HOTLINE

PRINCETON PLASMA PHYSICS LABORATORY

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# PPL Group Receives APS Award

Six laboratory staff members will share the American Physical Society (APS) Award for Excellence in Plasma Research for their work on a new scheme for driving plasma currents in tokamaks.

This is the second year the APS has presented its annual Division of Plasma Physics award, which consists of $5,000 and a citation certificate. Half of the $5,000 award will be given to the PPL group, with the remainder split between experimental teams at MIT and the University of Kyoto, Japan. PPL award winners include W. Hooke, S. Bernabei, F.C. Jobes, R.W. Motley, J.E. Stevens, and S.E. von Goeler.

The award was presented in recognition of the work all three groups have done in radio-frequency (rf) current drive in tokamak plasmas. The award citation commends the groups for "the experimental demonstration of start-up, ramp-up, and sustainment of toroidal currents by lower hybrid waves."

Previously, tokamak currents had been induced magnetically by a very large system of coils known as the OH (ohmic heating) transformer. Magnetic induction is an inherently pulsed technique; the prospect of replacing part or all of the OH system with rf current drive to obtain longer pulses or possibly steady-state systems significantly enhances the prospects for making the tokamak a practical energy source.

Dr. Hooke explained that prior to 1981, the study of rf current drive in tokamaks didn't exist. "The idea had been around, but it wasn't until the theoretical work of Nat Fisch that there was much hope that rf current drive might possibly be very efficient. We studied rf current drive here at the lab on test machines in 1979, and began working with it on PLT in late 1981 and early 1982."

In principle, RF waves can propel charged particles indefinitely, thus overcoming pulsed mode operation. Dr. Hooke predicted that future tokamaks will use some combination of the two modes, "probably rf-assisted ohmic heating."

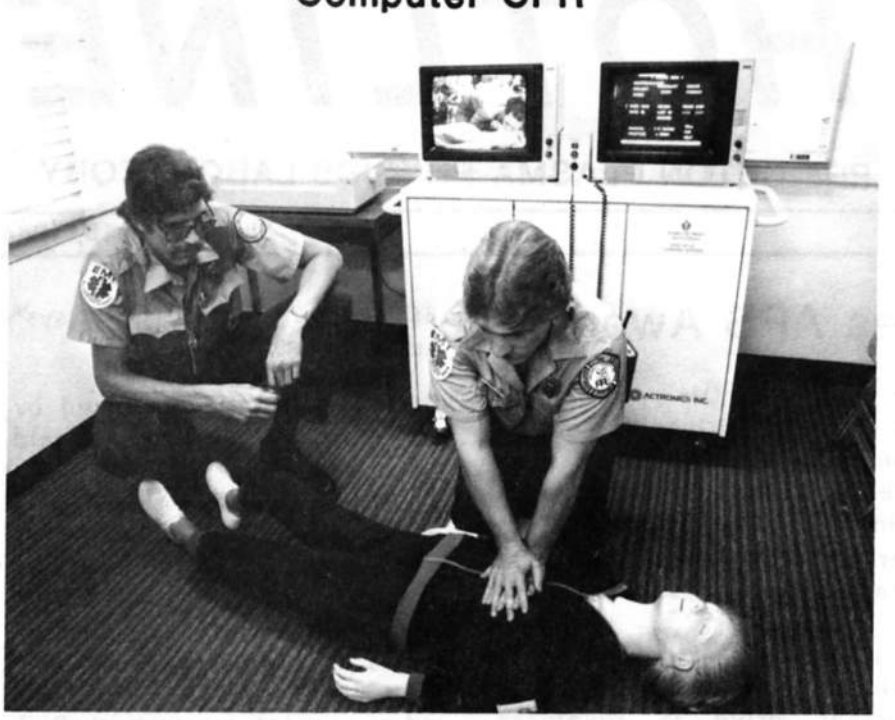
In the experiments conducted on PLT, rf-driven current pulses were maintained for three and a half seconds, and currents as large as 400 kA have been driven with lower hybrid waves. Experimentation also revealed that ohmic heating could be eliminated entirely, allowing very effective current ramp-up from 0-100 kA without the OH system.

"We were really surprised by our results," Dr. Hooke said recently. "We hadn't expected the efficiencies for current drive and ramp-up we got; that surprised everyone. First we were surprised to see that we could maintain large currents with no inductive current drive. Then we discovered rf current ramp-up on PLT and found it to be very efficient. Although they are accepted now, both results were initially received with great skepticism by the plasma physics community."

Present PLT experimentation involves an 0.8 GHz system capable of generating a few hundred kilowatts. A new 2.45 GHz rf system, almost completed, will be capable of delivering 1.2 MW to the PLT plasma. "This new system will enable us to operate at higher plasma densities and pulses of up to 10 seconds," Dr. Hooke said. "It should serve as a prototype for a TFTR experiment. In 1986, we plan to run transmission lines to TFTR for a preliminary experiment. In 1987, we hope to have a multimegawatt system installed out there."

The laboratory nominated the PPL group for the APS award. The group's work was then evaluated by an APS committee, which chose the award recipients.

## Computer CPR



*Emergency Services Unit members Scott Larson (left) and Frank Bozarth review their cardiopulmonary resuscitation (CPR) technique via the American Heart Association's computerized CPR learning system.*

Resusci-Annie is no dummy any more.

The familiar mannequin, who has helped teach cardiopulmonary resuscitation (CPR) to so many people, has finally joined the computer revolution. Now outfitted with a series of sensors, and aided by an Apple computer and a Sony videodisk player, Annie has begun "teaching" CPR recertification classes at PPL.

CPR is a lifesaving technique that couples mouth-to-mouth resuscitation with chest compressions. CPR can help revive someone who has had a heart attack by maintaining oxygen and blood flow.

The new integrated learning system, developed and patented by the American Heart Association, is being given a six-month trial by the laboratory's Emergency Services Unit (ESU). The interactive system allows CPR students to renew their qualifications at their own pace, with the computer -- and Annie -- acting as course instructors.

"Right now, we're using the system for recertification," explained ESU Captain Gregg Tompkins. "But eventually we hope to have the system take over all CPR training." The system generally cuts training time, provides more standardized and detailed instruction, and can be used on a 24-hour basis.

The CPR learning system is a self-contained, stand-alone unit. It interfaces the videodisk player and the microcomputer with two video monitors, a computer controlled audio player, a light pen, and the sensor-equipped mannequin. The system's CPR instruction begins with classroom lectures, viewed on the videodisk monitor. Students are periodically tested on course material through multiple choice or fill-in-the-blank quizzes. Questions are presented on the computer monitor; the student responds by using a light pen to select answers. The results of each test are automatically recorded by the computer.

The second portion of the course involves work on Resusci-Annie. Sensors monitor movement of the mannequin, including depth and placement of chest compressions, and the effectiveness of mouth-to-mouth ventilation. A combination of audiovisual coaching, visual computer displays, audio tones, and a computer graphic summary provides students with immediate feedback on their performance. The course concludes with a complete CPR test, which must be completed to the computer's exacting specifications.

Recertification using the new system is estimated to take approximately one hour. To make an appointment for recertification, contact Judy Duffy at ESU Headquarters, ext. 3166.

## Health ID Cards

Anyone who has yet to receive their health identification cards from Aetna or any of the four health maintenance organizations (HMOs) should contact Mary Moore at ext. 2043 or Eleanor Schmitt at ext. 2046. Recent new hires and those who have recently changed their coverage should expect a two month delay in receiving their cards.

## Fred Tenney

PPL research physicist Frederick H. Tenney, 62, died suddenly at Philadelphia's Graduate Hospital August 22.

Born in New York City and raised in Ridgewood, New Jersey, Dr. Tenney received a B.S. in mechanical engineering from the California Institute of Technology in 1943. Dr. Tenney enlisted as an ensign in the U.S. Navy in 1943, rising to the rank of full lieutenant. During World War II, he was on active duty as a radar officer in the Pacific.

After the war, Dr. Tenney worked in the Naval Ordinance Division of Eastman Kodak in Rochester, N.Y. He received his Ph.D. in physics from the University of Rochester in 1953.

Dr. Tenney joined the Physics Department of Princeton University in 1953, and became a laboratory research staff member in 1955. He was the first to analyze neutral beam injection successfully and quantitatively, and originated the concept of the divertor -- each of which was responsible for the design and construction of fundamentally new test reactors. His experimental and theoretical work was unusual in its range. He published frequently in professional journals, and was recently honored with an invention award from Princeton University.

Dr. Tenney was a member of the American Physical Society, the American Nuclear Society, the New Jersey Academy of Science, the New York Academy of Science, the American Academy of Science, and the Federation of American Scientists. He served on the Review Board for the American Nuclear Society, and was the former president of the Princeton chapter of Sigma Xi.

Dr. Tenney was co-founder and former president of the Ethical Culture Fellowship of Princeton, and former president of the Princeton chapter of United World Federalists. He belonged to the Union of Concerned Scientists, and was a member of the Council for a Liveable World. In recent years, he served as area chairman of the CalTech Alumni Association, and was also an active member of the Peace Education Committee of the Coalition for Nuclear Disarmament. In addition, he had been an enthusiastic performer in many PJ&B musicals since 1972.

Dr. Tenney is survived by his wife of 37 years, Dr. Lillian Baum Tenney, a physician; his children, Steven, David, Susan, and Jonathan; and two sisters, Mrs. Anne Long of Glen Rock, N.J., and Mrs. Margaret Anderson of Ridgewood, N.J.

A memorial service for Dr. Tenney was held at the Princeton University Chapel September 9. In lieu of flowers, contributions may be made to Amnesty International or the Coalition for Nuclear Disarmament.

## Ray Grimm

Raymond C. Grimm, formerly Deputy Head of the Theoretical Division and Head of the PPL Computer Center, died suddenly on August 6 in Sydney, Australia. He had been there less than four months, setting up a new plasma physics group at the Australian Atomic Energy Commission, Lucas Heights Research Laboratories.

Ray, 39, is survived by his wife, Elaine, and two children, Natasha, nine, and Toby, six. The family formerly resided at 4 Chopin Lane, Lawrenceville.

A memorial service was held at the Princeton University Chapel August 31. A memorial prize in Ray's name for graduate students at Princeton University is under consideration. Further information is available from Barbara Sarfaty at ext. 2440.

## Frederick Miller

PPL technical associate Frederick M. Miller, 61, died August 31. A member of the Engineering and Power Branch Office, he had been a laboratory employee for 16 years. He is survived by three sons, Gary, Frederick Jr., and Bryan C. Miller.

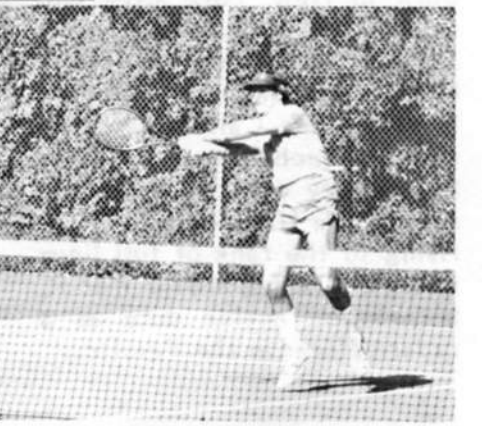
## Tennis Tourney

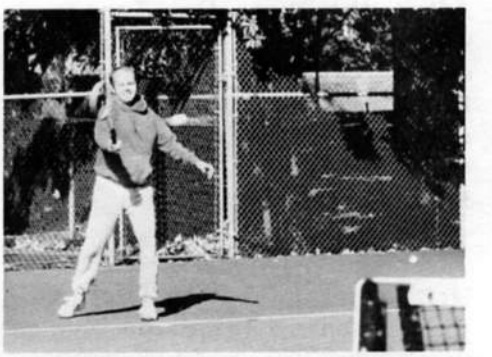
PPL athletes will get the opportunity to demonstrate their "net worth" September 22 by playing in the eighth annual Melvin B. Gottlieb Tennis Tournament.

The tournament is open to all laboratory employees and their families. All entrants must bring a can of new yellow tennis balls and four dollars to their first match.

A single draw will be used to pair opponents regardless of age, sex, or USTA rating. Each match will consist of three sets, with a 12-point tie breaker played if necessary. Winners of two of the three sets will advance, with first round losers entering the consolation bracket.

Participants should be able to play at least the first two rounds on Sept. 22 or 23. As many matches as possible will be scheduled during the morning hours on both days. Subsequent rounds will be played in the evening during the following week, and into the next weekend.





To enter the tournament, send your name, telephone number, and the times when you CANNOT play to Marilee Thompson (C-Site, B135, ext. 3422) or Vern Wu (C-Site, LOB, ext. 3391) by Sept. 20.

## Bowling League Signups

The PPL Mixed Bowling League will begin its 1984-85 season September 12 at Colonial Lanes on Route 1. Teams compete in league play each Wednesday at 6:15 p.m. during the 34-week season.

Anyone interested in joining the league should contact Bobbie Cruser at ext. 2101 or Dolores Mazalewski at ext. 3554.

## Kopliner Tribute

A farewell dinner honoring Forrestal Campus Security Director James Kopliner was held at Cedar Gardens Restaurant in late May.

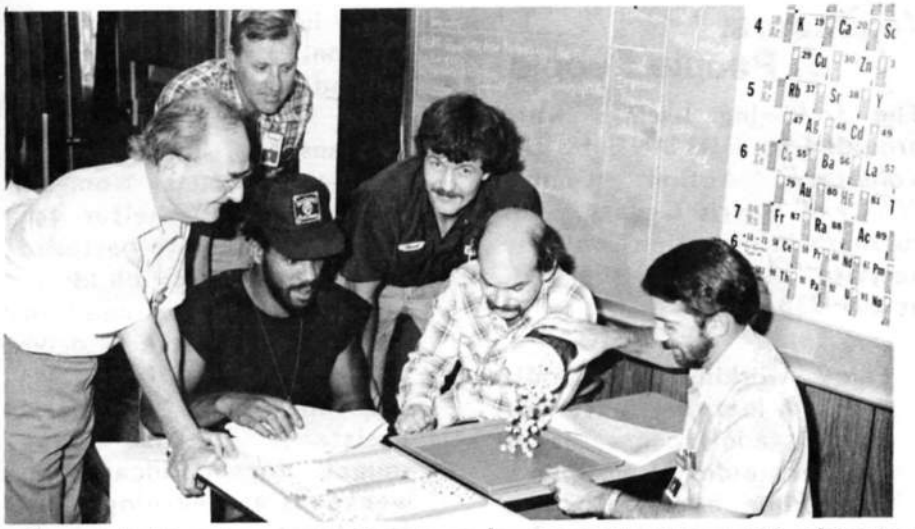
A fifty year resident of Princeton, Jim devoted much of his life to his community. Following a stint in the Marine Corps, he joined the Princeton Borough Police Department. He served as juvenile officer, safety officer, and shift supervisor from 1955 to 1965. During this period, he graduated from the FBI Training Academy in Quantico, VA and the New Jersey State Police Academy in Wilbertha, NJ.

Jim became Assistant Director of Security at the University's main campus in December of 1965. He remained at main campus for 14 years, until he was appointed Deputy Director of Security and Director of Security at the Forrestal campus in 1969.

## Transitions

BORN -- To Jerry Williams and his wife Cheryl, a daughter, Cheri Nicole, on August 5. Congratulations!

BORN -- To Nick Womak and his wife Judy, a son, Nicholas R. Jr., on July 8. Congratulations!



*Radioactivity is one of nature's purest games of chance; no one can predict if a given atom will decay in the next second or in the next century. Students in the recent "Fundamentals of Radioactivity" course taught by Dr. de Haas simulated that randomness by rolling 200 14-sided dice. Any die that landed with a specified face exposed was removed from the sample before the dice were thrown again. Pictured from left to right are students P. Del Gandio, E. Mitman, M. Kijek, S. Vinson, D. Terhune, and Dr. de Haas.*

## First Call For Help

You've got a problem. You need to find a good childcare agency, help for your aging parents, or a way out of the dead-end job you're in. You need information and assistance, but you don't know who to ask, or where to turn. How will you find the answers you seek? By contacting First Call for Help, a service funded by the United Way -- Princeton Area Communities.

First Call for Help is directed by the Princeton Area Council of Community Services, a United Way member agency. First Call does not deal solely with United Way organizations, however. Its purpose is simply to point people in the right direction for help with their problems or questions. If someone needs services outside the United Way's 13-community service area, First Call will link the individual with the appropriate agency.

The Council began offering information and referral assistance to individuals and agencies in 1976. Callers have been matched with community resources offering aid for problems as varied as job counseling, transportation, divorce, schizophrenia, housing, and care for the elderly. In addition, callers have received valuable help in handling state and local regulations affecting them. In 1983 (the last year figures are available), First Call aimed 284 people at the right agency.

First Call for Help can be reached by dialing 609-924-5865 or 609-799-6033. This service is one of more than 130 services available from the 28 member agencies of the United Way -- Princeton Area Communities. These services are possible thanks to financial contributions made to the United Way.

## Security Checkpoints

There are a few simple rules to follow to maintain office security and prevent thefts:

- Lock all doors, windows, desks, or cabinets when you are not in your office. If you don't have keys available, ask your supervisor to obtain them. Be sure to keep all keys out of plain sight.

- Secure small valuables in locked cabinets or drawers.

- Engrave valuables that have no identifying information (such as electric pencil sharpeners, staplers, small desk clocks, and so on). Employees wishing to borrow engravers, or who would like to make an appointment to have their property engraved, should contact the Security Department at the Chemical Sciences Building.

- Record all identifying information, such as government property numbers, serial numbers, and make and model numbers on all valuable items. Keep the records in a secure place.

- Keep personal valuables such as handbags, briefcases, or clothing secured.

Questions concerning theft and crime prevention should be directed to the Security Office at the Chemical Sciences Building, ext. 2894.

## HEALTH QUEST

"Life is movement," wrote a 19th century European physical training expert.

Nature didn't intend our bodies to be as sedentary as they have become since we changed from an agricultural to an industrial economy in the 20th century. Our bodies were made to move, to work vigorously.

Before the Industrial Revolution, physical activity was a regular part of everyday life. Today, relatively few physical demands are made on the body, so we must make a conscious effort to achieve and maintain physical fitness through exercise.

Each of the body's cells must have constant access to oxygen. How effectively our cardiorespiratory system transports that oxygen is a direct measure of our physical fitness. Cardiorespiratory efficiency is referred to as aerobic capacity. The easiest way to improve aerobic capacity is to exercise regularly (at least 30 minutes four times a week).

One of the best measures of physical fitness is your heart rate, because an efficient heart beats more slowly than one that is not fit. A fit person's resting pulse rate is generally in the range of 50-65 beats per minute, while an average person's rate is 72. You can check your pulse rate easily by pressing your fingers against your temple, counting the pulses for 10 seconds, and multiplying the result by six.

Exercise makes you look better, improves the quality of your sleep and play, and helps you cope with stress. So, come back to life -- get up and move!

## Volunteers: People People

The following listings were provided to HOTLINE by the Voluntary Action Center (VAC) of Morris County. For further information on any activity, please call the VAC at 201-538-7200.

- Enjoy working with children? A learning center for special adolescents needs teacher's aides to work on a one-to-one basis with students. Volunteers are also needed to help small groups of students with special projects. If journalism or photography are your passion, this school needs you, too.

- Enhance your knowledge of natural science, dinosaurs, Indians, and Early America while acting as a docent for a local cultural organization. Select your area of interest, then attend a training session which begins September 17. Hours are flexible.

The next three listings were provided by the Princeton Area Council of Community Services. For further information about volunteer positions, contact each agency directly.

- The Princeton Community Homemaker - Home Health Aide Service provides telephone safety checks for those persons living alone. All telephone calls are made at specific times each day at the mutual convenience of the volunteer and the person being called. All calls are in the caller's toll-free area. Volunteers can also choose to visit isolated people, or provide care to those in need of special attention. Call 609-799-0069 to lend a hand.

- Womanspace, Inc., run by the Mercer County Women's Center, offers shelter for up to six weeks to battered women and their children. The center is in need of volunteers to serve as drivers, interpreters, fund raisers, and board members. Assistance is also being sought for childcare on weekends and evenings, and for locating housing. If you're interested, call 609-394-9000.

- The Holistic Health Association of the Princeton Area seeks to educate the public in the principles of holistic health, providing services that will encourage individuals to assume responsibility for their health. Volunteers are needed to write articles and pamphlets, review books, do telephoning, participate in a speakers' bureau, and much more. To volunteer, call 609-924-8580.

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## For Sale

FOR SALE: One bedroom, 1-1/2 bath condo in Boynton Beach, Florida. Full-size kitchen with custom cabinets and luminous ceiling, tile baths and floors, marble sills, GE appliances, garbage disposal, central air conditioning. Fully furnished, wall-to-wall carpeting, enclosed Florida room. Clubhouse, pool, and putting green 1/2 block away at Pine Point Villa. Maintenance $71.50 per month, taxes $249/yr. Price $40,000. Call Marilyn McBride, ext. 2779. After 6 p.m., call 609-443-1647.



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