

Hotline

The Princeton Plasma Physics Laboratory is a United States Department of Energy Facility

Hawryluk Receives DOE Associate Award

Cited for his "important contributions to fusion research," PPPL's Tokamak Confinement Systems Department Head Richard Hawryluk recently garnered the U.S. Department of Energy (DOE) Distinguished Associate Award.

Hawryluk received the award from Anne Davies, the Associate Director for Fusion Energy at the DOE's Office of Energy Research, during an August meeting in Germantown, Maryland. The citation recognizes the outstanding individual efforts or achievements of DOE contractor employees and the relationship of the individual's performance to one or more of the Department's major programs, projects or responsibilities. In 1994, the award went to PPPL Deputy Director Dale Meade, PPPL Principal Research Physicist James Sinnis, and James Anderson, who had been "on loan" to PPPL from DOE's Los Alamos National Laboratory.



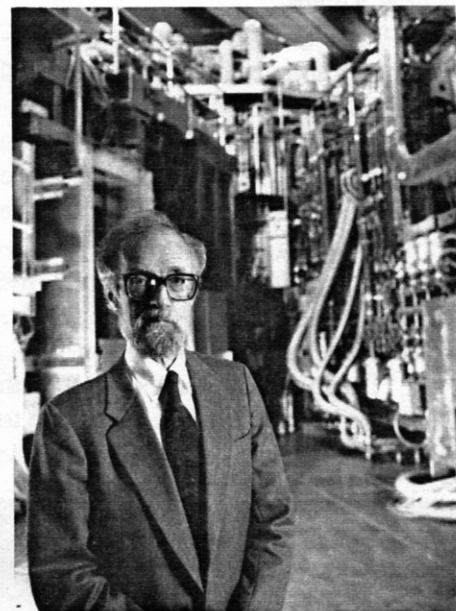
Richard Hawryluk

PPPL Director Ronald C. Davidson said, "Upon my coming to PPPL, it was clear that Richard Hawryluk was key to providing the intellectual and technical leadership of the TFTR Project to its fullest potential. His extraordinary abilities in leading the TFTR team and research program have resulted in several historic advances in our fundamental understanding of the properties of deuterium-tritium plasmas and alpha-particle effects, as well as the achievement of world-record fusion power levels on TFTR. Dr. Hawryluk has brought great distinction to PPPL, and we stand in awe of his technical acumen and outstanding accomplishments as a 'pioneer' in developing fusion as a practical energy source."

Added Milton Johnson, Manager of the DOE's Princeton Group, "I have known Rich for a number of years and no one is more deserving of this award than he is. His dedication to TFTR and to the fusion program are well documented. He and his family, like many others who have worked on TFTR, have made substantial personal sacrifices to bring TFTR to its present level. I am sure that each of us are proud of Rich's recognition."

Continued on page 4

Photo by Denise Applewhite



Harold Furth

Furth Lauded for Achievements

For the second time, the Fusion Power Associates' Board of Directors is honoring former PPPL Director Harold P. Furth.

Furth is the recipient of the group's 1995 Distinguished Career Award. The award recognizes Furth's outstanding technical, managerial, and leadership contributions to magnetic fusion and his career of "consistent and imaginative contributions to both the fundamental underpinning of fusion science and to its future directions."

Fusion Power Associates' President Stephen O. Dean presented the award to Furth on August 24 during

Continued on page 4

PPPL/Trenton Partnership Awarded for Innovations

In recognition of its "significant innovations and achievements," the PPPL/Trenton Partnership was recently selected by the National Center for Public Productivity to receive the New Jersey Exemplary State and Local Award.

PPPL Science Education Program Administrator Chris Ritter and former PPPL Science Education Senior Program Leader Sharon Sherman accepted the award on behalf of the Lab during a symposium at the Princeton Marriott on Friday, September 8. Sherman developed the PPPL/Trenton Partnership and Ritter assisted in its implementation.

"Through our Partnership with the Trenton Schools we were able to bring the tremendous resource of the

national laboratory to students, teachers, and community members," said Sherman, who is presently a professor at Trenton State College.

Added Ritter, "As a Trentonian and a team member in this Partnership, the biggest reward to me is to provide opportunities for the students, teachers, and the community to prepare themselves in the areas of science, math, and technology for the 21st century."

Expand Teachers' Knowledge

The PPPL/Trenton Partnership was established in 1990 to provide a framework for systemic reform in math, science, and technology education in the Trenton School District. A key objective of the Partnership is

to expand teachers' knowledge of science and math concepts and to assist them in presenting material in a way that engages students. Staff volunteers from the Laboratory also work with Trenton students, visiting them in the classroom to lead hands-on activities and small group discussions.



PPPL'er Chris Ritter addresses a group of Trenton students through the PPPL/Trenton Partnership. Ritter and Sharon Sherman accepted the New Jersey Exemplary State and Local Award this month on behalf of the Laboratory.



Former PPPL Science Education Senior Program Leader Sharon Sherman visits a Trenton classroom through the Partnership.

The New Jersey Exemplary State and Local Award is given by the National Center for Public Productivity based at Rutgers University and is supported by the Fund for New Jersey. The award recognizes programs for producing exceptional cost savings, measurable increases in quality and productivity, and improvements in the quality and effectiveness of government services. ●

HOTLINE

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PPPL Assists Nation's Textile Manufacturers

by Anthony DeMeo

Scientists at PPPL are applying diagnostic techniques developed in fusion research to help the nation's textile and garment industries remain competitive in the world market.

PPPL researchers have joined their colleagues from other Department of Energy Labs to participate in the American Textile Partnership, known as AMTEX. AMTEX is a government-industry consortium that includes many of the nation's leading textile and apparel manufacturers.

For years, PPPL scientists have used sophisticated lasers operating in the infrared, visible, and ultraviolet wavelength ranges to study the properties of hot ionized gases—high temperature plasmas in which fusion reactions occur. Staff will now apply these well-developed research tools to help textile manufacturers monitor the production process and physical characteristics of synthetic fibers.

Not only do PPPL scientists expect to expand the number of properties measurable, but for the first time, important fiber characteristics will be monitored during production. This will save substantial time and money by eliminating the need to halt the manufacturing process to remove samples for off-line lab analysis.

Said PPPL research physicist Boris Grek, "Working with major U.S. fiber manufacturers gives PPPL a chance to play an important role in increasing the productivity of a major segment of American industry. Interacting directly with the manufacturers is both an intellectually stimulating and rewarding experience for all of us involved in the project."

A Cooperative Research and Development Agreement (CRADA) has been established between PPPL and the Princeton Textile Research

Institute, a member of AMTEX. Under the terms of the CRADA, PPPL staff will develop instruments and data analysis techniques needed to use real-time, noncontact, optical and spectroscopic techniques. The Princeton Textile Research Institute will collaborate with PPPL on equipment development and the characterization of the measurements against

"Working with major U.S. fiber manufacturers gives PPPL a chance to play an important role in increasing the productivity of a major segment of American industry."

—Boris Grek

industry standards, organizing field tests and working closely with PPPL scientists in evaluating the results.

Specifically, laser light will be scattered from textile fibers during and immediately following solidification of the extruded material and during the drawing process. Two classes of measurements will be undertaken—passive and active.

In the passive case, low-power laser light in the visible or near infrared frequency range is scattered by the moving fiber, forming an interference pattern that is dependent upon the diameter of the fiber and the orientation and structure of polymer molecules within the fiber. The degree and nature of alignment of the polymer chains is related to physical characteristics of the fiber, including strength, elasticity, and surface smoothness. Generally, the greater the degree of alignment, the stronger the fiber. The lesser the degree of

alignment, the greater the elasticity. Periodic variations in the structure of the polymer chains in the direction of the fiber's movement can also be gleaned from changes in the scattering patterns with time, indicating changes in fiber properties. These changes can be caused by mechanical wobble, which if uncorrected, could render the fiber useless.

In the active case, light from powerful infrared or ultraviolet lasers incident on the fiber is absorbed by the molecules and readmitted at a different wavelength. Spectroscopic analysis of the scattered light yields additional information on the chemical and physical composition of the fiber material. This will allow manufacturers to control and maintain the chemical consistency of the product and related properties such as dye distribution and concentration.

On-line measurement of the physical and chemical properties of textile fibers will allow process adjustments to be made immediately—an enormous advantage. Vastly improved process reproducibility, efficiency, and quality control is expected to result, eliminating the need to overproduce to insure adequate supply of fiber with consistent characteristics.

The initial CRADA will run for two years and result in a pilot plant test of a scattering system, as well as laboratory tests on a variety of static and moving fibers. If successful, this work will be followed by the production of a prototype scattering system, with on-line demonstration of real-time measurements of fibers in 1998.

Technology Transfer Office Head Lewis Meixler said, "This CRADA exemplifies the applicability of fusion technologies in helping the commercial marketplace." ●

Furth

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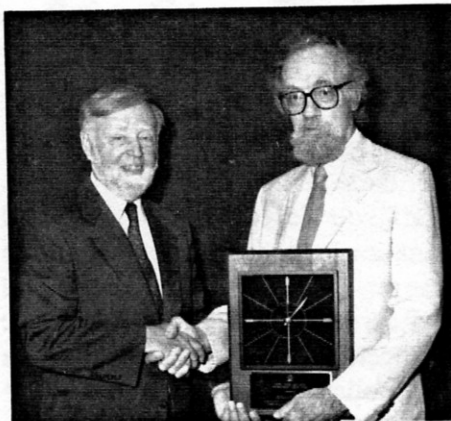
the Fusion Energy Educational Development Seminar held at PPPL. During the presentation, Dean said it was his privilege to recognize one of the "giants" of fusion.

In a letter to Furth, Dean further extolled the former Director's accomplishments. "With the recent exciting results on enhanced plasma confinement in TFTR and the Senate floor action urging DOE to continue TFTR operations, it seems a fitting time to recognize the critical role you played in the history of TFTR, as well as the incredible lifelong contributions you have made to the historic developments of plasma science and fusion," he wrote.

Lifelong Career Contributions

Created in 1987, the award honors individuals who have made distinguished lifelong career contributions that directly or indirectly have benefitted the development of fusion.

Upon accepting the award, Furth said, "It is very good to imagine things, but actually to *do things* and get re-



Stephen O. Dean (left) presents Harold Furth with the Fusion Power Associates' Distinguished Career Award.

sults that make scientific sense is a solemn and inspiring path."

Furth, who served as Director of the Lab from 1981 to 1990, received the Fusion Power Associates Leadership Award in 1982 "for having shown outstanding leadership qualities in accelerating the development of fusion." The same award went to PPPL Director Ronald C. Davidson in 1986, while he was at the Massachusetts Institute of Technology.

Davidson said of Furth's most recent citation, "Harold Furth's lifelong contributions to fusion, the Labo-

ratory, and the TFTR program are exceptional, and he is highly deserving of the recognition bestowed by the 1995 Distinguished Career Award."

Furth received a Ph.D. in physics from Harvard in 1960 and worked on controlled fusion research at the Lawrence Radiation Laboratory (now the Lawrence Livermore National Laboratory) in California prior to joining PPPL in 1967 and being appointed Professor of Astrophysical Sciences at Princeton University. Furth holds 20 patents, primarily in the areas of controlled magnetic fusion technology and metal forming with pulsed magnetic fields, and has published more than 190 technical papers.

Furth also has received the E.O. Lawrence Memorial Award from the U.S. Atomic Energy Commission (now the Department of Energy) in 1974, the James Clerk Maxwell Prize in Plasma Physics from the American Physical Society in 1983, the Joseph Priestley Award from Dickinson College in 1985, and the Delmer S. Fahrney Medal from the Committee on Science and The Arts of The Franklin Institute in 1992.●

Hawryluk

Continued from page 1

Hawryluk, Head of the Lab's TFTR Project, was cited for his "important contributions to fusion research and leading role in preparing for and carrying out the pioneering deuterium-tritium experiments in the Tokamak Fusion Test Reactor."

Upon receiving the award, Hawryluk said, "This award recognizes the accomplishments of the entire TFTR group. For the past two years, we've had a string of very successful and productive experiments. These experiments are the product of hard work by a highly dedicated scientific, engineering, and

technical staff who mastered the art of making D-T plasmas and, in the process, have performed some great experiments."

Hawryluk came to PPPL in 1974 after receiving a bachelor's, a master's, and a Ph.D. in physics from the Massachusetts Institute of Technology. When he first joined the research staff at the Laboratory, TFTR was just being conceived by former PPPL Director Harold Furth.

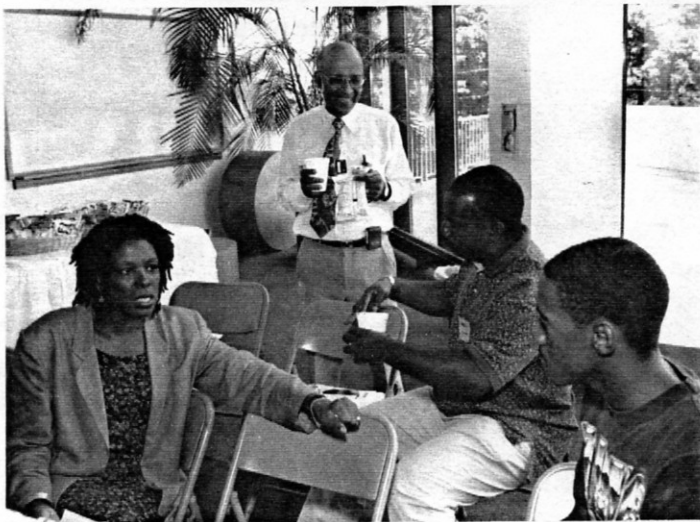
"The series of experiments on TFTR that followed produced first-rate science and technology," said Hawryluk, who has been Head of the Project during PPPL's record-breaking experiments on TFTR. In December, 1993, TFTR produced 6.2

million watts of fusion power, followed by 9.3 million watts in May, 1994, and 10.7 million watts in November, 1994.

Hawryluk said back in the 1970s, Furth had predicted that if the technology for a fusion device worked, exciting physics would occur, and it did. The series of experiments on TFTR established the high quality plasmas (supershots) years ago, providing the basis for using D-T in the later experiments, he explained.

"It's just a wonderful example of someone with a vision together with a talented group of people doing the difficult engineering and science required to bring it to fruition," said Hawryluk of Furth and the TFTR team.●

What's Happening at PPPL



About 50 PPPL staffers gathered at the Commons on August 10 for the Director's Minority Advisory Committee (DMAC) "Brown Bag" Lunch. From left are Pamela Lucas, Raki Ramakrishnan, DMAC Chairperson Ronald Hatcher, and Christopher Roberts, a summer intern in the Lab's Science Education Program. The DMAC Committee organized the informal lunch to give employees an opportunity to exchange ideas with the group and to define topics for DMAC to address. In addition to Hatcher, other members of the Committee are Shazim Hosein (Recording Secretary), Robert Kaita, Gail Marshall (Vice Chairperson), Jorge Micolta, Hironori Takahashi, Robert Tucker, and Arlene White. The two advisors to the Committee are John Schmidt and Margaret Young.



Martha Krebs, Director of the Department of Energy's (DOE) Office of Energy Research, presents PPPL's Jerry Levine with the 1995 Energy Research NCO Quality Award in Gaithersburg, Maryland. NCO stands for the NEPA (National Environmental Policy Act) Compliance Officer and the NCO Quality Awards recognize the achievements of the DOE's Office of Energy Research Headquarters, Field, and Laboratory personnel (See June 23, 1995, issue of *HOTLINE* for story on Levine).

Teachers Come to PPPL to Learn

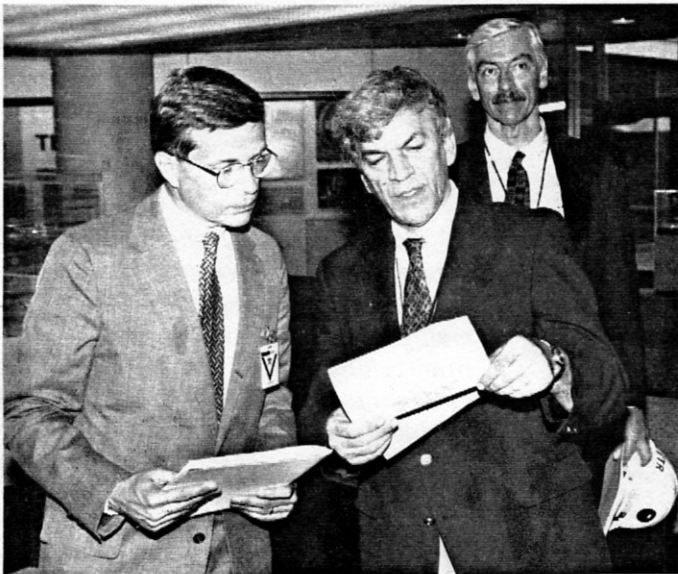


Former Science Education Senior Program Leader Sharon Sherman talks to a group of teachers who participated in the Teacher Leadership Workshops this summer at PPPL. Twenty-nine middle school teachers from across the state came to the Lab to gain an understanding of global energy needs and solutions to environmental problems through the workshops.

The sessions kicked off this summer with the theme "Global Energy and Environmental Solutions" and will continue over the next two summers. The workshops are part of a three-year math and science teacher enhancement and leadership program conducted by PPPL's Science Education Program and funded by a National Science Foundation grant.

Commercialization Grant Awarded to PPPL and CTC-NJ

PPPL and the New Jersey Center for Technology Commercialization (CTC-NJ) have been awarded a grant to commercialize the Bi-Directional Coaxial Sightline Device developed at the Laboratory. The instrument was originally developed for the fusion program and is used to align spectrometers at specific points to take radiation measurements in the tokamak. Half of the grant funds will be used by PPPL to fabricate a "marketing prototype" of the instrument and the other half will go to CTC-NJ for marketing efforts. The marketing prototype is expected to be available for the PPPL exhibit in October at Technology 2005, the year's major Technology Transfer Conference and Exhibition sponsored by the National Aeronautics and Space Administration.



Representative Dick Zimmer visited the Laboratory this summer, taking a tour of TFTR (led by Confinement Systems Department Head Richard J. Hawryluk), a trip to the Plasma Materials Processing Laboratory, and a final stop in the Lobby, where the legislator fielded questions from a handful of reporters. From left are Zimmer, PPPL Director Ronald C. Davidson, and PPPL Deputy Director Dale Meade in the Lobby.

DMAC Awardees

Four members of the Director's Minority Advisory Committee received Service Awards this summer. Plaques were presented to the following:

Pat Buggs
John Clark
Robert Ellis, III
Chris Ritter

TRANSITIONS

Births

Congratulations to Margaret King of Facilities and Environmental Management and her husband, Joel, on the April 27 birth of their daughter, Brittany Adeline.

Retirements

Michaela M. Mole, a technical writer in the Computer Division, retired on September 1 after eight years of service. Mole had been on disability for several years.

Delmar Dale Reynolds, a Motor Generator operator, retired on July 1. Reynolds had been at PPPL for 12 years.

Vick Wilkins, a foreman in Maintenance, retired on July 1. He had worked at PPPL for 26 years.

Thank You

My family and I would like to thank everyone for their kindness and sympathy extended to us for the loss of my father.

—Gene Pinelli