

Hotline

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

Krebs Meets PPPL Staff During Visit

In 45 minutes flat, DOE Office of Energy Research Director Martha Krebs saw the flash of a new experiment, the continuing vigor of tokamak research, and the promise of a new generation of plasma physicists.

Krebs took in the sights of PPPL — meeting staff and students and becoming acquainted with projects — during a November 17 visit. Accompanied by N. Anne Davies, the Associate Director for Fusion Energy at the DOE's Office of Energy Research, Krebs met



Richard Hawryluk shows Martha Krebs TFTR. Behind Hawryluk is PPPL Deputy Director Dale Meade.

with Laboratory and Princeton University officials, toured PPPL, and had lunch with about 50 PPPL'ers. Said PPPL Director Ronald C. Davidson, "We had a very good private session with Martha and Anne and also an excellent walkaround, which gave them a sense of the outstanding facilities and infrastructure here, and of the dedicated people behind the scenes."

The tour began with a stop at the Magnetic Reconnection Experiment

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MRX Produces First Plasma

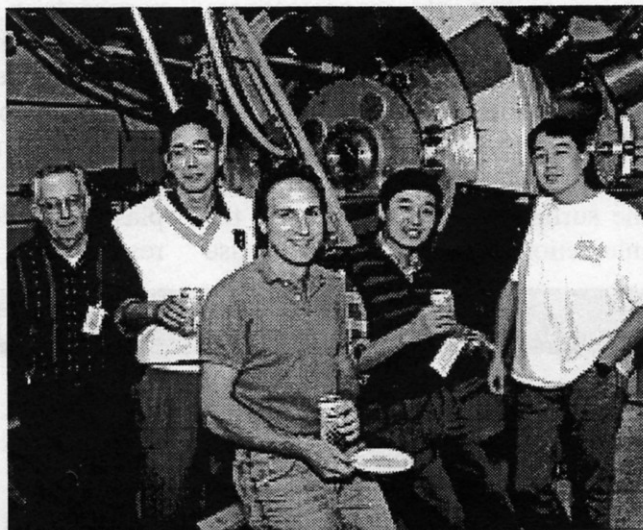
On the afternoon of October 17, Laboratory Director Ronald C. Davidson flipped the switch at the capacitor banks that power the Magnetic Reconnection Experiment (MRX) as an anticipatory group peered through a protective window. Then, in a flash, a bright double plasma ring sliced through a rich pink background plasma.

The twin rings were the first plasma produced by MRX, a double spheromak device. MRX is the first toroidal experiment to come on board at PPPL in nearly a decade.

Said Davidson, "My congratulations to Masaaki Yamada and his colleagues for bringing into operation this versatile facility. MRX will play a critical role in developing a fundamental understanding of magnetic reconnection in space and laboratory plasmas."

Yamada, the Principal Research Physicist who is directing the research, said the experiment focuses on magnetic

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From left are Ray Pysher, who helped on MRX, Masaaki Yamada, Head of the MRX Project, and MRX team members Dave Cylinder, Hantao Ji, and Scott Hsu. Not pictured is Troy Carter.

MRX

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reconnection — the topological breaking and rapid reconnections of magnetic field lines in a plasma medium.

Magnetic reconnection is seen in a wide range of plasmas from the sun to tokamaks. Through the experiment, researchers will try to solve the puzzle of how it occurs.

"Magnetic reconnection is one of the most fundamental processes of plasma physics with important relevance to fusion research. The experiments will reveal the essential physics of the interplay between plasmas and the magnetic field," said Yamada.

While the magnetic field is a way to confine the plasma, a loss of confinement often occurs when the plasma interacts with the field lines. Frequently, the plasma changes its configuration and the magnetic field lines open up, leading to diminished confinement. Thus, magnetic reconnection is an important fundamental issue for magnetic fusion.

In addition to its experimental relevance to fusion research, magnetic reconnection is important to the physics of the earth's magnetosphere and solar flare evolution. It may additionally play a key role in heating the plasma in the sun's corona.

Through MRX, researchers can study the phenomena happening in the surface of the sun, namely the interaction of the solar flares, also

known as plasma rings. "Our plasma has two rings so we can simulate the physics of the solar corona interaction," Yamada said, explaining that MRX produces two plasma rings to let them merge together by magnetic reconnection.

He noted that MRX may also reveal why the corona is dramatically hotter than the sun's surface. The corona, which is the outermost atmosphere of the sun, reaches temperatures of 2,000,000 degrees Celsius whereas the surface of the sun is 6,000 degrees Celsius.

"Our plasma has two rings so we can simulate the physics of the solar corona interaction."

—Masaaki Yamada

With experimental results of interest to the solar physics, astrophysics, and space physics, as well as the fusion communities, MRX is an example of the cross discipline of basic plasma science. Yamada noted the July meeting in Scotland on the "Interrelationship Between Plasma Experiments in the Laboratory and in Space," which he co-organized. Magnetic reconnection was one of the essential topics at the workshop, which brought together active members of the space and laboratory plasma physics communities. MRX results could play a key role in the

interpretation of data from the Yohko satellite that was launched by a joint effort of the U.S. and Japan and has captured pictures of solar flares and arcades.

Funding for the experiments is equally diverse, coming from the National Science Foundation, the National Aeronautics and Space Administration, the Office of Naval Research, and the U.S. DOE.

Since the first plasma, more than 300 discharges have been already obtained on MRX. To celebrate, Yamada threw a "MRX First Plasma" bash on November 1 in the L-wing.

"We had sushi and pizza, an interesting mixture, just like MRX," said Yamada, noting the diversity of funding sources and of the plasma physics disciplines interested in the results.

The MRX Head offered special thanks to PPPL's theory group, Russell Kulsrud, Neil Pomphrey, and the engineering technical staff for their strong support of the project.

Listen to the Plasmas

Said Yamada, "The most important goal of the MRX experiment is 'to listen to the plasmas' to find out the key physics for the interplay between the plasma and the magnetic field. Many people from plasma physics and other communities have resonated with this spirit and supported us. I would also like to thank the many people of PPPL who helped with the construction of MRX for their truly constructive support." ●

HOTLINE

Editor: Carol Phillips
Writer: Patti Wieser
Photography: Dietmar Krause

Graphic Artist: Greg Czechowicz
Layout: Patti Wieser

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Japanese Industrial Labor Union Representatives Tour PPPL



In November, about 30 visitors from Hokkaido, Japan, including representatives of major industrial labor unions and governmental officials, toured the Laboratory. At left is Masaaki Yamada, who led the group through the TFTR Test Cell. The visit included welcoming remarks from PPPL Director Ronald C. Davidson, an overview of PPPL's fusion program by PPPL's Yamada and Michio Okabayashi, and the tour of TFTR. Hokkaido is presently campaigning for the siting of the International Thermonuclear Experimental Reactor and the visitors are traveling to various fusion centers to gather information.

FY95 Trial of the Improved PPPL Audit Program

by Judy Malsbury

*In an earlier **HOTLINE** (Vol. 16, No. 13, June 9, 1995), changes to the PPPL Audit Program to be trialed in FY95 were announced. These changes were suggested by a cross-functional task force created to improve the audit program and to assure that the program supports the mission of the Laboratory. The task force consisted of J.W. Anderson, Jerry Gilbert, Frank Malinowski, Judy Malsbury, Sue Murphy, Wayne Reiersen, Dick Shoe, Rod Templon, and Al von Halle, with Frank Patrick of AT&T Qwest as the facilitator.*

Three audits were performed in FY95 that tested the suggested changes. A formal report of the results is available for access on the PPPL employees' Information Services WWW page within the Support Services Department, Quality Assurance area under the name "Results of FY95 Audit Trial." During the audits, surveys were given to both interviewees and the managers of the programs or systems being audited. The surveys provided feedback that, while indicating some refinement was needed, was overwhelmingly supportive of the changes. Details on the results of the survey are available in the complete report.

One of the most appreciated changes was inclusion on the audit team of personnel from both the organization and personnel that used that organization's services. The benefits were that the team had familiarity with the audited organization, increased subject expertise, and improved communication which made the audit more efficient, more accurate, and better accepted.

Perhaps the success of the new approach could best be summarized in the words of one of the auditors: "At its core this audit was performance based rather than compliance based ... This basis is a natural outcome of the composition of the team and the checks and balances of the ... process ... If we had formed a process improvement team ... our audit team is what it would have looked like. So not only can you take credit for the audit but for improving the process as well.

Because we concentrated on the process instead of the requirements, we were able to understand why things were done the way they were, and then to see if things met the requirements. This established a chain of evidence from the bottom up, allowing us to provide clear statements as to the finding, why it was important, and how it could be dealt with. This is clearly a proactive approach to auditing. I think all internal audits should go this way."

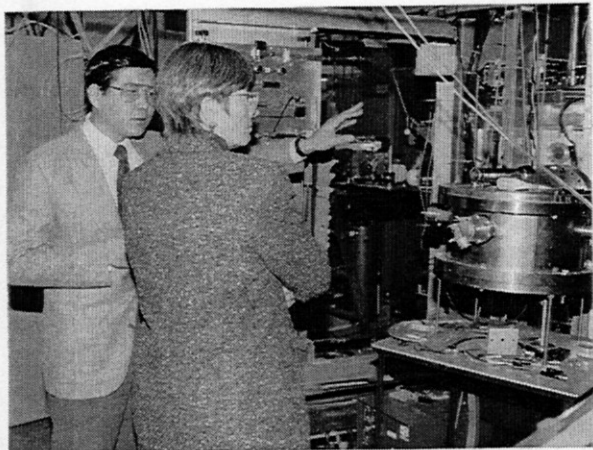
Krebs

Continued from page 1

(MRX) and culminated in a loop around the TFTR Test Cell. Krebs and Davies saw a plasma shot fired at MRX and were welcomed by Principal Research Physicist Sam Cohen at the Plasma Processing Lab.

New Spherical Tokamak

Then it was on to visit the Current Drive Experiment-Upgrade tokamak device, where Krebs and Davies were greeted by CDX-U Project Head Masayuki Ono and met Martin Peng of Oak Ridge National Laboratory (ORNL). Peng described the National Spherical Tokamak Experiment, a new spherical tokamak facility being designed at PPPL in collaboration with ORNL and various university groups.



Masayuki Ono describes the Current Drive Experiment-Upgrade (CDX-U) to Krebs during the tour of PPPL.

At the Graduate Student Lab, the Krebs' entourage paused to hear the plasma physics pupils describe their projects. There are six different experiments used in the Graduate Lab course taught by Cohen including a Pachen curve apparatus; a plasma thruster; a glow discharge and low voltage arc Langmuir probe experiment; a magnetron sputtering/spectroscopy experiment; a hollow cathode microwave interferometry experiment; and a microwave cavity

resonance experiment. The students in the class learn, first hand, how the theory and phenomena about which they have learned in their other courses are manifested in actual plasmas. This experience provides the students with training valuable for fusion research, astrophysical sciences, aerospace research, plasma-based illumination, and semiconductor processing techniques.

Said Cohen, "This Laboratory, built from equipment accumulated in over four decades of research, is used not only for Princeton students, but also for students from colleges and universities all over the U.S., through our National Undergraduate Fellowships Program and our program for students from historically black colleges and universities."

After TFTR Heating Systems Division Head Al von Halle pointed out the power supplies, the tour group headed to the ESAT Building, where Krebs and Davies donned protective eyewear to watch a test of a small experimental electric arc furnace. This furnace is modeled on those used on an industrial scale for steel recycling. "Slightly modified versions of this type of furnace have also been used to destroy toxic chemicals or to vitrify (i.e., glassify) radioactive wastes," said Principal Research Physicist Stewart Zweben. He noted that the protective eyewear was necessary to guard



Principal Research Physicist Stewart Zweben greets Martha Krebs in the ESAT Building. Behind them are Computer Systems Division Head Dori Barnes and TFTR Heating Systems Division Head Al von Halle.

against the bright light emitted by the arc.

Small-Scale Furnace

This small-scale furnace will be used in a "work-for-others" proposal being developed with Asea Brown Boveri for improving the operation of steel furnaces, and can also be adapted for research and development work on hazardous waste remediation for DOE or other government agencies.

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From left are Martha Krebs, MRX Head Masaaki Yamada, Engineering and Technology Development Department Head Michael Williams, and Dori Barnes watching a plasma shot on the Magnetic Reconnection Experiment device.

Krebs

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The final leg of the tour was a stop at the TFTR Test Cell, where Tokamak Confinement Systems Department Head Richard Hawryluk led the way. "This is the machine," he said, pointing to TFTR. "And it is a machine we are all very proud of. As you know, last year TFTR produced 10 megawatts of heating power."

At the conclusion of the tour, Krebs and Davies joined PPPL and DOE employees for lunch, during which Krebs spoke.

Referring to the recent reduction-in-force at PPPL and to the shrunken budget for fusion, Krebs said she would rather have visited under happier circumstances. However, she added, just as one would visit a family member during troubling times, she wished to be present when a member of the DOE "family" was going through a hard time.

"To have any part of the family going through difficulties is difficult for me," Krebs said.

Tremendous Impact

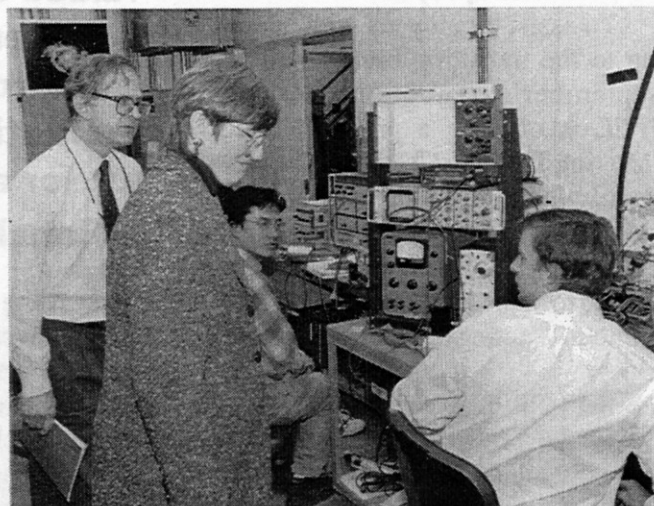
Krebs lauded the Princeton team, saying the science at PPPL has had a tremendous impact on both the scientific achievement and understanding of high temperature fusion plasmas while making it much more possible to achieve the ultimate energy goal.



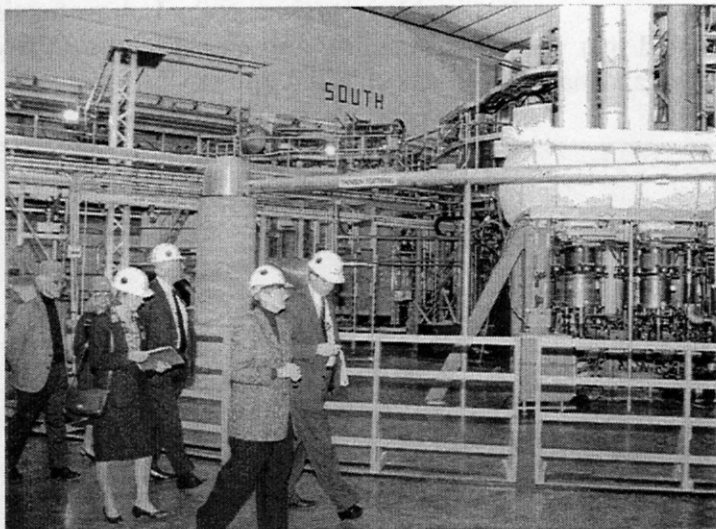
Tokamak Confinement Systems Department Head Richard Hawryluk presents a framed photograph of TFTR to Martha Krebs.

She conveyed how "personally frustrated" she is by what's happening to fusion as a result of a lack of Congressional support. The decision by Congress to reduce the fusion program reduces the possibility of having fusion as an energy resource by the middle of the next century, said the DOE official.

"Ultimately we have to try to figure out what we have to do next," Krebs said. ●



Sam Cohen (standing at left of Krebs) and Martha Krebs chat with students at the Graduate Student Lab.



Touring the TFTR Test Cell are, from left, Milton Johnson, DOE Princeton Group Manager, N. Anne Davies, Associate Director for Fusion Energy at the DOE's Office of Energy Research, PPPL Deputy Director Dale Meade, Martha Krebs, and Richard Hawryluk.



Making the rounds on a tour of PPPL are, from left, Martha Krebs, Richard Hawryluk, N. Anne Davies, Michael Williams, Dale Meade, and Dori Barnes.

"Moving Through Change"

Shock. Anger. Bargaining. Depression. And, finally, acceptance.

These are the five stages people go through when facing a significant emotional event that forces a change upon them. Personally, this event could be the loss of someone close or a serious illness. Professionally, it could be a reduction-in-force.

To Assist Employees

To assist employees with adapting to the transition brought on by September's reduction-in-force, PPPL is offering a program titled "Moving Through Change." The program, which includes a 45-minute videotape, "Managing Change and Transition," offers coping skills needed to manage change and to avoid burnout, "acting out," and serious illness.

Said PPPL Director Ronald C. Davidson, "The loss of so many valued colleagues in the recent reduction-in-force is a very traumatic experience for all of us, and I urge you to participate in this excellent program to help cope with the change."

Ben Bissell, who is featured on the training tape, said the five stages are both "normal and necessary." In

addition, they will take some time to get through.

"It takes a minimum of one-and-a-half years to work through these five stages," the speaker said. If people are unable to work through the stages in two years, they either get burned out and quit, become difficult to work with, or develop an illness.

"The loss of so many valued colleagues in the recent reduction-in-force is a very traumatic experience for all of us."

—Ronald C. Davidson

According to the video, employers can expect their staff to move through the stages at different rates, hopping from one to another and occasionally back to an earlier stage.

All the stages are basically feelings—not behavior. And while these feelings are not an excuse for failing to perform work duties, managers should expect their employees to have them.

The speaker noted that change produces loss and fear, and managers

can combat their employees' fear by keeping them informed. Managers should also try to keep as many things unchanged as possible so that employees have some stability. "Familiarity is important," he commented.

To better adapt to change, employees should bring new people into their support systems, take good care of themselves physically, and set aside some time to be children again.

Laboratory work groups are encouraged to participate in the "Moving Through Change" program. The videotape, participant guides, and facilitator's notebook—generally used by department heads in leading employee groups—are available through the Training and Certification Office. Group discussions, led by the facilitator, occur at the conclusion of each section of the video.

"Step one is the video. Step two takes place when managers help work groups deal with change," said Training and Certification Head Sue Murphy, who encourages employees to view the video in a group. ●

[Work groups who wish to view the video can contact the Laboratory's Training and Certification Office at ext. 2220.]

United Way Kicks Off

Door Prizes Sought



The 1995 United Way Campaign is kicking off! United Way Campaign Drive meetings are scheduled for Monday, December 18. Watch for a special edition of **HOTLINE** for details. In the meantime, if you would like to make a donation of a gift to be drawn during the meetings, call Steve Iverson at ext. 2007. Contributions in the past have included homemade craft items, tennis lessons, and gift certificates to area restaurants, exercise classes, and hair salons.

Hotline

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You Can Make a Difference ...the United Way

Dare to Care! The United Way Campaign for 1995 is underway at PPPL, with a challenge to employees to match their generosity of years' past.

"The United Way campaign provides a unique opportunity for us to express our concern for the needs and welfare of our neighbors. In these times of economic uncertainty, United Way agencies face an even greater demand for their services. Therefore, your contribution now is all the more important," said PPPL Director Ronald C. Davidson.

Added Mary Ann Brown, PPPL's 1995 United Way Chairperson, "The Laboratory has always been a strong supporter of the United Way. I hope this year we can continue our excellent standard of giving."

To assist employees in continuing their spirit of generosity, there will be two United Way meetings on Monday, December 18. Staff will be divided into two groups, each of which will be assigned to one meeting. Meetings are scheduled for 10 A.M. and 3 P.M. in the MBG Auditorium.

These gatherings will provide information on United Way programs

and will feature a brief talk by a United Way representative, two videos, refreshments, and door prizes [see list of prizes in this issue of **HOTLINE**]. The prizes have been donated by employees and local merchants.

Employees are free to attend a meeting other than the one they are scheduled for. Everyone who attends a meeting is eligible for the door prizes that are drawn at that meeting. And those who contribute to this year's campaign will be entered in the Grand Prize Drawing for a \$300 gift certificate for travel arrangements, compliments of PPPL. The Grand Prize will be drawn on

Friday, December 22, at 1 P.M., in the C-Site Cafeteria.

Staff will receive pledge forms in the interoffice mail prior to the December 18 meetings. These forms can be dropped off at the close of the employee's designated meeting or mailed to Mary Ann Brown at C-Site, LOB, Room B-374. Donations may be given as a one-time contribution or through payroll deductions. Contributors may also earmark which charities they would like their donations to fund.

According to United Way, many contributors divide their gifts between

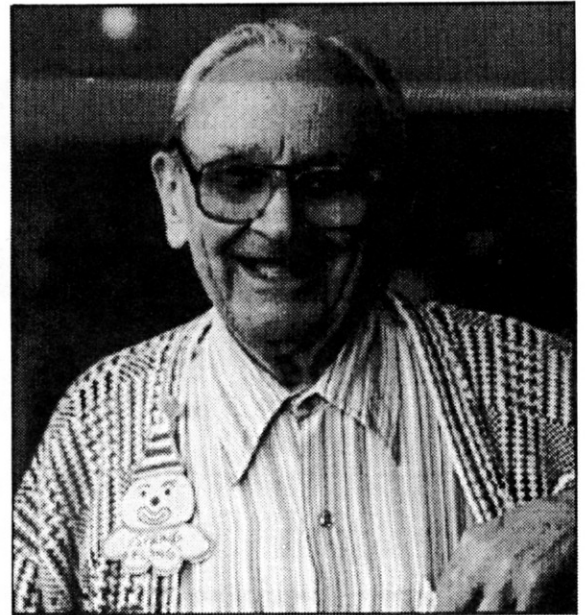
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This year's United Way Campaign Committee members are, from left, Sara Flohr, Margaret Young, Patti Wieser, Sonja Patterson, Rod Templon, Steve Iverson, Barbara Sarfaty, and Angelo Candelori. Not pictured is PPPL's United Way Campaign Chairperson Mary Ann Brown.



**United Way
Special Edition**



United Way

Continued from page 1

their work community and home community or a specific program. Gifts may also be targeted to a particular field of service.

Dozens of agencies are listed under service areas supported by United Way. A sampling of agencies includes the YMCA/YWCA, the Jewish Community Center, the Children's Home Society, the American Red Cross, Womanspace, Big Brothers and Big Sisters, Catholic Charities, and Multiple Sclerosis. Service areas range from child care to services for seniors, disabled individuals, and youth and families at risk, to community initiatives, emergency information and referral, health services,

counseling, and substance abuse services.

The United Way of Greater Mercer County 1995-1996 Campaign Chairperson Robert C. Machin noted that the Mercer County area is changing daily with some corporations continuing to restructure while others move out of the area.

"The local economic conditions are leading to an increase in the need for human care services for those who live and work here. At times like this, United Way of Greater Mercer County becomes even more important to our community and, in turn, so does your United Way contribution," said Machin in a published message. "As our region continues to change, United Way can be a beacon of hope for our community." ●

Grand Prize Drawing

Friday, December 22
1 P.M., Cafeteria
(during the Holiday Free Lunch)

Grand Prize:
\$300 Gift Certificate
for
Travel Arrangements

Compliments of PPPL

Runner-up Prize:
Greens Fees and Carts for Four
at
Princeton Meadows Country Club

*Anyone who contributes
to this year's PPPL United Way
Campaign will automatically be
entered in the Grand Prize Drawing.*

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Committee Chooses Slogan

Cheryl Such Wins Contest

P PPL'er Cheryl Such found it paid to put on her thinking cap for a United Way slogan.

"Why not?" she said when she saw the United Way Slogan Contest announcement in the *PPPL News Alert*. "It was a spur-of-the-moment impulse."

**Dare to Care?
Share!
The United Way**

Such, who has been at the Lab for 15 years and is presently the TFTR Operations Center Manager, came up with the top winning slogan — Dare to Care? Share! The United



PPPL United Way Campaign Chairperson Mary Ann Brown (left) presents a prize to slogan winner Cheryl Such. The prize was a \$20 gift certificate to the Forrestal at Princeton (formerly Scanticon).

Way — while driving home from work one evening. The United Way Campaign Committee selected it as

the winner out of seven entries and awarded Such a \$20 gift certificate to the Forrestal at Princeton. ●

Door Prizes to Highlight the United Way Meetings

Admission Tickets

UA MOVIES AT MARKETFAIR

Admission Tickets

GENERAL CINEMA, MERCER MALL

Admission Tickets

GARDEN THEATER, PRINCETON

Buy 1, Get 1 Free Lunch

CASTAWAYS, FORRESTAL VILLAGE

Sunday Brunch for Two

CASA LUPITA, MERCER MALL

\$15 Gift Certificate

CHILIS RESTAURANT, ROUTE 1

\$15 Gift Certificate

RUMBLESEATS, SO. BRUNSWICK

\$20 Gift Certificate

THE ANNEX RESTAURANT, PRINCETON

\$20 Gift Certificate

BOARDWALK SEAFOOD, FORRESTAL VILLAGE

\$20 Gift Certificate

TGI FRIDAY'S, MARKETFAIR

\$30 Gift Certificate

SUNNY GARDEN, ROUTE 1

Italian Glass Jar with Assorted Candy
PIER 1

Dinner for Two (up to \$40)

CHARLIE BROWN'S, ROUTE 1

Dinner for Two

ALCHEMIST & BARRISTER, PRINCETON

\$10 Gift Certificate

BRENTANOS BOOKSTORE,
MARKETFAIR

\$20 Gift Certificate

THE SPORTS AUTHORITY, ROUTE 1

\$25 Gift Certificate

CREATIVE HANDS, MONTGOMERY

Dinner for Two

ACACIA

Princeton Tiger Blanket

H. GROSS & CO, OUTFITTERS

Hardcover Book (exchangeable)

BARNES & NOBLE, MARKETFAIR

Gift Box of Coffees and Biscotti

PLATYPUS, MARKETFAIR

Free Car Washes

PRINCETON CAR WASH, ROUTE 1

Dinner for Two

RUSTY SCUPPER

Dinner for Two

MARRIOTT

Brunch for Two

PROSPECT HOUSE

\$50 Gift Certificate

MCCAFFREY'S MARKET

Five \$12 Gift Certificates for Cake

PENNINGTON MARKET

Hair Cut and Facial (\$80 Value)

ARTISTIC DESIGN

\$25 Gift Certificate

JAZZERCISE

Four \$20 Gift Certificates to Forrestal

at Princeton (formerly Scanticon)
PPPL

Manicure

LINDA DIBELLA NAILS

Avon Crystal Bowl

LENA SCIMECA

Four Carousel Coffee Mugs

ANONYMOUS

Decorated Evergreen Wreath

RICHARD'S FARM MARKET

Tray of Assorted Cookies

RICHARD'S FARM MARKET

Trays of Holiday Cookies

CRAMERS BAKERY, YARDLEY

Campaign Meetings

The One-Day United Way Campaign at PPPL is Monday, December 18, in the MBG Auditorium. Please come to the meeting for your group. Feel free to attend the other meeting if you are unable to attend the one for your group. Thank you!



10 A.M. — Group 1

- Engineering and Technology Development Department
- Support Services Department
- Office of Human Resources and Administration

3 P.M. — Group 2

- Advanced Projects
- Tokamak Confinement Systems Department
- Office of the Director
- Office of Resource Management
- Plasma Science and Technology Department
- TFTR

Dare to Care? Share! The United Way

Hotline

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Three PPPL Physicists Named APS Fellows

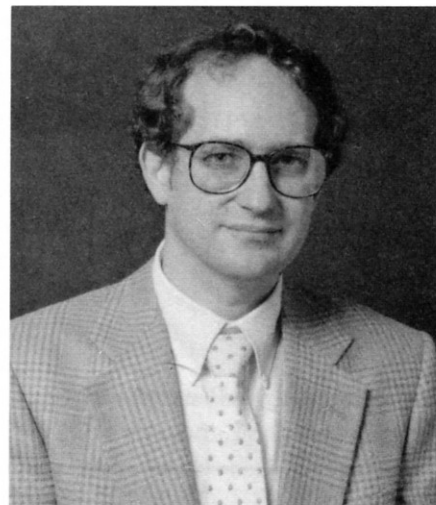
In recognition of their contributions to the field of plasma physics, three physicists from PPPL were recently named Fellows by the American Physical Society (APS).

The three elected to the rank of Fellow by the APS's Division of Plasma Physics (DPP) are Taik Soo Hahm, Janardhan Manickam, and Ned Sauthoff. Hahm, Manickam, and Sauthoff received the lifetime appointments at the November APS meeting held in Louisville, Kentucky. The APS rules limit the maximum number of Fellows selected each year to be half of one percent of the Division membership.

Hahm, a Research Physicist at the Laboratory, was cited in his Fellow-

ship Certificate "For outstanding contributions to progress in understanding anomalous transport and enhanced confinement regimes in toroidal plasmas through nonlinear analysis of microinstabilities and the development of the toroidal gyrokinetic formalism." He received a Ph.D. in plasma physics from Princeton University in 1984 and a Bachelor's in physics from Seoul National University in South Korea in 1980 and has been at PPPL since 1986. Hahm is internationally recognized as a leading theoretical physicist addressing the most challenging advanced confinement scientific issues.

Manickam, a Principal Research Physicist at the Laboratory, was cited "For his extensive contributions to the understanding of magnetohydrodynamic (MHD) plasma processes, discovery of the 'infernal mode,' and stewardship of the PEST code — a uni-



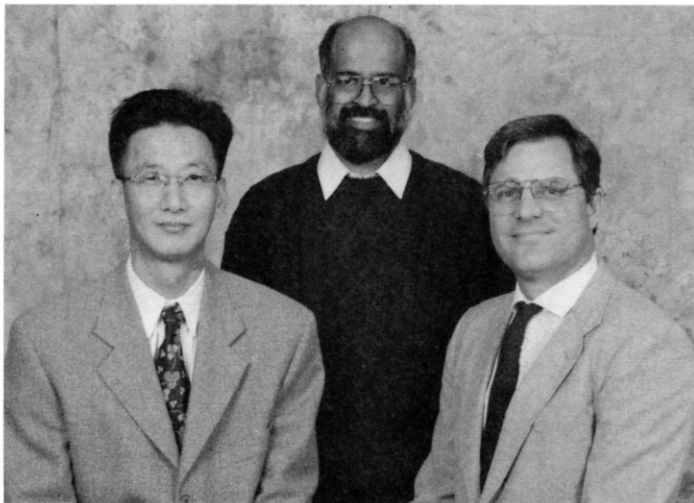
Nathaniel Fisch

Fisch Elected APS Vice-Chair

Nathaniel Fisch, a Professor of Astrophysical Sciences and Director of the Program in Plasma Physics at Princeton University, was recently elected Vice-Chair of the American Physical Society's (APS's) Division of Plasma Physics (DPP). The term begins this month. Fisch will become Chair of the DPP in 1998. He presently serves as Associate Director for Academic Affairs at PPPL.

Strong Personal Commitment

Laboratory Director Ronald C. Davidson said, "Professor Fisch has a very strong personal commitment to excellence in plasma physics research and education. I am delighted



The APS Fellows are, from left, Taik Soo Hahm, Janardhan Manickam, and Ned Sauthoff.

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APS Fellows

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versal tool for assessing tokamak stability properties." Manickam, who has been at PPPL since 1975, received a Ph.D. in plasma physics from the Stevens Institute of Technology in 1975, a Master's in nuclear physics from Andhra University in Waltair, India, in 1968, and a Bachelor's in physics from Osmania University in Hyderabad, India, in 1966. His present work centers on the simulation and interpretation of key MHD phenomena in tokamaks, and includes a lead role in investigating the physics properties of the new enhanced reverse shear modes in the Tokamak Fusion Test Reactor at PPPL.

Sauthoff, a Principal Research Physicist at the Laboratory, was rec-

ognized "For seminal contributions to the application of X-ray diagnostics to the study of sawteeth and disruptions in tokamaks, and for distinction in the leadership and management of important research projects."

Sauthoff came to PPPL in 1975 after receiving a Ph.D. in astrophysics from Princeton University. He received a Master's in nuclear engineering in 1972 and a Bachelor's in physics in 1971, both from the Massachusetts Institute of Technology. Sauthoff is Head of the Plasma Science and Technology Department at PPPL and is the Physics Manager of the U.S. International Thermonuclear Experimental Reactor (ITER) Home Team, coordinating the U.S. physics design participation in the ITER program.

Commenting on Sauthoff, PPPL Director Ronald C. Davidson said,

"Dr. Sauthoff's pioneering contributions to experimental fusion science, particularly to the study of disruptions and sawteeth oscillations in tokamak plasmas, can only be described in superlative terms. Also outstanding is the superb leadership he provides as Physics Head of the U.S. ITER Home Team and as Head of the Laboratory's Plasma Science and Technology Department."

Bill Tang, PPPL's Theory Division Head, said of Hahm and Manickam, "Dr. Hahm's exceptional productivity is characterized by depth and breadth. He is highly respected by the fusion research community. Dr. Manickam has played a valuable leading role in MHD theoretical analysis with key applications to PPPL projects, as well as to prominent national and international experiments." ●

Fisch

Continued from page 1

with his selection as Vice-Chair of the DPP, and wish him every success in championing the course of plasma physics in this important role."

Fisch came to PPPL in 1978 after receiving a Bachelor's, a Master's and a Ph.D., as well as postdoctoral experience, at the Massachusetts Institute of Technology. Best known for his research on ways to create electric currents in plasma, Fisch specializes in theoretical plasma physics with applications to controlled nuclear

fusion, plasma devices, lasers, and astrophysics. He is the author or co-author of about 80 research papers, has edited one book, and has been granted seven U.S. patents, including one on separation methods for petroleum refining. His current research focuses on improving the tokamak concept by using waves to extract power directly from energetic fusion byproducts.

APS Award for Excellence

Fisch, an APS Fellow, is the 1992 recipient of the APS's Award for Excellence in Plasma Physics Re-

search and is a 1985 Guggenheim Fellow.

During a recent interview, Fisch said he looks forward to working with the current Chair and Chair-elect of the DPP.

"These are difficult, unprecedented, and rapidly changing times for American science, in general, and for the Division of Plasma Physics, in particular. My immediate predecessors are already responding vigorously and wisely to the challenges faced by the Division. I look forward to joining their efforts," said the newly elected Vice-Chair. ●

HOTLINE

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Layout: Patti Wieser

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PPPL Scientists Begin Research Programs in Electrostatic Atomization

Scientists at PPPL are applying skills in theoretical and experimental plasma physics gained from fusion energy research to solve problems in the field of Electrostatic Atomization (EA). Attempts to understand the behavior of electrostatically-charged liquid and powder droplets date back to Lord Rayleigh. The famous nineteenth century physicist was intrigued by the pure science. Today there are good, practical reasons for the interest as well. A multitude of applications exist, including the design of novel fire sprinklers, fuel injection systems, and fine powder paint sprays.

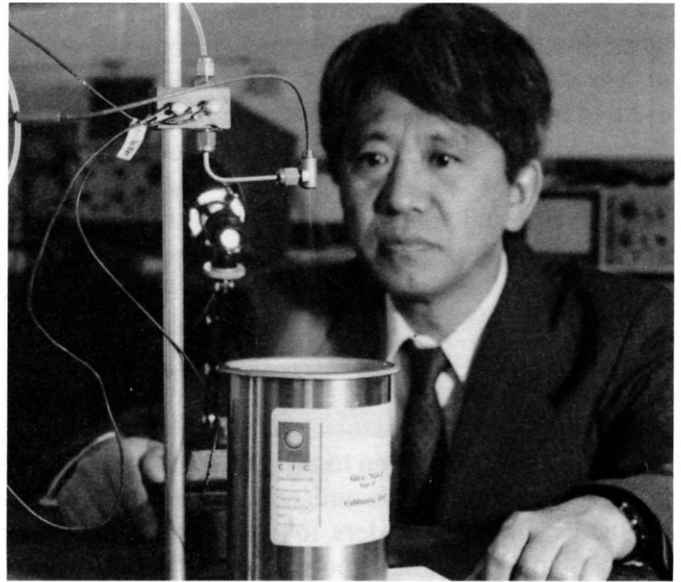
If fire sprinklers could be designed to discharge an electrically charged water mist, the amount of water required to control a fire could be reduced dramatically. Because flames are good conductors of electricity, the charged mist would be attracted to the fire, thereby eliminating the need to deluge an entire area and preventing unnecessary water damage to valuable materials not directly involved in the fire. It is estimated that one electrostatic sprayer could replace three or four conventional sprinklers.

Self-repelling Uniform Droplets

Using electrostatic atomization, gasoline, aviation, and diesel fuels can be atomized into self-repelling



Hideo Okuda measures the pressure of the vacuum tank using a discharge vacuum gauge.



Hideo Okuda adjusts the spray triode voltage to find the optimum spreading of the charged droplets.

uniform droplets, which are much smaller than the packets of fuel typically fed into engine cylinders. The droplets are burned more efficiently, increasing fuel efficiency and lowering pollutants.

Unlimited Atomization

For painting applications, fine powder particles can be charged using an electron gun. The particles are then attracted to grounded surfaces, electrostatically coating front, back and corners, thereby avoiding the need for cumbersome multiple spraying from all the directions. By directly injecting electrons into powder particles, unlimited atomization can be achieved.

Both experimental and theoretical research programs in EA are now underway at PPPL. The work is carried out in a Cooperative Research and Development Agreement between PPPL and a local area firm, Charged Injection Corporation (CIC). Work is also being supported as part of PPPL's Laboratory Development Program Activities. The goal of these programs is to set up a comprehensive EA research and development program at the Laboratory. ●

More detailed information on electrostatic atomization research at PPPL is available in a soon-to-be published PPPL Digest. Copies will be available in Information Services, C-Site, LOB, B-378.

Science on Saturday Kicks Off on January 13

Want to hear a Nobel Prize winning biologist discuss his work in rearranging the development of legs and eyes in fruit flies? Interested in finding out how a New York Times science writer puts together articles? Or how about a concert that includes unusual sounds created by digital techniques? These are among the topics and features of the 1996 Science on Saturday series beginning January 13 at PPPL.

Science on Saturday is a series of nine free lectures geared toward high school students, but open to all. The lectures are given by scientists and engineers who are leaders in their fields. Started as a grass-roots effort 12 years ago by PPPL scientists, it now attracts more than 300 people each Saturday, with attendees ranging in age from 8 to 80. This year's

series is being organized at PPPL by Norton Bretz and Paul LaMarche.

Well-known Scientists

"The Science on Saturday lecture series features some of the most well known scientists in the country this year, including 1995 Nobel Prize winner Eric Wieschaus, a professor at Princeton University's Department of Molecular Biology. Scheduled are presentations on anthropology, biology, molecular biology, psychology, physics, geology, medicine, science writing, and music," said Bretz, noting the speakers are all volunteering their own time to give the lectures. "The eagerness of the scientists from the area to come here makes it work."

The series kicks off with a lecture by Penn State University Professor and anthropologist Alan Walker, re-

cently spotlighted in the news. "Professor Walker has collaborated with Dr. Meave Leakey from the National Museum of Kenya to discover the remains of mankind's oldest ancestors who walked upright in Africa about four million years ago. He will be able to give a firsthand account of the discovery and its implications," said Bretz.

Variety of Topics

The series spans a variety of topics, including music, which Bretz conceded is not usually considered "science." "But science touches almost everything these days and music is no exception," said the series organizer. "Professor Paul Lansky, Chairman of the Princeton University Department of Music, has been a

Continued on page 5

PPPL to Host Regional Science Bowl; Volunteers from the Lab Needed

PPPPL is planning to host the New Jersey Regional Competition of the National Science Bowl® on Saturday, February 24. High school teams from New Jersey and Pennsylvania are expected to compete in the day-long bowl. The 1996 top winner of the regional competition will receive an all-expense paid trip to Epcot Center in Florida, to participate in the Fifth Annual National Science Bowl®, scheduled to begin May 3, 1996.

Seeking Volunteers

The organizers are seeking volunteers who would like to serve as judges, timekeepers, or scorekeepers, or to help out with refreshments. Anyone from the Laboratory wish-

ing to lend a hand can call PPPL's Pamela Lucas at ext. 3049.

The competition is a double-elimination tournament. Each team is made up of four students, a student alternate, and a teacher who serves as an advisor and coach. The students answer multiple choice or short answer questions in biology, chemistry, physics, astronomy, mathematics, and general, earth and computer sciences. The questions are being made up by scientists from the U.S. Department of Energy's (DOE) Oak Ridge National Laboratory in Tennessee. All the participating teams in the competition will receive certificates, while the top three will receive trophies and plaques.

The regional competition is sponsored by the DOE and hosted by PPPL. The National Science Bowl® is sponsored by the DOE and the Cray Research Foundation. Winners and finalists of the National Science Bowl® receive national recognition and are awarded prizes such as science trips at home and abroad, school link-ups to the National High School Supercomputer at the Lawrence Livermore National Laboratory in Livermore, California, computer hardware and software, and teacher scholarships. ●

[Don't forget! Call Pamela Lucas at ext. 3049 if you would like to volunteer during the bowl.]

Science

Continued from page 4

pioneer in electronic and computer-assisted music and has used digital techniques to alter and create a wonderful set of sounds and compositions. He has collaborated with the Electrical Engineering and Computer Science departments at Princeton to create many of these unusual sounds,

and he will play and describe some of his compositions for Science on Saturday."


Unique Opportunity

"This is one of the very few spots in the world where a program of this quality and breadth can be put together. I hope area students and anyone else who is interested will be able

to take advantage of this unique opportunity," he said.

The lectures begin at 9:30 a.m. and usually last about two hours. Seating is on a first come, first-served basis. An AT&T grant provides buses for transporting students from Trenton, as well as refreshments. ●

[The 1996 Science on Saturday Schedule is below.]

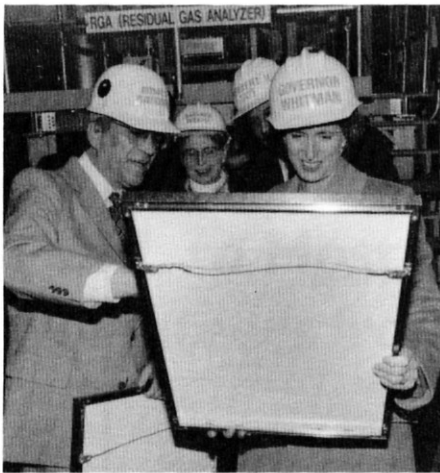
	<h2>Science on Saturday</h2> <p>Princeton University Plasma Physics Laboratory Lecture Series sponsored in part by AT&T</p>
January 13	NEW DISCOVERIES RELATING TO HUMAN ORIGINS by Prof. Alan Walker of Penn State University, Department of Anthropology
January 20	FLIGHT STRATEGIES OF MIGRATING BIRDS by Dr. Paul Kerlinger, Author and Environmental Consultant
January 27	SAT - NO PROGRAM
February 3	MAKING MUSIC WITH MACHINES by Prof. Paul Lansky of the Princeton University, Department of Music
February 10	THE HIGHS AND LOWS OF SCIENCE WRITING by Ms. Gina Kolata, Science and Medicine Reporter for the New York Times
February 17	SIGN-TRACKING, A MODEL OF DRUG ADDICTION by Prof. Arthur Tomie of Rutgers University, Department of Psychology
February 24	SCIENCE BOWL - NO PROGRAM
March 2	HOW GENES CONTROL THE WAY FLY EMBRYOS DEVELOP by 1995 Nobel Prize winner Prof. Eric Wieschaus, Princeton University, Department of Molecular Biology
March 9	COMETS AND THE ORIGINS OF LIFE by Dr. Chris Chyba, Princeton University, Department of Geological and Geophysical Sciences
March 16	MALARIA, MOSQUITOES, AND MAN by Prof. Photini Sinnis, New York University, Department of Medicine and Parasitology
March 23	BUILDING A STRONGER MAGNETIC BOTTLE TO CONTROL THE FUSION ENERGY GENIE by Dr. Michael Bell, Princeton University, Plasma Physics Laboratory

The Year in Review...

PPPL Makes Strides in Research, Faces Budget Battle, Rings in 1996 with New TFTR Schedule

For PPPL, 1995 was a year filled with excitement and recognition, a time of loss and transition, a period of renewed hope and ambition.

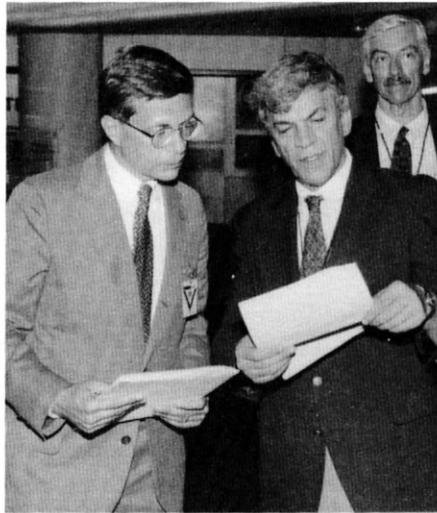
Visits from dignitaries abounded, from Department of Energy (DOE) officials and New Jersey politicians to Korean and Japanese representatives. New Jersey Governor Christine Todd Whitman pledged her support during a February visit to the Laboratory by saying of fusion, "You're seeing a whole new source of energy ... [a source] that doesn't hurt our environment and doesn't pollute."



PPPL Director Ronald C. Davidson presents Governor Whitman with a framed photograph of TFTR during a February visit.

Further support was voiced by the fusion panel of the President's Committee of Advisors on Science and Technology (PCAST). Robert Conn, Vice Chairman of the fusion panel, and Princeton University Professor Robert Socolow, another fusion panel member, said members viewed TFTR as the "flagship" device of the nation's domestic fusion program during a July presentation to employees.

Also backing the Laboratory during a summertime visit was Repre-



Representative Dick Zimmer talks with PPPL Director Ronald Davidson. In the background is PPPL Deputy Director Dale Meade.

sentative Dick Zimmer, who said, "Fusion will free us from our dependency on fossil fuels,...diffuse the situation in the Middle East, and reduce the cost of power. It promises an immense benefit not just for this country but for humanity."

PPPL and Princeton University officials continued their efforts to gain support for fusion from Congress throughout the year. Ultimately, the Department of Energy received just \$244 million from Congress for fusion for Fiscal Year 1996, down from the previous year's allotment of \$365 million. And in September, the Laboratory faced a reduction-in-force as a result of the cut.

Said PPPL Director Ronald C. Davidson, "The loss of so many valued colleagues in the recent reduction-in-force is a very traumatic experience for all of us."

But 1995 was also a year of firsts, and a time of acknowledgment for the staff's achievements.

Tokamak Fusion Test Reactor physicists discovered a new, fundamental mode of plasma confinement which could reduce substantially the size and cost of commercial fusion powerplants. The "enhanced reversed shear" technique involves a magnetic-field configuration which dramatically reduces plasma turbulence and could possibly double TFTR's record fusion power output.

In addition, the Magnetic Reconnection Experiment produced its first plasma in October and around the same time, the magnetic field for TFTR was pushed to 6 Tesla.

Staff Awarded

PPPL scientists and other staff were recognized for their achievements and generosity. Richard Hawryluk, the Tokamak Confinement Systems Department Head, received the U.S. Department of Energy Distinguished Associate Award for his "important contributions to fusion research" and former PPPL Director Harold Furth received the 1995 Dis-



From left are PPPL Director Ronald C. Davidson with 1995 PPPL Distinguished Research Fellows Masayuki Ono and Michael Zarnstorff.

tinguished Career Award from the Fusion Power Associates.

In November, three PPPL physicists — Taik Soo Hahm, Janardhan Manickam, and Ned Sauthoff — were named American Physical Society Fellows. Earlier in the year, PPPL physicists Masayuki Ono and Michael Zarnstorff received PPPL Distinguished Research Fellowships in honor of their “excellence in theoretical and experimental plasma physics research.”

The PPPL/Trenton Partnership was cited for its “significant innovations and achievements” by the National Center for Public Productivity, which gave the Laboratory the New Jersey Exemplary State and Local Award. In addition, PPPL employee Jerry Levine received the 1995 Energy Research NCO Quality Award and Bobbie Forcier, Suzanne Homer, Phyllis Schwarz, and Lynne Yager received the Princeton University Women’s Organization Awards.



Jim Kamperschroer gives a demonstration to a group of girls visiting the Laboratory for “Take Our Daughters to Work Day.”

In recognition of the generosity of PPPL’ers, the Laboratory garnered the United Way Silver Award for its contributions to the Greater Mercer United Way 1994/95.

New Beginnings

The year was also marked by farewells and new beginnings, with

Paul Rutherford retiring as Associate Director for Research, passing the baton to Robert Goldston.

Earlier in 1995, PPPL took an important step toward collaborating with Korea on fusion science and technology when Laboratory Director Ronald C. Davidson and Korea Basic Science Institute President Duk-In Choi co-signed a Letter of Intent for research cooperation in June.

“The agreement signals an opportunity for the Laboratory to collaborate with a major Korean institute committed to becoming a world-class research facility in fusion over the next decade,” said Davidson.

From 1995’s start to its finish, the spirit of the Laboratory was invigorated when PPPL opened its doors to special events and welcomed scores of visitors. In the winter months, PPPL hosted the Science on Saturday series, the New Jersey Regional Competition of the National Science Bowl®, and a procurement breakfast for small disadvantaged and women-owned businesses. Later in the year, the Laboratory hosted the International Symposium on Heavy Ion Inertial Fusion and took Japanese industrial labor union representatives on a tour of TFTR.

Special guests during the spring and summer included dozens of girls who came for “Take Our Daughters to Work Day” and nearly 30 middle school teachers from across the state who participated in the Teacher Leadership Workshops.

And PPPL managers went off for lessons in improving their skills by



Volunteer chefs dished up a free lunch for employees during the summer. From left are Lew Meixler, Margaret Young, Angelo Candelori, John Bavlish, and Steve Iverson.

participating in a seminar, “Maintaining a Positive Employee Relations Climate in a Dynamic Environment.”

The Laboratory was a hit outside its own doors as well, drawing a crowd at its exhibit at CommUniversity, an annual springtime celebration that joins Princeton University with the community of Princeton. Throughout the day, volunteers from PPPL handed out brochures and fusion buttons while answering questions.

Continued on page 8



Stewart Zweben (middle) discusses a small experimental electric arc furnace with N. Anne Davies (left) and Martha Krebs.

Year

Continued from page 7

Among the hosting and scientific endeavors, there was also time for respite. Employees took in the sunshine and a little revelry at the PPPL Picnic, gathered for a summertime free lunch, and concluded the year with a free holiday feast of turkey and ham.

DOE Officials Visit

In November, the Laboratory welcomed DOE Office of Energy Research Director Martha Krebs and N. Anne Davies, the Associate Director for Fusion Energy at the DOE's Office of Energy Research, for a tour. Davies, during an earlier visit, had lauded the successes of the Laboratory and of TFTR. "From a scientific endeavor, it's been a superb accomplishment."

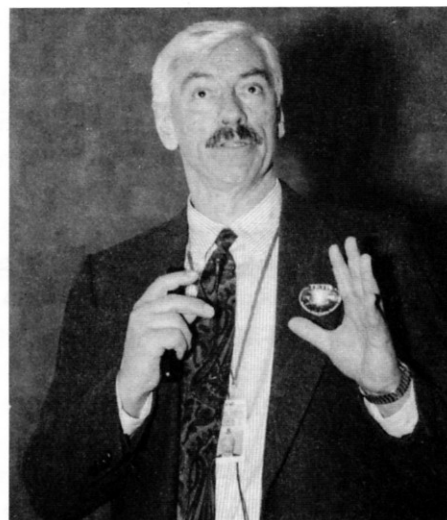
Krebs further complimented the Laboratory, saying the science at PPPL has had a "tremendous impact" on both the scientific achievement and understanding of high tempera-

**"The success of
TFTR reflects on
the entire Lab."**

— Dale Meade

ture fusion plasmas while making it much more possible to achieve the ultimate energy goal. She also conveyed to the staff how "personally frustrated" she is by what is happening as a result of a lack of Congressional support.

In December, PPPL Deputy Director Dale Meade addressed employees to unfold the Laboratory's ideas on what to do next, discussing its mission, progress and challenges,



Deputy Director Dale Meade discusses the Laboratory's plans with staff.

while outlining plans for an aggressive series of TFTR runs this winter. The Deputy Director expressed his appreciation of the staff's hard work.

"The success of TFTR reflects on the entire Lab," said Meade. ●

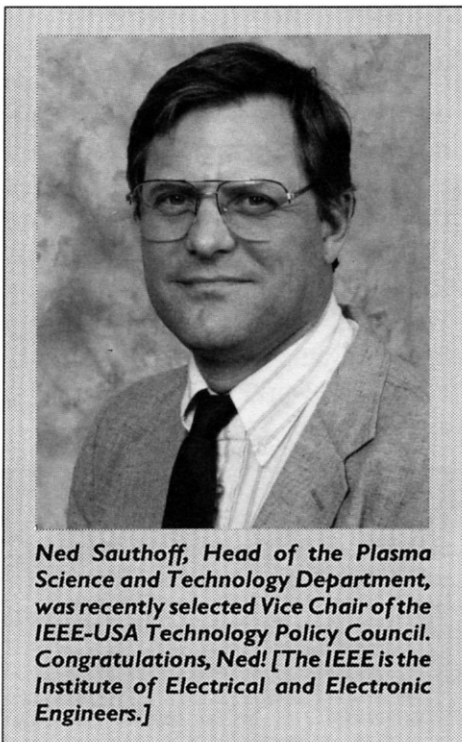


Best Wishes for 1996!



Hotline

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



Ned Sauthoff, Head of the Plasma Science and Technology Department, was recently selected Vice Chair of the IEEE-USA Technology Policy Council. Congratulations, Ned! [The IEEE is the Institute of Electrical and Electronic Engineers.]

Plasma Chemistry Comes to PPPL

by Anthony De Meo

Physicists at PPPL have entered a one-year Cooperative Research and Development Agreement (CRADA) to support the development of a novel technique for the conversion of toxic wastes and other materials to useful chemical products.

Working with Drexel University and Plasma Technology, Inc. (PTI), a small business in Santa Fe, New Mexico, PPPL researchers will apply their unique expertise in spec-

troscopic analysis of high-temperature plasmas to the emerging field of plasma chemistry. The CRADA will provide Princeton researchers with the opportunity to expand their present capabilities in the near ultraviolet and visible spectrum into the far infrared, a particularly useful frequency range for chemical analysis.

Technology Transfer Head Lewis Meixler said, "This collaboration with

Continued on page 4

DACW Plans Breakfast; Releases Survey Results

by Virginia Finley and Patti Wieser

Attention all PPPL women! You are invited to attend an informal breakfast meeting hosted by the Director's Advisory Committee on Women (DACW) on Thursday, February 22. The gathering, from 7:30-9 a.m. in the LOB Commons, gives female staffers a chance to become acquainted with their peers and the members of the DACW, as well as to express their concerns. The Council will join the group at 8:30 a.m.

The fare will include an informal breakfast, welcoming remarks from PPPL Director Ronald C. Davidson, and a short questionnaire.

At last year's DACW breakfast meeting, a survey was distributed to attendees to find out what issues are of concern to PPPL women. The survey was also e-mailed to all female employees. A total of 49 women responded. The responses are tabulated in the box on page 3. Not everyone who participated in the survey responded to all the questions.

Responses

Responses to the survey show that while the majority of respondents believe there is an increase in

overall career development training opportunities, they do not see an increase in career advancement and alternative career opportunities.

Survey responses also indicated a higher courtesy level at the Laboratory and an increase in networking and communications among women. In addition, the majority of those who responded to the question on sexual harassment behavior at the Lab believe it has decreased.

Besides the survey questions, many respondents offered additional

Continued on page 2

DACW

Continued from page 1

comments, noting a need for respect and recognition of individuals, as well as for flexible work schedules that would include telecommuting.

As a result of the survey and the comments, the Laboratory began examining career development, employee recognition, and flexible work schedules. Steve Iverson, Head of the Office of Human Resources and Administration Department, addressed the issue of career development during a spring DACW meeting. Iverson outlined three activities presently in various stages of development. The first is a redesign of the secretarial and clerical position-ranking system. Iverson said he envisions the redesign to be the combined work of a group consisting of Human Resources staff, two members of the DACW, members of the Quality Improvement and Renewal Committee, Jim Graham, secretaries, and managers. The Laboratory hopes to move toward a job description and skill-based system as opposed to the system that ties secretaries to whom they report, said Iverson.

Model Succession Plan

The second activity is the development of a model succession plan for individuals in managerial positions, which has been completed. From this model, senior management and/or department heads develop

plans for individuals. Each individual's succession plan is a "how-to" guide to prepare that employee for a management position or to prepare a manager for greater responsibilities and possible promotion opportunities.

Potential Candidates

The third activity is the formation of a committee organized to identify minority and/or women employees as potential candidates for career opportunities at PPPL. The committee is a mixture of individuals, all who are long-time PPPL employees, and is limited to one member of the PPPL Council. The functions of the committee are to review candidates' backgrounds, including education, experience, and other credentials, and encourage them to apply for any posted position that matches their skills and the job requirements.

All these activities are tied to the funding climate at PPPL. In a "no growth" environment, the number of new positions is limited and career opportunities are less available. Nonetheless, changes to improve the career development program at PPPL are in progress.

The two remaining issues of concern—respect and/or recognition and flexible work schedules—are being addressed by the DACW. According to former DACW Chairperson Phyllis Schwarz, a DACW subcommittee worked with the Quality Im-

provement and Renewal Committee in the formation of the Employee Recognition Program, which was recently approved by Laboratory Director Ronald C. Davidson. The Lab plans to recognize several employees annually through the program. [An upcoming issue of **HOTLINE** will give details of the nascent program.]

Your comments, questions, and suggestions are welcome by the DACW and should be directed to one of the committee members. The committee includes Chairperson Sue Hill and members Dori Barnes, Virginia Finley, Sara Flohr, Suzanne Homer, Carol Phillips, Ellen Riscoe, Chris Ritter, Molly Tompkins, and Sharon Warkala. The ex officio members include Diane Carroll, Martha Redit, Phyllis Schwarz, Michael Williams, and Margaret Young. ●

Director's Advisory Committee on Women

Informal Breakfast

LOB Commons

Thursday, February 22

7:30-9 A.M.

All PPPL women invited

HOTLINE

Editor: Carol Phillips
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DACW Survey Results

1. Overall career development training opportunities have increased:

Strongly Agree	5
Agree	28
Disagree	8
Strongly Disagree	4
No Opinion	5

2. Supervisor support for overall career development training opportunities has increased:

Strongly Agree	6
Agree	22
Disagree	10
Strongly Disagree	4
No Opinion	7

3. Career development training opportunities related to your present position job skills have increased:

Strongly Agree	6
Agree	17
Disagree	17
Strongly Disagree	3
No Opinion	8

4. Supervisor support for training opportunities related to your present position job skill has increased:

Strongly Agree	9
Agree	19
Disagree	7
Strongly Disagree	4
No Opinion	9

5. Career advancement opportunities in your present position have increased:

Strongly Agree	2
Agree	10
Disagree	21
Strongly Disagree	14
No Opinion	5

6. Alternative career opportunities have increased:

Strongly Agree	1
Agree	9
Disagree	22
Strongly Disagree	12
No Opinion	6

7. Employee courtesy level at the Laboratory has improved:

Strongly Agree	0
Agree	23
Disagree	8
Strongly Disagree	5
No Opinion	13

8. Based on personal experience, sexual harassment behavior has decreased:

Strongly Agree	4
Agree	14
Disagree	3
Strongly Disagree	3
No Opinion	24

9. Supervisor approval for flexible work schedules has improved:

Strongly Agree	7
Agree	23
Disagree	6
Strongly Disagree	3
No Opinion	10

10. Networking opportunities for women have increased:

Strongly Agree	9
Agree	26
Disagree	3
Strongly Disagree	4
No Opinion	7

11. The 1994 Appraisal Form format is an improvement:

Strongly Agree	2
Agree	22
Disagree	4
Strongly Disagree	3
No Opinion	18

12. The Director's Advisory Committee on Women is adequately addressing the concerns of the women at the Laboratory:

Strongly Agree	3
Agree	13
Disagree	10
Strongly Disagree	2
No Opinion	13

13. Open information meetings are useful:

Strongly Agree	7
Agree	32
Disagree	0
Strongly Disagree	3
No Opinion	7

Lunch-hour career development forums:

Attended 2 or more	11
Attended 1	5
Plan to attend	21
Not interested	8
1/2 hr lunch (not enough time)	

I did not attend because:

Dislike discussion groups	1
Not interested in topics	11
Inconvenient time	17
Forgot	3
Not aware of forums	1

Chemistry

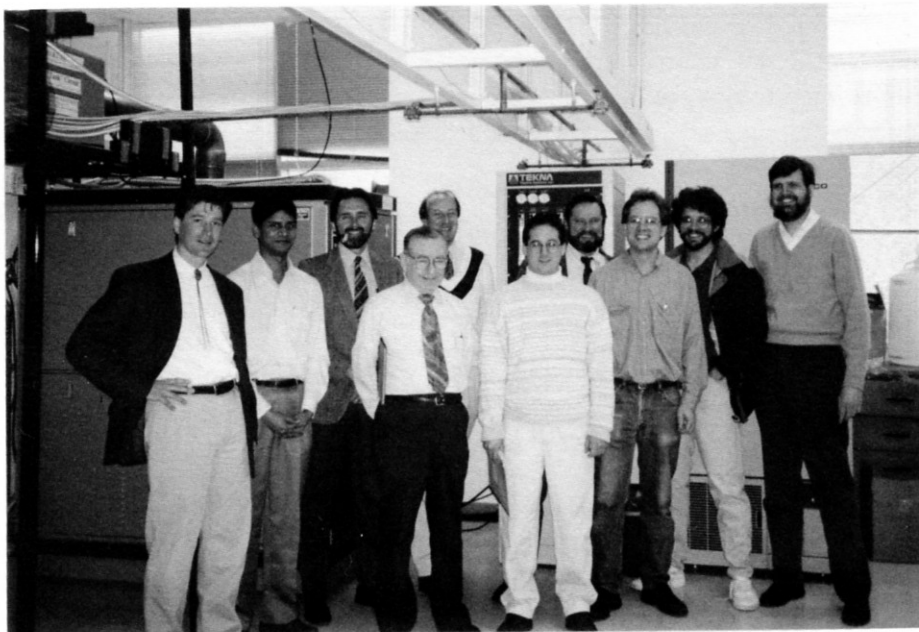
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Drexel University and Plasma Technology, Inc., has the potential to establish PPPL's credibility as a capable participant in the area of environmental monitoring and cleanup, as well as in the diagnostics of industrial plasmas. I hope these types of collaborations will be supported and extended so that PPPL can develop an array of capabilities in the non-fusion area, and thereby expand our scope of research and engineering opportunities."

Experimental work on the CRADA will be carried out at Drexel in Philadelphia using an off-the-shelf commercial torch from Tekna, a Canadian company. This device makes use of an induction-coupled plasma—one that is generated by the application of radio-frequency waves to a small volume of an inert gas such as argon. The gas is ionized and heated by an induced alternating current. The resulting plasma "torch" provides an excellent high-temperature medium in which complex molecules can be broken down into their constituent parts, including highly reactive free radicals. By selecting an appropriate working gas, an oxidizing or reducing environment can be created. This flexibility increases the variety and usefulness of the byproducts.

Useful Materials

This type of plasma reactor has been used to successfully demonstrate the conversion of hazardous complex wastes into useful materials such as "syngas," a mixture of carbon monoxide and hydrogen, and other materials that can be used either as fuels or precursors for chemical synthesis. Those studies were carried out using surrogate materials which are molecularly similar to the hazardous substances.



Members of the project team are, from left, Andreas Blutke, Sanjay Gupta, John Vavruska, El Grossmann, Rick Knight, Noel Silber, PPPL's Lewis Meixler, PPPL Project Co-Principal Investigator Brent Stratton, PPPL Post Doc Matt Goeckner, and PPPL Project Co-Principal Investigator David Mikkelsen.

In principle, specific chemical reactions will occur within the reactor depending upon the feed stock and temperature. The temperature of the plasma decreases gradually downstream away from the plasma source. By feeding materials into the reactor at different locations along the stream, researchers can select appropriate temperatures and cause desired reactions to predominate.

Next Phase

The next phase of the work, involving PPPL, will concentrate on the use of the system for the synthesis of ozone and the conversion of polymeric materials such as polystyrene, which are difficult to eliminate from the environment. Ozone is used commercially as a sterilization or bleaching agent, and it is believed that polystyrene can be converted to methane, which can be used as a fuel.

PPPL will perform spectroscopic diagnosis with the goals of identifying the species and concentrations of the chemicals present. These measurements will be modeled using a chemical kinetics code to identify the

key reaction pathways and to suggest possible means of improving the efficiency of the conversion process—an important step toward commercialization. Two spectroscopic techniques will be used: optical emission spectroscopy of the torch-feed gas interaction in the visible and near ultraviolet region of the spectrum (300-750 nm), and Fourier Transform infrared spectroscopy of the reactor region in the 2.5-25 μm spectral region.

PPPL is developing a capability for chemical kinetics modeling to support research on applications of low-temperature plasmas. This includes high-temperature neutral chemistry, as well as reactions with electrons and ionized species present in plasma regions.

Benchmark

The diagnostic measurements of chemical concentrations in the reactor region and the effluent will be used to benchmark the model. In turn, the model can be used to identify

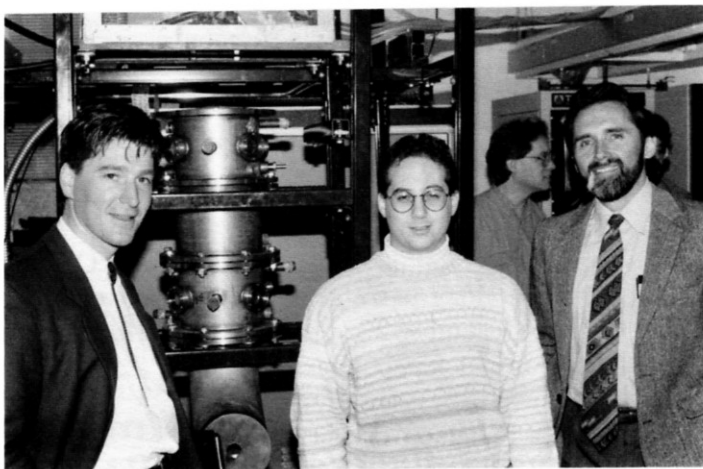
Continued on page 5

Chemistry

Continued from page 4

critical reaction mechanisms and select key species for observation. The ultimate goal of the modeling is to evaluate process modifications, e.g., altering the composition of the feed stock, which can move the chemical equilibrium away from undesirable byproducts and increase the yield of salable products. Overall, the project will also demonstrate the role that spectroscopic diagnostics and chemical kinetics modeling can play in understanding plasmas used for waste conversion and chemical synthesis.

David Mikkelsen, Co-Principal Investigator from PPPL on the project along with Brent Stratton, said, "We hope to use the experience gained on this project to win funding for plasma chemistry projects at PPPL in the future." ●



In front of the device at Drexel are Andreas Blutke, of Plasma Technology, Inc., Noel Silber, a graduate student at Drexel, and John Vavruska, of Plasma Technology, Inc.

Procurements and Quality Task Force

As indicated in an earlier Hotline, a cross-functional task force was created to review the quality program that supports procurements. The mission of the task force was to identify opportunities for improvement and to assure that the program supports the mission of the Laboratory. The task force consisted of Rich Borusovic, Jim Chrzanowski, Sally Connell, Ron Fredericks, Nevell Greenough, Henry Kugel, Judy Malsbury, Bob Simmons, Andy Vanisko, Mike Viola, and Sharon Warkala, with Frank Patrick of AT&T Quest as the facilitator. The Task Force recommended the following goals, which Quality Assurance is currently pursuing:

- 1. Assure quality issues are addressed in procurements through enhanced user understanding of those issues and providing resources to support them.*
- 2. Assure that supplier submittals and documentation adequately support the required quality of purchased products and services and provide a basis for historical reference by developing formal control systems for receipt, review and approval, and handling of deliverables and documents.*
- 3. Assure appropriate selection of and interaction with suppliers by establishing a system to maintain a history of supplier performance.*

A formal report was generated and is available for access on employees' WWW page within the Support Services, Quality Assurance area under the name "Procurements and Quality Task Force Report."

—Judy Malsbury

Contino Wins United Way Grand Prize

by Patti Wieser

Sometimes the gift of giving yields a little extra surprise for those who have been generous.

PPPL Training Specialist Anthony Contino found such a surprise when he returned home from his wife's office holiday party in New York City on December 22.

Blinking on his telephone answering machine was a message from co-worker Sonja Patterson that he had won the United Way Grand Prize — a \$300 gift certificate for travel arrangements.

New Orleans

"I was excited and so was my wife," said Contino, who works in the Office of Certification and Training. "We're going to use the prize to go to New Orleans."

Contino said he and his wife, Jeannine, plan to take the trip either in the spring or fall and look forward to great restaurants, great jazz, and good shopping.

"We can't find any decent red beans and rice in New Jersey so we have to go to New Orleans," said the

winner, adding that they will also shop for Mardi Gras masks and paintings of French Quarter street scenes.

In addition, the Continos plan to hook up with friends Contino made in New Orleans when he was an Ebasco employee involved in the Waterford Nuclear Plant in Louisiana.

"I'm truly grateful for the prize, but the biggest prize of all is the opportunity to help people through the United Way."

—Anthony Contino

Contino said he and his wife had earlier made preliminary plans to head south for vacation. "This works well. We were planning to go to New Orleans this year anyway, funding permitting. This prize will certainly help out."

Contino was among about 200 PPPL'ers who contributed to the cam-



PPPL United Way Campaign Chairperson Mary Ann Brown congratulates Grand Prize winner Anthony Contino.

paign and were automatically entered in the Grand Prize Drawing. The Grand Prize was drawn on Friday, December 22, during the free holiday lunch.

Contino beamed over his luck, but noted he has received a "double prize."

"I'm truly grateful for the prize, but the biggest prize of all is the opportunity to help people through the United Way," he said. ●

United Way Campaign Succeeds



The United Way Campaign at the Laboratory raised \$18,078, with more than 200 employees contributing. At left, United Way Committee member Sara Flohr hands John Luckie a jar of candy, one of the door prizes at the United Way meetings in December. Hats off to PPPL's spirit of generosity!

New Wetlands Signs Posted

by Joanne Savino

Have you taken an occasional walk around the site and enjoyed the wooded view along the CAS and RESA building? Perhaps as you strolled you noticed a few new signs posted along the wooded areas. They are wetland's protection signs that are posted to identify the wetlands and transition area.

Colorful Signs

The new, bright, colorful signs, containing pictures of wildlife, water fowl, marine life, and vegetation, replace the old brown signs. The new signs are along the border of the wetlands and transition zone and denote activities which are prohibited by the New Jersey Department of Environmental Protection. The wetlands and

transition area is protected from the following activities:

- Destruction of plant life including soil removal or dredging.
- Disturbance of the water level or water table including drainage.
- Dumping, discharging or filling with any materials.
- Erecting structures, paving, or placing of any types of obstruction.

These signs are a reminder that the wetlands are an important part of the environment, and that only we can preserve them for future genera-



From left are Joanne Savino and Virginia Finley next to the new wetlands sign.

tions. For a copy of the site plan depicting the wetlands, please call Joanne Savino at ext. 2622. Any questions about the wetlands and transition area can be directed to Virginia Finley at ext. 2746. ●

What are Wetlands?

Wetlands are defined as areas that maintain a soil type and seasonal water level in order to support vegetation adapted to life in saturated soil conditions. Examples of wetlands include, but are not limited to, marshes, swamps, and bogs.

Across the U.S.

Wetlands are found across the United States in places such as the Dakotas, where prairie potholes measuring less than a quarter acre are found, to the east coast where expansive salt marshes line the coast for miles, and the Florida Everglades (one of the most well-known examples of wetlands). Until recently, most wetlands were not seen as a treasure worth preserving.

Historically, wetlands were seen as a nuisance and land owners were encouraged to drain or fill them in

order to yield more productive soil. The public's attitude toward wetlands has recently changed due to ecological studies, education, and public awareness.

Today, wetlands are recognized for the important role they play in the overall environment of humankind. Some of the benefits provided by wetlands are:

- Restoration of water quality by functioning as a filter for removing toxic wastes, sediments, and other pollutants (such as greenhouse gases).
- Prevention of flooding by storing water and then releasing it slowly downstream.
- Serving as a buffer for the shoreline against erosion.

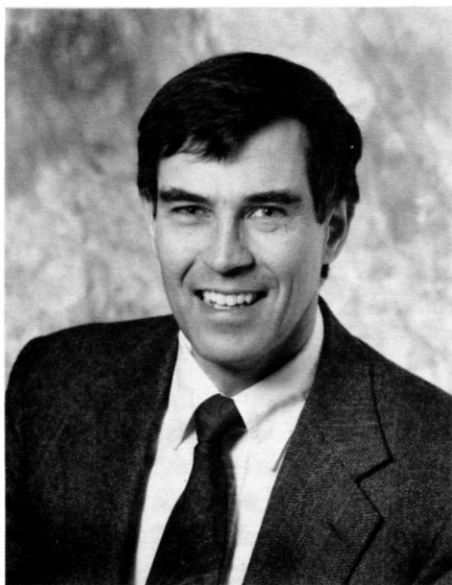
Three quarters of North America's bird species depend on wetlands for breeding, nesting, feeding, and escaping predators. The wetlands are also among the most biologically productive ecosystems. Two thirds of the commercial fish and shellfish harvest depend on wetlands during all or part of their life cycles.

Treasure of Gifts

Where else could you find such a treasure of gifts? The wetlands provide food, shelter, erosion and flood protection, clean air and water, along with beautiful wildlife and plant life to enjoy. Everyone benefits from preserving the wetlands. The wetlands must be protected so they may be enjoyed for generations to come.

—Joanne Savino

What's Happening at PPPL



PPPL Assistant Director Rush Holt is taking a leave of absence beginning this month to run for the seat in the 12th Congressional District, which includes parts of Monmouth, Middlesex, Mercer, Somerset, and Hunterdon Counties. PPPL'ers who wish to reach him can call (609) 737-2343 or write to him at P.O. Box 782, Pennington, NJ 08534.



Frank Malinowski and Judy Malsbury recently earned the Certified Quality Manager certification from the American Society for Quality Control. Malinowski and Malsbury were part of a group who took the first official test for the new ASQC certification package.

TRANSITIONS

Births

Congratulations to **Alan Bara** of the Facilities and Engineering Division, and his wife, Lisa, on the December 12 birth of their son, Shaun Michael.

Congratulations to **John Luckie** of the Warehouse/Materiel Control Division and his wife, Kathleen, on the November 29 birth of their daughter, Colleen Bridget.

Retirements

Ronald J. Alton, a principal engineer in the Engineering and Technology Development Department, retired on October 1 after 11 years of service.

Richard Salm, a technical assistant for the TFTR Project, retired on September 1. Salm had been at PPPL for 18 years.

Harry Smith, a mechanical engineer in the Engineering and Technology Development Department, retired on October 1. He had worked at PPPL for 35 years.



A group of PPPL'ers who are retiring to move on to new challenges were honored last month during a reception in the LOB Commons. The honorees, from left, are Al Malone, Dick Newman, Pat Newman, Mike Candelori, Nick Dereka, Frank Holloway, Russ Wester, John Timberlake, George Bronner, Bob Gulay, Mike Capone, Bill Perseley, Ken Quadland, Bob Hoch, and Tom Lupich. Combined, they represent 367 years of service at the Laboratory. Good luck in your new pursuits!

It's not too late to sign up as a volunteer at the New Jersey Regional Competition of the National Science Bowl®, which will be held at PPPL on Saturday, February 24. If you can help, call Pam Lucas at ext. 3049.

Hotline

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

Employee Recognition Program Debuts This Month at PPPL

To honor those employees whose "personal qualities and professional achievements have significantly contributed to a productive and harmonious work environment," PPPL recently established the Employee Recognition Program.

"This program will recognize people who really stand out — those employees who not only do their jobs very well but make the working environment pleasant," said Phyllis Schwarz, past Chairperson of the Director's Advisory Committee on Women (DACW). "A key concept in

the design of this program is that nominations are open across all PPPL staff categories."

The DACW, along with the Lab's Quality Improvement and Renewal Committee, developed the program. In February, PPPL Director Ronald C. Davidson gave it his stamp of approval.

Said Davidson, "I applaud this important initiative by the DACW and the Quality Improvement and Renewal Committee. Recognition of outstanding professional achievements and personal qualities by one's

peers will have a very special value to the recipients."

Through the new program, several employees will be cited annually during an Employee Recognition Program ceremony. Those recognized will be selected from nominations submitted by other employees. Said DACW member Suzanne Homer, "The program is *for* the employees, *by* the employees."

A Review Committee representative of the diversified employee

Continued on page 3

Laboratory Consolidates Space

PPPL is on the move! In an effort to reduce costs, the Laboratory is bringing the majority of its staff under one roof.

"The objective is to save the Lab money by consolidating staff. This means that buildings and trailers will be closed as they are no longer needed," said Sara Flohr, who is coordinating the moves.

For instance, staff housed for the past several years in the New Guggenheim and Aero Lab buildings at B-Site moved to the LOB West building and to the Engineering Wing. This relocation task required the moving of some Engineering Wing em-

ployees prior to the addition of the B-Site staff.

In addition, Human Resources employees moved closer together, filling in vacant offices next to Human Resources Head Margaret Young.

Other moves include establishing a training room for Training and Certification in the former Duplication Center of the A corridor across from the Photo Lab. The Lab closed down the Training Trailer after the movers brought its contents to the new area. Other trailers closed down



Larry Jones, of PPPL, moves a desk out of one of the QA trailers.

Continued on page 2

Moving

Continued from page 1

include those next to the Firehouse, which house the Quality Assurance (QA) employees. All staff from QA moved to Mod VI, following some rearrangement of Support Services staff within the modular unit. According to Flohr, a computer hub serving the REML from one of the QA trailers will be relocated to REML, and this, along with the relocation of bunk beds to one of the medical examination rooms, allows the trailers to be completely shut-down.

Wave of Moves

The present wave of moves began in January and will continue at least until the end of this month, said Flohr, noting that so far more than 75 people have been moved.

The coordinator said the Lab's Space Inventory was updated following the reduction-in-force last fall. "Vacant and under-utilized space was color-coded on architectural drawings for each building at C-Site. Opportunities for consolidation were identified, and discussions were held with these groups to match their needs with available space," said Flohr.

She added that once all the groups affected by the move were notified of the plan, a "Who, Where, and When" schedule was released to everyone



PPPL'er Bob Cancel (left) and a temp clear office equipment out of one of the QA trailers during the recent moves.

involved, including the Computer Division and Telecommunications Office.

She lauded the Move Crew, which is headed by Gerry Hart and includes Bob Cancel, Ray Whitley, Larry Jones, and Walt Weyman, as well as subcontractors hired for the moving tasks. "Feedback from all the groups moved to date indicates they are very pleased with the handling of the moves by this crew," said Flohr.

John Schmidt, Head of Advanced Projects, reiterated the praise for the crew, which recently moved his group from B-Site to LOB West.

"It was really nicely done," said Schmidt.

Added QA Head Judy Malsbury, "I would like to compliment everyone on the great job moving Quality Assurance from our trailers to Mod VI. The move was well planned and went smoothly. Our 'downtimes' for the phones and computers were only about one hour when I expected a day. ... the movers were extremely cooperative and helpful, going out of their way to meet our needs." ●

[Move-related questions and suggestions should be e-mailed to Flohr at sflohr@pppl.gov]



HOTLINE

Editor: Carol Phillips
Writer: Patti Wieser
Photography: Dietmar Krause

Graphic Artist: Greg Czechowicz
Layout: Patti Wieser

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Recognition Program

Continued from page 1

levels at the Laboratory will review nominations and then award Certificates of Appreciation to selected nominees during the annual ceremony. All full-time PPPL staff at all levels are eligible for nomination.

Nomination forms will be distributed to all PPPL employees once a year. Nominations require a written description of the nominee's "humanistic and professional qualities that distinguish him/her from others at the Laboratory," according to the newly established policy on the program. Nominations for the year ending January, 1996, are due by Friday,

April 5, and should be sent to Phyllis Schwarz at LOB, B330. Forms were mailed to each employee at the Lab in early March. [The form below can be used for nominations.]

"It's a wonderful opportunity to give your neighbor — someone who works especially hard — a pat on the back," said DACW Chairperson Sue Hill. ●

NOMINATION FORM

EMPLOYEE RECOGNITION PROGRAM

Designed to demonstrate:

"appreciation and recognition of employees whose (combination of) personal qualities and professional achievements have significantly contributed to a productive and harmonious work environment at PPPL."*

Nomination for: _____

Description of award qualifications:

Signature: _____

Forward to Phyllis Schwarz, B330 by Friday, April 5, 1996

* Policy on Employee Recognition Program

PPPL Hosts 25 Science Bowl Teams

Millburn High School Takes Top Prize; Volunteers Make the Day a Success

Anticipation lingered in the air as the teens held their fingers close to the buttons in front of them, ready to buzz in.

"Physics; multiple choice: A junction between n-type and p-type regions in a semiconductor has the unique property that (a) its Fermi energy is zero; (b) it will superconduct at high temperatures; (c) it is a ferromagnetic region in a diamagnetic material; or (d) it will conduct current in only one direction," asked the moderator.

Red Button Flashed

A red button flashed in front of the first student to ring in, and the student was given the opportunity to answer the question.

Similar scenes took place across the Laboratory Saturday, February 24, as 25 New Jersey and Pennsylvania high school teams competed in the New Jersey Regional Competition of the sixth annual National Science Bowl®. Teams, each made up of four students, a student alternate, and a teacher who served as an advisor

and coach, answered multiple choice or short-answer questions in biology, chemistry, physics, astronomy, mathematics, and earth and computer sciences.

Academic Competition

The National Science Bowl® is a Department of Energy (DOE) sponsored tournament-style academic competition that challenges and recognizes students' knowledge of science and mathematics.

"It's nice because it's both educational and fun. We hope it encourages the brightest kids in the area to become interested in science," said PPPL's Bill Davis, who helped organize the event at the Lab.

The Millburn High School team took home the top prize, and as the 1996 New Jersey Regional winners, were given an all-expense paid trip to Washington, D.C., to participate in the National Science Bowl® beginning May 3, 1996.

The East Brunswick High School team garnered second place, with Christian Brothers Academy coming

up third. The top three teams received trophies, while all participating teams took home certificates. [See complete list of teams at end of article.]

"It's nice because it's both educational and fun. We hope it encourages the brightest kids in the area to become interested in science."

— Bill Davis

PPPL's Pamela Lucas, who coordinated the event for the Laboratory, said the day-long competition went smoothly, largely because of the volunteers. About 40 volunteers, including PPPL'ers and their friends and relatives, along with a handful of graduate students and Princeton University staff, helped out, serving as science judges, timekeepers, scorekeepers, and helpers.

Said Lucas, "Science Bowl is a lot of hard work, but I love it. The Science Education Program and the PPPL community come together to show our commitment to young people and provide them with a forum to be recognized for their hard work and talent in science and math."

Mixture of Fun and Challenges

Volunteers and participants alike characterized the Science Bowl as a mixture of fun and challenges.

Commented PPPL's Joseph Smith, a volunteer, "It's a worthwhile activity and a lot of fun — for both the volunteers and the students."



Members of the Watchung Hills Regional High School work out the answers to a question during the Science Bowl® competition.

Continued on page 5

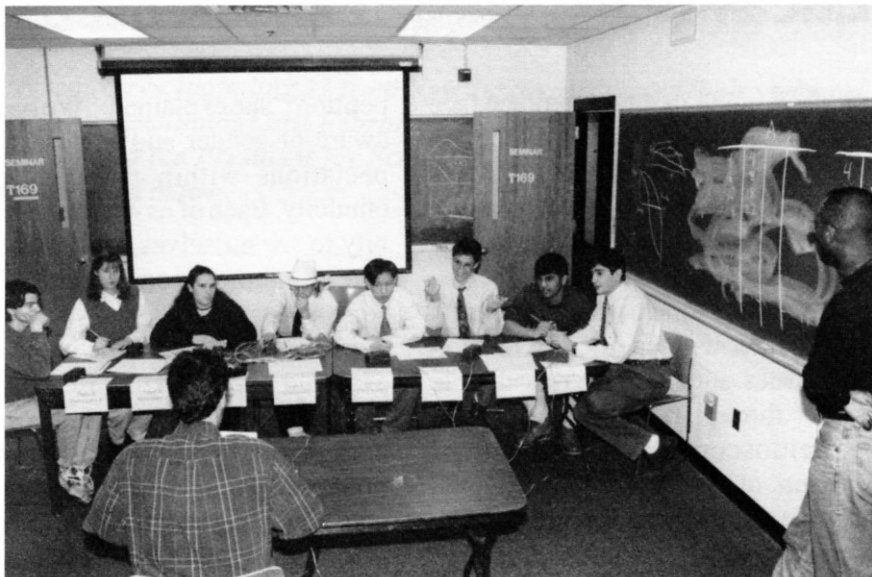
Bowl

Continued from page 4

South Brunswick High School student Adam Gordon, a participant for the second time this year in the Regional Science Bowl® at PPPL, said he came "because it covers areas in science we don't really learn in school and it's interesting to hear the questions and reason them [the answers] out."

Added Josh Feldman, also on the South Brunswick team, "It's a good challenge."

The following schools participated in the Regional Science Bowl® at PPPL: Bergen Catholic High School, Carteret High School, Christian Brothers Academy, Council Rock High School (Pennsylvania), East Brunswick High School, Governor Livingston Regional High School,



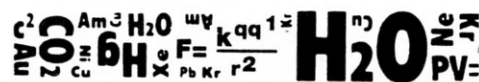
Two teams vied in PPPL's Theory Seminar Room during the New Jersey Regional Science Bowl®. At far right, volunteer Keith Harvest keeps score while Jim Rogers (at table, back to camera) reads the questions.

Highland Park High School, High Technology High School, Hightstown

High School, Hopewell Valley High School, Lawrence High School, McCorristin Catholic High School, Millburn High School, Neshaminy High School (Pennsylvania), New Brunswick High School, Old Bridge High School, Princeton Day School, Princeton High School, Seton Hall Preparatory School, South Brunswick High School, Stuart Country Day School, The Lawrenceville School, Watchung Hills Regional High School, West Windsor-Plainsboro High School, and Union High School. ●

Science Bowl Volunteers

Dwight Bashore	Tom McGeachen
John Bennevich	Jack Mervine
Kathy Borden	Bob Mika
Steve Cauffman	Tobin Munsat
Tamesha Chatman	Ihemba Mwamufiya
Sam Cohen	Meghan O'Connor
Bill Davis	Michael Richmond
Bruce Draine	Jim Rogers
Larry Dudek	Sue Rydera
Robert Ellis, III	Joe Smith
Mel Gensamer	Daren Stotler
Tom Gigney	Sean Strasburg
Keith Harvest	Marilee Thompson
Ron Hatcher	Diane Ward
Bob Heeter	Gerry Waters
Craig Helfgott	Patti Wieser
Patti Horan	John Wright
Frances Hunt	Student Volunteer Council,
Scott Larson	Princeton University
Xiaohu Li	National Society of Black
Zhihong Lin	Engineers, Princeton Chapter



I'M SCIENCE
SMART.



Lucas Takes Part in Kaleidoscope

Women in the workplace face a career barrier based on gender. For women of color, this barrier is two-pronged, with ethnicity joining gender in blocking career opportunities and advancement.

PPPL's Pamela Lucas recently joined other women of color in tackling issues surrounding this double barrier through a four-day seminar, "Kaleidoscope: A Gathering of Women of Color for Professional Growth and Empowerment." The group explored leadership issues that affect them relative to their own ethnic groups and others in the workplace.

Said Lucas, "Any discussion of the professional women of color must be a discussion of the twin barriers of ethnicity and gender on career opportunities. Women of color face double jeopardy. Perhaps nowhere is this position more strikingly illustrated than in the area of administration."

Fifty-four women, all of whom work in higher education, participated in the seminar held in San Diego late last year. Lucas, a Program Administrator in PPPL's Science Education Program, received a scholarship from the National Institute for Leadership Development (NILD) to attend the workshop, which was also sponsored by NILD. Her travel expenses were shared by the Director's Minority Advisory Committee (DMAC) and by Science Education.

The workshop participants included African American, Asian, Native American, and Latina women who had gathered to strengthen their own group connections and understand the commonalties and differences of other ethnic groups, said Lucas.

"Kaleidoscope encouraged the exploration of our feelings about power sharing, teamwork, and com-

petition," she explained. "We became aware of gender and leadership expectations within the context of ethnicity. Each of us had the opportunity to see ourselves within the context of another group's beliefs (i.e., stereotypes)."

Lucas noted that the group also explored coping skills used by professional women of various ethnic backgrounds, discussed organizational culture and politics, and shared personal experiences of discrimination. Participants were encouraged to frankly discuss stereotypes.

Painfully Honest Discussion

"Kaleidoscope provides a safe environment for painfully honest discussion about what it's like to be a 'double minority' in what continues to be a white male-dominated environment. Far from 'male-bashing' or a celebration of diversity, sessions focused on improving cross-cultural communication and recognizing prejudices and strengths within and among people of color," she said.

The program administrator commented that Kaleidoscope is different in that the group examined current research on ethnic/racial differences in leadership styles and discussed ways to promote inclusiveness and civil dialogue about diversity issues within each participant's own particular places of employment.

She noted that leadership issues are different for women than for men, and they are also different for women of color than for white women.

"Research has shown that women are not socialized to be leaders and unless women make a conscious effort to overcome early lessons and take charge of their own lives, their efforts to move into top levels of management will be frustrated," said Lucas. "Traditionally, both white



Pamela Lucas

women and women of color have been excluded from leadership positions on the basis of ascribed characteristics and their status as women. ... For example, assertiveness, competitiveness, and ambition are usually desirable administrative traits for men. Yet they are perceived as negative qualities when ascribed to women."

Lucas said these same attributes were used by other women of color at the workshop to describe African American women. "Various socialization patterns account for the behavioral patterns among women based on their ethnic groups. For example, Latina women have been socialized to hide their feelings. This can be confused with passiveness — a quality not identified with leadership," she said.

According to Lucas, workshop organizers view Kaleidoscope as a step toward organizational change by transforming a cadre of leaders within the organization.

"Downsizing, diversity, and dollars have forced new looks at leadership. Recognizing and capitalizing on diverse talents, successful organizations promote leaders who offer creative ways of handling new tasks and a new work force," said Lucas. ●

Congressional Representatives Support Fusion

Fifty members of the U.S. House of Representatives, including 11 from New Jersey, expressed their support for a strong U.S. program in fusion energy science and technology in a February 15, 1996, letter to Energy Secretary Hazel O'Leary and to John H. Gibbons, Assistant to the President for Science and Technology. Representatives from 16 states endorsed the letter, which is reprinted below.

Congress of the United States

House of Representatives

Washington, DC 20515

February 15, 1996

The Honorable Hazel O'Leary
Secretary of Energy
Forrestal Building
1000 Independence Ave SW
Washington, DC 20585

The Honorable John H. Gibbons
Assistant to the President for
Science and Technology
Office of Science and Technology Policy
Old Executive Office Building
17th St and Pennsylvania Ave NW
Washington, DC 20500

Dear Secretary O'Leary and Dr. Gibbons:

We are writing to express our support for a strong U.S. program in fusion energy science and technology. Specifically, we encourage the Administration to submit to Congress a recommendation of at least \$275 million for the Department of Energy's fusion energy program in the Fiscal Year 1997 budget.

As you know, the Department of Energy's Fusion Advisory Committee (FEAC) has recently completed a re-examination of the fusion program. The FEAC finds that cuts in the FY 1996 fusion budget effectively end U.S. leadership in this field at a time when there is tremendous progress and opportunity in fusion energy research. The report recommends that, by restructuring the Department of Energy's fusion program and providing a modest increase over the FY 1996 level, we can maintain our research strengths and thereby ensure our nation's active participation in international fusion energy development.

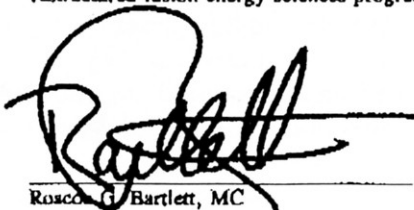
The FEAC report sets three policy goals for restructuring the fusion energy program which we believe Congress will support. These goals are to advance plasma science in pursuit of national science and technology goals; to develop fusion science, technology and plasma containment innovations as the central theme of the domestic program; and to pursue energy science and technology as a partner in the international effort.

Although we are all painfully aware of the severe budgetary constraints facing our nation, we must work to ensure that the U.S. fusion program is not reduced too deeply at a time when the fusion programs of other nations are growing and progress in fusion science and technology is accelerating. The U.S. must maintain a vital and competitive presence in this most fundamental area of science and this most promising energy technology.

Finally, we want to be clear that it is not our intent that other basic energy and science programs at the Department of Energy be deprived of funding to ensure necessary funding for the fusion program. Perceived competition for funding between science programs can only hurt the strength of U.S. science and technology initiatives.

Thank you for your consideration. We look forward to the Administration's strong support of a restructured fusion energy sciences program.

Sincerely,



Roscoe G. Bartlett, MC

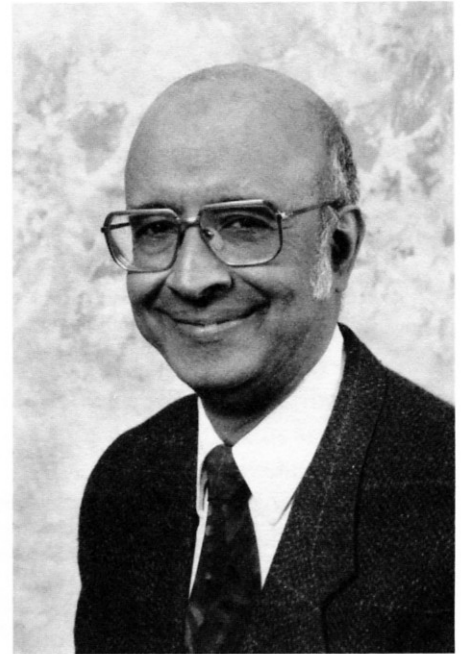


Tim Roemer, MC

What's Happening at PPPL

Annual Service Awards

The Annual Service Awards ceremony, which recognizes PPPL employees who have achieved a five-year milestone of employment during calendar year 1995, is scheduled for Friday, March 22, at 3 P.M. in the MBG Auditorium. Award recipients and their immediate supervisors are invited to attend.



Raki Ramakrishnan received a Master of Science in Engineering Management from the New Jersey Institute of Technology in January, 1996. Raki has been pursuing this program for the last three years on a part-time basis. Raki also has a Master of Science degree in Electrical Engineering and is a registered professional engineer in the states of New York and New Jersey. In 1986, he received the Industrial Certificate in Fusion Reactor Technology from Princeton.

TRANSITIONS

Births

Congratulations to **Rosemary Fuchs** of the Computer Division, and her husband, Chris, on the February 7 birth of their daughter, Briana.

Congratulations to **Ellen Riscoe** of the Security and Emergency Preparedness Division, and her husband, Tom, on the February 15 birth of their son, Daniel.

Best wishes to **Brent Stratton**, of TFTR Diagnostics, and his wife, Gayle, on the October 17 birth of their son, Oliver Clarke.

HOTLINE depends on you for tips and story ideas. Call ext. 2754 or 2757 with your suggestions.

In Memory

We are saddened by the loss of so many active and retired employees. We will miss the following: retiree **Lee Ellingham**, who died on December 23; employee **Juliann Jackson**, who died on March 4. Juliann had been on long-term disability; retiree **Melvin Shampagnier**, who died on February 23; retiree **Robert Sines**, who died on December 10; and retiree **Joseph Wood**, who died on February 27.

Hotline

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

Transforming CDX-U into New Experiment

In the reassembly activities going on this month, the Current Drive Experiment-Upgrade (CDX-U) is being transformed into a device in many ways prototypical of the National Spherical Tokamak Experiment (NSTX). NSTX is proposed as a national fusion project to be sited at PPPL.

"We are changing CDX-U into a high harmonic fast wave heating experiment," said Project Head Masayuki

Ono, who was also involved in the initial design of NSTX. "This is important for the NSTX project since it, too, will have a large amount of fast wave heating power." Fast wave heating appears to be one of the few viable ways to heat NSTX plasmas to a very high temperature, as well as to drive the plasma current — an essential element of a tokamak.

Continued on page 2



Frelinghuysen Vows Support

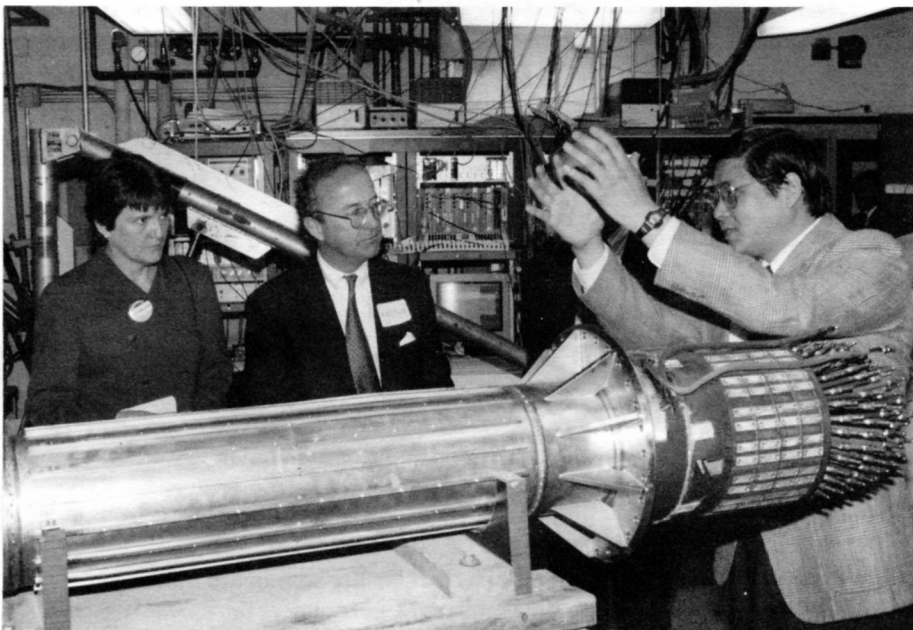
Calling PPPL a "truly remarkable place," Congressman Rodney Frelinghuysen vowed to continue his advocacy of the Laboratory and its fusion mission during a Wednesday, April 10, visit to the Lab.

"Let me salute each and every one of you for the work that you do," said Frelinghuysen, who addressed PPPL staff on the final leg of his visit.

Frelinghuysen, a Republican representing New Jersey's 11th Congressional District, has been one of the Laboratory's strongest supporters throughout the recent budget battle.

Said PPPL Director Ronald C. Davidson, "In October, 1995, through the persistent efforts of Representative Frelinghuysen, the House-Senate Conference Committee on Energy and Water added \$15 million above the House appropriations level

Continued on page 3



Discussing the CDX-U project are, from left, Geraldine Shannon, of Princeton University's Office of Government Affairs in Washington, D.C., Congressman Rodney Frelinghuysen, and Masayuki Ono. (See related story about Frelinghuysen's visit to PPPL on this page).

CDX-U

Continued from page 1

In 1994, CDX-U became the nation's first ohmically driven spherical tokamak. The plasma produced in the device more closely resembles a sphere with a hole through the center than a donut. Such plasmas are very compact and theories predict that these plasmas offer enhanced magnetic confinement and can produce substantial natural plasma current. Therefore, physicists believe that the spherical tokamak could lead to a more economical fusion reactor.

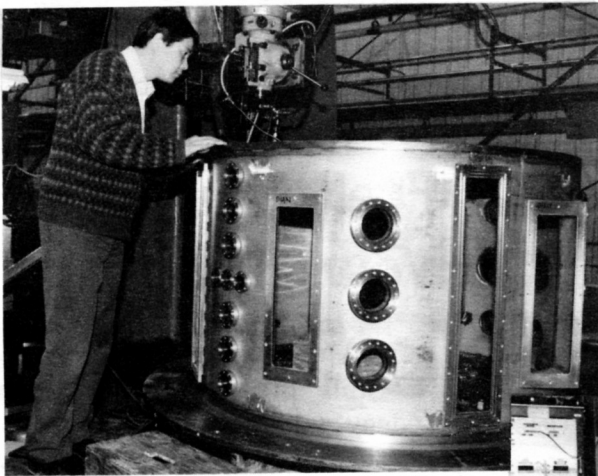
Ono said the conversion of CDX-U primarily entails replacing the outer vessel with a larger stainless steel chamber and making minor modifications to the top and bottom plates of the vessel. Because of the modularity of the device, a major change can be done quickly. CDX-U was taken apart in March and should be up and running again this month. "It's like a kit, composed of several different pieces that we can dismantle and put together again," said Ono.

The device is known for its versatility. Two years ago, it was taken apart and — with the addition of an ohmic heating coil in its center stack

— reassembled into a tokamak. But this is the first time a tokamak has been disassembled and reassembled in this manner. "As far as I know, no tokamak has done this kind of changeover in such a short time," said Ono, adding that he hopes NSTX will be similar in its adaptability to change.

"Innovative projects some times call for new hardware and new configuration," commented Ono.

The project team for dismantling and reassembling CDX-U includes Jon Menard, Jim Taylor, Wanho Choe, Dan Stutman, Ernest Lo, Josh Breslau, and Yong-Seok Hwang. ●



Clockwise, from left, CDX-U Head Masayuki Ono inspects the new stainless steel vacuum vessel, a major part of the upgrade; Robert "Red" Delany welds parts on the top flange; Ono stands in the CDX-U room that is temporarily vacant while the device is being converted.

HOTLINE

Editor: Carol Phillips
Writer: Patti Wieser
Photography: Dietmar Krause

Graphic Artist: Greg Czechowicz
Layout: Greg Czechowicz
Patti Wieser

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Frelinghuysen

Continued from page 1

for fusion. We are indebted to Representative Frelinghuysen for his extraordinary efforts on behalf of fusion and the Laboratory."

Davidson, along with Milton Johnson, Manager of the Department of Energy's Princeton Group, and Daniel Weitz, Westinghouse Science Talent Search finalist, met with Frelinghuysen before the Congressman toured TFTR and several small innovative projects at the Lab, including NSTX, MRX, CDX-U, and Plasma Processing.

His visit culminated in delivering remarks to PPPL staff at the MBG Auditorium. "In the short time I've been here, I have been most impressed by the individuals I have met. (PPPL) is truly a remarkable place," said Frelinghuysen.

He urged staff to "gear up" and educate this new Congress — and the general public — about fusion research. "You need to bring members of Congress here to see what's going on because while we talk about dollars, my view is that neither the administration nor the Congress is adequately providing for what you are focusing on."

He noted that Weitz, a student at Morristown High School who came in sixth nationally in the

Westinghouse Science Talent Search, has spent several summers at PPPL. "A lot of what he learned and of what he represents in terms of the future ... revolves around what he picked up here," said Frelinghuysen of Weitz's experience at the Lab.

The Representative urged PPPL to continue to reach

young people by providing them with similar opportunities and experience. "Physically being here and seeing the creativity will go a long way toward persuading Congress — and for that matter, the Administration — to take a closer look at what's going on," said Frelinghuysen.

He said PPPL's scientists must also get the word on fusion out to the general public. "Our fellow Americans have no physical knowledge of what's here (at PPPL)," said Frelinghuysen. "... As individuals, we have some responsibility to translate to our peers — and I mean outside of this room — and to capture their imagination about what you are doing."

He advised the research staff, as they write papers based on the

search data they collect, to communicate their work in "plain English" to the public at large. "As a layperson, I am coming away from here with a little bit of education and a lot of enthusiasm. There must be some way to translate that into the written word or, for that matter,



PPPL Director Ronald C. Davidson (right) pauses with Congressman Rodney Frelinghuysen in the Lobby.

through computer technology. ... We have to do it. It is absolutely imperative," said the Congressman.

Frelinghuysen promised to continue his advocacy of fusion research and said he hopes to bring other members of Congress to PPPL. "A lot of the members of my committee just don't have the familiarity with fusion. So I will double my efforts to educate them and do my best to bring them here," added Congressman Frelinghuysen, who is on the House Appropriations Subcommittee on Energy and Water Development.

**"Share the bounty of what you are doing with the general population. It's in your personal interest, but most importantly, it is in our national interest."
— Rep. Frelinghuysen**

He closed by reiterating the importance of reaching the public.

"Share the bounty of what you are doing with the general population. It's in your personal interest, but most importantly, it is in our national interest," Frelinghuysen said. ●



Daniel Weitz (left) discusses MRX with Congressman Rodney Frelinghuysen during the recent tour of the Lab.

Brown is Guest Speaker at Science Fair Ceremony

Area executives from nationally recognized research and technology institutions recently cleared a path to the podium for PPPL's Mary Ann Brown.

Brown was the guest speaker at the 43rd Mercer Science and Engineering Fair Awards Ceremony held at Rider University on March 12. The Engineers Club of Trenton, which sponsored the event, had invited Brown to speak at the ceremony that honored Mercer County grammar, middle, and high school students participating in the science fair.

PPPL Director Ronald C. Davidson said to Brown, "This is a terrific and well-deserved honor! We are very proud that you gave the welcome speech at the Mercer Science and Engineering Fair Awards Ceremony."

**"But win or lose, a project is a success when it demonstrates science can be fun and leaves the student transformed."
—Mary Ann Brown**

In her opening remarks, Brown welcomed students, teachers, parents, judges, and guests, thanking the students for entering their science projects.

"Science and engineering fairs have increasingly become part of the American scene. It is estimated over one million student projects are undertaken each year in the United States, and there are fairs in more than 20 other countries," said Brown.



Mary Ann Brown delivers remarks at the Mercer Science and Engineering Fair, which was held at Rider University in March.

Continuing, she said science fair projects range from collecting and analyzing data to constructing ingenious devices emphasizing experimental skills. Winning projects, she added, share the characteristics of originality, logical consistency, depth, and clear presentation.

"But win or lose, a project is a success when it demonstrates science can be fun and leaves the student transformed," said Brown, noting that she spoke from the experience of having had two sons enter this science fair every year from sixth grade through their senior years, culminating in both winning grand prizes. Both went on to the International Science and Engineering Fair, with one capturing three first-place awards.

Shaping National Goals

In closing, Brown encouraged this year's participants to think of their future roles in shaping national goals.

"Soon today's science fair participants will be empowered to help shape our national goals through their leadership and through the ballot box. One of these goals must be national

commitment to well-funded research programs — programs selected with vision and critical to continuing America's prosperity and security. Let us hope this is one small step toward that goal," she said.

Brown, who has been at PPPL since 1976, presently works for Michael Williams, Head of the Engineering and Technology Development Department. She said her children's involvement in Science Fairs over the years convinced her of their value to young people's career development in science and engineering. She is the mother of four grown children.

Supported Science Fairs

For the past 16 years, Brown has supported the Greater Mercer Science and Engineering Fair, the North Jersey Regional Science Fair, and the Student Exposition on Energy and Environmental Resources Science Fair by serving as a judge and presenting Corporate Awards on behalf of PPPL. Brown is also an Affiliate Council Member and Treasurer of the New Jersey Council on Energy and Environmental Education. ●

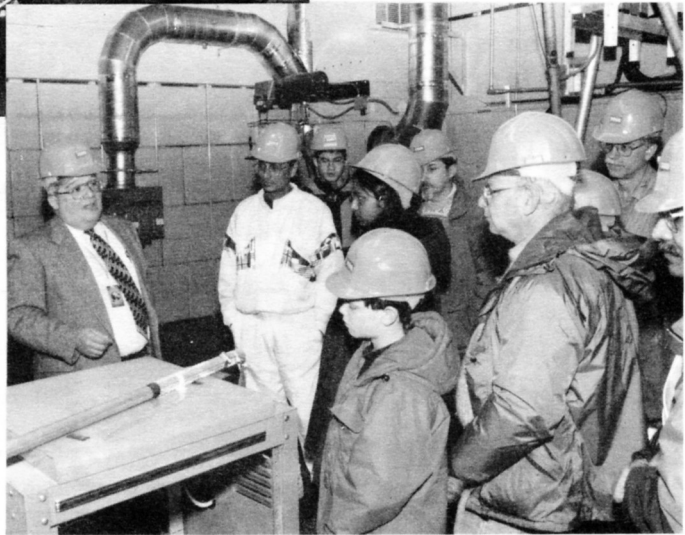


Mary Ann Brown congratulates Patrick Skinner, son of PPPL's Charles Skinner, on receiving an "outstanding achievement" certificate at the Mercer Science and Engineering Fair.

Science on Saturday Wraps Up; Group Tours TFTR



The Science on Saturday lecture series at the Lab this winter wrapped up with a March 23 talk by PPPL's Michael Bell titled, "Building a Stronger Magnetic Bottle to Control the Fusion Energy Genie." The 12-year-old series that kicks off each January is hosted by the Lab and is geared toward high school students but open to everyone in the community. The final lecture this year concluded with a tour of TFTR, which more than 200 people took. At top, Bell delivers his remarks on fusion at the MBG Auditorium. At right, Phil Heitzenroeder (far left) leads a group on the tour.



1996-1997 Holiday Schedule

For Administrative and Support Staffs, Professional Library, Research and Technical Staff members:

Independence Day	July 4	Thursday
Labor Day	September 2	Monday
Thanksgiving	November 28	Thursday
	November 29	Friday
Christmas	December 24	Tuesday
	December 25	Wednesday
New Year's	December 31	Tuesday
	January 1	Wednesday
Memorial Day	May 26	Monday
Optional Holidays		Two additional

Optional holidays may be used at the staff member's discretion and with the approval of the supervisor for religious holidays and any other personal reason.

Alternate holiday arrangements may be made by departments and offices such as the Library and Dining Services where work schedules or union contracts dictate other holiday schedules.

What's Happening at PPPL?



The Director's Minority Advisory Committee (DMAC) "Brown Bag" Lunch drew dozens of PPPL'ers to the Commons on Friday, March 15. From left are Linda Harmon, Pat Buggs, Zelda Gassaway, and Arlene White. The DMAC Committee organized the informal lunch to give employees an opportunity to exchange ideas with the group. Members of the committee are: Pat Buggs, Linda Harmon, Chairperson Ron Hatcher, Bob Kaita, Pamela Lucas, Erik Perry, Maria Pueyo, Raki Ramakrishnan, and Bob Tucker.

In Memory

Retiree Alfred G. Swain died on March 24. Swain had been a construction engineer at the Lab for 12 years, retiring in 1986. He will be remembered for the lovely roses he brought in frequently for PPPL's reception desk.

Thank You

My family and I want to express our thanks for all the flowers, fruit, and sympathy and mass cards we received following the loss of my husband. I would like to add a special thanks for all the hugs and kind words I received from so many at the Lab. Thank you again.

*—Jean Darazio
(Cafeteria)*

Classified



PPPL Director Ronald C. Davidson shows Ann McNeil (middle) and Geraldine Shannon around the Laboratory during a recent visit. Shannon works at Princeton University's Office of Government Affairs in Washington, D.C., and McNeil had been the Associate Director there.

For Sale: 1993 Dark green Dodge Dakota truck with extended cab; V6 automatic with two-wheel drive; loaded with extras; 18,000 miles. Asking \$12,700. Call Gene Baker at ext. 3231. After 6 P.M., call (609) 466-1152.

For Sale: Multi-room window unit air conditioner; 18,000 BTU; 220 volts. Good condition. \$150. Call J. Ignas at ext. 2673.

For Sale: Wolf Tanning Bed. Like new. \$1,000. Bamboo set with couch, two chairs, coffee table with glass top. Like new. \$700. Call Marilyn Hondorp at ext. 2656.

Take Our Daughters to Work Day

Employees are encouraged to assist the Laboratory in welcoming more than 40 girls who are visiting PPPL on Thursday, April 25, for "Take Our Daughters to Work" Day. Activities slated include mentoring, demonstrations, a speech, and a tour of TFTR. For more information contact Sue Hill at ext. 2227.

Annual Service Awards

About 150 employees were honored on Friday, March 22, during the 1995 Service Awards Ceremony at the MBG Auditorium. Honorees were recognized in the categories of five, ten, fifteen, twenty, twenty-five, thirty, thirty-five, and forty years of service at PPPL.

Said PPPL Director Ronald C. Davidson, "On behalf of the University and the Laboratory, I want to express our deep appreciation for your dedicated efforts during so many years of service."

Davidson noted that the past year has been a "difficult challenge" for the Laboratory, but said he was encouraged by the President's budget request for fusion in Fiscal Year 1997, which includes funds to operate TFTR and to begin construction of NSTX.

"This is a real measure of the Department of Energy's respect for the high quality of the staff and the numerous contributions to fusion science and technology made by PPPL over the years," said Davidson. "In short, it is a real tribute to all of your efforts, both recent and past, and a tribute to your ingenuity and the special skills that you bring to the Laboratory." ●

A decorative border of flowers and vines surrounds the text.

Communiversity '96 Welcomes Spring!

Communiversity '96, the annual spring celebration of the arts, will overflow the streets of downtown Princeton on Saturday, April 27, between noon and 4 P.M.

The event, which is sponsored by The Arts Council of Princeton and the students of Princeton University, will unite town and borough residents, students, merchants, nonprofit organizations, performing artists, visual artists, and crafters.

Attendants will stroll through exhibits of art work, crafts for sale, musical and dance performances, stop by "Bookseller's Row" or "Cafe Corner," and learn about local nonprofit organizations.

If you have any questions, call The Arts Council of Princeton at (609) 924-8777.

Rain date for this event: Sunday, April 28, from noon to 4 P.M.

A graphic of a rolled-up banner with the text "PPPL Employees Welcome!"

PPPL Employees Welcome!

Hotline

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

Davies Outlines OFES Program

Until recently, the fusion research road had been narrow — focused on one objective by a specific deadline. In short, it led to the operation of a demonstration fusion power plant by about 2025.

Now, because the money required to meet such a deadline is “quite different” from the budget reality, the path has been widened to accommodate a broader fusion program, according to N. Anne Davies, the Associate Director for the Office of Fusion Energy Sciences (OFES), U.S. Department of Energy.

“This broader program is aimed at science and innovation, and tied to energy and international work, especially ITER (the International Ther-

monuclear Experimental Reactor),” said Davies, who briefed PPPL staff about “The Restructured Fusion Energy Sciences Program” during a May 14 visit.

Davies said the restructuring retains a prominent place for PPPL as the national laboratory for fusion science. “They [the members of the Fusion Energy Advisory Committee] were clear it was this place — PPPL — because they recognize the tremendous value of the infrastructure here, both human and physical,” she said.

The Associate Director said the new mission for the restructured program is three-fold, entailing the advancement of plasma science, the

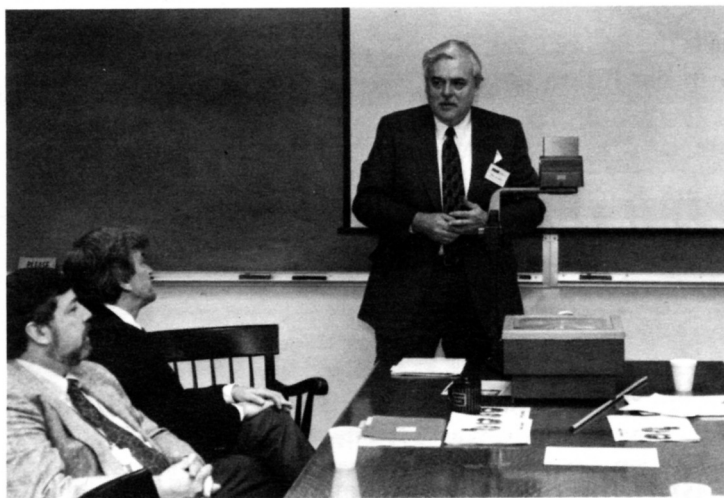


N. Anne Davies addresses PPPL staff.

development of fusion science and technology and plasma confinement innovations, and the continuation of

Continued on page 2

Local Politicians Visit Lab; Sign Letter of Support



Plainsboro Mayor Peter Cantu (standing) participates in the discussion among area government representatives and PPPL and DOE officials during the Breakfast Briefing at the Laboratory in April. At the far left is Jerry Faul, of the DOE Princeton Group, and in the middle is PPPL Director Ronald C. Davidson.

Area municipal and county officials visited the Laboratory on April 23 for a “Breakfast Briefing,” which included a discussion about the present funding and staffing levels at PPPL and their impact on the local economy. This visit concluded with a tour of TFTR.

Plainsboro Mayor Peter Cantu, who attended the briefing, sponsored a letter from the local officials to the chairmen of the House Appropriations Committee and the House Science Committee in support of PPPL and fusion energy research. The letter stated, in part, “...We strongly endorse a fully funded U.S. program in fusion energy science and technology — specifically a \$255.6 million appropriation for the Fiscal Year 1997 budget.” In addition to Mayor Cantu, representatives from Mercer, Middlesex, and Somerset Counties, Princeton Borough, Princeton Township, West Windsor Township, and South Brunswick Township signed the letter. ●

Davies

Continued from page 1

the efforts toward developing fusion energy science and technology through international collaborations, in particular on ITER. "[We must] do it with an eye toward how this will ultimately provide and contribute to the knowledge base for fusion energy, recognizing its potential for the nation and the world," said Davies.

She also noted that since the U.S. — unlike Japan and Europe — does not have a driving need for new energy sources, America's development of fusion energy will not be on a time scale.

Davies summarized the ten principles for the restructured program that were developed by FEAC. These include (1) focus on science, (2) keeping the energy goal, (3) being reliable as an international partner, (4) being complementary to the international effort, (5) having leadership in selected areas, (6) striving for scientific excellence, (7) maintaining a balance of facilities (small, medium, and large-scale), (8) recognizing the importance of a national laboratory for fusion science, (9) recognizing the need for education and human resources, and (10) having a diversity of participation.

The response to the FEAC recommendations is to first focus on innovations and science, said Davies, who addressed a full auditorium at PPPL. "We are already working with

other areas of the government and the department to develop a university-based plasma science initiative."

For the tokamak experiments, OFES is setting priorities among tokamak physics issues and using those facilities accordingly, said Davies. In addition, the Office is enhancing existing and beginning new small- and medium-scale alternative concepts experiments to complement tokamak physics, as well as enhancing theory and modeling research.

Plans further call for allowing the highest-priority scientific opportunities on TFTR to be exploited before terminating its operation during FY 1998 to free up funds for other science issues.

But while the TFTR program is concluding, \$5 million for fiscal year 1997 has been requested to begin building the National Spherical Tokamak Experiment (NSTX) at PPPL using the PLT base and space and various hardware from other experiments here at the Lab. The NSTX will be built as a national experiment in collaboration with various universities across the nation.

Davies, noting that her lunch meeting at PPPL revolved around plans for NSTX and the accomplishments on TFTR, thanked the staff for its dedication and professionalism during what she described as "turbulent times." "This is the bedrock science that we do in the fusion program. Without it there is no fusion program," she said. ●

DOE Princeton "ReGroup"

Taking part in a larger Department of Energy (DOE) effort to downsize, the DOE's Princeton Group has trimmed its staff from 19 to 15.

"We made a conscious decision not to replace anybody who left," said Milton Johnson, the most recent to transfer out of the Princeton Group. This month, Johnson, who had been Manager of the Princeton Group, becomes the Deputy Associate Director of the DOE's Office of Fusion Energy Sciences (OFES) in Germantown, Maryland, as well as the Director of OFES's Technology Division.

Down to 15

"The Princeton Group peaked at 19 employees during the period of most intense activity, the TFTR deuterium-tritium preparation period and TPX. With me leaving, the group goes down to 15," said Johnson. Jerry Faul is presently the Acting Manager of the Princeton Group.

Johnson said any vacated positions will not be filled as employees leave until the Department knows where the fusion program is headed and what role PPPL will have in the restructured Fusion Energy Sciences Program and the required needs of

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HOTLINE

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Layout: Greg Czechowicz
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DOE

Continued from page 2

the on-site staff. "We may shrink more, depending on the goals of the Lab in the future," he added.

Johnson said the DOE, as part of a Strategic Alignment Initiative, established a goal to reduce its staff by one-third. This shrinkage is expected to occur predominantly in the DOE

Headquarters rather than in field personnel numbers. He noted that the Chicago Office has already met its goals through 1998 through attrition and retirements.

The OFES, which had been called the Office of Fusion Energy, is being restructured following the Fusion Energy Advisory Committee Review. It has already dropped in number from 43 to 39. "Our hope is to go

down to 29 by the end of the next fiscal year," said Johnson.

Despite the downsizing, Johnson said one of his goals as Deputy Associate Director for OFES is to foster a stronger working relationship between the Princeton Group and the fusion group in Washington, D.C. "I intend to encourage the two groups to interact more with one another," he said. ●

Occupancy Sensors Move Into the Laboratory

Motion Detectors' Magic Saves Money ... Conserves Energy

Enter a room. Voila! It brightens. Exit. Eight minutes pass and presto! Lights out.

The *magic* that is being installed throughout most of the Laboratory beginning this month consists of occupancy sensors, also called motion detectors. The sensors turn off the lights anytime a room is unoccupied for approximately eight minutes.

"We're installing the sensors in all areas that are offices, cubicles, copier rooms and conference rooms," said Tom McGeachen, PPPL Project Engineer. Excluded areas include labs and shops. If funds remain when the first targeted areas at PPPL receive sensors, the units will be added to Module VI and to Facilities and Environmental Management (F&EM).

"This will save the Lab approximately \$14,000 a year in electricity costs."

—Tom McGeachen

"This will save the Lab approximately \$14,000 a year in electricity costs. That's 169,160 kilowatt hours a year in lighting savings, with an additional 30,754 kilowatt hours



Holding occupancy sensors are, from left, Tom McGeachen, J.W. Anderson, and Carl Potensky.

saved by reduced cooling loads," said McGeachen. The estimated average reduction in the electrical site demand is 200 kilowatts, which is approximately 2.5 percent of the non-experimental site electrical demand.

Installation of 464 Units

The project, which is funded by In-House Energy Management, a division of the Department of Energy (DOE), entails the installation of 464 units that are ultrasonic motion detectors. DOE facilities already using these sensors include DOE Headquarters (350 units), Lawrence Livermore National Laboratory (1,500 units), Oak Ridge National

Laboratory (400 units), Lawrence Berkeley National Laboratory (3,000 units), and Pantex (300).

The project at PPPL is expected to take seven weeks to complete, with individual office installations taking just 30 minutes apiece. In each office, installers will do the following: isolate the power to the lights; lock out the circuit breaker; install the sensor motion; restore the power; and check the operation of the unit. The benefits of the reduced cooling load is expected to be accrued this summer.

Previously, 20 units were installed on a trial basis for one year. During a period of adjustment, employees familiarized themselves with the operation of the units. The units continue to work well and save PPPL electrical costs.

McGeachen noted that following the addition of an occupancy sensor, two-circuit offices will continue to have two circuits, an energy saving option already in place in many offices. "If you have two light switches, you will still have two levels of lighting after the installation. There will be a selector for one row of lights, as well as one for all the rows," he explained. ●

[For more information, please call Tom McGeachen at ext. 2948.]

PPPL's Towner ... to the Rescue

When PPPL's Harry Towner gets a beeper call, it can land him on the roof of a multi-story building, in the middle of a car crash scene, or at the home of an injured or ill area resident.

Towner finds himself in the middle of such scenes as a volunteer on the Plainsboro Rescue Squad.

"This is a way of serving the community. It is neighbor helping neighbor," said Towner, who responds to about 200 emergency calls annually.

Towner, Head of General Purpose Operations and User Support Branch in the Computer Systems Division, is presently serving his third year as the captain of the rescue squad. He has also been its president, lieutenant, and trustee.

Inspired by Wife

The 14-year volunteer said he was inspired to join by his wife, Linda, now a former squad member. And the couple is passing the tradition on to their children.

"All three kids grew up with the rescue squad," said Towner. Presently, the couple's 18-year-old son is an Emergency Medical Technician (EMT) and their 16-year-old daughter just became a cadet, accompanying a three-member rescue team on calls. "We ride together on Friday nights," said Towner of his two children on the squad and himself.

The volunteer members cover the nighttime and weekend hours, which are not covered by the paid daytime crew. Each volunteer is "on call" four weekend days every three months in addition to being assigned weekly nighttime on-call shifts.

Calls to the volunteers, who all wear pagers, can come at any time. "You just put your fork down at the

dinner table, throw on a jacket, and go," said Towner, describing his actions if he gets beeped at dinner time. "Thank goodness I have an understanding wife."

Typical emergencies include pedestrians struck by a car when crossing a street, heart attack victims, or people who have cut themselves. Sometimes emergency responses involve additional efforts to reach accident victims, such as the time a man fell off a ladder while on the roof of a multi-story building.

"We had to climb up a ladder to get to him, pull up the equipment, and then splint his legs and lower him down in a basket," recalled Towner.

While squad members can give basic life support at the scene, they leave the dispensing of medications to a paramedic.

"If a person has chest pains or is in a serious motor vehicle accident, the dispatcher calls a county paramedic unit to meet the rescue squad at the scene," Towner noted.

Towner, who completed EMT and CPR training to become a member of the crew, keeps up-to-date with course training and certification. In addition, he has taken courses on extrication, on hazardous materials, and on multi-casualty situations. "Eight days a year I am out for training in addition to the regular squad and crew drills," said the volunteer.

Valuable Role in Community

He said the rescue squad plays a valuable role in the community, adding that many victims would not have survived if the squad had not responded.

Volunteers are equally rewarded. "The best way of ever getting thanks is being in the emergency room with a patient we have brought in and



Harry Towner prepares for duty as a Rescue Squad volunteer.

having him extend his hand to thank you," said Towner.

Towner noted that the Plainsboro Rescue Squad and the PPPL Emergency Services Unit (ESU) — of which he is also a volunteer member — act as back-up for one another in what he describes as "mutual aid." In the early 1980s, PPPL would send some members to assist with Plainsboro's daytime calls. A special thanks goes to Jim Chrzanowski, Mark Cropper, Jerry Faul, Scott Larson, Gregg Tompkins, and Sylvester "Bubba" Vinson, for a job well done in assisting the Plainsboro Rescue Squad.

Among other calls, Towner remembered responding to a fire at PPPL's cooling tower on a hot, humid summer day. The Lab's ESU was busy fighting the fire and the Plainsboro Rescue Squad responded with ambulances and full crews. Fortunately, no one was seriously injured, but about five people who were suffering from mild heat exhaustion had to be transported to the hospital.

"We're all in this to help each other out," said Towner. ●

TRANSITIONS

Births

Congratulations to **Robert Sheneman**, of the Facilities and Environmental Management (F&EM) Division's ERWM Branch, and his wife, Margaret, on the February 24 birth of their son, Andrew John.

Retirements

Dominic Bisanzio, an Operations Supervisor in F&EM, retired on November 1. Bisanzio had been at the Lab for 23 years.

Peter J. DePeter, a Technical Associate for PBX-M, retired on April 1. He had been at PPPL for 21 years.

Mykola Nick Dereka, a Master Instrument Maker in the Engineering and Technology Development Department (ETDD), retired on November 1 after 16 years of service.

Alex DeSantis, a Facility Manager in F&EM, retired on April 1. He had been at PPPL for 10 years.

Hector Morales, a Tech Welder in ETDD, retired on October 1. Morales had been at PPPL for 25 years.

Patricia Newman, a Senior Secretary for the Occupational Medicine Department, retired on November 1. Newman had been at the Laboratory for 11 years.

Richard Newman, a Neutral Beam Operations Engineer for the TFTR Project, retired on March 31. He had been at the Laboratory for 23 years.

Ron Pullem, Planning and Control Officer for the TFTR Project, retired on April 1. He had been at the Lab for 13 years.

Kenneth Quadland, a General Mechanic for F&EM, retired on November 1 after 21 years of service.

William Rauch, an Electrical Engineer in the Computer Systems Division, retired on May 1 after 18 years of service.

Peter Rogoff, a Senior Engineer in ETDD, retired on November 1. Rogoff had been at PPPL for 19 years.

Steven Stjepko Sesnic, a Principal Research Physicist, retired on April 30. Sesnic had been at PPPL for 14 years.

Rosemary Shangle-Johnson, an Administrative Supervisor in the Emergency Preparedness Division, retired on October 1. She had been at the Lab for 20 years.

Silas Snead, Coordinator/Inspector for Transportation, retired on May 1. Snead had been at the Laboratory for 37 years.



Margaret Young retired this month as Head of PPPL's Human Resources. Young, a member of PPPL Council, came to the Lab four years ago after serving as Director of Employment and then Director of Compensation at Princeton University. Her retirement plans include enjoying time on the water with her husband, who also recently retired. Happy sailing, Margaret!



Milton Johnson recently left his post as Manager of the Department of Energy's Princeton Group to become the Deputy Associate Director of the Office of Fusion Energy Sciences (OFES), as well as the Director of the OFES's Technology Division. Milt joined the OFES office, which is in Germantown, Maryland, on May 13. He had been at PPPL since 1980, first as Chief of the Engineering and Physics Branch of the DOE's Princeton Area Office (now the Princeton Group), and then as Assistant Manager of the Princeton Area Office before becoming Manager. Best of luck, Milt!



PPPL Family Picnic Slated for June 15

Mark your calendars! The PPPL Family Picnic is scheduled for Saturday, June 15, from noon to 4 P.M. at the PPPL Grounds. To buy tickets (\$5 for adults and \$2 for children), contact Joanne Bianco, Mod VI, ext. 3380; Sallie Citrolo, LOB B-354, ext. 3379; or Dawn Horner, Mod II, ext. 2658.

Send your HOTLINE suggestions to Carol Phillips in LOB B-378 or to Patti Wieser in LOB B-366.

Take Our Daughters to Work Day Draws Crowd



Sue Hill (far right), Chairperson of PPPL's Director's Advisory Committee on Women (DACW), welcomes the girls who came to the Laboratory for Take Our Daughters to Work Day on Thursday, April 25. More than 40 girls participated in the day, which was a DACW activity that included demonstrations, a tour of PPPL, and hands-on learning with mentors.



PPPL's Virginia Finley holds a flow meter probe in the basin discharge while Jill Mansfield (left), daughter of Dennis Mansfield, and Ashley Taylor (middle), daughter of Jim Taylor, read and record flow for how many gallons per minute were being discharged. Later, the three calculated that a total of 429,800 gallons would flow from the basin on that day and then saved this data on Finley's spreadsheet, which is used to report flow to the Department of Environmental Protection each month.



PPPL physicist Cynthia Phillips addresses a group of girls.



Sabrina Chrzanowski, daughter of Jim Chrzanowski, focuses an image on the enlarger in the Photo Lab. Sabrina and Heidi Fuchs accompanied mentor Dietmar Krause on his photo shoots at the Lab.

Photos by Sabrina Chrzanowski, Heidi Fuchs, and Dietmar Krause



Bobbie Forcier, of Human Resources, works on the computer with Caroline Bernabei, daughter of Stefano Bernabei.



PPPL industrial hygienist Jill Kwiatkowski places a respirator on one of the girls during a demonstration of personal protective equipment. Respirators protect workers from inhaling hazardous gases, dusts, and vapors.



PPPL's Vic Garzotto pours liquid nitrogen on the top of a filled balloon, which liquefies the air inside and collapses the balloon into the Dewar. When the balloon is removed from the Dewar, the nitrogen in the balloon warms up and reinflates the balloon, returning it to a normal filled state.

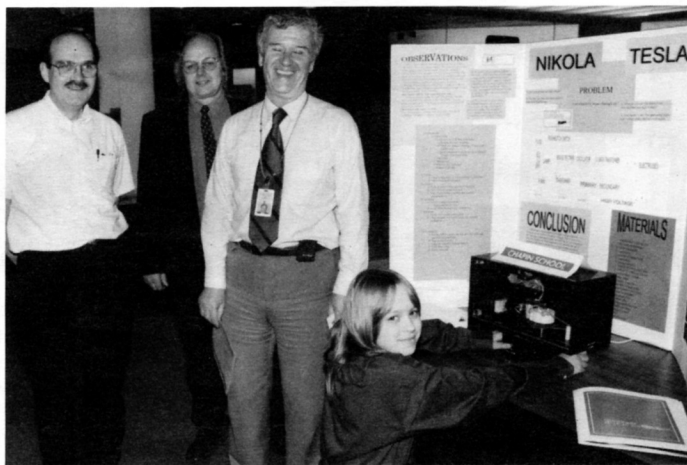


PPPL's Jim Kamperschroer pours liquid nitrogen onto a table as a group of girls watch the liquid turn into beads that boil on contact with the table and glide frictionless on a cushion of nitrogen gas. Behind and to the right of Kamperschroer is his daughter, Amy. Kamperschroer, Ray Camp, and Vic Garzotto gave demonstrations in the Commons during Take Our Daughters to Work Day.

What's Happening at PPPL?



PPPL staff and TFTR employees were each given Recognition Awards for their "outstanding performance" for safety in 1995 through the 68th Annual Governor's Occupational Safety and Health Awards Program. In photo at right, PPPL Director Ronald C. Davidson (right) shakes hands with TFTR Project Head Richard Hawryluk, who also heads the Tokamak Confinement Systems Department, and in photo at left, Davidson (left) presents the staff award plaque to Jack Mount.



PPPL's Science Fair winners displayed their award-winning projects on April 30 in the LOB Lobby. As part of a day-long visit, the winners, who are students who had participated in the Cranbury Science Fair, the Mercer Science and Engineering Fair, or the North Jersey Regional Science Fair, exhibited and discussed their projects with Lab staff. From left are PPPL'er Kevin McGuire, Ivan Sednef (father of a Science Fair winner), PPPL'er Aleksandar Ilic, and Science Fair winner Ffolks Sednef, who explained his project on the Nikola Tesla Coil. The Science Fair takes place annually at the Lab and is hosted by Mary Ann Brown.

Classified

For Sale: Organ manufactured by Hammond, model Cadette/V-322. Many features. Very good condition. \$125 or best offer. Call M. Awad at ext. 2345.

For Sale: Macintosh IIsi computer with 9M RAM, 80MB hard drive, 330 MB external hard drive, 13" hi res monitor, extended keyboard, mouse, and 14,400 baud modem. \$750 or best offer. Call Bill Slavin at ext. 2533.

Hotline

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

Negotiations Begin on New Contract

By Anthony DeMeo

On May 2, Secretary of Energy Hazel O'Leary agreed to enter into negotiations to extend Princeton University's contract with the U.S. Department of Energy (DOE) for the operation of PPPL through September 30, 2001. "Secretary O'Leary's decision is very good news for PPPL. It is the result of the Laboratory's excellent programmatic accomplishments and effectiveness in management," noted PPPL Director Ronald C. Davidson. The University's current five-year contract to operate PPPL expires on September 30, 1996.

New Contract

During the second week of May, the DOE gave the University a model contract for the extension. This draft incorporates fundamental changes in compliance with DOE's contract reform initiative. According to Jerry Faul, Acting Manager of the DOE



The negotiating team, from left, are (seated) Ed Winkler, Steve Iverson, Dale Meade, Howard Ende, June Wiinikka, and Marlene Martinez; and (standing) Joan Shands, Jeff Hoy, Jerry Faul, and Al Sinisgalli. Not pictured is Christopher McCrudden.

Princeton Group, who is leading the DOE negotiating team, "The model reflects the Department of Energy's current views on contract reform, as

well as other regulatory changes, and is being used as the basis for negotiations with the University. One of the

Continued on page 3

1996 PPPL Distinguished Fellows Honored

By Patti Wieser

Recognizing their excellence in research and in engineering, the Laboratory recently named two physicists and two engineers as the PPPL Distinguished Fellows for 1996. The Distinguished Research Fellows are Chio Z. "Frank" Cheng and Stewart Zweben and the Distinguished Engineering Fellows are Philip Heitzen-

roeder and Robert Woolley. The recipients were honored during a formal ceremony on June 7 at PPPL.

Said PPPL Director Ronald C. Davidson, "I wish our new Research Fellows and Engineering Fellows continued success in their very important work. Through their extraordinary accomplishments, the recipi-

ents bring great distinction to the Laboratory and Princeton University."

The Distinguished Research Fellow Program, which is funded by the U.S. Department of Energy (DOE), was created in 1993 to recognize

Continued on page 2

Fellows

Continued from page 1

members of the Laboratory's Research Staff. Fellowships are awarded to those who have achieved extraordinary records of creativity and accomplishments in research over an extended period of time. The Distinguished Engineering Fellow Program was created in 1995 to honor members of the engineering and scientific staff who have achieved outstanding records of innovation and accomplishment in engineering over an extended period of time. This year's Engineering Fellows are the first to be awarded through the program. Fellows receive one-time gifts of \$5,000 and qualify for priority in regard to their research and engineering programs.

The Distinguished Research Fellows, Cheng and Zweben, were cited for their "excellence in theoretical and experimental plasma physics research at PPPL."

Cheng, a Principal Research Physicist and Head of PPPL's Space Plasma Physics, was honored "for outstanding contributions to the theory of the interaction of high energy particles and magnetohydrodynamic modes, such as the Fishbone and the Toroidal Alfvén Eigenmode, and for important contributions to magnetospheric physics."

Cheng received a bachelor's degree in physics from the National Cheng-Kung University in Taiwan



The PPPL Distinguished Fellows for 1996 are, from left, Chio "Frank" Cheng, Stewart Zweben, Philip Heitzenroeder, and Robert Woolley.

in 1969 and a Ph.D. in physics from the University of Iowa in 1975 before coming to PPPL. He has been a member of the Laboratory's research staff since 1975.

During the presentation ceremony, Davidson said, "Frank is one of the world's leading theoretical experts on energetic particle effects and MHD (magnetohydrodynamic) modes, with applications to laboratory and space plasmas."

The citation for Zweben, a Principal Research Physicist, recognized him "for pioneering investigations of the physics of alpha particle effects on fusion plasmas including direct measurements of escaping charged fusion products leading to identification of several loss mechanisms including first orbit loss, stochastic to-

roidal field ripple loss, and MHD induced loss."

Zweben, who received a bachelor's degree in physics from the State University of New York at Stony Brook in 1972 and a Ph.D. in physics from Cornell University in 1977, came to PPPL in 1984.

Davidson said, "Stewart is one of the world's leading experimental plasma physicists, with extensive experience in fluctuation measurements and analysis, and in nuclear particle measurements and analysis."

The two Distinguished Engineering Fellows, Heitzenroeder and Woolley, were recognized for their excellence in engineering at PPPL. Deputy Director Dale Meade, who

Continued on page 3

HOTLINE

Editor: Carol Phillips
Writer: Patti Wieser
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Patti Wieser

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Fellows

Continued from page 2

presented the Engineering Fellowship plaques, said, "The recent accomplishments on the Tokamak Fusion Test Reactor are a tribute to the engineering efforts at PPPL. Without our engineering capabilities, we would not be able to reach our goals."

Heitzenroeder, a Principal Engineer and Head of the Design and Analysis Division, was cited "for many contributions to the development of fusion technology and advanced tokamak design. Mr. Heitzenroeder's technical leadership of design and fabrication efforts for magnets, vacuum chambers, plasma-facing components and remote handling equipment has contributed to advancing the state-of-the-art of these critical fusion technologies."

Heitzenroeder, a member of the engineering and scientific staff at PPPL since 1972, received a bachelor's degree in mechanical engineering from the New Jersey Institute of

Technology in 1969. While presenting the citation, Meade said, "Phil has been a major contributor to the Laboratory's engineering activities since 1972, and his outstanding technical capabilities and creativity span the full range from design, to research and development, to fabrication."

Woolley, a Principal Engineer and Head of TFTR Systems Engineering, Tokamak Operations, was honored "for contribution to the startup testing and extended operation of the Tokamak Fusion Test Reactor. Mr. Woolley's broad knowledge of power supplies and protection circuitry as well as technical leadership of upgrade activities have enabled the magnets to operate at or beyond the original engineering design specifications."

Woolley, who came to PPPL in 1976, received a bachelor's degree in electrical engineering from Lehigh University in 1969 and a master's in electrical engineering from George Washington University in 1973.

Said Meade of Woolley, "Bob has demonstrated outstanding creativity in diverse areas ranging from integrated systems testing, to optimized control systems, to advanced tokamak design."

Fellows Form Councils

Approximately ten PPPL Distinguished Research Fellows and five Engineering Fellows are expected to be appointed by the end of the decade. Five Research Fellows have been named at the Laboratory since the program was established in 1994. They are Russell Hulse, Masayuki Ono, James Strachan, Roscoe White, and Michael Zarnstorff. Fellows are expected to devote most of their time to active research and engineering activities. The Research and Engineering Fellows form the Distinguished Research Fellow Council and the Distinguished Engineering Fellow Council, respectively, which advise the Director on the scientific and engineering direction of the Laboratory. ●

Contract

Continued from page 1

primary goals of contract reform is to improve efficiency and thereby reduce costs, both for the Laboratory and the DOE."

Negotiations Now Underway

In addition to Faul, the DOE negotiating team includes June Wiinikka, Contract Specialist; Joan M. Shands, DOE Counsel; Marlene Martinez, DOE Chicago Office; and Jeff Hoy, DOE Germantown Office. Princeton University's team is led by Al Sinisgalli, Director of the Office of Research and Projects Administration, and includes Howard S. Ende, General Counsel; Christopher McCrudden, Associate Treasurer and Director of Finance; Dale Meade,

PPPL Deputy Director; Ed Winkler, Head of the PPPL Office of Resource Management; and Steve Iverson, Head of PPPL Human Resources and Administration.

The negotiations will involve a significant number of revised contract language issues pertaining to the use of performance measures, financial incentives, and liability issues. To prepare for the sessions, which began on May 16, the Princeton team has been reviewing the contract to gain an understanding of the changes and their potential impact on the Lab. "Princeton is not the first DOE contractor to negotiate a new contract since the reform measures were instituted. Over the past few years, we have kept ourselves informed of the progress made in the successful development of DOE con-

tracts with places such as Argonne and Brookhaven National Laboratories and the Continuous Electron Beam Accelerator Facility," said Steve Iverson. "Nevertheless, the University and DOE teams will face more than a few challenges in ironing out the new contract terms."

Opportunities for PPPL

Davidson said, "Aspects of the DOE contract reform initiative now being incorporated in the new contract would provide PPPL with unique opportunities for improved efficiency and greater self-determination, with less direct DOE oversight. But much work needs to be done between now and September to complete negotiations and arrive at a new contract agreeable to both parties. This is a formidable challenge." ●

Annual Patent Dinner Recognizes PPPL Inventors

By Patti Wieser

When it comes to ingenuity, there's no time like the present.

"Now is the time for inventions," said PPPL Deputy Director Dale Meade, who urged inventors at the Patent Awareness Dinner to continue their creativity in both fusion and non-fusion areas.

The Laboratory honored twenty-nine PPPL inventors for Fiscal Year 1995 during the dinner held in May at Princeton University's Prospect House.

Meade, who delivered remarks along with PPPL Committee on Inventions member Ken Young, extended congratulations to the honorees from PPPL Director Ronald C. Davidson.

In a congratulatory message, Davidson said, "The innovative concepts embodied in your inventions and patents are at the very intellectual heart of the Laboratory's core competencies in plasma science and technology."

Meade, noting that the Laboratory supports inventions in both fusion and non-fusion areas, said those related to fusion reflect PPPL's progress in its mission. "In some of these cases, the inventions were a necessity for moving forward and establishing our goal to provide a new energy source for the 21st century," said the Deputy Director.

Meade closed by challenging inventors and non-inventors alike to take in the spirit of creativity. "I want to remind everyone that now is the time."

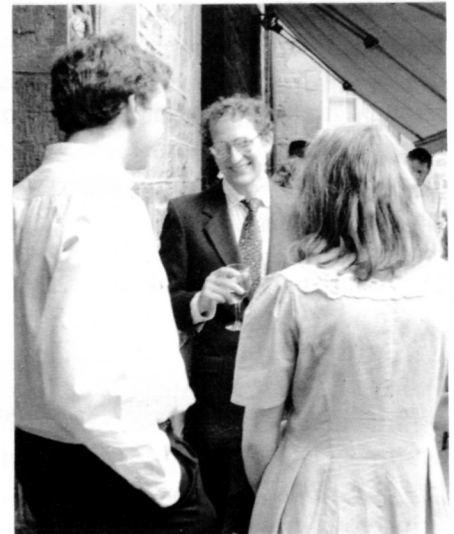
The Patent Committee on Inventions for 1995 included Peter Bonanos, Marilyn Hondorp, Steve Jardin, John Johnson, Dale Meade, Lewis Meixler, Schweick von Goeler, and Ken Young. ●



From left are Annie, Ana, and Ned Sauthoff, Anne Young, and PPPL Deputy Director Dale Meade.



PPPL Technology Transfer Head Lewis Meixler (right) converses with Princeton University's Jean Mahoney.



Nathaniel Fisch (middle) chats with Mark and Kim Herrmann (backs to camera).



PPPL's Stephen Paul poses with family members. From left are Paul's father-in-law, Martin Gen; his mother, Bernice Paul; his wife, Gilda Paul; Paul; his father, Sy Paul; and his mother-in-law, Sara Gen.



From left are Jan Wioncek and Mary and John Desandro.



Mr. and Mrs. Edward Nartowitz.



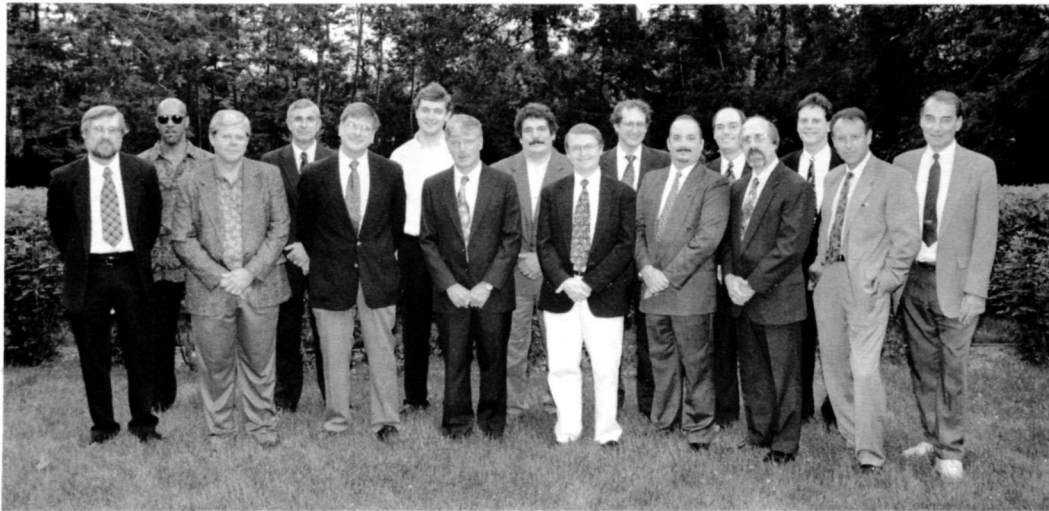
Clockwise from left are Enoch Durbin, Szymon and Ada Suckewer, Mrs. Durbin, and Sharon and Henry Kugel.



Enjoying the dinner are, clockwise from left, Dianne and Tom Walters, Kathryn and Robert Woolley, and Tom Kozub and Evelyn Agosto.

Photos by Dietmar Krause

Inventors from Fiscal Year 1995



The inventors honored at the Patent Recognition Dinner are, from left, Tom Kozub, Sylvester Vinson, Tom Walters, Henry Kugel, Robert Woolley, Mark Herrmann, Forrest Jobs, John Desandro, Edward Nartowitz, Nathaniel Fisch, Leonard Kralik, Gary Gibilisco, Jan Wioncek, Stephen Paul, Szymon Suckewer, and Enoch Durbin. Not pictured are Lloyd Ciebiera, Victor Garzotto, Thadius Golian, Fred Levinton, Dennis Manos, Jack Mervine, David Moore, Holt Murray, Jean Rax, Richard Rossmassler, John Timberlake, Frank Tulipano, and Shoichi Yoshikawa.

Patents Issued in Fiscal Year 1995

Method of High Level Radioactive Waste Management

Holt Murray

Lower Hybrid Current Drive in Tokamak Reactors Using Alpha Particles

Nathaniel Fisch and Jean Rax

Direct Current Sputtering of Boron from Boron/Carbon Mixtures

Dennis Manos, Edward Nartowitz, and John Timberlake

Patents Applied for in Fiscal Year 1995

PPPL Tritium Waste Package

Lloyd Ciebiera, Richard Rossmassler, Frank Tulipano, and Sylvester Vinson

Inventions Disclosed in Fiscal Year 1995

Mathematical Maze

Shoichi Yoshikawa

A Process to Eliminate Oxides of Nitrogen Emitted from an Internal Combustion Engine by Replacing the Intake of Air with Pure Oxygen

Stephen Paul

UHV Pressure Gauge using a Pure Electron Plasma with Enhanced Range

David Moore

Drawer-mounted Keyboard Platform

Jack Mervine

Traveling Spark Ignition (TSI) System

Enoch Durbin and Szymon Suckewer

SF₆/T₂ Detector

John Desandro and Victor Garzotto

Method and Apparatus for Steady-State Magnetic Measurement of Poloidal Magnetic Field Near a Tokamak Plasma Using Only Fixed Air-Core Electrical Coils and a Mechanical Strain Gauge

Robert Woolley

Rational Interferometer

Forrest Jobs

A Method of Obtaining an Estimate of Total Tritium on a Molecular Sieve Waste Container

R. Tom Walters

Pressure Profile via Motional Stark Effect

Fred Levinton

Channeling α -Particle Power with Two Waves

Nathaniel Fisch and Mark Herrmann

Cable Armor Removal Tool

Gary Gibilisco, Leonard Kralik, and Jan Wioncek

Oil Change Device for Equipment Used with Tritium

Lloyd Ciebiera, Thadius Golian, and Tom Kozub

Gated Boron Deposition Using Z-Pinch Ablation

Henry Kugel and John Timberlake

Lithium Carbide/Graphite Composite for Evaporation of Lithium

Henry Kugel and John Timberlake

Women's Review Highlights Improvements

By P.A. Moore*

The Fifth Department of Energy (DOE) Review of Laboratory Programs for Women recently held at Brookhaven National Laboratory (BNL) demonstrated that efforts put into quality of work at various sites have been rewarded, although almost all participants agreed that there was still much to be done to achieve equity. More than 100 participants from twenty DOE facilities recently met at Brookhaven to share successes over recent years in promoting women in science.

Successful Programs

The Review consisted of oral presentations and poster displays from DOE facilities and contractors on successful programs, followed by focus groups to make recommendations on implementing similar programs at other sites. Some successful programs include Women in Science and Technology (WIST) at Argonne, in which women scientists meet regularly to

discuss issues of importance to the lab, along with the Lab Women's Coordinator, Ruth Reck. Other labs reported implementing mentoring programs for junior staff, establishing day care centers on site, and a mother-daughter science club. These programs and others were presented during talks, poster sessions, and breakout groups.

Martha Krebs, Director of Energy Research (ER), gave the keynote address and emphasized the role of DOE in continuing to build on the basic science of the nation, and the need to have an informed public. Antoinette Joseph, also from ER, spoke to participants about the need to stay focused on goals. She complimented Victoria McLane, of BNL, and Abbie Layne, of the Morgantown Energy Technology Center, for their work in compiling the comparative report which measures women's programs at the various facilities. "Such a report provides

an important baseline to benchmark future progress," said Joseph, "and gives labs clear direction as to areas of improvement."

Scientific Solipsism

Invited speaker Sheila Tobias, author of "Overcoming Math Anxiety," spoke about scientific solipsism, in which we assume that science is only for people who are the same as us. In her recent book, and her talk of the same title, "Rethinking Science as a Career," Tobias indicated that while we cannot all be bench scientists, there is an important role to play in policy, legal affairs, and the media by science-trained people. "These types of careers are just as important to the nation as those who practice their science in the lab," said Tobias.

Participants from the conference, and points of contact for the labs, will return to their respective sites with new ideas for helping women in science. Linda Hansen, a computer sci-

entist from Argonne West, was delighted with the Review. "Seeing so many other accomplished and talented women is a real pleasure. Having this network is important to encourage other women that we can make that happen," she said. ●

**P.A. Moore is the Assistant to the Director at the Stanford Linear Accelerator Center in California.*



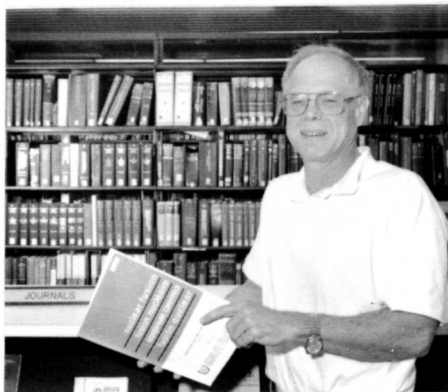
PPPL participants in the Fifth DOE Review of Laboratory Programs for Women are, from left, Carol Phillips, Chris Ritter, Sharon Warkala, Phyllis Schwarz, Steve Iverson, and Dori Barnes. Not pictured is Virginia Finley.

Ignat Takes Over as Editor of *Nuclear Fusion*

By Patti Wieser

PPPPL's David Ignat is the newly named Editor of *Nuclear Fusion*, a monthly journal of the International Atomic Energy Agency (IAEA). He replaces Cornelis Bobeldijk, who is retiring from the editorship after 11 years.

Ignat, who left PPPL in May, will begin his assignment at the periodical's headquarters in Vienna on July 1. His responsibilities include selecting referees, arbitrating between authors and referees, soliciting review articles, managing the budget, and proofreading. Ignat will primarily focus on coordinating manuscript changes with authors and referees, the latter of which are scientific judges who review manuscripts for science and clarity in the fields of their expertise.



David Ignat

"That will be the most delicate part of my job, perhaps the most demanding," commented the newly named editor of ironing out any differences in opinion.

Ignat has been both a contributing author and referee for *Nuclear*

Fusion, which was founded in 1960. The periodical presently has 375 paid subscribers, most of which are research libraries such as the one at PPPL. During the past two years, PPPL contributed 37 articles to the journal.

Ignat, who received a Ph.D. in plasma physics from Yale University in 1968, came to PPPL in 1977 as an administrator in the Experimental Division, eventually joining the engineering and scientific staff. He has been involved in the PLT, PBX-M, and TFTR projects.

Summing up his goals as editor of *Nuclear Fusion*, Ignat said, "I hope to be able to see the number of submitted articles rise slightly — even if the fusion budget does not ... and to keep it [the journal] readable." ●

Nuclear Fusion was founded as a multi-lingual journal in 1960 upon the advice of the Scientific Advisory Committee to the IAEA. The journal was then mainly concerned with basic plasma physics. After the third IAEA Conference on Plasma Physics and Controlled Nuclear Fusion Research held in Novosibirsk in 1968, when world research concentrated more and more on tokamak physics, the journal's focus shifted slowly to fusion-oriented research. As of 1967, it has been published in English only. The first 10 volumes had quarterly issues, the next 7 were bi-monthly, and since 1968, the journal has been published monthly.

—Information supplied by Cornelis Bobeldijk

Upcoming PPPL Recreational Events

- **August** (day to be decided) **Free Lunch for all employees**
- **Saturday, September 7** **Bus Trip to Atlantic City**
- **Saturday, December 7** **Holiday Dinner Dance**

*Mark Your Calendars! Watch for details in upcoming issues of **HOTLINE** and the **News Alert**.*

Hotline

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

PPPL Collaborates with Korea on Fusion Energy Research

Through a collaborative research agreement signed this month, PPPL is receiving \$540,000 from the Korea Basic Science Institute (KBSI) to assist in the planning and design for the Korean Superconducting Tokamak Advanced Research (KSTAR) facility to be constructed in Korea.

"This collaboration combines the expertise of U.S. fusion researchers with Korea's quest for a world-class fusion research facility during the next decade," said PPPL Director Ronald C. Davidson.

Expanding Partnership

Officials from PPPL, Princeton University, and KBSI recently inked the pact, which falls under an umbrella agreement signed last month by U.S. Secretary of Energy Hazel O'Leary and Korean Minister of Science and Technology Dr. KunMo Chung. The umbrella agreement is for expanding a partnership in nuclear energy and fusion energy research between the U.S. Department of Energy and the Korean Ministry of Science and Technology.

Through the Princeton-KBSI collaboration, a team of Korean physicists and engineers from the KSTAR Project will come to PPPL to work closely with a U.S. team comprised of

scientists who formerly developed the design for the canceled Tokamak Physics Experiment (TPX) Project. The KSTAR is a research program for the construction and operation of a tokamak with superconducting magnets. It is presently being organized by the KBSI in

for magnetic fusion research in the United States.

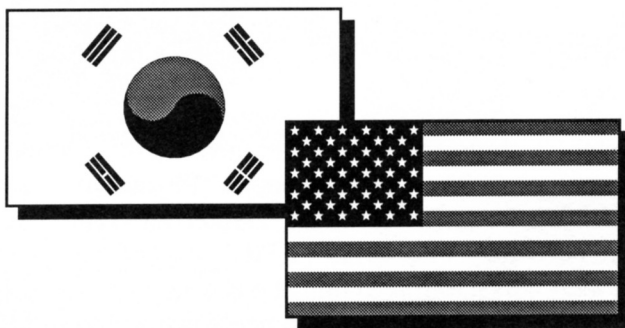
Exchanges of Scientists

The U.S. team involved in the collaboration with Korea will include researchers from PPPL, the Lawrence Livermore National Laboratory and

General Atomics Corporation in California, the Oak Ridge National Laboratory in Tennessee, and the Massachusetts Institute of Technology. Collaborative research activities on plasma physics and fusion science between the national team at PPPL and KBSI are expected to include exchanges of scientists and engineers, as well as of ideas and

information. PPPL's contribution would be to provide the physics and engineering expertise and design information that was developed as part of the TPX design activity.

In July, four researchers from the Korean institute are scheduled to begin working with the U.S. national team at PPPL. The Princeton activity will complement design and research and development tasks being carried out as part of the project in Korea. Up to nine Korean researchers are ex-



Taejeon sciencetown as part of a plan to become the leader in fusion science and technology in Korea.

The TPX Project was designed to be a superconducting advanced tokamak and had characteristics similar to those envisioned for the KSTAR. The TPX was a national research project funded by the Department of Energy that was to be sited at PPPL with participants from many of the U.S. plasma physics research laboratories, universities, and industrial firms. It was canceled last year due to a 32% cut in funding

Continued on page 2

Collaboration

Continued from page 1

pected to join the team at PPPL by the end of 1996. During the next six months, the collaborating group plans to advance the conceptual design of the Korean tokamak and to help develop Korean expertise in tokamak design and technology. The U.S. team will be based at PPPL under the direction of John Schmidt, Advanced Project Department Head and former TPX Project Director. The collaboration is expected to extend beyond 1996 as the project proceeds, and should continue into operation of the KSTAR tokamak.

Korea anticipates the KSTAR tokamak to produce its first plasma in 2002 — specifically on August 15 of that year — to coincide with Korea's Independence Day and with the year that the World Cup Soccer Match, co-hosted by Korea and Japan, is to be held for the first time in Asia. ●



Members of the former TPX team who will be working with Korean scientists on the KSTAR project are, from left (seated), James Sinnis and Wayne Reiersen and (standing) Robert Simmons and John Schmidt. Not pictured is G.H. Nielson.

PPPL Papers Selected for 1996 IAEA Conference

The Laboratory fared exceptionally well in the selection of papers by the International Atomic Energy Agency (IAEA) Technical Program Committee to be presented at the upcoming October 1996 Plasma Physics and Controlled Nuclear Fusion Conference in Montreal, Canada. The meeting is held every two years and is consid-

ered to be the most important international conference in this field.

The overview paper, "Physics of High-Performance Deuterium-Tritium Plasmas in TFTR," was chosen as the first technical paper to be presented at the conference — a position of honor and prominence accorded by the international fusion community to the TFTR project for the third

time in the last four meetings. In addition, there were eight TFTR papers and two basic plasma experimental papers selected for oral presentation — a large number from a single institution. PPPL Theory Division had five oral papers (including two among the TFTR papers) chosen. This was the largest number by far of any institution in the world. ●

HOTLINE

Editor: Carol Phillips
Writer: Patti Wieser
Photography: Dietmar Krause

Graphic Artist: Greg Czechowicz
Layout: Patti Wieser

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What's Happening at PPPL

Photo by Denise Applewhite



PPPL research physicist Stephen Paul recently developed an alternative fuel for motor vehicles that emits hydrocarbons and carbon monoxide at a level two to three times lower than conventional gasoline. The fuel is a blend of hydrocarbons but contains no petroleum products. The feedstocks consist of a combination of industrial, agricultural, municipal, and consumer waste products. Paul (left) conducts emissions tests on his car as it runs on the alternative fuel. Next to Paul is Robert DePalma of Compliance and Research Services, an Environmental Protection Agency-recognized emissions testing laboratory in Linden, NJ. Paul has used what he refers to as the "Princeton fuel" in a 1996 Ford Taurus flexible fuel vehicle, which is capable of running on both gasoline and ethanol-based fuels. He has put about 6,000 miles on the car since January and has just completed a seven-week program of emissions testing. On July 8, Paul and another PPPL employee, Jack Mount, will be conducting track tests at the Old Bridge Township race track. Princeton University, which has filed for a patent on the fuel, signed a licensing agreement with Pure Energy Corporation (PEC), of California, in May. The agreement names PEC as the exclusive, world-wide licensee to patents and/or applications comprising the Patent Rights relating to the alternative fuel.

Farewell Wishes

Ginny Zelenak, of the Computer Division, is retiring. Her last full day at the Laboratory is July 23. If you would like to say goodbye and wish her well, please do so before the 23rd. Best of luck on your retirement, Ginny!



Engineering and Technology Development Department Head Michael Williams (left) congratulates Lewis Meixler on receiving a plaque from the Northeast Region of the Federal Laboratory Consortium. Meixler, PPPL's Technology Transfer Office Head, was cited for "significant contribution to the Region's Technology Transfer Effort."



Happy July 4th!



Hotline

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

PPPL Staffers Receive First-time Employee Recognition Awards

Honored by their co-workers for their "outstanding professional achievements and personal characteristics," twenty-eight PPPL employees received the newly created Employee Recognition Program awards on Wednesday, July 24.

The 1996 recipients are J.W. Anderson, Wilbert Barlow, Dori Barnes, Michael Bell, Robert Cancel, James Chrzanowski, Lloyd Ciebiera, Connie Cummings, Michael Diesso, John Garboski, Gerald Hart, Sue Hill, Larry Jones, Paul Kivler, John Krzywulak, Dolores Lawson, Antonio Morgado, Richard Palladino, Subrahmanya "Raki" Ramakrishnan, Christine Ritter, John Robinson, Lane Roquemore, Barbara Sarfaty, James Taylor, Kenneth Tindall, Walter Weyman, Raymond Whitley, and Virginia Zelenak.



The recipients of the Employee Recognition Awards for 1996 are, from left (seated), Dori Barnes, Virginia Zelenak, Barbara Sarfaty, Dolores Lawson, Connie Cummings, and Christine Ritter; (standing) Lloyd Ciebiera, James Chrzanowski, John Krzywulak, J.W. Anderson, Larry Jones, Paul Kivler, Antonio Morgado, Kenneth Tindall, Richard Palladino, John Robinson, Michael Bell, and Lane Roquemore. Not pictured are Wilbert Barlow, Robert Cancel, Michael Diesso, John Garboski, Gerald Hart, Sue Hill, Subrahmanya "Raki" Ramakrishnan, James Taylor, Walter Weyman, and Raymond Whitley.

Respectful Work Environment

"I congratulate the recipients on their overall contributions to the Laboratory mission and for their efforts toward a congenial and respectful work environment," said PPPL Director Ronald C. Davidson. "You are all role models for the entire staff."

The first-time recipients of the annual awards were honored at a luncheon at the Lab and later at an awards

ceremony in the LOB Lobby. Employee Recognition Awards Review Committee member Barbara Sobel presented the certificates to the recipients during the ceremony, which was open to all staff.

Said Sobel, "It is important that the humanistic and professional qualities of employees be recognized as factors in the attainment of Laboratory goals and objectives. This

year's recipients were nominated by their fellow workers because of the positive impact — both professionally and personally — that they have had on the Laboratory as a whole."

The Director's Advisory Committee on Women and the Quality Improvement and Renewal Committee established the Employee Recog-

Continued on page 2

Recognition

Continued from page 1

nomination Program this year to honor those employees whose "personal qualities and professional achievements have significantly contributed to a productive and harmonious work environment." Through the program, several employees will be cited annually after being selected from nominations submitted by their co-workers. All full-time PPPL staff at all levels are eligible for nomination.

**"This year's recipients were nominated by their fellow workers because of the positive impact — both professionally and personally — that they have had on the Laboratory as a whole."
—Barbara Sobel**

Nomination forms will be given to staff once a year, and a committee selects from the submissions.

This year's committee includes Robert Ellis, III, Suzanne Homer, Hyeon Park, Phyllis Schwarz, Barbara Sobel, Nathaniel Thomas, and Michael Vocaturo. ●

Congratulations to the 1996 recipients of the Employee Recognition Awards!

Employee Recognition Award Recipients

J.W. Anderson

Wilbert Barlow

Dori Barnes

Michael Bell

Robert Cancel

James Chrzanowski

Lloyd Ciebiera

Connie Cummings

Michael Diesso

John Garboski

Gerald Hart

Sue Hill

Larry Jones

Paul Kivler

John Krzywulak

Dolores Lawson

Antonio Morgado

Richard Palladino

Subrahmanya Ramakrishnan

Christine Ritter

John Robinson

Lane Roquemore

Barbara Sarfaty

James Taylor

Kenneth Tindall

Walter Weyman

Raymond Whitley

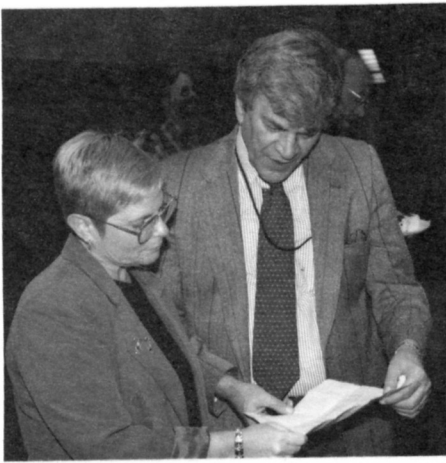
Virginia Zelenak

HOTLINE

Editor: Carol Phillips
Writer: Patti Wieser
Photography: Dietmar Krause

Graphic Artist: Greg Czechowicz
Layout: Patti Wieser

The **HOTLINE** is issued by the Princeton Plasma Physics Laboratory, a research facility supported by the United States Department of Energy. It is primarily an internal publication. Correspondence and requests to reprint material should be directed to the Editor, PPPL **HOTLINE**, P.O. Box 451, Princeton, NJ 08543; Interoffice correspondence should be addressed to Room B378, LOB Bldg., C-Site; fax 609-243-2751; telephone 609-243-2754; e-mail caphilli@pppl.gov



Barbara Sobel and PPPL Director Ronald C. Davidson compare notes for opening remarks at the Employee Recognition Awards ceremony.



At the awards ceremony are, from left, John Robinson, Richard Palladino, and Michael Bell.



Gathering around the cake table are (from left) Lane Roquemore, Phyllis Schwarz, Michael Bell, Richard Palladino, Connie Cummings, and Suzanne Homer (back to camera).



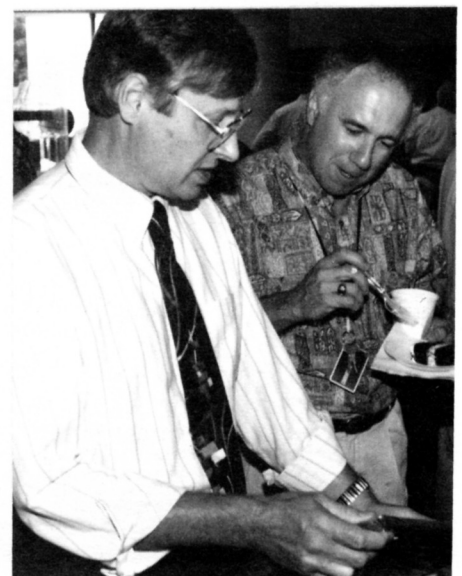
The Employee Recognition Award recipients are treated to a luncheon prior to the awards ceremony.



Dishing up a Chinese lunch in B-318 are Larry Jones (left) and Bob Cancel.



John Krzywulak



Recipient Kenneth Tindall (left) and co-worker Carl Scimeca read over the citation.

SPOTLIGHT: Emergency Services Unit

PPPL Firefighters Provide Emergency Response to Both Lab and Community

When President Clinton delivered remarks at Princeton University's commencement this year, a three-person ambulance crew from PPPL's Emergency Services Unit (ESU) stood nearby, ready to transport the nation's chief executive to the hospital should a medical emergency arise.

During the massive oil tank fire at the Shell Oil storage facility in Woodbridge earlier this summer, ESU crews delivered water to firefighters to use while hosing down oil tanks near the blaze to prevent it from spreading.

And when a fire broke out recently at an office building off Princeton-Hightstown Road in West Windsor, four ESU staffers hopped into the PPPL firetruck to back up the

Princeton Junction fire crew on the scene.

The Laboratory's ESU staff, which provides fire protection, security, emergency medical, emergency preparedness, and fire prevention services at the Lab, also provides emergency response to PPPL's neighboring communities.

"We play a vital role in the community," said Security and Emergency Preparedness Division Head John Bavlish.

Cross trained

ESU's 21 staffers in the Operations Division include captains, driver operators, and emergency services officers, who are all emergency medical technicians. All are cross trained to handle a variety of situations. And



From left are Jim McGuire, Mike Loh, and Bob Lamb at the scene of the oil tank fire.

there is a minimum five-person crew on duty at PPPL every hour of every day of the year. They serve as guards at the security offices at the main entrance to the Lab and as dispatchers, as well as maintain the command and communications center and perform a host of fire prevention tasks, such as inspecting sprinkler systems.

Prepared for the Worst

"Prevention is one of the main things we keep on top of," said Bavlish. "We ensure that our training is current and continually participate in exercises that keep us prepared for the worst."

ESU employees — many of whom are involved in fire and rescue squads in their hometowns as well — are also adept at operating the machinery lodged at the PPPL firehouse, including two fire engines that are pumpers, an ambulance, a rescue vehicle equipped for confined-space emergencies, and a tactical vehicle.



Dave Neuman (left) and John Bavlish settle in at the new Communications Center on the first floor of the LOB. The upgraded center includes all alarm, communications, and security systems at the Lab.



In photo at left are Kevin Rhoades (left) and Robert Hutchinson, who were part of the PPPL crew that responded to an office building fire in West Windsor in June. Not pictured are Robert Lamb and Dan Tomalin. In right photo are, from left, Wesley Foraker, (in driver's seat), Dave Gayley, Jim McGuire, and Bob Brown. The four, along with Kevin Brink, Mike Loh, Robert Lamb, and Bert Allen, assisted at the oil tank fire.

Besides their duties at the Lab, the ESU serves the community through mutual aid agreements with Plainsboro Township, Princeton Borough and Township, and Princeton University. The group is also part of the mutual aid system of the Middlesex County Office of Emergency Management, which brought PPPL firefighters to the scene of the oil tank blaze last month.

Supply Water

"Our primary operation there was to supply water to cool oil tanks at the scene. There were a number of fuel tanks in the area," said ESU's Jim McGuire, who assisted at the fire caused by lightning striking a 3 to 4 million gallon tank containing a gasoline mix.

McGuire described the scene as "chaotic," with numerous entities from local, state, and federal organizations, and about 90 pieces of firefighting apparatus. "There were loads of people, a lot of smoke and a lot of fire," he recalled.

About a dozen PPPL firefighters were among many from the region who were on the scene during a 24-

hour period until the blaze was quelled.

On a Saturday evening last month, PPPL received a request for help at an office building fire in West Windsor. The four-person crew, including Kevin Rhoades, Robert Lamb, Dan Tomalin, and Robert Hutchinson, suited up in their fire garb.

"We play a vital role in the community."

—John Bavlish

"We went out there and helped with the salvage and overhaul," said Rhoades. He noted that PPPL received the call when the fire was mostly under control, but extra manpower was needed to relieve the Princeton Junction fire crew on the scene.

And while ESU ambulance crew services were not needed during President Clinton's visit to Princeton University, Allen Davis, Mike Loh, and Robert Lamb were on hand in the PPPL ambulance in case the president needed to be taken to a hospital.

"Our team of professionals can handle just about any emergency that you can think of," said Bavlish. ●



An oil tank at the Shell Oil storage facility in Woodbridge last month took firefighters more than 24 hours to extinguish.



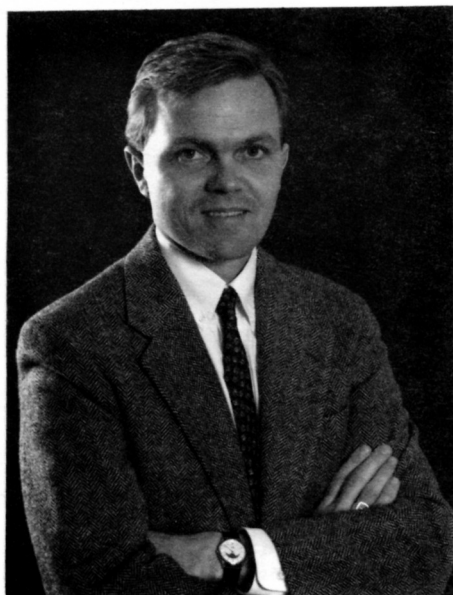
A Word from Human Resources...

The Furlough: The Laboratory's furlough is in effect from Monday, August 19, through Friday, August 30, with employees scheduled to return to work on Tuesday, September 3. A summary of the Furlough Policy and instructions from the PPPL Payroll Office on how to complete monthly and bi-weekly time sheets covering the furlough period was distributed recently to all staff by the Office of Human Resources and Administration.

Employees are urged to review their current vacation balances with their supervisors. If you do not have enough accrued vacation to cover the furlough period, you will be placed on a Leave of Absence Without Pay for the number of days you fall short. To accurately calculate the number of days you have available, remember to deduct any vacation time you have scheduled between now and the beginning of the furlough period from your current balance. Please remember that in accordance with the PPPL Vacation Policy, you cannot take vacation time before it is earned.

If you have any questions about the Furlough Policy Summary or Leave of Absence Without Pay, please contact the Human Resources Office at ext. 2101 or ext. 2033. If you have any questions about the completion of monthly or bi-weekly time sheets, please call PPPL Payroll at ext. 3506.

Training Reminder: Don't forget! Any employee who has training due during the furlough period should complete the training prior to the two-week break. Please call the Human Resources Office at ext. 2220 to schedule or challenge a course.



Anderson Named Chairperson of Quality Committee

The Laboratory recently named J.W. Anderson as the Chairperson of PPPL's Quality Improvement and Renewal Committee.

Anderson (pictured at left), Head of the Lab's Facilities and Environmental Management Division, replaces Geoff Gettelfinger, who resigned from PPPL earlier this month. If you have suggestions for quality

improvement or issues of concern, please contact Anderson at ext. 2207.

The committee members are Dori Barnes, Anthony Bleach, Gary D'Amico, John DeLooper, Robert Ellis, III, Steve Iverson (ex officio), Judy Malsbury, Tom McGeachen, Sue Murphy-LaMarche, Masayuki Ono, Phyllis Schwarz, James Taylor, Al von Halle, and J. Randy Wilson. ●

Lab and University Bring Science and Math Activities to Trenton Students

As part of its partnership with the Trenton schools, the Laboratory and the Student Volunteers Council (SVC) of Princeton University are bringing hands-on science and math activities to more than 400 Trenton students this summer.

Beginning this month, PPPL is placing 15 Princeton University student volunteers as interns in four community-based programs in the Trenton area through PPPL's Summer Internships in Trenton Program. The undergraduates will serve as tutors and mentors to inner city youngsters enrolled in programs at the Young Scholars Institute, Isles, and Hollowbrook Center in Trenton, and Project SMILE (Science and Math, Interesting, Learned Easily) at Mercer County Community College. The interns will focus on developing the Trenton students' problem solving and reading skills, providing hands-on math and science experiences, and increasing technology awareness.

Educating Region's Children

"As one of the major scientific institutions in the area, we want to help in providing assistance in educating the region's children," said PPPL Director Ronald C. Davidson.

PPPL Science Education program administrator Chris Ritter added, "It is wonderful to see the children respond so enthusiastically to the

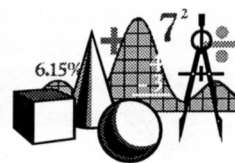


Directors of community-based programs in the Trenton area recently toured the Lab. Seated (from left) are Lisa Muentener, Associate Director, Isle, Inc.; Evelyn Thomas, Associate Director, Young Scholars Institute; Carrie Hoover, Office Specialist, Student Volunteer Council; standing (from left) Angelo Otterbein, Former SVC Student Administrator; Ruth Palmer, Education Specialist; Eleanor Harrison, SVC Director, Princeton University; Kevin Kopp, Environmental Education, Isle, Inc.; and Christine Ritter, Program Coordinator, PPPL Science Education. Not pictured is Herman Kimbrough, Executive Director, Hollowbrook Center.

Princeton students. They are eager for the experience and end up really liking the math and science."

The student volunteers will serve as interns this month and next at the four participating organizations. The Summer Internships program is part

of the PPPL/Trenton Partnership, which is funded by the U.S. Department of Energy. The partnership between the Laboratory and the Trenton Public Schools began in 1990 to improve math and science teaching and learning. ●





Sparkling “Best Friend” Recovered

As Tim Vavricka began cleaning the women’s bathroom on the second floor of the LOB early on the morning of July 10th, he spotted something shiny on the floor next to the garbage can.

Vavricka, a member of PPPL’s Facilities and Environmental Management (F&EM) Division, stooped down to discover a gleaming 2.5-carat diamond ring. He quickly picked it up and made his way to the Security Communications Center at the Laboratory.

“I took the ring to security on the first floor and reported it as being found,” said Vavricka.

The evening before, Joan Shands, DOE Counsel, made her own discovery — albeit alarming — while driving down U.S. Route 1 in rush hour traffic after leaving PPPL.

Diamond Ring Missing

“I had my hand on the steering wheel and noticed my diamond ring missing and almost stopped right there. That was my engagement ring that my husband had given to me 26 years ago,” said Shands, a member of the negotiating team to extend Princeton University’s contract with the U.S. Department of Energy (DOE) for the operation of PPPL. “I pulled

over to the side of the road and began looking for it.”

When she had no luck in finding the ring in the car, Shands drove back to PPPL and enlisted the help of Dottie Kerr, DOE Princeton Group, and two colleagues from the DOE’s Chicago Operations office. Kerr reported the loss to security and then the foursome scoured the area from 5:45 p.m. until 8:50 p.m. hunting for the precious stone.

**“I could not believe
that a person could
be so honest.”**

—Joan Shands

“We searched from the office to the parking lot,” recalled Shands.

As night set in, they called it quits and Shands returned to her hotel room for what she described as a “sleepless and excruciating night.” She even placed a call to her mom to commiserate over the uninsured ring.

The next morning, she arrived at the Lab around 6 a.m. and told the security guard on duty her name to gain entrance. The guard asked, “What did you say your name was?”

Once Shands repeated it, the guard informed her the ring had been found by Vavricka. Shands broke into tears of joy. “I had that wracking kind of cry that happens when you are so happy,” she said.

Soon after recovering the ring, which she quickly insured, the DOE attorney met up with Vavricka. “She ran up and congratulated me for finding it,” said Tim, who has been at PPPL for five years.

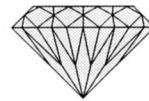
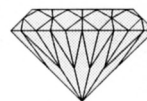
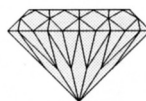
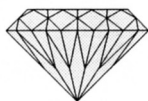
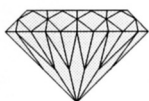
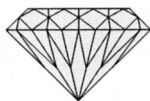
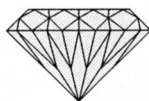
Said Shands, “I could not believe that a person could be so honest. Whatever I can say about him is not enough. I am still in awe.”

In a thank-you card inscribed with “It is more blessed to give than to receive,” Shands placed a reward and her own handwritten message to Vavricka, “I will be forever grateful to you — everyday I have a reminder of your honesty.”

Lot of Integrity

F&EM Head J.W. Anderson said, “I am very happy for Ms. Shands that the ring was found. It’s a tribute to Tim — he really takes pride in what he does and he has a lot of integrity.”

Vavricka, however, insists he had little choice in the matter. “After all, diamonds are a girl’s best friend,” he said with a smile. ●



Hotline

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

Electronic Publishing Blossoms

Professional Journals and Reference Tools Available Electronically to PPPL Staff

Imagine a world of information at your fingertips without venturing beyond your office — a place full of volumes of printed matter without a drop of ink or a single sheet of paper. Here, topics can be searched and information retrieved in a matter of moments. And professional journals can be read before they ever come back from the printer's.

Wealth of Information

Such is the universe of electronic publishing, which is available to PPPL computer users by tapping into the World Wide Web. A wealth of information resources both at Princeton and around the Internet is available through the PPPL Library and the Princeton University Library (PUL) Web server, which has links to a rapidly growing list of professional journals, reference tools such as the Encyclopedia Britannica and the Oxford English Dictionary, and government databases.

Some journals are available electronically in full, while others only in part. A few require a password or special software, which can be obtained from the PPPL Library.

Electronic publishing offers speed and convenience to users, as well as search and retrieval capabilities that far exceed those offered in paper versions. "The biggest ad-

For instance, the Encyclopedia Britannica can be searched quicker and more thoroughly on-line than through printed copies. And since many professional journals will be posted on the Web before they are printed, researchers will be able to keep current with developments in the scientific world.

While most journals and reports are still printed, some are no longer distributed in paper form. "A lot of journals are being published only on the Web," said the PPPL Librarian, noting that PPPL Reports are now published in an electronic version only, which eliminates printing and distribution costs.

In addition, the library acquisitions list is only available on the PUL Web server. "Going on-

line with our acquisitions list both reduces our costs and makes the information more widely available," said Frazer.

To use the PUL Web server, just go to the Library under the Services



PPPL Librarian Judy Frazer (right) and Sharon Brown tap into the world of electronic publishing at a computer at the PPPL Library.

vantage for people at the Lab is that they can get information from their own computers. It saves a lot of time," said PPPL Librarian Judy Frazer. "They can also search by author, subject, or word."

Frazer noted that reference tools on the Web are particularly helpful.

Continued on page 2

Publishing

Continued from page 1

by Organization section of the PPPL Home Page and from there, find the PUL.

Full text journals of interest to PPPL users that are available in an electronic version through the PUL Web server include *Astrophysical Journal Letters*, *Journal of Physics*, *Inverse Problems*, *Physical Review Letters* (requires a password or special software), *Plasma Physics and Controlled Fusion*, and *Plasma Sources Science and Technology*. Partial texts such as tables of contents, abstracts, and job postings are available from *Academe This Week*, *Current Contents*, *Nature*, and *Science*.

CD-ROMs Available

There are also several CD-ROMs available locally, including the DOE's Energy Science and Technology database and Thomas Register (See box for list of CD-ROMs available at PPPL Library). In addition, there is access to three databases mounted on a CD server on the main campus and access to Current Contents on a vendor's server.

If you need help logging on to an electronic journal or database, or need a password or special software, contact Judy Frazer at the PPPL Library, ext. 3567. ●

CD-ROMs Available at the PPPL Library

Energy Science and Technology

INIS Atomindex

INSPEC (physics, electronics, and computer abstracts)

ISTP (Index to Scientific and Technical Proceedings)

Math Reviews

PhoneDisc Powerfinder

Random House Dictionary

Science Citation Index

Thomas Register

Electronic Journals of Interest to PPPL Staff

(Most are accessible from the Princeton University Libraries Web server)

FULL TEXT

Astrophysical Journal Letters

Journal of Physics (all parts)

Inverse Problems

*Physical Review Letters**

Plasma Physics and Controlled Fusion

Plasma Sources Science and Technology

TABLE OF CONTENTS, ABSTRACTS, AND JOB POSTINGS

Academe This Week

*Current Contents**

Nature

Science

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Barnes and Perry Named Designated Individuals

Dori Barnes and Erik Perry are the new Sexual Harassment Designated Individuals at the Laboratory. They replace Margaret Young, who recently retired.

The primary role of the Designated Individuals is to ensure that the Lab responds promptly and fairly to complaints of sexual harassment. A Designated Individual discusses the options for resolving complaints before the complainant discloses detailed information, so that he or she can make an informed decision. Options could range from getting advice on how to deal with sexual harassment to filing a formal complaint. Unlike counselors who have protected confidentiality, Designated Individuals, once given the name of a complainant and respondent, have insti-

tutional responsibility to seek a resolution, such as an informal mediation between parties.

"Our job is to see that the institution responds to sexual harassment complaints," said Dori, who will also be involved in sexual harassment awareness training at the Laboratory.

If the Designated Individuals receive a complaint, they will listen to both parties' sides and try to resolve the situation in an informal manner, without bringing the issue to management. While the resolution would be private, it would be documented.

Dori and Erik, who recently completed training for their new roles, would not serve as advocates for anyone filing a complaint. Said Erik, "Although we cannot act as advocates for or against the complainant,

we can direct them to other counseling available, such as the resources at the SHARE (Sexual Harassment/Assault, Advising, Resources and Education) Office on main campus."

SHARE contains resources and options for dealing with sexual harassment on campus, including providing confidential counseling, advice, or support. SHARE can also work as an advocate to report a complaint to the University. The Designated Individuals at the Lab are associated with SHARE.

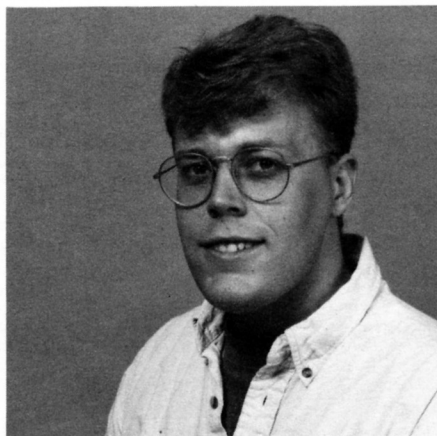
If you wish to discuss a complaint or want more information, call Dori at ext. 2557 or e-mail dbarnes@pppl.gov or Erik at ext. 3016 or e-mail at eperry@pppl.gov. The SHARE Program is at McCosh Health Center, 258-3310. ●

Two Graduate Students Awarded

Congratulations to Mark Herrmann and Jon Menard, graduate students in the Plasma Physics Program. Herrmann is the recipient of the Ray Grimm Memorial Prize in Computational Physics and Menard received the Princeton University Graduate School's Honorific Fellowship for 1996-97.

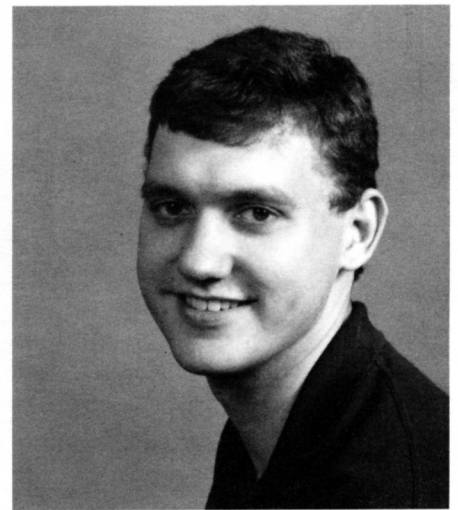
Herrmann, a fifth-year graduate student whose thesis advisor is Nathaniel Fisch, is doing theoretical research on alpha "channelling."

The Ray Grimm Memorial Prize in Computational Physics was established in May 1985 to honor Ray Grimm, a talented and popular scientist and teacher who taught computational MHD and supervised many students. It is given to a student in recognition of outstanding research achievements, academic merit, and creativity as a young computational physicist.



Jon Menard

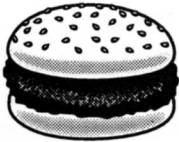
Menard has performed computer simulations studying the stability limits of spherical tokamaks such as the proposed National Spherical Tokamak Experiment (NSTX) device and is presently beginning experiments on the CDX-U device studying the viability of high harmonic fast wave heating of NSTX-like plasmas.



Mark Herrmann

The Honorific Fellowships were created to enable students to pursue dissertation research and writing on a full-time basis in their final year of university enrollment. Each department may nominate one student of outstanding academic merit. Each year, thirteen recipients are selected from the nominations submitted. ●

The Lab is pleased to provide an
Appreciation Picnic Lunch
for all PPPL Employees



Wednesday, August 14
Lobby Court Yard
11:30 A.M.-1:30 P.M.*



Hamburgers ★ Hot Dogs ★ Grilled Chicken Breast
Coleslaw ★ Potato Salad ★ Macaroni Salad
★ Ice cream ★ Buffalo Wings
Nachos ★ Potato Chips
Soda

*Due to limited space, staff are requested to leave the Court Yard and Cafeteria when they have finished their meals. No alternative menu will be served. The Cafeteria will close at 9:30 A.M. the day of the picnic to prepare. The rain date is Thursday, August 15.

Hotline

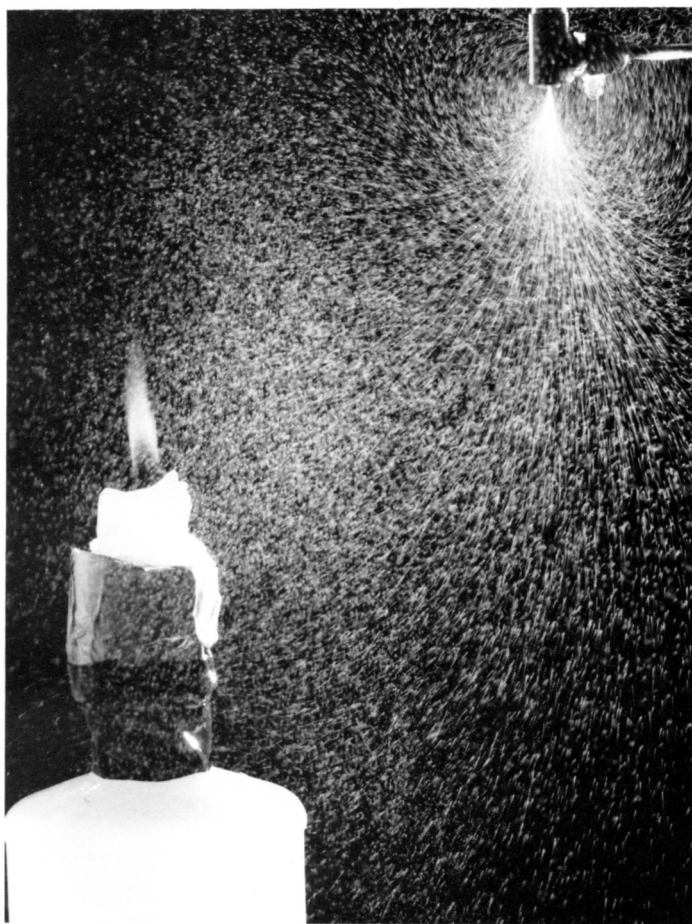
The Princeton Plasma Physics Laboratory is a United States Department of Energy Facility

PPPL Researchers Develop Novel Plasma Applications

By Anthony DeMeo

Over the years, the value of plasma physics as a scientific discipline has been greatly enhanced by the recognition of its wide practical and scientific applications. Currently, more than a dozen PPPL staff members are applying knowledge of plasma science and technology, gained in fusion research, to projects ranging from the development of novel fire suppression systems to the application of computer modeling techniques to study charge deposition in the xerographic process.

For example, Boris Grek is studying the use of laser diagnostic devices, developed to monitor fusion plasmas, for the measurement of physical properties of textile fibers during manufacturing (see *PPPL Digest*, August, 1995). His work will eliminate the need to stop the manufacturing process to sample output, leading to greater production efficiency. Hideo Okuda, working with a local small business, Charged Injection Corporation, is applying theoretical and experimental plasma physics principles to solve problems in the field of electrostatic atomization. There is a multitude of applications for Okuda's work including more effective fire sprinklers, as well as improved fuel combustion and spray painting efficiencies (see *PPPL Digest*, May, 1996).



PPPL physicist Hideo Okuda is conducting research on the electrostatic atomization of liquids and powder droplets. This photo depicts the behavior of an electrostatically-charged water mist as a fire extinguisher. Since a flame is a good conductor of electricity, the charged mist is attracted to the fire, eliminating the need to deluge an entire area with water.

Special Issue

Environmental Benefits

Most people agree on the longer-term environmental benefits of fusion energy, but may not be aware of the nearer-term environmental benefits of the plasma research underway at PPPL. Physicists David Mikkelsen and Brent Stratton are working with Drexel University and Plasma Technology, Inc., a small business in Santa Fe, NM. Mikkelsen and Stratton are applying their unique expertise in the spectroscopic analysis of high temperature fusion plasmas and their knowledge of chemical kinetics modeling to the emerging field of plasma chemistry. Their work involves monitoring plasma "torches," which can be used for the conversion of complex hazardous wastes into useful materials such as syngas. The PPPL group performs spectroscopic analysis to identify the species and the concentrations of the chemicals present. These measurements are modeled using a chemical kinetics code with the ultimate goal of improving the efficiency of the conversion process (see *PPPL Digest*, March, 1996).



Tom Holoman adjusts PPPL's experimental arc furnace.

Steel Recycling

Improved efficiency is also on the mind of Stewart Zweben and his team, which is applying plasma physics and their knowledge of electromagnetic design to electric arc furnaces such as used for recycling steel. The production of recycled steel using electric arc furnaces is a \$30

"A better understanding of the physics of the arc plasma will lead not only to improved efficiency, but also better control of industrial arc furnaces."

—Stewart Zweben

billion business worldwide, comprising about 40% of total steel production. According to Zweben, "A better understanding of the physics of the arc plasma will lead not only to improved efficiency, but also better control of industrial arc furnaces. We hope to extend this research to assist in the development of these furnaces for the destruction of hazardous organic and nuclear wastes."

Chemical Synthesis

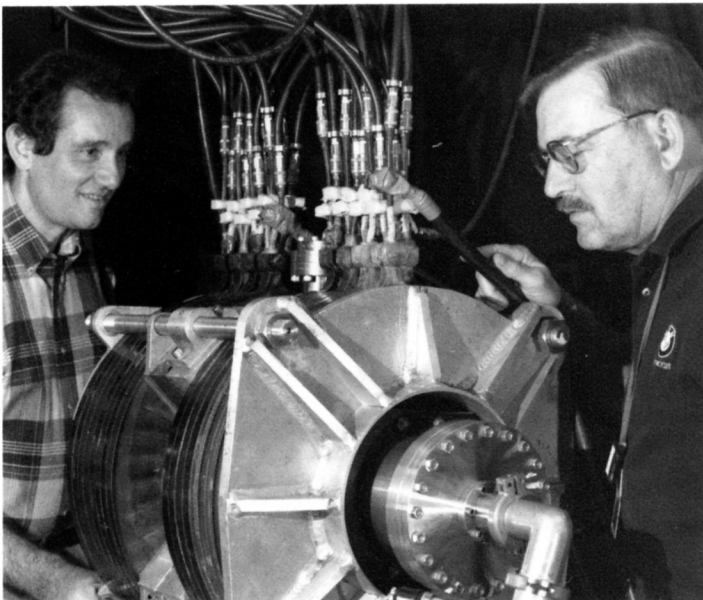
Meanwhile in the L-Wing, PPPL's Phil Efthimion and Jim Gorman are ready to begin synthesizing chemicals using a small plasma device they built. The synthesis process utilizes the plasma's energetic electrons (a few electron volts) to break apart the molecular bonds of chemicals introduced to the plasma device. This breaking apart is commonly referred to as molecular dissociation. By careful control of the gas temperature, the molecular fragments, known as free radicals, are expected to combine into the chemical of interest. The plasma device includes a small linear vacuum chamber and solenoidal magnetics. The plasma is produced by a few hundred watts of 40-MHz radio frequency waves introduced with a spiral antenna through a large vacuum

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Phil Efthimion (left) and Jim Gorman with the plasma device they built for the synthesis of chemicals.

window. According to Efthimion, "The plasma synthesis of this chemical is economically competitive with traditional chemical manufacturing techniques because it has the potential of synthesis with no metallic contamination. The market value of the chemical with this high degree of purity is ten times that of its normal purity grade, making the use of plasmas cost effective." Presently, the plasma device has been operated and tested with argon gas, and the gas handling system is being modified for chemical synthesis.

Materials Processing

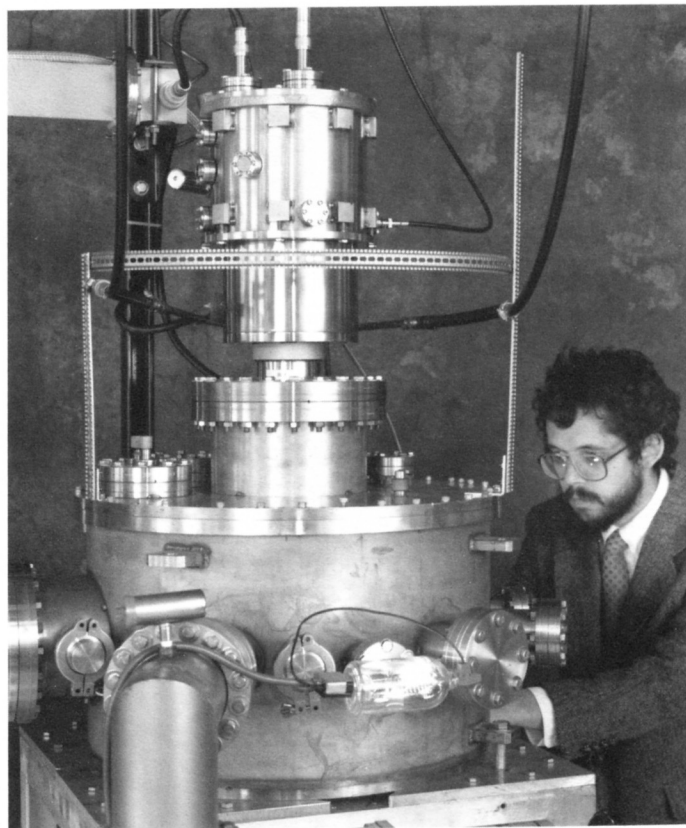
The use of plasmas for materials processing is not new at PPPL. For many years, small groups of Laboratory physicists have studied important applications including plasma processing of semiconductor materials and studies of spacecraft materials erosion. In these applications the plasmas are used, directly or indirectly, to drive chemical or physical surface processes.

For example, in semiconductor processing, plasmas are used directly in over a third of the steps required to produce modern computer chips. Without the aid of plasmas, much of the dramatic improvements in modern electronic technology could not have been made. However, in some situations direct plasma processing almost has been pushed to its limits. One method which appears to overcome those fundamental limitations is materials processing with hyperthermal atomic beams (HABs). In the late 1980's, PPPL physicists were able to simulate

the environment encountered by a spacecraft traveling in low-earth orbit, i.e., through a thin atmosphere of atomic oxygen. Using plasma ions reflected from a metal plate, they created a beam of neutral oxygen atoms and aimed the stream at candidate materials to measure erosion.

"Intense hyperthermal atomic (and molecular) beams may provide revolutionary methods to manufacture new materials..."
—Matthew Goeckner

The future for HABs is bright. According to PPPL physicist Matthew Goeckner, "Intense hyperthermal atomic (and molecular) beams may provide revolutionary methods to manufacture new materials, to alter materials properties, and to deposit and remove materials from surfaces. Films and coatings play a major role in a wide variety of applications including power generation, transportation, and environmental remediation." Matthew and his colleague Sam Cohen, along with two graduate



Matthew Goeckner with the unique, compact hyperthermal atomic beam device developed at PPPL.

students Jeff Wang and Jaeyoung Park, and technician Tim Bennett, are using a unique, compact HAB device developed at PPPL. While there are many novel features to the source, the most radical is the use of two reflections to create the neutral beam. As with the earlier neutral beam sources, the first bounce serves to neutralize energetic ions. However it is the second bounce which will make the new source successful in material processing. This is because the second bounce allows one to produce a contaminant (particle and photon) free neutral beam, which is uniform.

The group has proposed using the beam to improve the characteristics of coatings used in a wide variety of energy-intensive applications, including coatings which protect components, improve efficiency, and reduce pollution.

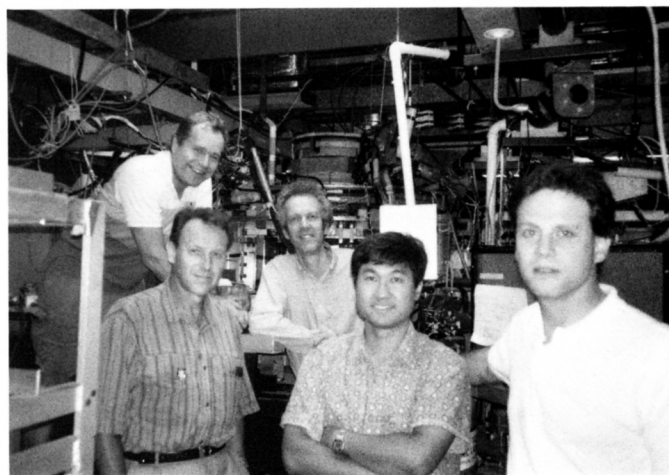
Modeling Xerography

The field of xerography has come a long way over the last thirty years from machines producing a few copies per minute to today's high-speed duplicators, virtually eliminating small lithographic printing presses. Color copiers such as that in PPPL Graphic Services have revolutionized in-house production.

In the xerographic process, a corona discharge deposits an electrostatic charge on a photoconducting surface which is then exposed to an image of the item being copied. The charge drains from the blank areas which



Meng H. Lean, Principal Scientist with the Xerox Webster Research Center, is shown with PPPL's Hideo Okuda and Scott Parker. The computer graphic depicts the three-dimensional simulation of the charging of toner (ink) particles and the photoreceptor surface in laser xerography.



At the VERSATOR tokamak at MIT are (from the left) Ivan Mostovesky (MIT), Szymon Suckewer, Charles Skinner, Joel Villasenor (MIT) and Steve Paul.

become conductive when exposed to light, leaving an electrostatic image. The image is then transferred to paper and an oppositely charged toner (ink) is applied. The ink is then fused to the paper by the application of heat.

Color copying involves the re-charging of the photoconductor surface for each of the primary colors comprising the image. Repeated charging can result in image defects. This is where PPPL physicist Hideo Okuda comes in. He is lending his expertise in electrostatics and charged particle/fluid dynamics to Xerox to develop detailed simulation models of the charging process. Knowledge gained from the simulations will complement experimental data, which is difficult to obtain because of the complexity of the copying process. Xerox hopes to eventually simulate the complete photocopying process as a way to study design trade offs between image quality and cost.

X-ray Lithography and Microscopy

Another group of PPPL physicists and their colleagues hope eventually to make use of a tokamak for the production of soft X-rays for lithography and microscopy, as well as a host of other applications, including the study of radiation effects on biological cells and the sterilization of biomaterials and artificial organs.

Compared to a synchrotron, the conventional source of X-rays, a compact tokamak has several distinct advantages. The construction and operation of a compact

tokamak is much simpler and far less expensive than the smallest synchrotron. In fact, a suitable tokamak would fit into an area about the size of two offices, whereas a typical synchrotron requires a space about half the size of a football field.

Because of the large number of ions and electrons (radiators) in a tokamak plasma, it can provide a much larger amount of soft X-ray radiation compared to a synchrotron. A compact tokamak can be operated in either a steady-state or pulsed mode, with very good stability and reproducibility of radiation characteristics. The radiation can be controlled and maximized for particular wavelengths by choosing the appropriate plasma composition. Possibly, a tokamak could augment the operation of a synchrotron, whenever a much more intense source of X-rays at a specific wavelength is needed for a particular application.

In projection soft X-ray lithography, an x-ray image of a circuit pattern is projected on to the surface of the silicon wafer, causing chemical changes in its photoresist coating conforming to the circuit pattern. The pattern is then etched into the surface by chemical treatment. The use of X-rays to "print" finely detailed integrated circuit patterns on semiconductors could result in a 100-fold increase in the number of components accommodated on a silicon chip. One can only imagine the impact of still smaller components for computers, consumer electronics, and a broad range of other applications.

The idea of using a small tokamak with central plasma temperature not exceeding 150-200 electron volts was conceived a few years ago by Szymon Suckewer in collaboration with Daniel Cohn and Leslie Bromberg, both of the MIT Fusion Center.

Szymon Suckewer is leading the PPPL team consisting of himself, Charles Skinner, and Steve Paul. Miklos Porkolab, director of the MIT Fusion Center, is leading MIT's effort. Currently the work is being done collaboratively with Applied Physics Technologies Corporation of Stony Brook, NY. In a few weeks, the group expects to perform final experiments on the small MIT tokamak, VERSATOR, followed by the preparation of proposals to different government agencies.

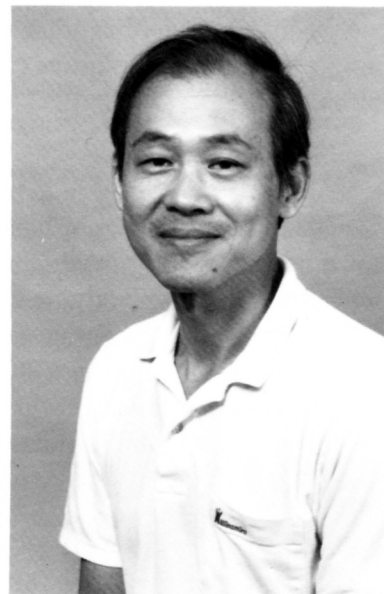
Photocathode Electron Projection

X-rays are not the only way scientists hope to increase the number of components on the surface of a chip. Comparable improvements can be obtained using electron microlithography. In collaboration with AT&T, PPPL's Long-Poe Ku was able to simulate a fundamental improvement to a technique known as photocathode electron projection. In such systems, a magnetic field is used to focus electrons emitted photoelectrically from a cathode patterned with the circuit to be etched.

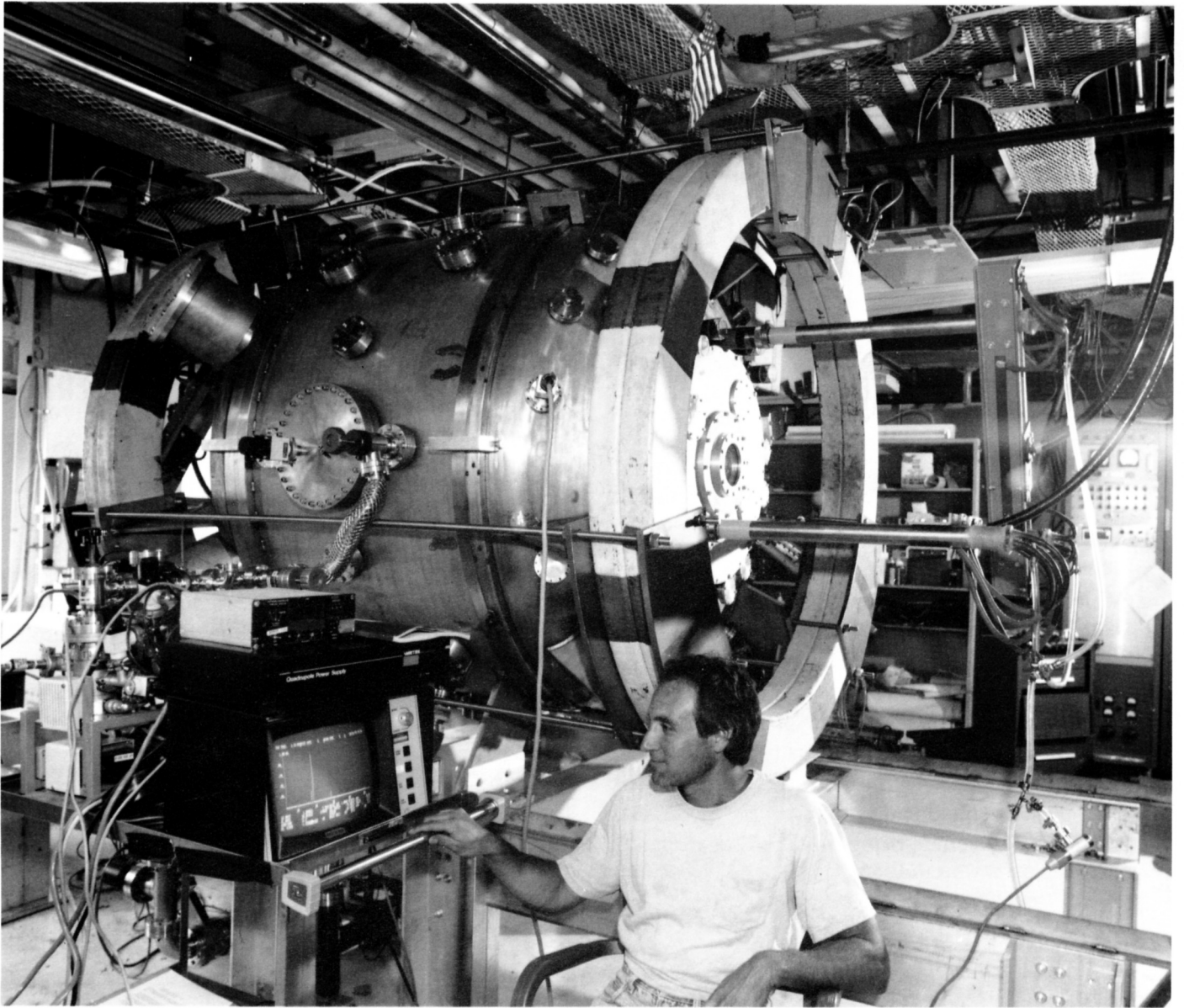
Long-Poe Ku has simulated a novel improvement of this technique using magnetic field compression to achieve greater pattern reduction down to resolutions of 100 nm. His technique would allow a 1-cm-square array of chips to be etched simultaneously.

In Long-Poe Ku's system, the photo-emitted electrons are accelerated by a grid. After passing through the grid, the electrons enter an electric field-free column in which the magnetic field strength is increased at the end where the silicon wafer is located. The electrons spiral around the converging magnetic field lines, much the way they do in a tokamak, resulting in an image compression.

As a result of his computer simulations of the system, Long-Poe Ku believes that the compression technique is feasible and that a "table-top" demonstration could be constructed for about \$250K using available superconducting magnet technology.●



PPPL's Long-Poe Ku



PPPL's Dave Cylinder and the Magnetic Reconnection Experiment (MRX).

MORE TO COME...

The projects described in this issue do not cover the entire realm of non-fusion work at PPPL. Other efforts are underway, most notably the Magnetic Reconnection Experiment (MRX) which involves fusion and solar physics aspects. The MRX and other programs will be covered in separate articles in upcoming editions of the PPPL Hotline.