

## At PPPL THIS WEEK

**WEDNESDAY, FEB. 13**

### PPPL Colloquium

4:15 p.m. ♦ MBG Auditorium

Volcanism, Impacts and Mass Extinctions: Causes and Effects

Gerta Keller, Princeton University

Refreshments at 4 p.m. in the LSB Lobby

[Click here for link](#)

**THURSDAY, FEB. 14**

Happy Valentine's Day

**SATURDAY, FEB. 16**

### Science on Saturday

9:30 a.m. ♦ MBG Auditorium

From Robot Soccer to Automotive Safety: An Optical Tour

Andrew Hicks, Drexel University

### UPCOMING EVENTS...

Feb. 22 - 23

### DOE's NJ High School Science Bowl®

Contact Deedee Ortiz, x2785 or email [dortiz@pppl.gov](mailto:dortiz@pppl.gov)

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# Safety Champions aren't shy when it comes to safety

By Jeanne Jackson DeVoe

The Safety Champions committee may sound like it's made up of a group of superheroes who fight for safety but in fact the group is made up of workers on the "front lines" at PPPL who will promote the cause of safety in the Laboratory.

And while they might not have superpowers, they do bring a wealth of knowledge about safety to the newly formed committee. The group's mission is to bring the perspective of workers from every level of the Laboratory to the safety discussion.

The Safety Champions group is loosely based on a similar group at PSE&G and comes partly as a response to the incident at PPPL last March in which a worker was injured while operating a skid-steer loader.

Michael Williams, Associate Laboratory Director for Engineering and Infrastructure, said PPPL has a strong safety record overall. But, he said, "One of the things that continues to occur over time in our safety performance is complacency. One of the challenges is keeping the safety culture fresh in people's minds. You have to introduce novel perspectives to keep people thinking there are fresh things (to learn) about safety."

The group will have a rotating membership, meaning that half the members will be replaced each year and the committee chair will serve for just one year. Another manager also will replace Williams eventually.

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# Sheldon does fusion with a big bang

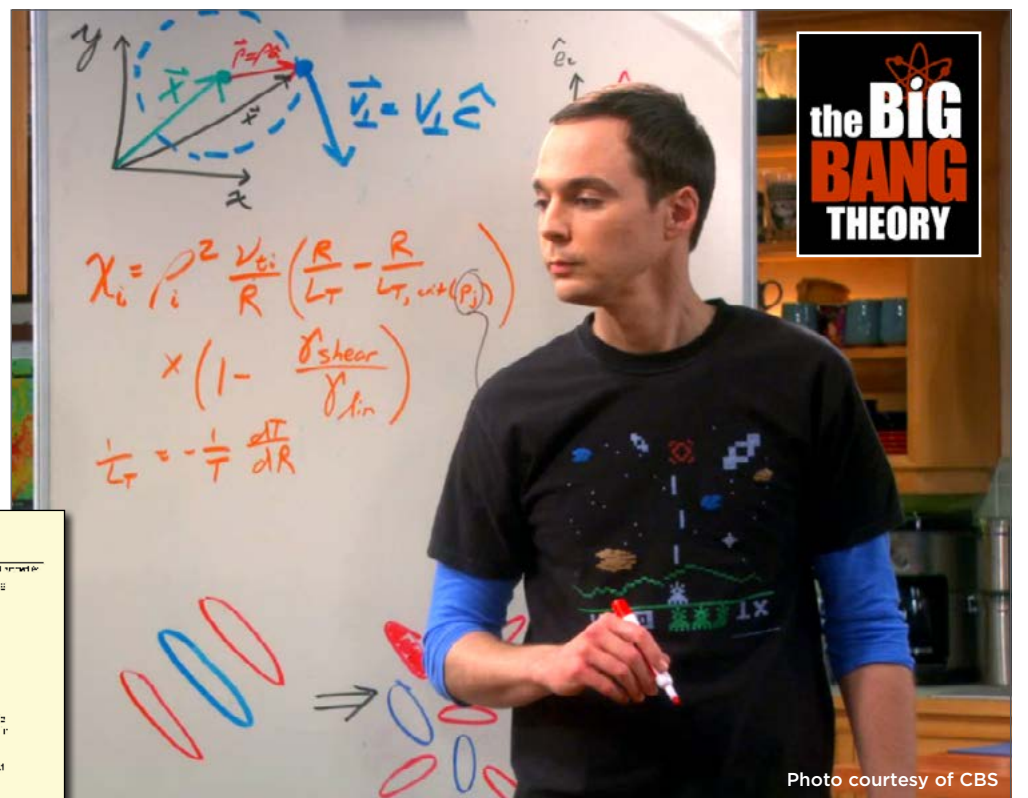


Photo courtesy of CBS

Above, in a scene from a recent episode of the top-rated CBS TV comedy, *The Big Bang Theory*, lead character Sheldon, a theoretical physicist, works on an equation describing turbulent diffusion in fusion devices. The equation closely resembles another included in a talk by PPPL physicist Greg Hammett at the Kavli Institute in Santa Barbara (inset left). Later in the same episode, Sheldon starts to explain his ideas for how to reduce turbulence and build a fusion reactor, only to be interrupted. David Saltzberg, a UCLA faculty member and the physics consultant to the show, is a Princeton University graduate.

**IFS-PPPL Transport Model**

• Fusion ion nonlinear gyrofluid simulation of IFS, includes wave coupling of constant speed kinetic  $\chi_i$  linear gyrokinetic for anisotropic electron orbits

$$\chi_i = \rho_i^2 \frac{v_{ti}^2}{R} \left( \frac{R}{L_T} - \frac{R}{L_{T,crit}(p_j)} \right) F(p_j) \left( 1 - \frac{\gamma_{shear}}{\gamma_{lin}} \right)$$

$$\frac{1}{L_T} = -\frac{1}{T} \frac{dT}{dr}$$

• Use same toroidal scalings from tokamak analysis theories into a simple formula. Computerwise enough to explore every closed orbit, tends to be more robust than other gyrofluid models by using gyroviscosity tensor and toroidal geometry (poloidal  $B$  and toroidal  $\omega$ ).

• Very successful in demonstrating that tokamak heating of ions based on resonant wave-particle interactions is a special improvement for more general gyrokinetic models of anisotropic ion key physics

$$\chi_i = \rho_i^2 \frac{v_{ti}^2}{R} \left( \frac{R}{L_T} - \frac{R}{L_{T,crit}(p_j)} \right) F(p_j) \left( 1 - \frac{\gamma_{shear}}{\gamma_{lin}} \right)$$

$$\frac{1}{L_T} = -\frac{1}{T} \frac{dT}{dr}$$

$$p_j = \left( \frac{R}{L_T}, \frac{R}{L_T}, \frac{T}{T_e}, q, \delta, Z_{eff}, m_i, \frac{r}{R}, \dots \right)$$

# Safety champions

continued from page 1

The eight-member committee held its first meeting on Jan. 29 and will meet again at the end of this month. The members plan to discuss their observations and come up with some suggested actions to address any perceived problems. The chairman of the group, Barry Jedic, will report the group's views to the ESH&S Executive Board, which meets quarterly and holds its next meeting in April.

Williams said the group immediately got into a lively discussion about each member's background in safety and observations about safety at the Laboratory. "They're not shy," said Williams. "None of them are afraid to speak up."

Sajjad Gilani, an electrician who is working on the NSTX upgrade, is one of the members who doesn't hesitate to say what he thinks. He told Williams for example, that he's not crazy about the all-hands safety meetings and he thinks smaller safety meetings would be more useful.

Gilani believes that everyone at the Laboratory should have the same awareness of safety that he sees in the technicians he works with every day who are quick to tell someone to put on a helmet or gloves or take other precautions. "If we could have everyone at the same level, things will be much better," he said. "Those guys take much more initiative when it comes to safety. When I'm working over there everybody watches everybody."

He hopes the committee will make a real difference at the Laboratory. "We talk to our coworkers and people we work with and get their ideas on what else can be done when it comes to safety, what they believe are the safe things to do, that make them feel safer," he said. "I hope that they plan to take our advice and run with it."

Jedic said those first-hand observations are invaluable. "I think there are opportunities to get a better feel for what the personnel at the Lab are thinking about safety and we can hopefully bring that to management," he said.

Jedic, a quality assurance engineer, said he and other committee members would also draw on their experiences at other companies or laboratories. Jedic learned a lot about safety working at Union Carbide (which later became a subsidiary of Dow Chemical) for 23 years. Since the company manufactures chemicals and polymers used in plastics, it requires all employees to attend mandatory safety trainings every month regardless of their job descriptions. "Even though at first it seemed like a waste of time, after a while you start seeing things differently," Jedic said.

He cited one example that occurred at PPPL a couple of years ago when there was a heavy snow. A person who had cleared the sidewalk piled about two feet of snow just outside one of the doors to a building. Jedic said many people probably didn't notice that the snow was blocking the emergency exit door. "If there was an emergency, they wouldn't be able to get out but the person clearing it obviously didn't notice it," he said. When he reported the situation the snow was cleared out immediately.

Steve Raftopolous, a senior engineer in the mechanical engineering division who is also a member of the group, said he likes the idea of sharing his observations from his work on the NSTX upgrade, where he works closely with technicians and encounters safety issues every day. "One of the perspectives I want to bring to this is to give feedback to management and the safety professionals about how the rules are perceived and how they work in the field," he said.

Adam Cohen, deputy director for operations, said he welcomes the opportunity to get different points of view about the Lab's safety policies and procedures. "I want their open feedback, I want the honest truth: Do you think it's going to work or not?" he said. "They know the work, they know PPPL, they know better than anyone sitting in these offices and we need that feedback." 📍



Members of the new Safety Champions Committee come from departments throughout the Laboratory. From left to right: Deedee Ortiz, Science Education; Erik Gilson, Plasma Science and Technology; Sue Hill, Human Resources; Michael Williams, (the Safety Champion), Associate Laboratory Director for Engineering and Infrastructure; Barry Jedic, Quality Control, the group's chair; Tim Conwell, Facilities and Site Services; Steve Raftopoulos, Mechanical Engineering, and Kris Gilton, Electrical Engineering. Not pictured here is Sajjad Gilani, Fabrications and Operations.

# SUPER Super Bowl Party

The festivities came two days early at PPPL's Super Bowl party on Feb. 1 where football fans and non-fans alike got to enjoy a feast of chicken wings, nachos, pigs in a blanket and pretzels while championing their pick in the upcoming game between the Baltimore Ravens and the San Francisco 49ers.

(Ravens fans came to work happy on Monday after their team won a close game 34 - 31).



There was a long line for the nachos as Adam Maul and his buddy Carl Wojtkowiak helped themselves while Ninaad Desai and John Lacenere waited on line.



Green Bay Packers fan Craig Jacobson, standing with Dennis Boyle, at right, wore green to the party.



La Mont Foreman Sr. shows off his allegiance to the Philadelphia Eagles.



Bob Budny and Charles Skinner enjoy a break from the workday at the party.



Above, football fans watched a video of last year's Super Bowl game between the Giants and the New England Patriots. (Happily, the Giants won again).

At right, Ravens fan Virginia Finley and Niners fan Kyron Jones get ready to duke it out over the upcoming game.




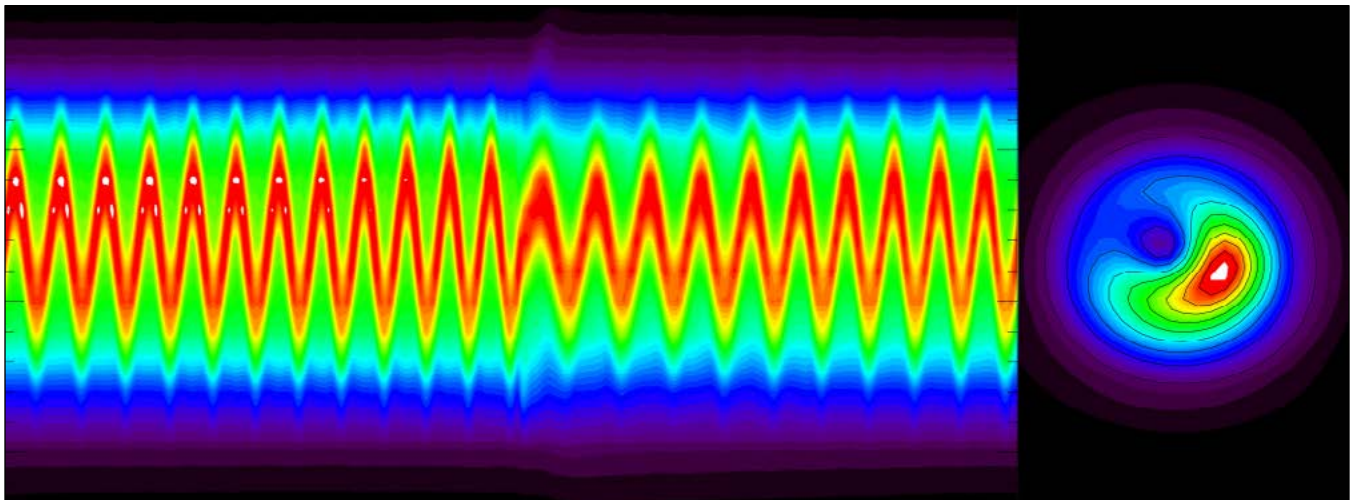
# PPPL-led research sheds new light on pesky “snakes” that cool fusion reactions

By John Greenwald

**C**orkscrew-shaped instabilities called “snakes” have long been a common feature of the hot, electrically charged plasma gas that fuels fusion reactions in tokamaks and other magnetic confinement facilities. Such snakes trap impurities released from the plasma-facing walls, and these impurities radiate away copious amounts of energy, cooling the plasma to temperatures below those required to produce fusion as a source of clean and abundant energy for generating electricity. Understanding the formation and survival of snakes can thus be essential to eliminating the problem so that fusion can take place.

New experimental data reported in the Feb. 8, 2013, issue of “Physical Review Letters” sheds new light on

how snakes form and survive in fusion plasmas. The paper, whose lead author is PPPL physicist Luis Delgado-Aparicio, cites recent experiments on the Alcator C-Mod tokamak at the MIT Plasma Science and Fusion Center. The findings compiled by a multidisciplinary team show that the formation of snakes cannot be explained, as previously thought, by plasma pressure alone. Instead, the formation reflects complex interactions among phenomena that include the separately evolving plasma density and temperature conditions that produce the plasma pressure. This separate evolution of density and temperature also enables the snakes to survive periodic relaxations of plasma pressure known as sawtooth instabilities. 




Left: Time sequence of a snake depicted by X-ray detectors. The sawtooth crash occurs halfway through the sequence and barely perturbs the snake. Right: X-ray tomographic reconstruction of cross-section of crescent snake inside Alcator C-Mod. (Images courtesy of Luis Delgado-Aparicio)

## Many people failing the composting and recycling test in the cafeteria

**A** QUICK QUIZ: You’re in the cafeteria at lunchtime and you’ve just finished your plate of pasta and your soda. Now you just have a paper plate, an empty soda can, an empty cup and a metal knife and fork on your tray. Do you:

- A. Dump everything, including the knife and the fork, into the trash?
- B. Put your knife and fork into the designated container and then dump everything else into the trash? *or*
- C. Put your knife and fork into a bin, your can into the recycling bin and throw everything else into the compost bin?

If you answered C, congratulations! You are doing the right thing!

But Building and Grounds supervisor Margaret King says that far too many people are ignoring the signs and dumping everything, including their utensils, into the trash. So, here’s a friendly reminder: Please put your cans and bottles into the recycling bin and all food, plates, cups, etc. into the composting bin and (it should go without saying) please don’t throw away the metal utensils! 



Above (from left to right) Building and Grounds Supervisor Margaret King, Environmental Engineering assistant Leanna Meyer and Virginia Finley, head of Environmental Compliance, demonstrate that nearly all of the paper and plastic goods in the cafeteria are compostable.

# 2013 Science on Saturday

Princeton University Plasma Physics Laboratory Lecture Series

<b>FEB. 16</b>	<b>FROM ROBOT SOCCER TO AUTOMOTIVE SAFETY: AN OPTICAL TOUR</b> by Prof. R. Andrew Hicks, Department of Mathematics, Drexel University
<b>FEB. 23</b>	<b>NO LECTURE — DOE'S NJ HIGH SCHOOL SCIENCE BOWL®</b>
<b>MAR. 2</b>	<b>LIGHT AND NANOTECHNOLOGY — ENGINEERING AND SO MUCH MORE</b> by Prof. Claire Gmachl, Department of Electrical Engineering, Princeton University
<b>MAR. 9</b>	<b>A SHORT HISTORY OF LENGTH</b> by Prof. Joel Langer, Department of Mathematics, Case Western Reserve University
<b>MAR. 16</b>	<b>A ROBOT'S VIEW OF OUR OCEAN PLANET</b> by Josh Kohut, Assistant Professor of Oceanography, Center for Coastal Physical Oceanography, Rutgers University

## Volunteers Needed


U.S. Department of Energy  
**NATIONAL SCIENCE BOWL®**

PPPL will host 48 teams of middle and high school students (about 250 students total) on Friday & Saturday, Feb. 22-23 at the New Jersey Regional Middle and High School Science Bowls.

### WE NEED YOUR HELP!

We are hoping to find: moderators, science/rules judges, time/score keepers, lunch attendants, etc.  
Won't you please consider volunteering your time? Lunch provided for competition day volunteers. Contact Deedee Ortiz @ 2785 or [dortiz@pppl.gov](mailto:dortiz@pppl.gov), to sign up or for more information.

# COLLOQUIUM




**Volcanism, Impacts and Mass Extinctions: Causes and Effects**

**GERTA KELLER**  
Princeton University

**Wednesday, February 13**

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


## Free Help With Taxes for Qualified Workers



The **United Financial Empowerment Center** is providing free tax return help for anyone who earns \$50,000 or less. Certified tax preparers at the Center, which is funded by United Way of Greater Mercer County and the Mercer Alliance to End Homelessness, will complete tax returns for anyone who qualifies and will help them claim tax benefits with the earned income and child tax credits. To make an appointment for free tax help or for help with the Free Application for Federal Student Aid, call 877-652-1148. For more information call 609-896-1912 or visit [www.uwgmc.org/money](http://www.uwgmc.org/money).

# 2013 Science on Saturday

Princeton University Plasma Physics Laboratory Lecture Series



**From Robot Soccer to Automotive Safety: An Optical Tour**

**R. ANDREW HICKS**  
Drexel University






**Saturday, Feb. 16 • 9:30 a.m. • M.B.G. Auditorium**



# PPPL Café Menu

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.

— Mark Gazo, Chef Manager

	<b>MONDAY FEB. 11</b>	<b>TUESDAY FEB. 12</b>	<b>WEDNESDAY FEB. 13</b>	<b>THURSDAY FEB. 14</b>	<b>FRIDAY FEB. 15</b>
<b>COMMAND PERFORMANCE CHEF'S FEATURE</b>	 <b>CREATE YOUR OWN CAESAR SALAD</b>	 <b>CHICKEN &amp; SAUSAGE JAMBALAYA</b>	 <b>BAKED ZITI WITH GARLIC BREAD</b>	 <b>TERIYAKI CHICKEN</b>	 <b>BAKED TILAPIA WITH CRAB STUFFING</b>
<b>EARLY RISER</b>	Mushroom, Spinach & Cheese Omelet	Smoked Sausage Crustless Quiche	Walnut Raisin Pancakes	Vegetable Omelet with Cheese	Onion & Cheddar Omelet
<b>COUNTRY KETTLE</b>	Minestrone 🍅	Chicken, Shrimp Gumbo	Tomato Basil With Rice 🍅	Potato Leek	Southwestern Shrimp & Corn Chowder
<b>GRILLE SPECIAL</b>	Apple Ham Melt With Cheddar Cheese On Texas Toast & Fries	Cajun Fried Catfish Po'Boy	Grilled Cheese with Tomato Served With Homemade Chips	Grilled Chicken Club On a Kaiser Roll With Fries	California Veggie Burger With Fries
<b>DELI SPECIAL</b>	Turkey Salad With Cranberries & Walnuts on Whole Grain Roll	New Orleans Muffaletta	Egg Salad Hoagie	Turkey, Pepperjack, Lettuce & Tomato on a French Baguette	Southwestern Shrimp Taco Pocket
<b>PANINI</b>	Pork Roll, Cheddar & Tomato Ciabatta	Open-Faced Tuna Melt 🍅	Shredded Chicken Quesadilla	Grilled Vegetables & Hummus Wrap 🍅	Fresh Mozzarella, Tomato & Basil Ciabatta

MENU SUBJECT TO CHANGE WITHOUT NOTICE

[CLICK HERE FOR A PRINTABLE WEEKLY MENU](#)

# WEEKLY

Editor: **Jeanne Jackson DeVoe** ♦ Layout and graphic design: **Gregory J. Czechowicz**  
Photography: **Elle Starkman** ♦ Web: **Chris Cane** ♦ Admin. support: **Pamela Hampton**

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 Thursday. Other stories should be submitted no later than noon on Wednesday.

Comments: [commteam@pppl.gov](mailto:commteam@pppl.gov) ♦ **PPPL WEEKLY** is archived on the web at: <http://www.pppl.gov/ppplweekly.cfm>