PRINCETON PLASMA PHYSICS LABORATORY VOL. 1, NO. 2 • SPRING 1997

PPPL News

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

TFTR Produces Last Plasma

By Patti Wieser

Shortly before 2 a.m. on Friday, April 4, a spectacular green glow spread across a large-screen monitor in the Control Room at PPPL. More than 50 people — physicists, engineers, technicians, and administrative and clerical staff — crowded around the monitor to witness an historic experiment being projected from a building several hundred yards away.

"That was the last shot on TFTR," said Richard Hawryluk, referring to the final plasma discharge from the Tokamak Fusion Test Reactor, the U.S.'s flagship experimental fusion machine. Hawryluk is the Head of PPPL's Tokamak Confinement Systems and of TFTR.

Despite the premature conclusion of experiments on TFTR, which was being shut down due to a cut in government funding, the enthusiasm of PPPL's scientific and technical staff prevailed. Indeed, enthusiasm peaked as the new — and final — experiments were mapped out. PPPL scientists had hoped to break new ground with the concluding experiments on the tokamak, which set a world record of 10.7 megawatts of controlled fusion power in 1994 and in 1995 reached a world record plasma temperature of 510 million degrees Celsius — more than 30 times hotter than the center of the sun. TFTR's last experiment concentrated on producing high-power results, and ultimately reached one of the highest performance discharges ever attained by the machine by producing 7.8 megawatts of power. The second to the last shot that day produced 7.1 megajoules of fusion energy — the second highest value ever achieved. Both discharges were deuterium-tritium,which are heavy forms of hydrogen used as the fusion fuel. (Power is the rate of use of energy, i.e., one megawatt equals one megajoule per second.)

Continued on page 2

Last Plasma

Continued from page 1

Staffers, reporters, and family and friends gathered around the monitor to watch the results, offering a swell of applause as the screen was lighted by a colorful glow that reflected the plasma inside the tokamak. Plasma — a hot, ionized gas — is produced when light hydrogen atoms fuse at high temperatures, releasing energy. Fusion is the same process that powers the sun and the stars, and the goal of fusion research is to harness that energy as a clean, limitless source of generating electricity. TFTR, which produced more than 70,000 discharges as the centerpiece of the nation's fusion program, was the largest operating magnetic fusion experiment in the U.S.

Sadly, just a few days before the final TFTR experiment was run, Lyman Spitzer, the founder of PPPL, died at his home. He was world-renowned for his contributions to plasma physics and astrophysics.

Hawryluk, characterizing the conclusion of TFTR's experiments as "bittersweet," lauded the staff for its efforts during the machine's 14 years of operation. "We have all been a part of history, and while we have some tough days ahead, you should feel proud of the accomplishments on TFTR," he said.

The Laboratory had pushed for the continuation of TFTR because of the machine's potential for physics experiments that would take the nation a step closer toward making fusion commercially viable. "It is tragic to stop the experiments at this time," said PPPL Deputy Director Dale Meade.

The closing of TFTR also marks the last page in the fusion careers of many at PPPL. The Laboratory faces a staff reduction this summer of up to 200 of its 500-plus employees. Many, who have pursued fusion as a lifelong dream, or who have devoted years of their lives to work surrounding TFTR, will be forced to look at other occupational options.

PPPL Interim Director John Schmidt stated, "The decade and a half of TFTR experimental operations has been marked by tremendous achievement of parameters and scientific understanding. In addition, the safe operation of TFTR is a credit to all of the individuals associated with TFTR. This serves as a demonstration that fusion devices can be safely operated with tritium fuel and associated fusion power production."

Steve Scott, PPPL Principal Research Physicist, said he has been drawn to fusion since he was 14, when his father presented him with a book about plasma physics. "The idea of bringing a star to earth is pretty nifty to me. That's all I've ever wanted to do."

Pointing to the technicians and engineers at work in the Control Room, Scott added, "Some of those guys have worked in front of those terminals for 10 years."

The shutdown of TFTR will occur during the next six months, and will include removing and transporting tritium off-site, as well as shutting down the electrical systems and mechanical operations. Then the tokamak will be indefinitely mothballed.

In a note to staff the morning of the final plasma, Hawryluk said, "No further tokamak experiments are planned on TFTR. Activities as part of the shutdown of the facility will begin immediately."●

PPPL — Fiscal Year '98 and Beyond ...

By Anthony De Meo

The U. S. has been a world leader in the development of magnetic fusion energy. As an alternative to fossil fuels and fission, fusion ranks high in its promise of unlimited, safe, and environmentally attractive energy for our children and grandchildren.

Since the late 1970's, funding for the development of magnetic fusion energy in the U.S. has fallen more than 70 percent. During the past two years alone, program funding has been slashed almost 40 percent, resulting in a substantial loss of highly skilled human resources at the nation's fusion laboratories. In contrast, the Europeans and the Japanese support fusion research with individual budgets more than twice that of the U.S.

The reduction in federal support for magnetic fusion research that occurred in fiscal year 1996 necessitated a restructuring of the program. The new national strategy focuses on the underlying scientific foundations of fusion.

The Tokamak Fusion Test Reactor (TFTR) at PPPL is one of the world's most advanced magnetic fusion experiments. It is the only machine that has performed extensive experimentation with plasmas comprised of a 50/50 mixture of deuterium and tritium, the fuel most likely to be used in the first generation of fusion power plants. Unfortunately, the restructuring of the U.S. fusion program has required the shutdown TFTR. "Last plasma" occurred shortly before 2 a.m. on Friday, April 4.

During the last decade, TFTR experimental results have dramatically improved our understanding of the

underlying science of fusion plasmas, including the discovery of enhanced plasma confinement techniques. Three years of unprecedented deuterium-tritium experiments on TFTR have yielded substantial data on the behavior of plasmas with properties approaching those required for commercial fusion power production. In the process, TFTR attained several world records including the production of 10.7 million watts of fusion power and a plasma temperature of 510 million degrees centigrade, the highest temperatures ever produced in a laboratory—many times the minimum temperature required for commercial fusion power production. In addition to its physics achievements, TFTR has met all of its original hardware design objectives, making major contributions in many areas of fusion technology development.

At $225 million, the Department of Energy's proposed budget for magnetic fusion research in fiscal year 1998 is essentially the same as 1997. However, the Department of Energy (DOE) has proposed $47.6 million for PPPL, a 15 percent cut from the current fusion budget of $55.9 million. The budget proposed for 1998 will result in some layoffs at PPPL.

Looking to the Future

Despite the cutbacks, PPPL has developed a forward thinking, innovative strategic plan for the period immediately following TFTR. This program includes the construction and operation of a new experiment, the National Spherical Torus Experiment (NSTX) , collaborative programs on moderate and large-scale experiments in the U.S. and abroad, advanced concepts development, plasma theory and computations, ongoing participation in the International Thermonuclear Experimental Reactor (ITER) Project, and continued work on non-fusion applications of plasma science and technology.

NSTX *(See PPPL News Vol. 1, No. 1)* will test an alternative approach to plasma confinement which has the promise to combine stability at very high plasma pressure with excellent energy confinement. The new device will utilize an advanced configuration which could lead eventually to a relatively inexpensive, compact magnetic fusion device capable of producing high levels of power. By utilizing approximately $130 million of existing PPPL infrastructure, the basic NSTX device will be constructed at a minimum cost (approximately $20 million), as a joint project involving PPPL, Oak Ridge National Laboratory, the University of Washington, and Columbia University. First plasma on NSTX is scheduled for April, 1999. The proposed 1998 budget for PPPL includes $12.6 million toward the construction of NSTX, up from $5 million in 1997, but significantly less than the $17 million requested by the Laboratory.

PPPL is determined to maintain a high quality fusion program. Our strengths are very closely aligned with the goals of the restructured fusion sciences program. A strong, diverse program of experimental and theoretical plasma science is envisaged, emphasizing understanding of the physics of plasmas and innovation in fusion confinement concepts. In the 1999-2004 time frame, a vibrant NSTX experimental program will be conducted, and a second moderate-sized advanced toroidal device will be proposed for construction at the Laboratory. PPPL will be working with the Department of Energy to make this vision a reality.●

PPPL Rated "Excellent" for 1996

By Anthony De Meo

The performance of PPPL in 1996 has been rated "excellent" by the U. S. Department of Energy (DOE) in a report issued in March.

The report cited the Laboratory's consistent excellent scientific and technological achievements, its successful management practices, and included high marks in a host of other areas including environmental management, employee health and safety, human resource administration, science education, and communications.

Outstanding Employees

"There is a tradition of excellence at PPPL which has been maintained by outstanding employees across all functional areas of the Laboratory. We are grateful for the recognition of the Department of Energy evident in their 1996 appraisal," noted John A. Schmidt, Interim Director of PPPL.

Jerry Faul, Manager of the Department of Energy's Princeton Group, said, "The purpose of this appraisal is to provide constructive feedback to University and PPPL management on the DOE's assessment of the Laboratory's accomplishments of its scientific and administrative goals. On the basis of our systematic, qualitative evaluation we are pleased to assign an overall rating of 'excellent' for PPPL's performance in 1996."●

Hawryluk Receives First Kaul Prize

Richard Hawryluk, Head of the Tokamak Fusion Test Reactor (TFTR) Project at PPPL, is the 1996 recipient of the Kaul Foundation Prize for Excellence in Plasma Physics and Technology Development. Hawryluk, who is the first recipient of the newly established prize, received the award during a ceremony and reception at the Laboratory on December 16.

Hawryluk, who also heads PPPL's Tokamak Confinement Systems Department, was cited "For his pioneering contributions to the physics of deuterium-tritium plasmas and his outstanding scientific leadership of the historic experiments on the Tokamak Fusion Test Reactor." The prize includes a cash award of $2,000.

"Richard Hawryluk is highly deserving of being the first recipient of this prize," said former PPPL Director Ronald C. Davidson, who created the prize by directing that $40,000 of the $100,000 gift he received as the 1993 recipient of the Award for Excellence in science, education, and physics from the Kaul Foundation be given to Princeton University to endow the Kaul Foundation Prize for Excellence. The prize is to be awarded annually to recognize a particular recent outstanding technical achievement in plasma physics or technology development by a full-time, regular employee of PPPL. Nominations for the award are submitted to the Prize Selection Committee, which includes the Princeton University Provost, the Chair of the Princeton University Research Board, and the PPPL Director, Deputy Director, and Associate Director for Research.

"By establishing the Prize for Excellence in Plasma Physics Research and Technology Development through Princeton University, I hope that many of the outstanding scientists and engineers at the Princeton Plasma Physics Laboratory who contribute so generously of their extraordinary talents to the development of fusion as a safe and environmentally attractive energy source will receive much-deserved recognition for their exceptional contributions for many years to come," said Davidson, who stepped down as Director in January.

Rich Hawryluk

Upon receiving the prize, Hawryluk said, "I want to express my appreciation to PPPL Director Ron Davidson and Deputy Director Dale Meade for their support of the D-T experiments and for giving me the opportunity to contribute on TFTR, and to former PPPL Director Harold Furth for bringing TFTR to PPPL. Most of all, I want to express my appreciation to my colleagues and family. The results on TFTR are the product of a great team of scientists, engineers, technicians, administrative, and office and clerical staff. It has been a pleasure to learn from them and work with them."

Hawryluk came to PPPL in 1974 after receiving a bachelor's, a master's, and a Ph.D. in physics from the Massachusetts Institute of Technology. He has been Head of the TFTR Project during PPPL's record-breaking experiments. In December, 1993, TFTR produced 6.2 million watts of fusion power, followed by 9.3 million watts in May, 1994, and 10.7 million watts in November, 1994. TFTR has made major contributions to understanding the properties of high-temperature fusion plasmas.●

Potensky Receives Gore's Hammer Award

PPPL's Carl Potensky recently joined the Lab's honored award recipients.

Potensky, Manager of the Maintenance Engineering Branch for the Lab's Facilities and Environmental Management Division (F&EM), helped "reinvent government" and received the prestigious Hammer Award from Vice President Al Gore for his efforts.

"Carl worked with a team of representatives from Department of Energy (DOE) laboratories to consolidate an onerous number of DOE orders — 13 orders consisting of over 500 pages — into one order less than 10 pages. It was truly a feat that took about two years to achieve," said J.W. Anderson, Head of the Lab's F&EM.

Potensky was a member of a 12-person utility and energy sub-group that was awarded for its contribution to the DOE Headquarters' initiative to dramatically improve the way DOE manages its physical assets. Physical assets include real estate, real property and facilities, i.e. land, buildings, structures, and roads.

The sub-group, which was one of four technical subgroups that supported a performance improvement team, included four contractors, four DOE Field Office employees, and four DOE Washington Headquarters representatives. The group met periodically from the fall of 1994 until the spring of 1996.

Continued on page 5

Hammer

Continued from page 4

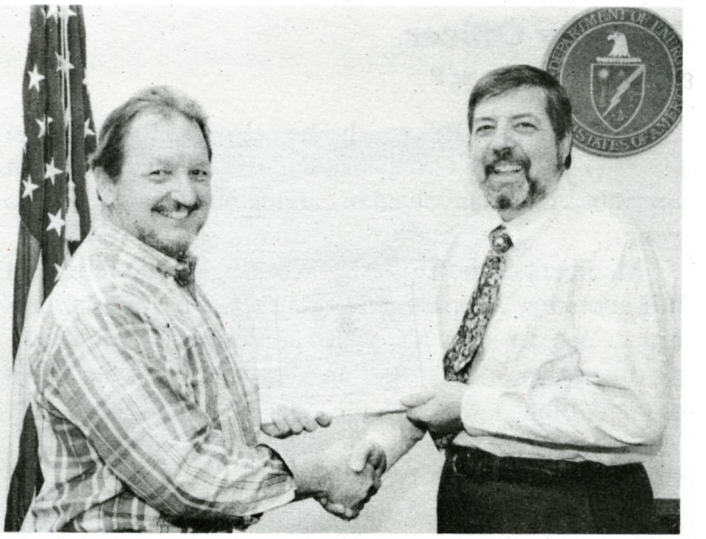
Eliminate Thick Layers

"During the whole time I felt like I was working toward something — a goal that was well defined. Our job was to eliminate thick layers of orders and allow contractors to do the jobs they were hired to do," said the award recipient.

As part of the DOE's contract reform efforts to manage operating contractors through performance-based contracts, and through the change in DOE's management approach to say "what," not "how" in DOE orders, the sub-group was able to consolidate 13 DOE orders relating to physical assets into a single order called Life Cycle Asset Management.

Each member of Potensky's sub-group received the Hammer Award by the National Performance Review for their "contribution to building a government that works better and costs less."

The Hammer Award is given to teams of individuals who are responsible for participating in an effort that "smashes" government bureaucracy. It is the Vice President's answer to yesterday's government and its $400 hammer. About 600 Hammer Awards have been presented to teams comprised of federal employees, state and local employees, and citizens who are working to build a better government.



Department of Energy Princeton Group Manager Jerry Faul (right) congratulates PPPL's Carl Potensky on receiving the prestigious Hammer Award. DOE officials at the Lab had presented the award to Potensky earlier.

"I'm very proud to have received the award and thankful to PPPL and DOE for selecting me to serve on the team," said Potensky, who received a plaque signed by Vice President Gore and a pin of a hammer signifying the elimination of government waste.●

Lucas Named Lab Diversity Officer

PPPL's Pamela Lucas has taken on a second job at the Lab.

Lucas was recently named PPPL's Diversity Officer, a newly established position created by former Director Ronald C. Davidson.

Said Davidson in a memo to staff, "The primary objective of the Laboratory Diversity Officer is to help achieve our institutional goal of strength through diversity."

As the Diversity Officer, Lucas oversees the Laboratory's diversity efforts and leads the newly formed Diversity Working Group at PPPL.

"My main objective is to see that diversity becomes an integral part of the Laboratory — not a separate function," said Lucas, a Science Education Program Leader. "I want diversity to be represented at each and every level at PPPL."

Pamela Lucas

Diversity encompasses individual distinctiveness, including, but not limited to race, gender, work-family issues, sexual orientation, religion, and physical capability.

Since the December appointment, Lucas, working closely with Human Resources staff, has met with senior staff to review how recruitment is done and is working on a plan for increasing the number of women and minorities in science and technology positions. She has been instrumental in seeing that advertising for post doctoral positions at PPPL are placed in magazines and web sites that deal with women in physics, as well as in a newsletter for black physicists.

"The key is that someone have 'ownership' of the diversity efforts," said Lucas, who came to the Lab four years ago.

Continued on page 6

Diversity Officer

Continued from page 5

As Diversity Officer, she has also led the first two Diversity Working Group meetings, which kicked off in December, and is involved in carving out a charter for the group.

Members of the Diversity Working Group represent the Laboratory's departments, projects, and working committees and diversity advocates are responsible for relating diversity issues to staff and implementing the Lab's diversity plan.

Workforce Diversity

Lucas said her goals include encouraging workforce diversity through recruitment and retention; assisting in the creation of a comprehensive career development program that gives employees the experience to compete for positions of increasing responsibility; and encouraging Procurement to continue contracting with minority and women-owned businesses.

She also intends to look for more ways to incorporate diversity in technology transfer, science education, and community outreach areas, and plans to work closely with Princeton University on diversity and race relations.

The University/PPPL Statement on Diversity and Community states, in part, "As a community, we respect the dignity, individuality, and freedom of each member. At the same time, we strive to be a place where individuals and groups learn with and from each other."

Lucas said the value of diversity in the workplace — besides being the right thing to encourage — is that utilizing each individual to his or her hightest potential boosts morale, increases productivity, offers new ways of tackling problems, and furthers the Laboratory's mission.

"I believe that if people are given the right environment to succeed and flourish, they will. I am committed to that and believe that the better our people are, the better the Lab is," said Lucas.●

PPPL and High School Students Create Robot

Team Competes at Rutgers and Brings Creation to Lab

By Patti Wieser

Using iron pipes, rubber tubes, old automobile parts, and a bit of ingenuity, PPPL and students from Hopewell Valley Central High School recently designed and built a 96-pound robot. The PPPL/Hopewell Valley team then took their creation to Rutgers University to participate in the Johnson & Johnson Mid-Atlantic Regional FIRST Competition, placing in the middle third out of 35 robots.

FIRST — For Inspiration and Recognition of Science and Technology — is a national engineering contest that immerses high school students in the world of engineering. For six weeks this winter, the team of 15 students from Hopewell Valley Central High School teamed up with PPPL Engineer Alex Nagy to design, construct, and test their robot, receiving a hands-on, inside look at the engineering profession. PPPL's Science Education Program sponsored the Hopewell Valley team's participation in FIRST.

The PPPL/Hopewell Valley robot.

Experience Gained

"The students did the design and I gave them guidance and answered their questions about why some things would not work," said Nagy, PPPL Chief Operating Engineer and Tokamak Fusion Test Reactor Shift Supervisor who is presently working on a collaboration at General Atomics in San Diego. "There is a lot of learning gained by designing a project and making it work after it has failed the first time. It is the experience gained that has a positive outcome."

Continued on page 7

Robot

Continued from page 6

Nagy said he and the students spent a total of about 100 hours — after school and on the weekends — producing the robot in the high school's former metal shop. A core group of about five students worked at nearly every session, while others on the team participated for shorter periods. "The students deserve many congratulations for their unending commitment in carrying out this project," said Nagy.

In March, the PPPL-Hopewell Valley team participated in the FIRST competition at Rutgers in New Brunswick. Each team's robot competed with other robots within a hexagon-shaped playing field, complete with an eight-foot, freely rotating central goal and a human player. The robot collected, transported, and lifted inner tubes to score points.

The PPPL/Hopewell Valley robot was operated by the student team in a competition comprising 34 other teams in seven heats with one first and six seconds, resulting in placing 16 out of the 35. Besides the main competition, prizes were awarded for "best looking" robot and "funniest" robot, among other categories.

In April, the students brought the robot to PPPL, giving a demonstration of its features in the Lobby.

Nagy said it was his first time, as well as PPPL's, to participate in FIRST. He noted the experience is equally rewarding for students and mentors. "I learned how to better communicate with people and that mentoring students in school is important because it gives them an opportunity to learn about and work with things in the real world."

Alex Nagy (left) and members of the team brought their robot to PPPL for a demonstration in the Lobby.

Added PPPL Science Education Program Leader Pamela Lucas, "FIRST is about motivation and team work. The competition gives the students an opportunity to see what science and engineering is like with real deadlines and real challenges, and how engineers must meet these challenges as part of a team."●

PPPL Establishes Diversity Working Group

The newly formed Diversity Working Group kicked off its first meeting in December with guest speakers Sara Brunson, of the Department of Energy (DOE), and Robert Willis, Affirmative Action Officer at Johns Hopkins Applied Physics Laboratory.

Brunson spoke about the DOE's Strategic Plan for Diversity while Willis addressed the distinction between Diversity and Affirmative Action. From left are Susan Murphy-LaMarche, Brunson, Linda Harmon, Steve Iverson, and (standing) Willis.●

Computer Division Scrambles to Add Sixth Digit for TFTR Shots

By Patti Wieser

The Computer Systems Division at PPPL was up against the clock. The Tokamak Fusion Test Reactor (TFTR) shot clock, that is.

All the computer systems associated with TFTR — which had accommodated a five-digit shot — had to be converted to accommodate a six-digit shot.

"TFTR has a master clock called the shot clock and it was designed way back in about 1982 with five digits. The shot numbers would go from one or zero to 99999," said Michael Diesso, of the Computer Systems Division (CSD). "The machine was supposed to shut down in the late 1980s or early 1990s but it got extended so many times that we ran into the problem of using up more shots than we had room for in the clock. We needed another digit — a sixth digit — to go up to shot 100,000 and above." TFTR averages 250 shots per week of operation.

By the time TFTR shut down in the summer of 1996 for maintenance, the Lab was up to shot 96391. "Various people calculated how many shots we needed by the time TFTR would end and found we would be over the limit. This past summer, most of the people in this division were busy going through all of the codes that related to TFTR to see if they used a shot number — and most of them did — and whether there was room for six digits. Most of the time there wasn't. We had to check all the codes and modify those that used the five-digit shot number," said Diesso. Diesso worked along with CSD's George Christianson and Jim McEnerney, who took the lead on the project.

That included looking at low level operating systems, all the diagnostic applications and display programs, as well as the controls systems. "Basically the entire guts of the computer system for TFTR was looked at and most of it was modified," Diesso said.

The task became trickier with a reduced staff level. "Over half the programmers had just been laid off so those of us who were left had to do this along with our other work," said Christianson. In addition, many of the people who had designed the programs were no longer at the Lab.

Forge Ahead

After weighing the alternatives, the group decided the best solution was to forge ahead and use six digits. "We talked about just starting over again at zero the way you would roll back an odometer on a used car. But all the solutions that could have saved work in one place produced as much or more work in another place," said Christianson.

For instance, the database information had dates, times, and shot numbers in sequence on graphs. If the graphs were to keep increasing with the shot numbers, there had to be increasing shot numbers. Rolling back would mean that data would go up and down. Another suggestion was to use alphanumeric figures, but that would entail modifying all the applications programs, which assumed the numbers were in digital format.

"If you had to go in and do something major anyway, you might as well do it the right way and go to six digits," commented Diesso.

Luckily, the hardware clock that produces the shot number had been designed for six digits, although power had not previously been put to the additional digit. That meant that the project simply became a huge software job.

McEnerney said about a dozen people were involved in modifying the code for several months, including about five who worked on the project full-time. "We got started in August right after the machine stopped. And we had a contractor off site helping us out," said McEnerney. "We were ready for first plasma when they started the machine again in the winter and we started with shot number 101,000."

Diesso added, "When we began TFTR, we reserved shots 99,000-99,999 for testing and calibration shots. At the end of the previous run, we made all of the code changes to handle six digits, tested the new code with six-digit test shots in the range 100,000-100,999, and began the latest run with shot 101,000."

He said the group devised a fall back plan that entailed pushing the clock ahead to 101,000. "That way when they started up the testing shots, the digits would all be six digits and in case we missed something critical, we could always roll back to 96,000 where we had left off and use the few remaining numbers until we could figure it out and then roll forward again," said Diesso.

The project leaders said that the six-digit accommodation posed such a problem that if the team had run into

The PPPL team involved in the "sixth digit" project are, from left, Gretchen Zimmer, Dick Wieland, Ken Silber, John Dong, Tom Gibney, Marilee Thompson, James McEnerney, Michael Diesso, Lewis Randerson, Jane Montague, James Hirsch, Christiane Ludescher, Doug McCune, and George Christianson. Not pictured are Phyllis Roney, James Chu, and Judy Giarrusso. The insert is the shot clock with six digits.

a wall, operation of the machine would have been halted. But there was also a chance the magic number would not have been needed. "When we did reach it, we realized that it had been absolutely necessary to have done all the work. It paid off," said Diesso, noting that TFTR is now past shot 104,000.

Christianson said the solution of adding a digit meant numerous routine changes rather than any real redesign. "Basically hundreds of programs had to be changed to accommodate more room for the six-digit shot number. But we did the same kinds of changes to each program so the work was routine in that sense," he explained. "Most of the work was not actually in physically changing the code but in rebuilding the programs. Then we needed time without the machine running to test the entire system."

Hundreds of Programs

Between 500 and 1,000 programs were affected, as well as routines of a systems nature that return shots or handle the naming of files. All the routines had to be modified before the programs were changed, and all the work had to be done sequentially. "I couldn't make my changes until low-level systems changes were done. And that couldn't be done until some even lower systems modifications were done," said Diesso, adding that hundreds of programs had to be looked at to see if they used shot numbers.

He added, "It was the size of the project that was most daunting, and the tedium of it. You would spend your entire day looking through code."

While the work was tedious, it was also high pressure. "It was difficult to maintain momentum on this work while actually supporting the run and also trying to do other work. And you knew that you were working against the clock — literally," Christianson said.

The problem facing PPPL's computer experts is similar to that being tackled by companies worldwide concerning the millennium.

Said CSD Head Dori Barnes, "What makes this project interesting is that it is solving the same issues that are causing so many commercial organizations to panic at

Continued on page 10

Sixth Digit

Continued from page 9

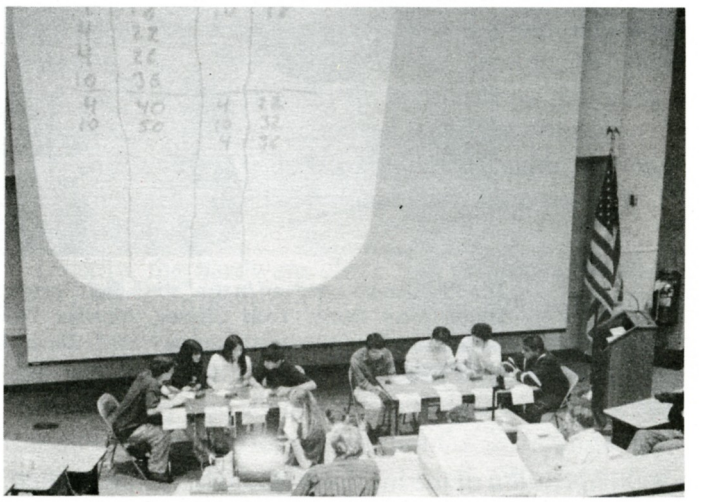
this time — the 'millennium problem' or 'year 2000 problem.'" When computers first came on the scene, digits were expensive, so only the last two digits of a year were used to represent that year; the "19" was understood. For instance, "1997" simply became "97." When the year 2000 comes, computers will see "00" and make calculations as if it were the year 1900, resulting in confusion. Before the millennium, all computer programs must be examined and changed to use all four digits for the year so that the year 2000 is just another year in the sequence.

"They will be coming to the same decision that we did. They will need to look at all the code that's been written and modify it. And if they don't fix it in time, it won't run. If we hadn't fixed our problem in time, TFTR wouldn't be running," said Diesso.●

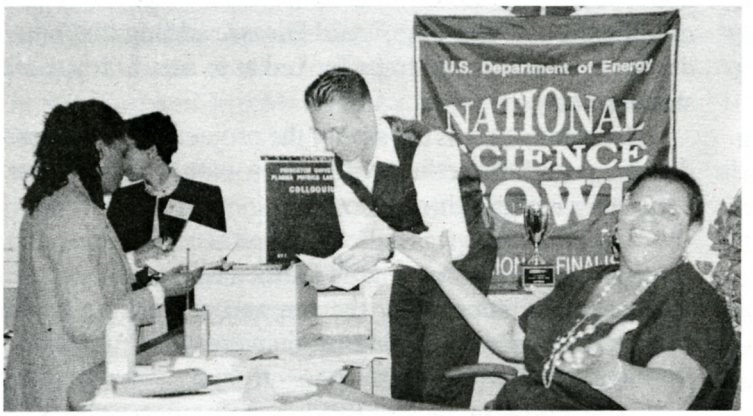
PPPL Hosts Regional Science Bowl

24 High School Teams Compete

PPPL hosted the New Jersey Regional Competition of the National Science Bowl® on February 22, opening its doors to 24 high school teams from New Jersey and Pennsylvania. The top prize — an all-expense paid trip to Washington, D.C., to participate in the Sixth Annual National Science Bowl® — was taken home by the Governor Livingston Regional High School team. The East Brunswick High School team and the Montgomery High School team, Group A, garnered second and third place, respectively. The top three teams received trophies.●



Two teams compete in the Auditorium at PPPL.



From left are PPPL'ers Pamela Lucas, Linda Harmon, James Morgan, and Christine Ritter at "Science Bowl Central."

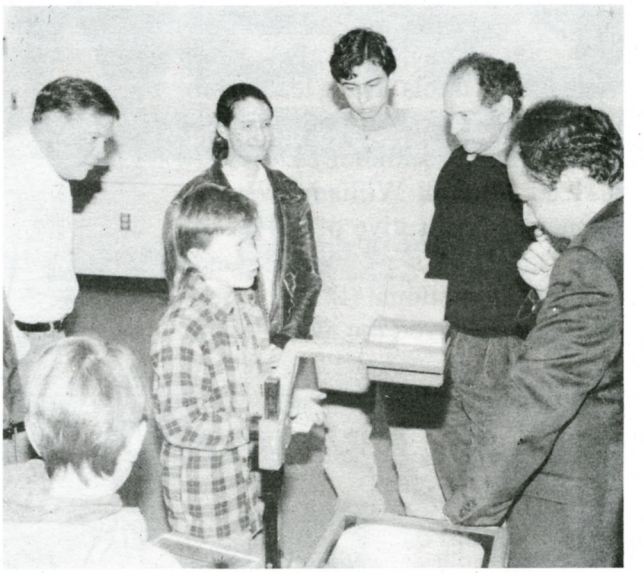
PPPL Science Education Program Head Diane Carroll (left) and Science Bowl volunteer Barbara Sarfaty, also of PPPL, get ready for the next round of competition.

Science on Saturday Draws Record Crowd

This year's Science on Saturday lecture series was a hit, drawing nearly 2,500 people to PPPL for talks on topics that ranged from earthquakes and science in the crime lab to diamond making and optoelectronics.

"We just completed another successful Science on Saturday lecture series, with 700 more people entering the doors of PPPL than last year," said PPPL Science Education Program Administrator Chris Ritter. "This outreach program traditionally has a high attendance record, with students, teachers, parents, and community members participating. This year, because of the mild winter and varied guest speakers, we had an even larger crowd. Among those in attendance were students from thirty-nine pre-college schools and eleven colleges and universities from the metropolitan area."

Science on Saturday is an annual series of free lectures geared toward high school students, but open to the community. The talks are given by scientists and engineers who are leaders in their fields. Started as a grassroots effort 13 years ago, it now attracts more than 300 people — ranging in age from 8 to 80 — each Saturday.



Visitors young and old gather around Princeton University Professor David Spergel to ask questions following Spergel's talk about "The Big Bang Theory."

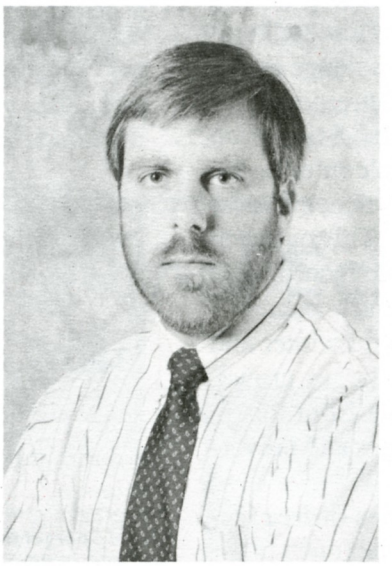
The 1997 series began in January and concluded in March. Buses for transporting Trenton students and refreshments were provided through a grant from AT&T.●

Princeton University Professor John Conway discusses "Knots, Tangles, and Bangles" during a "Science on Saturday" lecture at PPPL.

Mike Williams Named "Executive of the Year" by Professional Secretaries

In recognition of his strong leadership skills and "open door" policy, PPPL Engineering and Technology Development Head Michael Williams was recently named "Executive of the Year" by the Mercer Chapter of Professional Secretaries International (PSI).

Williams received the award at the group's luncheon on April 21. He had been nominated by his secretary, Mary Ann Brown, who said he "sets an example for all."



Mike Williams

Book of Standards

"By the nature of this office, consistent high standards and professionalism are requirements. To this end, my boss initiated a book of standards. These guidelines are now being followed by all employees," said Brown, who has worked for Williams for five years. "In addition, he responds to educational opportunities not only for me, but for all employees under his direction."

Brown also noted that Williams was "instrumental in helping our Laboratory achieve a milestone that makes us 'the world leader' in our field." Williams, who became Head of the Engineering Department in 1992, was also Deputy Project Head of the Tokamak Fusion Test Reactor (TFTR) Project during the Laboratory's record-breaking experiments on TFTR. In December, 1993, TFTR produced 6.2 million watts of fusion power, followed by 9.3 million watts in May, 1994, and 10.7 million watts in November, 1994.

Williams came to PPPL in 1976 after graduating magna cum laude from Rutgers University with a bachelor's degree in electrical engineering. In 1993, he received the Fusion Technology Award from the Institute of Electrical and Electronic Engineers.

Upon receiving the award, Williams said, "It's an honor to be here and receive this award from the Professional Secretaries International. In doing so, I would like to recognize Mary Ann and all of the office professionals at the Princeton Plasma Physics Laboratory who have contributed enormously to the Laboratory's success."●

PPPL NEWS

Information Services Head: Anthony R. DeMeo
Editor: Patti Wieser
Photographer: Dietmar R. Krause
Layout and Graphics: Gregory J. Czechowicz

The PPPL NEWS is issued by the Princeton Plasma Physics Laboratory, a research facility supported by the United States Department of Energy. Correspondence and requests to reprint material should be directed to: Information Services, Princeton Plasma Physics Laboratory, P.O. Box 451, Princeton, NJ 08543; telephone 609-243-2750; fax 609-243-2751; e-mail info@pppl.gov .