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HOTLINE

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Stratton Named New PPPL Diagnostics Head

This summer, PPPL Principal Research Physicist Brent Stratton was named the new Head of the Diagnostics Development Division at PPPL. Stratton replaces Dave Johnson, who became the U.S. ITER Diagnostics Team Leader earlier this year.

Stratton is responsible for the development and implementation of new diagnostics in support of all PPPL experimental activities in fusion facilities at the Laboratory and around the world. These range from NSTX and NCSX at PPPL, to DIII-D at General Atomics in San Diego and Alcator C-Mod at MIT, to KSTAR in Korea and the Joint European Torus (JET) in the U.K. He also will be an advocate for ITER diagnostics work to be done by PPPL.

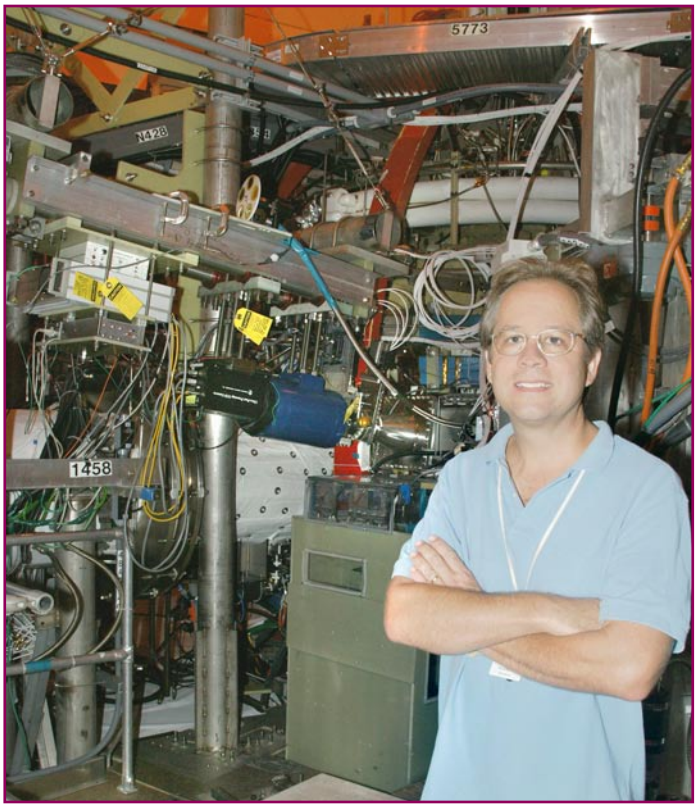
PPPL Director Rob Goldston said, "Brent is very well qualified for this challenging position, having 25 years of experience in spectroscopy and experimental plasma physics. He has been a key developer and user of diagnostics at PPPL and off site. We look forward to his efforts on behalf of the Laboratory's research program and in keeping PPPL at the forefront of diagnostic development."

The world of diagnostics is constantly changing, with advances in technology leading to new methods in the field. "New diagnostics are continually being developed, including systems that make measurements with higher time and spatial resolution," Stratton said. "For example, the development of very fast cameras make possible a variety of fast imaging diagnostics that were not possible years ago."

New diagnostics recently developed at PPPL include a method for making fast two-dimensional measurements of the electron temperature on the TEXTOR tokamak in Germany and a system for lost alpha particle detection at JET.

Stratton joined the research staff at PPPL full time in 1985, after spending time at the Lab as a Johns Hopkins University graduate student working in plasma spectroscopy. Spectroscopy measures the light emitted by the plasma to provide information on the plasma.

"I built an ultraviolet spectrometer and my professor at Johns Hopkins asked PPPL if I could use it on the Princeton Large Torus (PLT). I took data and participated in experiments on PLT," said Stratton. "Most of my time at PPPL has focused on spectroscopy and optical diagnostics of plasmas, including measurements of nonthermal confined alpha particles on TFTR and measurements of the plasma current density profile on JET."



Brent Stratton

As the new diagnostics head, his job is shifting from direct research to overseeing diagnostic design development and work. "As a diagnostic physicist, I worked one-on-one or one-on-two, but now I am managing. My work will be broader and less detailed, less focused on one scientific problem. I will be constantly learning new things and meeting people," he said, adding that he also will be traveling more frequently.

Stratton oversees a staff of approximately a dozen, including physicists and some technicians and engineers engaged in diagnostic work at PPPL.

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Stratton

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In addition to NSTX diagnostics, he has recently been involved in the planning of NCSX magnetic diagnostics. On most machines, diagnostics are added after the machine is built, but on NCSX, some magnetic diagnostics will be installed in places that will later be inaccessible and thus require early planning. These particular diagnostics measure the structure of the magnetic field produced by the plasma itself. Nearly all of the NCSX diagnostics will be installed after the machine begins operation, but planning work has already started and design work on many systems will start in the next two or three years.

Stratton said his involvement in NCSX magnetic diagnostics has been a challenge that he embraces. ITER, too, will pose welcome challenges. "Working in new areas makes the job interesting," Stratton said.

Stratton received a bachelor's degree in physics from Franklin and Marshall College in Lancaster, Penn., in 1978, and a master's and a Ph.D. in physics from The Johns Hopkins University in Baltimore in 1980 and 1984, respectively.

He and his wife, Gayle, live in Pennington with their two children, 14-year-old daughter, Kent, and 10-year-old son, Oliver.

Stratton said he looks forward to his new duties at PPPL, and thanked Dave Johnson for much he has learned about diagnostics and management. "It should be an exciting time to continue diagnostic work on NSTX and other machines, and to develop diagnostics on NCSX, a brand new device," Stratton said. ●

Summer Students Add Life to PPPL Halls

Twenty students for the National Undergraduate Fellowship Program in Plasma Physics and Fusion Energy Sciences (NUF) and eight students for the Science Undergraduate Laboratory Internships (SULI) spent 10 weeks participating in experiments at PPPL and other scientific institutions this summer. PPPL Science Education Program's James Morgan, who administered the NUF and SULI programs, said, "This is always an exciting time of the year for PPPL as the summer students collaborate with our researchers." The NUF and SULI programs are funded by the U.S. Department of Energy. Above are many of this summer's students.

Hotline

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Quark Park Features Goldston-Triefeldt Plasma Sculpture

Middle, Goldston steps into the plasma sculpture before it is caged in a stellarator-type structure; top left, Triefeldt (left) and Goldston look at the finished art; above right, PPPL staff assist with the installation of "Stellarator" in Quark Park.

More than a few heads turned as a plump swirl of pink made its way — on the back of a truck — from PPPL to downtown Princeton recently. Trenton sculptor Rein Triefeldt, inspired by the fusion research led by PPPL Director Rob Goldston, created a giant pink plasma sculpture for Quark Park in Princeton Borough.

The park is a temporary garden off Paul Robeson Place that joins art and science. Developed by Princeton architect Kevin Wilkes and landscape designers Peter Soderman and Alan Goodheart (the three creators of Writers Block a few years ago at the same location), it includes about 14 art installations that were inspired by the work of scientists from Princeton University, the Institute for Advanced Study, the Scripps Research Institute, Rutgers University, and other scientific institutions. Scientist-artist teams collaborated on the garden installations.

The Goldston-Triefeldt collaboration produced *Stellarator*, which includes a resin-coated styrofoam plasma sculpture inside a stellarator-style cage modeled on the National Compact Stellarator Experiment (NCSX) structure. PPPL provided the frame for the sculpture. Along the path with plantings from MOON Landscaping are an NCSX vacuum vessel segment prototype on loan from PPPL and a box with two magnetized balls representing atoms.

"It was great fun to see our science through the eyes of an artist. Rein perceived the mysterious beauty of NCSX and created a delightful celebration of plasma," said Goldston.

The *Stellarator* installation is in good company. Next door is a sculpture from the team of Princeton University President Shirley Tilghman, Princeton University electrical engineering Professor Jim Sturm, and artist Nancy Cohen. Nearby is a sundial from the team of Institute for Advanced Study Professor Emeritus Freeman Dyson, U.S. Rep. Rush Holt (NJ-12), and architect Allan Kehrt.

The park has been a work in progress since July, is open to the public this month, and is expected to remain in operation through Thanksgiving. For a comprehensive list of the scientist-artist teams and more information about the park, go to **http://www.princetonoccasion.org/quarkpark/**

Triefeldt said of the *Stellarator* installation, "For me this project is about the exchange of concepts and learning... it's about peace on Earth through passive energy, about solving the riddle of abundant energy without hazardous by-products." ●

Spotlight

Name: Charles Skinner

Position: Principal Research Physicist, presently involved in experimental research and diagnostics on the National Spherical Torus Experiment (NSTX). His work includes studies of deposition and dust, as well as spectroscopy support to track plasma purity.

Quote: "I have always been amazed and curious about the world and been eager to find out how it worked. One of my earliest memories is of standing on a chair, looking out the window at some newly fallen snow, and deciding that snow was white to reflect sunlight so it would last longer. As a teenager I was fascinated by relativity and atomic physics, and really excited to see Schrödinger's equation in a book at high school. Even though I didn't understand it at the time, I knew it was a powerful clue as to how the universe was made. I always knew I wanted to be a physicist," Skinner says.

Skinner grew up in post-war England — one of five children to a British Defense establishment engineer father and a mother who emigrated from Ireland to help with WWII work. He received a BSc and a Ph.D. from Imperial College, University of London, and joined PPPL in 1980 as a researcher working on X-ray lasers. Later he became involved with tritium diagnostics for the Tokamak Fusion Test Reactor (TFTR). His NSTX deposition and dust studies are an evolution of his tritium retention work on TFTR.

He describes dust as "both a mundane object of housekeeping and absolutely fascinating." For next-step tokamaks, dust levels will be much higher, and it must be diagnosed and controlled for safety reasons and to prevent plasma contamination, Skinner says. "The technology to do this is in its infancy and the best way to develop it is to do trials on small tokamaks such as NSTX," he explains. Tritium and deuterium (in NSTX) can be retained as in tokamaks and Skinner has observed a short-term form of retention called dynamic retention using some quartz microbalances on NSTX.

Other interests: Skinner has a passion for his family, the piano, and exploring the natural world. He met his wife, Dagmar, in Berlin while on a short-term assignment there at the Physikalisch Technische Bundesanstalt. They have one son, Patrick, who rekindled Skinner's interest in the piano 15 years ago when Patrick began taking lessons.

Skinner, who had taught himself to play the instrument as a child, decided to join in the fun. "With a good teacher, I realized how much I had missed both in the structure of the music and the techniques for practicing and playing it," he says. Now he enjoys playing more advanced pieces and is presently working on a Chopin Scherzo. By 1997, he had joined the board of the Steinway Society of Greater Princeton, becoming president in 2000. He invites people to check out the society's web site at

http://www.princetonol.com/groups/steinway/ and to attend its monthly musicales.

When Skinner isn't practicing piano and attending recitals, he's often exploring the natural world. He has rafted down the Colorado River in the Grand Canyon and climbed the Rocky Mountains and the Swiss Alps. In New Jersey, he appreciates Island Beach State Park and the Pine Barrens, and runs 10 miles on the D&R canal towpath every weekend.

His trip down the Grand Canyon gave Skinner a new appreciation of time and evolution. He notes how human history represents just 1 inch of sedimentation in the billion-year history of the mile-high canyon. "I recall biology at high school as a dry listing of parts of organisms — as appealing as learning recipes for cooking — but now it has been transformed both in molecular biology and the genetic code. Underappreciated, but potentially the most revolutionary change, is the emerging understanding of how human behavior evolved," Skinner says.

Skinner notes that Stephen Hawking has posed the question whether homo sapiens would be still around in 100 years given the ongoing political strife in the world, the increasing proliferation of powerful military technology, and the deteriorating health of the global ecosystem that supports all life. "To me the problem is the consequence of an imbalance between progress in technology and lack of progress in understanding human behavior. Recent work in psychology, sociology, ethology, anthropology, evolutionary psychology, and sociobiology is bringing these fields under the unified theory of all biology, that is Darwinian evolution," he says. He recommends reading the work of Richard Dawkins (*The Selfish Gene*) and Steven Pinker (*How the Mind Works*). "Possibly we are at the brink of a neo-enlightenment that will enable us to understand who we are, what makes us happy and unhappy, and why we behave the way we do. With this understanding maybe we can defuse at their source some of the troubles that threaten us all today. I realize this is an optimistic, maybe naive hope, but I cannot see our species lasting hundreds of years, let alone the millions of years, typical of other species in the grand panoply of life, without big changes in our understanding of our behavior," Skinner says.