PPPL PRINCETON PLASMA PHYSICS LABORATORY
A Collaborative National Center for Fusion & Plasma Research
U.S. DEPARTMENT OF ENERGY
WEEKLY
MONDAY, JANUARY 28, 2013

A meeting of the minds when NYC °CoolRoofs visits PPPL

By Jeanne Jackson DeVoe

The cool roof at PPPL was downright chilly when two representatives from New York City Mayor Michael Bloomberg's NYC °CoolRoofs program came to visit the Laboratory recently but the meeting itself was warm and could lead to a partnership between the city group, PPPL and Princeton.

Two visitors representing NYC °CoolRoofs got a tour of PPPL's cool roof above the Lyman Spitzer building on a cold, blustery day. From left to right: Geraldine Sweeney, chief strategy advisor in Mayor Michael Bloomberg's Office of Operations; Adam Cohen, PPPL Deputy Director for Operations; Wendy Dessy, the partnerships manager for NYC Service; Elie Bou-Zeid, a professor of civil and environmental engineering at Princeton University; Jay Dessy, a freshman at Princeton University: Dan Li, a graduate student working with Bou-Zeid; Prathap Ramurthy, a postdoctoral research associate at Princeton and Mark Hughes, an environmental engineering associate at PPPL.

Geraldine Sweeney and Wendy Dessy, who are both involved with the NYC °CoolRoofs program, got a frosty firsthand view during the Jan. 18 meeting of the rooftop of PPPL's Lyman Spitzer building, which is divided into a section covered by a cool white membrane and a black membrane. They also were able to view one of the five weather stations that will measure how the different roofs save energy in varying temperatures and weather conditions.

continued on page 4

Science on Saturday attracts science fans of all ages

By Jeanne Jackson DeVoe

By 7:50 a.m. on Saturday morning, cars were already lining up at PPPL's security booth. By 8:45 a.m., all the donuts and bagels were gone and by 9 a.m., the Lab's 280-seat auditorium had filled, sending visitors to pack the cafeteria.

continued on page 2

A packed audience for PPPL's Science on Saturday lecture on Jan. 12.

At PPPL THIS WEEK

WEDNESDAY, JANUARY 30

GFDL Events and Seminars
12 p.m. ◆ Geophysical Fluid Dynamics Laboratory (GFDL)
Smagorinsky Seminar Room
The history of GFDL computing: a user perspective
Ron Stouffer (GFDL)
www.gfdl.noaa.gov/events
(Gov't, University or 2 other forms of I.D. needed)

PPPL Colloquium
4:15 p.m. ◆ MBG Auditorium
Past and Future Hurricane Activity
Gabe Vecchi, Geophysical Fluid Dynamics Laboratory
Refreshments at 4 p.m. in the LSB Lobby
Click here for link

FRIDAY, FEBRUARY 1

PPPL Super Bowl Party
2 p.m. ◆ LSB Lobby
Wear your team colors!

SATURDAY, FEBRUARY 2

Science on Saturday
9:30 a.m. ◆ MBG Auditorium
From 0 to C in 60 minutes: a crash course in Einstein
R. Shankar, Yale University

UPCOMING EVENTS...

Feb. 22 - 23
DOE's NJ High School Science Bowl®
Volunteers needed.
Contact Deedee Ortiz, x2785 or email dortiz@pppl.gov

U.S. Department of Energy NATIONAL SCIENCE BOWL®

inside

Science on Saturday

continued from page 1

Welcome to Science on Saturday – the hottest ticket in town, where 510 people woke up early in the morning on a gloomy Saturday in January recently to listen to a talk on "Visualizing the Atomic World," by Udo Schwarz of Yale University.

The lecture was so popular on this particular day that there was standing room only in the cafeteria where the audience watched the presentation on large television screens.

The crowd was made up of a mix of the young – high school students who are getting extra credit or are simply crazy about science and the mature – retired people who just can't get enough science and who never miss a lecture, with many people of different ages in between.

For Varuni Bewtra, a senior high school student from Monroe Township, the lectures are a way for her to glimpse various science fields. "I was researching a lot of fields online but it's not the same as actually listening to people who are in the field talking – so you can kind of get a feel for why they like it and what they've done with it and why they are successful. It's kind of different because you can ask them questions also," she said.

One 16-year-old from Pennington admitted she was there because she was getting extra credit but she said she enjoyed the lecture even from her seat in the cafeteria. She said she plans to go into engineering and didn't mind missing some sleep to attend. "It's still more 'sleeping in' than school," she said with a shrug.

"They don't just come because they have to, they come because they want to," said Deedee Ortiz, a Science Education staff assistant who helps organize Science on Saturday. "I would never think of getting up that early when I was in high school but they're into it."

Sheldon Reich of Monroe Township has been coming with his wife Shirley for 10 years. A retired mathematician, Reich said he comes to the program because "it's the cutting edge of science. It's a lot of new stuff that I didn't know about, so it's very interesting," he said.

Tim Young of Princeton Junction also is a fan. "I just love every one of them," he said. "The speakers are fantastic. I love to see the kids here. I think this is the greatest program you could think of."

Two couples who are "regulars" at the lectures said they come to most lectures, rain or shine. Bob Neff of Levittown, Pa., a retired biology professor at Mercer County Community College, comes with his wife Elaine. They met as biology majors at Temple University and have shared a fascination for science ever since.

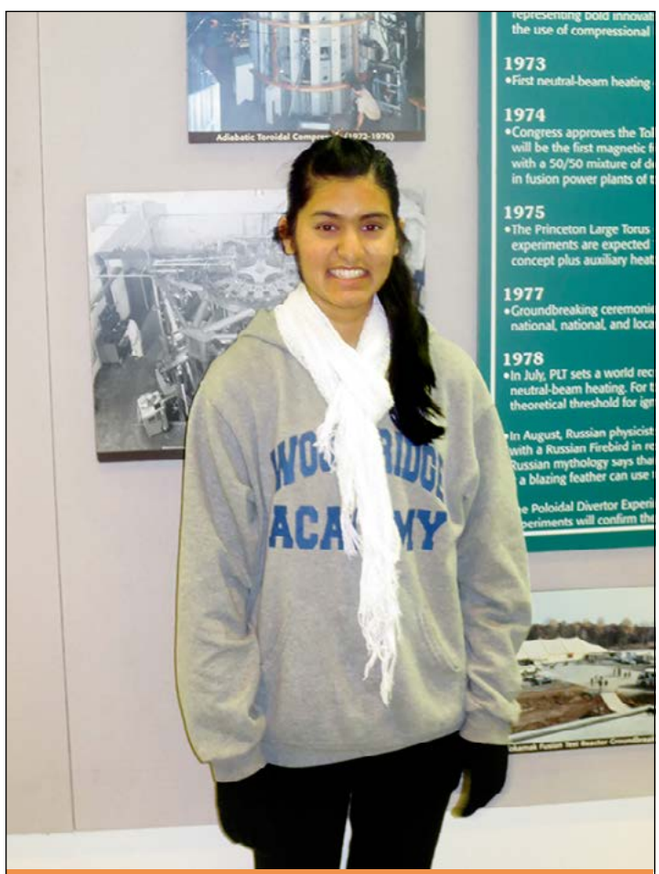
Carlo and Mary Alfare and their friends Bob and Elaine Neff are regulars at the lectures.

Udo Schwarz, of the Department of Mechanical Engineering and Material Science and the Department of Chemical and Environmental Engineering at Yale University, gave a talk on "Visualizing the Atomic World," to an audience of more than 500 people.

They sit in the back of the auditorium with their friends the Alfares. Carlo Alfare, of Roosevelt, a chemistry professor at Mercer County Community College, gives his students extra credit if they come to Science on Saturday. He and his wife Mary, a retired nurse, are regulars. They began coming when their daughter Kathleen was 3. Now she's 32 and has a PhD in chemistry and her mother gives some of the credit to the lectures. "She was fascinated by it from a young age," said Mary Alfare.

The two couples always arrive early but they still don't always make it in time for the doughnuts. "We try to be there by 8:15," said Mary Alfare, "because the kids walk a lot faster than we do."

More Science on Saturday photos on page 3

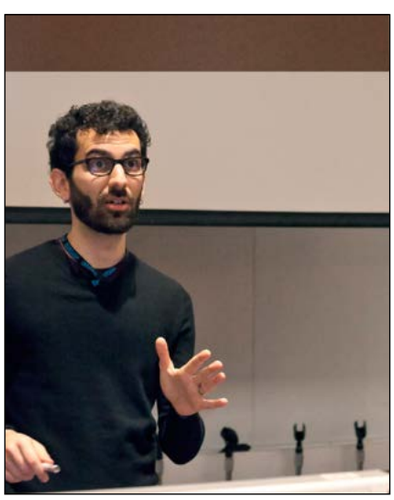


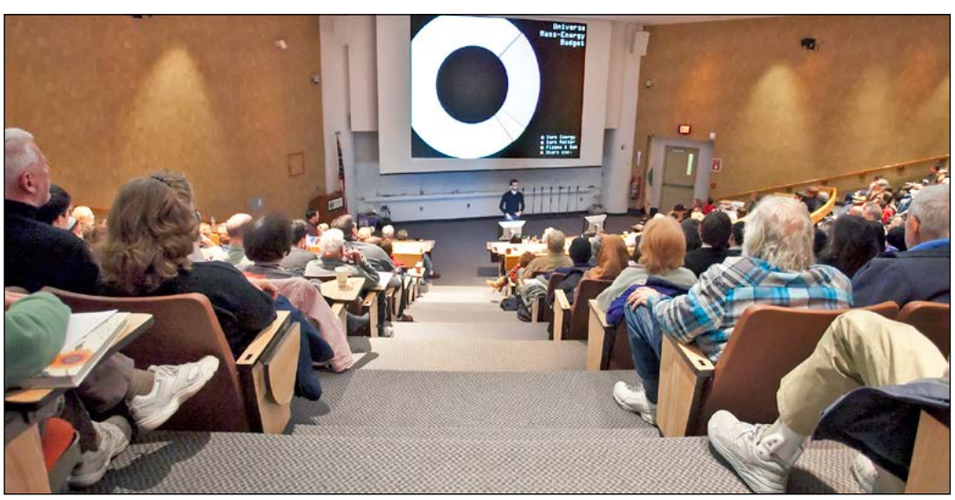
High school senior Varuni Bewtra comes to the lectures to learn about possible careers in science.

Science on Saturday

continued from page 2

Joshua E. G. Peek, a Hubble Fellow at Columbia University's Department of Astronomy and son of PPPL physicist and former director Robert Goldston, discusses "Outer Space!" before a packed crowd at the Jan. 19 Science on Saturday lecture, which 495 people attended.





Prestigious national fellowship in fusion energy and plasma science seeks applicants

There are just two more weeks for high-achieving undergraduate physics and engineering students entering their senior year of college to apply for the National Undergraduate Fellowship in Plasma Physics and Fusion Energy Science, a 10-week program offered each summer at PPPL and other top institutions.

The program begins with a one-week introductory course at PPPL. Students then spend nine weeks working with leading scientists all over the country on research projects in fusion energy or plasma science at PPPL and other sites, which in the past have included General Atomics, the University of California-Davis, Los Alamos National Laboratories and other prestigious institutions.

The fellowship offers a generous $4,800 to $5,000 fellowship plus travel expenses from students' universities or homes to PPPL and other institutions. The program pays for meals the first week of the program and for housing throughout the program.

About three-quarters of the students who take part in the program go on to get their PhDs in physics or engineering. The program is funded by the U.S. Department of Energy's Office of Fusion Energy Sciences. It is open to any university student who is a U.S. citizen or a permanent resident alien.

More information is available at the PPPL Science Education website, http://science-education.pppl.gov/NUF/Overview.html. You can access the online application at http://science-education.pppl.gov/NUF/Admission.html. Contact Deedee Ortiz, dortiz@pppl.gov with additional questions. Applicants will hear back about admission to the program by mid-February.

Cool roofs

continued from page 1

Dessy said she read about PPPL's cool roofs program on the Web and already knew something about PPPL because her son, Jay, who was also at the meeting, is a freshman at Princeton. "I was excited to learn about Princeton's research efforts surrounding cool roofs and to have the opportunity of further brainstorming how we could benefit from each other's work," said Dessy.

NYC °CoolRoofs has an army of volunteers who coat dark rooftops with reflective white paint to help them reduce energy, cooling costs and carbon emissions. The program supports New York City's goal of reducing greenhouse gas emissions 30 percent by 2030.

Program coated 3.6 million square feet of rooftops

More than 4,000 volunteers coated 3.6 million square feet of rooftops on 415 buildings in the organization's first three years. The group targets areas that have been identified as "hot spots," where the urban heat island effect is the worst. They have strict criteria for what types of buildings they can coat and they only work with buildings owned by non-profit organizations in areas that are easily accessible to volunteers. NYC °CoolRoofs also encourages building owners to cool their own roofs, and provides a "Cool It Yourself" toolkit on their website.

Geraldine Sweeney, chief strategy advisor in the Mayor's Office of Operations, said converting black roofs to white cool roofs is important because it combats the urban heat island effect, which causes New York City to be 5 to 7 degrees warmer than surrounding areas because of the vast number of roads and buildings made of asphalt and concrete that absorb heat. "Our goal is to coat 1 million-square-feet of rooftop per year," Sweeney told the group at the meeting. "The program provides benefits and savings to the building owner and has proved to be an effective way to help combat the urban heat island effect."

Sweeney helped start the CoolRoofs program, which was launched in September 2009 in Long Island City at a press conference with Mayor Bloomberg and former Vice President Al Gore. Dessy, the partnerships manager for NYC Service, an organization that connects volunteers with service projects like Cool Roofs, works closely with the project to raise funds from companies and coordinate volunteers. The program is a collaboration between NYC Service and the Department of Buildings.

Sharing research results

PPPL Deputy Director for Operations Adam Cohen, who gave Sweeney and Dessy a tour of PPPL's laboratory and fusion activities, described the meeting as "very positive." "It was great that they made the trek out here," he said.

Sweeney and Rule on the black portion of the LSB roof.

PPPL staff and representatives from NYC °CoolRoofs discussed a possible collaboration at the meeting. From center clockwise: Cohen, Ramurthy, Jeanne Jackson DeVoe, a communications specialist at PPPL; Jay Dessy, Wendy Dessy, Keith Rule, a senior project engineer at PPPL, Bou-Zeid, Sweeney and Leanna Myer, an environmental engineering assistant at PPPL.

"We showed them our cool roof activities and results and gave them some ideas that could be applied to their program."

The pilot program for NYC °CoolRoofs was monitored by Columbia University's Center for Climate Research, which collected data on three white "cool roofs," including one on the Museum of Modern Art Queens in Long Island City, and found there was a 42 degree Fahrenheit difference between white and black roofs during the day in the summer.

NYC °CoolRoofs was one of the first large-scale cool roof programs in the country and is possibly one of the largest in the world, Sweeney said. As a pioneer of the cool roofs concept, New York City is a charter member of the 100 Cool Cities, an initiative of the Global Cool Cities Alliance, which aims to install cool roofs and pavements in the 100 largest cities in the world from Mumbai to Chicago, to combat climate change.

The CoolRoofs program is interested in researching the effects of its program on a larger scale, Sweeney said. "The data collected shows a dramatic decrease in temperature from a black rooftop to a white rooftop, and we're studying the associated environmental benefits. Continuing to expand this program out on a citywide scale could have a tremendous impact on the environment in the years to come."

Interest in a model to predict energy efficiency

Sweeney and Dessy are particularly interested in the model being developed by Elie Bou-Zeid, a professor of civil and environmental engineering at Princeton University. Bou-Zeid, the lead researcher on the project at Princeton, is designing a way to predict the most energy-efficient roof for our regional climate and others. The model uses precise information from the PPPL sensors and weather stations and data on PPPL's energy consumption for heating and air conditioning from its automatic building systems.

NYC °CoolRoofs has a strong interest in further quantifying the benefits of cool roofs, Bou-Zeid said. "They've been going out and painting these roofs white. What they're interested in at this point is whether our measurements and models can help them confirm and quantify the impacts of their program," Bou-Zeid explained. "They're interested in what kinds of roofs would give them the most benefits if they paint them white."

Bou-Zeid said he would share his exact findings with the NYC °CoolRoofs team once he has completed the project over the next couple of months. But the data already show that there is a dramatic temperature difference between white roofs and black roofs in the summer. When

continued on page 5

Cool roofs

continued from page 4

temperatures were in the 90s during the third week of August last summer, for example, the temperature on the cool roof was between 90 to 100 degrees Fahrenheit, while the temperature on the black roof was 130 to 170 degrees. This temperature decrease could reduce the need for air conditioners, lower electric bills and reduce energy consumption and greenhouse gas emissions. However, Bou-Zeid's research also shows that there is much less difference in energy consumption between white and black roofs when a roof is well insulated.

Applying research to New York City

The CoolRoofs representatives would like to see how the research at PPPL could apply to buildings in New York. "One of the things we could look at is how well a roof is insulated and how do you apply that to a large-scale environment like New York City," Sweeney said.

NYC °CoolRoofs has been collecting information from building owners on energy bills before and after their roofs were converted to cool roofs. Keith Rule, a senior project engineer at PPPL, and Bou-Zeid may help them analyze that information by supporting a research project by a summer intern.

"I personally think all of this contributes to the validity and importance of the program and as your team pointed out, there are different benefits to different environments doing this," Dessy said.

The researchers at PPPL and Princeton also pointed out at the meeting that the type of air conditioner a building uses could theoretically be another factor in determining how effective the cool roofs are. A rooftop air conditioner on a cool roof could potentially save more energy than a window air conditioner because the cool roof would not only cool the surrounding roof, it could also cool the air being taken in by the air conditioner and circulated in the building. Rule and Bou-Zeid said they would be interested in doing the research to determine whether that theory is true.

The group examines the weather station on top of the cool roof on the LSB building. From left to right: Sweeney, Bou-Zeid, Ramurthy, Li, Cohen, Hughes, Wendy Desssy, Meyer, Rule and Jay Dessy.

Rule and Bou-Zeid also discussed the possibility of getting Google, which has previously provided funding to NYC °CoolRoofs, to use Google Earth to collaborate with the group on their research. Dessy has worked with Google in the past and they have shown an interest in aiding and helping to fund environmental issues. They are particularly interested in analyzing the effectiveness of cool roofs by finding out what percentage of roofs in the city are white versus black and what percentages of these areas are asphalt and concrete. The research could also perhaps include finding out what percentage of buildings have rooftop air conditioners.

Rule said PPPL is happy to play a role in supporting NYC °CoolRoofs. "This is part of our mission to do science education and outreach," said Rule "so when we have tangible information that could be shared and when you can continue collaborating with Princeton University professors, we all benefit."

For more information on the NYC Cool Roofs project, please visit: www.nyc.gov/coolroofs.

Mike Zarnstorff speaks at Mensa meeting

Michael Zarnstorff, PPPL's deputy director for research, discussed "The Path to Magnetic Fusion Energy" at a meeting of Central Jersey Mensa on Jan. 11 at the Hilton Woodbridge in Iselin.

Safety Culture Survey deadline is Jan. 31

If you received a PPPL Safety Culture Survey in your email last week, please make sure you take the time to fill it out and send it back by Jan. 31.

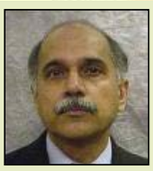
The quarterly survey went out to one-fourth of the PPPL staff and is part of an effort to get a continuous picture of the safety culture at the Laboratory.

PPPL Director Stewart Prager is asking all selected employees to fill out the 24-quesetion anonymous web survey so that PPPL can use employees' responses to make improvements and gauge whether those improvements are effective.

The quarterly survey will be issued again in April, July and October and each staff member will have the opportunity to participate once a year.

2013 Science on Saturday

Princeton University Plasma Physics Laboratory Lecture Series

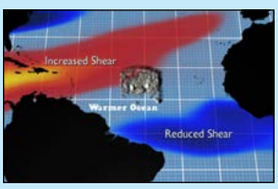


From 0 to C in 60 minutes: a crash course in Einstein

R. SHANKAR
Yale University

Saturday, Feb. 2 • 9:30 a.m. • M.B.G. Auditorium

COLLOQUIUM



Past and Future Hurricane Activity

GABE VECCHI
Geophysical Fluid Dynamics Laboratory

Wednesday, January 30

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

Volunteers Needed

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!

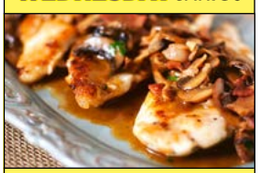
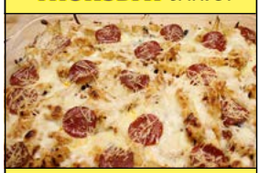
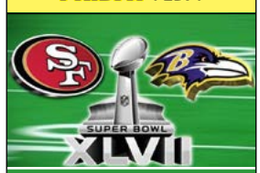
We are hoping to find: moderators, science/rules judges, time/score keepers, lunch attendants, etc.!
Won't you please consider volunteering your time?
Lunch provided for competition day volunteers!! Contact Deedee Ortiz @ 2785 or **dortiz@pppl.gov**, to sign up or for more information.

PPPL Café Menu

Brock Catering

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

COMMAND PERFORMANCE CHEF'S FEATURE	**MONDAY** JAN. 28	**TUESDAY** JAN. 29	**WEDNESDAY** JAN. 30	**THURSDAY** JAN. 31	**FRIDAY** FEB. 1
					
	RAVIOLI MARINARA	**BUFFALO CHICKEN WRAP**	**CHICKEN MARSALA**	**PIZZA CASSEROLE WITH GARLIC BREAD**	**NACHOS GRANDE WITH SEASONED BEEF**
EARLY RISER	Western Omelet	Chocolate Chip Pancakes	Steak, Mushroom & Cheddar Omelet	Southern Style Biscuits with Sausage Gravy	Italian Sausage, Peppers & Provolone Omelet
COUNTRY KETTLE	Split Pea with Ham	Vegetable Vegetarian Soup	Manhattan Seafood Chowder	Smoked Turkey Corn Chowder	Chicken Rice
GRILLE SPECIAL	Chicken Po' Boy with Cajun Mayonnaise and Hush Puppies	Bacon Blue Cheese Burger served with Fries	BBQ Pulled Pork Sandwich with Onion Rings	Grilled Cheese with Bacon & Tomato on Texas Toast w/ Fries	Buffalo Chicken Wings with Blue Cheese & Celery Sticks
DELI SPECIAL	Chicken Salad with Apples & Walnuts Wrap	Smoked Turkey & Muenster Cheese on a Kaiser Roll	Classic Tuna Hoagie	Seafood Salad Croissant	Corned Beef, Swiss, Coleslaw & Russian Dressing on Rye
PANINI	Corned Beef & Cheddar on Rye Bread	Pressed Italian Panini	Italian Sausage, Roasted Peppers & Provolone Ciabatta	BBQ Pulled Chicken & Provolone Ciabatta	Personal Pizza with choice of Toppings

MENU SUBJECT TO CHANGE WITHOUT NOTICE

CLICK HERE FOR A PRINTABLE WEEKLY MENU

WEEKLY

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Comments: commteam@pppl.gov ◆ **PPPL WEEKLY** is archived on the web at: http://www.pppl.gov/ppplweekly.cfm