

THIS WEEK

THURSDAY, MAR. 2

STEM Day at the Lab
9:30 a.m.–12:30 p.m. ♦ MBG Auditorium and other locations

FRIDAY, MAR. 3

Public Tour
10 a.m.
Contact tours@ppp.gov

SATURDAY, MAR. 4

Science on Saturday
9:30 a.m. ♦ MBG Auditorium
[Eyes wide open and all hands on deck: Challenges and opportunities in responding to the risks of climate change](#)
Elke Weber, Princeton University

UPCOMING

WEDNESDAY, MAR. 8

PPPL Colloquium
4:15 p.m. ♦ MBG Auditorium
[The Breakthrough Starshot Initiative: A Funded Interstellar Flight Project](#)
Edward Turner, Princeton University

SATURDAY, MAR. 11

Princeton Research Day
Science on Saturday
9:30 a.m. ♦ MBG Auditorium
[Science Invigorating Architecture](#)
Forrest Meggers, Princeton University

MAR. 12-15

Mercer Science and Engineering Fair
[See page 7 for information on how to volunteer.](#)

WEDNESDAY, MAR. 15

American Red Cross Blood Drive

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Tony Peurrung, PNNL associate director, discusses national security

By Jeanne Jackson DeVoe

PPPPLers got an overview of a much larger laboratory with a diverse portfolio of projects in a talk by Tony Peurrung, associate director of national security at the Pacific Northwest National Laboratory (PNNL) on Monday, Feb. 20, in the MBG Auditorium.

While national security makes up 55 percent of what PNNL does, the largest project at the Laboratory is less than 10 percent of the total budget and most large projects are less than 5 percent, Peurrung said.



Tony Peurrung gives a talk to PPPL staff on national security programs at the Pacific Northwest National Laboratory on Feb. 20. (Photo by Elle Starkman)

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PPPL launches collaboration with University of São Paulo in Brazil



Ricardo Galvão, of the University of São Paulo, speaks at the conference. (Photo by Elle Starkman)

[Story on page 2](#)

Matthew Kunz named a 2017 Sloan Research Fellow

Matthew Kunz, an assistant professor of astrophysical sciences at Princeton University and a physicist at PPPL, has been named a 2017 Sloan Research Fellow. The two-year, \$60,000 fellowship from the Alfred P. Sloan Foundation recognizes early career scientists of outstanding promise who have been nominated by their colleagues. Kunz, who studies [the detailed plasma physics of space and astrophysical systems](#), was among 126 researchers, including six Princeton University faculty members, to receive a 2017 Sloan fellowship. "I'm extremely grateful for



Matthew Kunz
(Photo courtesy of Princeton Department of Astrophysical Sciences)

having been chosen as a Sloan Fellow and for the flexibility that such an award provides to my research group," Kunz said.

Other Princeton 2017 recipients were Amir Ali Ahmadi, assistant professor of operations research and financial engineering; Nathalie de Leon, assistant professor of electrical engineering; Han Liu, assistant professor of operations research and financial engineering; Silviu Pufu, assistant professor of physics; and Nicholas Sheridan, assistant professor of mathematics.

PPPL launches collaboration with University of São Paulo in Brazil

A workshop that launched a collaboration between PPPL, Princeton University and the Institute of Physics at the University of São Paulo in Brazil took place last week at PPPL. The workshop addressed recent research in the areas of energetic particles and low frequency oscillations in tokamaks. Participants included University of São Paulo Professors Ricardo Galvão and Artour Elfimov. Among other speakers

were PPPL physicists Eric Fredrickson and Elena Belova, and Vinícius Duarte, a graduate student at the University of São Paulo who is conducting research for his dissertation at PPPL. "This collaboration is a new resource to broaden the research at our institutions," said physicist Nikolai Gorelenkov, who organized the workshop and is a thesis advisor for Duarte.



PPPL physicist Nikolai Gorelenkov, who organized the workshop, gives a presentation.
(Photo by Elle Starkman)



Vinícius Duarte, a graduate student at the University of São Paulo who is conducting research for his dissertation at PPPL, gives a presentation.
(Photo by Elle Starkman)

Ronald E. Hatcher Science on Saturday LECTURE SERIES

Mar. 4

Eyes wide open and all hands on deck: Challenges and opportunities in responding to the risks of climate change
Elke Weber, Princeton University

Mar. 11

Science Invigorating Architecture
Forrest Meggers, Princeton University

Mar. 18

Mechanics, organ development, and disease
Celeste Nelson, Princeton University

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

NSTX-U cooling water system is subject of sixth DVVR

By Jeanne Jackson DeVoe

While the field coil cooling water system for the National Spherical Torus Experiment-Upgrade magnets dates back to the Tokamak Fusion Test Reactor and the original National Spherical Torus Experiment before the recent upgrade, it is fully functional.

Engineer Neway Atnafu told a committee during the design verification and validation review (DVVR) meeting on Feb. 22 that the cooling water system is effectively cooling components on the NSTX-U.

The most significant issue to emerge from the DVVR was related to documentation, spare components, and single points of failure, said Rich Hawryluk, the head of the NSTX-U Recovery Project. "They're dealing with one of the older systems in the Laboratory," Hawryluk said. "Because of the age of the system there are issues with documentation. Some of it was updated for the meeting but there's still more to be done."

The cooling water system DVVR was the sixth of 12 scheduled through April. The DVVRs identify potential gaps in the design or construction of each system in the NSTX-U by raising issues identified in individual chits. After being reviewed the chits will become part of a corrective action plan that will be submitted to the U.S. Department of Energy.



A cooling water system alarm panel at D Site. (Photo by Elle Starkman)



Neway Atnafu shows the tour group the water cooling system connected to the NSTX-U. (Photo by Elle Starkman)

As the name implies, the cooling water system is intended to keep various components cool when the experiment is creating super-hot plasmas during experiments or shots and during bakeouts when the outer vacuum vessel is heated to temperatures of up to 150 degrees Centigrade.

The field coil cooling water system supplies water to the toroidal field coils, poloidal field coils, the OH coil, the inboard divertors, the center stack casing and other components. The water is stored in a 32,000-gallon storage tank in the D-Site Pump Room.

The review was chaired by Valeria Riccardo, head of engineering. External reviewers included Geoffrey Gettelfinger, department manager of the Physics Department at Princeton University and a former PPPL engineer; as well as Seokho Kim, of the ITER project office at Oak Ridge; Jim Irby and Brian LaBombard, of MIT's Plasma Science and Fusion Center; Dennis Youchison, of Oak Ridge National Laboratory; and Tom Todd, chair of the Extent of Condition Committee.

Neway and Stefan Gerhardt, deputy engineering director of the NSTX-U Recovery Project, along with Al von Halle, deputy head of operations for the Recovery Project, led members of the committee on a tour of the cooling water system at the NSTX-U test cell and D Site that included a visit to the basement of D Site where much of the equipment is located.

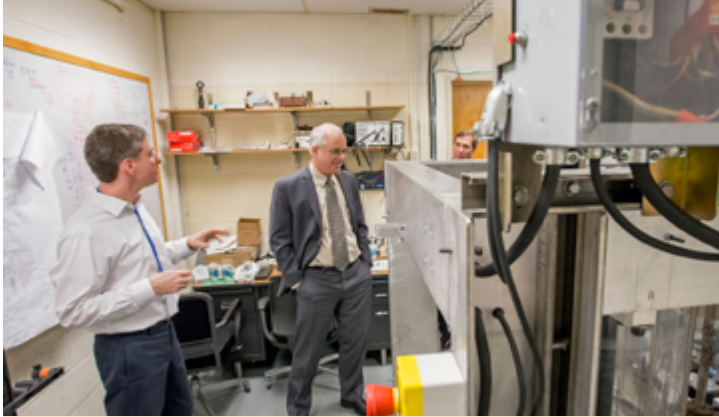


Neway Atnafu, left, the DVVR committee and other PPPL engineers and technicians involved with the review look at a new OH water heater, at right, which will soon be installed. From left: Stefan Gerhardt, deputy head of engineering for the NSTX-U Recovery Project; engineers Feng Cai and Danny Cai, Geoffrey Gettelfinger, department manager of the Physics Department at Princeton University and a former PPPL engineer; technician John Desandro; Valeria Riccardo, head of engineering; and engineer Pete Titus. (Photo by Elle Starkman)

Tony Peurrung

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“Our job is to leverage that science and technology base for a wide variety of national security mission sponsors. We develop and deploy technology, we influence policy,” Peurrung said. That means leading the direction of scientific research, he said. “We drive the science with mission relevance. The national security mission requires you to drive the science.”



Physicist Erik Gilson, left, shows Tony Peurrung, center, and Terry Brog, interim director of PPPL, an advanced liquid centrifuge he invented along with Phil Efthimion, Hantao Ji, Adam Cohen, and Eric Edlund. (Photo by Elle Starkman)

As associate laboratory director at PNNL, which has a campus in Richmond and other locations in Washington, Peurrung oversees PNNL’s portfolio of security programs. Clients include the U.S. departments of Energy, Homeland Security and Defense, the intelligence community, and the National Nuclear Security Administration. Peurrung was previously director of the Physical and Chemical Division, and was technical group manager in the Radiological and Chemical Sciences group and a staff scientist and senior research scientist. He has four patents and has authored 45 publications. Peurrung has a Ph.D. in plasma physics from the University of California, Berkeley.

Peurrung is a former colleague of Terry Brog, PPPL’s interim laboratory director. Brog and Peurrung said they planned to discuss potential collaborations between PPPL and PNNL.

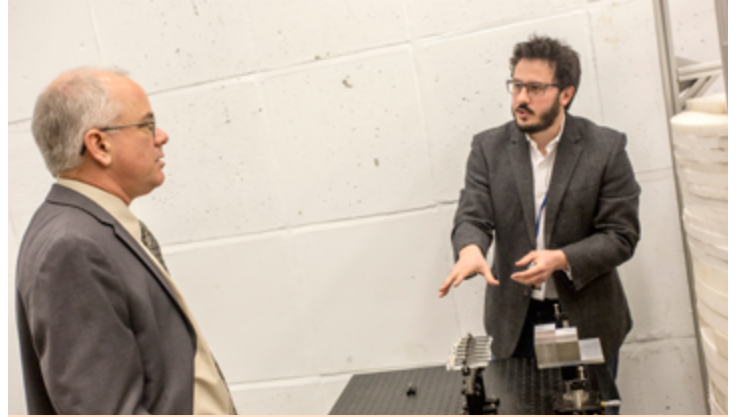
Peurrung discussed PNNL’s mission to advance science and provide leadership in several areas that include climate and earth systems science, biological systems, nuclear and particle physics, advanced computing, chemical and material sciences; and two DOE user facilities, the Environmental Molecular Sciences Laboratory (EMS) and the Atmospheric



Tony Peurrung, second from left, director of National Security at the Pacific Northwest National Laboratory (PNNL), at the National Spherical Torus Experiment-Upgrade (NSTX-U) test cell, with from left, Jonathan Menard, head of NSTX-U Research, who led the Feb. 20 tour; Michael Zarnstorff, deputy director for research; and Terry Brog. (Photo by Elle Starkman)

Radiation Measurement (ARM) Climate Research Facility. The Laboratory earned just over \$1 billion in fiscal year 2014 with a staff of 4,300, Peurrung said. More than half of that was national security with nearly \$572 million in business and a direct staff of 896, Peurrung said.

Scientists at PNNL are working in several research areas in energy and the environment, Peurrung said. These include electricity infrastructure, nuclear energy, nuclear regulatory, energy efficiency and renewable energy, clean fossil energy and environmental health and remediation, he said.



Sebastien Philippe, right, a Princeton University graduate student, shows Tony Peurrung, left, a device that could potentially be used to confirm nuclear weapons in future disarmament agreements in the CASL laboratory. (Photo by Elle Starkman)

Another element of the Laboratory’s national security mission is to steward critical national programs. For example, the Laboratory is the design authority for producing tritium in the United States, Peurrung said.

Among the biggest sectors of PNNL’s national security program are defense, nuclear security and nuclear non-proliferation, Peurrung said. The smallest of those is a \$75 million program and the largest is \$250 million. The laboratory has several new facilities, with 10 new buildings constructed in the last 8 to 10 years to replace World War II-era facilities, Peurrung said.

Among the numerous programs PNNL is heading is a program to research safety levels in nuclear operations. That will require a biological safety level 3 operation in Seattle, Peurrung said. “It is difficult but in my view we were put here to solve the hard problems,” he said. “I’m very pleased to step up to those.”

The national security office does research across the globe. “If you’re going to span from fundamental science to mission critical support, it turns out that requires travel,” Peurrung said. “In a typical year we work in more than 100 countries.”

PNNL specializes in nuclear material analysis, Peurrung said. He showed a photo of an old bottle that was unearthed 10 years ago at the Hanford Site in a safe. The analysis identified the age of the sample and where it was from. It turned out to be a gram of plutonium that was sent to Hanford from Oak Ridge National Laboratory in 1944. “That was indicative of the quality we have to do in nuclear material characterization,” Peurrung said. Analysts in other areas of the laboratory are similarly able to analyze the origin of microchips and even microorganisms that might be used in a biological weapon, Peurrung said.

PNNL is well known for helping to develop scanning technology for airports, Peurrung said. He noted that scientists at the laboratory have now developed a far more accurate scanning technology that can see whether someone has a weapon without human intervention.

DVVR

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Neway Atnafu, left, and engineer John Dellas and other group members in front of a large water tank in the D Site basement. (Photo by Elle Starkman)

Meanwhile, Hawryluk, along with Charles Neumeyer, engineering director for the Recovery Project, and Gerhardt, are preparing for a four-day extent of condition meeting that begins March 6. This involves evaluating which of the hundreds of chits to come out of the first five DVVRs must be addressed immediately in a corrective action plan. It also involves grouping individual chits into broader categories of super chits. The documents will be sent this week to members of the EOC committee, which is made up of external reviewers who are national and international experts in the field. The interim report for the corrective action plan is due at the end of March.

This week's DVVR is a two-day meeting on NSTX-U's power systems on Feb. 27 and 28. Engineer John Dellas is the main presenter and Neumeyer is chairing the meeting. 📍

Tony Peurrung

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Researchers monitor radiation from nuclear power plants and may have been the first to see a spike in radioactive xenon released from the Fukushima Daiichi Nuclear Power Plant in Japan in 2011. It also assesses foreign weapons programs for the U.S. government.

PNNL has been a leader in cybersecurity, Peurrung said. For example, researchers at the laboratory are developing collective protection tools that can alert all the national laboratories if one of the laboratory's cybersecurity systems is breached.

In the area of energy and environment, PNNL works on sustainable technologies that soldiers might be able to use.

After speaking to a full house in the MBG Auditorium, Peurrung took a tour of PPPL led by Jonathan Menard, NSTX-U research head. They were joined by Terry Brog, interim director of PPPL, and Michael Zarnstorff, deputy director for research. The group visited the NSTX-U test cell. They also visited the Consortium for Advanced Simulation of Light Water Reactors (CASL) laboratory. There, Princeton University graduate student Sebastien Philippe gave a presentation about his research into a system he developed with PPPL's Robert Goldston and Princeton University's Alex Glaser, that could potentially be used to confirm nuclear



Jonathan Menard, center, shows Peurrung, left, and Michael Zarnstorff, right, the NSTX-U test cell. (Photo by Elle Starkman)

weapons in future disarmament agreements. Physicist Erik Gilson showed Peurrung an advanced liquid centrifuge he invented along with Phil Efthimion, Hantao Ji, Adam Cohen, and Eric Edlund during a visit to the Laboratory Wing. The group also visited the new Laboratory for Plasma Nanosynthesis at PPPL where principal research physicist Yevgeny Raitses gave them a tour. 📍

American Red Cross Blood Drive

Wednesday, March 15 from 8 a.m. to 1 p.m.

Appointments are preferred. Please call the OMO at ext. 3200 or go to redcrossblood.org and enter sponsor code PPPLPrinceton.

You can make a difference! Your blood donation matters!

Thank you!

—American Red Cross, Occupational Medicine Office and Human Resources

Third graders learn about plasma science

Physicist Ahmed Diallo and engineer Atiba Brereton visited Mrs. Hopkins' third grade class at Wicoff Elementary School in Plainsboro Township on Feb. 16. They did science demonstrations and talked a little bit about plasma science. Among the pupils was Diallo's son Elias.



Pupils surround Atiba Brereton as he shows them how a marshmallow expands in a vacuum tube. (Photo by Ahmed Diallo)



Atiba Brereton uses a copper tube and a magnet to talk about how magnets work with third graders. (Photo by Ahmed Diallo)

Explorer's group tours PPPL

A group of 14 high school students and six parents from the Arconic Explorer's Post #7 toured PPPL on Feb. 20 with tour guide John DeLooper. The group is hosted by Arconic Power and Propulsion (formerly Alcoa Inc.) in Dover, New Jersey. Students do STEM projects and monthly field trips such as the trip to PPPL.



John DeLooper shows the Explorer's group the NSTX-U Control Room. (Photo by Steve Owens/Arconic Post #7)



John DeLooper shows students and parents the National Spherical Torus Experiment-Upgrade. (Photo by Steve Owens/Arconic Post #7)



An overhead shot of the Explorer's group touring the NSTX-U test cell. (Photo by Steve Owens/Arconic Post #7)

Volunteers wanted for Mercer Science and Engineering Fair

Organizers of the Mercer Science and Engineering Fair are looking for scientists and engineers to volunteer as judges of fourth to twelfth-grade science projects during the fair in March at Rider University.

Students from Mercer County schools show off their original science projects at the fair from March 12 to March 15. Judging takes place March 12 to 13. Additional information about the fair is available at <https://mercersec.org/about/msef>.

To volunteer, go to <http://mercersec.org/help/BecomeAJudge> or contact volunteers Kevin Lamb, klamb@pppl.gov or Hans Schneider, hschneid@pppl.gov.

Staff, Family & Friends Ski & Snowboard Trip

Join your co-workers, families and friends for a fun day of skiing and riding at Shawnee Mountain! Just a 90-minute drive from Princeton. Shawnee is a great place for novice skiers and riders, offering a “Best Value” package of lift ticket, equipment rental and lessons for only \$65.

NOTE: We need a minimum of 15 participants to get the discounted group rates shown below.

TRIP DETAILS - SATURDAY, MARCH 4, 2017

- Mountain is open from 8:00 am to 10:00 p.m.
- Lift Ticket: \$38.00/person
- Lunch Voucher: \$9.00/person (includes a choice of hot sandwich or salad, soft drink and French fries)
- Ski/Board Rental: \$25.00/person
- Helmet Rental: \$9.00/person
- “Best Value” Ski or Snowboard Package: \$65.00/person

(\$90 value: all-mountain lift ticket, rental & group lesson — lesson times throughout the day)

QUESTIONS:

Contact Rob Sheneman (x3392 or rsheneman@pppl.gov)

Two-step reservation process:

- 1. Complete the online reservation form using the link below: <https://goo.gl/oNNnWY>
- 2. Make your payment in cash or check to Rob Sheneman by 4 p.m. March 1. (x3392, MOD VI, Room 111)

Information on carpooling and how to pick up your lift tickets and vouchers will be distributed by email after you make your reservation.

**Reservation deadline:
Wednesday, March 1 by 4 p.m.**

This event is not sponsored by PPPL or financially supported by DOE contract funds.

Business Operations issues important highlights for General Guidelines for Subcontractor Travel

Business Operations has developed a document summarizing the Guidelines for Subcontractor Travel. The document is a high-level, quick reference tool highlighting the subcontract travel requirements with the intent of communicating the key facts quickly and succinctly. [The guidelines are available on the Travel and Conference Services website.](#) The important highlights document does not replace the General Guidelines for Subcontractor Travel incorporated into PPPL Subcontracts, and should only be used as a quick reference tool. Specific questions regarding travel under subcontracts should be directed to the Procurement Division and/or the Travel Office.

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 February 27	Tuesday February 28	Wednesday March 1	Thursday March 2	Friday March 3
COMMAND PERFORMANCE Chef's Feature	Asian Power Bowl	Taco Bar Tuesday served with Rice and Beans	Pollo Piccata over Linguine with Green Beans	Sloppy Joe with Tater Tots	Shrimp Basket
Early Riser	Blueberry Pancakes	Scrapple and Eggs	Tater Tot Breakfast Bake	Ham, Egg & Cheese French Toast	Bacon, Spinach & Mozzarella Quesadilla with Cilantro Cream
Country Kettle	Cream of Broccoli	Minestrone	Chicken Pot Pie	Cream Of Mushroom	Beef and Rice
Deli Special	Egg Salad Club Sandwich Wrap	Prosciuttini and Provolone on Semolina Hero	Lemon Rosemary Turkey Sandwich	American Hoagie with Ham, Bologna, and American Cheese	Capicola , Pepperoni, Salami, and Fresh Mozzarella with Spicy Pepper Pesto Mayo
Grill Special	My Big Fat Greek Turkey Burger	Made to Order Grill	Sweet and Sour Salmon Burger on a Whole Wheat Roll with Lettuce, Tomato and Grilled Scallion	Grilled Margherita Sandwich	Philly-Style Cheesesteak Calzone
Panini	Spicy Crab Salad Wrap	Chicken Breast , Fontina Cheese, Pesto Mayonnaise & Tomato on Ciabatta Bread	Buffalo Chicken Sliders served with Fries	Meatball Pepper and Onion Sandwich	NY Street Dog— 2 Sabrett Hot Dogs with Sauerkraut, Red Onions & Mustard served with Fries

MENU SUBJECT TO CHANGE WITHOUT NOTICE

HEART HEALTHY

VEGETARIAN OPTION

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