

THIS WEEK

WEDNESDAY, FEB. 7

Colloquium

4:15 p.m. ♦ MBG Auditorium
**High power beta electron devices
 - Beyond betavoltaics**
 William Ayers, WMA Associates

FRIDAY, FEB. 9

Employee Tour

Contact tours@pppl.gov
 to register

SATURDAY, FEB. 10

Science on Saturday

9:30 a.m. ♦ MBG Auditorium
**Electromagnetic Screening for
 Airport Security**
 Carey Rappaport,
 Northeastern University

UPCOMING

WEDNESDAY, FEB. 14

Council Café Lunch

12 p.m. ♦ Cafeteria
Hutch Neilson
 Head of Advanced Projects
 and of ITER Fabrication

FEB. 23-24

Science Bowl

[See page 10](#)

WEDNESDAY, FEB. 28

Colloquium

4:15 p.m. ♦ MBG Auditorium
**Gravitational Waves: Discoveries
 and Future Detectors**
 Professor Matthew Evans, MIT Physics

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PPPL bids a fond farewell to 38 employees taking VSPs

By Jeanne Jackson DeVoe

PPPPL said farewell last week to 38 employees who took a voluntary separation package to leave their jobs at PPPL, the vast majority of whom worked at the Laboratory for many decades. Together, the employees worked at PPPL for more than 1,300 years.

The Lab-wide celebration of the employees on Jan. 26, as well as numerous smaller celebrations, was bittersweet as the long-time PPPLers parted from friends and colleagues with whom they had worked for decades. Most departed on Jan. 31, although some extended their time at PPPL to finish work on the NSTX-U Recovery effort or other ongoing projects.



Physicist Charles Skinner makes some remarks as Rich Hawryluk, PPPL's interim director, looks on. (Photo by Elle Starkman)

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Fusion breakthroughs among highlights of DOE's research milestones over 40 years

By John Greenwald

The U.S. Department of Energy's (DOE) Office of Science, the largest U.S. supporter of basic research in the physical sciences, celebrated the 40th anniversary of its founding in 2017. To mark the 40th anniversary of Office of Science support for the country's national laboratories and basic research at universities and private industry, the DOE has compiled [40 milestone papers](#) that represent what the Department calls "a cream-of-the-crop selection that has changed the face of science."

Among the 40 Office of Science milestones: four landmark papers are on breakthroughs in the development of fusion energy. Two are from PPPL, one is from the DIII-D National Fusion Facility with which PPPL collaborates, and one is by Nat Fisch, a PPPL physicist and Princeton University professor, who based the paper on his doctoral dissertation at MIT.

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Surendra Tiwari brings decades of experience in the nuclear industry to challenging position as head of Quality Assurance

By Jeanne Jackson DeVoe

Surendra Tiwari, PPPL's new head of Quality and Assurance, comes to the Laboratory at a challenging time as PPPL launches rigorous new quality assurance procedures and moves forward with the recovery plans for the National Spherical Torus Experiment-Upgrade (NSTX-U).

But Tiwari says the challenges associated with the job, along with PPPL's scientific mission, are precisely why he applied for the position. "People are really passionate about our mission," Tiwari said. "I don't know one person who's not passionate about it. My philosophy is you've got to put the right controls in place and help the Laboratory implement them."

Tiwari has more than 35 years experience in the nuclear industry, including 25 in quality assurance. He prides himself on knowing the regulations and has experience in project management, engineering, and procurement. As head of Quality and Assurance, he reports directly to Rich Hawryluk, PPPL's interim director.

"I'm delighted to have Surendra heading our Quality Assurance team," Hawryluk said. "He is a strategic thinker whose many years of experience in the nuclear industry is invaluable to our quality assurance effort as PPPL institutes the crucial changes mandated by the Integrated Corrective Action Plan."

Tiwari started work at PPPL on Jan. 8. One of his first tasks was to work on the newly-approved Quality Assurance Program Description (QAPD), which outlines the new procedural requirements and was presented to the Lab Leadership Council and staff at orientation sessions last week.

The QAPD is the first of many initiatives in the Integrated Corrective Action Plan being launched in response to the failure of a coil that halted operation of the NSTX-U in 2016. The revised QAPD requires increased rigor in PPPL processes.

A change in culture

"We have some added responsibilities because of the culture we're shifting to – a culture of tighter controls, focused oversight of fabrication suppliers including international suppliers, and a culture of increased DOE scrutiny," Tiwari said. "The realization is coming to us that QA has to permeate that culture throughout our project teams by helping them understand and incorporate these more stringent requirements in work processes, and by enforcement."

For example, Quality Assurance staff members are assigned to oversee three outside vendors: Tesla Engineering Ltd. in England; Sigmaphi in France; Everson Tesla Inc. in Pennsylvania; plus PPPL's own coil shop, to ensure that they all have met PPPL's specifications to manufacture a prototype coil. Those specifications include a designated clean room and approved clean room procedures.

"We have a great team here" Tiwari says. "I have gotten a lot of help from QA staff and others at PPPL, especially Jim Graham, of QA/QC. People have been very friendly and welcoming and they've been mentoring me knowing that I don't come from a lab environment," he said.

But changing how an organization does things is challenging, Tiwari said. He said he might like to see PPPL consider implementing methods he used in previous jobs to help the lab staff understand and implement the new requirements. Such methods include helping to train small teams of engineers and staff members in lunch-and-learns about new programs or processes.

A quote to live by

On his desk at PPPL in the newly-renovated LSB Annex, Tiwari has a framed copy of a quote by Theodore Roosevelt that has traveled with him from job to job over three decades. It reads in part:



Surendra Tiwari

"It is not the critic who counts; not the man who points out how the strong man stumbles, or where the doer of deeds could have done them better," Roosevelt said. "The credit belongs to the man who is actually in the arena, whose face is marred by dust and sweat and blood; who strives valiantly; who errs, who comes short again and again, because there is no effort without error and shortcoming; but who does actually strive to do the deeds; who knows great enthusiasms, the great devotions; who spends himself in a worthy cause."

The framed quote was given to him at one of his early jobs in the nuclear industry when Tiwari was working on the remediation of the Three Mile Island Nuclear Plant, a few years after the nuclear meltdown there in 1979. "It means a lot to me," he said. "That's my guiding light because it tells you that no matter what people say, you have to keep doing it right."

Tiwari grew up in the Champaran District of the state of Bihar in eastern India near Nepal, a district where famous writer George Orwell was born and where Gandhi started his first civil-disobedience movement in India. He graduated first class with distinction from Bhagalpur University with a bachelor's degree in civil engineering. He then spent seven years in the Indian Army Corps of Engineers, where, as a captain, he managed a military construction project involving over 1,000 civilians and 129 enlisted people.

Tiwari came to the United States to get a master's degree in construction management from Ohio State University and went on to get his MBA at the university. He began working in the nuclear industry after graduating. He has worked on numerous projects involving nuclear power plants, including the Oyster Creek nuclear plant in New Jersey and a Canadian nuclear facility in Pickering, Ontario, as well as on DOE sites including Paducah, Kentucky; Portsmouth, Ohio; and Los Alamos National Laboratory, New Mexico. He is certified as a Project Management Professional (PMP) and as a Nuclear Lead Auditor.

More recently, he was the director of quality assurance for Burns and Roe Enterprises, now POWER Burns and Roe, in Oradell, New Jersey. There he served as a member of the consulting team to the governments of Thailand and Malaysia to help develop the nuclear industry in those countries. His most recent assignment was quality assurance manager at Public Service Electric and Gas (PSE&G), an electric utility company in Newark, New Jersey.

A published poet

In addition to his other professional accomplishments, Tiwari is a prolific poet who published a volume of poetry in Hindi in India. The collection title can be loosely translated as "call to action" and centers around Arjuna, a hero in Hindu mythology famous for his skills in archery. The collection contains poems of patriotism, romance, and life in general. It was published in 2000 with a second edition in 2010.

Tiwari lives in Franklin Township, New Jersey, with his wife of 43 years, Kamini. He serves as a commissioner of the Franklin Township Sewerage Authority. The couple has two grown sons, Abhishek, a management consultant in New Jersey, and Ankur, a specialist cardiologist, in Charlotte, North Carolina. 📍

Farewell celebration

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“It’s been a pleasure working with you all in different ways,” Rich Hawryluk, interim director of PPPL, told the retirees at the celebration. “You’ve done very impressive work here and I wish you enormous success. I want to thank you for everything you did and wish you luck in all your endeavors.”

“I wish you all the best,” said Dave McComas, Princeton University vice president for PPPL. “We really appreciate all of your contributions, each and every one of you. And I’d like to give a big round of applause for all of you who are leaving.”

“A stimulating and productive four decades”

“It’s been a really stimulating and productive four decades,” said physicist Charles Skinner. He is leaving PPPL in July because he heads the local organizing committee of the International Conference on Plasma Surface Interactions in Controlled Fusion Devices at Princeton University June 17 to 22.

Many of those taking the VSP said they would miss PPPL even as they look forward to new adventures. “I’ve got mixed emotions,” said Joanne Savino, an administrator for the National Spherical Torus Experiment-Upgrade group. “I’m leaving a lot of friends behind. I’ve been coming here for almost four decades and I like being part of something as exciting as what we do here.” At the same time, Savino said she would enjoy having the time and freedom to take part in car shows with her husband and go away for long weekends.



Engineer Bob Mozulay, who worked at PPPL for seven years. (Photo by Elle Starkman)



Virginia Finley, left, who worked at PPPL 27 years and was head of environmental compliance, with Ana Marie Datuin. (Photo by Elle Starkman)

“PPPL is like a family”

Lena Scimeca, who joined PPPL in 1976, also said she would miss everyone at PPPL. “PPPL is like a family,” she said. “You spend more time here than you do at home!” Retirement will give her the opportunity to spend more time with her grandchildren in Virginia Beach, Virginia, she said. She added that she plans to take some classes to learn how to play the piano or learn a new language.

“I’m really thankful for all the dedicated staff that made this time at PPPL so wonderful,” said physicist Robert Kaita. Like many physicists, he plans to keep doing research and will return to PPPL once a week to do some consulting work on surface science for the University of Tennessee.

“Ready for the next chapter”

Dave Johnson, a physicist who has been at PPPL for 42 years, was recently named an ITER Scientist Fellow along with Skinner. The two researchers will consult with the international fusion experiment in France during a three-year term. “I feel very good about retirement,” Johnson said. “I’ve had a great career here but I’m ready for the next chapter. I think that one of the exciting things is I don’t really know what’s going to be next.”

Physicist Daren Stotler, a 31-year veteran, recalled “what a thrill it was to work on TFTR.” More recently, he said, he has enjoyed working with C.S. Chang on high-performance computing. “That’s really the future as far as simulations,” he said. “C.S. has been able to attract some really brilliant scientists. I see what they’re capable of and I can’t keep up with these guys anymore!”



Staff members listen to remarks at the celebration. From left, post docs Dennis Boyle and Paul Hughes, and former graduate student Matt Lucia; Amitava Bhattacharjee, head of Theory; and retiring employees physicist Stewart Zweben; Virginia Finley, of ES&H; technician Gary Gibilisco; Lena Scimeca, of IT; Bob Reed, of IT; Joanne Savino, of NSTX-U; physicist Daren Stotler; Bob Herskowitz and Bill Bryan, of IT; and Tony Bleach, of Accounting. (Photo by Elle Starkman)

Farewell celebration

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Michael Zarnstorff, PPPL's deputy director for research, offers some farewell remarks. (Photo by Elle Starkman)

Virginia Finley, who worked at PPPL for 27 years as an environmental scientist, said PPPL gave the opportunity to do the work she loves. "The environment has always been a focus of my career and a passion in my life," she said. "It's given me the opportunity to work with all different kinds of people. I also enjoyed mentoring 14 students."

Physicist Dennis Mueller said he always considered himself "fortunate to always work with people who are smarter than me" during his four decades at PPPL. He plans to continue doing some work on the Experimental Advanced Superconducting Tokamak (EAST) in China and the Korea Superconducting Tokamak Advanced Research (KSTAR). "I tend to think I'm not really an optimist but since I'm working in nuclear fusion, I must be!" he said.

"The right time in my life to take this step"

Other staff members are pursuing other interests. Ken Tindall, who worked at PPPL for 42 years in the IT Department, will be busy working on his 10-acre farm in Robbinsville. Tony Bleach, a 36-year employee, said he's looking forward to having more time to exercise and golf. "I'm going to miss everyone but I believe it's the right time in my life to take this step," he said.

Some departing staff members like Mounir Awad, who is well-known for taking care of the motor generators during his 31-year career, don't know what the future will hold. But Awad said he plans to keep in touch and gave his coworkers his phone number and told them to call any time.



Sharing a laugh are, from left, technician Gary Gibilisco, who is taking a VSP after 35 years at the Laboratory; Al von Halle, who retired last year, and engineer Mike Mardenfeld. (Photo by Elle Starkman)



Preparing to serve cake are, from left, Stacia Zelick, chief planning officer; Marc Cohen, interim head of IT; Terry Brog, deputy director for operations; David Carle, head of Facilities and Site Services; and Andrea Moten, interim head of HR. (Photo by Elle Starkman)



Graduate student Brian Kraus and engineer Soha Aslam. (Photo by Elle Starkman)



Carl Scimeca, left, who retired from PPPL in 2015, with his wife, Lena Scimeca, who worked at PPPL for 41 years, and Larry Nixon, who retired a few years ago. (Photo by Elle Starkman)

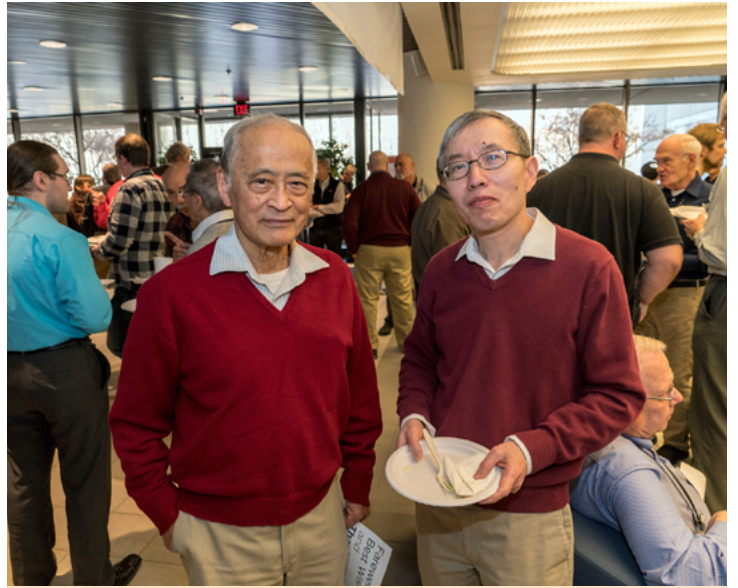
Nevell Greenough, a 41-year veteran of PPPL who heads the Radio Frequency group for the National Spherical Torus Experiment Upgrade and was named a "Distinguished Engineering Fellow" for his work on RF heating last year, said working at PPPL was a great opportunity. "It's been a great pleasure to work here," he said. "I can't think of a better career to be had being an engineer. It's been a collegial effort with everyone I work with, so thanks to everyone for really making it a fun and rewarding career!" 🍷

Farewell celebration

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Retiring engineers Elmer Fredd, far left, a 37-year veteran of PPPL; and Nevell Greenough, a 41-year veteran, with engineers Tim Stevenson and Mark Cropper.



Physicists T.K. Chu, left, who has been retired for several years, and Guo-Yong Fu, who is retiring after 25 years at PPPL.



Keith Erickson, left, chats with retiring engineer John Lawson, who began work at PPPL in the 1970s.



Paul Hughes, left, and retiree Nevell Greenough.



Jon Menard, head of NSTX-U Research with Joanne Savino, a 39-year veteran of PPPL.



One of the cakes at the retirement party.

Milestones

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“These papers highlight the substantial progress in fusion energy and plasma physics in the DOE program,” said Michael Zarnstorff, deputy director for research at PPPL. “This research has advanced our fundamental understanding and established the path to make fusion energy a reality.”

Here are the four major papers, which represent 10 percent of the DOE’s “40 Years of Research Milestones,” in reverse chronological order:

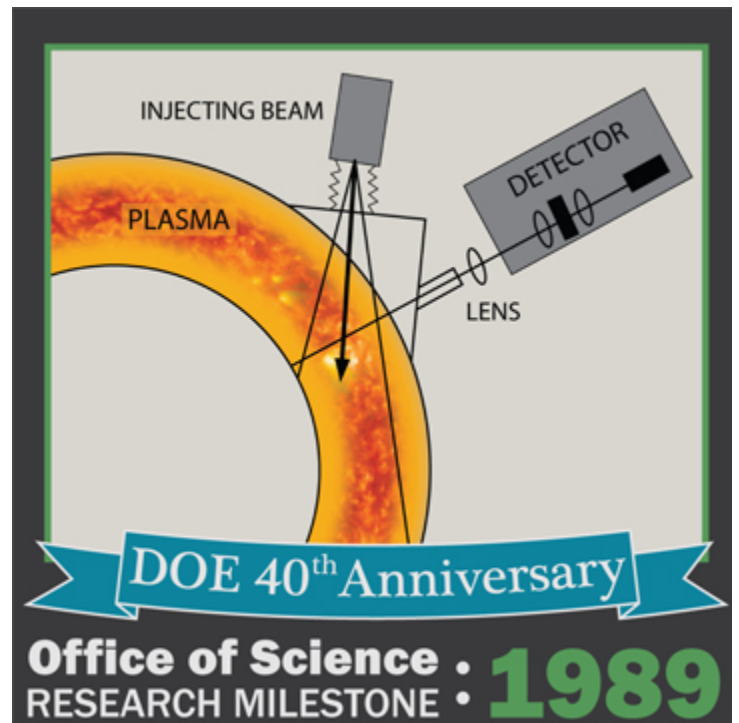


1994—PPPL physicists report [the successful first use](#) of a high-power mix of deuterium and tritium to produce fusion energy on the Tokamak Fusion Test Reactor (TFTR). Shortly after the paper appeared, the reactor produced an unprecedented 10.7 megawatts of fusion power. The deuterium-tritium mix will serve as fuel for future tokamaks including ITER, the international experiment under construction in France to demonstrate the practicality of fusion power.



1990—For fusion to take place in tokamaks, researchers must calm the randomly fluctuating turbulence produced by plasma that is far hotter than the core of the sun. At DIII-D, which General Atomics operates for the DOE in California, physicists discover that [changing the shearing of the flow](#) in the plasma can break up turbulent eddies that cause heat and particles to leak out. The discovery produced agreement

between experiments and key theoretical predictions and allows plasmas to reach the superhot temperatures that fusion requires and that will be crucial for the success of ITER.




1989—Research conducted on the Princeton Beta Experiment (PBX-M) at PPPL demonstrates how to [measure the helical magnetic field](#) that confines the plasma during fusion experiments. The magnetic field is given helical form by current induced in the plasma. Researchers measured the helical angle inside the hot plasma by interpreting the light emitted by atoms injected into the plasma. Today, the technique allows physicists to tailor the magnetic field to maximize fusion performance.



1978—The current that creates the helical magnetic field in tokamaks must be sustained during experiments. In the early days of tokamaks, the current could only be sustained for short time periods. In his landmark paper, Nat Fisch, drawing on his dissertation as a doctoral student at MIT and overturning the conventional thinking of power dissipation in plasma, suggested [an energy-efficient method for maintaining this current](#) using radio frequency waves. Fisch, now a professor in the Princeton University Department of Astrophysical Sciences, is director of graduate studies for the Program in Plasma Physics that brings graduate students to study and work with scientists at PPPL. 📄

Amitava Bhattacharjee discusses “Magnetic Explosions in the Plasma Universe” at Science on Saturday

Amitava Bhattacharjee, head of PPPL's Theory Department and a professor of astrophysical sciences at Princeton University, discussed “Magnetic Explosions in the Plasma Universe” at the Jan. 27 Ronald E. Hatcher Science on Saturday Lecture. Bhattacharjee discussed natural phenomena such as solar flares and the Northern lights, which are caused by magnetic reconnection in plasmas. 



Amitava Bhattacharjee discusses magnetic reconnection at the Science on Saturday lecture. (Photo by Elle Starkman)



Amitava Bhattacharjee at the Ronald E. Hatcher Science on Saturday lecture with host Andrew Zwicker, head of Communications and Public Outreach, in the background. (Photo by Elle Starkman)

Ronald E. Hatcher Science on Saturday LECTURE SERIES

Feb. 10

Electromagnetic Screening for Airport Security
Carey Rappaport, Northeastern University

Feb. 17

Self-Driving Cars and AI: Transforming our Cities and our Lives
Jeff Schneider, Carnegie Mellon University

Feb. 24


No Science on Saturday

Mar. 3

Looking Ahead A Split Second: How The Brain Learns Predictions In An Unpredictable World
Sam Wang, Princeton University

Saturdays at 9:30 a.m., MBG Auditorium

Brownies get excited about science in tour of PPPL

Several girls from West Windsor Brownie Troop #70218, along with parents and siblings, learned about plasma during a tour of PPPL led by engineer Jessica Guttenfelder on Friday, Jan. 26. 



Jessica Guttenfelder demonstrates the effect of a vacuum on a balloon. (Photo by Elle Starkman)



A brownie learns first-hand about static electricity with the Van de Graaff generator. (Photo by Elle Starkman)



Another Brownie is all smiles trying out the Van de Graaff generator. (Photo by Elle Starkman)

Submit your questions for Plasma 101 Lunch & Learn

Please submit your questions about fusion energy, plasma, or any of the research we do here in the box in the LSB lobby.

Sample questions:

What is plasma?

How is what we do different from “nuclear power?”

Why don't we have fusion energy on the grid yet?

COLLOQUIUM

High power beta electron devices - Beyond betavoltaics

William Ayers
WMA Associates

Wednesday, Feb. 7
4:15 p.m., M.B.G. Auditorium, Lyman Spitzer Building

Volunteer for the Science Bowl Feb. 23 to 24

Please sign up and volunteer for one or both
2018 NJ Regional Science Bowls on Feb. 23-24!

Technical volunteer role (Staff Researcher and/or Engineer):

- Moderator will read questions aloud and make final decisions should a rules or questions conflict arise. Moderator may acknowledge a player that buzzes in to answer a question.
- Science Judge will read along with Moderator and/or take turns reading questions aloud. Science Judge will assist Moderator with pronunciation, and help clarify rules. Science Judge may acknowledge a player that buzzes in to answer a question.

Non-technical volunteer role:

- Time/Score keeper
- Registration and/or lunch assistant
- Runner (deliver paper, pencils, water, etc. to competition rooms)
- Set-up and/or breakdown (before/after competitions)
- Other stuff as needed

Contact Deedee Ortiz, dortiz@pppl.gov, ext. 2785 for more information

Tour the Laboratory on an employee tour!

- Who:** PPPL Staff
- What:** See the NSTX-U Control Room, test cell, and other areas of the Laboratory on an employee tour.
- When:** Feb. 9, 10 a.m. to 11:30 a.m., and the second Friday of each month at 10 a.m.
- Where:** Meet in the LSB Lobby
- Why:** Learn more about our research and mission
- How:** [Sign up here](#) or contact tours@pppl.gov

BROCK

NICK PETTI
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 Feb. 5	Tuesday Feb. 6	Wednesday Feb. 7	Thursday Feb. 8	Friday Feb. 9
COMMAND PERFORMANCE Chef's Feature	Chicken Marsala over Egg Noodles	Sweet and Sour Meatballs over Fried Rice with Egg Roll	Parmesan Herb- Crusted Tilapia with Roasted Potatoes and Green Beans	Sushi	Chili Pot Pie
Early Riser	Western Omelette	Huevos Rancheros	Frittata Lorraine	Omelette Florentine with Spinach, Tomato & Mozzarella	Breakfast Tacos
Country Kettle	Vegetable	Beef Barley	Chicken and Mushroom	Potato	Seafood Chowder
Deli Special	Smoked Turkey Baguette	Greek Tuna Salad with Pita Chips over Lettuce	Tomato & Fresh Mozzarella on Ciabatta with Roasted Garlic Hummus	Seafood Salad Croissant	Southwest Turkey, Peppers & Cheddar with Jalapeño Ranch Spread
Grill Special	Italian Grilled Cheese	Buffalo Chicken Steak Sandwich with Fries	Pizza Burger	BBQ Bologna Sandwich	Chicken Zen Sandwich
Panini	Buffalo Shrimp Wrap	Grinder Sandwich	Crab Cake on a Kaiser with Lettuce & Tomato	Kielbasa and Kraut	El Diablo — Hot Ham, Pepperoni, Pepper Jack, Banana Peppers and Chipotle Sauce

MENU SUBJECT TO CHANGE WITHOUT NOTICE

HEART HEALTHY

VEGETARIAN OPTION

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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/>.