

At PPPL THIS WEEK

WEDNESDAY, AUGUST 27

Yoga Class (held weekly)
Noon - 1 p.m. ♦ LSB Commons

Carolyn J. Cohen, Jaya Healing Arts

UPCOMING EVENTS

September 1

Lab Closed
Labor Day Holiday



September 10
Princeton University
First Day of Classes

September 24
PPPL Colloquium
4:15 p.m. ♦ MBG Auditorium
To be announced

October 27-31
**56th Annual Meeting of the
APS Division of Plasma Physics**
New Orleans

Neilson visiting German stellarator Gates serving as Interim Head

By Jeanne Jackson DeVoe

Hutch Neilson, PPPL's head of Advanced Projects, is saying "auf wiedersehen" to the Lab for the next several months as he travels to Greifswald, Germany, where he will be paving the way for future U.S. researchers to participate on the Wendelstein 7-X (W7-X) program as the experiment begins preparing for operations next year.

David Gates, a principal research physicist and the stellarator physics leader at PPPL, will be serving as Interim Head of Advanced Projects in Neilson's absence.

Neilson's new position comes after the U.S. Department of Energy and the European Atomic Energy Commission signed an agreement in June establishing a long-term partnership with the Max Planck Institute for Plasma Physics (IPP) and PPPL, Oak Ridge National Laboratory and Los Alamos National Laboratory. The agreement names PPPL as the lead institute for the U.S. collaboration on the W7-X.

The device will be the largest stellarator in the world. Stellarators are fusion devices that are different from the more prevalent donut-shaped tokamaks like PPPL's National Spherical Torus Experiment (NSTX). Both stellarators and tokamaks create a highly charged, super-hot gas called a plasma to cause a fusion reaction. But in tokamaks, researchers drive a current through the plasma to create the magnetic field lines that contain the plasma. The current can

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Hutch Neilson



David Gates

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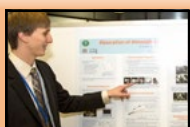
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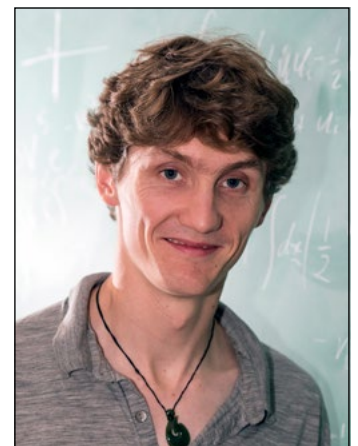
Jonathan Squire wins Princeton University Honoric Fellowship

By John Greenwald

Graduate student Jonathan Squire has won a highly competitive Honoric Fellowship from the Princeton University Graduate School. The award, for which Squire was nominated by the Princeton Program in Plasma Physics at PPPL, recognizes outstanding performance and professional promise and provides tuition and a stipend to fellowship winners.

"I'm honored to have been nominated and awarded the fellowship," said Squire, a native of New Zealand who is entering his fifth year of graduate study at Princeton. "It will definitely help in allowing me to focus more on my thesis research," since fellowship winners are required to spend full time on their research and not engage in teaching.

The fellowship is a tribute to Squire's "excellent academic accomplishments and the promise of a consequential dissertation," said Amitava Bhattacharjee, head of the PPPL Theory Department and Squire's thesis adviser.



Jonathan Squire

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produce chaotic swirls called “disruptions” that can halt a fusion reaction. Stellarators, on the other hand, are built with twisting, cruller-shaped magnetic field coils on the outside of the device. The magnetic field coils produce a three-dimensional, steady magnetic field in the plasma. This means the plasma is not subject to the same kind of disruptions found in plasmas produced in tokamaks. Some researchers say this advantage makes stellarators a promising technology for developing fusion energy as a source of electric energy.

A long-term partnership

Under the agreement, American scientists will help commission W7-X, and conduct research using the device, analyze data, present papers at conferences and oversee graduate students in their scientific investigations. The U.S. participants, including PPPL, will provide equipment to allow scientists to analyze the properties of the plasma. Participants also will contribute data to the W7-X database and provide any necessary expertise to advance science.

PPPL designed and delivered five massive trim coils for the W7-X that will fine-tune the shape of the plasma in experiments aimed at studying the conditions necessary to produce fusion energy. Now PPPL physicists are working on diagnostics and simulation tools to prepare for research on the machine. The U.S. contributions to the project, though small in dollar value compared to the overall cost of the facility, form the basis for a real partnership in which the U.S. scientists will be part of the W7 X team and have a voice in the research planning.

“The real payback will be in the form of science,” Neilson said. “We’re in this to have the opportunity to do research on this facility in collaboration with the IPP and its other partners. What’s in it for us is the science that we’ll get out of it and make available to ourselves and the world.”

Managing the U.S. program

As the program technical coordinator for the U.S., Neilson will be in charge of managing the U.S. program at W7-X and “proposing and recommending research objectives,” according to the agreement. Neilson said his primary responsibility would be to make it easier for U.S. researchers to take long-time assignments at the facility. He had to arrange numerous details for his own trip. He learned, for example, that long-term visitors like him, who are being paid by institutions at home, do not have to pay German taxes as one document stated. Neilson has already put together a FAQ sheet for researchers with advice on how to handle some of these arrangements.

Since 2010, the Department of Energy has provided over \$12 million in funding to PPPL, ORNL, and LANL for this collaboration, and has agreed to a budget of \$2.5 million to fund the collaboration in the next fiscal year. The project will cost more than \$1.4 billion to build.

Neilson’s wife Linda traveled with Neilson to Germany. She recently retired from her job as an office manager at Applied Educational Research, where she worked for 24 years. Their children are grown.

Gates taking the reins

Gates took over the position at the end of June and Neilson arrived in Germany on July 16. Neilson said he wouldn’t be able to take on such an assignment without someone like Gates to take the reins. “I could not have



Hutch Neilson in Germany.
Photo courtesy of H. Neilson

even considered it if there were not a capable leader like David Gates to take over in my absence,” he said. “Under Dave’s leadership, I know the department will be in good hands.”

As temporary head of Advanced Projects, Gates will take on numerous administrative tasks during Neilson’s absence. “There’s a fair number of departmental responsibilities,” he said.

Gates said one major difference for him is that he’ll no longer be able to walk down the hall to talk to Neilson about their research projects or anything else that comes up. “Hutch always encouraged me to have an impact on the program’s direction,” Gates said. “The difference is I used to go talk to Hutch

about these things and now I won’t be able to do that.”

Gates and Neilson have led efforts to build a new stellarator program through international collaborations. In addition to W7-X, they have also worked on the Large Helical Device (LHD) project in Japan.

Tools for W 7-X

Gates, along with Novimir Pablant and Sam Lazerson, has been working on tools that will be used after the W7-X begins operation. Pablant has been conducting research using diagnostic tools that include an X-ray imaging crystal spectrometer. Lazerson and Gates have been calculating whether the field coils built by PPPL affect the magnetic configuration as researchers predicted. These calculations will help determine how the coils can control the plasma performance.

Gates will continue his research while he assumes new responsibilities. He is in charge of the control system development on the NSTX-U, which is expected to begin operating early next year. These systems coordinate computer software programs developed through collaboration with General Atomics. The tools employ real-time data to generate the commands that control the power supplies, neutral beams, high-frequency waves, and gas input of the plasma during experiments.

Gates plans to continue collaborating with Luis Delgado-Aparicio investigating a physical phenomenon limiting fusion reactions. They found that magnetic islands, small bubble-like regions that appear in the hot charged gases formed during magnetic fusion experiments, can cool the plasma and cause a “density limit” that can prevent fusion reactors from producing as much power as possible. The American Physical Society cited this type of research when it named Gates an APS fellow last fall, an honor given to only one half of 1 percent of all APS members each year.

Gates also plans to work with other researchers at PPPL to analyze data from NSTX recording the process by which neutral beam energy in NSTX heats plasma. He and other researchers want to understand how efficient this mechanism is. The data will be used to test the theory and model the effects of Alfvén waves produced during neutral beam injection.

Gates will no longer be able to stroll down the hall to chat with Neilson to share ideas. But he is sure he will remain in touch with him via telephone, email or video chat. “We’ll still talk about that stuff,” Gates said. “And I don’t imagine the relationship will change because we’re all fairly collaborative.” 📞

Jonathan Squire

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Squire is developing a new theoretical insight into the growth of magnetorotational instability, a subtle process that appears to control the flow of matter around black holes and has implications for the creation of celestial bodies. The process takes place when matter in the form of magnetized plasma rotates around celestial objects and is drawn into them when the rotation grows unstable. "This is an astrophysical issue but our methods of approaching the problem could also prove very useful in fusion research," said Squire.

Squire's award marks his second major fellowship for graduate study. He came to Princeton on a three-year International Fulbright Science & Technology Award after graduating with honors in physics from the University of Otago in Dunedin, New Zealand, where he also studied the cello — an instrument he first took up at the age of 8 and still plays. Other recreational activities when he is not doing physics include rock climbing at the Mohonk Preserve near New Paltz, N.Y.

Squire becomes the second student in the Program in Plasma Physics to win an Honoric Fellowship in as many years, and the 18th winner to come from the program since 1991. Vassily Geyko, whose research on spinning and compressing plasmas is advised by Graduate Program Director Nat Fisch, received an Honoric Fellowship last year.

Several past winners are now members of the PPPL staff. They include Jonathan Menard, program director for the National Spherical Torus Experiment, who received the award in 1997; Joshua Breslau, a research physicist in the PPPL Theory Department who won a fellowship in 2000;

Honoric Fellowships Winners from the Program in Plasma Physics

<u>Student</u>	<u>Academic Year</u>
Steven Cowley	1991
Peter Beiersdorfer	1992
Dong-Eon Kim	1993
Chang-Hee Nam	1994
Alain Brizard	1995
Donald Roberts	1996
Jonathan Menard	1997
Dmitri Uzdensky	1998
Stanislav Boldyrev	1999
Joshua Breslau	2000
Daniel Clark	2001
Ilya Dodin	2003
Artem Smirnov	2004
Nathaniel Ferraro	2007
Mikhail Dorf	2008
Paul Schmit	2011
Vasily Geyko	2013
Jonathan Squire	2014

and Ilya Dodin, a 2003 winner who is a research physicist in the Theory Department and a lecturer in the Program in Plasma Physics. (See the chart above for the complete list of Program in Plasma Physics winners since 1991.)



TSA Enhances Security at International Airports for U.S. Bound Flights

The U.S. Secretary of Homeland Security directed the Transportation Security Administration (TSA) last month to enhance security at overseas airports that have direct flights to the United States. Travelers may be subjected to additional screening, which is described below:

- U.S.-bound passengers may be asked to turn on their electronic devices to prove that they work and are not explosives. TSA will not allow electronic devices onto planes if they do not power on.
- Passengers may see increased scrutiny of shoes and electronics, additional use of scanners that are designed to detect explosives and/or another stage of screening at boarding gates.

More information is available on the travel website: travel.pppl.gov under Helpful Security Links or on the TSA Home Page: www.tsa.gov and on the TSA's mobile app "Travelers On-the-Go," available at www.tsa.gov/mobile. You can also download the native iOS and Android versions of the My TSA App on [iTunes](https://itunes.apple.com/us/app/my-tsa-app/id888888888) and [Google Play](https://play.google.com/store/apps/details?id=com.tsa).

Source: <http://www.tsa.gov/traveler-information>
<http://www.dhs.gov/news/2014/07/02/statement-secretary-johnson>

Plainsboro Library patrons tour PPPL



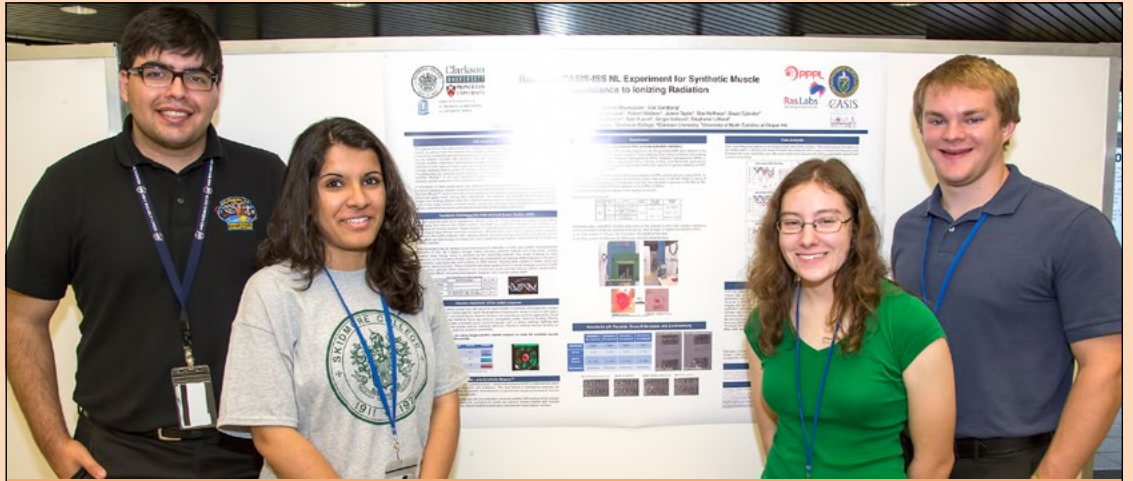
Sana Ahmed is all smiles as she touches the Van de Graaff generator in the LSB auditorium during a tour of Plainsboro Library patrons on Aug. 12. About 60 people toured the Lab.



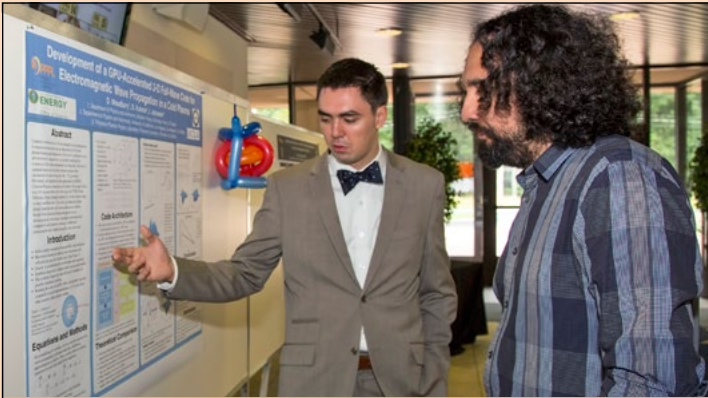
Physicist Erik Gilson shows visitors the stellarator model during the Aug. 12 tour.

Poster session highlights college interns' research

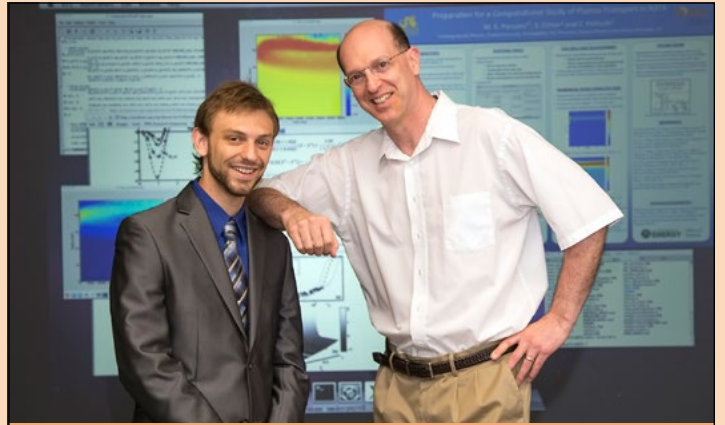
About 25 interns from colleges all over the country worked on research at PPPL this summer. They presented their results to PPPL researchers and staff members at a poster session on Wednesday, July 13.



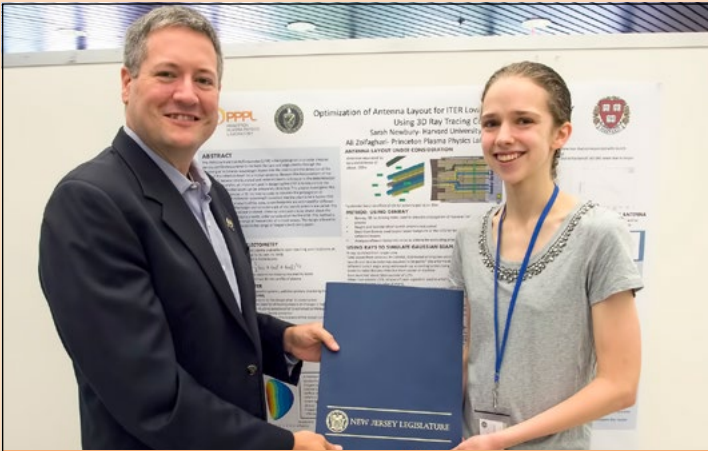
Interns worked with Lenore Rasmussen, of RAS Labs LLC, who tested an electroactive polymer for radiation resistance at PPPL. The material will undergo similar testing at the International Space Station. From left to right: Sergio Galluci, a student at Clarkson University; Surbhi Hablani, of Skidmore College, Whitney Blocher and Tyler Feurst, both of Clarkson.



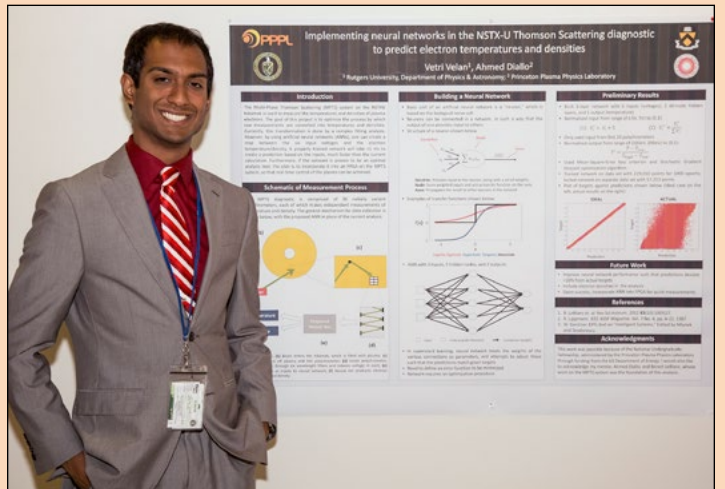
Daniel Woodbury, a student at Brigham Young University, shows off his research to Arturo Dominguez of Science Education. Woodbury worked with Irena Johnson, of PPPL and Shigeyuki Kubota, a visiting collaborator at PPPL from the University of California, Los Angeles.



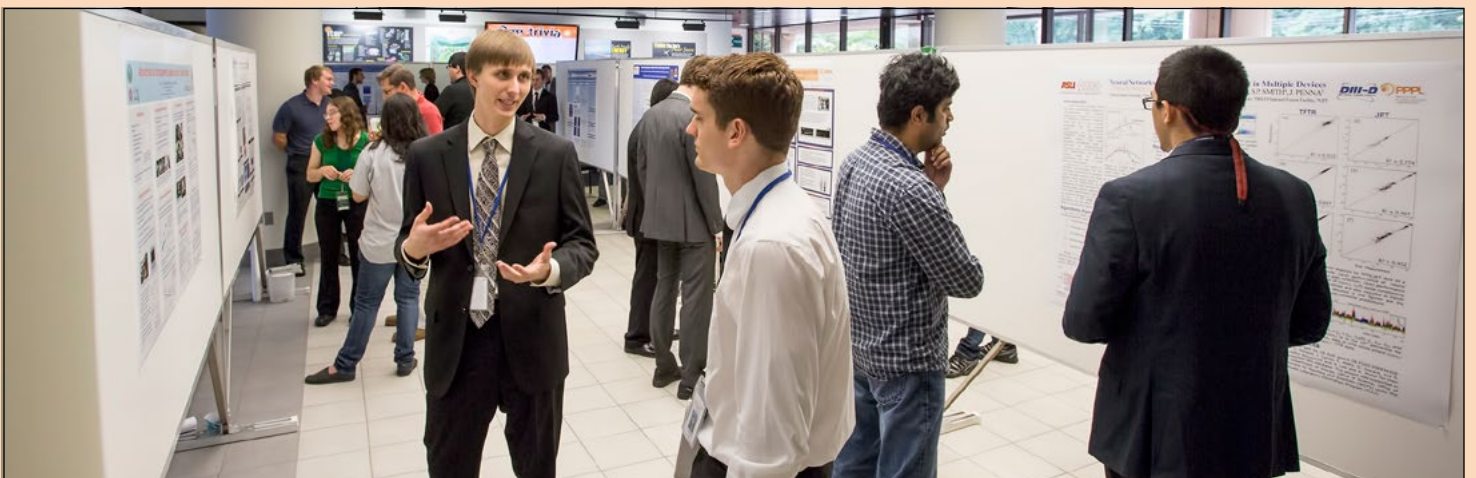
Matthew Parsons, a student at Drexel University, left, poses with computational scientist Eliot Feibush in the Vis Wall Room. Parsons also worked with physicist Stephane Ethier on his research.



State Senator Daniel R. Benson, of the 14th District, presents a certificate to Sarah Newbury, of West Windsor, a student at Harvard University. Newbury worked with PPPL engineer Ali Zolfaghari on her research project.



Vetri Velan, a student at Rutgers University, who worked with PPPL physicist Ahmed Diallo, displays his research poster.



Connor Hart, a student at the University of Maryland talks to Nathaniel Posey, of Columbia University. Hart worked with PPPL physicists Angie Capece and Charles Skinner and Princeton University Professor Bruce Koel. Posey worked with physicist Doug Darrow.

Roadway Repairs to Stellarator Road

Roadway repairs to Stellarator Road are tentatively scheduled for the end of this month.

There will be significant roadway repair work at Booth 6, as well as at other Stellarator Road locations within PPPL premises (the ring road). At Booth 6, the inbound lanes will be shut down and inbound traffic will be detoured (with cones and barriers) to one of the outbound lanes. ESU Officers will be posted at both sides of the Booth to assist with traffic flow. The Booth 6 work should take 1 to 2 days, depending on the weather.

All staff members are encouraged to use caution in these areas during this project and to obey all postings, signage and ESU directions. Please maintain situational awareness while driving or walking around the site. And always communicate perceived hazards to your supervisor for further information.



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*

COMMAND PERFORMANCE
CHEF'S FEATURE

	MON. 25 AUG.	TUE. 26 AUG.	WED. 27 AUG.	THU. 28 AUG.	FRI. 29 AUG.
COMMAND PERFORMANCE CHEF'S FEATURE	 Santa Fe Chicken	 Cincinnati Chili over Pasta	 Home-style Turkey Meatloaf, Mashed Potatoes & Vegetable	 Orange Chicken with Broccoli over Rice	 Baked Macaroni & Cheese served with Stewed Tomatoes
EARLY RISER	Oatmeal Raisin Pancakes with Turkey Sausage	Western Omelet with Home Fries	Pork Roll, Egg & Cheese on a Croissant	Steak, Onion & Cheese Omelet with Home Fries	Banana Walnut Pancakes with Bacon
COUNTRY KETTLE	Chicken Wild Rice	Vegetable Soup	Turkey Corn Chowder	Cream of Cauliflower	New England Clam Chowder
GRILLE SPECIAL	Fat Cat Hoagie with Steak, Cheese, Chicken Fingers, Fries, Onion Rings	Philly-style Broccoli Rabe and Portobello Sandwich, Potato Salad	Bruschetta Chicken & Provolone Torpedo	Grilled Turkey Pastrami Reuben with Fries	Scrambled Egg, Bacon, & Cheddar on a Torpedo served with Home Fries
DELI SPECIAL	Vegetarian Quesadilla with Sour Cream & Salsa	Toasted Roast Beef & Cheddar Hoagie	Capicola, Swiss Cheese & Sweet Peppers on a Kaiser Roll	Grilled Tuna Caesar Salad Wrap	Chicken Salad, Bacon & American Cheese Toasted Hoagie
PANINI	Ham, Turkey, Swiss, Tomato, Banana Peppers & Honey Mustard	Tuna Melt with Tomato & Cheddar	BBQ Turkey Burger with Pepper Jack, Tomato & Chipotle Mayo	Focaccia Bread with Avocado, Jack Cheese, Tomato & Red Onion	Turkey, Swiss, Bacon & Tomato on an Open-Faced Pita

COMMAND PERFORMANCE
CHEF'S FEATURE

	MON. 1 SEPT.	TUE. 2 SEPT.	WED. 3 SEPT.	THU. 4 SEPT.	FRI. 5 SEPT.
COMMAND PERFORMANCE CHEF'S FEATURE	 happy LABOR DAY!	 Potato Cheese Pierogies with Sour Cream, Onions & Vegetable	 Open-Faced Sloppy Joe served with Mashed Potatoes & Vegetable	 Carved Pork with Herb Stuffing & Vegetable	 Baja Fish Taco served with Chipotle Slaw & Cilantro Lime Rice
EARLY RISER		Blueberry Pancakes with Sausage	Chicken, Spinach, Mushroom and Cheese Omelet with Home Fries	Hash Browns, Bacon, Egg & Cheese Wrap	Breakfast Pizza
COUNTRY KETTLE		Tomato Basil Bisque	Chicken Noodle Soup	Vegan Coconut Curry Lentil Soup	Creamy Chicken Rice
GRILLE SPECIAL		Grilled Cheese with Ham & Tomato	"Greasy Tony Special" Steak Sandwich	Cheesy Mexican Chicken Torpedo with Peppers & Onions	Portobello Pizza Sandwich
DELI SPECIAL		Liverwurst & Onion on Rye with Mustard	New Orleans Muffaletta	Lemon Grilled Shrimp Salad Wrap	Breaded Chicken Cutlet with Lettuce, Tomato & Onion
PANINI		Tuna, Swiss, Tomato & Bacon Wrap	Chicken Enchilada Burrito	Roasted Vegetables with Hummus & Provolone Cheese	Pizza Pannini with Side Salad

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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The **PPPL WEEKLY** is currently on a summer biweekly schedule. The next issue will be published on **Sept. 8**.