

At PPPL THIS WEEK

TUESDAY, JAN. 28

Back Care Seminar
10 - 11 a.m. ♦ MBG Auditorium

PPPL Colloquium
4:15 p.m. ♦ MBG Auditorium
(rescheduled from Jan. 22)
Addressing Big Data Challenges in Simulation-based Science
Manish Prashar, Rutgers University

WEDNESDAY, JAN. 29

PPPL Colloquium
4:15 p.m. ♦ MBG Auditorium
The Usefulness of Useless Knowledge: The History of the Institute for Advanced Study
Christine Di Bella, Institute for Advanced Study

MON., JAN. 27 - WED., JAN. 29

Business Clothing Drive
8-9 a.m. & 12:30-1:30p.m. ♦ A116

SATURDAY, FEB. 1

Science on Saturday Lecture
9:30 a.m. ♦ MBG Auditorium
The Invisible World of Marine Microbes: How Earth's Smallest Living Things Have the Biggest Impact on How Our Ocean Works
Prof. Kay Bidle, Rutgers University

UPCOMING EVENTS

February 21-22
NJ Regional & High School Science Bowl
Lab wide
Volunteers needed.
Contact Deedee Ortiz,
dortiz@pppl.gov, ext. 2785.

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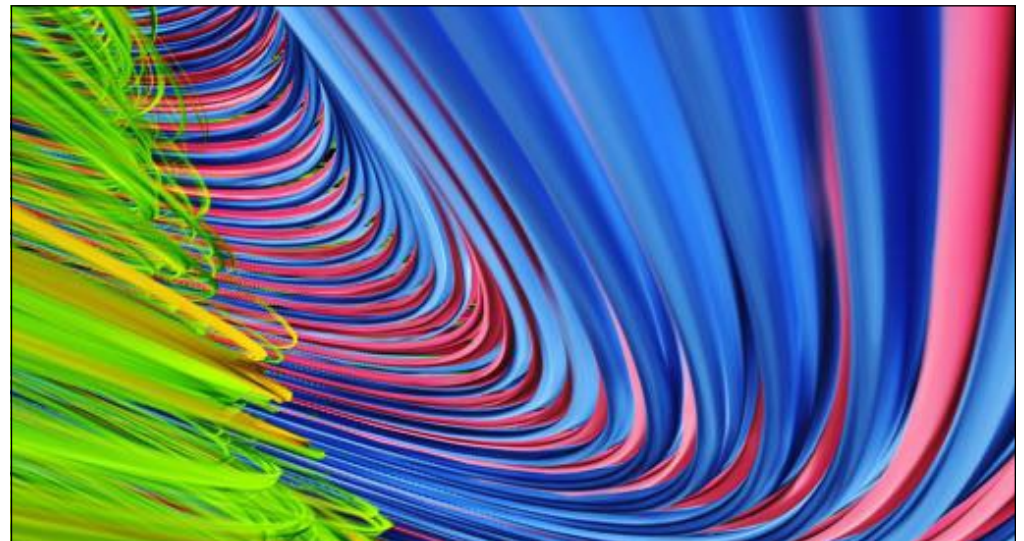
PPPL physicists win supercomputing time

By John Greenwald

Researchers led by scientists at PPPL have won highly competitive allocations of time on two of the world's fastest supercomputers. The increased awards are designed to advance the development of nuclear fusion as a clean and abundant source of energy for generating electricity.

The allocations marked the second year of three-year grants from a DOE program to accelerate scientific discovery. The nationwide program, called Innovative and Novel Impact on Computational Theory and Experiment (INCITE), awards millions of computer core — or processor — hours for cutting-edge research on energy projects. For example, 100 million core hours on a supercomputer would equal roughly 100 million hours — or 11,000 years — on a desktop computer powered by a single processor. Powering supercomputers, by contrast, are hundreds of

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Computer simulation of plasma turbulence carried out in collaboration with PPPL scientists by Kwan-Liu Ma and colleagues in the Department of Computer Science at the University of California-Davis.

PPPL's environmental management policy goes public

By Jeanne Jackson DeVoe

There's ample evidence that PPPL's environmental management policy is woven into the fabric of everyday life at the Laboratory: from recycling bins to reminders to order green products to office lights that shut off when you leave.

But while everyone at PPPL knows to compost food and paper goods in the cafeteria and to print documents out on both sides of the paper (or not print them at all), not everyone may know exactly what the Laboratory's environmental policy says.

Robert Sheneman, head of PPPL's Environmental Services Division, wants to change that. He wants PPPL employees to know the basics of what PPPL's environmental policy is and to be able to explain the policy in advance of an environmental management audit at PPPL from Feb. 3 to Feb. 7. Employees will get some help learning about the policy when they receive green badge cards this week that outline the policy.

"We don't expect everyone to be an environmental expert, we expect them to do their job, understand at a basic level how their job affects the environment and then know where to go if they have questions if they're not sure," said Sheneman. "If you

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Supercomputing time

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thousands of processors that run simultaneously and can accomplish in minutes what a desktop computer would take years to carry out.

The PPPL recipients:

A multi-institutional center led by PPPL physicist C.S. Chang that studies the turbulent edge of the superhot, electrically charged plasma gas that fuels fusion reactions. Chang's team, the Center for Edge Physics Simulation (EPSI), won a total of 229 million core hours — more than double the 100 million core hours the center received in its first-year and among the top three allotments in the INCITE program. Control of the edge will be crucial for sustaining a fusion reaction in ITER, an international tokamak under construction in France to demonstrate the feasibility of fusion power.

Participants in the center include physicists, mathematicians and computer scientists from PPPL and 10 other U.S. institutions. "We have been making very good progress in both physics and computation," said Chang, whose EPSI team is developing a high-performance computer code to simulate the edge of the plasma in donut-shaped fusion facilities called tokamaks.

The team recently succeeded in modeling "blobby" — or intermittent — nonlinear plasma-edge turbulence for the first time using the so-called gyrokinetic simulation method, which captures the complex dynamic behavior of plasma particles. Such studies had only been done in the past using simple fluid-modeling codes. The researchers employed most of the nodes of central-processing and graphical-processing cores on "Titan," the Cray XK7 supercomputer at Oak Ridge National Laboratory, to carry out this first fully kinetic simulation of the "blobby" edge turbulence.

The team's new award consists of 129 million core hours on the Titan, the world's second most powerful supercomputer, and 100 million core hours on the IBM Blue Gene/Q supercomputer at Argonne National Laboratory. EPSI could consume the time relatively quickly since the team's comprehensive, high-performance computer codes can utilize hundreds of thousand of cores in a single hour of massively parallel computing. PPPL researchers who will make use of the newly awarded time include Seung-Hoe Ku, Jianying Lang, and Robert Hager.


An international team led by PPPL physicist William Tang that is developing a high-performance code

to study the properties of plasma confinement. Such a code will be an essential ingredient for designing an efficient fusion reactor. The team, which includes U.S. and German researchers, won 50 million core hours on the IBM Blue Gene/Q machine at Argonne, up from 40 million core hours in the previous year's allotment.

"The goal of this project is to gain new insights on confinement scaling by using powerful, world-class supercomputing systems to carry out simulations with unprecedented resolution and temporal duration," said Tang. "Findings will also address the key question of how the turbulent transport of plasma particles and associated confinement scale from present generation devices to much larger ITER-size plasmas."

Results

Results from the first year of Tang's INCITE project found that the improvement in confinement as devices grow larger takes place far more gradually, and with significantly lower loss rates, than less-powerful computer simulations have indicated. These first-year results received a "High Performance Computing Innovation Excellence Award" from International Data Corp. for Tang and physicists Stephane Ethier of PPPL and Bei Wang of Princeton University. Wang highlighted the results in a paper and talk presented at "SC13," an international supercomputing conference that drew more than 10,000 attendees when it was held in Denver in November.

The supercomputing awards to PPPL were among four 2014 INCITE awards to researchers at Princeton University. Also winning supercomputing time were Emily Carter, the Gerhard R. Andlinger Professor in Energy and the Environment, and a professor of mechanical and aerospace engineering & applied and computational mathematics; and Jeroen Tromp, a professor of geosciences, applied and computational mathematics, and Blair Professor of Geology. Carter and collaborator Lin-Wang Wang of Lawrence Berkeley National Laboratory won 25 million core hours on Titan to simulate processes inside nanosystems—systems measured in billionths of a meter. Tromp, who also is director of the Princeton Institute for Computational Science and Engineering (PICSciE), and co-investigator Olaf Schenk of the University of Lugano, Switzerland, received 100 million core hours on Titan to develop computer models of the interior of the Earth. 

Register Now for Young Women's Conference in Science, Mathematics, Technology & Engineering

Calling all young female future engineers, mathematicians and scientists! Registration is open for the Young Women's Conference in Science, Mathematics, Technology and Engineering, hosted by PPPL, on March 22 at Princeton University.

The all-day conference for seventh through tenth-graders will include lectures, hands-on activities and tours of Princeton University's laboratories.

Registration is open to the daughters of PPPL staff and school groups through Feb. 14. Staff members can register at <https://www.surveymonkey.com/s/CQK53PN>. Go to https://pppl.princeton.edu/ywc_information on the Science Education website for more information or contact Deedee Ortiz at dortiz@pppl.gov.



A group of students tour the chemistry laboratory at Princeton University during last year's Young Women's Conference. The registration deadline for PPPL employees' daughters is Feb. 14.

Environmental Policy

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understand how your job affects the environment, you can identify the places that you might be able to do something about it.”

PPPL's Environmental policy was second written

PPPL has long had a commitment to the environment. The Lab's environmental stewardship policy is P-0002, meaning it was the second policy issued at the Lab in 1992. PPPL has won numerous awards for its environmental practices, including being recognized by the New Jersey Department of Environmental Protection last year for being the top facility in the state for sustainable practices.

PPPL also must comply with federal requirements to have a strong environmental management system. A presidential order signed by President Obama in 2009 mandates that all federal facilities must reduce energy use and greenhouse gas emissions. The DOE also requires all its laboratories to have an environmental management system that is registered with or conforms to the ISO 14001 international standard. ISO 14001 requires that organizations set goals and measure their environmental performance so they can continually improve. It also requires outside auditors to evaluate how well an organization is meeting those standards.

PPPL registered against ISO 14001 in 2011 and had an initial pre-registration audit, followed by yearly audits. A team of auditors will visit the Lab for a more extensive re-registration audit in the fall.

Auditor will evaluate PPPL's performance

In the upcoming audit, an evaluator from the UL-DQS, a global auditing firm, will visit the Laboratory for a week to measure PPPL's performance against the requirements of ISO 14001 and the performance goals PPPL set for itself. While PPPL generally has a very good track record, one area that received less than stellar grades in the past is how well the Lab communicates with employees about its environmental policy.

The auditor will evaluate documents and will interview Lab management and staff in Facilities and other departments who are most likely to affect the environment. But the evaluator may also talk to other employees to gauge how much they know about the Lab's environmental policy and whether they have received training. (The answer to the training question is that all PPPL employees receive training in PPPL's environmental policy through GET training when they are first hired and must continue the training every three years).


Employees should know that PPPL's environmental policy has four main goals: making sure the Lab complies with environmental regulations and protects the environment; preventing pollution and conserving resources; communicating sustainable practices; and monitoring and improving the Lab's performance.

Above all, employees should know how the policy applies to their job; how their job affects sustainability at PPPL; and that they should call ext.

3333 if there is a spill or emergency. Employees should think about environmental impacts in work planning, follow ES&H guidelines and procedures and share ideas for improvement by emailing ems@pppl.gov. “People here are not usually afraid of giving feedback,” said Sheneman. “If there's a problem we'd like to know about it and if they have an idea or suggestion, we'd like to know about that too.”

Many of the innovations that reduce waste and prevent pollution come from PPPL's employees, Sheneman said. Years ago, for example, technicians in the machine shops substituted biologically-based cutting oil for the petroleum-based machine oil that they traditionally used. Unlike the petroleum-based product, which was considered a hazardous waste, the oil was non-toxic and could easily be disposed of – thereby preventing pollution and saving the Laboratory money. “It's the creativity of the employees and the commitment people have to really do their job well that makes an impact,” Sheneman said.

Sheneman encourages employees to learn more about the Lab's environmental policy and to wear the badges. He says it's fine if people who are questioned by the auditor pick up the badge and essentially read off the answers. “It's not cheating,” he said. “It's a user's aide.”

Information about the Lab's environmental policy is also available on tabletop cards in the cafeteria and in the Lab's weekly slide show. A full copy of the policy is available on the internal website at <http://bp.pppl.gov/policy/p002.pdf>. 



PPPL image featured in LLE calendar

The University of Rochester's Laboratory for Laser Energetics (LLE) chose this image, at right, to highlight the month of December in the 2014 LLE calendar. The image comes from an experiment that PPPL's Amitava Bhattacharjee and William Fox conducted with Rochester collaborators on the OMEGA EP laser system at LLE. The experiment studied magnetic reconnection between counter-propagating, magnetized laser-produced plasmas. This work was part of a National Laser Users' Facility grant awarded by the U.S. Department of Energy/National Nuclear Security Association to the University of New Hampshire (UNH) while Bhattacharjee and Fox were on the UNH faculty.

The image is a proton radiograph, in which white areas reflect regions of intense magnetic fields that deflect the diagnostic proton beam off the film. The diagrams were provided by the LLE publication department. The complete calendar can be downloaded [here](#).

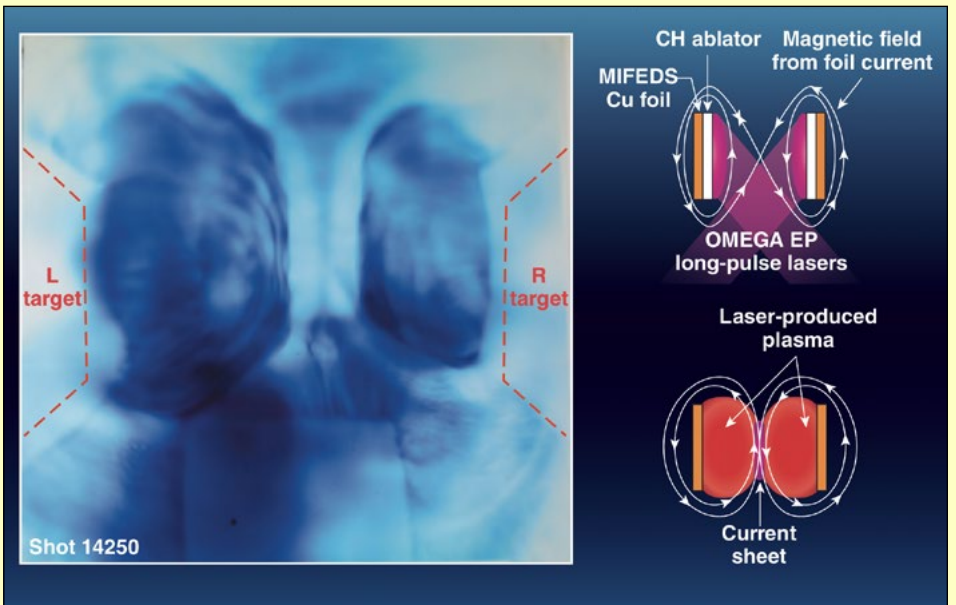


Photo courtesy of LLE.

COLLOQUIUM



Addressing Big Data Challenges in Simulation-based Science

MANISH PRASHAR
Rutgers University

Tuesday, Jan. 28 (rescheduled from Jan. 22)

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

COLLOQUIUM



The Usefulness of Useless Knowledge: The History of the Institute for Advanced Study

CHRISTINE DI BELLA
Institute for Advanced Study

Wednesday, Jan. 29

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

Science Bowl Volunteers Needed: Feb. 21 and Feb. 22

PPPL will host 48 teams of middle and high school students (about 250 students total) on Friday, Feb. 21 and Saturday, Feb. 22 for the New Jersey Regional Middle and High School Science Bowls.

We need your help! Please volunteer to help out as moderators, science/rules judges, time/score keepers, lunch attendants etc. Lunch will be provided for competition day volunteers.

Please contact Deedee Ortiz at dortiz@pppl.gov or ext. 2785 to sign up or for more information.

2014 Science on Saturday

Princeton University Plasma Physics Laboratory Lecture Series



The invisible world of marine microbes: how Earth's smallest living things have the biggest impact on how our ocean works

PROF. KAY BIDLE
Rutgers University

Saturday, February 1

9:30 a.m. • MBG Auditorium

Café 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*

COMMAND PERFORMANCE
CHEF'S FEATURE

MON. 27
JAN.



Chicken Fajita with Rice & Beans & Southwest Fixins'

Ham, Egg & Cheese Panini

Chicken Rice

Grilled Tofu Over Mediterranean Chopped Salad

Corned Beef & Turkey on Pumpernickel

Pepperoni, Provolone & Tomato Panini with Pesto & Arugula

VALUE MEAL \$5

2 Value Menu Hamburgers, French Fries, & 12 oz. Beverage

TUE. 28
JAN.



Baked Eggplant Parmesan served over Pasta

Poached Eggs Florentine over English Muffin with Hash Browns

Vegetable Minestrone

Texas BBQ Beef Sandwich with Southwest Coleslaw

Pepper Ham & Muenster Cheese on French Bread

Fried Catfish with Creole Peppers and Onions on French Bread

Cheese Sandwich, Small Soup & 12 oz. Beverage

WED. 29
JAN.



Beef Tips Stroganoff over Parsley Egg Noodles

Cajun Sausage, Peppers, Onions & Potato Omelet

Chicken Sausage Gumbo

French Toasted Monte Cristo

Mu Shu Shrimp with Napa Cabbage Wrap

Buffalo Popcorn Chicken Wrap served with Carrot & Celery Sticks

2 Grilled Veggie Sliders, Chips & 12 oz. Beverage

THU. 30
JAN.



Cajun Chorizo Sausage, Chicken & Shrimp Jambalaya

Grilled Kielabasa with 2 Eggs any style & Potatoes

Cream of Mushroom with Sherry

Fish Cake Sliders served with Fries

Waldorf Turkey Salad with Cranberries on Multigrain Roll

Vegetable Cacciatore Sub

Sloppy Joe Sliders with Chips & 12 oz. Beverage

FRI. 31
JAN.



Grilled Mustard-Glazed Salmon with Rice Pilaf

Baked Apple Crisp with Rolled Oats & Cream

Mushroom Beef Barley

Grilled Cajun Chicken Breast with Bacon & Pepperjack on French Bread

Portobello Caprese with Tomato, Mozzarella & Basil on Ciabatta

Hot Roast Beef with Blue Cheese & Caramelized Onions

2 Hot Dogs with French Fries & 12 oz. Beverage

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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