

# HOTLINE

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

## Staff Completes Diversity Training

In an effort to create an atmosphere that nurtures and encourages diversity, PPPL held a Diversity Stand-down for all employees this spring. Staff members were required to attend the two-hour training program, which included presentations by PPPL Director Rob Goldston, Department of Energy Princeton Group Manager Jerry Faul, and Princeton University Associate Provost Joann Mitchell, followed by a National Diversity Training Program and Seminar videotape.

"I believe that diversity benefits everyone – and is everyone's responsibility," Goldston told staff. He said

the goals of the stand-down are to support Energy Secretary Bill Richardson's initiative in emphasizing the importance of diversity, to have a clear understanding of what diversity is at PPPL, and to reinforce the Laboratory's commitment to diversity and zero tolerance for discrimination.

Earlier this spring, Secretary Richardson directed that all DOE Laboratories conduct a mandatory diversity stand-down. In a memo to Departmental employees,

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## Dave Cylinder Develops Bird-like Surveillance Devices

By Patti Wieser

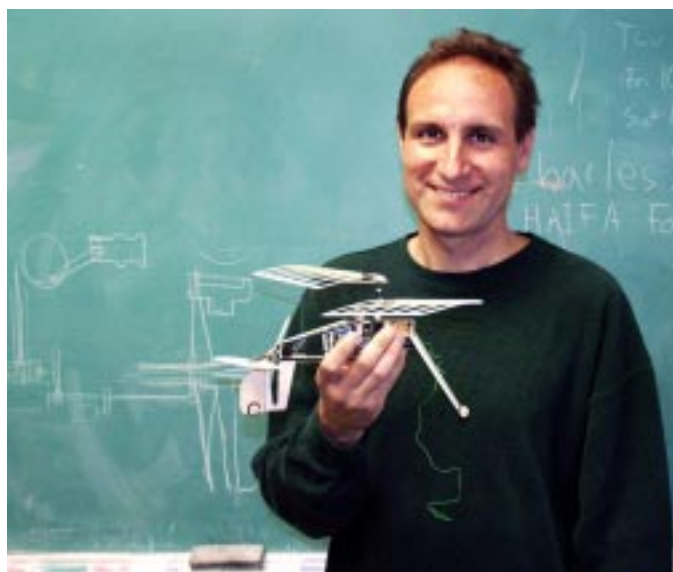
The next time a small bird perches on a ledge outside your office window, beware; it could be a surveillance device.

PPPL researcher David Cylinder is creating innovative, bird-like airframes for micro aircraft vehicles, which could carry sensors for intelligence gathering and radar jamming. Cylinder's creation is part of his work with the U.S. Naval Research Laboratory (NRL) to develop autonomous vehicle systems for use in various military applications.

### Bug-size to Bird-size

The aircraft would range from bug-size to bird-size, weigh in at under a pound, and have wingspans of less than a foot. The Navy and Marines would ultimately use the aircraft to carry electronic, acoustical, magnetic, nuclear, chemical, motion, and other types of micro-sensors and secure transmitters. For surveillance purposes, the vehicles could resemble an insect or a bird.

Cylinder designed one model, Samara, which looks like two winged seeds that counter rotate. The name hails



Dave Cylinder holds the Samara prototype.

from the samara seed — such as that of a maple tree — which has a wing like a single-bladed rotor.

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## Cylinder

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### Inspired by Hummingbirds

His inspiration for the Samara model? Hummingbirds. “I thought about the Samara design while I was in the backyard watching a hummingbird. When they hover, they flap their wings like reversing propellers because without a rotary joint, the wings cannot go all the way around like a helicopter. The Samara’s wings rotate slightly off kilter, so that they can go all the way around. One wing just passes over the top of the other,” he noted.

Cylinder’s models, made from balsa wood reinforced with carbon fiber and a smattering of plastic, are extremely delicate. Fashioned from his designs, he fabricates them with off-the-shelf parts and raw materials. Powered by rubber bands or small electric motors, the models can actually fly.

Cylinder’s initial tiny demonstration model has a six-inch wingspan. The next remote-controlled prototype will be more practical with a 14-inch wingspan. “In the future, we will be able to build whatever size to fit the need,” he said.

The researcher, who came to the Lab in 1980 and has been involved in the Magnetic Reconnection Experiment (MRX), will be moving to a new space in the C-wing to concentrate full-time on developing micro aircraft. Presently, he is devoting half of his time to Micro Air Vehicle work. It is a dream come true, said the PPPL technician, who has notebooks full of designs. The arrangement with the NRL came about after Lab Director Rob Goldston asked a friend at the NRL to meet with Cylinder. The April meeting went well, and now Cylinder, who has also mentored aerospace and engineering students at Princeton University, can devote his creative juices to micro aircraft development.

Cylinder, who has a lifelong passion for birds and model planes, observed, “Nature has the perfect flying system — birds. They have every piece of apparatus to survive and still can fly thousands of miles without refueling. We are nowhere near duplicating this...but maybe we can learn to design better small aircraft from the birds.” ●



*Cylinder tries out a couple of his models in the Commons.*



## HOTLINE

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# PPPL Among Three Labs Forming One Virtual Lab

**P**PPPL has joined forces with Lawrence Berkeley National Laboratory (LBNL) and Lawrence Livermore National Laboratory (LLNL) in a memorandum of agreement (MOA) to create a “virtual lab” that will conduct research on heavy ion inertial fusion energy.

## Three Labs Collaborate

The MOA will be funded through DOE’s Office of Fusion Energy Science. Under the terms of the MOA, the three laboratories collaborating in the new Heavy Ion Fusion Virtual National Laboratory (HIF-VNL) will work together on “conducting heavy ion driver development and related topics in the common pursuit of Inertial Fusion Energy, and promoting more rapid progress in the development of heavy ion drivers through technical management integration of the laboratories’ scientific staff, equipment, and experimental facilities.”

In heavy ion fusion, high-powered beams of heavy ions ignite pea-sized capsules of deuterium and tritium fuel. The fuel burns so quickly it is confined by its own

inertia long enough for the reaction to produce energy.

Roger Bangerter, of Berkeley Lab’s Accelerator and Fusion Research Division (AFRD), a long-time leader in heavy ion fusion research, will be the director of the HIF-VNL. The deputy directors will be Grant Logan of LLNL and Ronald Davidson of PPPL.

Said Davidson, “The HIF-VNL provides an excellent opportunity for PPPL researchers to have a major technical impact on the development of heavy ion fusion, particularly in critical physics and engineering areas related to intense nonneutral beam propagation, final focus optimization studies, and beam-plasma interactions in the target chamber.”

The HIF-VNL agreement has been publicly hailed by Stephen Dean, president of the Fusion Power Associates, an independent fusion advocacy group, as proof that DOE’s non-weapons labs can still collaborate on research projects with the weapons labs even though the latter are now a part of National Nuclear Security Administration. ●

— *Provided by Lawrence Berkeley National Laboratory*

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# Hall Thruster Student Fu Receives Shenstone Prize

**K**ai-Mei Fu, a Princeton University student who was involved in experiments on PPPL’s Hall Thruster, is among this year’s recipients of the Allen G. Shenstone Prize in Physics. The prize is awarded to graduating seniors from Princeton’s physics department who have done excellent work and who have senior theses in experimental physics.

PPPL Associate Director for Academic Affairs Nathaniel Fisch presented the award to Fu during a May 29 departmental class day reception on main campus. Fisch is the Principal Investigator for the Hall Thruster project and served as Fu’s senior thesis advisor. PPPL’s Yevgeny Raitses of PPPL worked closely with Kai-Mei on her project.

## Developed Comprehensive Diagnostics

“It was delightful for us to work with Kai-Mei. She developed comprehensive and useful diagnostics to analyze the Hall Thruster plasma. She developed a fast plasma probe and a suitable spectropic system. These diagnostics had to operate in a very harsh plasma environment,” said Fisch.

Fu was at PPPL as an Energy Research Undergraduate Laboratory Fellowship student last summer and fall. She graduated from Princeton in June and plans to live in Singapore for a year and then attend graduate school at Stanford University. ●



*Kai-Mei Fu inside the Hall Thruster.*



# Staff Bring Their Children to PPPL



Above (clockwise from left) are PPPL Procurement specialist Sharon Warkala, PPPL employee Marie Robbins, Robbins' daughter Kelila, and Jessie and Jemma Kalish, daughters of Mike Kalish. Warkala, who served as a mentor, explained business practices to the youngsters. Above right, PPPL tour guide Virginia Finley (pointing at drawing) leads a group of the youngsters through the NSTX Test Cell.



Touring NSTX are, from left, PPPL's Al Planeta and his children Sarah, Brian, and Rachel.

The Director's Advisory Committee on Women (DACW) hosted 28 children of employees on April 27 for PPPL's "Take Our Daughters to Work Day." The day included a talk, "How Fusion Will Protect Our Natural Resources," by PPPL Director Rob Goldston; a tour of the National Spherical Torus Experiment; and mentoring sessions with staff members and parents. ●



Caitlyn Campbell and her father, PPPL's Glenn Campbell, look inside the NSTX vacuum vessel.



# PPPL Shows Off Science Toys at Pennington Day



On May 13, Ray Camp, Lloyd Ciebiera, Steve Davis, John DeLooper, and Rod Templon operated a PPPL exhibit at the Pennington Day street fair. The PPPL staff members answered questions and demonstrated several hands-on science education toys, including the flowing bubble and eddy current tube. Above, Ciebiera mans the Lab's display and at left, Camp demonstrates turbulence with the flowing bubble apparatus. ●

## Dr. Caruso Retires

Following ten years of service, Dr. John Caruso retired this spring as Head of PPPL's Occupational Medical Services under the Lab's Site Protection Division. Co-workers honored Dr. Caruso during a March retirement luncheon at Goodtime Charley's restaurant. His stint at PPPL capped a long and successful medical career involving private industry, as well as serving as a medical officer in the Nuclear Navy. Occupational Medicine services are now being provided, under subcontract, by the Clinical Center of the Environmental and Occupational Health Sciences Institute, which is affiliated with the Robert Wood Johnson Medical School, University of Medicine and Dentistry of New Jersey. Good luck, Dr. Caruso! ●





# PPPL Firefighters Use Mock Fire at Mod II to Train

It was the last hoorah for Mod II. And while there was no bang, there was a lot of smoke.

In June, PPPL's Site Protection Division conducted firefighting training at the module, where they introduced "cold smoke" to simulate the conditions firefighters would encounter in a real fire. The training occurred prior to the scheduled demolition of Modules I and II.

The training evolutions completed by many from the Division's platoons, included advancing hose line, search and rescue, ventilating practices, forcible entry, and Firefighter Assist and Search (FAST) training.

"Use of an acquired structure for training purposes is an extremely valuable asset for our Division," said Emergency Services Unit (ESU) Training Coordinator David



Neuman, who planned the exercises. "The very nature of the Modules — with individual offices, large conference rooms, open areas, and narrow hallways — makes them identical to places in other areas of the Laboratory where we may be called to fight fires."

Neuman said the firefighters applied tactics they had learned in classrooms to situations in a controlled environment. "It is important that we continue to sharpen our skills as structural firefighters," he added, noting that ESU staff go through continual, on-the-job training.

Using a dummy as the victim, one of the drills centered on the search and rescue of an "individual" in a simulated fire. The firefighters donned full gear and used a charged hose line. To locate the victim, they searched all the offices, progressing room-by-room in a left-handed search. Once the firefighters found the dummy, they pulled it from the fire and used a hose line to find their way out.

Ventilating practices training, which would involve breaking windows and cutting holes in roofs, illustrated the necessity of reducing smoke and heat. "Ventilating a burning structure makes it safer," said PPPL Chief of Fire Protection Jim McGuire.

Staff used non-toxic, theatrical smoke from a smoke machine borrowed from the Plainsboro Fire Department to create the fire-like conditions. "We wanted to make it as realistic as possible. In a fire, we rely on our senses to feel and hear, since the smoke temporarily impairs our vision," said McGuire. "While it was a controlled environment, it simulated what we would go through at the scene of a fire and showed what happens to smoke and how it falls in layers."

Prior to the exercises, staff eliminated hazards at the training site, sweeping up nails and glass and getting rid of wires.

"The drills went like clockwork," McGuire observed. ●





*PPPL firefighters arrive at a mock fire at Mod II (top of page 6 and top left of page 7). At bottom on page 6, two firefighters enter Mod II during a search-and-rescue drill. Clockwise from top right on page 7, they pull their hose to the mod; gain access; pull the "victim" from the scene; and stay low to the ground in a smoke-filled area.*



## Diversity

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Richardson said, “We must build a culture of respect and inclusion; one which welcomes and values the contribution of each employee. To be successful in the global economy, we must embrace diversity, for diversity is a catalyst for new ideas, new concepts, and new strategies. Through it, we find the keys to success.”

Richardson said he had rededicated the DOE to the following principles: equity, opportunity, accommodation, nondiscrimination, and inclusion. “Diversity means inclusion in every facet of work. I am committed to ensuring that the Department of Energy is a model workplace, where everyone has an equal opportunity to serve, and each person is treated with dignity and respect in all aspects of employment,” he explained.

### Task Force Against Racial Profiling

During his presentation at PPPL, Faul explained what led DOE officials to requiring the stand-down. “In the wake of alleged espionage by Communist China at DOE’s major nuclear weapons laboratories, the potential for racial profiling against Asian Pacific Americans increased at DOE labs and facilities nationwide. In response, the Energy Secretary established the DOE Task Force Against

Racial Profiling, headed by Deputy Secretary T.J. Gauthier,” he said.

The Princeton Group manager said that while the recent security crisis was the catalyst for this stand-down, the implications of the report go far beyond. The task force found that racial profiling exists at DOE sites, which Faul stressed goes against the Secretary’s policy that the DOE will neither commit nor tolerate any racial profiling. This commitment was reiterated by Faul. “As the DOE Site Manager, I want to make it clear that discrimination on the basis of national origin, religion, gender, sexual orientation, ethnic background, national origin, or ancestry is against Federal Law. It is my job to enforce Federal Statutes and I am personally committed to ensuring a diverse workplace.”

The Stand-down, organized by PPPL Human Resources Deputy Head Susan Murphy-LaMarche, PPPL Diversity Officer Pamela Lucas, and the DOE’s Chicago Operations Office and Princeton Group, took place in the Gottlieb Auditorium, with television feeds to the LSB Lobby and the Cafeteria. The National Diversity Training Program and Seminar was broadcast to employees at all of the National Laboratories.

Employees who could not be present at the program either attended additional sessions or viewed videotapes individually. ●



# Diversity Works!!!