

HOTLINE

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

PPPL Opens Pilot Topical Computing Facility



PPPL Chief Scientist Bill Tang (far right) cuts the ribbon on the Pilot Topical Computing Facility. With Tang, from left, are Oak Ridge National Laboratory's Lee Berry, PPPL's Daren Wah, Geophysical Fluid Dynamics Laboratory's Brian Gross, PPPL's Steve Jardin, PPPL Director Rob Goldston, Lawrence Livermore National Laboratory's Bill Nevins, and PPPL's Doug McCune, Ernie Valeo, and Steve Davis.

Lab officials and friends cut the ribbon on the Fusion Energy Science (FES) Pilot Topical Computing Facility (TCF) in October. This facility is part of the new PPPL Fusion Computational Center (FCC), a data analysis and computational physics center that also includes the PPPL Petrel Cluster.

Pilot Topical Computing Facility

The goal of the pilot is to determine the best configuration for a full TCF for the Fusion Energy Science community. A TCF will support computing throughout

the fusion community, offering a unique capability that joins advanced computing and modeling with theory and experiment to improve advancements in the field of fusion. "Predicting the properties of energy producing fusion plasma systems is a formidable challenge. It can only be met with advanced scientific computing in tandem with theory and experiment," said PPPL Chief Scientist Bill Tang, Principal Investigator for the project. Tang explained that future research requires the accelerated

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Computing

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development of computational tools and techniques for the timely development of more realistic predictive models. When properly cross validated against experiments, the resultant codes would allow FES simulations of increasingly complex phenomena with greater fidelity.

In support of this mission, the FES researchers actively participate in the DOE Office of Science's Scientific Discovery through Advanced Computing (SciDAC) program. A component of the SciDAC strategy involves establishing TCFs to concentrate on specific sets of scientific applications in which the computer system in the topical facility is optimized for those applications.

The pilot TCF focuses on national FES collaborations involving the SciDAC centers for Plasma Microturbulence, Extended MHD, and the Fusion Collaboratory. In addition, the facility includes the strong involvement of Princeton University, which provided matching funds, and NOAA's Geophysical Fluid Dynamics Laboratory (GFDL) in "grid computing" explorations. Grid computing is a distributed computing infrastructure for advanced science and engineering applications involving large-scale resource sharing. This includes not only file exchange, but direct common access to computers, software, data, and other resources. The Department of Energy provided \$250,000 and the PPPL Director provided \$60,000 for the TCF. The University and its newly established Princeton Institute for Computational Science and Engineering (PICSciE) contributed \$200,000 for the grid computing explorations.

The PPPL pilot investigates how a TCF can best enable new scientific research. Complementary to its involvement in "capability computing" activities on the most powerful available supercomputing platforms at major centers (e.g., at the National Energy Research Scientific Computing Center and at Oak Ridge National Laboratory), the pilot TCF is addressing important "capacity computing" issues by examining the cost-effective utilization of commodity clusters dedicated to key FES applications. As noted earlier, this involves collaborations with several SciDAC teams and the active exploration of the potential advantages of grid computing with Princeton University and GFDL. "Knowledge gained through this pilot project about capability as well as capacity computing issues can be usefully applied toward planning a full Fusion Energy Science TCF," noted Tang.

The advanced computing facility is across from the NSTX Control Room in the area that had previously hosted the Tokamak Fusion Test Reactor (TFTR) Central Instrumentation, Control and Data Acquisition (CICADA)

system. This large space was renovated last summer to accommodate the FCC, including the TCF. The renovation included the removal of under-floor cables and the installation of new raised flooring, reconditioning and installation of power, the reconditioning of heating, ventilating and air conditioning equipment, and the installation of racks to house the computing equipment. "Everything was ripped out and cable trays were installed for power and signals, along with a raised floor," said Steve Davis, Project Engineer. He said 64 dual-processor AMDs [Advanced Micro Devices, Inc.], each with a gigabyte of memory, were installed to support the pilot TCF.

Petrel Cluster

In addition, 76 new computers from Datel Systems — dual processor AMDs — were added to the Petrel Cluster, which is housed partially in the FCC and partially in the Lab's PPLCC. Initially, the Petrel Cluster, built at PPPL at the end of FY01 and early FY02, was a prototype system with 34 Intel systems and one dual AMD system that provided PPPL researchers with a local facility for code development and parallel computing resources. The following year, PPPL expanded this system and implemented the pilot TCF. The Petrel Cluster now consists of the 35 original dual processor systems plus the 76 new AMD dual processors. PPPL groups that use the cluster include Advanced Projects, Collaborations, Computational Plasma Physics, NSTX, Theory, and Plasma Science and Technology. The Petrel Cluster and TCF run the RedHat Linux operating system.

Over the past few years, PPPL has built up extensive experience in the implementation and utilization of commodity computing clusters. These are basically modest super-computers built from components that can be purchased "off the shelf." This type of computing, which links desktop machines to support advanced scientific computing, has clearly helped accelerate research progress. "With the new FCC, we installed rack-mountable units from Datel Systems, but from a performance point of view, they are no different than the computer system that any home user might buy," said Davis.

In addition to Tang and Davis, PPPL's involved in establishing the pilot TCF include: Scott Klasky and Ernie Valeo, Co-Principal Investigators for the pilot TCF; Steve Jardin, Principal Investigator for the Fusion SciDAC Extended MHD Project; Doug McCune, Co-Principal Investigator for the SciDAC Fusion Collaboratory; Marques Johansson, Lew Randerson, Darren Wah (Lead Software Engineer), and Kevin Ying, Systems Software Support; Harry Bush and Frank Jones, Facility Preparation; Henry Carnevale, HVAC; Art Wise, Power Engineering; and Ken Tindall, Network Engineering. ●



PPPL Celebrates America Recycles Day



The Lab celebrated “America Recycles Day” on October 22 with exhibitors in the Lobby and a special program in the Auditorium. The program featured a skit starring PPPL’s Margaret Kevin-King and Thomas McGeachen as Chef Re and Chef Cycle and John Benneville as the PPPL Spirit of Recycling, as well as a report about PPPL’s performance in recycling and buying recycled-content items in 2002. Exhibitors included Executive Business Products and Home Depot.

Said Kevin-King, “The America Recycles Day at PPPL gives us the opportunity to reflect on how well we are recycling and purchasing recycled content products. It is important to note that PPPL recycled 8 percent more of its office waste stream this year. The Lab’s recycling

rate this year was 43 percent. We are proud of the efforts made by all and we look forward to a higher percentage next year. The DOE has set a goal of 48 percent by Fiscal Year 2005.”

As part of the program, PPPL Deputy Director Rich Hawryluk presented the 2002 “Green Machine” awards to Lab employees for their efforts to “Reduce, Reuse, Recycle and Buy Recycled.” The honorees were: Joyce Bitzer, Tom Bogdan, Mary Ann Brown, Henry Carnevale, Jim Conover, Matt Lawson, Carl Potensky, Bob Tucker, and Ray Whitley. Kevin-King and McGeachen (pictured at right with fellow skit actor John Benneville, who is in the middle) organized the event. At left is McGeachen with Tucker. ●



Antenna Collaboration

PPPL, in collaboration with Oak Ridge National Laboratory (ORNL) and the European Union, is developing a prototype of a new antenna design to be used on the Joint European Torus (JET). This new ion cyclotron radio frequency antenna is to be added to JET during the 2004 opening. PPPL staff designed, built, and assembled the prototype antenna enclosure box, Faraday shield, and protective tiles, which were recently shipped to ORNL for further testing. PPPL staff also developed and refined new fabrication techniques for the corrugated Inconel box and the stainless steel radio-frequency gaskets, which were required for the new design. From left with the antenna are PPPL’s Fred Simmonds, Doug Loesser, and Randy Wilson, who were involved in the project. ●

Lab's Firefighters Conduct Fire Prevention Demos



PPPL Site Protection staff members Michael Loh (left) and Kevin Rhoades man the Fire Prevention Week displays (above) and demonstrate how to operate a fire extinguisher (at right, with Loh at right) in the Cafeteria Courtyard.



PPPL's Site Protection staff showed off their finest gear and gave demonstrations at the Lab during Fire Prevention Week, celebrated the second week of October. With the theme, "Team UP for Fire Safety," the firefighters encouraged employees to recognize the role they play in keeping their homes — and workplace — fire-safe. The Lab's firefighters offered fire extinguisher training in the Cafeteria Courtyard, as well as distributed handouts about fire safety and exhibited fire fighting clothing and equipment.

Displays included photos of hazards at the Lab, which employees were invited to identify. Equipment on display featured a self-contained breathing apparatus used by firefighters when entering burning buildings and a thermal imaging camera that identifies heat. "Being able to find hot areas in a smoke-filled building or room helps firefighters find victims more easily and quickly, often saving lives," said Captain Dave Neuman of the special camera. Neuman, who organized the Fire Prevention Week activities for staff, added that so far the camera has been used at PPPL to find hazards such as overheated light fixtures and transformers.

As part of the week, Home Fire Safety Checklists were available to all PPPL staff. "Everyone was encouraged to take the checklist home and review it with their families, bringing back to us any questions concerning the checklist," said Neuman.

He noted that Site Protection staff is always available to inspect offices and work stations for fire hazards, as well as to answer questions about fire safety. ●



As part of the Fire Prevention Week activities, the Site Protection group held a drawing for six smoke detectors and six fire extinguishers. The winners are above with Dave Neuman. From left are John Bennevich, Tom McGeachen, Neuman, Keith Rule, Lisa Owen, Patti Bruno, Rick Cargill, and Frank Malinowski. Winners not pictured include Terry Greenberg, Pamela Hampton, Maria Pueyo, Leslie Rodriguez, and Gretchen Zimmer.

Reduce Your Risks

According to the National Fire Protection Association, 85 percent of all fires occur in the home, and most of these fires are preventable. You can reduce your risk of damage and injury by focusing on three key safety messages:

- Installing and testing smoke alarms
- Practicing home escape plans
- Recognizing home hazards

PPPL Holds Second Annual Safety Forum

On October 24 and 25, PPPL convened its 2nd Annual "Safety Forum," which was designed to engage PPPL staff in the review, discussion, and improvement of the Lab's health and safety program. The forum was a special opportunity to collectively consider ways to improve safety and reduce the risks of injury while working at PPPL. The activities included presentations by PPPL Director Rob Goldston, PPPL Deputy Director Rich Hawryluk, and ES&H and Infrastructure Support Head Jack Anderson (above, right). Michael Roberts, of the Department of Energy's Office of Fusion Energy Sciences, welcomed the attendees. Guest speaker David Sarkus provided a rousing talk about "Leading with Passion, Principles and Performance." Of particular interest were the Workgroup Sessions, which provided a forum for staff to focus on specific topics, such as hazard analysis, training, and communication. A facilitator led each workgroup and the results were presented to management and staff during a three-hour session on October 25.

On November 4, Anderson gave a summary presentation to PPPL Council members, who reviewed feedback and issues discovered through the forum. The Council is evaluating areas that need attention regarding safety and is developing an action plan. ●



PPPL Lauded for Safety



In recognition of its safety performance in 2001, PPPL recently received two New Jersey Governor's Occupational Safety & Health awards. The honors include a Recognition Award for outstanding performance and a Citation of Merit for NSTX for working through the year without a lost-time injury or illness. From left are Jerry Levine, Masa Ono, Mike Williams, and Martin Peng, with the awards. Congratulations! ●

Womanspace Holiday Drive

The Director's Advisory Committee on Women (DACW) is sponsoring a drive for Womanspace, a local shelter for abused women. Donations from a holiday wish list (below) can be dropped off at the office of Mary Ann Brown, LSB, B-376, by Thursday, December 12.

Women's Items in All Sizes: Robes, Sweaters, Nightgowns, Sweatsuits, Underwear, Socks, Bras, Slippers, Wallets, Umbrellas, and Prepaid Phone Cards.

Children's Items: (Please, no toys fostering violence) Educational Toys, Coloring Books, Crayons, Videos, Legos, Books, Board Games, Dolls, Toy Trucks/Cars/Trains, Walkman Sets, Sports Toys (basketballs, footballs), Paints/Brushes, Drawing Papers, Infant and Toddler Toys, and African American and Latina Dolls.

General Items: Tags, Tape, Appointment Books, Calendars, Journals, Wrapping Paper/Ribbons, and Gift Certificates to Beauty Salons, Movie Theaters, Appliance Stores, Clothing stores, Gas Stations, and Book Stores. ●



PPPL staff members review materials displayed by safety exhibitors in the Lobby during the Safety Forum.

PPPL's Ascione is a Frequent Flyer

One beautiful autumn Sunday, PPPL's George Ascione got in line for a trial demonstration, eventually took the controls of a model helicopter, and was instantly hooked.

"It was so much fun. I had to take it up," recalled Ascione of what was to become his favorite pastime — operating radio-controlled model helicopters.



At top is George Ascione with "Big Bird," which is used for huge, graceful maneuvers. Below, he is surrounded by the Ascione family's model helicopters. At the far left is the 3-D aircraft, which is used for fast and nimble maneuvers. Ascione calls it the "wild machine."

That was three years ago. Now he and his 15-year-old son, David, have five model helicopters and a space carved out at their home for building, maintaining, and storing their aircraft.

"It's a great thing to do with your kids," said Ascione, noting that David sparked his interest in the hobby.

Because of David's fascination, George and his wife, PPPL's Cathy Saville, decided to check out a "Fly Off"

hosted by a radio control aircraft club in a nearby open field. After that day, George and David put together their first helicopter and flew it in the spring.

The first flight was brief. "It flew three seconds before crashing," recalled Ascione. "But we had it fixed and back together the next day."

Compared to flying model airplanes, model helicopters present a special challenge when it comes to launching and keeping them in the air. Like their large-scale counterparts, they are inherently unstable. Ascione reiterated how a fellow aficionado described the process. "It is like balancing an upside-down broomstick in the open palm of your hand," said Ascione. "Try doing that for 30 minutes straight."

It takes a lot of practice and, in the beginning, it is best done under the guidance of more experienced fliers. "You really need to learn how to fly with the help and experience of others," noted Ascione.

He said an operator must visually place himself or herself in the cockpit. The model should have its tail facing the operator and its nose away. Beginners start by flying the helicopters sideways and working on small figure eights, often with the aircraft tethered. Gradually they work up to more advanced moves, such as barrel rolls.

Since taking up the hobby, Ascione has learned a lot about aerodynamics. "It is a continuous adjustment to keep helicopter stable in the air," he said.

The average model helicopter weighs 20 pounds and flies up to 200 feet in the air and 1/4 mile out. The aircraft include wood or carbon fiber graphite blades, fiberglass or high-impact plastic canopies, and aluminum tails. A tank of fuel keeps one in the air between 20 and 45 minutes.

The style of the helicopter is chosen according to use. Some are for sheer speed, others to fly patterns and elegant, graceful maneuvers, while some — the 3-dimensional configurations — are for "out of control or wild" maneuvers, said Ascione. Those, he added, are David's favorites.

Ascione and his son operate their aircraft all the way into December, as long as there is no snow or rain. The best weather is still and cloudy since the machinery is sensitive to the elements, he noted. Model aircraft should be operated by Academy of Model Aeronautics (AMA) members on AMA-certified fields.

It is an expensive hobby — the largest helicopter the Asciones have is valued at \$4,000 — so it is an activity that the father and son develop as birthdays and special



At left, Ascione's son, David, takes the controls. David, now 15, is 13 in the photo. At right, Ascione operates a model helicopter at PPPL.

holidays come around. Their gift requests include kits for new helicopters, engines, electronics, and parts. A kit supplies the structure of the machine; the assembler buys the engine and electronics separately. Each takes about 20 hours to build. The Asciones usually spread the construction time over a six-month period.

In addition to the aircraft they fly outside, the Asciones have a tiny, tethered, battery-operated helicopter that is six inches across and is flown inside the house.

The Ascione family often attends weekend model aircraft events, which offer a chance to hook up with

fellow aircraft enthusiasts and to practice flying. "We usually watch each other fly and help each other repair models," said Ascione. He added that there are also many shows and competitions they enjoy watching, although they do not compete.

Now Ascione's youngest son is interested in the activity. "Once you pick up the sticks on a radio-controlled model helicopter, you almost can't not take up the activity," Ascione said. "Operating a model helicopter creates a rush of excitement, whether you've been at it for 20 years or are just a beginner." ●

New Salad Bar Installed



Improvements continue in PPPL's Cafeteria. A new salad bar was installed recently and flooring in the serving line area is expected to be replaced during the holiday break. Above, PPPL's Marie Robbins samples the salad bar offerings.



Holiday Pies For Sale

The Cafeteria will be selling pies for the holiday season. You must specify the type and amount of pies you would like and include your name, phone extension, order date, and pick-up date on the your order form. Forms are available in the Cafeteria. Pies range from \$6-\$7 each. Flavors include Boston cream, apple crumb, pumpkin, fruits of the forest, caramel apple nut, southern pecan, sweet potato, cherry crunch, apple, blackberry, mincemeat, coconut custard, and lemon meringue. ●



Fusion Fighters Join Fellow Scary Creatures on Halloween

PPPL celebrated Halloween in style. Festive PPPL'ers at bottom left are, from left, PPPL Director Rob Goldston, Hans Schneider, Leslie Rodriguez, Elle Starkman, Joanne Savino, Mary Ann Brown, Rajesh Maingi, and Sonja Patterson. At top left, fusion fighters Goldston (left) and Maingi duel. At right is Andrea Moten and at bottom right is Regina Worthy.



The Holiday Party at PPPL is scheduled for Friday, December 20th at Noon.

Hotline

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