

PPPL NEWS

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

Open House Draws Record Crowd



Photo by John Bennevich

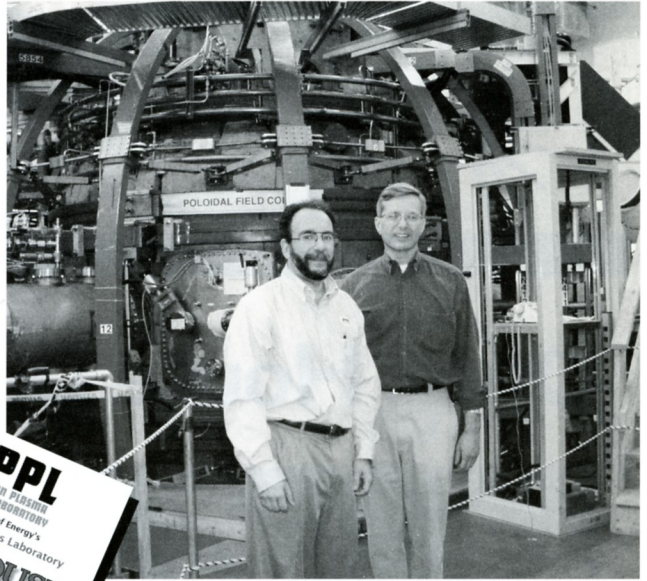
PPPL's Marianne Tyrrell has a "hair raising" experience during the Lab's Open House. Tyrrell tried out the Van de Graaff generator at the hands-on science demonstrations. The generator develops an electrostatic charge, making the hair of anyone who touches it stand on end. Behind Tyrrell is her husband, PPPL's Mike Viola (wearing white T-shirt), and at left is PPPL's Bob Simmons (in cap).

Science, fun, and a chance to tour the nation's newest fusion machine — the National Spherical Torus Experiment (NSTX) — attracted about 2,400 people to the June 3 Open House at the U.S. Department of Energy's Princeton Plasma Physics Laboratory. The Lab's visitors, ranging from tots to seniors, walked around NSTX, learned about the physics behind sports, crawled into a

portable planetarium, and participated in safety activities, as well as tabletop demonstrations about electromagnetism, thermodynamics, and common plasmas.

John DeLooper, PPPL Associate Director of External Affairs, said, "This was a wonderful opportunity for the

Continued on page 4

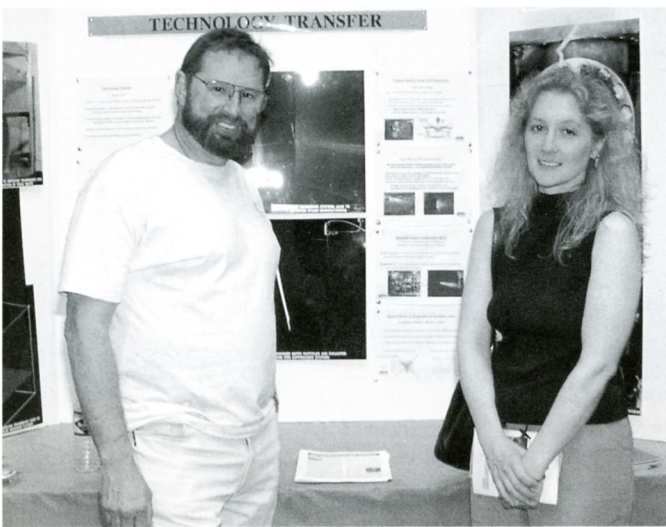
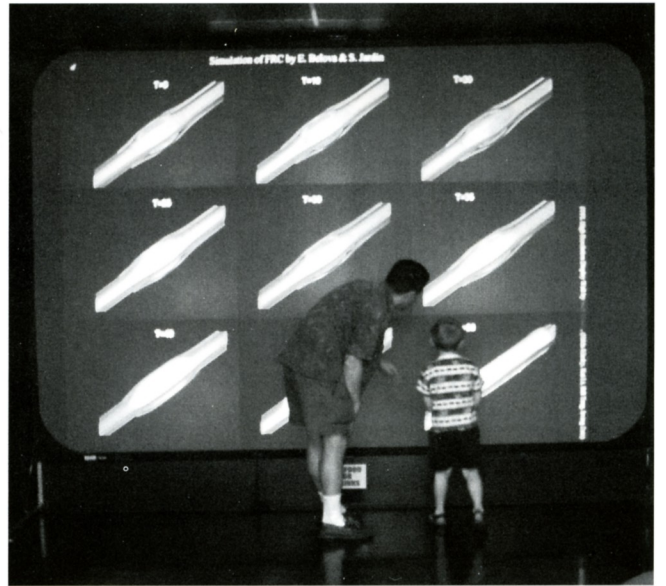
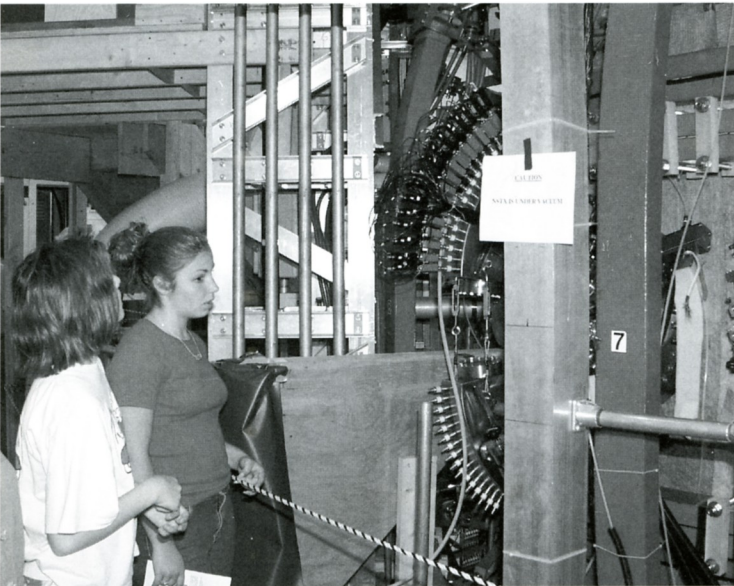


PPPL
 PRINCETON PLASMA PHYSICS LABORATORY
 The U.S. Department of Energy's
 Princeton Plasma Physics Laboratory
OPEN HOUSE
 Saturday, June 3
 from 10 a.m. to 4 p.m.
 Come and see the newest experimental fusion device,
 the National Spherical Torus Experiment.

- Tours of the Laboratory
- Hands-on science demonstrations
- Energy and science related exhibits
- Food and fun toys equipment
- Something for everyone.

The Princeton Plasma Physics Laboratory is a U.S. Department of Energy Office of Science facility.





Open House

Continued from page 1

public to see what we do at the Laboratory and to get a sense of the staff's excitement about working on a complex problem — fusion energy. Our employees and students really enjoyed explaining what they do at PPPL." DeLooper headed the Open House efforts.

Open House guests talked to PPPL researchers about fusion and the Laboratory's progress while taking self-guided tours of NSTX, the Tokamak Fusion Test Reactor, and smaller experimental areas, including the Current Drive Experiment-Upgrade and the Magnetic

Reconnection Experiment. The event also featured activities ranging from cryogenics shows that demonstrated how ordinary objects behave when cooled to the temperature of liquid nitrogen (-320 degrees Fahrenheit) to robot demonstrations to tours of the Hall Thruster, a plasma-based propulsion system for space vehicles such as satellites.

Other popular features included a lecture, "PPPL: The Hottest Place on Earth,"* by PPPL Director Rob Goldston; fire extinguisher training; and computer-controlled milling machine demonstrations. Along the route, there were a variety of energy and plasma-related exhibits, as well as displays about PPPL departments and activities. ●

Inside photos: page 2, clockwise from bottom left, Eric and Ryan Starkman playing with hands-on science "toys"; PPPL physicist Masayuki Ono (far right with glasses) hosting NSTX tours; PPPL engineer Ray Camp (glasses) giving a cryogenics demonstration; PPPL Director Rob Goldston (left) and Congressional candidate Dick Zimmer at NSTX; a young visitor; PPPL's Kevin Rhoades teaching a visitor how to use a fire extinguisher. Page 3, clockwise from bottom left, PPPL's Lew Meixler (left) operating a Tech Transfer exhibit; visitors touring NSTX; food and relaxation in the courtyard; lunch break for guests; visitors checking out the high-resolution wall; Goldston (left) giving Zimmer a tour of NSTX.

— Photos by Elle Starkman

An Open House Visitor wrote:

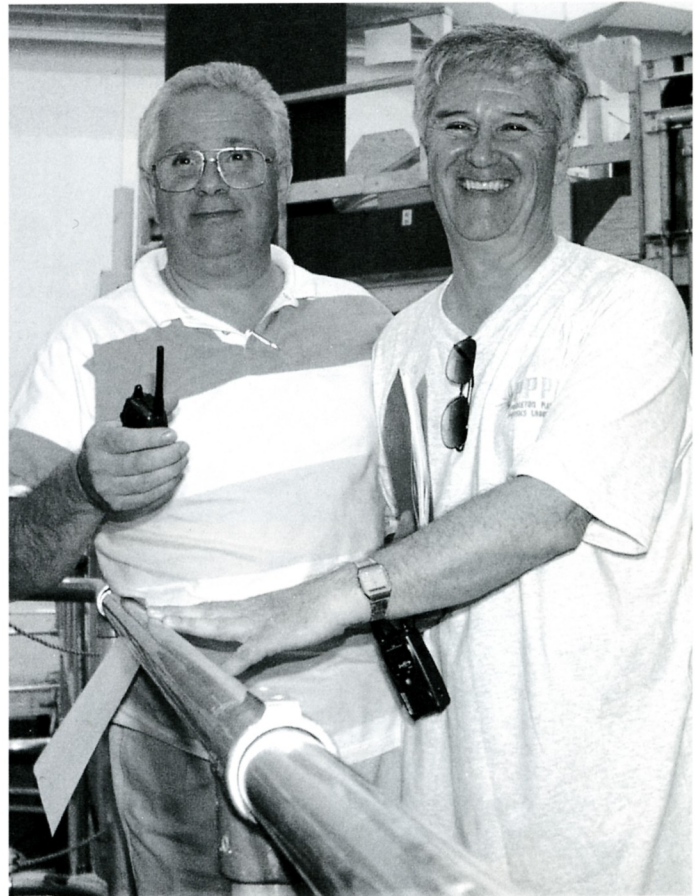
June 5, 2000

Dear Mr. Goldston,

On Saturday, my family and I attended your Open House. We thought we would come and spend an hour. We were still there three hours later. It was so wonderful and interesting. My son, who is twelve and just finished learning about matter in school, grumbled about going to something educational. We had to tear him away only because he needed to get to a previous appointment.

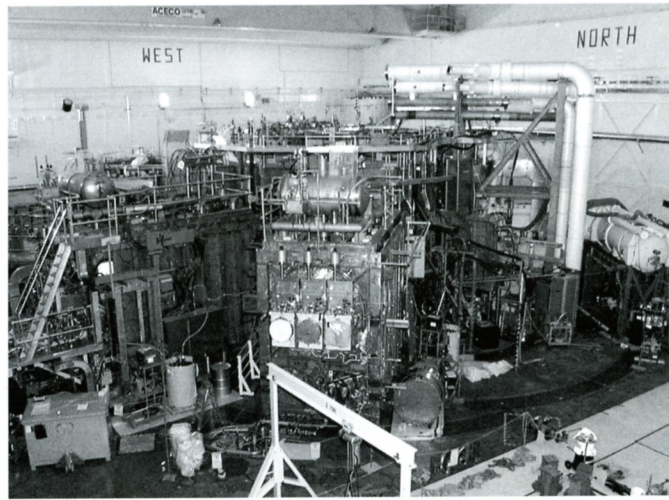
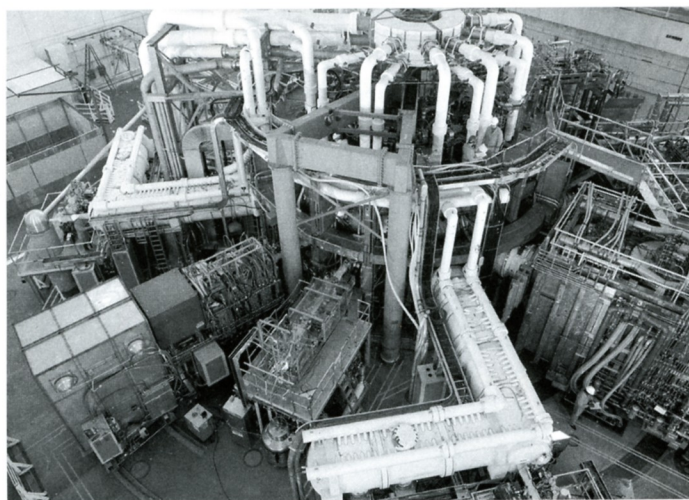
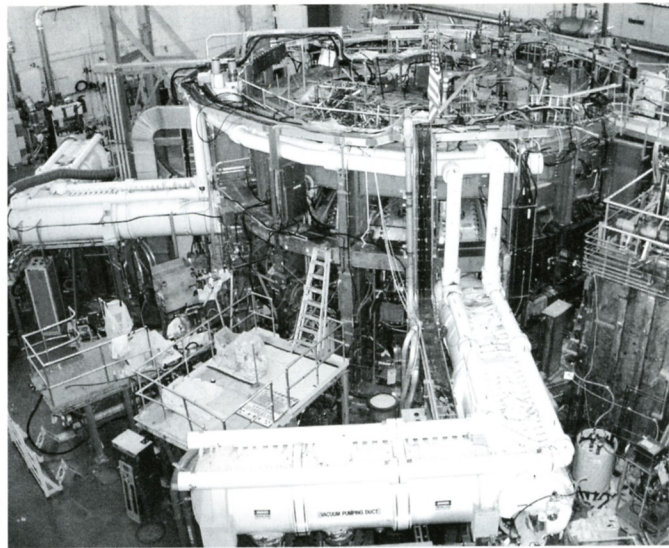
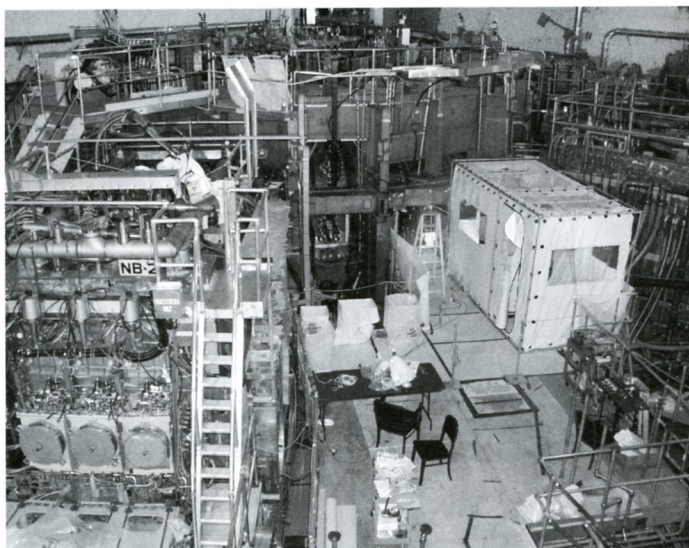
So thank you for a wonderful time. We appreciate all the effort that went into this. Also, all the workers who were so patient answering our questions. Your scientists were able to answer and explain even to me (the most unscientific person in the world) what you are trying to accomplish.

Good luck in all your future endeavors.



PPPL Engineer Alex Ilic (right) showing a guest the machines during the Open House.

Part by Part... Employees Dismantle TFTR



Last fall, the Laboratory began the disassembly and removal of the Tokamak Fusion Test Reactor (TFTR) device to make room for a future fusion energy experiment. The project is expected to be completed in three years at a cost of \$47.9 million. Clockwise, from bottom left, are TFTR (circa 1989) prior to the start of disassembly and removal; the platform with a two-room tent for a vacuum vessel entry; the northeast door opening to the Mock-up Building; the removal of shielding blocks from the northeast door; the TFTR Test Cell in March; and the southeast corner with heating and cooling manifolds removed. — Photo collage by Elle Starkman.

Personal Connections: PPPL's Reaching Out

Communiversy

On April 15, PPPL participated in Communiversy, the annual town-gown festival in downtown Princeton. Below, PPPL's Steve Iverson (left, behind table) and Hutch Neilson field questions.

Take Our Daughters to Work Day

The Director's Advisory Committee on Women (DACW) at PPPL hosted 28 children of employees on April 27 for "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. At right, touring NSTX are PPPL's Al Planeta and his children Sarah, Brian, and Rachel.

Pollution Prevention Awareness Day

Nearly 200 area students who had participated in the Lab's Earth Week Poster Contest came to PPPL on April 20 for Pollution Prevention Awareness Day. The events featured speakers, awards for poster contest winners, and hands-on science exhibits. At bottom left is PPPL's Margaret Kevin-King being interviewed by an Action News reporter. At middle right is PPPL's Andy Carpe with his daughter, Andrea. At bottom right, PPPL's John DeLooper watches some young visitors try out the science "toys."



Photo by Elle Starkman



Photo by John Bennevich



Photo by Elle Starkman



Photo by Carol Phillips



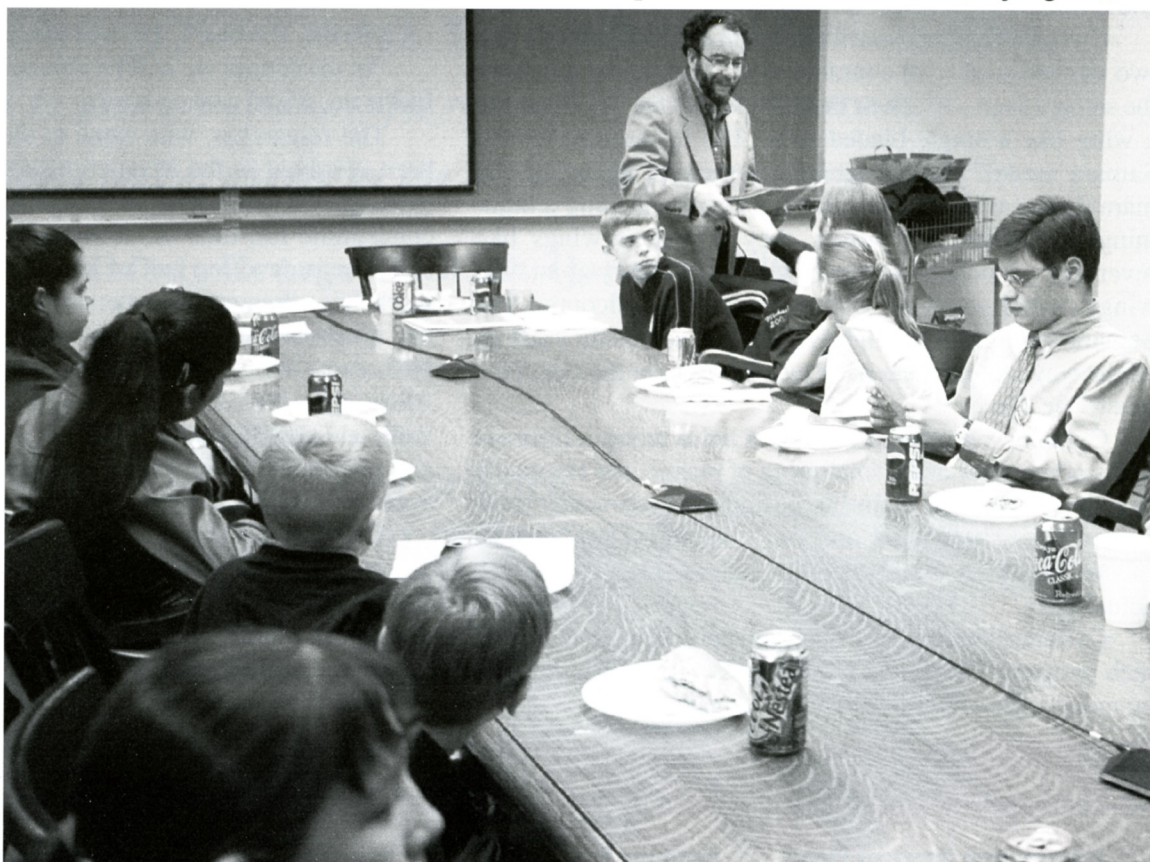
Photo by John Bennevich

Science Bowl

Concentration, tension, and excitement mingled in rooms across the Laboratory on February 26 as twenty-four high school teams competed in the New Jersey Regional Competition of the National Science Bowl®. For the seventh year, PPPL hosted the annual double-elimination tournament sponsored by the U.S. Department of Energy. Throughout the day-long event, students answered multiple-choice or short-answer questions in biology; chemistry; physics; astronomy; mathematics; and general, earth, and computer sciences in their quest to take home the top prize — an all-expense paid trip to Washington, D.C., in May to participate in the Tenth Annual National Science Bowl®. East Brunswick High School won the regional competition, beating out 23 other teams from 22 high schools in New Jersey and Pennsylvania. Millburn and West Windsor-Plainsboro South placed second and third, respectively. Each team was made up of four students, a student alternate, and a



teacher who served as an advisor and coach. Lab employees and members of the community served as timekeepers, scorekeepers, moderators, and science judges. ●



Science Fair *Fourteen area students exhibited their science projects at PPPL on April 11 during the Lab's annual Science Fair Day. The fair honored the winners of PPPL's Corporate Awards, who were chosen among student exhibitors in March at the North Jersey Regional Science Fair at Bell Labs in Murray Hill and at the Mercer Science and Engineering Fair at Rider University in Lawrenceville. PPPL's Science Fair winners, as well as several Honorary Mention recipients, were on hand throughout the day to discuss their exhibits, which ranged from "Balloon-powered Cars" to the "Efficiency of Subliminal Messages on Audio Tapes." The featured young scientists were 9 to 17 years old. PPPL's Mary Ann Brown organized the Science Fair activities. Highlights for the honorees included having lunch with PPPL Director Rob Goldston; participating in a roundtable discussion with Nobel Prize winner Russell Hulse; and touring the National Spherical Torus Experiment. Shown is Director Goldston handing out certificates to the youngsters following lunch.*

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.

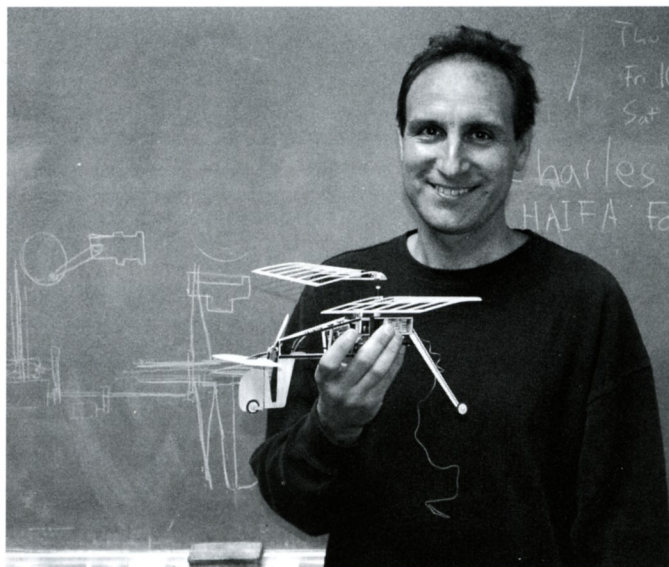
PPPL researcher David Cylinder is creating innovative, bird-like airframes for micro aircraft vehicles, which could carry sensors for intelligence gathering and radar jamming. Cylinder's creation is part of his work with the U.S. Naval Research Laboratory (NRL) to develop autonomous vehicle systems for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

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



Dave Cylinder with the Samara prototype.

“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 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.” ●

PPPL NEWS

Information Services Head: Anthony R. DeMeo

Photographer: Elle Starkman

Editor/Writer: Patti Wieser

Layout and Graphics: Gregory J. Czechowicz and Patti Wieser

The PPPL NEWS is issued by the Princeton Plasma Physics Laboratory, a research facility supported by the United States Department of Energy and managed by Princeton University. Correspondence and requests to reprint material should be directed to: Information Services, Princeton Plasma Physics Laboratory, P.O. Box 451, Princeton, NJ 08543; telephone 609-243-2750; fax 609-243-2751; e-mail info@pppl.gov .