

## CRADA to Improve Long Trace Profiler

At facilities such as BNL's National Synchrotron Light Source (NSLS), mirrors are used to focus beams of x-rays, ultraviolet or infrared light onto samples. The standard instrument for measuring the shape of synchrotron radiation mirrors is the Long Trace Profiler (LTP) developed in 1987 by Peter Takacs, Instrumentation Division, in collaboration with Eugene Church, of the Army's Research and Development Center, and Shinan Qian, University of Science and Technology, China.

The LTP can detect minute flaws in mirrors, which can be disastrous to synchrotron experiments. It can also measure x-ray space telescope mirrors and extremely small imperfections inside of glass slabs used to make high-power lasers for nuclear fusion experiments.

Now, BNL has signed a Cooperative Research and Development Agreement (CRADA) with Continental Optical Corporation in Hauppauge, to improve the performance and capabilities of the LTP. Better mirrors will result in more accurate data for researchers in such varied fields as biology, physics, chemistry, medicine and materials science.

Continental Optical holds the license to manufacture and sell the LTP, patented by Associated Universities, Inc. Takacs will be working on the project with Manfred Grindel, President of Continental Optical.

In the profiler, a narrow beam of light from a laser is split into two parallel beams, which are directed onto the mirror surface being tested, reflected back into a lens, and focused on a detector. When the beams rejoin, the interference image is analyzed by a computer, which provides a map of the surface imperfections in the mirror.

Takacs explained that a synchrotron mirror, which focuses x-rays on a sample, must be as smooth and flawless as possible to avoid degrading the high quality of the intense x-



Manfred Grindel of Continental Optical Corporation (left) and Peter Takacs of BNL's Instrumentation Division prepare a mirror for testing with the Long Trace Profiler.

Photo by Roger Stoutenburgh

ray beam. "It's comparable to light being reflected off water onto an object. If the water is smooth, a clear picture of the object can be seen. But if the water is choppy, the reflection is flawed," he said.

Currently, the LTP checks mirrors with an accuracy measured in billionths of a meter. By making improvements in the instrument's detector and computer, the CRADA collaborators hope to increase the speed of data acquisition fivefold. Increased speed means improved accuracy, since shortening the time between measurements reduces the chance that environmental changes could

affect the measurement.

To improve measurement accuracy further, the collaborators plan to make the instrument's laser beam ten times more stable. With the goal of limiting jitter to one hundredth of a micrometer, the researchers will move the laser source off the LTP's scanning head and use fiber optics to pipe the laser beam into the system.

In addition, the researchers will upgrade the profiler so that it will be capable of taking two-dimensional measurements, that is, profiling an area on a surface instead of just along a single line.

(continued on page 2)

## AUI Lecture

### Arno Penzias: The Information Revolution

Computers are becoming ever more powerful and more commonplace. In the 21st century, they most likely will continue to influence the character and pace of the workplace profoundly.

Nobel laureate Arno Penzias, Vice President of Research at AT&T Bell Laboratories, will discuss the evolution of computing during the last half century, as well as his vision of its future, in the next AUI Distinguished Lecture. His talk on "Computer Paradigms and Information Transparency" will be held on Wednesday, March 24, at 4:30 p.m., Berkner Hall.



Arno Penzias

Penzias said, "Today's computers cover a vast range, all the way from the slivers of silicon, which handle the insides of point-and-shoot cameras, to the room-sized banks of blinking lights that sometimes appear as villains in science-fiction movies."

Penzias categorizes computers as having five basic functions: numerical calculation, data processing, monitoring and control, personal assistance and pattern matching. He will discuss the ongoing development of computing as the story of the "Information Revolution." At its end, Penzias envisions an era of information transparency, one in which information flows easily, frameworks for decision-making are richer, and a better use of resources supplants today's paperwork-bound regimes.

Penzias began his scientific career in 1961 when he joined Bell Labs, where he did research in radio communication and took part in the pioneering Echo and Telstar communications satellite experiments. He is best known for his work in radio astronomy, especially his part in the discovery of evidence supporting the Big Bang theory of the origin of the universe, work for which he shared the 1978 Nobel Prize in Physics. Penzias is also author of the 1989 book *Ideas and Information: Managing in a High-Tech World*.

Associated Universities, Inc., began the AUI Distinguished Lecture program in 1965 to offer talks by experts on various topics of interest to the general public. Before Penzias' talk, refreshments will be served in the Berkner Hall lobby.

## Women's History Month Profile

### Brookhaven Town Honors Sue Davis for Science

M. Sue Davis, BNL's Associate Director for Reactor, Safety and Security, is one of ten women who will be honored for their accomplishments and contributions to Brookhaven Town. The awards will be presented at the Town's seventh annual Women's Recognition Night, on Thursday, March 25, as part of its observance of Women's History Month.



M. Sue Davis

Davis, the first woman member of the BNL Directorate since the Laboratory was established in 1947, is being cited for excellence in the field of science. Other awards are being given in the fields of business, communication, education, government, law, medicine, religion and social service.

Davis was nominated for this award by Brookhaven Women in Science, which cited her "highly successful career [that] has ranged from pure research to tackling problems of immense concern to the average citizen, such as the disposal of nuclear wastes."

In his letter seconding Davis's nomination, BNL Deputy Director Martin Blume noted, "Dr. Davis is an established Physical Chemist and her responsibilities for environmental health and safety concerns of the Laboratory match very strongly the concerns of residents of the Town of Brookhaven. Dr. Davis's professional and managerial accomplishments have made her a most important resource, not only to Brookhaven National Labora-

tory, but also to the U.S. Department of Energy."

Davis received her Ph.D. in physical chemistry from the University of Rochester in 1975, and has worked at BNL since. For six years, she was a chemist in the Department of Applied Science, pursuing research in photosynthesis. In 1980, she joined the Nuclear Waste Management Division in the Department of Nuclear Energy. There, she performed technical evaluations of the problems associated with the management of radioactive wastes.

In 1985, Davis was appointed Special Assistant to the Associate Director for Applied Programs, and, in 1990, she was named Assistant to the Laboratory Director. She became Acting Associate Director in May 1993, and, following a nationwide search, she was appointed to the position permanently last January.

As Associate Director, Davis oversees the management of the Reactor Division, the Safeguards & Security Division, and the Safety & Environmental Protection Division, as well as the Office of Environmental Restoration.

**CRADA**

(cont'd)

This improvement would benefit such programs as AT&T Bell Laboratories' projection lithography project at the NSLS. This experimental technique for making smaller, more efficient computer chips uses reduction imaging with mirrors.

Finally, the collaborators plan to work with glass manufacturers to

reduce imperfections in the profiler's laser glass one hundredfold, to ten parts in a billion. These imperfections can cause scattering of the laser beam and impede its focus.

Funding for BNL's participation in this CRADA comes from the U.S. Department of Energy's Office of Energy Research, through the Research & Development Laboratory Technology Transfer Program.

— Diane Greenberg

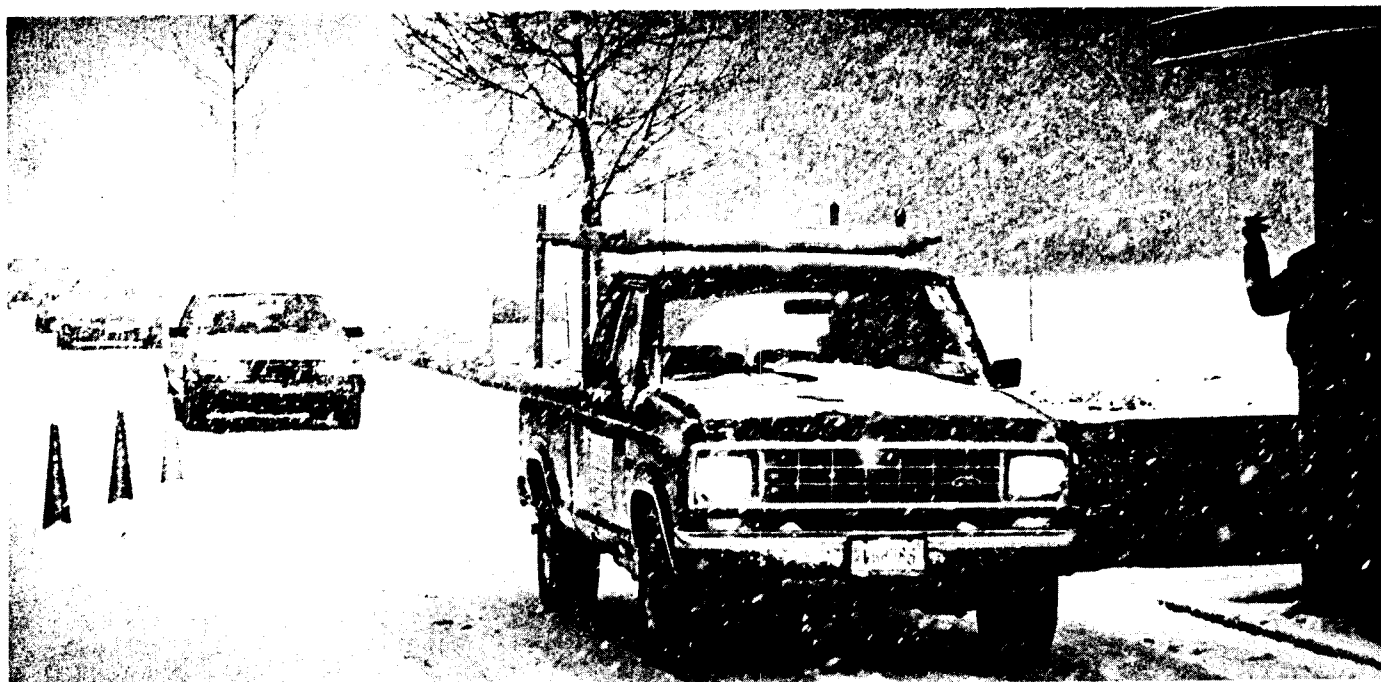
The new CRADA between BNL and Continental Optical Corporation is a good example of technology transfer in optics research. To learn more about such opportunities at BNL, the Optical Society of Long Island (OSLI) met at Brookhaven on the evening of February 23.

Those involved with the meeting included (from left): Conference organizer Peter Takacs, BNL, who is working on the new CRADA with (right) Manfred Grindel, Continental Optical; Bud Hippisley, executive director of the nonprofit New York Photonics Development Corporation (NYPDC), who spoke about NYPDC's role in linking federal laboratories, universities and economic development organizations to pursue research and development in the field of photonics; Anthony

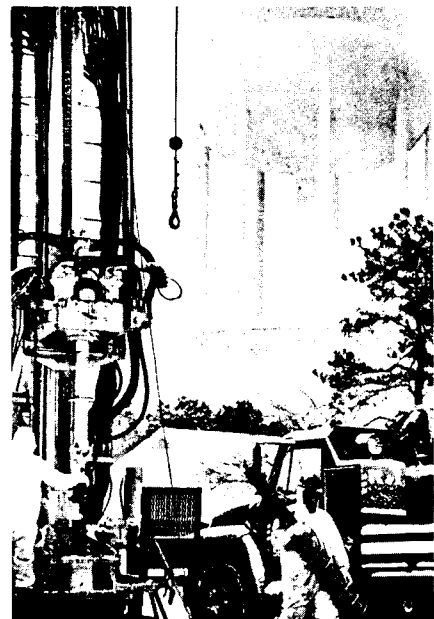


Pirera, President of OSLI; and Dorry Tooker, BNL's Office of Technology Transfer, who addressed the group on technology transfer opportunities at BNL.

Following the workshop, the group toured Brookhaven's optics-related facilities, including the National Synchrotron Light Source, the Optical Metrology Laboratory, Instrumentation Division, and the Laser Accelerator Project in the Center for Accelerator Physics.



Snow photos: (clockwise from above) Main Gate; Police Headquarters, Bldg. 50; Biology Department greenhouses; parking lot by Bldg. 526.



**A Last Look at a Long Winter**

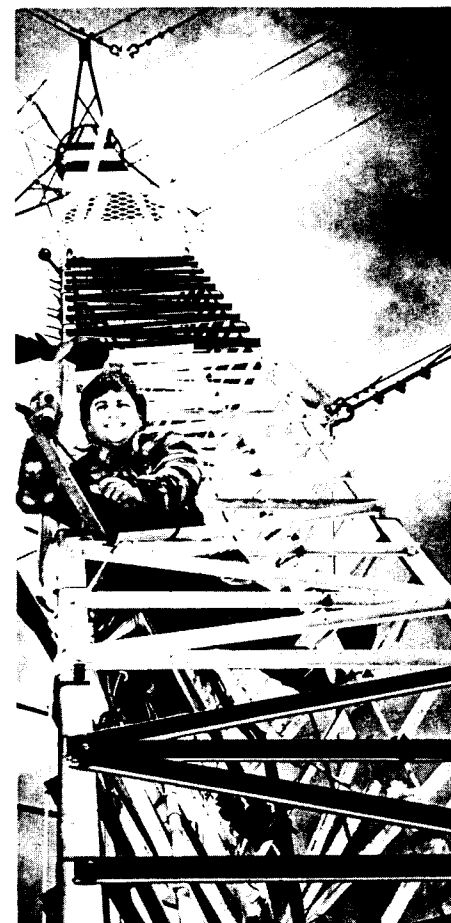
Spring arrives tomorrow morning at 9:41 a.m., supplanting a long winter characterized by several small snowfalls and capped (we hope!) by the intense storm that swept through our area this past weekend and its smaller follow-up on Wednesday night.

Though most of us weathered the storm at home, essential personnel from the Plant Engineering (PE) Division, the Safeguards and Security Division and other areas around the Lab remained on the job. One of those was Victor Cassella, a meteorologist in the Oceanographic & Atmospheric Sciences Division of the Department of Applied Science. He tracked the storm, updated the telephone forecast and assisted other groups, such as PE, by providing them with data on the storm's progress.

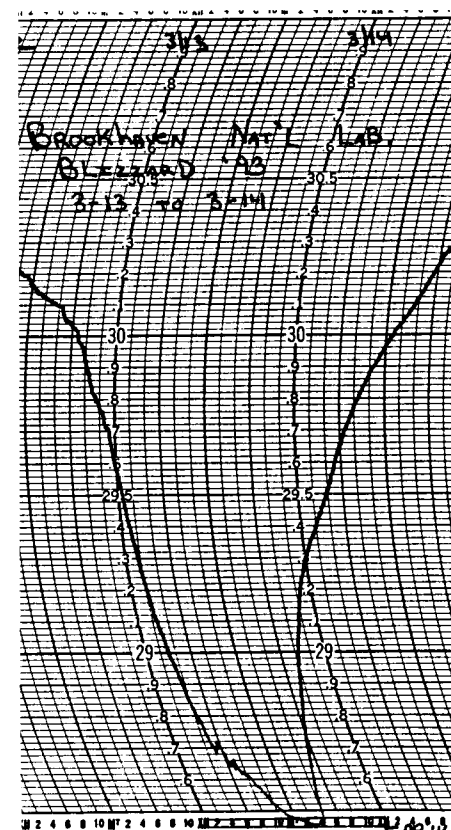
Some of the data Cassella collected was related to barometric pressure. At its lowest point, this storm measured 96.539 kilopascals (28.392 inches of mercury) — almost breaking the BNL record of 96.472 kilopascals (28.374 inches) set by Hurricane Donna in 1960.

"It would have set a record low if the center of the low had come over Long Island, instead of New York City," observed Cassella. "With that barometric pressure, if it had come at a different time of year, this storm could have been classified as a class III hurricane."

The storm is gone, and winter is almost a memory. But these photos, taken by photographer Roger Stoutenburgh during one of this season's smaller snowfalls, give us a brief look back at a winter in which the weather did not stop BNLers from getting the job done.



Victor Cassella climbs the meteorology tower, known as "Ten," to check weather data.



Barometric pressure as measured at BNL, March 13-14, 1993. Except for Hurricane Donna in 1960, last weekend's storm had the lowest pressure ever recorded on site.



## Proposed BERA Policy Change

In addition to voting for two candidates in this year's BERA Board Election, March 29-April 2, the Brookhaven Employees Recreation Association (BERA) also requests that you cast your ballot to amend or retain the following BERA policy:

*At present, the BERA manual, under Management, Article IV, Section I, states that Executive Board Members serve a term of four (4) years, and, after completion of this term, they may not run again for one (1) calendar year. There have been requests to revise this policy so as to permit as many employees as possible the opportunity to serve as Executive Board members.*

Therefore, please vote for one of the following revisions to this policy:

*After completing a four-year term, an Executive Board Member may not run again for:*

- four years (a full term)
- three years
- two years
- one year (present policy)

## Aerobic Dance & Stretch Classes

Spring is here, and it's time to put some spring in your step — with the Aerobic Dance Club. During the spring session, instructor Pat Flood will lead two different courses of exercises.

Classes in aerobic dance will be held on Tuesdays and Thursdays, while stretch classes will be on Mondays. Classes run from 5:15 to 6:15 p.m. Mats are recommended.

Either or both classes may be taken, and each ten-week session costs \$30, payable at registration preceding the first classes:

- **Stretch** - Monday, March 22, Physics Lounge, Bldg. 510.
- **Aerobic Dance** - Tuesday, March 23, and Thursday, March 25, Recreation Building in the apartment area.

For further information, call Pat Flood, Ext. 4853 (a.m.) or Ext. 5070 (p.m.), or Janet Sillas, Ext. 2345.

## RC Model Club

The Radio Control Model Club will meet in the Berkner Hall lobby, at noon, Wednesday, March 24. For information, call John Raynis, Ext. 3783.

## Tennis Trip To U.S. Open

The BERA Tennis Committee has scheduled a repeat of its popular bus trip to the U.S. Open Tennis Championships at the National Tennis Center for Tuesday, September 7. The bus will leave from the parking lot by the Lab's tennis courts at 8:30 a.m. and make one or two stops at LIE park & rides. Departure from the National Tennis Center will be at 7 p.m.

The cost of \$43 per person includes a \$30 ticket for the day session and the round-trip bus fare. Paid reservations are being accepted in the BERA Sales Office. Sign up early, as there are only 49 bus seats available.

## Meet the Brookhaven Council



Roger Stouenburgh

Since it was first established, in 1962, the Brookhaven Council has been charged with advising the Director on matters concerning the scientific staff. Elected from BNL's tenured scientific staff for three-year terms, the 15 members of this advisory group work together to make recommendations on staff appointments, tenure, involuntary terminations and other matters on which the Director may request advice. The Council is also an avenue for bringing the concerns of members of the scientific staff to the attention of the Director.

Shown here at the first meeting of the 1993-94 Brookhaven Council, held March 8, are current members: (seated, from left) Lou Remsberg, Chemistry Department; Stephen Shapiro, Physics Department; Charles Meinhold, Department of Nuclear Energy (DNE); (standing, from left) Arjun Chanana, Medical Department; Betsy Sutherland, Biology Department; Benjamin Burr, Biology; Masaki Suenaga, Department of Applied Science (DAS); Council Chairman Horst Foelsche, RHIC Project; Council Secretary Peter Thieberger, Physics; Michael White, Chemistry; Walter Kato, DNE; Laurence Trueman, Physics; and Y.Y. Lee, Alternating Gradient Synchrotron Department.

Not shown are Paul Falkowski, DAS, and Erik Johnson, National Synchrotron Light Source Department.

## BWIS Meeting

Ana Hossain, the president of the Society of Women Engineers at the State University of New York at Stony Brook, will be the guest speaker at the next meeting of Brookhaven Women in Science, on Wednesday, March 24, at noon, in Room A, Berkner Hall.

In her discussion of the Society's efforts to encourage more women to pursue engineering, as well as scholarships and positions available, Hossain will be joined by the group's advisor, Wendy Tang, a professor in Stony Brook's Electrical Engineering Department.

All are invited to attend. Please bring your lunch; coffee and tea will be served.

## Camera Club

The Camera Club's spring agenda and its organization will be discussed at the next meeting, on Tuesday, March 23, at noon, in the Berkner Hall lounge.

The display in Berkner Hall will be changed on March 25 at 5 p.m. The subject will be shots taken of New York City. For further information, call Ripp Bowman, Ext. 4672.

Catch a glimpse of

### GLANCE

playing in Berkner Hall  
weekdays, 11:30 a.m. to 2:00 p.m.  
Show changes every Tuesday.

## Addled Addresses

- Uptonburg, NY 11973
- Brookhaven National Lab
- Brookhaven Nail Lab
- Supply Old Materiel
- Brooklyn National Museum
- Brookhaven Natural Gas
- Brookhaven Intern. Lab
- Dr. Office Bldg. 134 P.O.B.

### Note to Employees:

Attendance at lectures, meetings and other special programs held during normal working hours is subject to supervisory concurrence.

## Defensive Driving Courses Scheduled

Several defensive driving courses have been scheduled on site by the Safety & Environmental Protection Division, Occupational Medicine Clinic and the Traffic Safety Committee, to take place during April, May and June. These courses are designed and approved by the National Safety Council.

Upon completion of the course, participants will each receive a certificate for a 10 percent reduction on their automobile insurance and up to four points on their driver's license. For those who have preregistered, the agency will be mailing a schedule of courses.

The six-hour courses will be offered by Classic Insurance Agency, Inc., and will be scheduled after hours, from 6 p.m. to 9 p.m. weekdays and from 9 a.m. to 3:30 p.m. on Saturday. The fee is \$29 per person.

For further information, contact Ronnie Zambelli, Bldg. 129, or Mary Wood, Bldg. 490.

## Better Seats At Mets Game

Not only do you still have time to enter the lottery drawing for Mets home-game tickets, scheduled for Monday, March 29, but BERA has also been notified that the location of the seats up for grabs has been improved.

To review the game schedule and seat location, and to place your name in the lottery, stop in the BERA Sales Office, by Wednesday, March 24, Monday through Friday, 9 a.m. to 1:30 p.m., to see Carolann Zebrowski, or call Ext. 3347.

## Reminder: Claim Your FSA

Employees who participated in a Flexible Spending Account (FSA) during 1992 — either a Health Care or Dependent Care Reimbursement Account — must send in all claims for 1992 medical, dental or child-care reimbursements by March 31.

Pick up claim forms from Personnel, Bldg. 185, and mail them to the address on the back of the form. For more information, call Personnel Services, Ext. 2877.

## Volunteers Needed

Male volunteers, ages 25 to 45 and in good health, are needed to participate in brain and heart-imaging studies being conducted by BNL. A fee will be paid; supervisory approval is required. For more information, call Naomi Pappas, Ext. 2694.

## IBEW Meeting

Local 2230, IBEW, will hold its regular monthly meeting on Monday, March 22, at 6 p.m., in the Knights of Columbus Hall, Railroad Avenue, Patchogue. There will also be an afternoon meeting at 2 p.m. for shift workers in the Union office at 31 Oak Street, Patchogue. On the agenda will be regular business, committee reports and the president's report.

## Local OCAW President Lauded



Louis Evers (second from right in above photo), a senior operator in the Reactor Division, is President of Local 8-432 of the Oil, Chemical and Atomic Workers (OCAW) Union, which represents BNL's Reactor Operators. On a recent evening, Evers was applauded for his efforts in training workers across the country in the safe handling of hazardous materials. Evers was one of a select group of instructors chosen by the international union, under a multimillion-dollar grant from the U.S. Department of Labor to OCAW.

Following an intensive training session last year at the Martin-Marietta gaseous diffusion plant in Portsmouth, Ohio, Sylvia Kieding, OCAW's Health & Safety and Grant Project Director, wrote to Evers, "I've heard nothing but good reports on your classes. I want to congratulate you not only on your endurance but your ability to handle a large crowd with very little notice. You are . . . a real credit to the program."

Shown with Evers, honoring him for his training efforts, are OCAW members: (from left) Gary Jayne, Reactor; Robert Rooks, Reactor; Frank Micale, OCAW International Representative; Richard Tache, Reactor; and David Bingham, Reactor.

## BROOKHAVEN BULLETIN

Published weekly  
by the Public Affairs Office  
for the employees of  
BROOKHAVEN NATIONAL LABORATORY

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