

## At PPPL THIS WEEK

NOV. 5 - NOV. 7

**PPPL Advisory Committee**

NOV. 4

**PPPL Colloquium**

4:15 p.m. ♦ MBG Auditorium

HTS and ARC for Fusion

**Dennis Whyte - MIT**

### UPCOMING EVENTS

November 11

**Electronics Recycling Collection**  
7 - 10 a.m. ♦ Lower Parking Lot

November 11

**PPPL's America Recycles Day Celebration**  
10:30 a.m. to 1 p.m. ♦ LSB Lobby

November 17-19

**Environmental Management Systems Audit**

November 19

**PPPL Colloquium**  
4:15 p.m. ♦ MBG Auditorium  
Antibiotic Resistance: A Global Challenge  
**Dr. Laxminarayan Princeton University**

January 14, 2015

**PPPL's Records/Paper Shredding Event (For PPPL business-related records and documents only)**  
9 a.m. - 4 p.m.  
Warehouse Receiving Area #3

## Inside...



America Recycles Day  
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PPPL on the (Apple) map  
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Are you backed up?  
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Menu  
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## Hole in one: Technicians smoothly install the center stack in the NSTX-U vacuum vessel

By John Greenwald

*Editor's note: This is the first of a series of articles on preparations for the start of NSTX-U operations. Coming next: The neutral beam injection systems.*

**W**ith near-surgical precision, PPPL technicians hoisted the more-than-29,000-pound center stack for the National Spherical Torus Experiment Upgrade (NSTX-U) over a 20-foot wall and lowered it into the vacuum vessel of the fusion facility. The smooth operation on Oct. 24 capped more than two years of construction of the center stack, which houses the bundle of magnetic coils that form the heart of the \$94 million upgrade.



"This was really a watershed moment," said Mike Williams, the head of engineering and infrastructure at PPPL and associate director of the Laboratory. "The critical path [or key sequence of steps for the upgrade] was fabrication of the magnets, and that has now been done."

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Machine tech supervisor Joe Winston, front left, inspects bottom of the center stack with members of the lift team before the lift.

## Lyman Spitzer named one of top innovators in New Jersey history

By Jeanne Jackson DeVoe

**P**rincenton astrophysicist Lyman Spitzer, who founded the Princeton Plasma Physics Laboratory, embarked on the quest for fusion energy and inspired the development of the Hubble telescope, was named one of the top innovators in New Jersey history at the New Jersey Chamber of Commerce Innovation Gala on Oct. 24 in Somerset.

The Chamber named Spitzer (1914–1997) among the top innovators for his founding of PPPL, which "each year brings us closer to the promise of fusion energy." It

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## Center stack

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The lift team conducted the final steps largely in silence, attaching the bundled coils in their casing to an overhead crane and guiding the 21-foot-long center stack into place. The clearances were tiny: The bottom of the casing passed just inches over the shielding wall and the top of the vacuum vessel. Inserting the center stack into the vessel was like threading a needle, since the clearance at the opening was only about an inch. Guidance came chiefly from hand signals, with some radio communication at the end.

The installation merged three key features of the upgrade that had been developed separately. These included the casing, the bundled coils and the work to ready the vacuum vessel for the center stack. Slipping the casing over the bundle was a highly precise task, with the space between them only a few thousandths of an inch. "The key word is 'fit-up,'" said Ron Strykowski, who heads the upgrade project. "We had a robust enough design to handle the very fine tolerances."

Installation of the center stack completed a key portion of the upgrade and opened another chapter. "For me, the burden is off our shoulders," said Jim Chrzanowski, who led the coil project and retired on Oct. 31 after 39 years at PPPL. "We've delivered the center stack and are happy," added Steve Raftopoulos, who worked alongside Chrzanowski and succeeds him as head of coil building. "This is my baby now," said Raftopoulos, noting that he will be called on to resolve any problems that occur once the center stack is in operation.

The two leaders praised the many technicians who made the center stack possible. They ranged from a core of roughly a dozen workers who had been with the project from the beginning to technicians throughout the

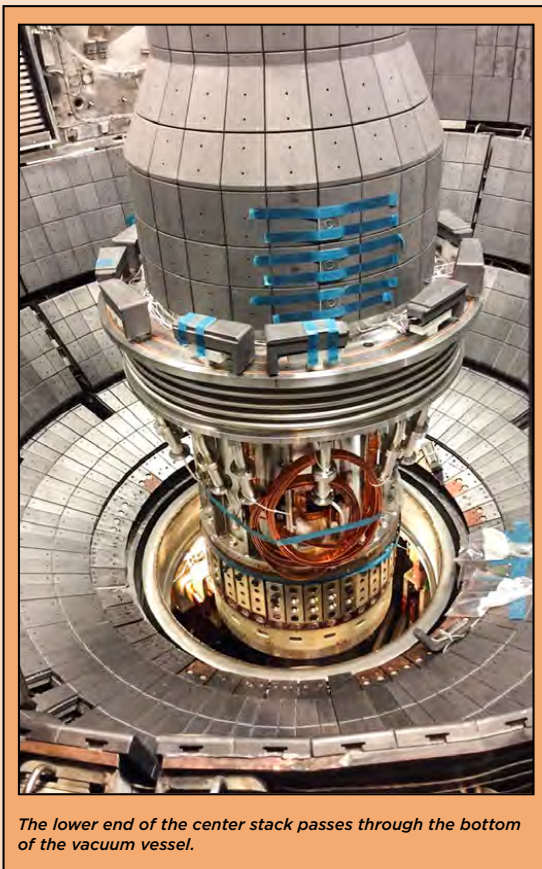


Technicians guide the center stack into the vacuum vessel.

Laboratory who were called on to pitch in. "We drafted everyone," Chrzanowski said.

Their tasks included sanding, brazing, welding and applying insulation tape to each of the 36 copper conductors that went into the center stack, and bundling them all together through multiple applications of vacuum pressure impregnation — a potentially volatile process. Next came fabrication and winding of the ohmic heating coil that wraps around the bundle to put current into the hot, charged plasma that fuels fusion reactions.

"Everyone who worked on this feels a lot of pride and ownership," Raftopoulos said. "Steve and I were the conductors, but the technicians were the orchestra," Chrzanowski said. "We've got to give credit to the guys who actually build the machines. They take our problems and make them go away."



The lower end of the center stack passes through the bottom of the vacuum vessel.



An overhead crane raises the center stack above the shielding wall.

Completion of the upgrade now rests with technicians working under engineer Erik Perry. Their jobs include connecting the center stack to the facility's outer coils to complete a donut-shape magnetic field that will be used to confine the plasma. The work calls for installation of layers of custom-made electrical equipment plus hoses for water to cool the coils, all of which must fit around diagnostic and other equipment. Also ahead lies the task of completing the connection of a second neutral beam injector for heating the plasma to the vacuum vessel. "It's like a big puzzle," said Perry. "Everything must fit together, and that's what we excel at." 📷

## N.J. innovators

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also cited his inspiration for space-based telescopes like NASA's Hubble Space Telescope and Spitzer Space Telescope that allow scientists on earth to view clear images of the cosmos.

PPPL's Director of Communications Kitta MacPherson accepted the award to Spitzer on behalf of PPPL Director Stewart Prager. MacPherson said that everyone at PPPL "from scientists to CPAs is working on the world-changing quest to bring fusion to fruition."

More than 600 people attended the award ceremony, which was part of the New Jersey Chamber of Commerce's celebration of "350 years of innovation" in the state. This year marks the anniversary of the founding of the British colony. The colony was named New Jersey in 1664 in honor of Sir George Carteret, governor of the Isle of Jersey. Representatives from the Isle of Jersey attended the celebration.



*PPPL Director of Communications Kitta MacPherson and Robert Doherty, Second Vice Chair of the N.J. Chamber of Commerce Board of Directors, with the crystal Innovator's Award in honor of Spitzer that MacPherson accepted on behalf of PPPL. (Photo by Russ DeSantis/ Courtesy of N.J. Chamber of Commerce)*

One of the first speakers was Lieut. Gov. Kim Guadagno, who praised the inventors of numerous items in New Jersey that include bubble wrap, air conditioners and condensed soup. "We have more scientists and engineers in New Jersey than anywhere in the world," Guadagno said.

### RECALLING SPITZER'S CONTRIBUTIONS

In her acceptance speech for Spitzer, MacPherson noted that Spitzer wrote a classified paper making the case for a floating space observatory in 1946, more than a decade before the Russians launched the Sputnik satellite. He went on to lobby the government for a U.S. satellite. Those actions led to his being known as "the father of the Hubble telescope," she said.

MacPherson recounted the story of Spitzer coming up with the idea of a stellarator while on a ski lift in Aspen, Colo. That idea led to the founding of PPPL. Spitzer was also "the first to understand that stars continually die and are reborn," which became the basis of the field of stellar dynamics, MacPherson said.

MacPherson also recalled Spitzer's reputation at Princeton University for "prankish behavior." An avid mountain climber, he was famous for climbing up Princeton's graduate tower at age 60. When MacPherson asked Spitzer about the incident during a 1993 interview with him when she was a reporter for the Newark Star-Ledger, Spitzer quipped, "I just needed the practice."

She recalled a quote from Spitzer in a 1997 interview with the American Institute of Physics not long before his death. "I have a weakness of character – a fascination with the spectacular," Spitzer said. "But then I have a sort of theory about our weaknesses being our strengths."

"Fusion scientists have made extraordinary progress since the days of Dr. Spitzer's leadership," MacPherson said, "and we proudly carry on his work. On fusion, we say with certainty that, 'It isn't a matter of if, but when.'"

### TOP FIVE INNOVATORS INCLUDE EDISON & EINSTEIN

Spitzer was among 25 innovators in New Jersey history chosen by a team at the New Jersey Chamber of Commerce and the NJBIZ newspaper and was one of the top five innovators announced at the ceremony to receive special honors. David Sarnoff, whose work developing TV and radio made him the "father of broadcasting," was number six on the list and astronaut Buzz Aldrin, who walked on the moon, was number seven.

Spitzer was in good company in the list of top five innovators. Number four was a team of Bell Labs researchers who created the transistor; number three was Selman Waksman, the Rutgers professor who developed a powerful antibiotic to treat tuberculosis and other diseases. The Chamber named Thomas Edison as the number two innovator in New Jersey's history and Albert Einstein topped the list as the number one innovator.

Edison was cited for his prolific inventions that resulted in more than 1,000 patents in the U.S., including the light bulb, the phonograph and the motion picture camera. Edison was also one of the first to have a laboratory devoted to developing inventions. He was among the first to target his inventions to meet the needs of everyday people. In addition to his dozens of inventions, his great-grandson noted that he worked on a very early version of the electric car. Adrian Micu, president and CEO of Haier America, who announced Edison as the number two innovator, recalled his famous quote: "I have not failed. I just found 10,000 ways that would not work." His award was accepted by three of his great grandchildren and a great-great granddaughter.

### IZZO PRAISES PPPL MISSION

PPPL got a shout-out from Ralph Izzo, the president, CEO and chairman of PSE&G and the chair of the New Jersey Chamber of Commerce's board of directors. Izzo said he thinks of his time as a research scientist at PPPL in the early 1980s with "tremendous fondness." He added that he has

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## N.J. innovators

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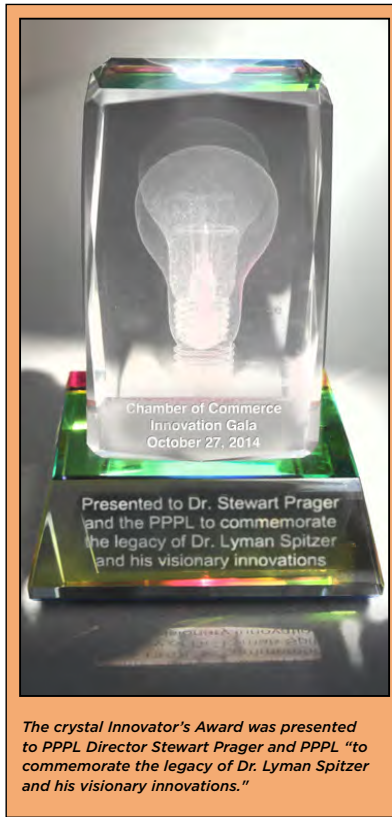
felt growing respect for the “young women and men” at PPPL who are “working tirelessly to create fusion energy.”

In announcing Einstein as the number one innovator in New Jersey history, Izzo noted that anyone who took physics in college would appreciate Einstein’s genius. He noted that among his numerous well-known achievements, his work on the nature of light led to the discovery of the photon.

Although most of his work was done in Europe before he settled in Princeton in 1933, Einstein attracted some of the greatest minds of the day to Princeton University and the Institute for Advanced Study, Izzo said.

### A HUMBLING OBLIGATION

Karen Jezierny, director of Public Affairs at Princeton University, accepted the award on behalf of Princeton University and the Institute for Advanced Study. “The opportunity to continue to be associated with the brilliance of Albert Einstein is a remarkably



humbling obligation,” Jezierny said. Jezierny said Einstein’s innovative spirit could be found in each of the 25 innovators recognized by the Chamber of Commerce.

The one top innovator on the list to attend the gala was John J. Mooney, an engineer from Paterson who developed the first three-way catalytic converter, which greatly reduced pollution from cars. The list also includes two other living innovators: astronaut Buzz Aldrin, of Montclair; and Pfizer researcher Lloyd Conover.

The top 25 list also includes several women, such as the late Alice Paul (No. 15), who helped win women the right to vote and who got a warm round of applause from the audience. Other women in the list include Beatrice Alice Hicks (No. 10), a pioneering engineer; Ida Cohen Rosenthal (No. 19), co-founder of the Maidenform intimate apparel company; and Alice Parker (No. 20), an African-American woman from Morristown who patented the home heating system in 1919. 📷

## Displays, designs and prizes at PPPL's America Recycles Day celebration Nov. 11

PPPL's Recycling Day celebration on Nov. 11 from 10:30 a.m. to 1 p.m. will feature displays, games, and prizes, an electronics recycling collection, and a new design contest for items made of recyclable, compostable and stock items or trash.

Among the displays will be one showing which areas of the Laboratory are doing the best job composting and recycling. There will also be a collection box from Terra Cycle for office items that can't be recycled.

There will be an electronics collection in the lower parking lot from 7 to 10 a.m.

Another new activity this year will be a game in which PPPL'ers can choose discarded items and toss them into the appropriate bucket for single stream, compost, trash, and warehouse buckets in order to earn points for prizes. The catch is that they will have to choose the right bucket.

There will also be a design contest in which PPPL'ers can design art work, inventions, fashion, or objects of any kind using materials from one of the following categories: recyclables (bottles, cans, paper, cardboard); compost (paper towels, recyclable trash bags, food and any cafeteria items); stock items (CDs), or trash (Styrofoam, candy wrappers).

Please contact Dana Eckstein [danae@pppl.gov](mailto:danae@pppl.gov) (ext. 2588) or Nicole Allen, [nallen@pppl.gov](mailto:nallen@pppl.gov) (ext. 2503) by Friday, Nov. 7 to register for the contest and discuss ideas.

The dresses will be displayed during a fashion show at 11:45 a.m. and at 12:30 p.m. on the day of the celebration. The designs will be on display throughout the celebration. PPPL'ers will be able to vote for the best dresses and the best designs. The winners will receive gift certificates to the Plasma Hutch and the cafeteria.

The first 150 people who sign the America Recycles Day pledge will receive a free thermal lunchbox made of recycled materials.

The cafeteria will host a Beach Party Barbecue in honor of PPPL's America Recycles Day and Veteran's Day, which is also Nov. 11. There will be hot dogs, hamburgers and side dishes and a few green items for Recycling Day. Anyone who wears a green shirt or a Hawaiian shirt will be entered into a contest to win cookbooks. 📷



Dana Eckstein shows off her dress made out of recyclable CDs during the fashion show at last year's America Recycles Day.

### Please bring the following items to recycle for the Terra Cycle box:

- Chip bags
- Broken staplers
- Dried magic markers
- Staple removers
- Pens
- Old eye glasses and goggles
- Transparencies
- Cloth and clothing
- Non-recyclable plastics

# A switch to CrashPlan PROe will keep files safe

PPPL is migrating away from its current backup solution, Netbackup, to a new more powerful system, CrashPlan PROe. To ensure continued backup of their computers, PPPLers should contact the Help Desk no later than Dec. 1 to make the switch if they haven't already done so.

The Help Desk can easily install the system remotely on computers (Call ext. 2275 or submit a ticket). Once installed, users can view their data on their smart devices by downloading the mobile app.

"CrashPlan PROe enables users to have greater interaction with their backups than they do today," said Marc Cohen, head of the User Support and Operations, which includes the Help Desk. "Users are able to easily review the status of their backups and initiate file restores."



The new cloud-based system allows users to back up their computers from anywhere as long as they have an active Internet connection. The included web interface allows users to access their data from any system with


To learn more about the features of CrashPlan PROe, please visit PPPL's knowledgebase article at:

<https://helpdesk.pppl.gov/home/default.asp?id=191>



a modern web browser. This feature can be particularly useful in the event that your computer crashes. Some 200 devices at PPPL are already using CrashPlan PROe and it is automatically installed on new computers.

Unlike the current system, CrashPlan PROe allows backups on both the wired and wireless networks. Another advantage is that backups now occur continuously throughout the day rather than just a few times a week. Advanced data compression techniques have also been implemented to make backups faster.

PPPL partnered with Princeton University to get CrashPlan PROe and was able to save half the usual cost of installing the system. Princeton University is already using the system on more than 3,000 computers on campus. CrashPlan PROe is also used at several other national labs including the Lawrence Livermore National Laboratory. 

## Arlene White at DOE's Small Business Kick-Off Forum



Arlene White, head of PPPL's Small Business program, poses with John Hale, director of the DOE's Office of Small and Disadvantaged Business Utilization (OSDBU) at the DOE's Small Business Kick-Off Forum on Oct. 22 at the DOE's headquarters in Washington. Nearly 300 small businesses attended the forum and White met more than 50 small business owners at the event.

**TFTR 20th Year Megawatt Anniversary Celebration Postponed** - The TFTR 20th Year Megawatt Anniversary celebration and colloquium originally scheduled for Nov. 14 has been postponed. Stay tuned for details about the new date and time.

## Putting PPPL on the (Apple) map

Chris Cane, PPPL's manager of digital strategy and visual communication, has literally put PPPL on the map. Cane took action after learning that users draw a blank when they request an address for the Lab on Apple Maps, which run on iPhones, iPads and Mac computers. He contacted the company and was able to get PPPL's address listed. Now visitors will be able to find their way to PPPL without getting lost.



## Open Enrollment continues through Nov. 14

PPPL's HR Director Paulette Gangemi announced recently that due to changes in PPPL's HR structure, Princeton University's Main Campus Human Resources office will handle PPPL's employee benefits.

**Open enrollment for benefits began on Oct. 20 and will continue through Nov. 14.** There are several changes to the Princeton Health Plan this year, including the addition of a new health plan and several incentive programs. More information is available at Princeton University's website <http://www.princeton.edu/hr/benefits/>.

PPPLers can call the University's Benefits Helpline at Main Campus (609) 258-3302 or email [benefits@princeton.edu](mailto:benefits@princeton.edu) with any questions or concerns.

Gangemi said the PPPL HR Office will continue to provide on-site support for managing leaves of absence (once an employee has called the helpline for first line questions and understands the process).

## COLLOQUIUM



### HTS and ARC for Fusion

PROFESSOR DENNIS WHYTE  
Massachusetts Institute of Technology

Wednesday, November 4

4:15 p.m. (Coffee/Tea at 4 p.m.)  
M.B.G Auditorium, Lyman Spitzer Building



## Travel reimbursement rates

PPPLers who travel for business are responsible for ensuring that they are using the proper meals and incidental expenses (M&IE) rate and must make sure they book a hotel that has rates that are at or under the hotel allowance amount set by the federal government.

The DOE's per diem reimbursement rates for domestic travel are based on the federal General Services Administration rates for the U.S. To find current rates in the continental United States ("CONUS Rates") go to the links below and search the city where you will be staying by city, state and zip code or by clicking on the map.

[CONUS DOMESTIC PER DIEM RATES](#)  
[Domestic Meal Allowance Deduction Table](#)

### Foreign Per Diem Rates

Foreign Per Diem rates are established monthly by the Office of Allowances as a maximum dollar amount. Lodging and M&IE (meals & incidental expenses) are reported separately followed by a combined daily rate.

Any location not listed for per diem under a country should be calculated at the "other" rate for that country, even if the location is a suburb of a city that is listed.

You can find information about foreign meals here:  
[Foreign Meal Allowance Deduction Table](#)

## SPD • TIP • OF • THE • WEEK

### Fall building evacuation drills and NEW EVACUATION MAP

In preparation for the Fall building evacuation drills, we are forwarding the below information to serve as reminders of our responsibilities as building occupants. The Site Protection Division (SPD) conducts evacuation drills for the Laboratory. Notice may or may not be given in advance of a drill, however, all building occupants who are on site during the drill are required to participate. Drills may include evacuation, lockdown or shelter-in-place procedures.

Information on the Building Evacuation Program may be found on the PPPL Employee Services Home Page:  
<http://siteprotection.pppl.gov/buildingevacuation.html>.

All staff and visitors should be familiar with building evacuation procedures, including your assembly area and your primary (and alternate) building evacuation monitor. Please identify the monitors for your office/area.

The Designated Evacuation Assembly Area Map has been updated with NEW evacuation assembly areas. Please locate your evacuation assembly area on the attached map. Note: A poster-sized version of the map may be found in the LSB Lobby.

Questions or concerns regarding the Building Evacuation Program may be directed to Capt. Kevin Rhoades ([krhoades@pppl.gov](mailto:krhoades@pppl.gov) / Ext. 3166).

# TIGER TROT

5K FOR HUNGER

## Friday, Nov 7th

### 3pm - Dillon Gym

T-shirts to the first 150 who pre-register by Mon., Nov 3rd

TO REGISTER GO TO: [WWW.PRINCETON.EDU/CAMPUSREC](http://WWW.PRINCETON.EDU/CAMPUSREC)  
 Email Form to: [jessward@princeton.edu](mailto:jessward@princeton.edu), or bring to Rm. 104 Dillon Hall.

RACE DAY REGISTRATION FROM 1:45 - 2:30 P.M.


Entrance fee is a non-perishable food item or donation to:  
 The Crisis Ministry of Princeton and Trenton

5K Run or Walk

## BROCK Café 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. 3 NOV.	TUE. 4 NOV.	WED. 5 NOV.	THU. 6 NOV.	FRI. 7 NOV.
<b>COMMAND PERFORMANCE CHEF'S FEATURE</b>	 Turkey Shepherd's Pie	 Cheese Manicotti served with Sautéed Zucchini	 Kielbasa with Braised Cabbage and Potato Pierogies	 National Nachos Day!	 Chicken Tikka Masala served over Rice
<b>EARLY RISER</b>	2 Eggs any Style, Choice of Meat, Potatoes and Toast	Sweet Potato and Collard Greens, Sausage and Egg Stack	Hash Brown, Egg & Cheese Wrap	Mushroom and Cheese Omelet	Pancakes served with a Variety of Toppings
<b>COUNTRY KETTLE</b>	Country Chicken Vegetable	Vegetable Bean	Harvest Sweet Potato Soup	Cream of Celery	Split Pea with Ham
<b>GRILLE SPECIAL</b>	French Bread Cheesesteak Hoagie	Monte Cristo with Ham, Turkey and Swiss Cheese	Shrimp Po' Boy	Buffalo Chicken Wrap	Grilled Cheese with Roasted Vegetables on Rye
<b>DELI SPECIAL</b>	Broccoli, Peppers, Onions and Cheddar Wrap	Pastrami and Swiss with Coleslaw and Mustard on Rye	Blackened Chicken Caesar Salad	Tuna Salad with Olives, Roasted Peppers and Celery on Multigrain Roll	Tandoori Chicken Salad on Naan Bread
<b>PANINI</b>	Glazed Ham on Ciabatta Bread with Cheddar and Mustard	Seafood Quesadilla	Turkey with Cream Cheese, Cheddar, Scallions, Roasted Peppers and Salsa	Portobello with Roasted Peppers, Spinach and Provolone on Ciabatta Bread	3 Cheeses, Sautéed Peppers and Onions 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: **Dan Fernandez**  
 Photography: **Elle Starkman** ♦ 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 Thursday. Other stories should be submitted no later than noon on Wednesday. Comments: [commteam@pppl.gov](mailto:commteam@pppl.gov) ♦ PPPL WEEKLY is archived on the web at: <http://w3.pppl.gov/communications/weekly/>.