PPPL PRINCETON PLASMA PHYSICS LABORATORY
A Collaborative National Center for Fusion & Plasma Research
U.S. DEPARTMENT OF ENERGY
WEEKLY
December 15, 2014

At PPPL THIS WEEK

WEDNESDAY., DEC. 17

PPPL Colloquium
4:15 p.m. ◆ MBG Auditorium
Industrialization of Nb_3Sn conductor
Jeffrey Parrell - Oxford Instruments Superconductivity Technology

THURSDAY., DEC. 18

PPPL Colloquium
4:15 p.m. ◆ MBG Auditorium
Magnetized Target Fusion work at General Fusion
Michel Laberge - General Fusion

UPCOMING EVENTS

December 23
PPPL Holiday Luncheon
Noon ◆ LSB Lobby and Café

December 24 - Jan. 2
Lab Closed - Happy Holidays

January 10
Ronald E. Hatcher Science on Saturday Lecture Series
9:30 a.m. ◆ MBG Auditorium
Consciousness and the Social Brain
Michael Graziano, Princeton Univ.

January 14, 2015
PPPL's Records/ Paper Shredding Event
9 a.m. - 4 p.m. ◆ Receiving 3

Inside...

Raftopoulos takes on the challenge as Chrzanowski "turns the page" after 39 years

By Jeanne Jackson DeVoe


Steve Raftopoulos


Jim Chrzanowski

Steve Raftopoulos is a lifelong "tinkerer" who has always found joy in building things and who loves his job at PPPL because it allows him to do just that. Now he's bringing that sense of fun to a serious job as head of the team of engineers who help create the coils and other components of PPPL's experiments.

Raftopoulos succeeds Jim Chrzanowski in two key positions as head of the Mechanical Design Branch of the Mechanical Engineering Division and the lead engineer for PPPL's coil engineering efforts. The changing of the guard comes after both helped oversee a major feat: The fabrication of the center stack, which was recently installed into the core of the Laboratory's largest experimental vessel, the National Spherical Torus Experiment Upgrade (NSTX-U). This powerful magnet, devised by PPPL's coil winding team, is a centerpiece of the upgrade.

But Raftopoulos isn't resting on his laurels. "It's done and it's installed but I think the ultimate satisfaction will come when we put power to (the coils) and make a plasma," he said. "We've put the new engine in the car but the car's not ready to go around the track yet. That's kind of where we are."

Raftopoulos succeeds Jim Chrzanowski who retired Oct. 31 after 39 years at PPPL. Chrzanowski said he was both relieved and delighted to see the center stack installed. "I'm really happy," he said. "I really wanted to see this finished. I definitely wanted to deliver a finished component."

The bundled magnetic coils in the center stack are like the powerful core of the NSTX-U apple. They create a magnetic field that helps contain the charged gas called plasma in a vacuum vessel inside the spherical container called a tokamak. At the same time, an ohmic heating coil in the center stack will inject a current into the plasma to help create a magnetic field and help heat the plasma to super-hot temperatures during experiments. The high temperature is required to create the conditions necessary to create fusion energy.

Like a doubles tennis team

Raftopoulos said he and Chrzanowski split many of the duties associated with overseeing the project. "It was like a doubles tennis team," Raftopoulos said. "We

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Hong Qin promoted to executive dean at the University of Science and Technology of China

By John Greenwald


Hong Qin

Hong Qin bestrides the globe as a leading scientist and educator. For the past four years he has shuttled between PPPL and a teaching post at the University of Science and Technology of China (USTC), which named him executive dean of its School of Nuclear Science and Technology in October. Hong takes up the position while maintaining his agenda as a principal research physicist in the PPPL Theory Department and his teaching in the Program in Plasma Physics at Princeton University, where he is a lecturer with the rank of professor in the Department of Astrophysical Sciences.

Hong's promotion coincides with another form of recognition that he received in October: The American Physical Society (APS) named him an APS Fellow — an honor given annually to one-half of 1 percent of the society's nearly 50,000 members.

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Raftopoulos

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didn't say, 'You handle this and you handle that.' We filled in where the other person was too busy to cover or where we saw a need."

In his new position as head of the Mechanical Design Branch, Raftopoulos oversees a team of 25 people, including 20 CAD designers and six engineers. He says he views his primary responsibility in the new position as helping his team members do their jobs. "My job is to help them to be as good as they can be and facilitate their work," he said. "In a sense I work for them."

Mike Williams, PPPL's Associate Director for Engineering and Infrastructure, said Raftopoulos's collaboration with Chrzanowski will serve him well in the new position. "They are big shoes to fill but Steve has a long distinguished career on his own and is definitely up to the challenge," Williams said.

For Raftopoulos the new position is the latest challenge in a career that has been all about building the components that are vital to PPPL's experiments. When he began in 1984 he worked on diagnostics for the Tokamak Fusion Test Reactor (TFTR). He also worked on the complex, twisted coils of the stellarator for NCSX, the National Compact Stellarator Experiment (now called QUASAR). "I've had a blast for 30 years," Raftopoulos said. "It's always interesting but when we're building things it's super exciting."

Building the coils for NCSX was especially challenging. Raftopoulos was responsible for the metrology on the device, meaning he was in charge of making exact measurements. He used computerized equipment to take 40,000 to 50,000 measurements of the coils' dimensions to a thousandth of an inch. The project was never finished due to funding issues. But Raftopoulos said he and other members of the coil team derived some gratification in seeing the coils completed. "We at least got the satisfaction of building the most difficult coils that maybe anyone ever built," he said.

The next challenge for Raftopoulos will be overseeing the installation of other components for the NSTX upgrade. His work on NSTX-U will continue even after it begins operating, Williams said. He and other engineers will be charged with ensuring it operates at optimal levels.

The "guru" of metrology

Williams said Raftopoulos put his expertise as the Lab's chief metrologist or the "guru of metrology" to good use with NSTX-U. He will continue to use those skills as other components are installed, Williams added.

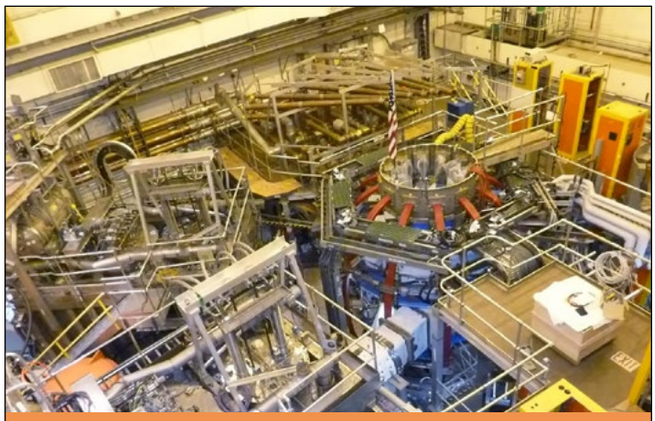
The new head of the coil shop is known for his easy-going friendly manner, Williams noted. "He has great people skills," he said.

He commutes at least an hour from his home in Cliffside Park, N.J., where he lives with his wife, Pera, a human resources professional, and two children Irene, 9, and John, 6. Raftopoulos spends most of his time off with his kids. He also enjoys photography.

Passing along his knowledge

Raftopoulos credits Chrzanowski with passing along his years of knowledge by training him and other engineers. However, there will be no substitute for being able to stop into his former boss's office to exchange ideas. "I would go in with one idea about how to solve a problem and I'd leave with a different idea about the direction," he said.

Chrzanowski was sent off with a farewell luncheon at which many of his past and present colleagues discussed his contribution to the Laboratory. Phil Heitzenroeder, head of the Mechanical Engineering Division, noted that Chrzanowski scheduled his retirement perfectly just after



Raftopoulos and Chrzanowski both worked on the coils for NSTX-U.

the center stack was completed. He praised Chrzanowski's work as "a very efficient manager."

Chrzanowski was responsible for designing the coils and devising a method to create them. This involved a complex coil winding operation in which insulated tape was wound around 36 copper conductors. They were then bundled together through several applications of a vacuum pressure impregnation (VPI) process at temperatures of up to 100 degrees centigrade. The team then fabricated the ohmic heating coil that wraps around the bundle.

Hutch Neilson, the head of Advanced Projects, recalled that the National Compact Stellarator Experiment (now called QUASAR) needed coils that were designed to stabilize and maintain the plasma. "This was something so innovative and technologically revolutionary that it really had to be done in the Lab, so we gave the job to Jim, who assigned a dedicated coil team and got the job done," he said.

In addition to NCSX, Chrzanowski was also involved in numerous projects, including creating the coils for the Advanced Toroidal Facility at Oak Ridge National Laboratory. He also worked on the recently commissioned trim coils for the Wendelstein 7-X stellarator in Germany, which is due to begin operating next year.

Many challenges

"There've been so many challenges over the years," Chrzanowski said in an interview. "The modular coils for NCSX were the most difficult and also the most gratifying. There were 18 technicians on the job and they did a phenomenal job."

Chrzanowski was quick to give credit for the success of the NSTX-U coils to the team of designers who "ran with" his ideas and the technicians and engineers who worked on the coils. "It's a team effort no matter what you do," he said. "You do a lot of brainstorming. My strengths are in fabrication — how to go ahead and do it."

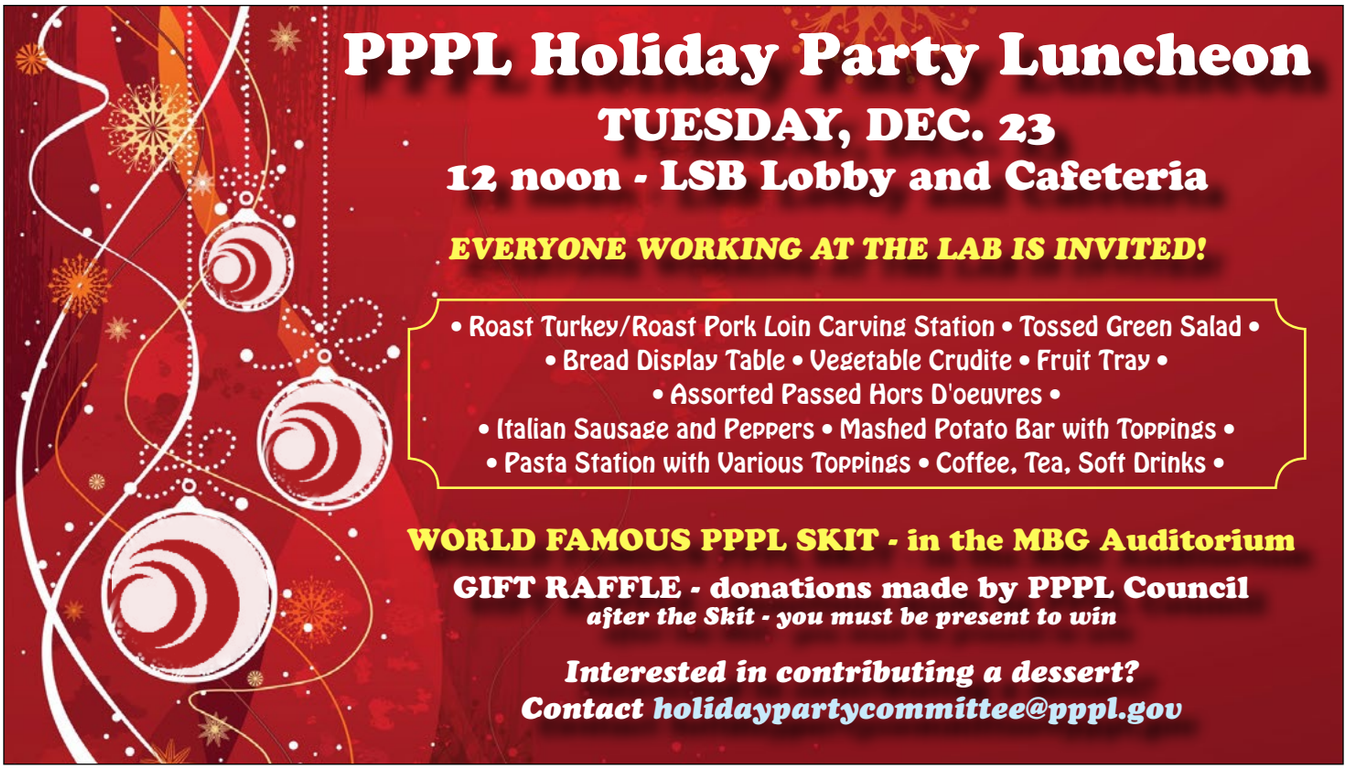
Turning the page

Having the center stack completed just before he left was perfect timing, he said. "It's done, I'm done," he said. "Turn the page. This place was terrific. I would do it all over again but it's the right time for me."

Chrzanowski's immediate plan in retirement is to get ready for the holidays. An avid skier, he also plans to spend time skiing. Best of all, he'll get to spend more time with his 4-year-old grandson Nathan, who lives in Philadelphia.

He said he would miss working with colleagues who have come to feel almost like family members. "For me, it's the people and the work," he said.

"We're working on a noble endeavor," Raftopoulos said. "We're doing something that will help humanity. It's a great way to make a living."



Hong Qin

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Hong's new role at USTC "is a win-win for everyone — PPPL, USTC and Princeton University," said Nat Fisch, director of the Program in Plasma Physics. "The Chinese fusion program is advancing rapidly," Fisch said, "and Hong has played a pivotal role in our collaboration with it. With his new role, Hong will be even more valuable to us in pursuing collaborative research and teaching initiatives with the expanding and vibrant Chinese program. Lucky for us that Hong can manage so much on his plate."

The promotion puts Hong in charge of the entire program in plasma physics and magnetic fusion at the nuclear science school. Among his tasks will be supporting the design of a Chinese fusion facility that is to mark a step beyond ITER, the international fusion experiment under construction in France. At the same time, Hong will continue to collaborate with researchers on the Experimental Advanced Superconducting Tokamak (EAST), China's main fusion facility. USTC participates in EAST under the auspices of the Chinese Academy of Sciences.

Teaching and learning are two sides of the same coin for Hong. "I don't know if I'm a teacher or a student," he said. "What excites me is that I want to see new things and not the same old stuff. Students are fast thinking and ask questions that point to new things that can be discovered, and that benefits both them and myself."

A range of research interests

As a researcher, Hong's interests range from advanced mathematical methods for modeling fusion plasmas to exploring the physics of high-intensity charged particle beams — a subject he works on with former PPPL Director Ron Davidson. Hong, together with Davidson, published a graduate-level textbook on nonlinear beam dynamics in 2001. "Hong is extraordinarily bright and enthusiastic and a fun person to work with," said Davidson, now a senior research fellow and professor emeritus in the Princeton Department of Astrophysical Sciences. "He has an extensive tool kit and tackles very difficult problems in a very creative way."

A native of Zhengzhou, an ancient capital of China, Hong enrolled in the Program in Plasma Physics in 1993 and joined the Laboratory's research staff after earning his doctorate in 1998. In 2004 he became one of just six scientists from U.S. Department of Energy (DOE) national laboratories to win both a U.S. Presidential Early Career Award for Scientists and Engineers and a DOE Office of Science Early Career Scientist and Engineer Award. The prize citations noted Hong's contributions to research on magnetic fusion energy and high-intensity particle beams.

Hong began teaching graduate courses in 2005 and quickly became a magnet for students at PPPL. "He is very engaging and always thinks about problems in interesting ways," said Greg Hammett, a fellow graduate-program instructor and Theory Department member who is developing a course with Hong on computational methods in plasma physics. Concurs Amitava Bhattacharjee, who heads the Theory Department: "Hong is a person of very broad scholarship who brings a great deal to the table. We are very fortunate to have him."

Hong joined the USTC faculty in 2011 as part of China's Thousand Talents Program that recruits outstanding scientists in a variety of fields. Among his jobs has been interviewing and helping to select Chinese undergraduates who gain admission to the Program in Plasma Physics.

Zest for new ideas

Hong's zest for new ideas appeals to both students and practicing scientists. When he lectured at PPPL on advanced mathematical methods in plasma physics a few years ago, "You could just see the seminar room filling with graduate students, post-docs and researchers," Nat Fisch recalled.

Among those attending the talks was John Krommes, a colleague in the Theory Department and the Program in Plasma Physics. "Hong is a world-class expert in advanced methods of mathematical physics," said Krommes. "That expertise, as well as his clear and enthusiastic teaching style, has attracted not only graduate students but also senior faculty to his lectures."

Such attraction reflects Hong's knack for educating by example. "You don't teach people by telling them what to do," he said. "You teach by showing them what you do and pointing out unsolved problems that they can work on. That excites students. They want to see a world where they can make a contribution."

SPD•TIP•OF•THE•WEEK

TEMPORARY CHANGE TO AN EVACUATION ASSEMBLY AREA

Due to construction, the northeast corner of the Facilities Building (the gravel area south of the ESAT Building) will NOT be used as an Evacuation Assembly Area for the next 7 weeks.

AFFECTED AREAS/BUILDINGS:

- Facility Engineering Building
- CAS Building
- R.E.S.A. Building
- Haz Mat Storage Building

All occupants of the above listed buildings will need to utilize the Lower "N" Parking Lot as an evacuation assembly area as of Monday, Dec. 15. Contact Jamie Dunnigan at ext. 2314 if you have any questions or concerns.

Writers wanted for Princeton Writes Essay Contest

Princeton Writes is inviting PPPL and other University staff members to enter its first-ever Princeton Writes Prize Staff Essay Contest. The essay, which is due Jan. 15, should be 750 to 1,250 words that describe an aspect of the Princeton University campus (including PPPL). The first-prize winner will receive a $1,000 prize and a certificate and there will be three honorable mentions. More information is available on the Princeton Writes Prize website.

PRINCETON WRITES
Practical Communication Tools for University Employees & Students

Going to a workshop or conference next year?

If you plan to attend a workshop or conference next year, even if it's nearby, the Travel Office needs to hear from you. Please consult the list of conferences from last year in the PPPL Conference List 2014 at the Travel website, travel.pppl.gov to see if your conference is listed. If it is, simply email the Travel Office (travel@pppl.gov) that you plan to attend and state whether you are an attendee, participant, or presenter. If your conference is not on the list, please fill out a form giving the details of your conference by using the New Conference Request Form on the website. The deadline is Dec. 23. Unsure about whether your event is a conference? Email travel@pppl.gov for help.

Registration Open for Young Women's STEM Conference

You can help inspire the next generation of female scientists, engineers, and mathematicians by encouraging young women you know to attend the Young Women's Conference in Science, Technology, Engineering and Mathematics, hosted by PPPL on March 19.

The conference, for seventh-to-tenth grade girls, at Princeton University's Frick Chemistry Building includes hands-on science activities by women in the STEM fields, tours of Princeton's science laboratories, and lectures by prominent women.

PPPL employees can register at least three young women by filling out the form here. Members of the public can also register at https://pppl.princeton.edu/ywc_information. The deadline is Feb. 13. Please contact Deedee Ortiz, dortiz@pppl.gov with any questions.

You can still contribute to United Way until the end of the year

Please help numerous charitable organizations in the Mercer County area by contributing to United Way Mercer County. Employees can make contributions by cash or check or through payroll deductions until the end of the year. Princeton University will contribute an additional 15 percent for all gifts through payroll deductions or 10 percent for all gifts by cash or check.

Consciousness and the Social Brain

Michael Graziano
Princeton University

Saturday, Jan. 10, 2015

MBG AUDITORIUM • Doors open at 8:15 a.m.
Lectures begin promptly at 9:30 a.m.

Retirements at PPPL

PPPL bids a fond farewell to a retiring employee!

Ed Briemann
Engineering Department
15 years

Donate food to feed the hungry

PPPL will collect food and personal hygiene items for The Mercer Street Friends Food Bank in the LSB Lobby through Dec. 17 as part of a University-wide effort. The food bank distributes food to hungry people in the greater Mercer County area through nearly 50 pantries, shelters, and soup kitchens. The most needed items are:

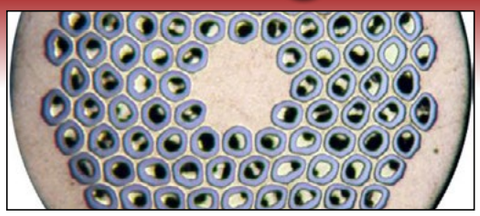
- Canned salmon, tuna or chicken
- Low sodium soups
- Fruit cocktail in 100 percent juice
- Shelf-stable fat free milk such as Parmalat
- Whole grains
- Beans, nuts, crackers
- Peanut butter
- Gravy, herbs, and spices
- Vinegar & mustard
- Canned vegetables
- Salad dressing
- Dish and laundry soap
- Soaps, body wash, shampoo and conditioner
- Deodorants & feminine products

No open packages or glass containers please!

More information about the Princeton University Holiday Outreach programs is available here.

Donation box is located in the LSB lobby through Dec. 17.

COLLOQUIUM



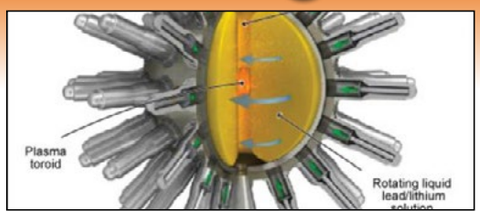
Industrialization of Nb_3Sn conductor

Jeffrey Parrell
Oxford Instruments Superconductivity Technology

Wednesday, December 17

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

COLLOQUIUM



Magnetized Target Fusion work at General Fusion

Michel Laberge - General Fusion

Thursday, December 18

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

BROCK Café at PPPL 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*

	MON. 15 DEC.	TUE. 16 DEC.	WED. 17 DEC.	THU. 18 DEC.	FRI. 19 DEC.
					
COMMAND PERFORMANCE CHEF'S FEATURE	Roast Pork Loin served with Stuffing & Vegetable	Cheese Manicotti served with Sautéed Zucchini	Kielbasa with Sauerkraut & Potato Pierogies	Turkey Chili served over Rice	Cheese Tortellini with Peas in a Pink Vodka Sauce
EARLY RISER	2 Eggs any Style, Choice of Meat, Potatoes & Toast	Blueberry Pancakes	Hash Brown, Egg & Cheese Wrap	Mushroom & Cheese Omelet	Scrambled Eggs & Grits
COUNTRY KETTLE	Country Chicken Vegetable	Vegetable Bean	Tomato Bisque	Cream of Vegetable	Split Pea with Ham
GRILLE SPECIAL	French Bread Cheesesteak Hoagie	Monte Cristo with Ham, Turkey & Swiss Cheese	Shrimp Po' Boy	Buffalo Chicken Wrap	Grilled Cheese with Roasted Vegetables on Rye
DELI SPECIAL	Broccoli, Peppers, Onions & Cheddar Wrap	Turkey Pastrami & Swiss with Coleslaw & Mustard on Rye	Blackened Chicken Caesar Salad	Tuna Salad with Olives, and Peppers on Multigrain Roll	Curry Chicken Salad Wrap
PANINI	Fresh-Carved Glazed Ham on Ciabatta Bread	Seafood Quesadilla	Southwest Turkey Panini	Portobello stuffed with Roasted Peppers, Spinach & Provolone	3 Cheeses and Sautéed Peppers & Onions on French Bread

MENU SUBJECT TO CHANGE WITHOUT NOTICE

VEGETARIAN OPTION

CLICK HERE FOR A PRINTABLE WEEKLY MENU

WEEKLY
Editor: **Jeanne Jackson DeVoe** ◇ Layout and graphic design: **Gregory J. Czechowicz**
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