

At PPPL THIS WEEK

MAR. 11

Colloquium

4:15 p.m. ♦ MBG Auditorium
[Future Electrical Technologies from a GE Viewpoint](#)
Dr. James Bray, GE Global Research

MAR. 12

Hamilton Colloquium Series

4:30 p.m. ♦ Room A10, Jadwin Hall, Princeton University
[Theory of Non-Symmetric Plasma Confinement and a New Large Physics Experiment](#)
Per Helander, Max-Planck Institute for Plasma Physics

MAR. 14

Ronald E. Hatcher Science on Saturday Lecture Series

9:30 a.m. ♦ MBG Auditorium
[Scientific Opportunities and Challenges in the Upgraded National Spherical Torus Experiment](#)
Dr. Jonathan Menard, Principal Research Physicist, PPPL

UPCOMING

MAR. 18

PPPL/American Red Cross Blood Drive

8 a.m. to 1 p.m. ♦ American Red Cross Bloodmobile, Lower End Parking Lot

MAR. 19

2015 Young Women's Conference in Science, Technology, Engineering & Mathematics

9 a.m. to 2 p.m. ♦ Frick Chemistry Building, Princeton University

INSIDE

3-D Printing	2
Guest Corner	3
New Employees	3
Retirees	4
Young Women's Conference	4
Blood Drive	6
Menu	7

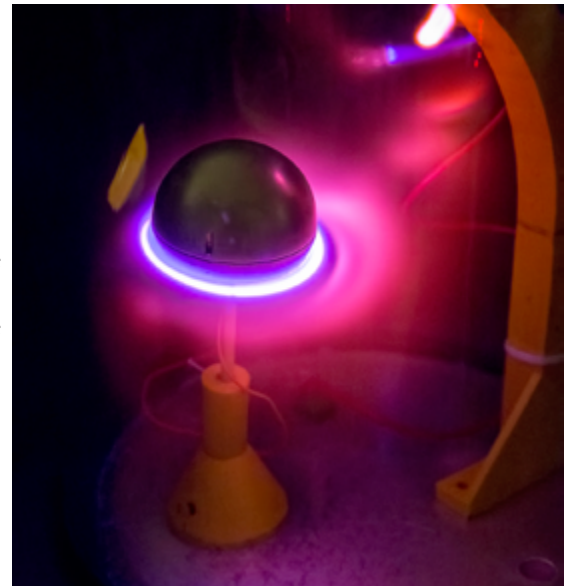
Researchers find 3-D printed parts provide low-cost, custom alternatives for lab equipment

By Raphael Rosen

The 3-D printing scene, a growing favorite of do-it-yourselfers, has spread to the study of plasma physics. With a series of experiments, researchers at PPPL have found that 3-D printers can be an important tool in laboratory environments.

"The printer is now a crucial piece of our Laboratory and used regularly," said Andrew Zwicker, the head of Science Education at PPPL and lead author of a paper that reports the results in the current issue of the American Journal of Physics. "The versatility of the printer is such that our first reaction to an equipment need is no longer whether we can find or purchase the required piece of equipment, but can we print it?"

Three-dimensional printers create objects by laying down layers of material, whether plastic, metal, ceramic or organic. A computer controls a moveable nozzle that extrudes the hot material according to digital computer-aided design (CAD) files. Each layer is thin, often measuring only several hundred millionths of a meter in height.

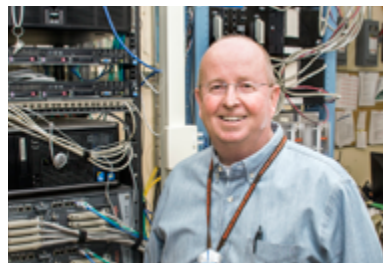


3D printed parts provide the stands for the aluminum globes in PPPL's Planeterrella, a device that simulates Northern Lights.

[continued on page 2](#)

Guest Corner

Beware of phone scams from fake support companies



By Bill Bryan,
Telecommunications Manager

Several of our Laboratory staff members have recently received suspicious phone calls from phone scam artists trying to access their computers or identify their names and organization. These phone scams are also happening on home and wireless phones. We estimate PPPL employees receive 20 to 40 of these phone calls a day.

In the latest version, phone scammers claim to be computer support technicians and even state that they work for well-known companies like Microsoft.

They typically will tell you that they've detected viruses or other malware on your computer to trick you into giving them remote

[continued on page 3](#)

3-D Printing

continued from page 1

Hobbyists have used 3-D printers to build curiosities such as sets of interlocking rings. But researchers have become interested because the printers can build customized parts for experiments, often at very low cost. And because a 3-D printer can produce parts quickly, the time between when a need is recognized and when a part is ready to install can be just a few hours.

During the experiments, Zwicker and his team printed plastic parts, including a cone and a cylinder, to test basic properties such as size, shape, use as an electrical insulator and ability to operate in a vacuum. The researchers also printed parts for an electrode in a plasma physics experiment, and replacement parts, such as a guard for a cooling fan and a handle for a piece of test equipment. Zwicker needed to see if the parts could withstand moderate vacuum environments in some plasma physics experiments and could withstand physical stresses. The team also needed to determine whether the dimensions of the parts matched the specifications of the designs.

The dimensions proved accurate, but only up to a point: On average, the individual layers were larger or smaller than the specifications by a fraction of a millimeter. While this degree of accuracy was not enough for objects that had to be built with a high level of precision, it was good enough for many laboratory purposes.

The plastic parts passed the vacuum tests and stress tests, too. Zwicker wanted to know if the parts began to emit hydrocarbon gas — as plastics sometimes do — that would contaminate the vacuum and ruin plasma experiments at

moderate pressures. But as long as the plastic was kept below 75 degrees Celsius, no hydrocarbon gas was detected.

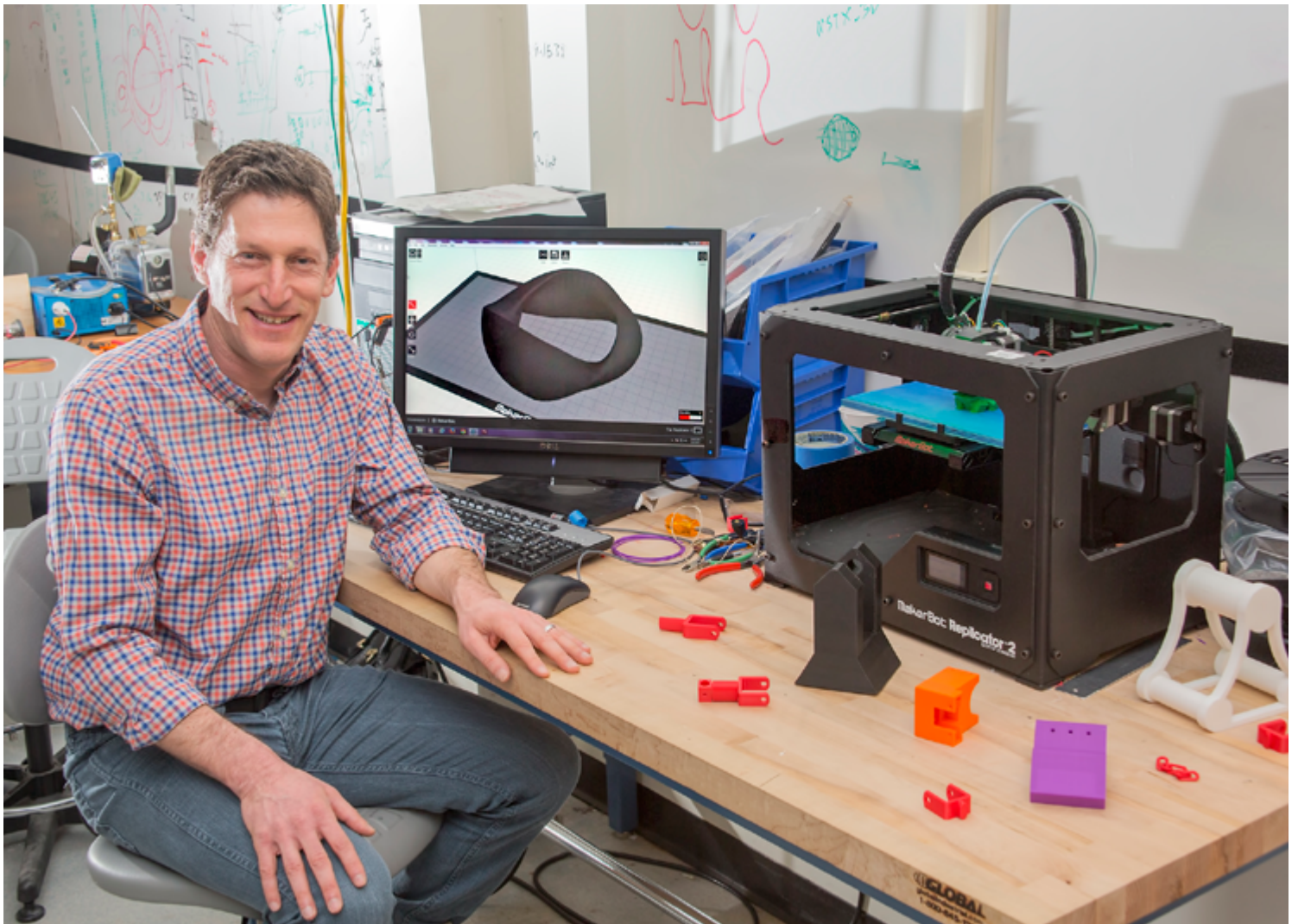
Next, the team placed small bars of 3-D printed plastic in a machine that tested the ability of a material to withstand pulling, and found that printing did not weaken it. In general, the strength of printed parts matched that of bulk plastic.



This 3D printed part replaced the meter's original handle. (Photo by Andrew Zwicker)

Finally, Zwicker found that a 3-D printer was an important tool for producing dielectric insulators for electrodes.

"The ability to print this material in any size, shape, or configuration provided an unmatched flexibility to quickly and efficiently test new configuration ideas for different experimental conditions," Zwicker said. 📷



Andrew Zwicker sits in front of the 3-D printer in the Science Education laboratory. Various machine parts created by the printer are shown on the table.



Guest Corner

continued from page 1

access to your computer, or even paying for their fraudulent services. They might also ask you to verify your name and then hang up on you. In this tactic, their goal is to build a name and number database they would most likely sell to telemarketers or other phone scammers.

How tech support scams work

The scam begins with a phone call. Scammers can get your name and other basic information from various directories. They might even guess what computer software you're using. Once they have you on the phone, they often try to gain your trust by pretending to be associated with well-known computer companies. They offer to resolve your issues by confusing you with a barrage of technical terms. They may ask you to go to your computer and perform a series of complex tasks. They sometimes target legitimate computer files and claim that they are viruses. Their tactics are designed to scare you into believing they can help fix your "problem."

This is known as a social engineering attack, and the intent of this scam is to steal your personal information and to obtain remote access to your computer.

Once they've gained your trust, they may:

- Ask you to give them remote access to your computer and then make changes to your settings that could leave your computer vulnerable.
- Try to enroll you in a worthless computer maintenance service or warranty program.
- Ask for credit card information so they can bill you for false services.
- Trick you into installing malware that could steal sensitive data like user names and passwords.
- Direct you to websites and ask you to enter your credit card number and other personal information.

Regardless of the tactics they use, they all have one purpose: to access your computer and ultimately steal your money.

What to do if you get a call

If you get a call from someone who claims to be a tech support person, take the caller's information down and immediately report it to the PPPL IT Helpdesk at helpdesk@pppl.gov.

Remember, a caller who creates a sense of urgency or uses high-pressure tactics is probably a scam artist.

Keep these other tips in mind:

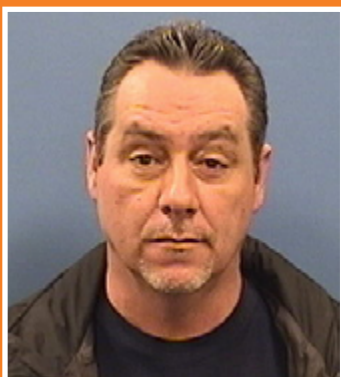
- Never give control of your computer to a third party unless you can confirm that it is a legitimate representative of a computer support team with whom you are already a customer, and you have previously requested support from that company.
- Do not trust or rely on Caller ID to authenticate a caller. Scammers have Caller ID spoofing technology that lets them display any number or organization's names on your screen. They may appear to be calling from a legitimate company or a local number when they're in fact not even in the same country as you.
- Do not trust Caller ID on your wireless phone either. Wireless phones are receiving calls from phone numbers with three-digit area codes that appear to be local calls but are actually associated with international pay-per-call phone numbers. If you receive a call like this and do not recognize the number of the incoming call, do not return the call.
- Never provide your credit card or financial information to someone who calls and claims to be from tech support.
- If a caller pressures you to buy a computer security product or says there is a subscription fee associated with the call, take the caller's information down, hang up, and immediately report it to the PPPL IT Helpdesk at helpdesk@pppl.gov.
- Never give your password.
- Put your phone number on the National Do Not Call Registry at <https://www.donotcall.gov/>.

The PPPL Telecommunications Office is working hard to block known phone-scam numbers, but the scammers have the technology to change their incoming phone numbers.

If you have received such a phone call and have recognized it as a scam, that's great work!

If you have been a victim of this scam and have not previously reported the encounter, please contact Jim Hirsch (jhirsch@pppl.gov) or me (bbryan@pppl.gov) with the details. 📧

PPPL Welcomes New Employees!



ANDREW DECARO
Janitor
Engineering



ZHI "ANDY" GAO
Power Systems
Design Engineer
Engineering Department

PPPL bids a fond farewell to retiring employees:



LLOYD CIEBIERA

Technical Associate, Engineering Department

34 years



LEW MEIXLER

Head of Technology Transfer

39 years

Calling All Volunteers for Young Women's Conference



Dozens of volunteers are needed for PPPL's Young Women's Conference in Science, Technology, Engineering, and Mathematics, on Thursday, March 19 at Princeton's University's Frick Chemistry building from 8 a.m. to 2 p.m.

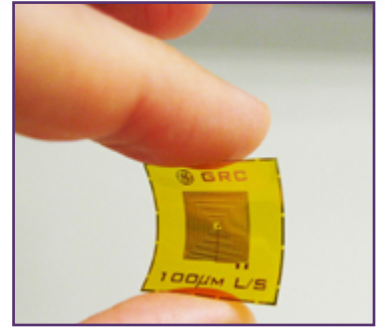
The event attracts more than 300 young women from seventh to tenth grade and volunteers are needed to help with everything from registration to helping out with exhibits.

Please fill out a [volunteer form](#) if you are interested in volunteering or contact Deedee Ortiz at dortiz@pppl.gov

COLLOQUIUM

Future Electrical Technologies from a GE Viewpoint

Dr. James Bray
GE Global Research



Wednesday, March 11
4:15 p.m. (coffee/tea at 4 p.m.)
M.B.G Auditorium, Lyman Spitzer Building

Hamilton Colloquium Series

Theory of Non-Symmetric Plasma Confinement and a New Large Physics Experiment

Per Helander
Max-Planck Institute for Plasma Physics



Thursday, March 12
4:30 p.m., Room A10, Jadwin Hall, Princeton University

Ronald E. Hatcher

Science on Saturday LECTURE SERIES

Scientific Opportunities and Challenges in the Upgraded National Spherical Torus Experiment

Dr. Jonathan Menard
Principal Research Physicist, PPPL



Saturday, March 14
Doors open at 8:15 a.m., lectures begin promptly at 9:30 a.m.
M.B.G Auditorium, Lyman Spitzer Building

New PPPL Colloquium Page

PPPL has a new Facebook page for Colloquia with all the latest information about upcoming lectures.



American
Red Cross



Not all heroes wear capes.

March is Red Cross Month. Every donation you give helps us do more of what we do.

PRINCETON PLASMA PHYSICS LAB American Red Cross Blood Drive

Wednesday, March 18, 2015

American Red Cross Bloodmobile

Lower End Parking Lot

8 a.m. to 1 p.m.

Appointments are preferred.

For an appointment or information, please contact:

Tricia Berran

609-243-3200

Or sign up online at www.redcrossblood.org

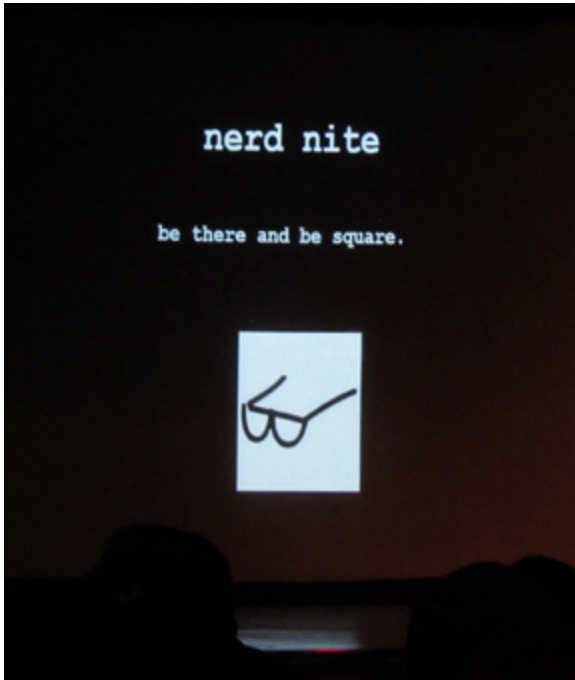
Enter Sponsor Code: **PPPLPrinceton**



Download the Blood Donor App today!

redcrossblood.org | 1-800 RED CROSS

Clayton Myers talks up plasma physics at nerd night event



Physicist Clayton Myers gave a talk entitled “A Hitchhiker’s Guide to Plasma: Solar Flares, Fusion Energy, Aurorae, and More!” at a “nerd nite” event on Feb. 27 at the Littlefield performance and art space in Brooklyn. The event was one of several talks given worldwide last month as part of a “Global Plasma Month” organized by early career scientists in locations from Hawaii to London.

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 March 9	Tuesday March 10	Wednesday March 11	Thursday March 12	Friday March 13
COMMAND PERFORMANCE Chef's Special	Swedish Meatballs Served over Egg Noodles	Baked Potato Bar	COMMAND PERFORMANCE Pho Vietnamese Noodle Bowl	Carved Roast Beef Served with a Baked Potato and Vegetables	Grilled Maple Glazed Salmon Served over Vegetable Couscous
Early Riser	Greek Omelet with Spinach, Tomato & Feta Cheese	Steak, Egg & Cheese Quesadilla	Blueberry Pancakes Served with Sausage	Grilled Kielbasa, 2 Eggs & Potatoes	Sausage, Egg and Cheese Croissant
Country Kettle	Escarole & White Bean	Potato with Bacon & Cheddar	Mushroom Barley	Split Pea	Chicken Noodle
Grille Special	Meatball Parmesan Torpedo Served with Fries	Pork Cutlet Parmesan Sandwich Served with a Side	Grilled Tuna Salad & Cheese on Rye Served with a Side	Philly Chicken Cheesesteak with the Works on French Bread Served with a Side	Cheesesteak Sliders Served with a Side
Deli Special	Krab Salad Croissant	Roast Beef & Cheddar Wrap with Chimichurri Sauce & Sautéed Peppers & Onions	Liverwurst & Onion on Rye Bread	Greek Gyro	Tuna Hoagie
Panini	Krabby Kake on a Kaiser Roll	Homemade Tuna Burger on a Kaiser Roll with Lettuce & Tomato	Pesto Chicken Panini with Mozzarella, Spinach & Tomato	Portobello, Bell Peppers & Goat Cheese Panini	Buffalo Chicken Wings Served with Fries, Celery & Blue Cheese Dressing

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