but plasmas can be ejected at much higher speeds. Therefore, much less fuel needs to be carried on board,” said Fisch.

**“We want to start the project of removing TFTR promptly and finish it promptly, to make room for a future experiment and retire caretaking costs.”**

**—Rob Goldston**

At TFTR, Goldston, Deputy Director Rich Hawryluk, and Engineering and Technical Infrastructure Head Michael Williams talked about the upcoming decontamination and decommissioning (D&D) of the tokamak, which completed its experimental life in 1997. “The three-year plan for the D&D project includes filling the vacuum vessel with concrete and then cutting it into pieces with a diamond wire. The pieces will then be shipped to Hanford, Washington and buried,” said Williams. In addition to removing components, the project



**Legislative Assistant Tom Klouda lights a fluorescent lightbulb with a plasma globe during a science demonstration at PPPL.**

entails compiling data for the decommissioning of future fusion projects.

“We want to start the project of removing TFTR promptly and finish it promptly, to make room for a future experiment and retire caretaking costs,” added Goldston, noting that it costs \$3.6 million each year simply for caretaking. The D&D project is anticipated to cost \$46 million over a three-year period, and begins in October.

The final stop before lunch was NSTX, where Project Head Masa Ono and Program Head Martin Peng talked to the Congressional staff members about the Lab’s newest machine. Peng noted that 14 institutions are involved in the national project, which recently began experimental operations. Ono told the visitors that the machine was built 10 weeks ahead of schedule within budget.

Congressional staff who toured PPPL included Michael Lach, Science Fellow, from the office of Representative Vern Ehlers (MI); Aloysius Hogan, Legislative Director for Representative Joe Knollenberg (MI); Mike Gruber, Legislative Director for Representative Tom Latham (IA); Tom Klouda, Legislative Assistant for Representative Zoe Lofgren (CA); Jeff Siegel, Minority Staff Assistant [on the] Budget Committee for Senator Frank Lautenberg (NJ); Jonathan Masur, Legislative Correspondent and Systems Administrator for Representative Zoe Lofgren (CA); Alfonso Lopez, from the office of Senator Robert Torricelli (NJ); and Richard Rowberg, of the Congressional Research Service.●



# More Than Just a Summer Job



*Undergraduate students who participated in PPPL summer programs this year are, from left, (kneeling) Sabrina Turner, David Schuster, Jesse Hwang, Damon Tuney, Kai-Mei Fu, Amaria George; (middle) Jonathan Nazemi, Vyacheslav Lukin, Geoffrey Brumfiel, Shinya Kurebayashi, Tim Miller, Anthony Mrozckowski, Mike Mulligan, Karl Leuenroth, Adam Edwards; (back row) Brian Pierce, Eugenio Ortiz, Remik Ziemiński, Jeff Nine, Steve Little, David Hannum, Brian Kirby, Thawatchai Onjun, and Warren Welch.*

In an effort to prepare the next generation of scientists and engineers, PPPL staff served as mentors to 16 undergraduate and graduate college students this summer. The mentors and students came together through three summer programs organized by PPPL's Science Education Program. The programs include the National Undergraduate Fellowship (NUF), the Energy Research Undergraduate Laboratory Fellowship (ERULF), and a newly implemented collaboration among PPPL, Florida A&M University, and Fisk University aimed at students in Master's degree physics programs.

PPPL Senior Program Leader Pamela Lucas said, "These undergraduate and Master's research programs are designed to prepare future scientists by providing outstanding students with an opportunity to conduct research in the disciplines that comprise the plasma sciences, in general, and fusion research, in particular. It also provides our researchers with capable summer assistants." Lucas oversaw the summer student programs.

## NUF

Through the NUF program, established in 1992, fifteen undergraduate students were selected to participate in the nationwide program this year. A committee with representatives from PPPL, General Atomics, and other institutions made the selections. Six worked on projects at PPPL, while the remaining nine went to various institutions for internships.

PPPL physicist Martha Redi served as a mentor to NUF participant Ahmed Diallo, a University of Montana student who is originally from Burkina-Faso in Africa.

"I've been fortunate to have three NUF students work with me during the last few years," said Redi. "Each opportunity has been enjoyable and worthwhile, both personally and professionally."

Redi characterized the students as "able and energetic and pleasant to work with" and noted that they often make such a contribution to the project that they are included as authors on the project's papers. For instance, Diallo is one of the authors of the "Robustness and Flexibility in the NCSX: Global Ideal MHD [magnetohydrodynamics] Stability and Energetic Particle Transport" paper presented at the 12th International Stellarator Workshop in September in Madison, Wisconsin. NCSX is the proposed National Compact Stellarator Experiment.

"Ahmed has made a great contribution. Without him, I would only have been able to do a fraction of the work," said Redi.

Diallo became part of the stellarator team, attending meetings and participating in teleconferences. Redi and Diallo ironed out computing problems that involved moving programs across platforms, which required some program conversion. "What works well is to bring the student into the project I'm actually working on, giving that student the same things to do that I'm doing," said Redi.

Diallo, who was given computer and desk space in the Lab and spent many hours consulting with Redi, said the work was intensive. He often spent evenings at the library on Princeton's main campus continuing his research. Said Diallo, "Working with Dr. Redi has been great. She has taught me a lot, especially about how to organize. I was



really challenged by the project.” He added that one of his biggest discoveries was how a research team designs a machine such as a stellarator — through intensive and occasionally heated discussion.

## ERULF

ERULF is a national program offered by the Office of Science at the U.S. Department of Energy (DOE). PPPL, one of 10 laboratories across the U.S. participating, hosted eight undergraduate students this year. PPPL’s Ronald Hatcher was a mentor for two ERULF students, helping them with computer and engineering projects.

Pittsburg State University senior Brian Kirby worked on converting an old code for tokamak equilibria for use on a UNIX workstation. University of Texas senior Michael Mulligan assisted in the design of high-power fast switching diode arrays for a Magnetic Reconnection Experiment power system upgrade, which involved some analytical and simulation work.

Said Hatcher of his role as mentor, “It is satisfying in that hopefully you help these students move from academic work where they can find answers to problems in textbooks to something more involved where they are finding solutions and solving problems on their own.”

Kirby, a physics major at the Pittsburg, Kansas university, said, “This was a great learning experience and a lot of fun.” Mulligan agreed and noted that the projects benefit students other than those enrolled in plasma physics programs. “This was a very good experience for me because the work supports experiments at the Laboratory, but it was not strictly plasma physics research,” said Mulligan, an electrical engineering student.

Kirby and Mulligan presented their work, “Porting and Benchmarking the PPPL FQ Equilibrium Code” at



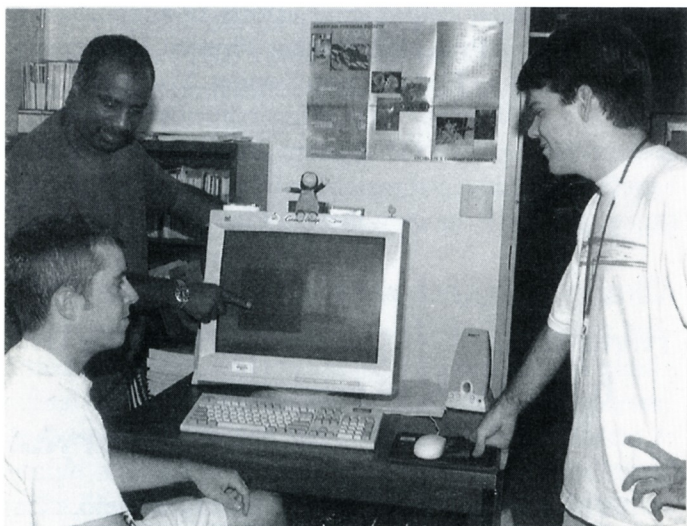
**Student Ahmed Diallo (left) works with physicist Martha Redi.**

the Faculty and Student Undergraduate Research Educational Conference at Argonne National Laboratory this summer. Hatcher also attended the conference.

## Collaboration

Through a collaboration with Florida A&M and Fisk Universities, the Laboratory is working with faculty and students from the two institutions whose highest physics degree is a Master’s. As part of the collaboration, Kyron Williams and Erick May, two graduate students under Professor Joseph Johnson at the Center for Nonlinear and Nonequilibrium Aerospence at Florida A&M University, spent three weeks at PPPL this summer. They were involved in setting up a laser-induced fluorescence diagnostic on PPPL’s Current Drive Experiment-Upgrade (CDX-U). Florida A&M provided the laser, optics, and detector for the diagnostic and PPPL provided the data collection electronics, as well as on-site coordination and physics support. Physicist Andrew Post Zwickler in Science Education and CDX-U Co-head Robert Kaita served as the PPPL mentors to the students. “In a relatively short time, the hardware was made operational and the data archiving was set up to enable offsite access,” said Kaita. “We look forward to continuing our fruitful collaboration as our colleagues at Florida A&M and Fisk are able to analyze their data remotely in the months ahead.”

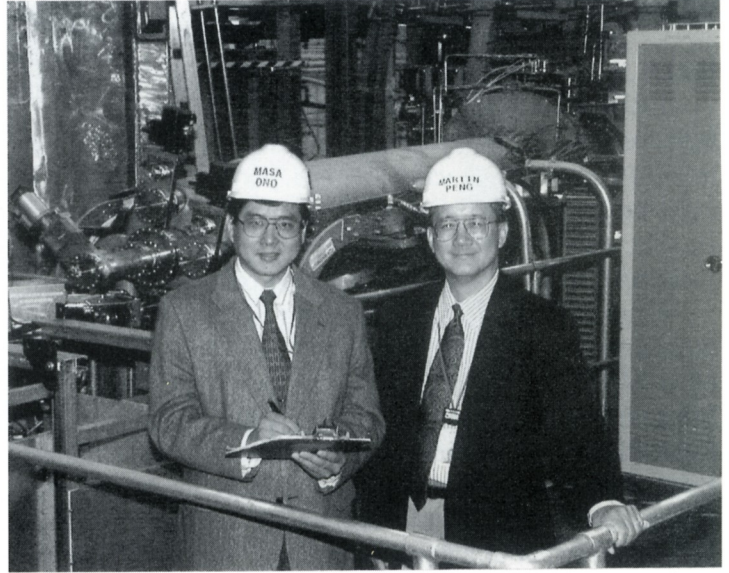
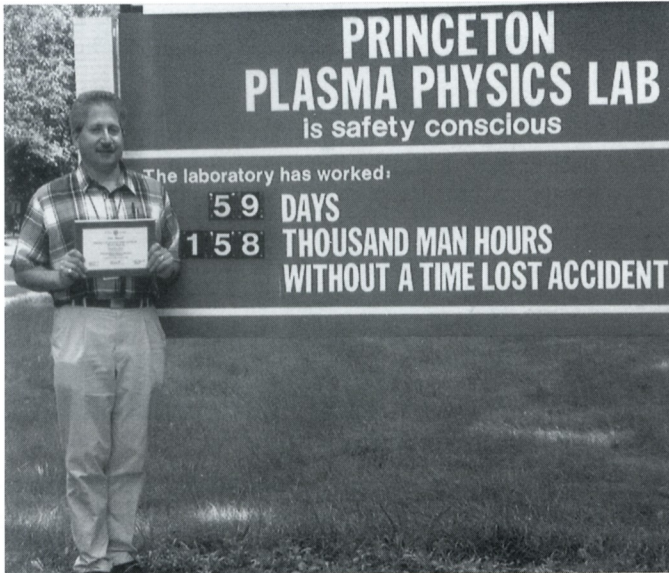
Both the NUF and ERULF programs are funded and sponsored by the DOE, while the collaboration project is internally sponsored. Other projects the students were involved in for the summer programs ranged from working on the Hall Thruster diagnostics and modeling to computer modeling and computer programming. And while it benefitted students, it was a real bonus for mentors. “Having a summer student work with me increases the work done by a factor of about three, and it’s also more fun,” said Redi. ●



**From left are PPPL’s Ron Hatcher (pointing), and students Brian Kirby (sitting), and Michael Mulligan.**



# PPPL Receives Two Awards from the State



*The Laboratory recently received two New Jersey Governor's Occupational Safety and Health Department Recognition Awards. At right, NSTX Project Director Masa Ono (left) and Program Director Martin Peng received one plaque on behalf of NSTX employees and at left, ES&H Division Head Jerry Levine displays the award received on behalf of all PPPL employees. Congratulations, staff!*

## DOE Honors Laboratory Staff for Safety Efforts



*The recipients of the DOE Certificates of Appreciation are, from left (front row), John DeLooper, Al von Halle, and Joanne Bianco; (back row) George Ascione, Bill Slavin, DOE Princeton Group Manager Jerry Faul (who presented the awards), Jerry Levine, and Jim Graham. Not pictured are J.W. Anderson, Larry Dudek, Scott Larson, Dave O'Neill, Mike Viola, and Mike Williams.*

Several PPPL employees received Certificates of Appreciation from the U.S. Department of Energy (DOE) for their efforts during the Lab's recent Integrated Safety Management (ISM) system review.

Those honored include J.W. Anderson, George Ascione, Joanne Bianco, John DeLooper, Larry Dudek,

Jim Graham, Scott Larson, Jerry Levine, Dave O'Neill, Bill Slavin, Mike Viola, Al von Halle, and Mike Williams. DOE Princeton Group Manager Jerry Faul presented the certificates during the August 23 Laboratory Management meeting.

The citations, signed by DOE Chicago Operations Office Manager Robert San Martin, recognized the recipients for their "significant efforts in support of the verification of Princeton Plasma Physics Laboratory's Integrated Safety Management System. Your professionalism and dedication to the effort contributed greatly to accomplishing an ISM System Verification that is of benefit to the Chicago Operations Office, the CH Princeton group, and the Princeton Plasma Physics Laboratory."

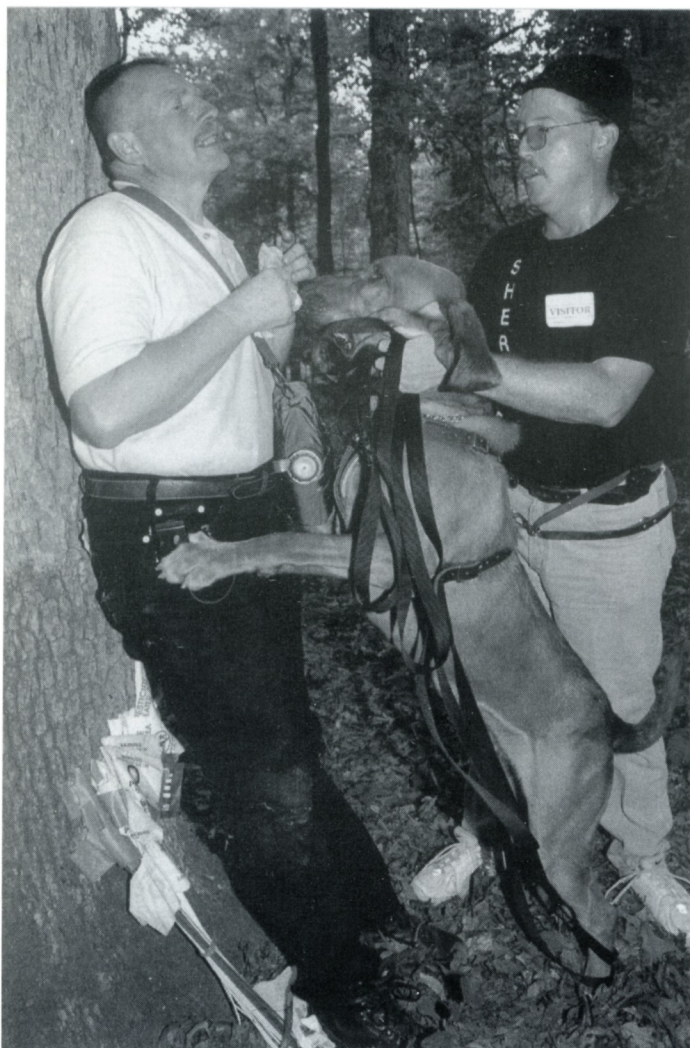
**"I am thrilled with the way the ISM review went. Its success reflects the hard work of everyone here."**

**— Rich Hawryluk**

PPPL Deputy Director Rich Hawryluk said, "I am thrilled with the way the ISM review went. Its success reflects the hard work of everyone here."●



## Going to the Dogs



**T**he Mercer County Sheriff's Department brought five dogs to the Lab on August 5 as part of a training exercise with PPPL's Site Protection Division. The canines — four bomb sniffing and one tracking — and their trainers from the Sheriff's Department, went on the hunt for the scent of explosives and for specific individuals. The search and tracking exercises took place at various areas around the Lab, including the Warehouse and surrounding woods.

Site Protection Head John Bavlish, one of four PPPL'ers involved in the day, said, "The exercises benefitted both PPPL and the Sheriff's Department. We had a mutual exchange of ideas and will be able to call upon the Department for help if we ever have a bomb threat or receive a suspicious package." Above, a bloodhound tracks down a person (left) after being given an article with the individual's scent. Both the dog's handler (right) and the trackee are from the Sheriff's Department. ●

## New Librarian



**M**itchell Brown is the new PPPL Librarian. He came on board July 1. Prior to accepting the position at the Laboratory, Brown had been head of the Chemistry Library at Louisiana State University for five years. He has a bachelor's degree in physics from Carnegie Mellon University in Pittsburgh and a Master's in Library Science from the University of Texas at Austin, where he also completed some graduate work in physics. Welcome, Mitchell! ●

## Retirees Honored



*During the spring, the Laboratory recognized staff who had retired in 1998. The honored retirees at the party, which was held in the Commons are, from left (front row), Ray Pysher, Richard Palladino, Joseph Ignas, and Sallie Citrolo; (back row) Glenn Feller, Edward Hall, and Charles Ancher. Not pictured are Harold Anderson, John Anderson, Frank Beane, Judith Benson, George Christianson, John Citrolo, William Edwards, Jr., Forrest Jobs, Carl Lindemuth, Allen Martin, Ann McKee, Richard Neindorff, Thomas O'Conner, Gloria Pollitt, Robert Popp, Dottie Pulyer, Paul Rutherford, George Sheffield, Judith Sheffield [nee Giarrusso], Ellis Simon, and James Walsh.*



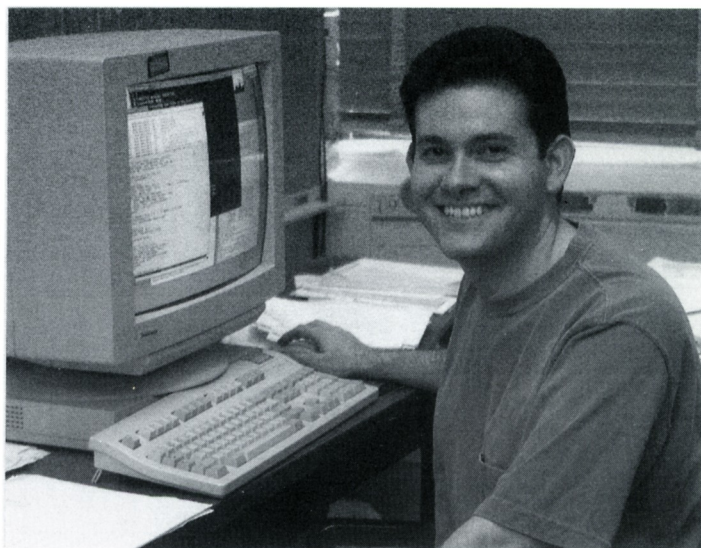
# Grad Student Breslau Receives Procter Fellowship

**P** PPL graduate student Joshua Breslau is the recipient of the 1999 Charlotte Elizabeth Procter Honorific Fellowship from Princeton University. Breslau received the award in recognition of his distinguished work in the Program in Plasma Physics in the Department of Astrophysical Sciences.

Breslau and other recipients of the fellowship were honored during a reception and dinner on September 18 hosted by the Association of Princeton Graduate Alumni at the University's Woodrow Wilson School of Public and International Affairs.

Breslau came to the Laboratory in 1995 after receiving a bachelor of science degree in physics from the Massachusetts Institute of Technology the same year. In 1997, he received a Master of Arts degree in astrophysical sciences and plasma physics from Princeton University. Breslau is presently working on his Ph.D. His thesis work involves the development of a parallel resistive magneto-hydrodynamics code to study magnetic reconnection. He is using the code to perform scaling studies of reconnection physics, as well as optimizing and expanding the code to run more detailed, two-fluid simulations.

Steve Jardin, Deputy Head of Theory at PPPL, said of Breslau, "I was very happy to see Josh recognized for his accomplishments. He is pioneering techniques for applying the new generation of supercomputers to some very fundamental and complex problems in plasma physics. He has used his knowledge of both physics and supercomputer architecture to develop very efficient al-



*Joshua Breslau*

gorithms to allow these powerful computers to solve important problems that were previously impossible to solve on any computer." Jardin is Breslau's thesis advisor.

The Charlotte Elizabeth Procter Honorific Fellowship recognizes a student's significant achievements in his or her graduate program and facilitates completion of the degree by providing a stipend sufficient to release the recipient from other obligations. The fellowships are reserved for Ph. D. candidates entering their final year of enrollment. ●

## Holiday Schedule

For Princeton University administrative and support staff, professional library, research, and technical staff members.

### 1999-2000 Holiday Schedule

Independence Day (observed)	Monday, July 5, 1999
Labor Day	Monday, September 6, 1999
Thanksgiving	Thursday, November 25 and Friday, November 26, 1999
Christmas	Thursday, December 23 and Friday, December 24, 1999
New Year's	Thursday, December 30 and Friday, December 31, 1999
Memorial Day	Monday, May 29, 2000