PPPL PRINCETON PLASMA PHYSICS LABORATORY
A Collaborative National Center for Fusion & Plasma Research
U.S. DEPARTMENT OF ENERGY
WEEKLY
March 31, 2014

At PPPL THIS WEEK

WEDNESDAY, APRIL 2

PPPL Colloquium
4:15 p.m. ◆ MBG Auditorium
Your Restless Brain: Changing Continually throughout the Day and Night
Barry Jacobs, Princeton University

FRIDAY, APRIL 4

PPPL Service Awards
9:30 a.m. ◆ MBG Auditorium

UPCOMING EVENTS

Apr. 9
PPPL Colloquium
4:15 p.m. ◆ MBG Auditorium
Trenton iron and steel
Clifford Zink, Independent Historian

Apr. 27
Communiversity Festival
4:30 p.m. ◆ Nassau St., Princeton

Apr. 28
Spitzer Lecture
4:30 p.m. ◆ Princeton University Peyton Hall
Experimental techniques in high energy astrophysics
Fiona Harrison, Caltech

Apr. 29
Carebridge Seminar
Noon ◆ Viz Wall Room
Financial planning for retirement

Apr. 29
Spitzer Lecture - Colloquium
4:30 p.m. ◆ Princeton University Peyton Hall
The Nuclear Spectroscopic Telescope Array (NuSTAR) High-Energy X-ray Mission: Bringing the High Energy Universe into Focus
Fiona Harrison, Caltech

Inside...

Young Women's Conference cheers on girls interested in STEM

By Jeanne Jackson DeVoe

This year's Young Women's Conference became a pep rally for science when all 400 girls attending ended up shouting "Science" at the top of their lungs from the bleachers in Jadwin Gymnasium, at the urging of keynote speaker Jayatri Das. It was no doubt the first such cheer ever shouted in the gym.

Das, the chief bioscientist at the Franklin Institute in Philadelphia, noted that more seventh to tenth graders attend the conference each year. "It keeps getting better and better!" she said. "Twenty years ago I was you and there was nothing like this."

The "Science" cheer was a fitting conclusion to PPPL's Young Women's Conference (YWC) in Science, Technology, Engineering and Mathematics on March 21, which was aimed at inspiring young women's interest in the STEM fields and sparking their interest in STEM careers.

continued on page 4

Bianca Scott, a student at Fischer Middle School in Ewing Township, smiles as her hair rises due to static electricity from the Van de Graaff generator at PPPL's display.

Ronald Hatcher dies at 56

By John Greenwald

Ronald Hatcher, a principal engineer whose contributions to the Laboratory ranged from designing and analyzing key power supply systems to mentoring early career engineers and running the Science on Saturday program, died on March 24, after suffering a medical emergency on his way to work. He was 56.

Ronald Hatcher

"Ron brought unique expertise to a very important area of the Laboratory," said Michael Williams, head of the Engineering and Infrastructure Department and associate director of PPPL.

Led two projects vital to NSTX-U

Hatcher excelled at creating power supplies that supported plasma operations. At the time of his death he led two projects vital to the success of the National Spherical Torus Experiment Upgrade (NSTX-U). These called for developing systems that will protect the NSTX-U coils from the power of the enhanced facility and will control the delivery of power to the experiment. Both projects drew upon his rare combination of talents. "Ron was well-known for his versatility in electrical engineering, including very strong analytical skills and the ability to serve in operational roles," said engineer Charles Neumeyer, who supervised Hatcher and was a long-time friend and colleague. "An additional asset was Ron's knowledge of plasma physics and his ability to work closely with the research staff. In these regards he was unique and his services were always in high demand."

Hatcher joined PPPL in 1984 with a bachelor's degree in electrical engineering and mathematics from Carnegie-Mellon University, and a master's degree in electrical engineering from the same school. He arrived after starting his career at the Westinghouse R&D Center in his hometown of Pittsburgh.

continued on page 3

DOE review will look at PPPL's systems to evaluate and improve performance

By Jeanne Jackson DeVoe

A U.S. Department of Energy (DOE) review team will visit PPPL from Monday, March 31 through Thursday, April 3 to evaluate the Laboratory's contract assurance systems (CAS). They are designed to ensure that PPPL meets its contractual obligations to the DOE by employing a wide variety of methods to evaluate, measure, and improve the performance of the Lab.

The six-member team will meet with managers and staff at the Laboratory and review documents. They will likely give some feedback on their findings on the final day of their visit and will issue a written report about a month later.

The team includes team leader John Adachi, of the Office of Science Integrated Support Center (SC-ISC) in Chicago; Johnny Moore, the Site Manager of Oak Ridge National Laboratory; Mike Weis, the Site Manager of the Fermi National Accelerator Laboratory; Tracy Sims, of the SC-ISC; and Leif Dietrich and Brian Bozarth of the Princeton Site Office.

Maria Dikeakos, the DOE's Princeton Site Office Manager, noted that "through contractor assurance the Office of Science asks each of its National Laboratories to have a strong self-assessment program that helps management understand where the problems are, apply resources to the most impactful areas, and assure that operations will be efficient in meeting the mission and producing the best results. It only makes good business sense. A critical piece of that is healthy communication, openness and transparency between the Lab and the DOE. On a very basic level, if we do not see and understand your systems and your results, it is hard to give you credit for all the good work being done! As part of this review, I am hoping to find new ways to enhance communication between our offices, making us more effective in jointly focusing on the right things."

Wide-ranging systems at PPPL are part of CAS

Adam Cohen, PPPL's deputy director for operations, said PPPL has wide-ranging systems in place that are part of CAS. "Our folks work very hard to make sure that we are following the contract and ensuring that our operations are effective in meeting the mission," Cohen said. "We're proud of the systems that we have in place."

These systems include everything from the weekly meetings of managers to quarterly reviews, audits, assurance assessments and the PPPL "dashboard" on the internal website, which gives a snapshot of how effectively each department is meeting its goals. "The metrics give you a measure of the health of the program," Cohen said. "Analogous to what you have in your car, our dashboard gives a quick view of our status."

The CAS includes everyday procedures like the recent walkthrough of the building by members of the Facilities and Site Services team that found some carpet squares coming up in one area of the Laboratory, Cohen said.

"We have a lot of Lab systems that are in place to assure that we do work effectively and efficiently and consistent with the mission and DOE requirements," agreed Michael Williams, head of the Engineering and Infrastructure Department and associate director of PPPL.

Such systems include procedures that spell out how work is to be performed, and not only document the process but also help with training. In that way "the next person can pick up the procedure and figure out what to do," Williams said.

Each PPPL department has numerous ways to review its work. These include multiple design reviews for new machinery, with action items along each step. At the same time, internal groups like the Project Status Review Board monitor the Lab's project management programs and the Lab often brings in outside experts for external reviews.

Continuous improvement

"Continuous improvement is the name of the game," Williams said. "You want to have systems, you want to use the systems, you want to make improvements and go back to them. It's a continuous process."

Continuous improvement is particularly important when it comes to establishing strong safety procedures and building on them through integrated safety management, Williams added. "If you don't strive to continuously improve things, there's a risk of becoming complacent, and if you become complacent bad things may happen."

John DeLooper, head of Best Practices and Outreach, said the review team may talk with staff members about the procedures they use in their jobs, or how they ensure that they're doing jobs safely and correctly. His advice is to answer any such questions frankly and completely.

"Just tell them what you are doing and how you are doing it," he said. "We're in good shape, we're very comfortable with what we do and how we do it," he added. "We just have to show the review team."

The DOE began using contractor assurance systems at its 10 Office of Science Laboratories in 2009 as a way to "more effectively manage processes, resources and outcomes," and "provide transparency between the contractor and DOE," according to a document on the Office of Science website. PPPL was last reviewed in 2011 along with the other laboratories.

A.J. Stewart Smith, University vice president for PPPL, said the DOE instituted CAS five years ago "to reduce the administrative and compliance burdens for everyone, and to improve communications, trust and partnership. The University as contractor would now have the primary responsibility for making sure PPPL operations were in compliance with the contract, with the DOE holding the University and Laboratory accountable instead of focusing their efforts on detailed day-to-day compliance reviews," Smith said. "Though results so far have been mixed the situation is improving. We are committed to making CAS successful and expect the review to help get everyone to a better place."

The current review of the Office of Science laboratories is part of a larger effort by the Office of Science called "Office of Science Management Systems Refresh." This effort aims to ensure that the CAS systems used by the Office of Science laboratories integrate as well as possible with the Office of Science oversight process.

CAS will be the focus of an entire session of an upcoming meeting of Deputy Director for Field Operations Joseph McBrearty in April at the Pacific Northwest National Laboratory in Washington, which Dikeakos, Cohen, and Smith will attend, along with officers from other national labs.

"What we want to do is make sure that we're taking the opportunity to look back and learn," Dikeakos said. "CAS is an important process that we rely on, so let's find out what it is that will make it better, evaluate where we are and learn from it."

Ron Hatcher

continued from page 1

Role on numerous projects

His expertise in power electronics, combined with his mathematical training and keen grasp of physics, led to power-supply roles on facilities ranging from the S-1 Spheromak and Poloidal Divertor Experiment to the Tokamak Fusion Test Reactor and NSTX. "No one person could have taken the role that Ron had because of his broad knowledge base," said Al von Halle, the head of electrical engineering at PPPL.

Hatcher contributed to national and international fusion experiments. He served on extended assignment at MIT during the commissioning of the Alcator C-Mod tokamak, and worked on collaborations on the DIII-D tokamak that General Atomics operates in San Diego. More recently, he helped design power supplies for the trim coils that PPPL built for the Wendelstein 7-X stellarator in Greifswald, Germany.

Working with Hatcher was fun. His booming laugh echoed down hallways. "Ron was the kind of person that you could have an argument with and have it turn into a joke," said Keith Erickson, a system engineer who joined Hatcher on the NSTX-U coil-protection and power-control projects. "We would work together four-to-five hours a day, five days a week and have a ball doing it."

A Lab-wide circle of friends

Though seemingly quite private, Hatcher had a Lab-wide circle of friends. "He was the most social anti-social person I know," said Jean Wernock, a member of the Human Resources Department and participant in the pot-luck summer cookouts that Hatcher loved to organize for coworkers throughout PPPL. "I called him the unofficial social director of the Lab," said Anthony Bleach, head of the Accounting Department and a Hatcher golf partner. "He had a lot of things going on."

Hatcher, whose close friends knew him as "Ronnie," enjoyed sharing his knowledge with others — a trait that his leadership of the Science on Saturday lectures reflected. He singlehandedly found and recruited world-class speakers to give talks in the series that high school students and the general public would appreciate. He even made time to tutor the children of colleagues in math. "He was a great mentor for young engineers at the Lab," said physicist Stefan Gerhardt, who worked with Hatcher on the NSTX-U power projects. "Ron would give them all the information, support, and responsibility and defend them if mistakes were made."

Hatcher did nothing half-heartedly. He was an avid golfer and skilled amateur photographer. He passionately followed "March Madness," the annual NCAA college basketball tournament, and regularly took vacation days to watch the first rounds — rooting for his beloved University of Pittsburgh Panthers.

He leaves behind high professional achievements and an indelible imprint on the Laboratory. "Ron's friendly demeanor, smiling face and the unique sound of his laugh," said Charles Neumeyer, "will always be remembered."

Visitation

There will be a visitation on Tuesday, April 1 from 11 a.m. to 2 p.m. and a funeral service at 2 p.m. at Barlow & Zimmer Funeral Home, 202 Stockton St., Hightstown.

Directions and details are available at http://www.barlowzimmer.com/book-of-memories/1835696/Hatcher-Ronald/index.php.

Windows 7: Is Your NSTX Control & Data Acquisition Environment Compatible?

The upgrade to Windows 7 on April 8th could impact your NSTX run-time environment.

NI Labview: Is your copy of Labview older than Labview 2009? If so, you will need to upgrade. Renewing your current license of Labview saves you 50 percent on the cost of a new license.

Do you have a PPPL Labview license you no longer use? We can re-purpose it! Send an email to gzimmer@pppl.gov with your license number (add-ons and tool kits, too).

Application Builder, included with some Labview packages, can be added to your version for $999. Unlike the Labview Application license, your Application Builder license never expires. By entering the license number, you can download the current version from the NI website.

NI Hardware: Are your data acquisition boards & drivers compatible with Win7?

DAQmx 9.8 is the driver that is used with the current version of Labview running on a Windows 7 machine. The following webpage provides links to charts where you can check your particular board: nstx.pppl.gov/nstx/Win7Upgrade/NIDeviceSupport.html

For frame grabber boards (used with cameras on NSTX), refer to this NI-IMAQ chart: nstx.pppl.gov/nstx/Win7Upgrade/FrameGrabber.html

Do you have other data acquisition boards or software, or PLC-programming software that you have been using under Windows XP? If so, contact the vendor to determine a path forward to Windows 7.

— Paul Sichta, Controls and Data Acquisition Division

"Green Machine" Awards

Please submit PPPL Green Machine award nominations for PPPL employees or teams that have contributed to our environmental performance during the past year by:

- *Reducing greenhouse gas emissions*
- *Saving energy*
- *Saving water*
- *Reusing equipment or material*
- *Recycling materials or equipment*
- *Reducing the use of toxic or hazardous materials*
- *Sustainable acquisition (purchasing recycled content, biobased, and other "green" products)*
- *Reducing or eliminating pollution*
- *Other actions that help protect public health or the environment*

Nominations should include:

- *Nominee's name(s)*
- *PPPL work group*
- *Description of the actions taken*
- *Estimated cost savings or environmental benefit*

Nominations are due by Monday March 31 by completing the online nomination form here or by email to Virginia Finley vfinley@pppl.gov.

Courtney Kaita, an accomplished cellist (and daughter of PPPL's Robert Kaita), uses her cello to explain sound waves to some future scientists.

Girls from 46 schools flocked to the Frick Chemistry Building at Princeton University to take part in hands-on experiments, tour University laboratories and talk to female scientists and engineers.

Studies show that many girls lose interest in science in middle school. More than half of college graduates (57 percent) are women but only 20 percent of incoming female freshman say they intend to major in a STEM field, compared with 31 percent of males. And while more women are entering some STEM fields such as biotechnology and the social sciences, women hold only about 26 percent of all science and technology jobs. About 12 percent of engineers are women and only 25 percent of computer scientists and mathematicians are women, according to a 2010 study by the National Science Foundation.

Changing perceptions of STEM fields

Surveys of young women attending the YWC show the conference helps change their ideas about women and science. The percentage of girls who believe that women are "very good" at science and engineering jumped from 6 percent before the conference to 18 percent after the conference, according to a 2010 survey. The percentage of girls who said they would consider majoring in physical sciences and engineering had a similar bump from 8 percent before the conference to about 13 percent for general science and 18 percent for physical sciences.

Shannon Greco, a program leader in the Science Education Department at PPPL, said it's important that girls at the YWC meet a wide spectrum of females involved in science —from high school girls trying to recruit new participants for the New Jersey Regional Science Bowl to undergraduate and graduate students and established researchers. "It's been proven many, many times, that actually seeing a possibility for themselves to be scientists is key," Greco said. "If they don't see that, they won't pursue it, and also if they don't see it's interesting and fun, they won't pursue it."

At this year's YWC, young women from New Jersey, New York and Pennsylvania learned about forensics from female F.B.I. agents, got to touch artificial muscle, and took part in the great "phytoplankton race" in which they tried to build the most buoyant phytoplankton — plants that live in the ocean — and achieve the slowest sinking time.

PPPL's plasma demonstrations, including the Van de Graaff generator, which made girls' hair stand on end, were some of the most popular of the 26 hands-on activities.

Stacey Gould, a chemistry teacher at Council Rock High School North in Newtown, Pa., said the conference fights a persistent message about girls in the STEM field. "There's still a perception by some that girls are not good at math and science," she said. "I try hard to fight that stereotype but it's everywhere."

Seeing various fields of science

That's why it's so important for young women to see that science is a viable career and to watch role models in action, Gould said. " "I love for the girls to see all the fields of science and the women who do them," she said. "There's really no limit to what they can do."

The girls seemed to be getting the message. "It's really interesting – I've learned a lot," said Grace Xiong, of Community Middle School in West Windsor, after a tour of Guyot Hall. "I've learned about the ocean. We learned a lot of different things: About sound, about plasma, and how certain things work – how sound works with music."

Jacquelyn Cai, an eighth grader at Community Middle School, said she enjoyed the hands-on activities the most. "It gives you a taste of everything," she said.

A very enthusiastic audience

"They were very, very enthusiastic and they were so into the talk and the exhibits and it was exciting to just watch them learn," said Deedee Ortiz, the PPPL organizer of the event.

Lenore Rasmussen, founder of Ras Labs Synthetic Muscle™ for Prosthetics & Automation, showed off small samples of polymers she uses to produce synthetic muscle made of an electroactive polymer. Rasmussen told students that it took a long time for her to get her Ph.D. and then do post-graduate research before going on to get a job and eventually forming her own company. "It's a tough way but if you love science it's worth it," she said.

44 PPPL volunteers

Physicist Angie Capece was one of 44 PPPL volunteers, along with a dozen volunteers from the University, who served in numerous roles ranging from group leaders to exhibitors. Capece said she was impressed by the enthusiasm of the young women at the conference. "The girls ask really great questions and it's great to see them so excited about some of the demos we have here," she said. "I think it's good to give the girls a chance to talk to real scientists and especially female scientists."

continued on page 5

continued from page 4

Girls examine a dinosaur at Princeton University's Guyot Hall during one of several tours of science labs at the University.

PPPL physicist Angie Capece, seen here showing plasma demonstrations at a PPPL's exhibit, was one of 44 PPPL volunteers at the Young Women's Conference.

Values shape emerging science and technology

Keynote speaker Jayatri Das of the Franklin Institute gave a presentation entitled, "How values shape emerging science and technology." She started out asking the girls to think about whether it's acceptable to use a cell phone in a movie or when they are with a group of friends. Most of the girls said it would be rude to use their cell phones in either case.

"Every time we have a new technology, the rules evolve," Das told the audience. She noted that last year people traveling by air had to turn off their cell phones during a flight. Now travelers can use cell phones at the beginning and end of flights and on airplane-mode during flights.

Future uses of nanotechnology

Das asked the students to think about several examples of possible future uses of nanotechnology: A space elevator, quantum computing, gold nanoshells that could be used to treat cancer, super-strong military clothing, a "tea bag" water filter, inexpensive and tiny solar panels and fuel cells based on nanotechnology. She asked the girls to choose three technologies for themselves and their families.

"I'd like to have an invisibility cloak and the military clothing — the invisibility cloak because it's awesome," said one girl. Another girl chose the nanoshells, the water filter and the military clothing.

"We think about family health," Das said. "We think about technologies that are cool — who wouldn't want an invisibility cloak? And we heard about technologies that will help global problems."

Das then asked the girls to take on the role of various fictitious characters, including a soldier in Iraq and a pregnant woman with a small business in South Africa, and then make decisions about what technology they would choose. One girl chose the fuel cell, the solar panels and the water filter for the South African small business owner. Another chose the military clothing and the invisibility cloak for the soldier in Iraq.

"There are different values that determine where their priorities would be," Das said. "As scientists we feel our role is to bring these conversations to light," she said. "I'm hoping you will all create conversations."

At the end of the conference, Andrew Zwicker, head of the Science Education Department, urged the girls gathered at Jadwin Gym to continue their interest in science. "I want you all to know how inspiring it is to see you here," he said. "We want your help to change the world by curing disease or finding a new form of energy."

Jayatri Das, a bioscientist at the Franklin Institute, was the keynote speaker at Jadwin Gym and led the 400 girls in the audience in a "Science" cheer.

Join in the fun and volunteer for Communiversity

The Communiversity Festival of the Arts is a great opportunity to have some fun and let the community know about PPPL. Please volunteer for one or two hours on Sunday, April 27 from 1 to 5 p.m. to talk to members of the public, help with demonstrations and hand out prizes at this annual event, which is sponsored by Princeton University and the Arts Council of Princeton and attracts more than 200 artists, crafters and merchants, and thousands of visitors. Please contact Jeanne Jackson DeVoe, jjackson@pppl.gov, ext. 2757 to volunteer. More information about Communiversity is available at the Arts Council of Princeton website.

COLLOQUIUM

YOUR RESTLESS BRAIN: CHANGING CONTINUALLY THROUGHOUT THE DAY & NIGHT

BARRY JACOBS, PRINCETON UNIV.

Wednesday, April 2

4:15 p.m. (Coffee/Tea at 4 p.m.) • MBG Auditorium

THIS FRIDAY April 4

9:30 a.m. • MBG Auditorium

Site Protection Division TIP•OF•THE•WEEK

The Emergency Voice Evacuation System (EVES) is primarily intended to initiate an evacuation by use of a sustained tone, followed by specific instructions to Laboratory personnel (e.g., evacuation routes, specific areas to avoid, protective actions to be taken, etc.). The EVES system allows for a warning tone to be broadcast prior to any instructions. Upon hearing the warning tone, personnel should move to a location where the announcement may be heard. There is typically a delay of 5-10 seconds between the warning tone and the instruction announcement.

BROCK Café at PPPL Menu

BREAKFAST ..... 7 a.m. • 10 a.m.
CONTINENTAL BREAKFAST ..... 10 a.m. • 11:30 a.m.
LUNCH ..... 11:30 a.m. • 1:30 p.m.
SNACK SERVICE ..... until 2:30 p.m.

*— **MARK GAZO**, Chef Manager*

	MON. MAR. 31	TUE. APR. 1	WED. APR. 2	THU. APR. 3	FRI. APR. 4
					
COMMAND PERFORMANCE CHEF'S FEATURE	*Ota-Ya* Sushi Bar	Vegetable Paella	3 Cheese Lasagna	Pork Chop Italiano with Roasted Potatoes & Vegetable	Tilapia with Caper-Parsley Sauce and Rice Pilaf
EARLY RISER	Spanish Omelet with Grilled Onions, Peppers, Mushroom & Cheddar	Huevos Rancheros Wrap	Oatmeal Cookie Pancakes with Apple Cider Syrup	Sausage Gravy served over Fresh Baked Biscuits	Apple French Toast
COUNTRY KETTLE	Chicken Rice	Sweet Potato Carrot Soup	Sausage, Pepper & Spinach Soup	Navy Bean Vegetable	Cream of Turkey
GRILLE SPECIAL	Classic Corned Beef Reuben served with Coleslaw	Grilled Ham & Cheese with Pineapple & Dijon on Texas Toast	Crispy Baked Flounder Sandwich with Pineapple Slaw on Naan	Roast Turkey with Cheddar, Onions & Red Pepper Aioli on French Bread	Grilled Eggplant with Mozzarella, Spinach, Roasted Peppers & Hummus
DELI SPECIAL	Roasted Sweet Potato Wraps with Mushrooms, Onions & Pesto	Roast Beef, Provolone, Coleslaw & Russian Dressing on Rye	Sliced Pork Club Sandwich	Parisian Tuna Sandwich	Turkey Cobb Wrap with Bacon, Avocado, Blue Cheese & Egg
PANINI	Ham, Bacon, Cheddar Cheese & Tomato Flatbread Griller	Artichoke & Tuna Melt with Tomato & Swiss Cheese Torpedo	Roast Turkey French Dip with Provolone Cheese & Stuffing	Southwest Mushroom & Pepper Quesadilla	Hot Roast Beef with Provolone, Onion & Tomato on French Bread

MENU SUBJECT TO CHANGE WITHOUT NOTICE

VEGETARIAN OPTION

CLICK HERE FOR A PRINTABLE WEEKLY MENU

WEEKLY

Editor: **Jeanne Jackson DeVoe** ◆ Layout and graphic design: **Gregory J. Czechowicz**
Photography: **Elle Starkman** ◆ Web: **Chris Cane** ◆ Admin. support: **Pamela Hampton**

The **PPPL WEEKLY** is published by the PPPL Office of Communications on Mondays throughout the year except for holidays. Deadline for calendar item submissions is noon on Thursday. Other stories should be submitted no later than noon on Wednesday. Comments: commteam@pppl.gov ◆ **PPPL WEEKLY** is archived on the web at: http://w3.pppl.gov/communications/weekly/.