

At PPPL THIS WEEK

WEDNESDAY, MAR. 25

Colloquium
4:15 p.m. ♦ MSB Auditorium
[Controlling Quantum Dynamics](#)
Professor Herschel Rabitz,
Princeton University

THURSDAY, MAR. 26

Hamilton Colloquium Series
4:30 p.m. ♦ Room A10, Jadwin Hall,
Princeton University
[Spotting the elusive Majorana
under the microscope](#)
Ali Yazdani, Princeton University

FRIDAY, MAR. 27

Lunch and Learn
12-1 p.m. ♦ Room B318
"The NoMachine," a virtual
desktop to the PPPL Linux cluster
Eliot Feibush

UPCOMING

WEDNESDAY, APR. 1

Colloquium
4:15 p.m. ♦ MBG Auditorium
[The NASA Planetary
Science Program](#)
Dr. James Green, NASA

FRIDAY, APR. 3

**Deadline for Green Machine
Nominations**

Open Public Tour
10 a.m. ♦ LSB Lobby
Email jjackson@pppl.gov
to register

WEEK OF APR. 13

Lab-wide office cleanup

TUESDAY, APR. 21

Grounds Cleanup
April 23 rain date

WEDNESDAY, APR. 22

Earth Day Celebration at PPPL

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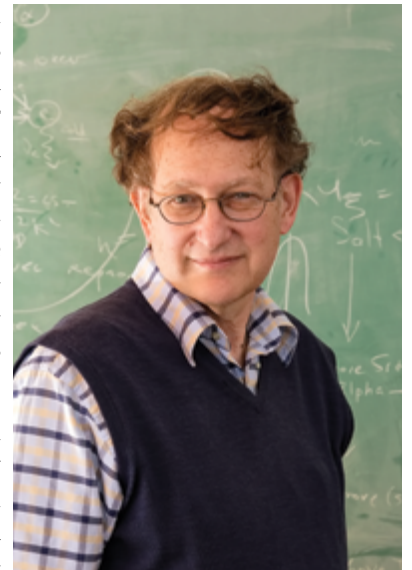
Menu 6

Nat Fisch Wins Europe's Prestigious Alfvén Prize

By Raphael Rosen

The European Physical Society (EPS) has named physicist Nat Fisch winner of the 2015 Hannes Alfvén Prize. Fisch, director of the Princeton Program in Plasma Physics and professor and associate chair of astrophysical sciences at Princeton University, will receive the honor in June at the annual meeting of the EPS Division of Plasma Physics in Lisbon, Portugal. The prize, named for 1970 Nobel Laureate Hannes Alfvén, a pioneering Swedish plasma physicist, goes each year to a person who has contributed greatly to the advancement of plasma physics or shows promise of doing so in the future.

"I am very grateful that the European Physical Society reached across the ocean to recognize my contributions to plasma physics research," said Fisch. "My efforts would not have been successful without the support and vibrant intellectual environment provided by my colleagues at PPPL over many years."



Nat Fisch

Among other honors, Fisch has received the American Physical Society Award for Excellence in Plasma Physics in 1992, the U. S. Department of Energy Bronze Medal for Outstanding Mentor in 2002, the Ernest Orlando Lawrence Award in 2004, and the James Clerk Maxwell Prize for Plasma Physics in 2005.

"Being selected for this award is major recognition for Nat," PPPL Director Stewart Prager said of the Alfvén Prize. "It recognizes seminal work he did in developing fundamental plasma physics theories. All in all, Nat's research has been smashingly successful and practical, and has contributed immensely to the fusion enterprise. And despite the length of his career and the importance of his endeavors, his creativity continues unabated."

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Modern facilities ahead as PPPL moves forward with IOI plans

By Jeanne Jackson DeVoe

PPPL leaders are preparing detailed plans for \$25 million in improvements to PPPL's buildings through the Infrastructure and Operational Improvements (IOI) Project, a blueprint for change that will create modern office space, improve storage spaces and move tech shops to a new area.

The IOI team presented plans for the project to experts from other national laboratories in a director's review in late February and the reviewers gave the go-ahead for the PPPL team to submit the plans to the DOE for an independent review in April. A DOE Office of Project Assessment review team conducted the first independent review in November, which resulted in several recommendations requiring additional information.

The IOI Project would create new space by shuffling around offices, machine shops, and storage space. It is the second phase in PPPL's 10-year campus plan, which will replace outdated facilities with state-of-the-art laboratories and offices to support the newly rebuilt National Spherical Torus Experiment (NSTX-U) and other Laboratory activities. Under the proposed plan, work would begin in early summer of 2016 and would be completed in 2018.

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Nat Fisch

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"The prize recognizes that Nat Fisch is one of the intellectual leaders of plasma physics," said David Spergel, chair of the Princeton Department of Astrophysical Sciences. "He has contributed not only through his innovative ideas and research but also by serving as a mentor for several generations of graduate students."

Fundamental Calculations

Fisch received the Alfvén Prize for fundamental studies of wave-particle interactions and for predicting new plasma phenomena, including new ways of creating electrical currents using radio-frequency waves. One notable prediction exploited how certain plasma waves could increase the energy of electrons going in only one direction along a magnetic field. The asymmetry in absorption meant that electrons traveling in one direction would collide with ions less often than would electrons traveling in the opposite direction. The collision asymmetry then leads to a powerful effect: Huge electrical currents might then be created with relatively little power consumption.

Experiments to test this effect showed that Fisch's predictions were correct, demonstrating that tokamaks could operate in a continuous, or steady state. Steady-state operation is thought to be necessary for economical production of fusion energy in magnetic confinement devices.

Fisch has been studying waves in plasmas for years and in many different contexts. "The problem of using waves to transform energy in plasma from one form to another is one I returned to again and again during my career," he said. In addition to pursuing how wave effects might make fusion energy practical, he is currently researching how to use plasma to reach the next generation of laser beam intensities.

Fisch joined PPPL as a researcher in 1978, the same year that he earned his Ph.D. from MIT's Department of Electrical Engineering and Computer Science. While a member of the PPPL Theory Department he served as consultant at the Exxon Research and Engineering Company from 1981 to 1986 and as a visiting scientist at the IBM T.J. Watson Research Center in 1986. He became director of the Princeton Program in Plasma Physics and a professor in the University's Department of Astrophysical Sciences in 1991, and in 1993 was named PPPL's Associate Director for Academic Affairs.

In addition to directing the Program in Plasma Physics, Fisch teaches the program's first-year graduate course and has supervised 13 doctoral theses. He holds 10 patents, mostly based on direct applications of plasma physics. His work is remarkably varied; together with graduate student Vasily Geyko, he is currently applying for a patent related to enhancing the efficiency of internal combustion engines based on his and Geyko's predictions concerning the heat capacity of spinning gases. "Plasma physics is inherently a multi-disciplinary field," Fisch says. "It touches on a lot of topics."

When asked about the most gratifying part of his career, Fisch had a global perspective. "For someone like me who mainly makes up things in his mind, perhaps the greatest satisfaction comes when experimentalists make the effort to test the theory," Fisch said. "It is a source of immense satisfaction to me to see experiments all around the world now using these current-drive methods, not only to generate electric currents for the reasons I had thought most useful, but also for new uses for these currents that I had never thought of myself." 📧

Green Machine Award nominations

Please submit nominations for PPPL'ers who are helping to keep PPPL green by filling out a form at <http://tinyurl.com/m5feqnd> or emailing Margaret King (mking@pppl.gov) or Leanna Meyer (lmeyer@pppl.gov).

The application deadline is April 3.

IOI Project

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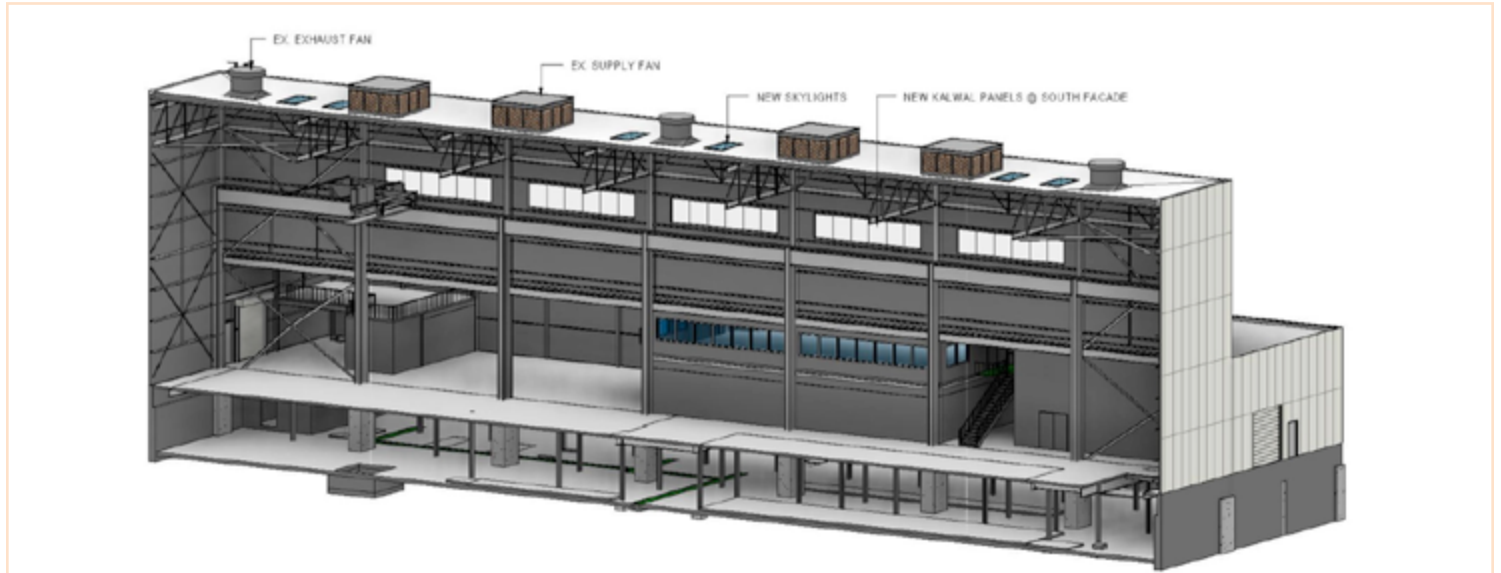
“The reason we’re doing all this is because we want the best possible experimental and office space in which to carry out our mission,” said Deputy Director Adam Cohen. “I’m very optimistic about the opportunity we have to improve the infrastructure, and I think we have a path forward to work with DOE in implementing the IOI Project,” he said.

Parallel paths

The IOI project comprises two parallel paths. The first would be to renovate the C-Site Motor Generator (MG) Building to create new machine shops so that the machine shops currently in the Research Storage & Assembly (RESA) Building could move to the MG site. The RESA building would then

“We have a good schedule, we have a good budget, we have a good team from a management perspective,” Rozycki said. “I can’t say enough about [PPPL engineer] Steve Langish serving as the project director. He’s done a wonderful job managing. I think you guys are really lucky to have him here. If we’re reading the tea leaves, a lot of good things are in the right places to make the project come together nicely.”

The DOE must approve each phase of the IOI. CD-2 would detail the project’s cost and schedule and would probably be submitted by the end of 2015. CD-3 would approve the start of construction, which would probably be submitted in the spring of 2016 prior to construction. CD-4 would approve the end of construction.



A rendering of the interior of the motor generator building, which will be refurbished to create space for machine shops.

be refurbished as a modern storage site with rack storage and better lighting to house machinery and equipment from throughout the site. The machinery and equipment that is currently housed in 75 trailers on site would either be disposed of or moved to the RESA building. The long-term storage trailers would then be demolished.

The second major path of the IOI project will be to renovate three floors of the East Annex of the Lyman Spitzer Building (LSB) to modernize current offices and meeting spaces and create new workspaces for the employees currently working in Mod VI. Once the new workspace is ready, the employees would move to the LSB and the Mod VI building would also be demolished.

The Lab’s leadership team must get approval from the Energy Systems Acquisition Advisory Board (ESAAB), an independent review board, at each stage of the IOI project. The DOE has approved the earliest stage, the Mission Need Statement called “Critical Decision 0” but has yet to approve the next stage, Critical Decision 1 (CD-1). It confirms the cost and schedule range of the project as well as the analysis of the options considered to achieve the mission need.

To get approval for CD-1, members of the PPPL team must provide a detailed explanation of how they chose various components of the project. They must also provide information on each step of the project, including how they will acquire the design and construction expertise, how the project will be managed, and how they will avoid any potential hazards.

The team will choose an architect for the architectural design of the project. The job will likely mean hiring additional support staff for the design and construction, said Sam Rozycki, a senior project manager in Princeton University’s Office of Design and Construction, who is project manager for the IOI.

Phase One of campus plan underway

The IOI is a part of a major phase in the campus plan, and each phase of the campus plan depends on the other, said Langish. “It’s one piece of the puzzle so it has to get done,” he said. “You have to think about it in terms of the whole campus plan to understand how all the pieces fit.”

The first phase of the campus plan began last year and includes \$10 million in projects to replace or repair equipment that is essential to the operation of NSTX-U and supports international collaborations.

For NSTX-U, the D Site cooling tower has been refurbished and one of the motor generators that provides electric power to NSTX-U has been repaired. Also included in the long list of projects is a new HVAC system in the PPPL Computer Center, an elevator serving the C site motor generator space, and a new lighting system in the LSB. Work on the nanolaboratory renovation should be completed this spring, and work has also begun to clear space for a new low-temperature plasma lab.

The first phase of the project is being funded by General Plant Projects (GPP) funding from the Office of Fusion Energy Sciences, with \$5 million allocated in fiscal year 2014, \$2.5 million in fiscal year 2015, and an anticipated \$5 million in fiscal year 2016.

The GPP funding reflects the DOE’s recognition that additional funds are necessary to maintain and repair PPPL’s facilities, said Michael Williams, PPPL’s associate director for engineering and infrastructure. “Our campus planning activity inspired them to increase the GPP back up to more reasonable levels,” he said. The PPPL team has already begun work on the proposal for fiscal year 2017 funding, he added.

[continued on next page](#)

IOI Project

Phase Three of the project would cost an estimated \$20 million and would also be funded through GPP funds. While some work in this phase has started, such as the work on the low-temperature plasma laboratory, most of the work for Phase Three would begin in fiscal year 2016 and end in fiscal year 2018.


In this phase, the RF and COB buildings would be renovated to create modern laboratory space for small experiments such as the Plasma Mass Filter Experiment and the Magnetic Nozzle Experiment. Both will move to space in the RF and COB buildings, along with the Lithium Tokamak Experiment. FLARE, the next generation of the Magnetic Reconnection Experiment, is about to be installed in the "High Bay" in C Site, which most recently was used for coil winding for NSTX-U's center stack.

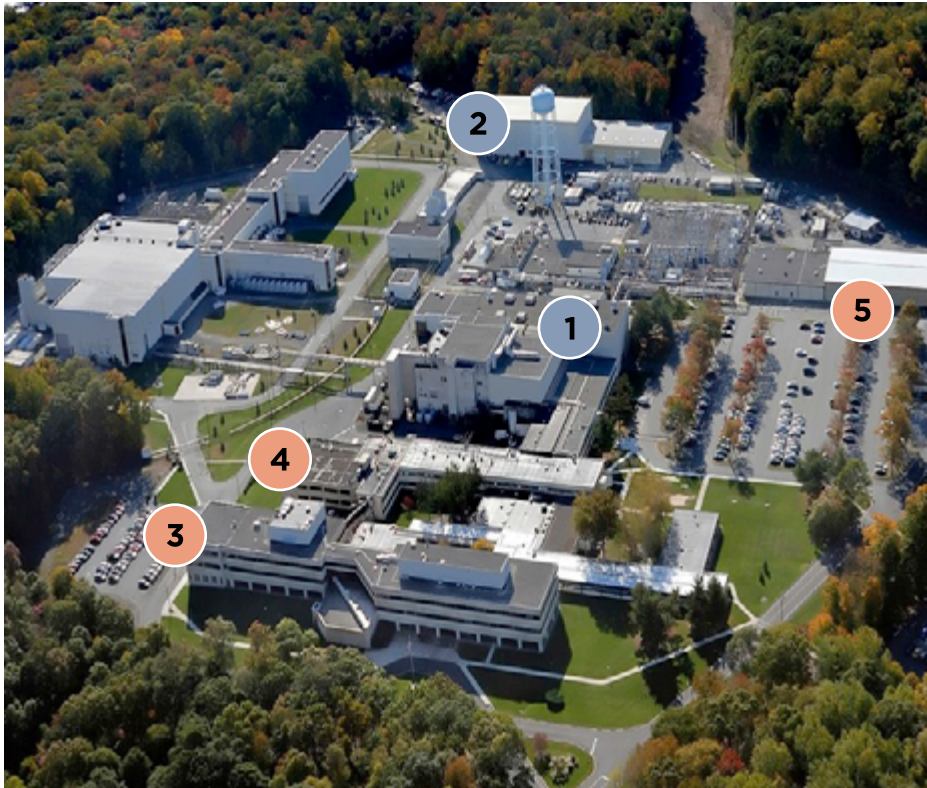
State of the art offices for Theory staff in Phase IV

Phase Four, which would cost an estimated \$45 million, would like the IOI project be funded through the DOE's Office of

Science Scientific Laboratory Infrastructure (SLI) program. The plan calls for the L wing to be renovated to create state-of-the-art offices for researchers and staff currently located in the Theory and Administration wings. The Theory and Administration wings would then be demolished. With all that accomplished, the plan calls for creating a modern, 21st century façade on the west side of the Lab, including a beautiful new central entrance opening up into the L Wing.

The Campus Plan also includes a Phase Five, which, depending on programmatic needs, could include building a new laboratory building or addition that would add 20,000 square feet for small and medium laboratories. Phase Five would not start before 2021.

When the plan is completed, Williams said, "We will have a revitalized campus. We'll have vibrant new experimental space and new office space, so the Lab will have a new flow, a new look, and the PPPL campus will be refreshed." 



An overhead view of the PPPL campus shows major elements of the IOI plan.

1 Renovate C site MG and move machine shops to C Site

2 Renovate RESA to accept all storage

3 Renovate LSB East Annex to modernize office and meeting space

4 Renovate Engineering Wing to create 50 new office spaces

5 Demolish Mod VI

Hamilton Colloquium Series

Spotting the elusive Majorana under the microscope

Ali Yazdani
Princeton University



Thursday, March 26
4:30 p.m., Room A10, Jadwin Hall, Princeton University

Travel Tips

Did you know? Travel vendors charge substantial fees for cancellations or changes in travel plans

PPPL is implementing a Princeton University travel policy by requiring that PPPL travelers take responsibility for canceling their own travel reservations. Travelers who do not cancel their reservations in a timely manner will be responsible for any expenses incurred due to the cancellation.

The policy is being adopted as a result of an audit recommendation by Princeton University. PPPL employees traveling on business travel will not be reimbursed for cancellation fees if they fail to make last-minute cancellation requests.

“Princeton has a travel policy that’s very clear that no-show fees are not allowable,” said Kristen Fischer, CFO and Head of Business Operations.

This policy change will require travelers to understand the cancellation policies associated with their travel arrangements (airfare, hotel, rental car, and limousine). Travelers should familiarize themselves with the cancellation timeframes for the vendors for their travel arrangements.

Hotels often charge a one-night hotel stay when reservations are not canceled within the required timeframe. Car services (limousines) may charge the entire fee for the trip if there is a cancellation within 24 hours.

Purchased airline tickets are usually nonrefundable with substantial fees for any changes. If flight reservations are not canceled at least two hours prior to flight time, the value of the ticket is lost. Tickets that are canceled in advance can usually be used as a credit towards the purchase of another ticket, on the same airline, minus the change fee and the airfare difference for the new itinerary. Airline tickets that have been canceled can usually be held for up to 12 months from the date of original issue.

Travelers should call the Graycar emergency assistance phone number, 1-800-787-1049, and give the access code E3776 or they may call the airlines, hotels, and rental agencies or car services directly to cancel their reservations. The phone numbers for car services and hotels are listed on travelers’ itineraries. Travelers should ensure they receive confirmation of the cancellation along with the person’s name with whom they spoke. Additionally, travelers must inform the travel office after they have canceled or changed their plans.

People often have to cancel travel plans due to a personal emergency, weather-related problems or work responsibilities, said Travel Manager Lynda Lauria. Exceptions must meet a unique and valid business need and not simply be based on a traveler preference, and must be requested prior to incurring the expense. Exceptions must be properly documented on the expense report. The new policy will require travelers to either contact Graycar emergency services or the vendors directly after 3 p.m. on normal business days or on weekends/holidays.

Travelers can still contact the travel office for help to cancel their reservations, but they must do so during regular business hours by 3 p.m. Additionally, travelers must ensure that they receive an email confirmation that their reservations were canceled.

GrayCar Travel: 1-800-858-0852

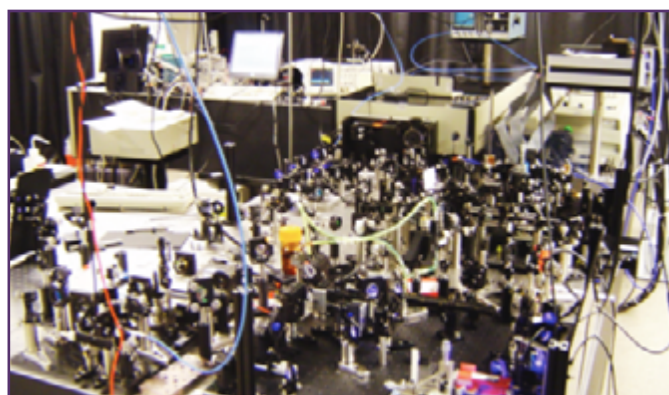
GrayCar Travel 24-hour Emergency Service 1-800-787-1049 (from the U.S., Canada, Puerto Rico & the Virgin Islands): 1-800-787-1049

Access code to identify PPPL employees: E3776

COLLOQUIUM

Controlling Quantum Dynamics

Professor Herschel Rabitz,
Princeton University



Wednesday, March 25

4:15 p.m. (coffee/tea at 4 p.m.)

M.B.G Auditorium, Lyman Spitzer Building

Brock & Co. Presents The Celebrity Guest Chef Series

Some of the biggest names in the business, from Gordon Ramsey to Paula Dean, will be right here at The Brock Café... Kind of.

Each month we will feature some of the favorite dishes of some of today's brightest culinary stars, preparing the recipes from the "Guest Chef's" own cookbook.

Everyone who purchases the featured special will not only enjoy a wonderful meal, but will also be entered into a drawing to win one of several of the "Guest Chef's" cookbooks that will be given away that day.

MARCH: Tyler Florence

"Tyler's Ultimate"

Peppered Salmon with Creamy Chickpea Dressing, Fresh Greens, Oven Fries, Pear Cobbler with Cranberry Streusel

APRIL: Alton Brown
"Feasting on Asphalt"

MAY: Anthony Bourdain
"Les Halles"

JUNE: Paula Dean
"Southern Cooking Bible"

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 23	Tuesday March 24	Wednesday March 25	Thursday March 26	Friday March 27
COMMAND PERFORMANCE Chef's Special	Baked Chicken Pecan Served with Stuffing, Vegetable & Gravy	Eggplant Parmesan Served with Pasta & Garlic Bread	<small>TYLER FLORENCE "TYLER'S ULTIMATE"</small> Peppered Salmon with Creamy Chickpea Dressing, Fresh Greens, Oven Fries, Pear Cobbler with Cranberry Streusel	Carved Turkey Served with Stuffing & Vegetables	Battered Fried Fish Served with Macaroni & Cheese & Vegetable
Early Riser	Italian Omelet with Mushrooms, Onions, Mozzarella & Marinara Served with Hash Brown	Tex Mex Scramble with Shredded Beef, Pepperjack, Tomato, Jalapeno, Onion & Fried Tortilla Strips	Corned Beef Hash and 2 Eggs Any Style	Banana Chocolate Chip Pancakes	Fried Spaghetti & Scrambled Eggs with Cheddar Cheese
Country Kettle	Creamy Sweet Potato Soup	Kielbasa Soup	Tomato Soup	Chicken Rice	Creamy Potato Leek with Cabbage & Cheddar
Grille Special	Swiss Steak Served on a Kaiser Roll with Mashed Potatoes	Italian Hot Dog Served with House-Made Potato Chips	Grilled Cheese with Swiss, Bacon & Thousand Island Dressing on Sourdough Bread Served with Tomato Soup	Turkey Cobb Burger with Blue Cheese, Lettuce, Tomato, Avocado & Bacon Served with Fries	Turkey Sloppy Joe Served with Sweet Potato Fries
Deli Special	Peppered Ham & Muenster Cheese On Pumpnickel Bread	Breaded Chicken Cutlet with Ham, Swiss, & Dijonnaise on a Kaiser Roll	Ham Salad on Rye Bread	Monster Focaccia Sandwich with Turkey, Ham, American, Provolone, Cream Cheese Spread, Lettuce & Tomato	Chicken Waldorf Salad Wrap
Panini	Turkey, Ham, Salami, Pepperoni, Provolone, Cheddar & Banana Peppers on Sourdough Bread	Tuna Salad Quesadilla with Cheddar Served with Corn Relish	Buffalo Chicken Panini	California Grilled Veggie Sandwich with Feta Cheese	Reuben Meatball Quesadilla with Swiss Cheese, Sauerkraut & Russian Dressing

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 ♦ PPPL WEEKLY is archived on the web at: <http://w3.pppl.gov/communications/weekly/>.