

## At PPPL THIS WEEK

MONDAY, OCTOBER 14

**Andlinger Center for Energy and the Environment Seminar**  
4:30 p.m. ♦ Computer Science Auditorium 104

Plant Biotechnology for Biofuels  
Prof. Marcus Pauly, Univ. of California

WEDNESDAY, OCTOBER 16

**PPPL Colloquium**  
4:15 p.m. ♦ MBG Auditorium  
One Second After the Big Bang  
Christopher Tully, Princeton University

SAT.-SUN., OCTOBER 19-20

**Lyman Spitzer Conference**  
Dept. of Astrophysical Sciences  
Peyton Hall, Princeton University

### UPCOMING EVENTS

October 21  
**Open Enrollment Begins**

October 26  
**Boy Scout Merit Badge Fair**

Oct. 28 - Nov. 1  
**Max Planck Princeton Research Center for Plasma Physics Meeting**  
Oct. 28 - 29 at PPPL  
Oct. 30 - Nov. 1 at Princeton Univ.

November 4  
**United Way Campaign begins**

November 6  
**Health Fair at PPPL**  
10 a.m. - 2 p.m. ♦ LSB Lobby

November 11-15  
**55<sup>th</sup> Annual Meeting of the APS Division of Plasma Physics**  
Denver

### Director's Corner

## An update on the federal government shutdown



By **STEWART PRAGER** — Director, Princeton Plasma Physics Laboratory

Dear PPPL'ers:

With the lapse in federal funding now entering its third week, we are further scrutinizing all expenses and reducing costs. We are intensifying our efforts to reduce travel, procurements, and discretionary spending in general. Although we have funds to maintain laboratory operations for the near future, the uncertainty in the length of the partial government shutdown implies that we should be very conservative in our expenditures.

Various federal agencies have temporarily furloughed employees. The Department of Energy is handling the situation in each national laboratory on a case-by-case basis as each laboratory differs in its financial details and mission requirements. Some laboratories may have to furlough employees very soon, and some may not. Because this is a fluid situation and we want to prepare for any eventuality, we are planning for several scenarios that include the possible shutdown of the laboratory earlier than anticipated if it is warranted by events. While we are cutting back on expenditures, we are also doing everything we can to avoid furloughs and maintain our essential mission elements. Of course, under no circumstance will safety be compromised during this time of stress.

Thank you for your continued focus on your work during this difficult time. We will keep you updated as the situation evolves.

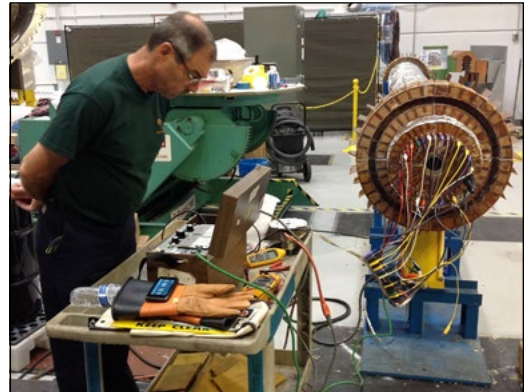
Sincerely,

*Stewart C. Prager*

## Total success: Newly formed NSTX-U magnetic field coils pass crucial test

By John Greenwald

**A**n elated team of engineers and technicians who are fabricating the center stack for the National Spherical Torus Experiment Upgrade (NSTX-U) witnessed the success of their work last week as their efforts easily passed a key electrical insulation test. The full bundle of 36 magnetic field conductors that the team completed this month proved its ability to keep high-voltage current separate in each coil. This showed that the bundle was fit for the advanced fusion experiments that scientists will run on the NSTX-U.



Technician Colin McFarlane performs an electrical test to verify the integrity of the insulation.

(Photo by Jim Chrzanowski)

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## PPPL team beats the clock on ITER electrical system contracts

By Jeanne Jackson DeVoe

**A** PPPL team worked furiously up to the 11th hour in order to meet important deadlines to procure vital electrical components from manufacturers across the world for an electrical system providing power to the 500-megawatt industrial scale international ITER fusion experiment in Cadarache, France.

The 12-member team had to work through challenging technical requirements and a thicket of paperwork, legal requirements and approvals from multiple agencies in order to award contracts for eight separate procurements — from factories as far away as South Korea and as close to home as Pennsylvania — worth a total of \$12.5 million.

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## NSTX-U coils

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“This was a very big deal and all eyes were watching,” engineer Ron Strykowski, who heads the NSTX-U project, said of the insulation check. “This major achievement stemmed from the hard work and dedication of everyone on the coil fabrication team,” Strykowski said. “And we would not be where we are without the continued support of the PPPL Emergency Safety Unit and the departments of Safety and Quality Assurance/Quality Control.”

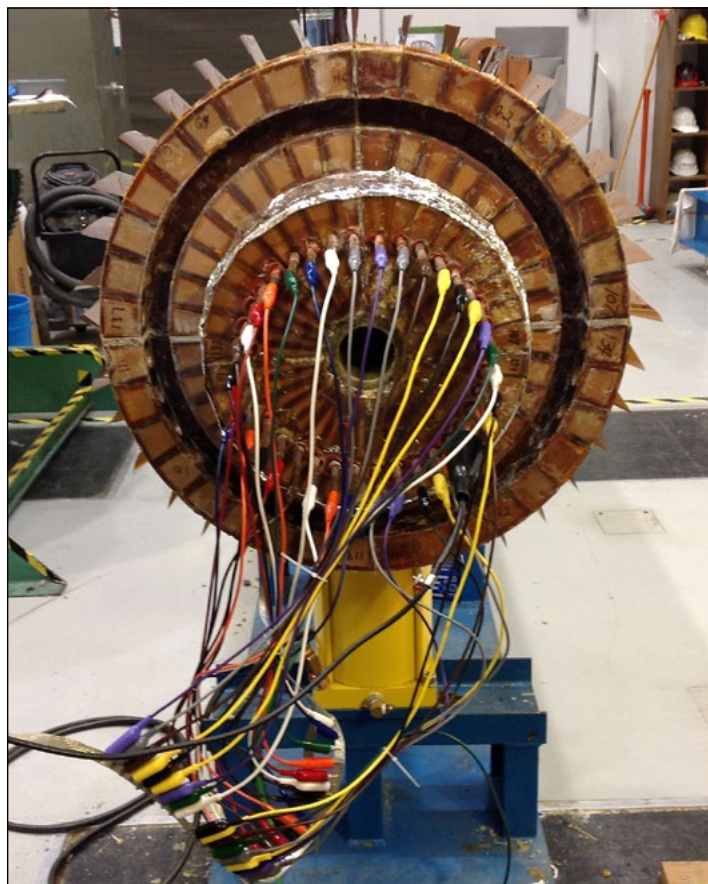
The successful test capped some 18 months of work on the bundle, which included tasks ranging from soldering cooling tubes into each 20-foot-long, 350-pound copper coil and sandblasting, priming and wrapping each one with fiberglass glass tape. Technicians assembled these coils into nine-unit quadrants and used a potentially volatile process called vacuum pressure impregnation (VPI) to first seal and insulate each quadrant and then bind them all together into a nearly 20,000 pound cylindrical whole.

### Teamwork

Strykowski stressed the teamwork that made all these steps possible. Among those closely involved were technicians Buddy Kearns, who led the VPI process; Steve Jurczynski, who led the soldering; and Mike Anderson, who headed the sandblasting, priming and fiberglass-wrapping operations. Also essential to the success of the work were members of the PPPL tech shop, whose services ranged from making and modifying conductor components to creating new tools.

The culmination of this Lab-wide effort created “a feeling of relief and happiness that all the work over the past year-and-a-half has been successful,” said Jim Chrzanowski, the center stack lead engineer. “Now we move on to our next adventure and challenges.”

Those challenges include winding a nearly 15-foot-long ohmic heating coil around the bundle of conductors and sealing coil onto the bundle through a final VPI process that is scheduled for early next year. “We all feel great about where we are, but now there’s another mountain

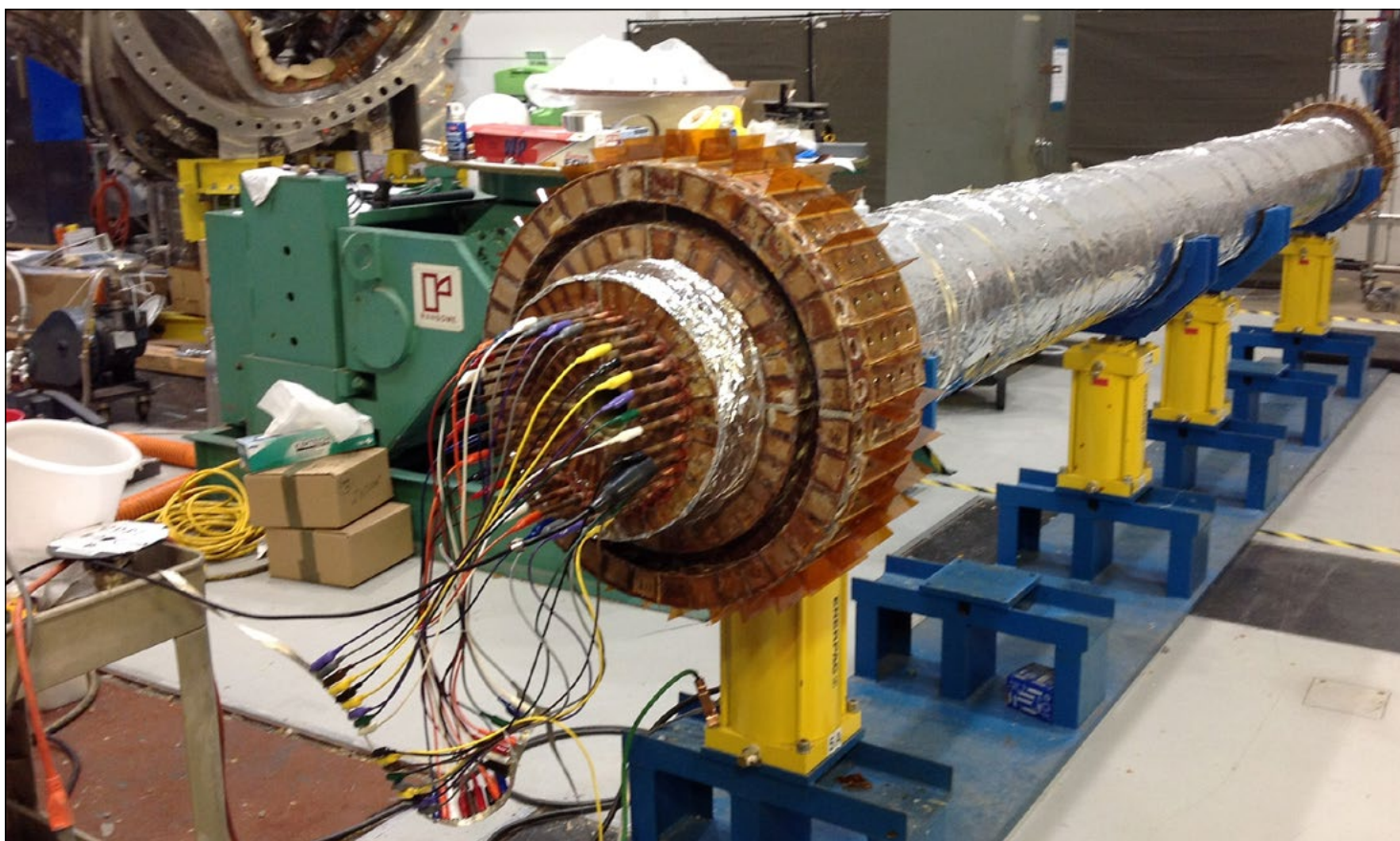


*Testing the ground wall — or outer layer of insulation — for the full bundle.*

(Photo by Jim Chrzanowski)

to climb,” Steve Raftopolous, who co-directed construction of the bundle with Chrzanowski, said of winding and sealing the ohmic coil that will heat and put current into the plasma that fuels fusion experiments.

Leading these experiments will be physicist Jon Menard, program director for the NSTX-U. “This is definitely a major milestone,” Menard said of the successful insulation test. “This center stack will enable us to explore new physics by putting twice as much current into the machine, and have a five-times greater pulse length than a spherical tokamak has ever been able to achieve before.” 📷



*Testing all 36 copper conductors and the four quadrants at once.*

(Photo by Jim Chrzanowski)

## ITER contracts

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Procuring the components for the steady state AC electrical network or SSEN is essential for the ITER project in order to provide power during the construction of buildings and the commissioning of systems at the 103-acre site where the massive international fusion experiment is set to begin plasma operation in the 2020s. The electrical network will power everything from the gigantic pumps and compressors for the cooling water system and cryogenic plant, all the way down to the lights and heating and air conditioning for the 39 buildings at the site.

### A crucial “milestone”

By working hard to meet the Sept. 30 deadline, the team can check off a crucial “milestone” in its goal of having the electrical components in place at ITER by the fall of 2015 that are needed to power the systems as they are commissioned at the ITER site. Meeting the milestone also means PPPL will receive an incentive fee for meeting its obligations on time.

“The staff have put in a heroic effort to try to meet the Laboratory’s commitments in the US ITER project in the face of some very unusual and complex obstacles that arose,” said Rodney Templon, head of procurement at PPPL.

The machinery the PPPL team is procuring will be used to build a 400 Kilovolt (kV) electrical substation (a kilovolt is equal to 1,000 volts) for the electrical system that supplies the SSEN loads. Another electrical system, the Pulse Power Electrical Network or PPEM, being provided by the Chinese Domestic Agency, will provide pulse power to the ITER tokamak itself. PPPL is fulfilling the U.S. obligation to provide 75 percent of the equipment for the SSEN project, as part of the U.S. contribution to ITER. The European Union Domestic Agency provided the SSEN design and will contribute 25 percent of its materials, as well as install both the SSEN and PPEM systems.

Charles Neumeyer, the Team Leader of the SSEN, was involved early on with the design of ITER in the 1990s and has been called upon several times to lead “expert groups” and chair design reviews related to the more exotic AC/DC converter and high power switching systems that make up the ITER power supplies. Neumeyer said he is glad to be contributing to a project that aims to prove the feasibility of fusion as an energy source. “ITER is a grand technological challenge and I’m amazed by it. I’m committed to make it work,” he said.

The SSEN components the team is procuring are standard commercial items, not nearly as complex as other parts of the ITER power supply systems or the ITER diagnostic systems and in-vessel coils being designed by other PPPL teams. However, because the SSEN is the first US ITER sys-



Charles Neumeyer, third from right, visited Hyundai Heavy Industries in Ulsan, South Korea, from Sept. 25 to 27 as part of the a manufacturing readiness review for ITER’s Steady State Electrical Network. From left: Paul Russman, a PPPL consultant; Supriya Nair, ITER IO Technical Responsible Officer; Jin Ho Kang, Manager, Hyundai Heavy Industries; Joel Hourtoule, ITER IO Electric Power Distribution Section Head; Charles Neumeyer, PPPL, USDA Technical Responsible Officer; So Young Lee, Manager, Hyundai Heavy Industries; and Ajoy Das, URS Corporation, Engineering Support Subcontractor to PPPL.

(Photo courtesy of Hyundai Heavy Industries)

tem to embark on a large-scale procurement of commercial items in the international marketplace, it was the first to encounter various obstacles and had to develop solutions as the process unfolded. It also proved to be quite challenging to negotiate the terms and conditions of contracts for ITER procurements because of the unique requirements for ITER and the fact that most of the suppliers were located in other countries and time zones. As a result, each SSEN contract took several months to finalize.

### Intense negotiations with manufacturers

The team approved its first contract in June but the other seven were held up by the terms and conditions negotiation process, Neumeyer recalled. “As the deadlines approached, the situation became quite nerve-wracking,” he said.

Templon and Neumeyer credit Natalya Gnyp, a subcontract administrator in Procurement who worked as the RFP coordinator for the group, for getting the last of the contracts over the final hump. Gnyp said there were still no agreements the Friday before the deadline on Monday, Sept. 30. She and other team members worked late on Friday and Gnyp came in on a Saturday night and worked from 6 p.m. to 1 a.m. By Monday at 4 p.m., the contracts were signed. “It was three days and we accomplished something that usually takes three weeks,” she said.

The team began its work in earnest in September of last year when US ITER signed the SSEN “Procurement Arrangement” (PA) document with the ITER International Organization, which defined the scope of work and divided the SSEN procurements into 16 groups of components that could be purchased from separate suppliers. The SSEN group at PPPL then prepared technical specifications, issued lengthy requests for proposals and reviewed



An overhead photo of the 103-acre ITER site shows the location of the SSEN substation in relation to the tokamak.

(Photo courtesy of the ITER International Organization)

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# ITER contracts

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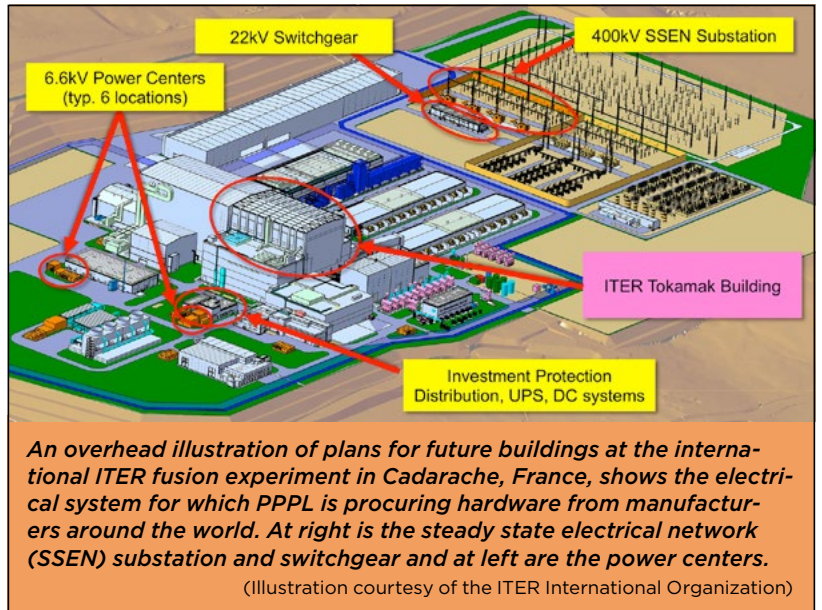
the dozens of proposals that came in from suppliers around the world. They then evaluated the proposals and recommended which manufacturers should be awarded the contracts. After making their recommendation, they had to negotiate the terms and conditions before writing and finally signing the contracts, which had to be approved by the DOE Princeton Site Office, the Office of the General Counsel of Princeton University, as well as the US ITER Project Office at Oak Ridge National Laboratory and the ITER International Organization in France.

John Dellas, the lead electrical engineer for the project, also plays a central role in the projects. Before coming to PPPL, Dellas worked at the ITER site in France where he was the design coordinator for the power supplies at ITER. He previously worked on two of the world's largest subway systems: the New York subway system and the London Underground. "It was a big relief that we met all the goals and we hope that everything can proceed onward without any hiccups," he said.

### Unique requirements

One of the biggest roadblocks was the negotiation of contractual terms and conditions with the suppliers, which are dictated by requirements set forth by DOE, the US ITER Project Office and the ITER International Organization in France. Some of the requirements, such as intellectual property disclosure and agreement, are unique to ITER and the suppliers were sometimes stymied, especially when many of the suppliers spoke different languages.

Neumeyer recalled that when he was frustrated by the delays in reaching an agreement with Alstom, an international company based in Lyon, France, he called the company on a Friday evening requesting a videoconference with the company's lawyer the following Monday. To his amazement, company representatives were so eager to resolve the matter that they decided to fly in over the weekend for the Monday meeting with their lawyer in tow. They spent the next three days negotiating, finally coming to an agreement on Wednesday. The attorney from the Office of the General Counsel of Princeton University, Kevin Licciardi, played a key role. "We needed to gather together all the stakeholders and the deciders," Neumeyer said.



### No time to pause

With the first eight contract agreements signed, the team members have no time to rest on their laurels. Another eight have to be awarded during Fiscal Year 2014, and once the contracts are awarded the group must make sure the contracts are executed properly. They are holding "kick-off meetings" by videoconference with the selected suppliers to outline the work and the milestones they must meet during the manufacturing process. PPPL has subcontracted with the URS Corp., based in Princeton, to provide engineers and quality control inspectors who will oversee much of the work at manufacturing sites around the world.

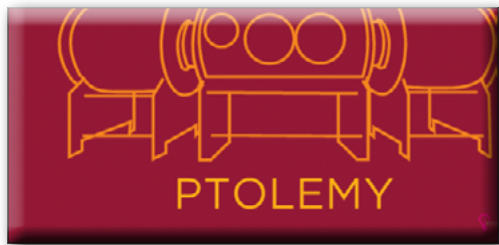
Team members may also visit the sites themselves if necessary. For example, Neumeyer, along with an engineer from URS, recently visited Hyundai Heavy Industries in Ulsan, South Korea, (the same company that makes automobiles), to take part in a manufacturing readiness review for the four huge substation transformers that supply the SSEN system.

The contracts have thus far been awarded to suppliers with manufacturing plants in Korea, France, Italy, Mexico, the Netherlands; and Pittsburgh, all of which should be finished with equipment deliveries before the end of Fiscal Year 2015. Meanwhile, the team will have to award another eight contracts totaling nearly \$20 million in Fiscal Year 2014, bringing the total of SSEN awards to \$32.5 million. Each contract is at a different stage and each has individual "milestones" to meet over the next year, including ones coming up in December and next March. "They're all different ages," said Gnyp, "and some are just babies." 📅



Members of PPPL's SSEN procurement team: From left to right: Skip Schoen, John Dellas, Natalya Gnyp, Charles Jacomino, of the URS Corp.; Charles Neumeyer, Team Leader; Kathleen Lukazik, Frank Malinowski, Ajoy Das, of the URS Corp.; Emil Nassar and Tom Egebo. Not pictured are Larry Sutton and Chi-Man Cheung.

# COLLOQUIUM



## One Second After the Big Bang

**CHRISTOPHER TULLY**  
Princeton University

**Wednesday, Oct. 16**

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

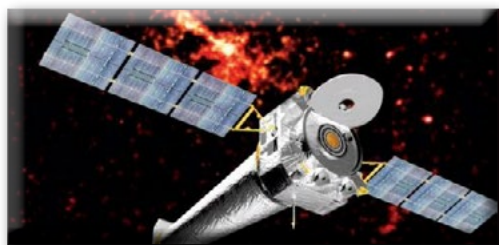
# PREVENT KITCHEN FIRES

GO TO [FPW.ORG](http://FPW.ORG) AND GET COOKIN' WITH FIRE SAFETY!



Due to inclement weather last Friday  
**FIRE PREVENTION WEEK ACTIVITIES**  
have been rescheduled to  
**Monday, Oct. 14 from 11 a.m. to 2 p.m.**  
in the LSB Loop and LSB Lobby.  
Learn about fire safety.  
There will be a fire hose demonstration  
with a hose house,  
PPPL Fire Engine 66 and  
a fire extinguisher demonstration.

# COLLOQUIUM



## Space Weather

**JACOB BORTNIK**  
University of California - Los Angeles

**Next week • Wednesday, Oct. 23**

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

## OPEN ENROLLMENT BEGINS OCT. 21

Open enrollment for health benefits will be from Oct. 21 through Nov. 15. You should receive the 2014 Annual Benefits Open Enrollment packet at home by the start of open enrollment and you can also view the packet online at [www.princeton.edu/hr/oe](http://www.princeton.edu/hr/oe) starting Oct. 21.

The PPPL Health Fair will be held on Nov. 6 from 10 a.m. to 2 p.m. and representatives from various health care providers will be on hand to answer your questions.

Representatives of two free programs, My Health Coach and My Medical Expert, will give a presentation in the MBG auditorium at 11 a.m.

# 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

COMMAND PERFORMANCE  
CHEF'S FEATURE

**MON. 14**  
OCT.



**SEAFOOD STUFFED PORTOBELLO MUSHROOM OVER PASTA WITH A SPINACH CREAM SAUCE**

Corned Beef Omelet with Home Fries

**TUE. 15**  
OCT. **COLUMBUS DAY**



**HOMESTYLE MEATLOAF W/ MASHED POTATOES & VEG.**

Garden Omelet

**WED. 16**  
OCT.



**PASTA PRIMAVERA W/ GARLIC BREAD**

Pancakes with Choice of Breakfast Meat

**THU. 17**  
OCT.



**CARVED ROAST BEEF WITH MASHED POTATOES AND ROASTED VEGETABLES**

Tomato, Onion, Peppers, Garlic, Herbs Omelet

**FRI. 18**  
OCT.



**FRIED TILAPIA WITH RICE PILAF AND VEGETABLE**

Chocolate Chip Pancakes

EARLY RISER

Italian Wedding Soup

COUNTRY KETTLE

Turkey Meatball Parmesan Torpedo

GRILLE SPECIAL

Greek Olive, Cucumber, Romaine & Artichoke on Pizza Dough

DELI SPECIAL

Pepperoni & Provolone Ciabatta

PANINI

½ Sandwich, Small Soup or Salad, Chips, 12 oz. Soda

Minestrone

Fish Fillet Sandwich

Cheese Combo Sub

Corned Beef Reuben

2 Slices Pizza, Bag of Chips, 12 oz. Soda

Sausage Chicken Gumbo

Double Decker Mushroom Swiss Burger

Egg Salad Club Sandwich

BBQ Meatloaf & Cheddar on a Kaiser Roll

Cheeseburger, French Fries, 12 oz. Soda

Chicken Noodle

Cheesesteak Hoagie

Classic Turkey Club

Portobello, Chicken, Mozzarella & Roasted Peppers Ciabatta

2 Hot Dogs, French Fries, 12 oz. Soda

Tomato Bisque

Grilled Cheese with Bacon & Tomato

Turkey Pastrami, Swiss & Coleslaw on Rye

Vegetable Panini

Meatball Sandwich, Potato Chips, 12 oz. Soda

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**  
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