

## THIS WEEK

**APRIL 4-28**

**Trenton Rescue Mission  
Clothing Drive**  
[See page 6 for details.](#)

**TUESDAY, APRIL 5**

**Due date for Green Machine  
Award nominations**  
[See page 8 for details.](#)

**WEDNESDAY, APRIL 6**

**PPPL Colloquium**  
4:15 p.m. ♦ MBG Auditorium  
**Pilot-wave hydrodynamics**  
John W. M. Bush, MIT

**FRIDAY, APRIL 7**

**Public Tour**  
10 a.m.  
[Tours@pppl.gov](mailto:Tours@pppl.gov)

## UPCOMING

**MONDAY, APRIL 10**

**Due date for PPPL Children's  
Drawing Contest**  
[See page 9 for details.](#)

**TUESDAY, APRIL 11**

**Nature Walk at the  
Plainsboro Preserve**  
12 p.m.  
Contact Virginia Finley, [vfinley@pppl.gov](mailto:vfinley@pppl.gov), ext. 2746, for more information.

**THURSDAY, APRIL 13**

**Lecture: "Blind Spot: Hidden  
Biases of Good People"**  
4:30 p.m. ♦ McCosh Health Center,  
Room 50  
Keynote speaker: Mahzarin Banajl,  
Harvard University

**APRIL 17-21**

**Earth Week at PPPL**  
[See page 7 for details.](#)

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## PPPL submits interim report on NSTX-U recovery

By Jeanne Jackson DeVoe

**P**PPPL reached a major milestone last week when the National Spherical Torus Experiment-Upgrade (NSTX-U) Recovery Team sent the U.S. Department of Energy (DOE) a detailed Extent of Condition Interim Report that outlines major recommendations aimed at ensuring the experiment operates reliably.

The interim report was a "notable outcome" required by the DOE to "identify all design, construction and operational issues" on the NSTX-U in the wake of a series of technical problems on the machine, including the failure of a magnet that caused the NSTX-U to shut down last summer. The report is based on the first nine of 12 design verification and validation reviews (DVVRs), taking place through April 20, which analyze potential gaps in the design or construction of components on the major systems of the NSTX-U. The report includes recommendations by an external Extent of Review Committee based on the findings of the first five DVVRs.

"I think the report is very comprehensive," said Terry Brog, PPPL's interim director. "I want to thank not just the PPPL staff members who prepared the DVVRs but also the external Extent of Condition Review team, which came in and did a tremendous job."

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## NASA aerospace engineer tells more than 600 girls to reach for the stars at PPPL's Young Women's Conference



Aprille Ericsson, a NASA aeronautical engineer, and the keynote speaker for the conference, addresses students in Princeton University's Richardson Auditorium. (Photo by Elle Starkman)

[Story begins on page 3](#)

# Extent of Condition

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## Extent of Cause underway

Brog noted that the Extent of Cause review is already underway and will examine the underlying cause of the NSTX-U shutdown and other events at the Laboratory over the past several years. This will include the quality of procedures, and adherence to procedures with respect to engineering, design, quality assurance and control, fabrication, installation, and operations. Some of these issues were identified in the Extent of Condition. He added the first step will be a root cause analysis of the failure of the PF1A magnet that triggered the shutdown.

Rich Hawryluk, the head of the NSTX-U Recovery Project, said the next step will be to complete the last two DVVRs, scheduled April 5 to 6 and April 19 to 20. (One of the DVVRs was completed after the interim report was submitted.) At the same time, the Recovery Team will develop designs, costs, and schedules based on some of the EOC report's recommendations. A second Extent of Condition Committee meeting based on the final eight DVVRs will be held May 15 to 18 and a final corrective action report is due by the end of September.

"We're not done yet," Hawryluk said. "But we've made a lot of progress. We have a much better appreciation for what needs to be done. People have worked extremely hard and we've gotten a lot accomplished. All of those things are very positive. We need to do more work to develop a detailed cost and schedule and that will also have to undergo an external review."

## Further analysis of recommendations

The NSTX-U Recovery Team will conduct a conceptual review to analyze the major recommendations of the EOC committee. "These are significant recommendations that require further analysis of the implications on the physics result and impact on the schedule and the cost of the recovery effort," the report states.

One of the biggest recommendations is the proposal to eliminate design features that support research into coaxial helicity injection (CHI), a non-inductive method of heating the machine that creates a plasma without a central magnet or solenoid. The committee found that the design features supporting that have been unreliable and could jeopardize NSTX-U. The committee concluded that these features pose "an unacceptably high risk to the project."

The EOC committee also "strongly recommends" that PPPL replace all three PF1A, B and C sets of magnets called poloidal



Rich Hawryluk, left, head of the NSTX-U Recovery Project, and Charles Neumeyer, the head of Engineering for the NSTX-U Recovery Project, second from right, view the NSTX-U center stack outside the test cell during a March 6 tour with the EOC Committee. (Photo by Jeanne Jackson DeVoe)

field coils that are nestled in the upper and lower center stack of NSTX-U and are used to shape the plasma in experiments.

## Focus on bakeout

The PF1B coils should be redesigned to solve a problem with the bakeout of the NSTX-U vacuum vessel, the EOC committee report said. The bakeout is used to remove water from the vacuum vessel by heating inner tiles to 350 degrees Centigrade. In the NSTX-U, the PF1B coil was located so close to the inboard divertor that the coil could be damaged by the heat. The report recommends redesigning the PF1B coils to provide additional insulation that would withstand temperatures of at least 300 degrees Centigrade.

The EOC also recommends that PPPL analyze the feasibility of replacing the current graphite tiles inside the vacuum vessel with CFC (carbon fiber composite) or other carbon tiles and it said the tiles should be mounted in such a way that they can withstand the heat and stress of plasma experiments.

Recovery Team engineers have already begun preliminary designs for PF1A coils to replace the upper PF1A coil that failed last summer and its twin lower PF1A coil, which was manufactured identically. A coil winding facility to construct the coils at PPPL is being assembled in the C Site High Bay.

The report notes that PPPL has been investigating companies and national laboratories that can manufacture the coils and has expanded its search to include international companies.

"We will get through this," Hawryluk said. "But we have to realize that there remains a great deal to do." 📌



Members of the Extent of Condition (EOC) Committee during their meeting at PPPL March 6 to 9. From left clockwise: Richard Callis, of General Atomics National Laboratory; Brian LaBombard, of MIT's Plasma Science and Fusion Center; Ronald Parker, emeritus professor at MIT's Plasma Science and Fusion Center; Dennis Youchison, of Oak Ridge National Laboratory, Tom Todd, the committee chair, retired chief technologist at the Culham Centre for Fusion Energy; Rem Haange, ITER technical director; Michel Huguet, former head of ITER Magnets; Martin Cox, of the Culham Centre for Fusion Energy; and John Smith, project manager at General Atomics. (Photo by Elle Starkman)

# NASA aerospace engineer tells more than 600 girls to reach for the stars at PPPL's Young Women's Conference

By Jeanne Jackson DeVoe



Alexandra Ramadan, a visiting fellow in Princeton University's electrical engineering department, gives a chemistry demonstration. (Photo by Elle Starkman)

**N**ASA aerospace engineer Aprille Ericsson told more than 600 seventh- to tenth-grade girls at PPPL's Young Women's Conference that she was depending on them to pursue their dreams and make their ideas a reality in the wide-open field of Science, Technology, Engineering and Mathematics (STEM).

"You guys are very capable of so many ideas and I'm depending on you," Ericsson told an enthusiastic audience at Princeton University's Richardson Auditorium at the March 23 event. "Don't be scared to keep pushing forward until you achieve your dream."

The Young Women's Conference has a serious purpose: inspiring young women to enter STEM fields. The number of women in STEM fields has doubled in the past two decades but while half of all college-educated employees are women, they still make up just 29 percent or less than one-third of the STEM workforce in the U.S., according to the National Science Foundation.



Annie Dykstra, an eighth grader at John Witherspoon Middle School in Princeton, tries out the Van de Graaff generator, which creates static electricity to make her hair rise, at a PPPL exhibit. (Photo by Elle Starkman)



Nicole Allen, right, an engineer at the Princeton Plasma Physics Laboratory, speaks to a student. (Photo by Elle Starkman)

The conference was the 16th hosted by PPPL and the biggest to date with girls coming from schools from all over New Jersey as well as Pennsylvania. They spent the day doing hands-on science activities at more than 30 exhibits at Princeton's Frick Chemistry Laboratory and they listened to talks by female engineers and watched colorful chemistry experiments before coming together for Ericsson's keynote address.

## Exploring new science topics

Students got to test substances on a soiled car seat to determine if the substance was (simulated) blood at the FBI exhibit. They tried out 3-D goggles and built models of the DNA of a virus. "They explored a lot of new science topics," said organizer Deedee Ortiz, the program administrator in PPPL's Science Education Department. "This is an opportunity that the majority of these girls would never have otherwise."

# Young Women's Conference

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A student tries on a fire hat at PPPL's Emergency Service Unit's display. (Photo by Elle Starkman)

PPPL had several displays in which students learned about plasmas, watched a 3-D printer at work, learned about how a computer is built, and got to try on firefighting equipment. Kathryn Wagner, of Princeton University, showed students chemistry experiments in which she made substances go "boom" and turn bright colors.

"It's all cool science," said Annie Dykstra, an eighth-grader from John Witherspoon Middle School in Princeton. Her teacher, Janet Gaudino, was equally enthusiastic. "I love it and I know the girls love it," she said. "There are so many activities and all it takes is one booth for a girl to say, 'I want to do that.' You can't manufacture that level of engagement in a class."

"It's just a fabulous event," said Terry Brog, interim director of PPPL, who was one of 60 volunteers from PPPL and Princeton University at the conference. "We need these types of things to get kids interested or keep them interested in STEM."

Assemblyman Dan Benson, who visited the event with Assemblyman Wayne DeAngelo, both from the 14th district, said he also was impressed by the event. "This really opens up their eyes to how many avenues there are in the STEM fields," he said.

## Finding a good life balance

Students heard talks by Jyoti Sharma, a wireless engineer for Nokia, and Valeria Riccardo, head of engineering at PPPL. Riccardo said she told students to "work hard and find a good life balance," when they begin their careers. Having that balance helps if women are treated like outsiders on the job, she said. "Sometimes we are made to feel we are in the wrong place and it's good to know in advance that you are OK, which is not always easy," she said.

In her keynote address, Ericsson, the first African-American woman to receive a Ph.D. in mechanical engineering from Howard University, recounted how she became a scientist. Growing up in Brooklyn, Ericsson said she was inspired to go into a space-related field by movies like "Star Wars" and television shows like "Star Trek." She said she took part in her school science fairs and was a promising math student. She attended MIT as an undergraduate. But despite being a strong student,



Volunteers Olivia Merrill, left, and Drina Duryea, both from PPPL's IT Department, at a PPPL display on computers. (Photo by Elle Starkman)



Deedee Ortiz, the organizer of the Young Women's Conference, onstage at Richardson Auditorium before the keynote speech. (Photo by Elle Starkman)

# Final organizational diagnosis report released to staff

By Jeanne Jackson DeVoe

David McComas, the Princeton University vice president for PPPL, said leadership will work with PPPL staff to address fundamental issues raised in an organizational diagnosis released last week that reveals both the staff's strong commitment to the Laboratory's mission and a deep concern over PPPL's uncertain future.

McComas released [the final report](#), in a March 28 email to all staff. He said he is grateful that 80 percent of staff (419 people) participated in the organization-wide survey. Ruth Orenstein, president of Princeton Consulting Resources Inc., which did the diagnosis, also commented on the participation rate. She told staff at a feedback meeting that a response rate above 50 percent is considered good and an 80 percent rate is "almost unheard of."

McComas said the next step will be to come up with a plan to address employees' concerns. "We take this report very seriously and we recognize that the onus is on the leadership team to take the next steps to quickly address the issues raised in the report," McComas said. "We are looking forward to working together to come up with solutions and take the appropriate actions."

Terry Brog, PPPL's interim director, said the Lab's Leadership Council, along with McComas, plan to start formulating an action plan based on the concerns identified in the survey. "The culture survey gives us plenty of opportunity to look at ways to improve the workplace environment," Brog said. "We are just starting to kick that effort off."

McComas noted in his email that one issue – sexual harassment – "is too important to wait." PPPL's leadership will be working with Princeton University to ensure PPPL staff are aware of the numerous mechanisms in place to "safely report harassment," he said.

The organizational diagnosis was based on confidential individual and group interviews with 160 people at the Lab, which were used to identify issues in a survey sent to about 500 employees. Princeton Consulting met separately with research and operations staff in feedback sessions last month before giving the report to McComas. Princeton Consulting's final report is in the form of a PowerPoint presentation and is comprised of the set of slides previously shown to the staff plus three pages of feedback from the meetings and two more with some statistical information requested by staff. [↗](#)

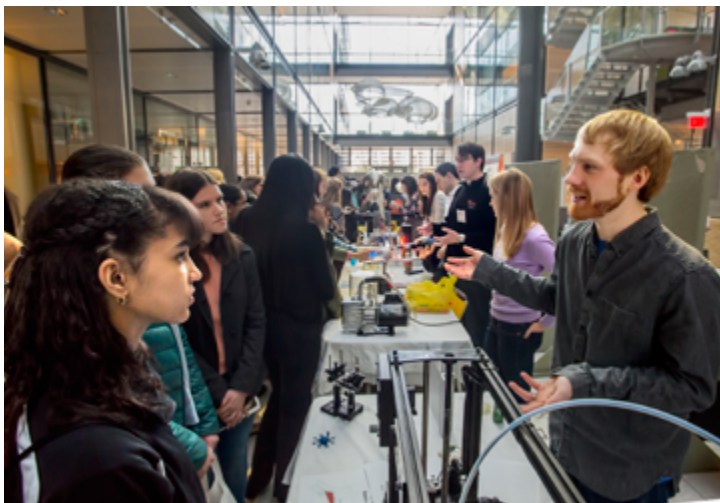
## Young Women's Conference

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it wasn't always easy, she said. When she failed the same calculus class twice, she might have quit, if it weren't for the encouragement of mentors to keep going. "If I ever worried about what people thought about me, I would never have become a rocket scientist," she told students.

By persevering, she became an engineer for NASA's Goddard Space Flight Center just outside Washington D.C. in Greenbelt, Maryland. She was the project manager or engineer for numerous instruments, including the Lunar Orbiter Laser Altimeter (LOLA) that measures the topography of the moon on board the Lunar Reconnaissance Mission, which has been orbiting the moon since 2009.

Along the way, she worked with a Nobel Prize winner and met the famous civil rights pioneer Rosa Parks. She taught engineering at Howard University and other institutions and has been heavily involved in STEM education programs. Among many awards, Ericsson received the Washington Award from the Western Society of Engineer in 2016, an award whose past recipients include Orville Wright, Henry Ford and Neil Armstrong.



Volunteer Brian Kraus, a graduate student at PPPL, shows students a 3-D printer. (Photo by Elle Starkman)



NJ Assemblymen Dan Benson, right, and Wayne DeAngelo, both from the 14th district, talk to Vidushi Vashist, left, and Bhavishya Banda, both sophomores at West Windsor-Plainsboro North High School. (Photo by Elle Starkman)

Ericsson told students she believes humans could travel to Mars in their lifetime but only if future scientists solve some major challenges over the next decades. She charged the young women in the audience with that task. "We need you guys to develop new launch vehicles that will get us there," she said.

### Viewing the world without boundaries

When astronauts look down to Earth from the International Space Station they don't see any boundaries, Ericsson told the audience, "so there shouldn't be any boundaries for us to work together. You are part of that dream and vision for diversity."

Students said they liked hearing Ericsson's story. "I think it was very inspiring," said Bhavisha Banda, a 10th-grader at West Windsor-Plainsboro North High School. "After her speech, I realized you can mix a lot of your interests (in your career)."

"I enjoyed her passion," said Michelle Tong, a 10th-grade classmate of Banda's. "It kind of reinforced the idea that we can be successful in STEM and have a big impact on the future." [↗](#)

## Princeton University's director of the Office of Gift Planning tours PPPL



John DeLooper, far left, the special advisor to PPPL's interim director, shows Rochelle Makela-Goodman, the director of Princeton University's Office of Gift Planning, second from right, and friends and family, the NSTX-U test cell during a March 28 tour.

## New training module on reporting sexual misconduct

[A new training module](#) for PPPL employees on what to do if you experience or witness sexual misconduct or other illegal activity has been posted on PPPL's Human Resources website, [hr.pppl.gov](http://hr.pppl.gov).

The module advises PPPL staff members of available resources at PPPL and Princeton University for anyone who is the victim of sexual misconduct or who witnesses or learns of such conduct or other illegal activities. The module was developed by Michael Gonzalez, of PPPL's HR Department.

The video reminds PPPL staff to call PPPL's Emergency Services Unit immediately at ext. 3333 from PPPL phones or 609-243-3333 from non-campus phones if they are the victim of or witness a crime or other emergency. Princeton University policy states that all staff members have an obligation to report sexual misconduct to the University's Human Resources Department.

The University also has a confidential hotline at 866-478-9804 as well as several other confidential resources. Additional information is available at <http://sexualmisconduct.princeton.edu>.

# PPPL Celebrates Earth Month

**April 4-28**

## **Trenton Rescue Mission Clothing Drive**

Drop off used or new donations at the Old Security Entrance. If you have any questions, please contact Margaret King, [mking@pppl.gov](mailto:mking@pppl.gov), ext. 3568, or Dana Eckstein, [deckstei@pppl.gov](mailto:deckstei@pppl.gov), ext. 2588.

**April 5**

## **Due date for Green Machine Award nominations**

[See page 8 for details.](#)

**April 10**

## **Due date for PPPL Children's Drawing Contest**

[See page 9 for details.](#)

**April 11**

## **Nature Walk at the Plainsboro Preserve**

12 p.m.

[Sign up here.](#) Contact Virginia Finley, [vfinley@pppl.gov](mailto:vfinley@pppl.gov), ext. 2746, for more information.

**April 18**

## **PPPL Sitewide Campus Cleanup**

10:30 a.m.

A pizza lunch will be served after the clean-up in Mod 6. [Sign up here.](#) The rain date is April 20.

## **April 19 – Earth Day Celebration**

### **Unicor Home Electronics Collection**

7:30 a.m. to 10 a.m.

Warehouse roll-up door  
across from the ESU building

Contact Kyron Jones, [kjones@pppl.gov](mailto:kjones@pppl.gov),  
ext. 3326, for more information,

### **Vendor displays**

11 a.m.

LSB Lobby

Includes Children's Art show  
and succulent office plant giveaways

### **Green Machine Awards**

11:30 a.m.

MBG Auditorium

Snacks and raffle prizes.

### **Earth Day Colloquium (TBD)**

4 p.m.

MBG Auditorium

Go to PPPL's [Environmental Services Division Earth Week page](#)  
for up-to-date information.

## **Hidden Biases lecture at Princeton University**

**“Blind Spot: Hidden Biases of Good People”**

**Thursday, April 13 at 4:30 p.m.**

**McCosh Health Center, Room 50**

**Keynote speaker: Mahzarin Banajl, Harvard University**

# Nominate your green colleagues or teams for Green Machine Awards

Please submit your nominations now for Green Machine Awards honoring PPPL employees or teams that have helped contribute to making PPPL green by the Wednesday April 5 deadline. Complete [the online nomination form](#) or email Virginia Finley ([vfinley@pppl.gov](mailto:vfinley@pppl.gov)).

Please submit award nominations for PPPL employees or employee teams that have contributed to PPPL's environmental performance during the past year by:

- Reducing greenhouse gas emissions
- Saving energy
- Saving water
- Reusing equipment or material
- Recycling materials or equipment
- Reducing the use of toxic or hazardous materials
- Sustainable acquisition (purchasing recycled content, energy efficient, bio-based, and other "green" products)
- Reducing or eliminating pollution
- Other actions that help protect public health or the environment

**Nominations should include:**

- Nominee name(s)
- PPPL work group
- Description of the actions taken
- Estimated cost savings or environmental benefit

**Self-nominations will be accepted.**

**Please contact Virginia Finley ([vfinley@pppl.gov](mailto:vfinley@pppl.gov)) or Leanna Meyer ([lmeyer@pppl.gov](mailto:lmeyer@pppl.gov)) if you have questions or would like information about past Green Machine awards.**

**Note:** While the PPPL Green Machine Awards recognize environmentally sustainable practices at work, we would also like to hear about what you're doing at home. If you've made an effort to "green your home" and would like to share your experience during Earth Day, please complete the applicable section of the online nomination form.



# PPPL Children's Art Poster Contest for Earth Day

The Green Team is sponsoring an art poster contest for PPPL staff members' children and grandchildren, from kindergarten through eighth grade, in honor of Earth Day.

Children can submit 11-by-17-inch art on white drawing paper in any medium by April 10. Winners will receive a special prize and their drawings will be displayed in the LSB lobby on April 19.

Please contact Virginia Finley, [vfinley@pppl.gov](mailto:vfinley@pppl.gov), ext. 2746, for more information or to pick up paper.

**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 April 3	Tuesday April 4	Wednesday April 5	Thursday April 6	Friday April 7
COMMAND PERFORMANCE <b>Chef's Feature</b>	<b>Pulled Pork Walking Taco</b>	<b>Cheesy Mac and Shells</b>	<b>Teriyaki Pork Loin</b> with Lo Mein Noodles and Egg Roll	<b>Sloppy Joe</b> with Tater Tots	<b>Shrimp Basket</b>
Early Riser	<b>Blueberry Pancakes</b>	<b>Cheesy Grit Cakes</b> with 2 Eggs	<b>Tater Tot Breakfast Bake</b>	<b>Ham, Egg &amp; Cheese French Toast</b>	<b>Bacon, Spinach &amp; Mozzarella Quesadilla</b> with Cilantro Cream
Country Kettle	<b>Cream of Broccoli</b>	<b>Spinach and White Bean</b>	<b>Chicken Pot Pie</b>	<b>Cream Of Mushroom</b>	<b>Beef and Rice</b>
Deli Special	<b>Philly-Style Vegetable Cheesesteak</b>	<b>Pepper Ham and Provolone</b> on Semolina Hero	<b>Lemon Rosemary Turkey Sandwich</b>	<b>American Hoagie</b> with Ham, Bologna, and American Cheese	<b>Salami and Fresh Mozzarella</b> with Spicy Pepper Pesto Mayo
Grill Special	<b>Chicago-Style Hot Dog</b>	<b>Chicken and Waffles</b>	<b>Grilled Fish Cake Sandwich</b>	<b>Grilled Margherita Sandwich</b>	<b>Pepperoni Roll</b>
Panini	<b>Stadium Brats</b> with Sauerkraut	<b>Chicken Breast</b> , Fontina Cheese, Pesto Mayonnaise & Tomato on Ciabatta Bread	<b>Buffalo Chicken Sliders</b> served with Fries	<b>Meatball Pepper and Onion Sandwich</b>	<b>NY Street Dog</b> — 2 Sabrett Hot Dogs with Sauerkraut, Red Onions & Mustard served with Fries

MENU SUBJECT TO CHANGE WITHOUT NOTICE

HEART HEALTHY

VEGETARIAN OPTION

**WEEKLY** Editor: **Jeanne Jackson DeVoe** ♦ Layout and graphic design: **Kyle Palmer** ♦ Photography: **Elle Starkman** ♦ Science Editor: **John Greenwald** ♦ Science Writer: **Raphael Rosen** ♦ Webmaster: **Chris Cane** ♦ Communications Director: **Larry Bernard**

The PPPL WEEKLY is published by the [PPPL Office of Communications](#) on Mondays throughout most of the year and biweekly during the summer, 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](mailto:commteam@pppl.gov) ♦ PPPL WEEKLY is archived on the web at: <http://w3.pppl.gov/communications/weekly/>.