

MIT Professor Dresselhaus Speaks at Lab

Women Scientists Encouraged

Mildred S. Dresselhaus, one of 12 active Institute Professors at the Massachusetts Institute of Technology (MIT), spoke May 27 on two important topics. After a luncheon for PPPL women scientists and engineers and Princeton University women faculty and students in science, mathematics, and engineering, held in the LOB Commons, Dresselhaus spoke on "Women in Engineering, Science, and Mathematics: Impact on Science Education." Later, she presented a PPPL colloquium, "Carbon C₆₀: Bucky Balls and Tubes."

Dresselhaus, who is the mother of four children, held the Abby Rockefeller Mauze Chair in Electrical Engineering and in Physics at MIT, is eminently qualified to speak on both topics. A fellow of the American Physical Society and former President, she is affiliated with the MIT Center for Materials Science and Engineering, which she formerly directed.

She is now Chairman of the National Academy of Sciences Committee on Women in Science and Engineering, has served as a member of the Department of Energy

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MIT Professor Mildred Dresselhaus (right) listens intently as PPPL Staff Physicist Dr. Martha Redi introduces her before her talk on "Women in Engineering, Science and Mathematics: Impact on Science Education."

Photo: D. Krause

Association for Women In Science

This spring, the New Jersey Chapter of the Association for Women In Science (AWIS) was reestablished with significant organizational effort by AWIS members employed at PPPL. The Chapter was established in 1979, but had been inactive for some time. Now, there are 38 members.

Acting officers are: President, Martha Redi; PPPL Staff Physicist; Vice President, Marilee Thompson, PPPL Software Engineer; Treasurer, Rhoda Stasiak, Lab Librarian and Ph.D. in Chemistry; and Secretary, Teresa Greenberg, Secretary in the Theory Division. PPPL Deputy Director Dale Meade has agreed to be the unofficial mentor of the group.

The NJAWIS Chapter has chosen to focus on science education and scientific literacy, according to Redi. A book club has been established with monthly meetings focusing on these topics, chaired by Jane Holmquist, Librarian for the Princeton University Astrophysics Library and the Biology Library, as well as former PPPL Librarian. The AWIS Book Club meets on Princeton's main campus for the convenience of graduate students as well as professional women and men.

Three monthly AWIS meetings were held this spring, with speakers on science education themes. In March, Dr. Ellen Mappen of the Douglass Project

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Dresselhaus Speaks

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Research Advisory Board for six years—including a year when she chaired the Education Panel—and is advisor to the DOE on Laboratory Programs for Women.

In this capacity, she was a keynote speaker during a DOE Review of Laboratory Programs for Women held at the Lawrence Livermore National Laboratory in February. Says Dr. Martha Redi, PPPL Staff Physicist, who represented the Lab at the DOE meeting, "When I heard the keynote speakers, I knew Professor Dresselhaus would contribute greatly by speaking here, and I'm delighted we were able to invite her."

Women in Science

During her first talk, Dresselhaus noted that when she began at Hunter College in 1948, she felt she had three career choices—nursing, secretarial work, and teaching. Her goal was to become an elementary school teacher until one of her professors, Nobel Laureate in medicine Rosalyn Yalow, told her she was in the wrong field—that she should be a scientist!

Dresselhaus, who has published over 100 papers in materials science just since 1985, graduated from Hunter *Summa Cum Laude* in 1951 and went on to a Fulbright Fellowship before completing a Masters at Radcliffe College in 1953. While studying for a Doctorate in Physics at the University of Chicago, she held a Bell Laboratories fellowship.

She remembers that both advisors and family told her she was "wasting her time," because she wouldn't be able to get a job in her field. Thirty-four years after her 1958 graduation, Dresselhaus has not only proven them wrong, but has encouraged many other women to follow her into scientific fields. Remembering the days when she was the only woman student in the physics classroom, Dresselhaus speaks convincingly of a need for "critical mass"—that minimum number of women students in a science program that makes their presence viable. That number is documented to be 15 percent—after which their performance becomes indistinguishable from that of men.

Dresselhaus explains, "When women see each other, they are attracted to participate and to feel encouraged to continue and do well. I often give talks like this one today to encourage women. With only 97 women receiving doctorates in physics in this country last year, such voices of encouragement can have a real impact." She observed that if she were able to encourage even one more woman to enter the field, that would make a one percent difference. Because such encouragement is so important for success, Dresselhaus stresses the need for mentoring of women students.



After her talk, Professor Dresselhaus (right), chats with Dr. Margaret Fels, Senior Research Scientist at Princeton University's Energy and Environmental Center. Photo: D. Krause

Dresselhaus emphasizes that with a dwindling college population and a fewer number of college students (men and women) choosing majors in mathematics, the sciences, and engineering, opportunities for women are increasing, and women should take advantage of them by entering these fields.

According to Redi, President of the New Jersey Chapter for Women in Science (AWIS)—see story, beginning page 1—Dresselhaus was brought to the Lab by the Chapter through a grant to AWIS from the Alfred P. Sloan Foundation. Bus transportation to the Lab from main campus was arranged by Alison Bernstein, Associate Dean of the Faculty at Princeton along with the University Standing Committee on the Status of Women.

Bucky Balls, Fullerenes

In his introduction to her colloquium talk, PPPL Director Ron Davidson called Dresselhaus "One of the nation's preeminent physicists," noting that she has received six honorary doctorates and was awarded the National Medal of Science in 1990.

In her talk, Dresselhaus explained that "Bucky Balls" received their name because the shape of these C_{60} molecules brings to mind the geodesic dome of Buckminster Fuller. They demonstrate five-fold symmetry (looking similar to a soccer ball).

According to Dresselhaus, "Because many other chemicals can be attached to them, Bucky Balls open up a whole new field of synthetic chemistry." Other similar compounds are termed "Fullerenes"—also in reference to Buckminster Fuller.

Semiconductor Conference Held Here Technology Transfer the Theme

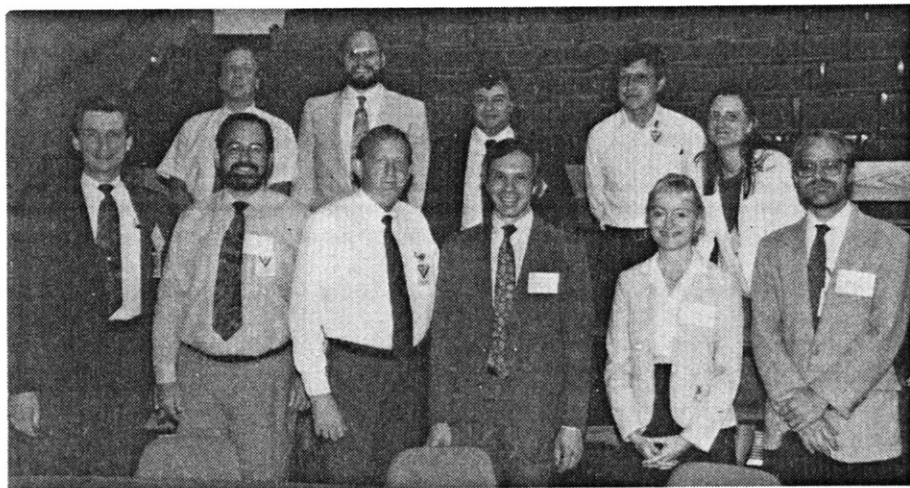
The transfer of technology from research settings to industry was an important theme during the Topical Research Conference (TRC) in Plasma Etching held here in May. Eighty participants attended, representing nine semiconductor manufacturing companies, four manufacturers of plasma etching equipment, eight universities, two national laboratories, and six SEMATECH Centers for Excellence (SCOEs).

According to Joe Cecchi, Director of the New Jersey SCOE for Plasma Etching and Head of the Plasma Processing Research Group at PPPL, "During the Conference, technology transfer-oriented presentations on state-of-the-art issues in plasma etching were given. These included etch tools and processes, damage and contamination, diagnostics, and modeling."

In addition to the technical sessions, the TRC explored the process of technology transfer by examining case studies of successful technology transfers from research to manufacturing within companies.

According to Cecchi, the highlight of the TRC was a panel discussion on the important issues that affect technology transfer from universities and national labs to industry. The discussion focused on practical ways to improve the climate for the transfer of technology. There was a consensus that there is a need to enhance the communications between the semiconductor industry and the university and national laboratory communities. This is necessary to ensure that the universities and national labs understand in detail the research needs of the industry and to transfer the technology developed in university and national lab facilities.

The TRC program was chaired by Cecchi at the request of the Semiconductor Research Corporation, which administers the funding for the SCOEs. The conference was sited at Princeton due to the significant role that the New Jersey SCOE plays in plasma etching research.



During the recent Semiconductor Conference held here, the Technology Transfer Panel discussed practical ways to improve the tech transfer process. The panel included: (back row, left to right), Dr. Joel Cook, Applied Materials; Professor Herb Sawin, MIT; Professor Harold Anderson, University of New Mexico; Dr. Chien Chiang, Intel; Dr. Susan McNevin, AT&T; (front row), Dr. Ralph Kerns, Drytek, Dr. Dennis Hartman, SEMATECH/Motorola, Dr. Ray McMahon, SRC; Professor Joe Cecchi, PPPL and Princeton; Dr. Linda Ephrath, IBM; and Professor David Graves, University of California, Berkeley.

Photo: D. Krause

AWIS

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spoke about the Project's efforts to encourage women undergraduates in science, math, and engineering. In April, Dr. Stephanie Bird, past national President of AWIS, and Professor at the Massachusetts Institute of Technology (MIT), spoke of the importance of mentoring. The May program was the talk by MIT Professor Dresselhaus (see cover story).

AWIS is open to anyone who supports the full participation of women in science and includes members from a wide range of fields—physicists, anthropologists, medical researchers, teachers of science, policy analysts, engineers, chemists, and students. If you would like to join AWIS or want more information, please get in touch with one of the officers listed above.

HOTLINE

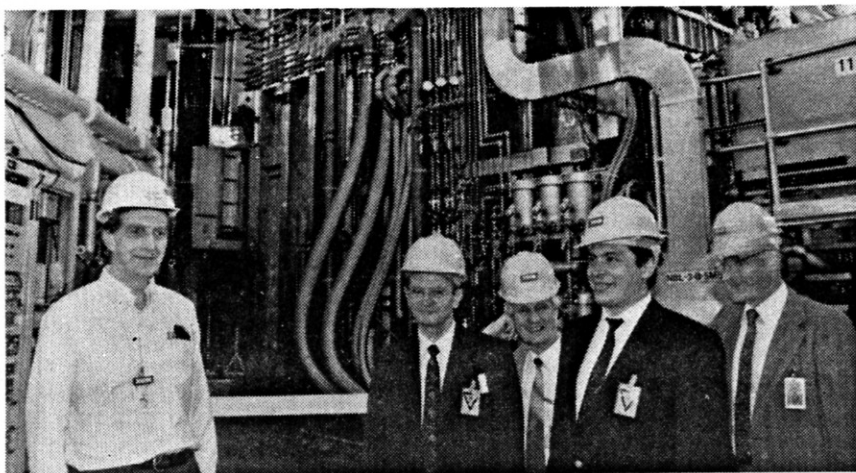
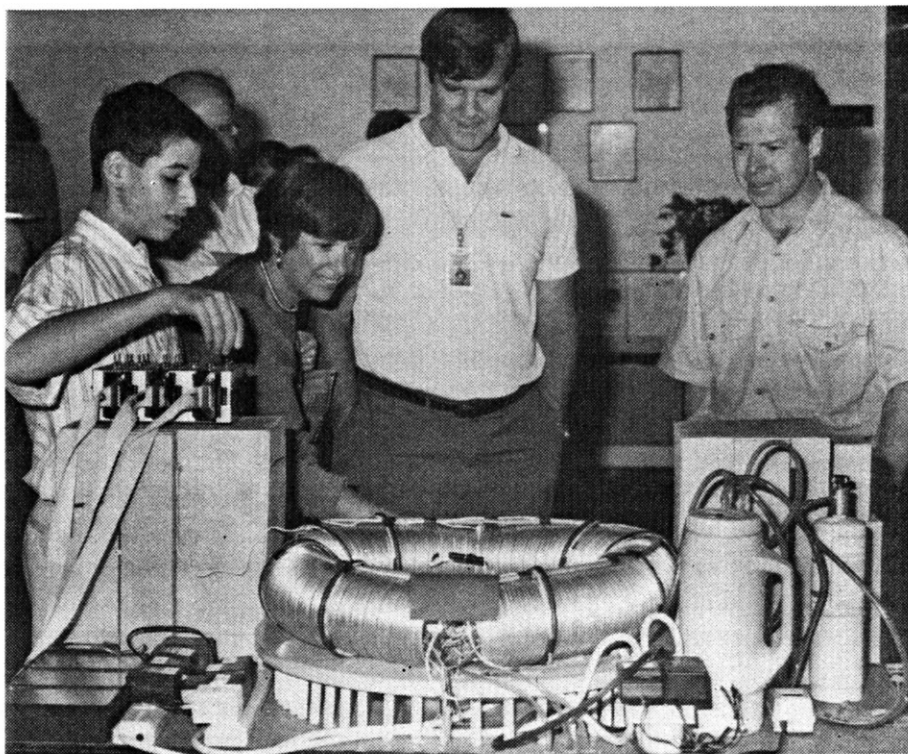
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What's Happening at PPPL?

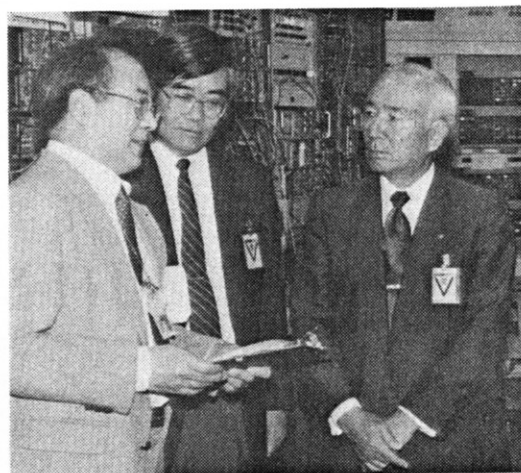
Danny Weitz, (left), of Morristown, NJ, explains his exhibit, titled "Fusion: The Eternal Fire—Model of TFTR," to Lab staff members Dori Barnes, Steve Davis, and Mike Viola. Weitz was one of 12 PPPL winners of the 13th Annual Student Exposition on Energy (SEER) Awards. Their exhibits were set up in the LOB lobby when the twelve visited the Lab on May 29 for a luncheon in their honor and a tour of TFTR.

Photo: D. Krause



Ken Young, Head, TFTR Diagnostics (far left), took recent Russian visitors on a tour of TFTR. They are (left to right): Evgeny Avrorin, Chief Scientist at the Institute of Technical Physics at Chelyabinsk 70; Anatoli Diakov, Director, Center for Arms Control, Energy, and Environmental Studies at the Moscow Institute for Physics and Technology; and Vladamir Creuchenkov, Head of Experimental Physics, also from the Institute of Technical Physics. Far right is retired PPPL employee and consultant John Boychuk, who acted as interpreter.

Photo: D. Applewhite



Shozo Shimomura, right, President, and Mashashi Ilzumi (center), Deputy Director, both of the Japan Atomic Energy Institute (JAERI), listen intently as Michio Okabayashi explains the PBX-M during a recent tour of the Laboratory.

Photo: D. Applewhite



PPPL PICNIC—JUNE 27TH—2PM—6PM
GET YOUR TICKETS NOW!—Deadline: June 24