

THIS WEEK

TUESDAY, APR. 21

Grounds Cleanup
10:30 a.m.
Lunch for volunteers
April 23 rain date

WEDNESDAY, APR. 22

Earth Day at PPPL
7:30-10:30 a.m.
UNICOR electronics collection
Lower parking lot at warehouse
10-11 a.m.
Vendors, displays, raffles, and prizes
LSB Lobby

11 a.m.
Green Machine Awards
MBG Auditorium
11:30 a.m.
Lunchtime movie "The Burden"
MBG Auditorium
Bring your lunch and get a free snack

4:15 p.m.
Special Earth Day Colloquium
"Efforts in New Jersey to Prepare for Climate Change"
Jeanne Herb, associate director of the Environmental Analysis and Communications Group, Rutgers University's Edward J. Bloustein School

FRIDAY, APR. 24

Special Earth Day nature walk
Walk at the Plainsboro Preserve with N.J. Audubon Naturalist
Contact Virginia Finley to sign up,
vfinley@pppl.gov

SATURDAY, APR. 25

TEDxCarnegie event on "Revival"
12-4 p.m. ♦ Princeton Public Library, 65 Witherspoon Street
Andrew Zwicker will discuss "Reviving Science Education"

SUNDAY, APR. 26

Communiversity
12-6 p.m. ♦ Princeton University/Princeton
Volunteers needed! Email Jeanne Jackson DeVoe,
jjackson@pppl.gov

UPCOMING

TUESDAY, APR. 28

Lunch and Learn
12-1 p.m. ♦ MBG Auditorium
Info session on phasing out Postini

WEDNESDAY, APR. 29

Lunch and Learn
10-11 a.m. ♦ MBG Auditorium
Info session on phasing out Postini

THURSDAY, APR. 30

Lunch and Learn
10-11 a.m. ♦ MBG Auditorium
Info session on phasing out Postini

INSIDE

Launch to ISS **2**

Earth Day at PPPL **3**

Visualizing Big Data **4**

Menu **8**

Eliot Feibush leads new Princeton consortium to visualize Big Data

By John Greenwald

If a picture is worth a thousands words, a computer graphic is worth millions. With that thought in mind, PPPL has named Computational Scientist Eliot Feibush to lead a new University consortium that will share efforts to turn mountains of scientific data into eye-friendly computer visualizations. Joining PPPL in this venture are the Princeton Institute for Computational Science & Engineering (PICSciE) and the Geophysical Fluid Dynamics Laboratory (GFDL), institutions whose research ranges from exploring supernovae and the interior of the Earth to predicting climate variability and change.

"People are modeling ever-larger and more complex processes," said Feibush, who heads the development of web-based software for imaging data from fusion experiments at PPPL, a position he continues to hold. "Visualization is a way to see all the data in a human way and produce new scientific insights."



Eliot Feibush

[continued on page 4](#)

Synthetic Muscle developed with help of PPPL blasts off to Space Station

By Jeanne Jackson DeVoe



The SpaceX Falcon 9 rocket carrying the Dragon spacecraft and the synthetic muscle material blasts off from Cape Canaveral on April 14 at 4:10 p.m. (Screenshot courtesy of NASA)

[continued on page 2](#)

Launch to ISS

continued from page 1

“The Dragon has spread its wings and is headed to the Space Station.”

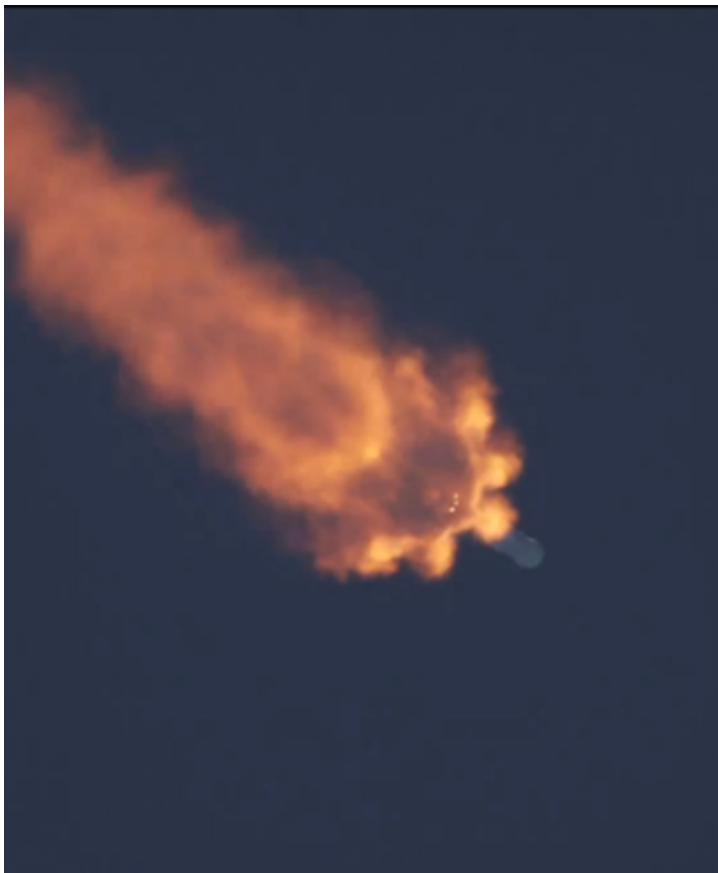
That was the NASA announcement after the SpaceX Dragon spacecraft carrying a synthetic muscle material developed with the help of PPPL – as well as two tons of supplies and materials -- separated from the rocket that launched it into the atmosphere on April 14.

The Dragon was expected to orbit 257 miles above the planet for two days before meeting with the International Space Station on Friday, April 17, at 7 a.m. The spacecraft will then be captured with the Space Station’s robotic arm.



Rasmussen at Cape Canaveral along with Paul Reichert, a principal investigator from Merck Research Labs, whose experiment will also be on board the International Space Station, Rasmussen’s son, Carl, and her mother, Winola Carman. (Courtesy of Lenore Rasmussen).

The SpaceX Falcon 9, carrying the Dragon, launched at 4:10 p.m. after a one-day delay due to thunder clouds threatening the launch area. Researcher Lenore Rasmussen, who developed the synthetic muscle material, was on hand to see the liftoff, along with her mother and son.



The rocket 15 minutes after launching. It took just over 10 minutes for it to place the Dragon spacecraft in orbit. (Screenshot courtesy of NASA)



The NASA Control Room during the launch. (Screenshot courtesy of NASA)


“It was beautiful,” Rasmussen said the day after the launch. “It looked like poetry. It was just really, really cool.”

Charles Gentile, who worked on testing the material and planning for the launch with Rasmussen, said he was excited watching the launch as well. “We had an experiment on that rocket and I found it very exciting and my heart was racing a bit because you don’t know if it’s going to go,” Gentile said.

The material could be used for robotics in deep space travel due to its resistance to extreme temperatures and high doses of radiation. Gentile helped Rasmussen test the material for radiation resistance at PPPL last summer. PPPL researchers also played a role in developing the material early in Rasmussen’s research by using plasma-treated metal to help the gel-like material adhere to the metal.

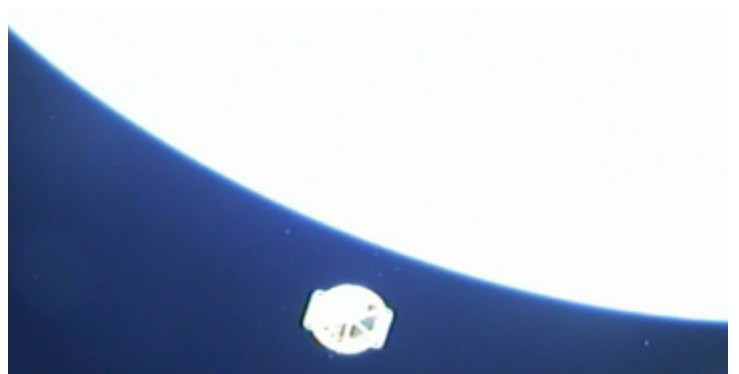
The synthetic muscle will remain in the U.S. National Laboratory of the International Space Station for 90 days to test how it is affected by space radiation. When the specimen is returned to Earth in July, it will be tested against an identical sample that remained here.

The liftoff was live-streamed at the NASA website. When the rocket lifted into the air, the NASA announcer said, “The Falcon soars from its perch to the ISS carrying Dragon and new science experiments for the one-year crew.”

The launch can be viewed on YouTube at <https://www.youtube.com/watch?v=XfJoDxX0m7s>. 



A view of earth from the Falcon 9 rocket after it took off. (Screenshot courtesy of NASA)



The Dragon spacecraft in orbit after separating from the rocket. (Screenshot courtesy of SpaceX)

PPPL celebrates Earth Day with cleanup, exhibits, lunchtime video & colloquium

PPPL's Earth Day celebration on April 22 this year features a variety of activities, including a lunchtime video called "The Burden" about how U.S. dependence on oil affects the military and the U.S. with free snacks. A special colloquium on how New Jersey can prepare for climate change will follow.

"We are offering a variety of different activities the entire week and we hope that PPPL'ers will find something that inspires them to make Earth Day every day," said Dana Eckstein, a member of the Green Team, which is planning the event.

The Earth Day events kick off the day before Earth Day on April 21 with PPPL's annual campus cleanup starting at 10:30 a.m. There will be a free pizza lunch for volunteers following the cleanup. The rain date is Thursday, April 23 at 10:30 a.m. Many volunteers are still needed. Please sign up at <http://tinyurl.com/ppplcleanup>.

On Earth Day, there will be a UNICOR electronics collection in the lower parking lot by the warehouse between 7:30 and 10 a.m. Please bring household electronics for recycling and proper disposal.

At 10 a.m., there will be displays and exhibits in the LSB Lobby and a raffle. Exhibitors include the Mercer County Improvement Authority, PSE&G, Sustainable Princeton, and the Bike to Work Challenge.


PPPL'ers who have helped PPPL save energy, conserve resources, and recycle will be honored at 11 a.m. in the MBG Auditorium with the annual Green Machine awards. At 11:15 a.m., Diane Landis, the executive director of Sustainable Princeton, will speak briefly about her community organization.



PPPL'ers enjoyed Earth Day exhibits last year.

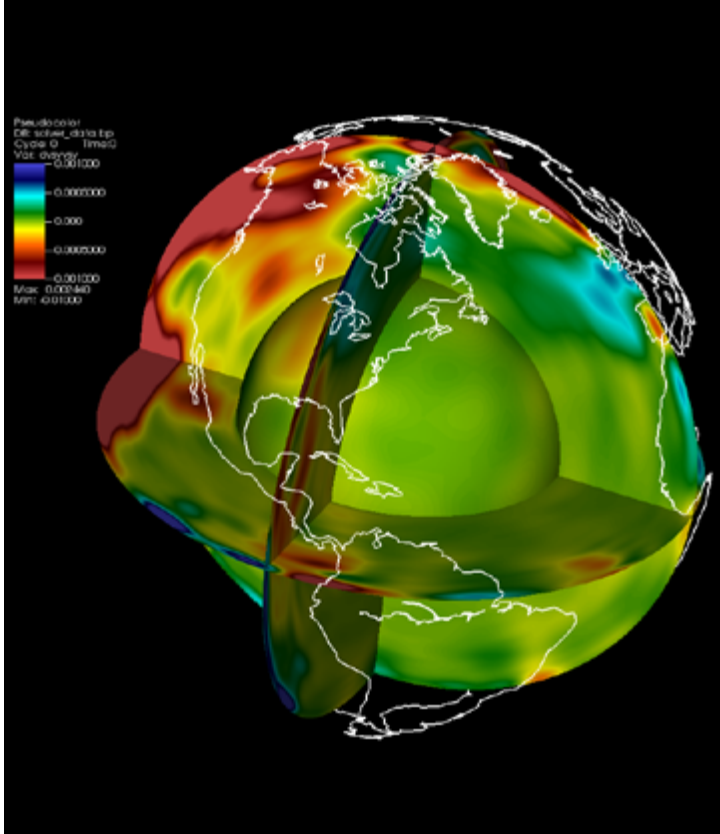
The Earth Day festivities continue at 11:30 a.m. with the premier screening of "The Burden" in the MBG Auditorium. Moviegoers can bring their lunch and will receive a free snack and a free souvenir. The movie is about how the U.S. dependence on oil threatens the military and what it is doing to explore alternative energies. You can view a trailer at <http://www.theburdenfilm.com> and in the LSB lobby during lunch on Monday and Tuesday.

At 4:15 p.m., Jeanne Herb, associate director of the Environmental Analysis and Communications Group of Rutgers University's Edward J. Bloustein School of Planning and Public Policy, will give a special Earth Day colloquium. Her topic will be "Efforts in New Jersey to Prepare for a Changing Climate." Herb will give an overview of how agriculture, coastal communities, New Jersey's infrastructure, public health, and water resources will be affected by climate change, and she will discuss efforts in the state to prepare for those effects. The lecture is open to the public.

On Friday, there will be an Earth Week walk from noon to 1 p.m. at the Plainsboro Preserve just a few minutes from PPPL with a naturalist from the N.J. Audubon Society. Contact Virginia Finley vfinley@pppl.gov or ext. 2746 or sign up at the table on Earth Day. 

Visualizing Big Data

continued from page 1



A PICSciE visualization that maps the speed of seismic waves. (Credit: Ebru Bozdog and David Pugmire)

New software tools

As technical leader of the new collaboration, Feibush will develop new software tools for importing data into visualizations and will tutor researchers from grad students to professors on using the tools. Programs will be stored on a remote server from which they can be readily launched from desktop or laptop computers.

“The main purpose is to coordinate and share knowledge among institutes working on common tasks,” said James Stone, professor of astrophysical sciences and applied and computational mathematics and director of PICSciE, an interdisciplinary institute. PICSciE provides hardware, technical support and educational and outreach programs in computational and information science in collaboration with the Princeton Office of Information Technology’s Research Computing Department. “Visualization is something we all need to do,” Stone said.

Colleagues welcomed the new consortium. “This is a fabulous opportunity to share hardware and human resources,” said Jeroen Tromp, Blair Professor of Geology and a professor of geosciences and applied and computational mathematics and associate director of PICSciE. “Everybody has been developing their own visualization solutions, but this model of independent development is no longer sustainable because the data volumes have become too large.”

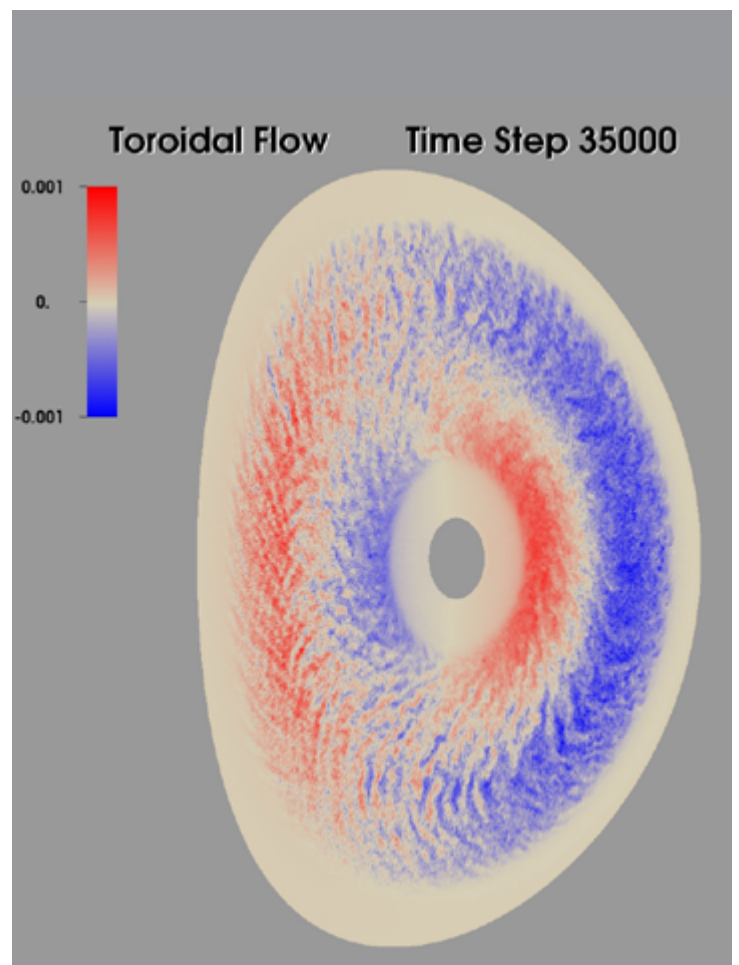
At GFDL, a laboratory of the National Oceanic and Atmospheric Administration located on the Forrestal Campus, Deputy Director Brian Gross applauded the new coalition. “All scientific agencies look for the best ways to depict very large amounts of data through visualization,” he said, “and this will mean access to shared expertise.” GFDL partners with Princeton University through the Cooperative Institute for Climate Science, which is housed in the Atmospheric and Oceanic Sciences Program in Princeton’s Department of

Geosciences. To see an animated GFDL visualization of climate change, [click here](#).

Among benefits of the new collaboration will be tutelage by Feibush in programs such as Visualization Toolkit software, an advanced method for visualizing data. Trained use of the program can enable researchers with little prior experience with the software to distill massive amounts of data into clear and concise imagery.

Several projects at PPPL will gain from such broadened access to visualization software and savvy. They include a scientific code that physicist Seung-Hoe Ku runs on two of the world’s most powerful supercomputers to study turbulence at the volatile edge of fusion plasmas. Also expected to benefit are physicists Weixing Wang, who seeks advanced visualization of the data from his turbulence simulation runs, and Josh Breslau and Steve Jardin, who use animated visualizations to help interpret the output of their magneto-hydrodynamic codes, which treat plasma as a magnetic fluid.

The new consortium grew from a proposal that Bill Tang, a principal research physicist at PPPL, former associate director of PICSciE and current member of the PICSciE executive committee, put forth at the group’s executive meeting last fall. “I pointed out that PICSciE and GFDL could both make significantly better use of modern visualization capabilities,” Tang recalled. Moreover, he added, the collaboration stood to enhance PPPL’s effort to engage in mutually beneficial cooperative ventures with the main campus. The idea was a natural — a fact shown by the committee’s prompt action to approve the proposal in January and the formal appointment of Feibush. 📺



Cross section of a tokamak plasma with red and blue colors showing direction and structure of plasma flow.

Keep PPPL clean and sign up for Earth Week cleanup!

Many volunteers are still needed for the annual Earth Week cleanup on Tuesday, April 21 at 10:30 a.m. Please sign up by going to <http://tinyurl.com/ppplcleanup>. Volunteers will receive a pizza lunch. The rain date is Thursday, April 23 at 10:30 a.m.

COLLOQUIUM

Efforts in New Jersey to Prepare for a Changing Climate

Ms. Jeanne Herb
Rutgers University



Wednesday, April 22

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

Adaptive Optics Imaging of Extosolar Planets

Professor Bruce MacIntosh
Stanford University



Thursday, April 23

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

A Walk on the Wild Side (well, almost!) OR a non-sanctioned PPPL Earth Week Event

When

Friday, April 24, noon to 1 p.m.

Where

Plainsboro Preserve
80 Scotts Corner Road, Cranbury
(10-15 minute car-pool ride from PPPL)

Who

Anyone who signs up at PPPL's Earth Day Celebration on April 22 or e-mails vfinley@pppl.gov.

What to bring

Sturdy walking shoes, water bottle and a smile (required). Camera, binoculars, bird ID books (optional).

Why

To get acquainted with the Plainsboro Preserve, get some air, commune with nature, etc.

What to expect

30 minute walk on an easy trail with a NJ Audubon Naturalist and a chance to learn more about the Preserve.

Questions

Contact Virginia Finley (vfinley@pppl.gov) or X2746.



Postini, a Labwide email message security system, will be phased out at the end of the month.

Please stay tuned for important announcements involving the transition to another system.

There will be a lunch and learn session on the changes on Tuesday, April 28, from noon to 1 p.m. and other information sessions on Wednesday, April 29, from 10 a.m. to 11 a.m. and on April 30 from 2 to 3 p.m., all in the MBG Auditorium

Zwicker to give TEDx talk on Science Education

Andrew Zwicker, head of Science Education, will take part in a TEDxCarnegieLake event on the theme of “Revive,” on Saturday, April 25, from 12 to 4 p.m. at the Princeton Public Library. Zwicker’s talk will be “Revive Science Education.” He is among 10 speakers and two performers for the event, ranging from a Buddhist nun discussing “Revive Oneself,” to a representative from Climate Central discussing, “Revive Global Climate.”

This is Zwicker’s third TEDxtalk. He will discuss New Jersey’s long history of

innovation and how we need to revive science education through events like PPPL’s Young Women’s Conference in order to make sure that tradition continues. Zwicker’s 2013 talk at a TEDx event at Saint Peter’s University, “Fusion Energy, Utopian or Practical,” is available on [YouTube](#).

You must purchase tickets to attend the event. Tickets cost \$25 for regular admission and \$13 for students and senior citizens. The library is located at 65 Witherspoon St., Princeton.

[More information on the event is available here.](#)

Volunteer for Communiversity!

Come join in the fun at Communiversity Festival of the Arts on Sunday, April 26 from 1 to 6 p.m. The annual event, sponsored by Princeton University and the Arts Council of Princeton, attracts thousands of visitors and features more than 200 artists, crafters, merchants and organizations from the area. We need PPPL volunteers at the PPPL booth to talk to members of the public, help with demonstrations and hand out prizes. Please contact Jeanne Jackson DeVoe, jjackson@pppl.gov, ext. 2757 to volunteer.



[More information about Communiversity is available at the Arts Council of Princeton website.](#)

Join PPPL's bikers during the May Bike to Work Challenge

May is National Bike Month and PPPL is once again urging bikers of all kinds to leave their cars at home and bicycle to work as part of the Bike to Work Month Challenge from May 1 to May 31, hosted by the Cascade Bicycle Club.

To join, all you have to do is sign up at <http://tinyurl.com/k6huwz7>. You'll be invited to join one of PPPL's teams and to register on the Bike Month Challenge website. The website will be used to track your bike rides during May and that information can be used to tally the number of miles ridden, number of new riders, and how much PPPL's bike riders saved in carbon dioxide emissions.

PPPL's Bike to Work group will have a table at PPPL's Earth Day celebration, where you can get information and sign up to ride. The group is also planning a "Bike Maintenance 101" clinic with Princeton University's CycLab campus bike shop and a gathering at the end of the month to celebrate the Bike to Work Challenge.

For more information, please contact Rob Sheneman at ext. 3392.

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 April 20	Tuesday April 21	Wednesday April 22	Thursday April 23	Friday April 24
COMMAND PERFORMANCE Chef's Feature	Chicken Pot Pie	Stuffed Shells Alfredo Served with a Side Salad	Chicken Fried Steak with Mashed Potatoes, Collard Greens & Country Gravy	Celebrating National Picnic day!	Fettucine Alfredo with Shrimp, Red Peppers & Peas
Early Riser	Egg McMuffin with Ham Served with Hash Brown	Chicken & Cheddar Omelet with Spinach & Home Fries	Bagel with Lox & Cream Cheese	Italian Omelet with Sausage, Peppers, Onions, Mozzarella, Sauce & Hash Brown	Corned Beef Hash Stack with Peppers, Onions, Mushrooms and Scrambled Egg
Country Kettle	Chicken Noodle	French Onion	Tortilla Meatball Soup	3 Bean Veg Chili	Turkey Corn Chowder
Grille Special	Rodeo Burger with Onion Ring, Bacon, Cheddar & BBQ Sauce	Bacon Pizza Steak Hoagie on French Bread	Popcorn Shrimp Taco with Chimichurri Sauce & Slaw	Fill your picnic basket! Pulled Pork Sliders, Chicken Sliders, Hot Dogs, Grilled Veggies, Vegetarian Baked Beans, Assorted Finger Sandwiches & Assorted Salads	Broccoli Rabe, Eggplant, Onion, Roasted Pepper, Sundried Tomato and Provolone Torpedo
Deli Special	Grilled Vegetables with Hummus Pesto Dip Spread	Slow-Cooked BBQ Shredded Beef on a Kaiser Roll with Coleslaw	BLT Hoagie		Turkey Club Croissant Served with Pasta Salad
Panini	Prosciutto, Fresh Mozzarella, Roasted Pepper, Artichoke & Pesto Mayo Ciabatta	Tuna Primavera Salad	Chicken, Mushroom, Onion, Roasted Pepper, Swiss & Honey Mustard Wrap		Roast Pork, Provolone and Sweet Peppers Ciabatta

MENU SUBJECT TO CHANGE WITHOUT NOTICE

Menu Item is in keeping with American Heart Association (AHA) and U.S. Department of Agriculture (USDA) guidelines.

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/>.