PPPL
U.S. DEPARTMENT OF ENERGY
PRINCETON PLASMA PHYSICS LABORATORY WEEKLY
MONDAY, FEBRUARY 27, 2012

At PPPL THIS WEEK

WEDNESDAY, FEBRUARY 29

PPPL Colloquium
4:15 p.m. ◆ M.B. Gottlieb Auditorium

Solving Large-Scale Computational Problems Using Insights from Statistical Physics

Bart Selman (Cornell University)

CLICK HERE FOR ABSTRACT

GFDL Events and Seminars
12 p.m. - 1 p.m. ◆ GFDL Smagorinsky Seminar Room

Oxygen Minimum Zones in the Eastern Boundary Currents of the Southern Atlantic - A Model View

Martin Schmidt (Baltic Sea Research Institute, Germany)

www.gfdl.noaa.gov/events
(Gov't, Univ. or 2 other forms of I.D. needed)

THURSDAY, MARCH 1

PPPL Theory Seminar
10:30 a.m. ◆ T-169

Matt Landreman

Physics Colloquium
4:30 p.m. ◆ Main Campus Jadwin A10

Measuring the Spins of Black Holes and Applying the Results

Jeffrey McClintock (Harvard)

FRIDAY, MARCH 2

DIII-D Science Meeting
1 p.m. ◆ B-233

SATURDAY, MARCH 3

Science on Saturday
9:30 a.m. ◆ M.B. Gottlieb Auditorium

Why Are Computers So Stupid and What Can Be Done About It?

Ernest Davis (New York University)

Leader of the Lab

A Close-up Look at Stewart Prager

By John Greenwald

Stewart Prager

It took Stewart Prager some 40 years to make the 60-mile trip from his childhood home in the Bronx to the U.S. Department of Energy's Princeton Plasma Physics Laboratory (PPPL), which he now directs. Along the way came several stops: college and graduate study at Columbia University, a two-year stint at what is now General Atomics in San Diego and 31 years at the University of Wisconsin in Madison, where he taught, ran a laboratory and made scientific discoveries.

Prager returned to his East Coast roots to take the PPPL job in 2009. He was attracted by the prospect of leading "a large Laboratory with a terrific staff." There was also "the challenge and opportunity to influence the science produced at PPPL and the evolution of the national program in fusion and plasma physics." He arrived as the sixth director of PPPL and the first to be recruited without previous ties to the Laboratory or to Princeton University, which runs the facility for DOE.

This was a time of transition for the Laboratory. The DOE had just cancelled funding for the uncompleted National Compact Stellarator Experiment, an innovative fusion experiment that ran into higher-than-expected costs while PPPL was building it. To take up the slack, Prager shepherded a three-year application process that won DOE approval for a $94 million upgrade of the Laboratory's National Spherical Torus Experiment (NSTX), which will make that facility the most powerful of its type in the world when construction is completed in 2014. "The idea for the upgrade predated me," notes Prager, who says the project will provide crucial new tools for understanding how to turn the electrically charged gases called plasmas into a virtually limitless source of energy for generating electricity.

Other changes now under way at the Laboratory are "very much a work in progress," says Prager. Among his priorities are "amplifying our program in areas connected to fusion and not connected to fusion," and working with other laboratories to help chart the development of fusion reactors. PPPL conducted an international workshop on roadmaps for fusion last September. The forum gave rise to a plan for yearly events that will bring together scientists from around the world to coordinate

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SAVE the DATE

STATE OF THE LABORATORY ADDRESS

WEDNESDAY, MARCH 7, 2012 - 2 P.M. - M.B.G. AUDITORIUM

After Dr. Prager's presentation, the Kaul Awards and the Distinguished Engineering Fellow Award will be presented. Refreshments to follow. All staff are invited to attend.

Lab Leader Close-up

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work on key technical issues under the auspices of the International Atomic Energy Agency.

Prager tries to bring a light touch to directing PPPL, which has been a leader in fusion and plasma physics research for more than 60 years. "You can't manage science with an iron fist because science by its nature has to be creative and productive and a little bit unpredictable," he says. "But at the same time you have to assure that there are very high rates of productivity."

While at Wisconsin, Prager led research on the "Madison Symmetric Torus" (MST) experiment and headed a center that studied plasmas in both the laboratory and the cosmos. His MST team investigated a plasma in which the confining magnetic field was about ten times weaker than in a tokamak, the most widely used type of experimental fusion device. This can be a large advantage for a reactor since magnetic fields are costly to create. However, the weak field itself becomes chaotic, allowing heat to leak from the plasma. Prager's team developed an understanding of the cause of this "magnetic chaos," and used that understanding to reduce the chaos and suppress the heat loss. "That insight and approach was then exported to laboratories around the world that study these types of plasma configurations," Prager says. The MST went on to study many effects of magnetic chaos that occur in both laboratory and astrophysical plasmas.

It was also at Wisconsin that Prager co-discovered the "bootstrap current" — a key finding that has influenced the design of today's tokamaks. The bootstrap current arises spontaneously in reactor-made plasmas and helps to sustain the magnetic fields that confine the superhot gases, which must be held steady for fusion to occur. "Without the bootstrap current, tokamak plasmas cannot be kept in a steady state," Prager says. "So now tokamak designs are tailored to optimize the bootstrap current."

The magical-seeming current was jointly discovered by Prager and Michael Zarnstorff, a Wisconsin graduate student who came to PPPL in 1984 and now is deputy director for research at the Laboratory. In Madison, the two physicists did an experiment that confirmed the existence of the current, which many had dismissed "as a theorist's fantasy that seemed too good to be true," says Prager. Zarnstorff later verified the finding by detecting the current in the Tokamak Fusion Test Reactor that PPPL operated in the 1980s and 1990s. "That is what put the bootstrap current on the map," notes Prager, who shared with Zarnstorff the American Physical Society's 2008 Dawson Award for Excellence in Plasma Physics Research for spotting the long-theorized current.

Prager came relatively late to his scientific calling. "A lot of scientists you talk to say that when they were three years old they were playing with arcs and sparks," says Prager. "But that wasn't the case with me. I mainly played in the streets as a kid."

Stewart Prager — leader of PPPL.

A high school physics class, however, caught his attention. Then it was on to an engineering degree at Columbia, which he combined with a liberal arts degree from Queens College before earning a doctorate in plasma physics from Columbia. "Plasma physics captured my interest, both for its basic physics content and its huge range of applications."

While still an undergraduate Prager drove with friends to Woodstock, the storied 1969 rock festival that took place on a dairy farm over a rainy summer weekend. "My main recollection is just enormous amounts of mud, just being out there in the mud for 36 hours," recalls Prager. "The movie was better."

Prager was working on his doctorate when he met his wife, Karen, who was studying theater at Columbia and has pursued a career ranging from acting to journalism to educational research. "We met in grad school and it was great to be with a nonscientist," Prager says. The couple has three sons — Daniel, a graduate student in economics, Zachary, a U.S. Navy lawyer and Gabriel, a beginning medical student.

Looking ahead, Prager says the future of fusion as an energy source rests on the level of funding. Physicists have now advanced quite far toward understanding how to build a commercial fusion reactor, he observes. "It's not a question of whether it's possible or if we can have one, but rather when and how attractive it will be. So I, and probably most fusion people, would say that we're confident that there will be a fusion reactor in a timely manner if there is robust funding."

PPPL Celebrates National Engineers Week

Engineers at the Laboratory enjoyed a pizza party in the NSTX Annex on Feb. 21 in celebration of National Engineers Week. Above are several of the engineers at the lunch, which was hosted by PPPL.

Young Women's Conference Volunteers Needed

As you may know, PPPL hosts an annual Young Women's Conference (YWC), which this year will be held on March 23 from 9 a.m. to 2 p.m. In fact, this is the tenth anniversary of the event that encourages women to pursue careers in science, mathematics, engineering and technology, and we continue to be very proud to host it. Over the years, the conference has expanded dramatically; last year's conference had 240 students, the most ever! The YWC was even mentioned by President Tilghman last year in her article in the Princeton Alumni Weekly as a key element of our efforts in science education.

This year, we expect over 300 students to attend, and as a result, we are hosting the conference on the Princeton University campus. While the venue is changing, PPPL's role in organizing and running the conference is not, nor is the need for volunteers to make the conference run as smoothly as possible and to get all those attending excited about careers in science and engineering. In short, we need your help.

Outreach is an activity that I support and greatly encourage, and assisting with this particular conference is an excellent opportunity to get involved in an activity with an enormous impact. In addition to the direct impact on the students that attend, this conference strengthens our connection with the local community and with Princeton University.

To see how you can help please contact YWC Director Stephanie Wissel at swissel@pppl.gov.

Adam Cohen
PPPL Deputy Director for Operations

More info CLICK HERE

PPPL Hosts Emergency Drill

PPPL's Site Protection Division hosted a very successful training program for our mutual aid partners at the B-Site New Guggenheim Building February 11-12. Approximately 70 emergency responders participated in the joint training exercise to learn about and practice key facets of emergency first response.

Topics included electrical safety, ventilation, forced entry, rescue, confined space, incident command and scene management. The division's Jamie Alkhateeb provided leadership and oversight of the training committee, as well as the entire weekend's activities, personnel and logistics. From left are PPPL's Kevin Rhoades, Howard Caruso, Fran White, Jamie Alkhateeb, Bill Slavin, Marissa Mills-Clark (and inset), and Darren Thompson.

COLLOQUIUM

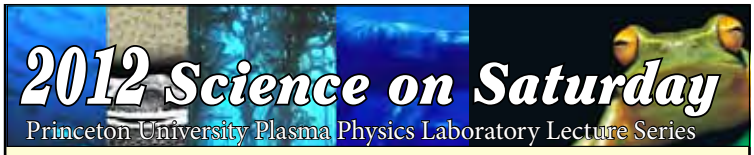
Solving Large-Scale Computational Problems Using Insights from Statistical Physics

BART SELMAN
Cornell University

Wednesday, February 29

4:15 p.m. (Coffee/Tea at 4 p.m.)

M.B. Gottlieb Auditorium, Lyman Spitzer Building



Why Are Computers So Stupid and What Can Be Done About It?

ERNEST DAVIS
New York University

Saturday, March 3, 2012

9:30 a.m.

M.B. Gottlieb Auditorium, Lyman Spitzer Building

Brock PPPL CAFÉ MENU

BREAKFAST 7 a.m. – 10 a.m.
CONTINENTAL BREAKFAST 10 a.m. – 11:30 a.m.
LUNCH 11:30 p.m. – 1:30 p.m.
SNACK SERVICE until 2:30 p.m.

	MONDAY, FEB. 27	TUESDAY, FEB. 28	WEDNESDAY, FEB. 29	THURSDAY, MAR. 1	FRIDAY, MAR. 2
COMMAND PERFORMANCE CHEF'S FEATURE	 Spaghetti w/ Meat Sauce, Garlic Bread	 Turkey Meatloaf	 Chicken Pot Pie	 BBQ Pulled Pork	 Maryland Crab Cakes w/ Fries
EARLY RISER	Southern Style Biscuits and Sausage Gravy	Fresh Baked Banana Bread	The Dee Dee Special	The Belly Buster Hoagie	Oatmeal Raisin Pancakes w/ Bacon
COUNTRY KETTLE	Vegetarian Country Vegetable	Chicken with Spinach and White Bean	Seafood Chowder	Zuppa Tuscana	Cream of Chicken
GRILLE SPECIAL	Chicken Tender Parmesan Hoagie w/Fries	Double Bacon Cheeseburger, Onion Rings	Hot Corned Beef and Swiss on Rye with Fries	Vegetable Quesadilla with Salsa and Sour Cream	Double Decker Grilled Cheese w/Tomato, Bacon
DELI SPECIAL	The Tuna BLT Wrap	Prosciutto, Salami, Pepperoni, Provolone Hoagie	Roast Beef Ranchero Roll-Up	Honey Mustard Chicken Salad on Multi Grain Roll	Fried Tilapia, Cheddar Cheese, Lettuce, Tomato
PANINI	The Cheese Steak Panini w/ Peppers and Onions	Grilled Portabello, Provolone, Red Pepper	Turkey, Bacon, Cheddar, Tomato and Chipotle Mayo	The Buffalo Chicken Salad Panini	3 Cheese, Bacon and Ham Flatbread Griller

MENU SUBJECT TO CHANGE WITHOUT NOTICE

CLICK HERE FOR A PRINTABLE WEEKLY MENU

WEEKLY

Editor: **Patti Wieser** ◆ Copy Editor /Graphic Design: **Gregory Czechowicz**
Photography: **Elle Starkman** ◆ Web: **Chris Cane**

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