

## Calendar of Events

### MONDAY, MAR. 21

**Adlinger Center for Energy  
and the Environment Highlight  
Seminar Series**

4 p.m. ♦ Maeder Hall, Princeton  
University

[Burning for Fusion Energy:  
In Pursuit of Self-heated Plasmas  
and Beyond](#)

Ned Sauthoff, Oak Ridge National  
Laboratory

### WEDNESDAY, MAR. 23

**PPPL Colloquium**

4:15 p.m. ♦ MBG Auditorium

[Ocean Acoustic Ecology: Great  
Whales, Ocean Scales, Big Data](#)

Dr. Christopher Clark, Cornell University

## UPCOMING

### MAR. 28-30

**“Fisch Fest” Symposium  
“Solved and Unsolved Problems in  
Plasma Physics”**

Mar. 28 and 30 ♦ MBG Auditorium  
Mar. 29 ♦ Adlinger Center for  
Energy & the Environment

[Scheduling and registration](#)

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## Engineers design and build digital device to help manage NSTX-U current

By Raphael Rosen

**T**he electric current that powers fusion experiments requires superb control. Without it, the magnetic coils the current drives cannot contain and shape the plasma that fuels experiments in doughnut-shaped tokamaks correctly.

Now, engineers at PPPL have developed an updated version of a key electronic component that helps regulate the current that powers the coils in PPPL’s recently completed National Spherical Torus Experiment-Upgrade (NSTX-U). The device, known as a digital firing generator, replaces an analog device in the previous machine that was less accurate and harder to maintain.

This upgrade will bring NSTX-U in line with other tokamaks around the world that employ the same kind of device. The engineers — Robert Mozulay, Weiguo Que, and Charles Neumeyer — presented their results at the 26th Symposium on Fusion Engineering in June 2015. This work was supported by the DOE Office of Science (Office of Fusion Energy Sciences).

“The digital firing generator is very important for ensuring that NSTX-U operates effectively and reliably,” Neumeyer said. “These new generators extend the life of the power supplies that form the backbone of PPPL’s electrical power system, and provide the precise control necessary to drive currents in the NSTX-U magnet coil up to 140,000 amps — higher than any previous experiment at PPPL.”

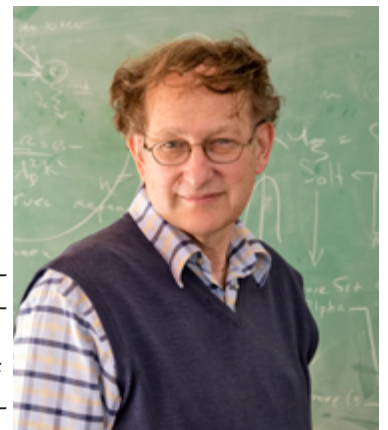
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## Three-day symposium in honor of Nat Fisch begins next week

By John Greenwald

**S**ome 200 leading scientists from around the world will gather next week at Princeton University and the U.S. Department of Energy’s (DOE) Princeton Plasma Physics Laboratory (PPPL) for a March 28-30 “Fisch Fest” — a three-day symposium on “Solved and Unsolved Problems in Plasma Physics” in honor of the 65th birthday of physicist Nat Fisch.

“I’m just the excuse for this event,” said Fisch, associate director for Academic Affairs at PPPL, director of the graduate Program in Plasma Physics and professor and associate chair of the Department of Astrophysical Sciences at the University. “A wonderful group of people is going to come together to discuss unsolved problems.”



Nat Fisch

Joining the gathering will be alumni of the Program in Plasma Physics, turning the event into a reunion as well. “I’m looking forward to seeing my former students,” Fisch said. Sessions will be in the Melvin B. Gottlieb Auditorium at PPPL on March 28 and 30 and in the Adlinger Center for Energy and the Environment on the main campus on March 29.

[continued on page 4](#)

# Another PPPL international collaboration: Avatar the guide dog will go to Japan

By Jeanne Jackson DeVoe

**A**vatar, Rob Sheneman's guide dog in training, will soon have to learn to bark in Japanese.

Avatar is bidding farewell to Sheneman and his family and to PPPL as he prepares to head off to Japan at the end of this month to become part of a breeding program there.

Officials at The Seeing Eye guide dog foundation in Morristown, New Jersey, chose Avatar to be part of the breeding program for seeing eye dogs at Eye Mate in Tokyo based on his good health, strong bones, and his sweet temper, said Peggy Gibbon, director of canine development for the foundation. "He is a very stable confident dog," Gibbon said. "He's friendly and calm but learns well. All of these things make him a good candidate for a breeding dog."



Avatar at PPPL. (Photo by Elle Starkman)

Avatar is a 22-month-old yellow Labrador and Golden Retriever mix that has been with the Sheneman family since he was just eight weeks old. He went back to The Seeing Eye last summer to be trained as a guide dog and the Shenemans got another foster puppy, a black Labrador named Pixie, to train. But a few weeks later, officials at The Seeing Eye called the Shenemans to ask if they would take Avatar back for several more months. Sheneman, head of the Environmental Services Division, has been taking Avatar to work with him for a year and a half.

The Seeing Eye officials asked the Shenemans if they were OK with Avatar going to Japan because it would mean Avatar could not return to them. The foundation usually offers families the chance to adopt the dogs back when they retire as breeding dogs or are not selected as guide dogs. But when Avatar goes to Japan, he won't be coming back to the United States. "We're going to miss him," Sheneman said. "But he'll make many other people happy."

Avatar was scheduled to leave his foster home March 17. He will spend two weeks at the Seeing Eye for some health screenings and training and then will fly to Japan with the director of training for Eye Mate, Gibbon said.

In addition to the two foster dogs, the Shenemans also have two family dogs at home, Angelo, a yellow Lab that is almost 10, and Whistler, a black Lab, that is 8.



Rob Sheneman and Avatar at home. (Photo by Margaret Sheneman)

Avatar is the 13th and Pixie the 14th dogs the Shenemans have fostered. The dogs become part of the family. They go to church with the family and band practice with their youngest son, Ben. They go on family vacations. Sheneman takes Avatar to work at PPPL a few days a week and has just begun taking Pixie. "You change your family lifestyle to adapt to having the puppies around but we have really enjoyed it," Sheneman said. "They're sweet dogs, they're smart, and seeing them working is really nice. It's quite a reward."

Avatar and Pixie are two of nearly 500 puppies bred at the Seeing Eye and fostered by New Jersey families each year. "Without families like the Shenemans we couldn't have the dogs that are guiding the way they do because they get such exposure just seeing the world," Gibbon said.

Only 60 percent of the dogs bred for the program become guide dogs. Some go on to become police dogs to sniff out bombs or drugs, and a few may become other types of service dogs. One dog became a guard dog at the White House.

Avatar's foreign posting came about because The Seeing Eye officials have a relationship with Eye Mate officials in Tokyo. They have helped train Eye Mate instructors and they have sent several breeding dogs, Gibbon said. The director of the school will come to the United States in March just to get Avatar. He will take the pooch back to Japan and, like all breeding dogs, Avatar will live with a Japanese family.

Gibbon said Avatar's selection is in part a tribute to Sheneman and his family's hard work. "They're very proud of him and I think they should be," she said. "He was chosen to be an ambassador because he's an exceptional example of our dogs and they certainly helped him get there." 🐾



Avatar as a puppy at PPPL. (Photo by Elle Starkman)



## Digital firing generators

continued from page 1

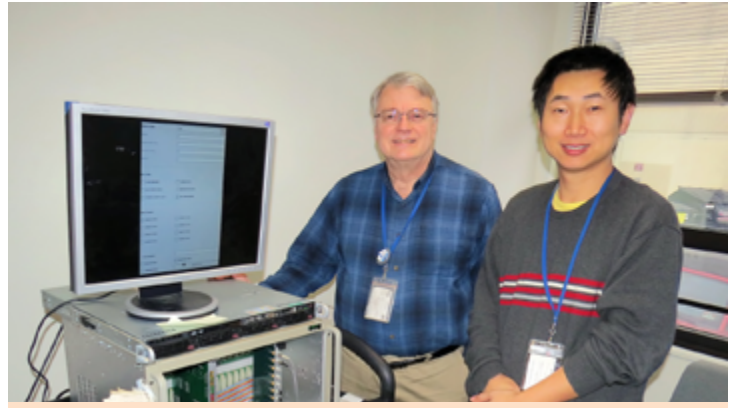
The ability to better manage the electric current flowing into NSTX-U, the world's most advanced spherical tokamak, will provide new insights into how to control plasma, the soup of electrons and charged atomic nuclei that swirl within fusion facilities. With better control, scientists will be able to perform experiments on NSTX-U to advance the design of a working fusion reactor.

The new generator links the computer that controls NSTX-U and a device called a "thyristor rectifier" that adjusts the voltage, and thus the current, for NSTX-U experiments. Through a computer command sent via fiber optic cables, the digital firing generator causes the AC (alternating current) that flows into PPPL to convert to DC (direct current) and deliver the amount requested for an experiment. The team also built the fiber optic links that make the conversion possible.

"A single thyristor rectifier can generate up to 2,000 volts of DC current at 24,000 amps, for about three seconds," Mozulay said. "That amount of voltage corresponds to 48 megawatts



One of the digital firing generators  
(Photo by Robert Mozulay)




PPPL scientists Robert Mozulay and Weiguo Que (Photo by Hans Schneider)

of power, which, during the three-second pulse, could power approximately 8,000 average-sized New Jersey homes."

NSTX-U has 32 pairs of thyristor rectifiers, each controlled by its own digital firing generator. These rectifiers help to double the heating power and magnetic field strength that the upgrade has made possible. "All of the firing generators were designed, built, and tested here at PPPL," Mozulay said.

Other advantages over their analog predecessors include a greater ability to coordinate the production of electric current and to shut down when sensing that a rapid change in current might damage components. This synchronized shut-off process is like applying the brakes in a car, Mozulay said.

Engineers will also be able to adjust the digital firing generators much more easily than their analog predecessors. "Making changes in the future will mean making changes to the programming, not electronics," Mozulay said. "A new program can be downloaded into the digital signal processors within the firing generators in minutes, thereby allowing fast, accurate updates."

Other PPPL staff members who helped design and build the digital firing generator include Jim Corl, Ed Bremen, Gary D'Amico, Westley Reese, Cindy Lasky, Gary Gibilisco, Alexis Sanchez, and Elliott Baer. 

## ORNL's Ned Sauthoff discusses fusion energy March 21 at 4 p.m. at the Andlinger Center

Ned Sauthoff, of the Oak Ridge National Laboratory, a plasma physicist and project manager of the U.S. Contributions to ITER Project, is the next speaker in Princeton University's Andlinger Center for Energy and the Environment Highlight Seminar Series. He will give a lecture entitled "Burning for Fusion Energy: In Pursuit of Self-heated Plasmas and Beyond" on Monday, March 21 at 4 p.m. The seminar will be held in the Andlinger Center for Energy and the Environment's new lecture hall, Maeder Hall on the corner of Prospect Avenue and Olden Street, and followed by a reception. We hope you will join us.

Ned Sauthoff's bio and an abstract of his talk can be found on the [ACEE website](#).

## Fisch Fest

continued from page 1

Speakers will explore key plasma physics developments over the last 40 years and discuss issues to be worked on over the next decade. “We will try to survey what was done in the field in the last decades, and we will also try to articulate major unsolved problems that plasma physics will be busy with in the near future,” said Ilya Dodin, a former Fisch student who is now a PPPL physicist and lecturer in the Department of Astrophysical Sciences and chair of the committee that is organizing the event.

Many discussions will touch on subjects impacted by Fisch, whose theoretical insights have covered a broad range of plasma physics since he joined PPPL in 1978 with a doctorate from the Department of Electrical Engineering and Computer Science at MIT. His work on wave-particle interactions has transformed research in magnetically confined plasmas, to take one example, and led to new ways to improve energy confinement. His many honors include the James Clerk Maxwell Prize for Plasma Physics from the American Physical Society in 2005 and the Hannes Alfvén Prize from the European Physical Society in 2015.

“The advances to plasma physics due to Nat have been seminal, deep and wide,” said PPPL director Stewart Prager. “The list of speakers at the symposium—a stellar set of experts covering a large span of plasma physics—perfectly mirrors Nat’s many contributions and will make for a fascinating meeting.”

Some 40 scientists will discuss still-unresolved questions in the plasma physics field. Topics will range from magnetically and inertially confined plasmas to laser-plasma interactions, plasma devices and the connection between plasma physics and other scientific disciplines.

Experts will represent both the theoretical and experimental sides of the plasma physics aisle. Invited speakers include Rush Holt, former U.S. congressman and former assistant director of PPPL; Dennis Whyte, head of the Department of Nuclear Science and Engineering at MIT; William Brinkman, former director of the Office of Science of the U.S. Department of Energy; Steve Cowley, CEO of the United Kingdom Atomic Energy Authority and member of the PPPL Advisory Committee; Robert Conn, president and CEO of the Kavli Foundation, which establishes research institutes at major universities; and Mark Herrmann, director of the National Ignition Facility at the DOE’s Lawrence Livermore National Laboratory, whose Ph.D. thesis advisor was Fisch.

Also scheduled on March 28 and 29 are alumni talks by a dozen Program in Plasma Physics graduates. These will include John Wright, Jong-Kyu Park, Michael Campanell and Greg Hammett. A poster session will wrap up the March 29 daytime event.

That evening will feature a banquet in the Frist Campus Center at which Fisch’s achievements—and current and future projects—will be highlighted and celebrated. Those who have not yet registered for the symposium or the banquet can do so [here](#).

Fisch himself regards his 65th birthday as no big deal. “The real thing for me came when I turned 62,” he said. “That’s when I got half-price tickets on New Jersey Transit.” 🍷

# COLLOQUIUM

## Ocean Acoustic Ecology: Great Whales, Ocean Scales, Big Data

**Dr. Christopher Clark**  
Cornell University



**Wednesday, Mar. 23**

4:15 p.m., M.B.G Auditorium, Lyman Spitzer Building



# Pi Day Celebration

P PPL celebrated Pi Day, a celebration of the mathematical constant pi on March 14 (3/14) with managers serving staff a tasteful variety of pie, including cherry, apple, blueberry, coconut custard and pecan, and ice cream. 🥧

[more photos on next page](#)



Adam Kelley displays his pie and his pi teeshirt.



Shanda Carmichael, left, and Drina Duryea, with Neil Gerrish, in back, are all smiles during the celebration.



Director Stewart Prager poses with a poster of Einstein.



Acting Deputy Director for Operations John DeLooper and Chief Information Officer Stacia Zelick take a break from serving.



Zhirui Wang, left, with Liang Xu, center, and Ke Han, sample different types of pie at the event.



# Pi Day Celebration

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Former Deputy Director Dale Meade enjoys the celebration with Renaud Gueroult and Stewart Zweben.



Angelica Ottaviano and Matthew Parsons show off the remains of their pie.



Carol Ann Austin, right, helped organize the event. Also serving from left to right are: DeLooper; Paulette Gangemi, head of HR; Masa Ono, project director of NSTX-U; and Phil Efthimion, head of Plasma Science & Technology.



Prager serves pie to Dave Gates.

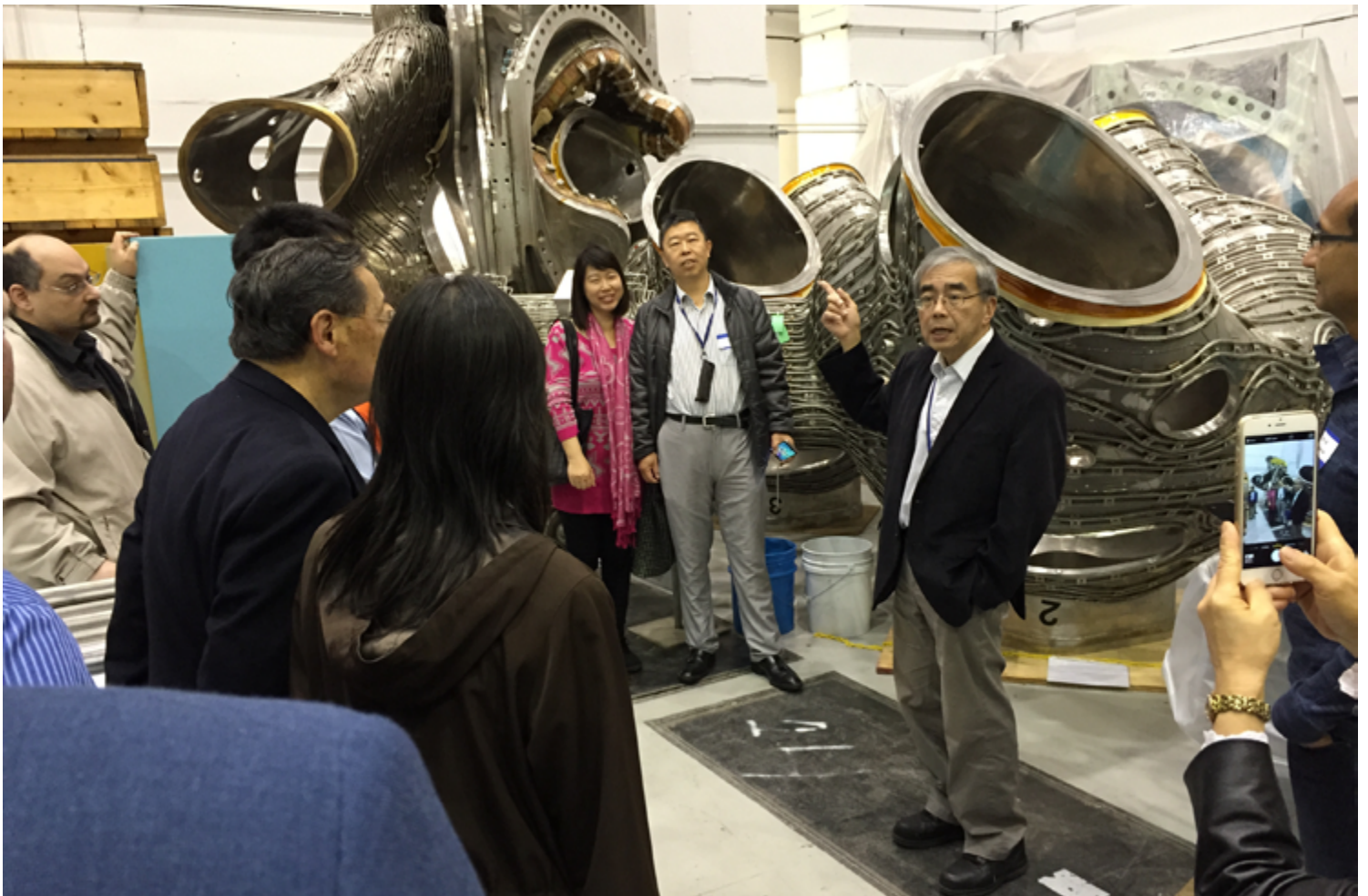


## A PPPL tour for Rutgers & Princeton executives



Acting Deputy Director for Operations John DeLooper, right, gives a tour to Christopher Molloy, center, senior vice president, Rutgers University Office of Research and Economic Development, along with Coleen Burrus, director of the Princeton University Corporate Engagement and Foundation Relations office, and Alan Naidoff, senior associate director of Corporate Engagement and Foundation Relations, on March 11. (Photo by Elle Starkman).

## Asian American Engineer of the Year Award Conference Tour March 11



Physicist Robert Kaita shows the QUASAR coils to a tour group from the Asian American Engineer of the Year Awards Conference who toured the Laboratory on March 11. Engineer Yuhu Zhai, not shown, was also a guide. (Photo by Raphael Rosen)



# Earth Day Photo Contest



**Alternative Power**



**Community**



**Conservation**



**Energy Efficiency**



**Climate Change Adaptation**

**\*Note:** All images are category winners from 2015 except climate change adaptation which is a new category for 2016.

## U.S. Department of Energy Earth Day 2016 Photo Contest

### CALLING ALL PHOTOGRAPHERS

**Professionals, amateurs, and shutterbugs!**

We invite all DOE employees and DOE contractors to share images of ways we save the planet.

One winner will be selected from each of the following five categories:

1. Conservation
2. Community
3. Alternative Power
4. Energy Efficiency
5. Climate Change Adaptation & Resilience

#### Entry Procedures and Requirements:

- Submit photographs via email to Diane Burnes at [dburnes@pec1.net](mailto:dburnes@pec1.net) by 4 pm ET March 31, 2016
  - jpg or .tiff images preferred
  - Maximum of one photograph per category
  - Files must not exceed 15MB
  - Please size photographs to no larger than 8"X10"
- Note the category in which you are submitting the photo
- Title each photograph in the file name and the email
- Include your contact information in the email

#### Where to View:

A broad selection of the submitted photographs will be featured at DOE Headquarters from April 18 thru April 28. The five winning photos will also be displayed on the DOE website.

#### Judging:

The 2016 DOE Earth Day Planning Committee will determine a winning photograph from each of the five categories (noted above).

Winners will be announced April 28, 2016, and will be notified via email. Their photographs will receive special recognition that day and will be featured on the DOE website.

#### Questions:

Eric Bradley, 202-586-7301 or [eric.bradley@hq.doe.gov](mailto:eric.bradley@hq.doe.gov)  
Diane Burnes, 240-686-3059 or [dburnes@pec1.net](mailto:dburnes@pec1.net)



## “Actuality” Podcast reporters at PPPL



Al von Halle, the head of the Electrical Engineering Division, was interviewed by Sabri Ben-Achour, left, of National Public Radio WNYC’s “Marketplace,” and Tim Fernholz, of the business website Quartz, with producer Clare Toeniskoetter, on March 15 for “Actuality,” a twice-monthly podcast that will air in April. Von Halle led the group on a tour of NSTX-U. The journalists and their producer also recorded PPPL Director Stewart Prager and Francesca Poli, a staff research physicist, in interviews arranged by Jeanne Jackson DeVoe of the Office of Communications for the podcast about fusion energy. (Photo by Larry Bernard)

# BROCK

**MARK GAZO**  
**Chef Manager**



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.

	Monday March 21	Tuesday March 22	Wednesday March 23	Thursday March 24	Friday March 25
<b>COMMAND PERFORMANCE</b> <b>Chef's Feature</b>	<b>Chicken Fajita</b> served with Yellow Rice & Black Beans	<b>Roast Chicken</b> served with Pasta Primavera	<b>COMMAND PERFORMANCE</b> <b>Create your own</b> <b>Pasta Bar</b>	<b>Chicken Fried Steak</b> with Country Gravy, Fried Okra, Mashed Potatoes & Biscuit	<b>LUNCH &amp; A MOVIE:</b> <b>JIRO DREAMS OF SUSHI</b> <b>Ota-Ya Sushi</b>
Early Riser	<b>Kielbasa &amp; 2 Eggs</b> any style	<b>Coconut Banana</b> <b>Steel Cut Oatmeal</b>	<b>Steak &amp; Eggs</b> with Seared Tomatoes	<b>2 Eggs Any Style</b> with Corned Beef Hash	<b>Veggie Omelet</b> with Home Fries
Country Kettle	<b>Lasagna Soup</b>	<b>Spring Pea Soup</b>	<b>Chicken Gumbo</b>	<b>Potato Leek</b>	<b>Manhattan</b> <b>Clam Chowder</b>
Grille Special	<b>BURGERLICIOUS</b> <b>My Big Fat Greek Turkey</b> <b>Burger</b> Grilled Turkey Burger with melted feta cheese, tomato, red onion, banana peppers & spinach topped with cucumber sauce on a grilled whole wheat roll (Available all week)	<b>Grilled Salmon Salad</b> with Oranges & Citrus Vinaigrette	<b>Tuna Steak</b> with Asian Slaw	<b>Grilled Chicken</b> with Spinach, Feta Cheese & Kalamata Olives on Ciabatta	<b>Seafood Newburg</b> over Rice
Deli Special	<b>American French</b> <b>Bread Hoagie</b> with Cooked Salami, Bologna & American Cheese	<b>Flank Steak</b> <b>Caesar Salad</b>	<b>New Orleans</b> <b>Muffaletta</b>	<b>Popcorn Shrimp</b> <b>Po' Boy</b>	<b>Seafood Salad</b> <b>Croissant</b>
Panini	<b>French Bread Panini</b> with Fresh Mozzarella, Pesto, Peppers & Provolone	<b>White Pizza</b> with Arugula & 3 Cheeses	<b>Cajun Chicken</b> on a Kaiser Roll with Peppers, Onions, Pepper Jack, Tomato & Chipotle Mayo	<b>Fried Ravioli</b> served with Grilled Vegetables	<b>Glazed Ham</b> on a Ciabatta Roll served with Asparagus Salad

MENU SUBJECT TO CHANGE WITHOUT NOTICE

VEGETARIAN OPTION

# WEEKLY

Editor: **Jeanne Jackson DeVoe** ♦ Layout and graphic design: **Kyle Palmer**

Photography: **Elle Starkman** ♦ Science Editor: **John Greenwald** ♦ Webmaster: **Chris Cane**

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 WEDNESDAY. Other stories should be submitted no later than noon on TUESDAY.**

Comments: [commteam@pppl.gov](mailto:commteam@pppl.gov) ♦ PPPL WEEKLY is archived on the web at: <http://w3.pppl.gov/communications/weekly/>.