PPPL PRINCETON PLASMA PHYSICS LABORATORY
A Collaborative National Center for Fusion & Plasma Research
U.S. DEPARTMENT OF ENERGY
WEEKLY
JUNE 03, 2013

At PPPL THIS WEEK

WEDNWSDAY, JUNE 5

PPPL Colloquium
4:15 p.m. ◆ MBG Auditorium
Laboratory Dynamos
Cary Forest, University of Wisconsin – Madison

THURSDAY, JUNE 6

Laboratory visit
3:00 p.m. ◆ MBG Auditorium
139 students from Busan High School, in South Korea visit the Library

FRIDAY, JUNE 7

Just Breathe: Mindfulness Series at PPPL
12 p.m. ◆ Furth Plasma Physics Laboratory

FRIDAY, JUNE 7

High Energy Theory Seminar
1:30 p.m. ◆ Princeton Physics Dept.
Yasunori Nomura, University of California – Berkeley

UPCOMING EVENTS...

JUNE 11
The start of the Research Experience for Undergraduates, a 10-week program in which 40 college students work with PPPL scientists on research projects.

June 18
Service Awards
9:30 a.m. ◆ MBG Auditorium.

June 24
Patent Awareness Program
6 p.m. ◆ Prospect House, Princeton University

Inside...

Prager sees bright future for PPPL despite Challenges

By Jeanne Jackson DeVoe

The Princeton Plasma Physics Laboratory's mission as a national leader in plasma research, its work on the National Spherical Tokamak Upgrade (NSTX-U) and its key role in ITER, the huge international fusion project, heralds a bright future for the Laboratory, PPPL Director Stewart Prager told staff members on May 28 during his annual "State of the Laboratory" address.

Despite "turbulent times" caused by uncertainty over the federal budget, the U.S. Department of Energy is "committed to PPPL as a national lab and as the national laboratory for fusion and plasma science," Prager said.

continued on page 2 & 3

Director Stewart Prager told staff members he has "a strong core of optimism" about PPL's future in his State of the Laboratory address on May 28.

N.J. DEP recognizes PPPL as state's top environmental steward

By Jeanne Jackson DeVoe

PPPL has been recognized by the New Jersey Department of Environmental Protection as the top facility in the state for environmental stewardship.

PPPL is first among more than 750 companies, colleges and universities, hospitals and municipalities enrolled in the DEP's Environmental Stewardship program, in which facilities voluntarily monitor themselves to improve their sustainability programs.

"The Princeton Plasma Physics Laboratory, long a leader in the area of fusion energy research, is also a leader in the area of being a good steward of the environment," DEP Commissioner Bob Martin said on May 21. "I commend their efforts at making sound environmental practices that benefit their staff, their community and their state an integral part of the facility's daily operations."

continued on page 4 ►

Prager sees bright future for PPPL despite challenges

continued from page 1

A new era for fusion energy

The construction of ITER, the 10-story fusion facility being built in Cadarache, France, that is expected to produce 500 million watts of energy, heralds a new era for fusion energy, Prager said. But it also presents budgeting challenges as the U.S. increases funding for the facility from $105 million in Fiscal Year 2012 to a projected budget of $225 million in 2014 and for the next several years, Prager explained.

At the same time, the funding for fusion research in fiscal year 2014 is expected to drop 21 percent by $63 million from $296 million to $233 million, Prager said.

10 percent cut in funding

Those cuts will not affect the NSTX upgrade, which is fully funded. However, they will reduce Fusion Energy Sciences funding to PPPL by about 10 percent or $6 to $7 million. "This is serious and it has an effect on our Laboratory but it's not catastrophic," Prager told staff members, who filled the MBG Auditorium.

The cuts will mostly be felt in PPPL's Theory and ITER Tokamak departments, both of which will have voluntary staff reductions. Prager said he does not anticipate any Laboratory-wide staff cuts or voluntary reductions in fiscal year 2013 and said such cuts are unlikely in fiscal year 2013.

The cuts will also essentially end funding for collaborations with the C-MOD experiment at MIT, which has stopped operating due to funding cuts, and curtail collaborations with the DIII-D facility at General Atomics, Prager said.

Prager said one of the issues that has frustrated both the leadership and staff at PPPL – freezes in staff salaries over the past three years by first the University and then a DOE mandate – is likely to end in Fiscal Year 2014. "We are expecting, and will fight for, normal salary increases," he told the PPPL staff.

Looking at the national program beyond the current fiscal crisis, Prager said PPPL is working with the U.S. fusion community to make sure Congress is informed about the future of fusion energy and is working with other fusion researchers on long-term strategic planning. In addition, Prager noted, PPPL Communications Director Kitta MacPherson is working with other laboratories on a national communications plan to inform the public about the quest for fusion energy as a clean and plentiful energy source. PPPL also has a new website, a new information kiosk in the lobby and a new e-newsletter for an external audience.

A flexible strategy

PPPL's research strategy of developing magnetic fusion energy while at the same time advancing basic plasma science is "flexible to fit uncertain times" because it allows PPPL to explore "many areas of research and many opportunities," Prager said.

He noted that the FESAC Science Advisory Committee gave NSTX-U an A rating, meaning it is "absolutely central" to the national fusion program. NSTX-U is a spherical tokamak that will offer a smaller, less expensive method of creating plasma fusion.

NSTX-U will be PPPL's "scientific anchor"

A U.S. Department of Energy review of the five-year plan for the NSTX-U completed in the third week in May said, "NSTX-U will be a leading facility in the world research program." "The quality of the proposed research is excellent, employing state-of-the-art diagnostics to obtain data that will be compared to theory using a wide variety of numerical models," the review said.

Prager emphasized that the NSTX-U will "provide a scientific anchor for PPPL for the next decade." The new center stack and the addition of a second neutral beam for the upgrade will double the heating power of the machine and quintuple the duration of plasmas, Prager explained. He noted that work on the center stack is proceeding very well with three quadrants already completed and the neutral beam installed ahead of schedule. "This is one reason why I'm optimistic about the future of PPPL," he said.

Another project, the stellarator, provides a "steady-state, high-stability, high-gain plasma confinement," Prager said. PPPL is advancing stellarator research through collaborations with the W7-X stellarator in Germany and the LHD experiment in Japan. A proposal by PPPL for research on the former National Compact Stellarator Experiment, which has been renamed QUASAR (QUASI-Axisymmetric Research experiment), was rated "absolutely central" to continued research by FESAC and has received substantial international support. However, FESAC did not choose between QUASAR and another stellarator design by the University of Wisconsin.

During the outage caused by the NSTX upgrade, PPPL researchers have collaborated in research across the U.S. and the world, including work on: KSTAR in South Korea; LHD in Japan; EAST in China; MAST in the UK; as well as DIII-D and C-MOD in the U.S.

Plasma research in numerous areas

PPPL also continues to play a central role in the construction of ITER, including designing port plugs and in-vessel coils and providing electrical equipment.

At the same time, PPPL researchers also are making significant contributions in numerous other areas, including: investigations at the Max Planck Princeton Research Center for Plasma Physics; applications of plasma research to nanotechnology; research into using advanced mass separation techniques using a plasma mass filter to separate nuclear materials; and research with material scientists at Princeton University and others into the use of liquid metals in tokamaks. Princeton University physicist Chris Tully is using PPPL facilities for the PTOLEMY Experiment (Princeton Tritium Observatory for Light, Early Universe, , Massive Neutrino Yield), aimed at detecting neutrinos created one second after the Big Bang.

PPPL researchers have recently won numerous awards over the past year, Prager said. PPPL researchers Jon Menard, NSTX program director, and Egemen Kolemen, as well as Vlad Soukhanovski (LLNL) and Joon-Wook Ahn (ORNL), who are on long-term assignments here, won the R&D 100 Award for the development of the snowflake divertor. PPPL physicist Ahmed Diallo won an Early Research Program award from the DOE for his research and Phil Heitzenroeder won the Nuclear and Plasma Sciences

Prager sees bright future for PPPL despite challenges

continued from page 2

Society's 2013 Fusion Technology Award from the IEEE. Prager noted that PPPL researchers made contributions to 11 out of 15 press releases chosen for highlighting by the American Physical Society's Division of Plasma Physics at its annual conference last October. In other areas, Prager said the Laboratory has "made progress in our safety, in our sustainability and our security" over the past year. He noted that the Laboratory has quarterly safety surveys of the staff and has established a Safety Champions Committee. He praised the efforts of the entire staff in keeping the Laboratory safe and said the challenge over the coming year is to not "let down our guard."

A commitment to sustainability

PPPL has made numerous efforts to be more sustainable over the past year, from research into cool roofs, to increasing recycling and composting, to reducing paper use, Prager told the audience. Those efforts led to PPPL being named the top environmental manager out of 760 organizations in the state on May 20.

The director noted that PPPL's cyber security program blocked more than 7,000 email viruses, 48,000 "phishing attempts" and millions of malicious web sites and email spam These successes led DOE to laud PPPL's cyber security program for its exemplary practices.

PPPL's Site Protection Division also won high praise from the DOE, which cited its use of Emergency Service officers who do security and serve as medical and fire officers, as well as its booth operations as "best practices," and named its mutual aid program, in which it responded to more than 200 calls in the area last year, as the best in its class.

PPPL's Human Resources and Business Operations department have also done an outstanding job meeting increased compliance, training, and regulatory requirements with the same number of staff, Prager said. Business Operations processed 50 percent more proposals than last year.

Prager extended a warm welcome to Kristen Fischer, PPPL's new chief financial officer, who just began work on Friday, May 24. She was previously budget director for the New Jersey Office of the Attorney General.

In summing up the past year and PPPL's future prospects, Prager said the Laboratory is continuing to shine despite some difficulties. "In very challenging times, I think our progress has been outstanding and our future is bright," he said, "and there's one reason and that's the ingenuity and the hard work of everybody here."

After awarding the Kaul Foundation Prize to Steve Sabbagh and the Distinguished Research Prize to Greg Hammett, who joined the ceremony over Skype, the staff repaired to the lobby where they enjoyed coffee and ice cream sundaes.

PPPL Celebrates Emergency Services Week

PPPL Emergency Services Officer Jonathan Bain shows off the Mass Response Unit 3 truck from Trenton that visited PPPL on May 21 as part of EMS Week. The truck carries supplies to treat from 75 to 125 people at the scene of a large event and is one of three such trucks in the state. In addition to his job at PPPL, Bain is Commander of Special Operations for the City of Trenton EMS.

Science on Display at Pathway to Science Event

Young women scientists in PPPL's Pathway to Science program, which connects mentors with aspiring female scientists, presented their research posters on a variety of topics including holography, botany, taxonomy, biology and fluid dynamics at the Science Summit at PPPL on May 11. The event also marked the beginning of a collaboration with ARISE, a mentoring program that will absorb the PPPL Pathways to Science Program in the coming year. Here, a student shows Aliya Merali, a program leader in Science Education, her project on the effects of ultraviolet light on bacteria. (Photo by Deedee Ortiz).

N.J. DEP names PPPL top environmental steward

continued from page 1

"We are committed to protecting the environment; our mission, for example, to enable fusion energy - a clean, green, safe and nearly inexhaustible source of power - illustrates that commitment," said Adam Cohen, Deputy Director of Operations at PPPL. "This commitment extends to the operations of our facilities and the dedication of our employees.

"We have worked hard over many years to reduce our energy use and carbon emissions, convert our vehicles to more environmentally friendly fuels, compost our waste, and in general, implement a broad-based sustainability program, " Cohen said. "This recognition by New Jersey is a great honor and a tribute to our commitment to the environment."

In a ceremony at PPPL on May 20, DEP Assistant Commissioner Wolfgang Skacel said PPPL's achievement in meeting the standards is "unique." "We have a program that has 21 different categories and nobody has reached 21 but only one facility has reached 20 out of the 21 and that's PPPL," he said. "Kudos to all of you."

Skacel presented Director Stewart Prager with a certificate recognizing PPPL as the leading facility for environmental stewardship. "Congratulations to all of you on a fine job," Skacel said. "The environment is better because of you."

Prager thanked Skacel for the recognition. "It means a lot," he said. "We're internally motivated to do this but somehow an outside pat on the back makes a big difference."

He added that all of the employees at the Laboratory could take credit for the award because everyone takes part in PPPL's recycling and compost programs. "This is something that everyone in the Laboratory can take pride in this accomplishment so thank you for all of this." PPPL employees enjoyed cake and coffee down in the lobby of the LSB building to celebrate the award.

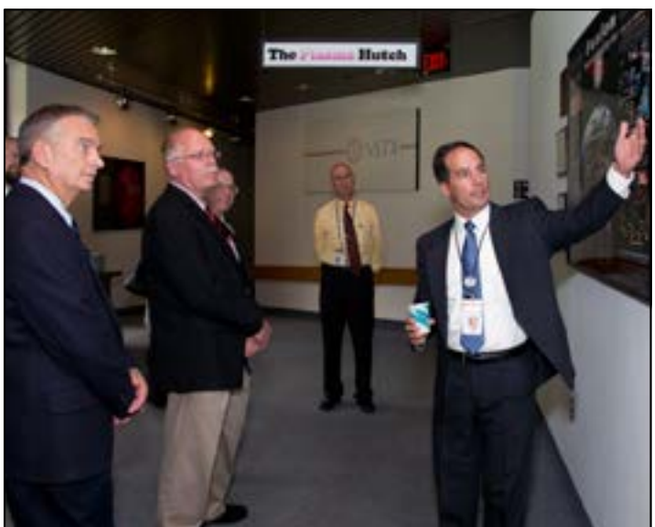
Prager singled out Robert Sheneman, head of the environmental services division, for being one of the key people guiding PPPL's sustainability programs.

The DEP's Environmental Stewardship program rates facilities on everything from reducing greenhouse gas emissions to green building certification to green purchasing. PPPL has actively improved its performance in each of those areas: The Laboratory received the Department of Energy's 2012 Sustainability award for cutting its carbon footprint nearly in half in three years. The Laboratory's main office building is LEED-Gold certified and is an EPA Energy Star building and PPPL was one of just three facilities in the country to receive the DOE's gold GreenBuy Award for its green buying program.

After the ceremony, John DeLooper, head of best practices and community outreach, and Sheneman led Skacel and seven others from the DEP on a tour of the Laboratory, stopping at the National Spherical Torus Experiment control room, the bay where the NSTX center stack is being fabricated for the $94 million upgrade, the Science Education laboratory and the computer center.

Sheneman pointed out the composting and recycling bins throughout the Laboratory that allow PPPL to divert nearly 70 percent of its waste from landfills. He also told the visitors about PPPL's 30 percent reduction in paper use over the past two years and its use of biodiesel in all of its EMS support vehicles. He even pointed out the cooling systems for some of the banks of computers that circulate cool air around the computer to reduce energy use in the larger area. "It's a good team here," Sheneman said. "People really take these things seriously. They want to participate."

PPPL Director Stewart Prager, left, holds a certificate awarded by DEP Assistant Commissioner Wolfgang Skacel in a ceremony at PPPL on May 20.



Robert Sheneman, right, head of PPPL's environmental services division, shows off PPPL's environmental awards to DEP officials following the ceremony on May 20. From left to right: Rai Belonzi, Central Bureau Chief of Water Compliance and Enforcement; behind him, Geoffrey Pritchard, inspector for the Central Bureau of Water Compliance and Enforcement; Skacel, Jeffrey Hofman, a supervisor environmental specialist for the Central Bureau of Water Compliance and Enforcement, and PPPL's John DeLooper, head of best practices and outreach.

PPPL honors Sabbagh and Hammett

PPPL presented its 2013 outstanding research awards to physicists Steven Sabbagh and Gregory Hammett following Director Stewart Prager's May 28 State of the Laboratory Address. Sabbagh received the Kaul Foundation Prize for Excellence in Plasma Physics Research and Technology Development for his work on advancing the understanding, and enhancing the stability, of high-performance plasmas in fusion facilities called tokamaks. Hammett was named winner of the Distinguished Research Fellow Award for his work on deepening the theoretical understanding of turbulence in fusion plasmas.

Sabbagh, a senior research scientist at Columbia University and an adjunct professor of applied physics at Columbia, was the first long-term collaborator at PPPL to receive the Kaul Prize, which includes a $6,000 cash award. Former PPPL Director Ronald Davidson endowed the prize by giving Princeton University a portion of the gift he received as the 1993 recipient of the Award for Excellence in Science, Education and Physics from the Kaul Foundation in Tampa, Fla.

The honor for Hammett, a principal research physicist at PPPL, includes a $5,000 cash award supported by the U.S. Department of Energy. The recognition is part of the Laboratory's Distinguished Research and Engineering Fellow Program, which honors members of the PPPL scientific and engineering staffs for their accomplishments.

Steven Sabbagh

Sabbagh has worked as a research scientist and has led a group of Columbia University researchers conducting experiments at PPPL for more than two decades. He has mentored students doing research at the Laboratory as well. "We're very pleased to make this award to Steve," said Michael Zarnstorff, PPPL deputy director for research. "We deeply value his contributions to the Lab and to the U.S. fusion program through the facilities here, and to the role that he's played as a leader of experimental programs."

Sabbagh began work as a full-time, on-site collaborator at PPPL after earning his Ph.D. from Columbia in 1990. He first created plasmas on the Tokamak Fusion Test Reactor (TFTR) that significantly exceeded previous limits for a crucial factor called "beta"—the ratio of the pressure of the plasma to the strength of the magnetic field that confines it. The higher the beta, the more cost-effective the confinement. These high-beta plasmas produced some of the highest fusion power in the operation of TFTR.

Sabbagh next moved to the National Spherical Torus Experiment (NSTX), where he investigated ways to stabilize plasma at high beta by controlling phenomena called resistive wall mode instabilities. His research produced record betas that surpassed a stability milestone called the "no-wall limit" by as much as a factor of two. He plans to continue to advance such research when the NSTX upgrade is completed next year.

Sabbagh conducts complementary experiments on the KSTAR superconducting tokamak in South Korea and the DIII-D tokamak in San Diego, and has been awarded a number of honors. He received the Nuclear Fusion Award from the International Atomic Energy Agency in 2009 and was elected an American Physical Society Fellow in 2010. He lives in Warren with his wife, Mary Lepore-Sabbagh, who has worked in information technology for Bell Labs and Lucent Technologies.

Gregory Hammett

Hammett specializes in computational and theoretical studies of the complex physics of plasma turbulence and has been a fellow of the American Physical Society since 1997. "Greg is a scholar known worldwide for his seminal contributions to plasma kinetic theory," said Amitava Bhattacharjee, who heads the Theory Department at PPPL. "Along the way, he has mentored outstanding students who have gone on to make striking contributions to theoretical and computational plasma physics."

Hammett first came to PPPL as a summer college student in 1979 and began his career at the Laboratory the following year, first as a graduate student and then as a member of the research staff, which he joined in 1986 after completing his Ph.D. He became increasingly interested in turbulence in fusion facilities in the late 1980s and has made that the focus of most of his career. He and collaborators seek to develop improved computer simulations of this turbulence, first to understand how future fusion devices will perform and then to find ways to improve their performance.

Hammett began teaching in the Princeton Program in Plasma Physics in 1995 and has been a lecturer with the rank of professor since 2001. He has supervised nine Ph.D. students. He served as director of graduate studies for the program in spring, 2013, and is currently a visiting research fellow at Merton College at the University of Oxford. There he lives in a house that dates to the 1300s and once served as a meeting place for thinkers such as the philosopher John Locke and the scientist Robert Boyle. He will be returning to his home in Plainsboro, where he resides with his wife of 25 years, Kate.

Steven Sabbagh

Gregory Hammett

Watch Andrew Zwicker's TEDx talk on fusion energy on YouTube

A TEDx talk by Andrew Zwicker, head of Science Education, on "Creating a Star on Earth: the Path to Fusion Energy," given at Saint Peter's University March 21 as part of a Tedx conference on "Future Utopias," is now available on the Web. The talk can be viewed at: http://www.youtube.com/watch?v=BxE4ghfShE4&feature=youtube

COLLOQUIUM

"LABORATORY DYNAMOS"

PROFESSOR CARY FOREST
University of Wisconsin - Madison

Wednesday, June 5

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

JUST BREATHE

Mindfulness Series

Mindfulness is the practice of purposely focusing your attention on the present without drifting into concerns about the past or future.

Friday: 6/7

12-12:30 p.m. Furth Plasma Physics Library

FOR PPPL STUDENTS, FACULTY, AND STAFF

Drop in as often as you can! No registration is required.

Learn to quiet the mind and ease physical distress. This mindfulness series will provide an opportunity to slow down in this fast-paced setting, and to experience balance and a sense of calm.

Facilitated by Shefalika Gandhi, LCSW, University Health Services. Sponsored by Princeton Plasma Physics Laboratory (PPPL). Email mgonzalez@pppl.gov for more information.

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

	MONDAY JUNE 3	**TUESDAY** JUNE 4	**WEDNESDAY** JUNE 5	**THURSDAY** JUNE 6	**FRIDAY** JUNE 7
COMMAND PERFORMANCE CHEF'S FEATURE	 ZESTY ORANGE CHICKEN AND RICE	 GRILLED SALMON SERVED WITH WILD RICE	 CHICKEN MARSALA WITH MASHED POTATOES AND VEGETABLE	 STUFFED SHELLS IN ALFREDO SAUCE SERVED WITH TOMATO SALAD	 STUFFED TILAPIA WITH VEGETABLE
EARLY RISER	California Eggs Benedict	Blueberry French Toast	Apple Raisin Pancakes	Turkey Omelet	Spanish Omelet
COUNTRY KETTLE	Cream Of Mushroom	Beef Noodle	Vegetable Vegetarian	Cream Of Chicken	Spinach & Sausage Soup
GRILLE SPECIAL	Grilled Peanut Butter, Bacon & Banana	Cajun Chicken Breast with Peppers, Onions and Pepperjack Kaiser	Popcorn Shrimp Po' Boy	Italian Hot Dog	Italian Grilled Cheese
DELI SPECIAL	Zucchini, Hummus, Feta Cheese & Spinach Pita	New Orleans Muffaletta	Grilled Vegetable Dagwood	Asian Chicken Wrap	Liverwurst & Onion on Rye
PANINI	Chicken Satay Sammie	Chicken Parmesan Sandwich	Bacon, American Cheese & Tomato on Ciabatta Bread	BBQ Beef with Roasted Onions on Ciabatta Bread	BBQ Pulled Pork Sandwich

MENU SUBJECT TO CHANGE WITHOUT NOTICE

CLICK HERE FOR A PRINTABLE WEEKLY MENU

WEEKLY

Editor: **Jeanne Jackson DeVoe** ◆ Layout and graphic design: **Nora H. Ananos**
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 ◆ **PPPL WEEKLY** is archived on the web at: http://www.pppl.gov/ppplweekly.cfm