

## Calendar of Events

### WEDNESDAY, OCT. 28

**PPPL Colloquium**

4:15 p.m. ♦ MBG Auditorium

[Seeing the Big Bang More Clearly:  
The Evolution of Observational  
Techniques in CMB Studies](#)

Dr. Bruce Partridge, Haverford College

### THURSDAY, OCT. 29

**PPPL Benefits Fair**

10 a.m.-2 p.m.

## UPCOMING

### NOV. 3-6

**18th International Spherical  
Torus Workshop**

Princeton University

### FRIDAY, NOV. 6

**Public Tour**

10 a.m.

[tours@pppl.gov](mailto:tours@pppl.gov)

**PPPL Colloquium**

2:15 p.m. ♦ MBG Auditorium

[Technical Aspects of the Iran  
Nuclear Deal](#)

Professor Robert Goldston,  
Princeton University

### NOV. 16-20

**American Physical Society Division  
of Plasma Physics conference**

Savannah, Georgia

### FRIDAY, NOV. 20

**Public Tour**

10 a.m.

[tours@pppl.gov](mailto:tours@pppl.gov)

## INSIDE

Colloquium **2**

Promotion Luncheon **4**

Open Enrollment **4**

Young Women's Conference **5**

Flu Vaccines **6**

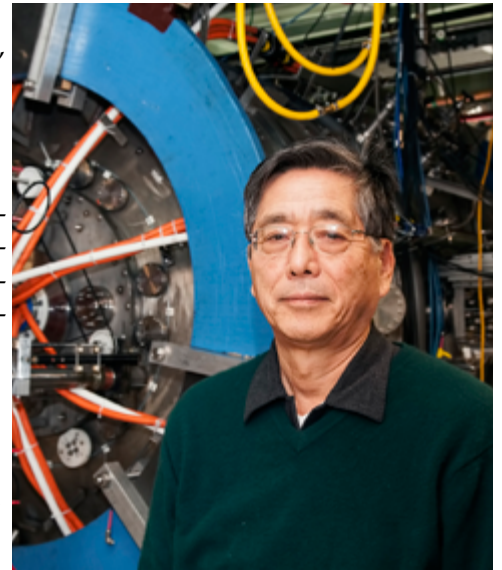
Menu **6**

## Physicist Masaaki Yamada wins 2015 James Clerk Maxwell Prize in Plasma Physics

By Raphael Rosen

Masaaki Yamada, a Distinguished Laboratory Research Fellow at PPPL, has won the 2015 James Clerk Maxwell Prize in Plasma Physics. The award from the American Physical Society (APS) Division of Plasma Physics recognized Yamada for “fundamental experimental studies of magnetic reconnection relevant to space, astrophysical and fusion plasmas, and for pioneering contributions to the field of laboratory plasma astrophysics.”

Yamada will receive the award at the 57th annual meeting of the APS Division of Plasma Physics in Savannah, Georgia, in November, and will present a plenary talk to the session. “I am quite honored and pleased to be recognized,” said Yamada, the principal investigator for PPPL’s Magnetic Reconnection Experiment (MRX), the world’s leading laboratory facility for studying reconnection—an astrophysical process that gives rise to solar flares, the northern lights, and geomagnetic storms.



Masaaki Yamada

[continued on page 2](#)

## Synthetic muscle experiment remains in space following rocket explosion

By Jeanne Jackson DeVoe

A synthetic muscle experiment on board the International Space Station (ISS) that was developed with the help of PPPL scientists is now tentatively scheduled to return to earth in March of 2016 on a new SpaceX-10 rocket. It would be returning eight months later than originally planned after an unmanned SpaceX Falcon 9 rocket headed for the ISS exploded a few minutes after liftoff in late June.

The rocket, carrying the Dragon capsule with 4,000 pounds of foods and supplies, was on its seventh resupply flight to the ISS. It was the third loss of a rocket bound for the ISS in the past year. In April, a Russian resupply ship exploded and in October an Orbital Sciences Corp. Antares rocket carrying a Cygnus cargo craft exploded shortly after liftoff.

The Synthetic Muscle™ material, developed by scientist Lenore Rasmussen at Ras Labs in Quincy, Massachusetts, lifted off on April 14 aboard the same rocket, which was carrying the Dragon spacecraft and some 4,300 pounds of supplies and payloads, including materials for research experiments for the U.S. National Laboratory aboard the ISS. The experiment was slated to return to earth in mid-July. But the material must now remain in space through March while SpaceX investigates the explosion and takes steps to prevent any future problems.

[continued on page 3](#)

## Masaaki Yamada

continued from page 1

Yamada previously won the APS's Award for Excellence in Plasma Physics Research in 2002 and received the Laboratory's Kaul Foundation Prize for Excellence in Plasma Physics Research and Technology the following year.

"Masaaki has accumulated a body of experimental work that has reshaped our understanding of the ubiquitous phenomenon of magnetic reconnection – overturning standard models, discovering new effects, defining new problems," said PPPL Director Stewart Prager. "The results have had huge impact from space physics to fusion plasma physics."

Yamada joined PPPL in 1973 as a postdoctoral fellow after earning a Ph.D. in physics from the University of Illinois. He previously received a bachelor's degree in applied physics and a master's degree in nuclear engineering from the University of Tokyo.

At PPPL, Yamada first worked on basic plasma physics experiments and fusion physics before pioneering research on the MRX, which he built in 1995. The device creates a prototypical magnetic reconnection, which takes place when lines of magnetic force separate and violently reconnect, unleashing large amounts of energy. Yamada has authored or coauthored more than 200 papers, and most recently he and co-workers identified the physical process by which magnetic reconnection converts magnetic energy into explosive particle energy.

Yamada's research bridges the worlds of fusion and plasma astrophysics. His management of the MRX project connects the behavior of magnetic field lines in magnetic fusion facilities with those on the surface of the sun and stars. "One of

the nice things about this research is that we can learn a lot of solar and space science, as well as astrophysics, through the common language of plasma physics," he said.

Reconnection can have powerful consequences for both stars and tokamaks. In tokamaks, reconnection can cause disruptions that shut down fusion reactions. In the sun, reconnection can propel huge blobs of plasma into the solar system, creating disturbances that can disrupt satellites, obstruct cell phone service, and black out electricity grids when the plasma collides with the magnetic field that surrounds the Earth.

Yamada has held invited professorships at several international institutions, including the École Polytechnique Fédérale de Lausanne in Switzerland, Kyoto University and the University of Tokyo in Japan, and more than a dozen graduate students have received a Ph.D. under his guidance. He remains modest about his achievements. "My winning the Maxwell Prize wasn't the result of my actions alone," he said. "I had a great deal of help from all of the other scientists who work on MRX and other plasma devices."

Yamada is the fourth PPPL researcher in the past 25 years to receive the Maxwell Prize. Former PPPL director Ron Davidson won the prize in 2008; Nat Fisch, director of the Princeton Program in Plasma Physics, received the honor in 2005; and Russell Kulsrud, a former head of PPPL's Theory Department, won it in 1993. [▶](#)

# COLLOQUIUM

## Seeing the Big Bang More Clearly: The Evolution of Observational Techniques in CMB Studies

**Dr. Bruce Partridge**  
Haverford College



**Wednesday, Oct. 28**

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



# Lenore Rasmussen

continued from page 1

Meanwhile, the additional time on board the ISS means the material will be exposed to much more space radiation after several months in space than it would be in three months that had been planned.

“I would like to get the experiment back to see what happened but from a scientific point of view it’s good to get the longer exposure,” she said. “It’s not really a setback. It’s just a delay.”

Rasmussen worked closely with PPPL scientists to develop the material’s ability to adhere to metal. She also tested the material for radiation resistance at PPPL last year when scientists exposed the material to 300,000 RAD of gamma radiation. The tests showed there was no change in the material integrity or electroactivity of the selected materials when exposed to high doses of radiation.

“There have only been 1,200 experiments on the whole planet that made it to the International Space Station and her package, with us helping, was one of them,” said Charles Gentile, who collaborated with Rasmussen on the experiments at PPPL. “It shows PPPL is able to support collaborations on a broad spectrum in addition to fulfilling the needs of our mission to develop fusion energy.”



A photo by an ISS astronaut of the lockers holding Rasmussen’s experiment. The metal container is held to the wall with Velcro. (Photo courtesy of NASA)

Rasmussen was back at the Laboratory in late July to discuss future collaborations with Gentile and other scientists. One possibility would be to expose the material to extreme cold temperatures of 400 millikelvin by using a dilution refrigerator that is being used in the Ptolemy project. The temperature is much colder than the temperature of space and is even colder than the temperature of liquid helium of about 4 kelvin.



Eric Sandberg, the CEO of RAS Labs, and Lenore Rasmussen hold samples of their material during a visit to PPPL in late July to discuss future collaborations.

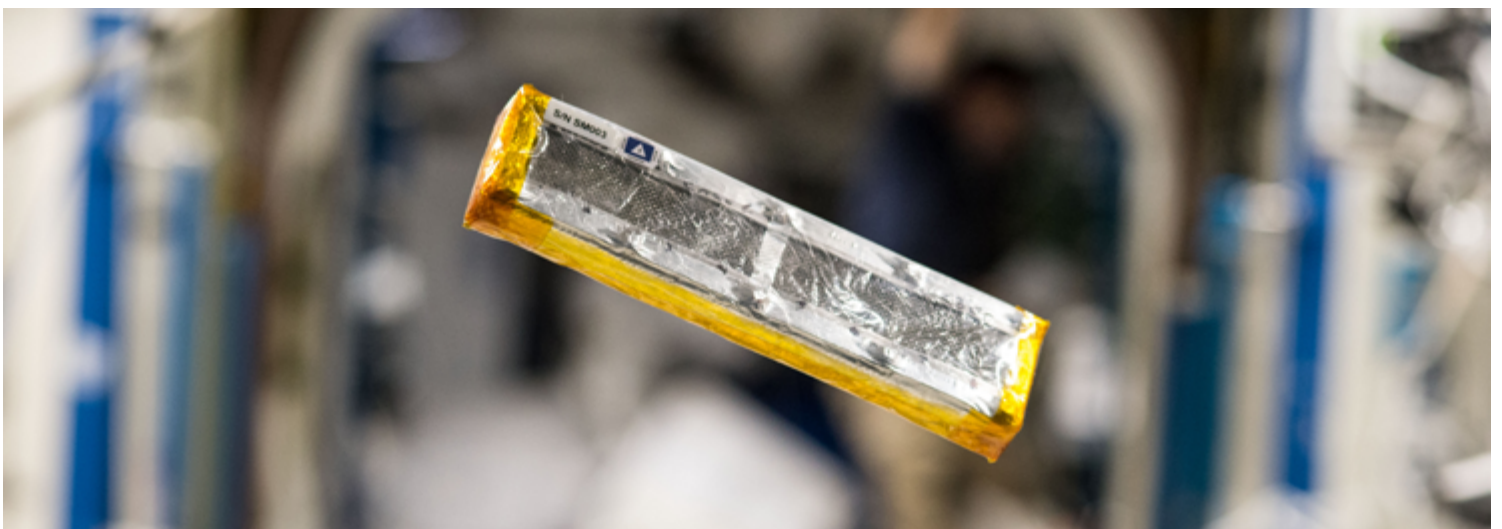
Meanwhile, astronauts on the Space Station continue to take the material from its floating locker in the U.S. laboratory once a month and send back photographs to Rasmussen. “Everything looks good so far,” Rasmussen said.

With the material still in space, Rasmussen must wait for research results that will tell her how well the material withstands the high radiation levels in space. If the material holds up well, it could be useful in developing robots for deep-space exploration such as trips to Mars. It could also be used for robots remediating sites on earth contaminated with high radiation that is too dangerous for humans.

While the material remains on the ISS, Rasmussen has also had to push back the deadline on a chapter in a book she is editing on electroactive polymers, which will include contributions from various experts in the field.

In the meantime, Rasmussen has been busy working on developing the synthetic material for use in prosthetic limbs and other applications. “Now I’m trying to make the materials even more electroactive but maintain that robustness,” she said.

Rasmussen has also been developing a prototype of a self-adjusting prosthetic liner made from the material through a grant from the Pediatric Medical Device Consortium at the Children’s Hospital of Philadelphia. The electroactive polymer could make prosthetics more comfortable because the material would be capable of automatically adjusting as the vestigial limbs of amputees expand and contract during the day. 📺



A photo taken by Astronaut Scott Kelly of a sample of the synthetic muscle experiment floating in the ISS. (Photo courtesy of NASA)

## Staff Members Honored at Promotion Luncheon

More than a dozen of the 30 PPPL staff members who were promoted during fiscal year 2014 (Oct. 1, 2014 to Sept. 31, 2015) were honored at a promotion luncheon in the NSTX-U Annex on Oct. 20.

“I want to congratulate all of the promotees,” said Laboratory Director Stewart Prager. “I think getting promoted is a very significant event. It means for each person here that’s gotten promoted you’ve done an outstanding job at what you do.”

The luncheon was organized by the Events Planning Committee, headed by Kate Harkness and Carol Ann Austin. 📷



Lab Director Stewart Prager congratulates promoted staff members.



Promoted staff who attended the luncheon: Front row from left to right: Jeanine Grau, Doug Loesser, Zhirui Wang, Yang Ren, Helen Wojtenko, Margaret Kevin-King, Carol Ann Austin, John Schmitt, Enrique Merino and Russ Feder. Back row left to right: Michael Mardenfeld, Bill Gervasi, Neil Gerrish, Barry Jedic, Paul Henderson. Not shown are: Robert Andre, Choong-Seock Chang, Bill Davis, Svetlana Drapkin, Dana Eckstein, Renaud Gueroult, Ammar Hakim, Donald Harrison, John Luckie, Adam Maul, Emil Nassar, Raffi Nazikian, Jaclyn Pursell, Akeem Robinson, and Ronald Strykowski.

## Open Enrollment begins Oct. 19

Open Enrollment for benefits will begin **Monday, Oct. 19**, and end **Friday, Nov. 13**.

PPPL will hold its annual Benefits Fair on **Oct. 29** from **10 a.m. to 2 p.m.**



# Young Women's Conference

## PPPL's 15<sup>th</sup> Annual

# YWC

## March 18, 2016



Where: Princeton University,  
Frick Chemistry Building

When: March 18, 2016

Arrival Time: 8:00AM for  
group check-in. Conference  
starts at 9:00AM

End: 2:00PM after keynote  
session.



Registration opens October 16, 2015 and will remain open  
until the registration deadline of March 1, 2016.  
Hurry, space is limited!

Visit our [website](#) or contact Deedee Ortiz at  
[dortiz@pppl.gov](mailto:dortiz@pppl.gov), for more information.



<http://www.pppl.gov/YWC>

# Flu Vaccines Are Here!

Influenza is a contagious disease caused by a virus. It can be spread by coughing, sneezing or nasal secretions.

By getting the flu vaccine, you can protect yourself from influenza and may also avoid spreading this illness to others.

Please call the OMO at extension 3200 to make an appointment.

Thank you.

—The OMO Staff

**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 October 26	Tuesday October 27	Wednesday October 28	Thursday October 29	Friday October 30
<b>COMMAND PERFORMANCE Chef's Feature</b>	<b>Mediterranean Chicken Paella</b>	<b>Vegetable Tetrazzini</b>	<b>Salisbury Steak</b> served with Egg Noodles & Wild Mushroom Stroganoff	<b>Glazed Ham</b> with Apple Cider Raisin Sauce served with Mashed Sweet Potatoes & Vegetable	<b>Red Devil Casserole</b> with Ground Beef Potatoes & Onions
Early Riser	<b>Breakfast Taco</b> with Homemade Turkey Sausage Hash	<b>Grilled Cheese</b> with Sausage, Ham, Egg & Cheese	<b>French Toast English Muffin Sandwich</b> with Sausage & Egg	<b>Grilled Cheese</b> with Veggies, Egg & Cheese	<b>Boo Berry Pancakes</b>
Country Kettle	<b>Country Kettle Sweet Potato Split Pea</b>	<b>Jambalaya Soup</b>	<b>Beer Cheese Soup</b>	<b>Cheeseburger Soup</b>	<b>Pumpkin Soup with Lentil</b>
Grille Special	<b>Handmade 8 oz. Burger</b> with Onion Straws, American Cheese & BBQ Sauce	<b>Bologna Burger</b> with Peppers, Onions & American Cheese	<b>Fried Shrimp Po' Boy</b>	<b>Roast Turkey</b> on a Torpedo Roll with Stuffing, Cranberry Sauce and Gravy served with Sweet Potato Fries	<b>Vegetable Boo Rito</b> with Rice & Beans
Deli Special	<b>Portobello &amp; Grilled Onion</b> on Ciabatta with Provolone & Chipotle BBQ Sauce	<b>Slow-Cooked Italian Beef Torpedo</b>	<b>American Hoagie</b> with Cooked Salami, Bologna & American Cheese	<b>Apple Tuna Salad</b> with Walnut, Relish & Grapes served on Multigrain Bread	<b>Mummy Pizza</b>
Panini	<b>Muffaletta Panini</b> on Sourdough Bread	<b>Hot &amp; Crusty Shrimp Sandwich</b>	<b>Vietnamese Chicken Sandwich</b>	<b>Veggie Burger Parmesan</b> with Mushrooms and Mozzarella	<b>Beans &amp; Frank &amp; Stein</b> (Hot Apple Cider)

MENU SUBJECT TO CHANGE WITHOUT NOTICE

VEGETARIAN OPTION

**WEEKLY**

Editor: **Jeanne Jackson DeVoe** ♦ Layout and graphic design: **Kyle Palmer**

Photography: **Elle Starkman** ♦ Science Editor: **John Greenwald** ♦ Webmaster: **Chris Cane**

The PPPL WEEKLY is published by the [PPPL Office of Communications](#) on Mondays throughout the year except for holidays.

**DEADLINE for calendar item submissions is noon on WEDNESDAY. Other stories should be submitted no later than noon on TUESDAY.**

Comments: [commteam@pppl.gov](mailto:commteam@pppl.gov) ♦ PPPL WEEKLY is archived on the web at: <http://w3.pppl.gov/communications/weekly/>.