

## NSLS Initiative Gets \$3M Towards X-Ray Lithography Source

The national initiative to develop a compact synchrotron, which began at the National Synchrotron Light Source (NSLS) in March 1986, has received \$3 million from the Department of Defense (DOD) towards the building of the first U.S. compact synchrotron.

Received last month, the \$3 million for the x-ray lithography source (XLS) is the first portion of a \$21 million, five-year grant. It comes as part of DOD's effort to reverse America's increasing dependence on foreign suppliers of supercomputer chips, particularly Japan and West Germany.

X-ray lithography is the most promising new, production-line method to manufacture high resolution computer chips, with line widths of 0.25 microns and below. The thinner the pattern lines on a silicon chip, the denser the integrated circuit; the denser the chip, the more information that can be stored and the faster the flow of electrical signals. At present, the line width of mass-produced chips is about 1.5 microns.

"In supporting this project, the U.S. government is taking the crucial step to bolster the domestic semiconductor industry by developing advanced synchrotron technology," says NSLS Chairman Michael Knotek.

### Transfer the Know-How

"By funding the compact superconducting ring, DOD has presented the NSLS with two challenges — to develop the technology and transfer

the know-how to industry," continues Knotek.

To transfer the technology, equipment manufacturers will be apprenticed at the NSLS while two XLS prototypes are developed. After they acquire the necessary expertise, they can build and sell compact sources of x-rays to the U.S. semiconductor industry.

DOD's goal is to establish domestic vendors of synchrotrons to be used for chip production by x-ray lithography.

In switching to synchrotron-based x-ray lithography, U.S. chip makers have a chance of recapturing the U.S. and world markets. Japan and West Germany, however, have a head start in the development of dedicated compact sources and the technology associated with x-ray lithography.

### Never Before in America

The NSLS compact synchrotron initiative began with a series of workshops in 1986-87, at which the NSLS staff met with semiconductor and equipment industry representatives. As a result, the chip makers decided that they wanted a room-sized, push-button, inexpensive synchrotron designed exclusively for chip production by x-ray lithography.

Using \$750,000 obtained last year from DOD by U.S. Congressman George Hochbrueckner, the NSLS staff used these specifications to come up with a conceptual design report, in which they spelled out two options.



Roger Stoutenburg

XLS project team: (from left) Gaetano Vignola, John Galayda, John Keane, Richard Heese, James Murphy, Jules Godel, Slobodan Pjerov and Hank Hsieh. Absent from the picture is Ming Wu Fan.

One was the building of a relatively smaller, but still conventional, magnet ring with an associated x-ray lithography facility. The second option was the research and development of an unconventional, never-before-built-in-America machine: a compact synchrotron using superconducting magnets.

"The second option was both more challenging to the NSLS staff and more attractive to the superconducting industry — and that is what DOD is funding," explains Knotek.

The conceptual design team was headed by NSLS Associate Chairman Jules Godel, with Senior Physicist Richard Heese as technical coordinator.

The XLS initiative is now headed by Heese, the project manager in charge of coordinating source development and technology transfer, and Physicist Gaetano Vignola, the technical manager in charge of XLS design, development and testing.

### Prototypes, Warm and Cold

The first XLS prototype is scheduled to be built within the next 18 months. It will be the "warm" conventional magnet version of the second prototype, the factory model that will have "cold" superconducting magnets and produce the full x-ray flux needed for x-ray lithography.

"Superconducting magnets are necessary because they are the only magnets with a high enough field strength to bend electrons of this energy within such a small circumference," says Vignola (see XLS specifications story).

The cold magnet XLS is scheduled to be completed by 1992.

"We can rapidly field the first prototype by using some existing hardware and the NSLS's existing injection system" (Continued on page 2)

## New Funds To Plan Center For Semiconductor Technology

BNL's Office of Research & Technology Applications has been granted \$60,000 from New York State (NYS), with matching funds from the U.S. Department of Energy (DOE), to plan for a Center for Advanced Microelectronic Processing (CAMP).

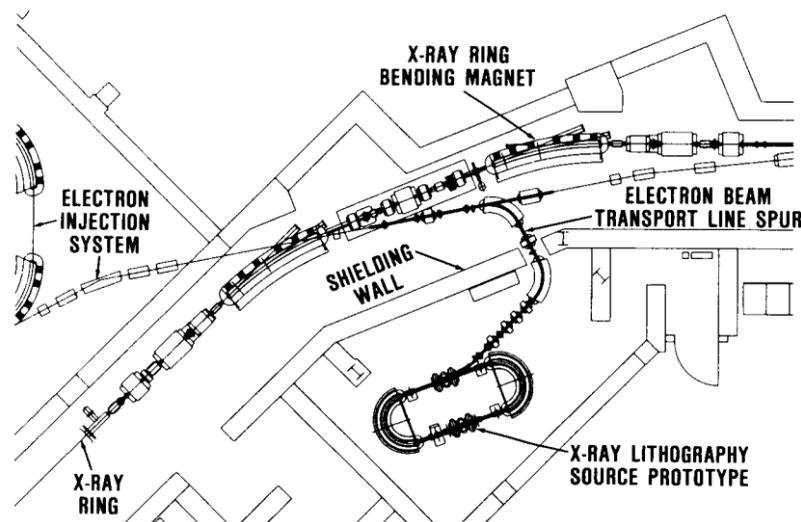
CAMP's purpose would be to improve the techniques and equipment used to manufacture advanced supercomputer chips by x-ray lithography. Specifically, the Center would develop and commercialize semiconductor processing equipment used to make chips with 0.1-micron resolution.

CAMP would be set up to establish a solid research and development foundation on which the semiconductor processing equipment manufacturers could build in NYS.

To do this, the Center would coordinate the resources of BNL, the State University of New York at Stony Brook and Cornell University in undertaking semiconductor processing research. For example, CAMP researchers could use beam lines at BNL's National Synchrotron Light Source to develop and improve the transfer of circuit patterns onto silicon wafers.

To plan for the Center, at least two workshops will be held at BNL over the next year to invite input from potential collaborators from academia and industry, both from within and out of state. The planning funds came from the NYS Science & Technology Foundation and DOE's Technology Transfer Initiative Program.

## X-Ray Lithography Source Specs



Racetrack shaped, the X-Ray Lithography Source (XLS) will be a little over four meters long and a bit over two meters across — only slightly bigger than one of the bending magnets of the 170-meter-in-circumference x-ray ring of the National Synchrotron Light Source (NSLS).

As the injection system is a major cost of a synchrotron, the higher the energy, the greater the cost. Thus, the XLS design calls for relatively low-energy injection, 50-200 million electron volts (MeV).

Within the compact synchrotron, then, the electrons will be accelerated up to design energy: In the conventional warm magnet XLS, the electrons will be accelerated to 200 MeV; those in the cold, superconducting magnet model, to 700 MeV — nearly the energy of the 750 MeV vacuum ultraviolet (VUV) ring at the NSLS. While the VUV ring has a circumference of 51 meters, the XLS's circumference, however, will be only 8.5 meters.

## Vacuum Design for Light Sources

What are the best chamber designs to achieve ultra high vacuum? What are the best of the different types of ultra high vacuum pumps? What is the best way to clean and condition vacuum chambers, such as those used in BNL's National Synchrotron Light Source (NSLS) and Alternating Gradient Synchrotron (AGS)?

These were three of the questions discussed at the topical conference "Vacuum Design of Advanced and Compact Synchrotron Light Sources," held at BNL on May 16-18. The conference drew 150 participants and was sponsored by BNL and the Vacuum Technology & Surface Science Divisions of the American Vacuum Society.

Pictured are members of the local organizing committee: (from left) Dick Hseuh, AGS; Robert Ellefson, Monsanto Research Center, Ohio; Joseph Schuchman, NSLS; Erik Johnson, NSLS; Kimo Welch, AGS; Roger Klaffky, NSLS; and Henry Halama, NSLS.



Peter Horton

## Service Awards

The following employees received service awards during the month of May:

### Forty Years

Bernard Lattanzio ..... Plant Eng.  
Roland Sick ..... App. Science

### Thirty Years

Kenneth H. Johnson ..... Plant Eng.  
Eugene W. Rogers ..... Accel. Dev.  
Richard W. Rothe ..... Light Source

### Twenty-Five Years

David S. Johnstone ..... Plant Eng.  
Ronald F. Peierls ..... App. Math  
Helga Pirozzi ..... Photo. & G.Arts  
John H. Weinmann ..... AGS

### Twenty Years

Dominick G. Bartolomeo ..... AGS  
Ollie J. Booker Jr. .... Plant Eng.  
Vincent E. Chiampou Jr. .... AGS  
Joseph A. Curtiss ..... Nuc. Energy  
Michael J. LeVine ..... Physics  
William L. Overton ..... Sup. & Mat'l.  
Richard C. Sautkulis ..... Biology  
Kenneth A. Sutter ..... App. Science

### Ten Years

Patricia A. Bender ..... Plant Eng.  
William H. Birkholz ..... Con. & Proc.  
Patricia Carr ..... App. Science  
Karen N. Cestra ..... Plant Eng.  
Joseph M. Collins ..... Physics  
Melanie J. Covitz ..... Accel. Dev.  
Joseph Cracco ..... Physics  
William J. Devall ..... Plant Eng.  
David P. Elling ..... App. Science  
Carmen T. Falkenbach ..... Nuc. Energy  
Dorothy-Jean Greco ..... Con. & Proc.  
William B. Jensen ..... Cent. Shops  
John E. Kulesa III ..... Plant Eng.  
Joseph M. Kutschera ..... Plant Eng.  
Jesus Marte ..... Sup. & Mat'l.  
Daniel P. Mullaly ..... AGS  
Payman Mortazavi ..... Light Source  
Donald P. Price ..... Staff Serv.  
Darlene J. Reeves ..... Accel. Dev.  
Rhea Robinson ..... Saf. & Env. Prot.  
William W. Slavinsky ..... Plant Eng.  
Theodor Teichmann ..... Nuc. Energy  
Elaine D. Zukowski ..... Dir. Off.

## Equipment Demos

Motion Control components will be shown by Motion Control Sales/Control Sales Inc., in an equipment demonstration at Berkner Hall on Monday, June 13, from 10 a.m. to 3 p.m. On display will be stepping motors, controls, XY tables, dc servo motors, dc drives, positioning systems, amplifiers and photoelectrics.

August Waeldin, Inc., will display the quality scientific and industrial products they distribute on Wednesday, June 15, from 10 a.m. to 3 p.m., in Berkner Hall. The product lines on exhibit will include quality inspection and biological microscopes, CCTV systems, image analysis and apparatus for testing and inspection.

## New Ambulance to the Rescue



Roger Stoutenburgh

This brand-new ambulance is the latest addition to the five-vehicle fleet operated by the Fire & Rescue Group of the Safety & Environmental Protection Division. Purchased from the Wheeled Coach Company, the ambulance is completely set up for basic life support for transport of victims off site. Typically, the ambulance is operated by three fire-fighting emergency medical technicians. One such crew, shown here with Chief Fred Strier (standing, center), includes (from left) Kenneth Licata, Joseph Gallitelli and Daniel Harrow. Gallitelli is kneeling by a CPR Thumper, a device for performing cardiopulmonary resuscitation on a victim whose heart has stopped.

## 24-Hour Banking En Route to BNL

Laboratory management has arranged with Barclays Bank of New York to have a 24-hour automated teller machine (ATM) installed on site for cash and banking services. The Barclays machine will be networked with the New York Cash Exchange (NYCE) System and probably with an international cash network system as well.

The ATM will be installed in the outer lobby of the main entrance to Berkner Hall. Preparatory work has already been completed, and the facility should be fully installed and available within the next few months. Employees will be informed as soon as the exact installation date is known.

Employees having checking or savings accounts with Barclays Bank of New York are encouraged to apply for plastic banking access cards at the on-site branch office, if they do not already have one. Those employees who have access from other banks belonging to the NYCE network will also be able to use the Barclays machine on site.

Employees who do not now enjoy the benefits of direct deposit of their net paychecks may want to consider this option. On payday, employees with direct deposit will be able to obtain cash from the banking machine regardless of the time of day, thus avoiding long lines at their banks. While utilizing a Barclays Bank account on site is an added convenience, employees can have their paychecks direct deposited at any bank of their choice. In order for an employee to access an account through the on-site Barclays Bank machine, however, the employee's bank must belong to the NYCE network.

Any questions regarding the capabilities of the ATM should be directed to the Barclays Bank branch office on site. With questions about direct deposit of payroll checks, contact the Payroll Section of the Fiscal Division, Ext. 2470.

## Increase the Tubing . . . and the Savings!



Roger Stoutenburgh

Eugene Kaplan, a Senior Technical Specialist in the Alternating Gradient Synchrotron (AGS) Department, was recently awarded \$150 for his suggestion to buy shrink tubing in full, four-foot lengths and cut them to size on site. This will save the AGS \$1,500 annually. Here, Kaplan is joining two pieces of electrical cable, which are insulated by nine-inch lengths of shrink tubing. By using a heat gun, he reduces the tubing's diameter, causing it to fit snugly around the cable. A full length of shrink tubing stands to the right.

Original, cost-saving suggestions for the Lab are always welcome and employees who submit new ideas will receive a "thank you" mug from the Employee Suggestion Program.

## NSLS Initiative (cont'd)

tem," states Knotek. Heese designed the beam transport line modifications, so that the prototype can share the injection system used for the NSLS x-ray and vacuum ultraviolet rings.

To be located inside the shielding wall of the x-ray ring, the first prototype will be used to study the injection of electrons at low energy and the dynamics of the electron beam within such a small machine.

Vignola and Associate Physicist James Murphy have designed the XLS lattice, which is the arrangement of magnets that bend and focus the electrons to circulate around the track and emit x-rays at each bend. The warm magnets for the first prototype were designed by Research Engineer Ming Wu Fan.

The mechanical engineering is being performed by NSLS Associate Chairman Hank Hsieh and his Mechanical Engineering Section; the electrical engineering by Chief Electrical Engineer John Keane and his staff, and the diagnostics by NSLS Associate Chairman John Galayda.

### A Parallel Effort

In parallel with their effort on the first prototype, Vignola and others will be researching the design of superconducting magnets for the second prototype, calling upon the cold magnet expertise and experience within the Accelerator Development and Alternating Gradient Synchrotron Departments, as well as elsewhere.

Throughout the design, building and commissioning stages of both prototypes, Heese will be involving U.S. equipment manufacturers, both by farming work out to them and bringing their people into the project. To date, several companies, such as Grumman Aerospace in Bethpage and General Atomics in San Diego, have expressed interest in learning the synchrotron trade.

"Transferring the technology will be as much of a challenge as developing the sources themselves," concludes Heese. — Marsha Belford

Jonathan was born with a hole in his heart.



Ten of you saved his life... By giving blood.

The more blood that's given, the more children like Jonathan can be saved.

Please help — join in the BNL Blood Drive which is being held Tuesday-Thursday, June 21-23, from 10 a.m. to 3 p.m. at the Brookhaven Center. Giving blood is absolutely safe — you cannot get any disease, and all materials used are new, sterile and disposable. If you have questions, see your departmental or division Blood Captain, then call Susan Foster, Blood Drive Chair, on the Blood Drive hot line, Ext. 5126, to fix an appointment.

## New Officers for PSI

Professional Secretaries International, Upton Chapter, will install its new officers on Thursday, June 16, at 5:30 p.m. in Berkner Hall, Room C. A celebration dinner will follow at 7 p.m. at the Pine Grove Inn, East Patchogue. The cost of \$23 includes tax and gratuities. Everyone is invited to both the installation and dinner. For more information, call Susan Carlsen, Ext. 7716.

Congratulations to the new officers for 1988-89: President — Susan Carlsen, Safety & Environmental Protection; Vice President — Nancy Griffin, CPS, Safeguards & Security; Recording Secretary — Patricia Towey, Applied Science; Corresponding Secretary — Mary Anne McGrath, Nuclear Energy; and Treasurer — Patricia Oster, Alternating Gradient Synchrotron.

## Microcomputer Club

The BNL Microcomputer Club will present a demonstration of the IBM Personal System/2 (PS/2) computer at noon on Thursday, June 16 in the main conference room, Bldg. 475. The speaker will be Don Litcher of the Applied Mathematics Department. Topics of discussion will include the PS/2 product line, the unique hardware architecture and the OS/2 operating system. All those interested in this subject are invited to attend. For more information, contact Frank Salzano, Ext. 4458.

## Swim Club

The results for the BNL Swim Team from the last half of the 1987-88 indoor season of Empire State masters swimming are now available. They show that as a result of overall performances at five designated meets held in the metro area during the entire season, three BNL swimmers earned Empire State indoor-season awards in their respective age groups: Marsha Belford is third among women 30-34; Wlodek Guryn is second, men 35-39; and Peter Cameron is third, men 40-44.

Also during this season, Ron Witlock set two national records in a short-course meter pool for men 50-54: 100-meter backstroke, 1:31.77; 200-meter backstroke, 3:16.76. Congratulations on a season well swum.

## Summer at the Gym

The following summer schedule is now in effect at the gym:

### Workdays:

11 a.m. - 2 p.m. general activities, employees only.  
5 p.m. - 9:30 p.m. general activities, employees, families & guests.

### Weekends & Holidays:

Closed  
**Guest Rule:** One guest per employee is permitted. Advance arrangements for additional guests, up to a maximum of five at any one time, must be made at the Recreation Office in Personnel. This rule applies to all recreation facilities.

**Note:** Summer hours at the swimming pool will go into effect on Wednesday, July 6. A schedule will be published in a future issue of the Bulletin.

## Bowling Champs



In the Pink League, it was Apple Blossoms time: (from left) Anne Ostermeyer, Kathy Folkers, Renie Rosati and Maria Apelskog.



The Diamonds bowled to victory in the White League: (from left) Nancy Erickson, Ted Erickson, Pat Manzella; (missing from photo) Vito Manzella.

Photos by Peter Horton



Champions in the Red & Green League are the Sandbaggers: (standing, from left) Ed Meier, Charlie Bohnenblusch, Bob Jones; (kneeling, from left) Ken Asselta, Dennis Klein.



It took Four of a Kind to win top honors in the Purple League: (from left) Bob and Sharon Jones and Mary-Grace and Ed Meier.

## Tennis Fun Day

The BERA Tennis Committee is sponsoring a one-day tennis "mixer" event open to employees, family members of employees, and summer visitors. This "Tennis Fun Day" will be held on Saturday, June 18, at the tennis courts, from 9 a.m. sharp to noon. The rain date is Sunday, June 19.

Participants are asked to bring their own tennis balls. Refreshments will be provided, and prizes will be awarded.

In order to facilitate planning, participants are asked to sign up in advance at the BERA Sales Office or to call one of the following: Nick Combatti, Ext. 3389; Om Singh, Ext. 5332; or Neal Tempel, Ext. 3418.

Join us for this celebration of the outdoor tennis season.

Please note: Courts will be closed to all other play during the event.

## Cricket Club

The Brookhaven International Cricket Club will hold practice sessions on the next two Fridays, June 17 and 24, at 5:15 p.m. at the Recreation Field. As in previous years, we expect to play a few matches against visiting teams, and the first of these will be against the Staten Island Cricket Club on Saturday, June 25, at 1:30 p.m. For further information, call Dave Cox, Ext. 3818; John Millener, Ext. 3853; or Arun Bommannavar, Ext. 5614.

## Softball

### League I

#### Games of May 24

Cutting Edge 10 - Blue Jays 8  
Cool 'n Gang 4 - Light Source 3  
Phoubars 12 - Bandits 2  
Sudden Impact 6 - Magnuts 3  
Six Pax 8 - Ravens 7

#### Makeup Games from May 17

BNL Bandits 17 - Cutting Edge 1  
Six Pax 17 - Cool 'n Gang 1  
Sudden Impact 11 - Raven 9  
Light Source 10 - Blue Jays 8

### League II

#### Makeup Games from May 18

Scram 20 - Medical 1  
AMD Bombers 5 - Dirty Sox 3

### League III

#### Games of May 23

Snakebites 5 - Farm Team 3  
Hounds & Foxes 16 - Kidz-R-U's 3  
Simple Awesome 14 - Foul-Ups 4

#### Makeup Game from May 5

Snakebites 15 - Kidz-R-U's 3

### League IV

#### Games of May 23

Turkeys 7 - Sandboxers 6  
Who Cares 21 - Seventh Inning Stretch 7  
Spacekadets 27 - The Far Side 2  
Underalls 11 - Mudville Sluggers 7

#### Makeup Games from May 5

Turkeys 24 - Who Cares 9  
Underalls 10 - The Far Side 7

## Cafeteria Menu

### Week of June 13

#### Monday, June 13

Chicken gumbo	(cup) .75
	(bowl) .95
Beef stew over noodles & 1 veg.	3.05
BBQ Chicken & 1 veg.	2.90
Chicken salad primavera (lite-weight)	2.25
Hot deli: French dip	(bread) 2.75
	(roll) 2.85
	(hero) 2.95

#### Tuesday, June 14

Beef barley soup	(cup) .75
	(bowl) .95
Meat tortellini w/tomato sauce & 1 veg.	2.85
Broccoli cheddar quiche & 1 veg.	2.90
Filt of fish Parisien & 1 veg. (lite-weight)	2.95
Hot deli: Turkey	(bread) 2.75
	(roll) 2.85
	(hero) 2.95

#### Wednesday, June 15

Cooper French onion soup	(cup) .75
	(bowl) .95
Pot roast & 1 veg.	3.05
Chicken chow mein & 1 veg.	2.90
Tropical fruit salad bowl (lite-weight)	2.25
Hot deli: Grilled Reuben	(bread) 2.75
	(roll) 2.85
	(hero) 2.95

#### Thursday, June 16

Tomato rice soup	(cup) .75
	(bowl) .95
Ham & noodle au gratin & 1 veg.	2.85
Meatloaf & 1 veg.	2.90
Buttered baked fish (lite-weight)	2.95
Hot deli: Pastrami	(bread) 2.75
	(roll) 2.85
	(hero) 2.95

#### Friday, June 17

Fish chowder	(cup) .75
	(bowl) .95
Chicken breast Bolognese & 1 veg.	3.05
Fried fish amandine & 1 veg.	2.95
Cucumber tuna boat (lite-weight)	2.25
Hot deli: Sloppy Joe	2.85

## Note to Diners

The Cafeteria will be closed on Saturday, June 11. On that day, snack bar service will be available from 9 a.m. to 2 p.m. at the Brookhaven Center.

# BROOKHAVEN BULLETIN

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# To Your Health

"Prostate and Testicular Cancer: A Winnable Battle" will be the topic discussed at the next Health Promotion Seminar. Wayne Waltzer, a physician with the Department of Urology, School of Medicine, at the State University of New York at Stony Brook, will address this topic on Thursday, June 16, from noon to 1 p.m. in Berkner Hall.

## Arrivals & Departures

### Arrivals

Lars R. Furenild ..... DAS  
Victoria L. Goldsborough..Plant Eng.  
Danny J. Mangra ..... Accel. Dev.  
Doreena J. Victoria ..... Plant Eng.

### Departures

This list includes all employees who have terminated from the Laboratory, including retirees:  
Benjamin C. Craft III ..... NSLS

## Help Wanted At Cafeteria

Marriott Corporation, which runs the Cafeteria, needs several new employees to fill utility and general positions. Marriott Corporation is an equal opportunity employer. Anyone interested may apply in person at the Cafeteria, Ext. 3541.

## Classified Advertisements

### Placement Notices

The Laboratory's placement policy is to select the best-qualified candidate for an available position, with consideration given to candidates in the following order of priority: (1) present employees within the department and/or appropriate bargaining unit, with preference to those within the immediate work group; (2) present employees within the Laboratory as a whole; and (3) outside applicants. In keeping with the Affirmative Action plan, selection decisions are made without regard to age, race, color, religion, national origin, sex, handicap or veteran status.

Each week, the Personnel Office lists new personnel placement requisitions. The purpose of these listings is, first, to provide open placement information on all non-scientific staff positions; second, to give employees an opportunity to request consideration for themselves through Personnel; and, finally, for general recruiting purposes. Because of the priority preference policy stated above, each listing does not necessarily represent an opportunity for all candidates. As a guide to readers, the listings are grouped according to the anticipated area of recruitment.

Except when operational needs require otherwise, positions will remain open for one week following publication date.

For further information regarding a placement listing, contact the Employment Manager, Ext. 2882.

**LABORATORY RECRUITMENT** - Opportunities for Laboratory employees only.

2869. MATERIAL HANDLER - Supply and Material Division.

2870. P&GA CLERICAL POSITION - Under general supervision, will perform complex & diversified clerical functions. Requires two years' post-high school training or equivalent plus relevant work experience at an advanced clerical level. Photography & Graphic Arts Division.

2871. CLERK TYPIST POSITIONS - Requires accurate typing skills and data entry experience. Additional duties will include filing and records maintenance. Supply and Material Division.

**OPEN RECRUITMENT** - Opportunities for Laboratory employees and outside applicants.

2872. AFFIRMATIVE ACTION OFFICER - Responsible to the Director for the management of all phases of the Affirmative Action Program. Requires a minimum of a bachelor's degree or equivalent, knowledge of Executive Order 11246 as revised and OFCCP reviews plus a record of progressively increasing management responsibility and accomplishment in the EEO/AA field. In addition, experience in the development, coordination and monitoring of Affirmative Action Plans is required. Please contact Marsha R. Kipperman on Ext. 2871 for further information.

2873. CLERICAL POSITION - (part-time) Requires knowledge of office practices, good communication skills and accurate typing. Will provide varied clerical support to Project Secretary. Duties will include mail distribution, filing and photocopying. Word processing experience helpful. Accelerator Development Department.

2874. COMPUTER OPERATIONS POSITION - Requires AS degree in data processing or successful completion of computer operations training program or equivalent experience. Will assist in the operation of a large electronic digital computer. Shift work required. Applied Mathematics Department.

2875. PLANNER/ESTIMATOR - With a minimum of supervision, performs detailed work analysis, job layout and material selection; develops labor and material estimates in accordance with industry standards, for architectural repairs and maintenance. Requires considerable construction experience and proven ability equivalent to that of a Craft Supervisor. Uses professional judgment in determining performance standards appropriate to each individual job. Plant Engineering Division.

2876. ENGINEERING POSITION - Requires a BS in health physics, nuclear engineering, or physics. Advanced degree and ABHP certification preferred. Work involves research facility review for radiation protection concerns. Will assist in resolution of radiation safety questions and program development. Possession of or the ability to obtain a Q clearance is necessary. Knowledge of neutron dosimetry and computers is desired. Safety and Environmental Protection Division.

2877. TECHNICAL POSITION - Requires a BSET degree or an AAS degree in electronic technology with a minimum of two years experience in the fabrication and repair of high power RF equipment. Must be able to use various test equipment and work from schematics, drawings, rough sketches as well as from verbal instructions. Position involves the fabrication, testing, repair, and maintenance of high power RF amplifier control systems at circuit and system level. National Synchrotron Light Source Department.

### Autos & Auto Supplies

88 TRAVEL TRAILER - 32', a/c, master bedroom, full bath, sleeps 5, \$15,000. Ext. 4685 or 929-8673.

87 TOYOTA PICK-UP - long bed, extra cap, p/s, p/b, a/t, overdrive, mint, 14k mi., \$8,800. Joe, Ext. 5215 or 924-2805.

86 HONDA GYRO SCOOTER - elec. start, low miles, \$495 neg. 589-4407 after 7 p.m.

85 CUTLASS SUPREME - all power, new brakes, tires, tune-up, 42k mi., \$6,500 firm. 736-8190.

84 BUICK REGAL - p/s, p/b, a/c, tilt wheel, cruise, 4 new tires, 69k mi., \$4,600. 345-5589.

84 CAMARO - 5 speed, V6-2.8L, blue, sunroof, 61k mi., excel. cond., asking \$5,500. Fred, Ext. 7947 or 588-2268 after 5 p.m.

83 YAMAHA VIRAGO - low miles, excel. cond., \$1,400. 286-3679 after 6 p.m.

83 BUICK REGAL - a/c, p/s, p/w, am/fm, beige landau top, excel. cond., \$5,200 neg. Ext. 2964.

82 CHEVY CAVALIER - type 10, hatchback, a/c, not running, \$600 or best offer. 924-5192 after 5 p.m.

82 VW RABBIT - many new parts, good transportation, asking \$950. 475-1608.

81 TRIUMPH TR7 - convertible, red, 38k mi., excel. cond., \$4,500 neg. Ext. 3862 or 242-4573.

81 KAWASAKI 650 CSR - 7k mi., garaged, new battery, very good cond., \$950. Phil, Ext. 4867 or 473-9357 after 6 p.m.

81 VW RABBIT - diesel, whole or for parts, \$100 neg. 821-3086.

81 RS-175 DIRT BIKE - limited edition, good cond., \$350. Phil, 286-1348.

80 BUICK SKYLARK - 4 dr., full power, am/fm cass., new trans., no dents, excel., \$1,800. Ext. 3593.

80 MONZA - 4 speed, 4 cyl., looks good, needs some work, \$850. Ext. 2175.

80 OLDS TORONADO - all power, sunroof, luxury int., \$1,000 firm. 249-4519.

79 COUGAR XR7 - fully loaded, am/fm cass., a/c, wire wheels, burgundy, \$800. Tony, 698-9274.

79 MUSTANG - 8 cyl., p/s, p/b, a/c, am/fm cass., good cond., asking \$2,000. Ext. 2175 or 399-0224.

79 CHEVY MALIBU - wagon, sunroof, new trans., good cond., dependable, \$1,300. 286-4150.

78 FIAT SPIDER - convertible, \$1,650. 286-3679 after 6 p.m.

78 MERCURY - wagon, clean in/out, needs head gasket, \$300 or best offer. Ext. 4605 or 395-5991.

78 VW RABBIT - 5 speed, a/c, am/fm, new tires, excel. cond., \$1,800. Mac, Ext. 4389 or 924-2348 after 5 p.m.

77 CADILLAC SEDAN DEVILLE - white w/red leather int., vinyl roof, new tires, good cond., \$2,100. Jim, Ext. 4040 or 289-0876.

77 FORD GRANADA - p/s, p/b, a/c, runs well, \$1,400. Ext. 7686 or 878-0897.

76 CADILLAC SEVILLE - brown w/tan int., 350 V8 fuel-injected, low miles, new exhaust, p/s, p/b, needs body work, must sell, \$1,000. 924-6610.

75 PLYMOUTH VALIANT - runs well, many new parts, \$600. Susanna, Ext. 3959.

75 GRANADA - 2 dr., rear-defroster, engine runs roughly, many new parts, 120k mi., \$50. Bob, Ext. 2088.

75 CHEVELLE - p/s, p/b, a/c, a/t, 68k mi., \$850. Bob, Ext. 2503.

75 CHEVY IMPALA - station wagon, 405 cu. in., 9-passenger, cream color, good tires, \$650. Arnold, Ext. 2050 or 473-6432.

73 SAAB - runs well, needs several minor repairs, many miles, \$100. Dick, Ext. 2030.

76 CHEVY 280Z ENGINE - still in car and runs. Ext. 2871 or 588-7092 after 10:30 p.m.

TIRES - 2, Dunlop Gold Seal, belted, P215/75B15, \$30; 2, Volvo rims, 15", \$20. Bill, Ext. 3369 or 929-6442 after 6 p.m.

FRAME HITCHES - 1 for car, 1 for truck, \$35/each; running boards, \$25. Artie, Ext. 4987 or 325-0743.

CAR STEREO - Panasonic, am/fm cass., used 2 months, orig. \$300, asking \$150. Ext. 3862.

### Boats & Marine Supplies

27' TARTAN - 9 sails, VHF-fm, d.f./rdf, autohelm, compass, refinished topside, many extras. 669-9202 after 6 p.m.

21' VENTURE SAILBOAT - fiberglass, sleeps 4, 3 sails, w/trailer, very good cond., \$2,000. 924-5192 after 5 p.m.

19' FLYING SCOT - sails, trailer, excel. cond., fiberglass. Perlman, 444-1034 days, 472-1174 eves.

17' BOWRIDER - 1982, Mercruiser I/O, w/trailer, \$3,500. 727-4036 days, 724-4663 eves.

16' HOBIE CAT - w/trailer & extras, \$2,000. Ext. 4122 or 286-0872 after 6 p.m.

14' INFLATABLE BOAT - takes 25 h.p. motor. 286-8706.

6 H.P. EVINRUDE ENGINE - new water pump, \$250. 732-6838.

SAILFISH - good cond., \$250. Jim, Ext. 3372 or 821-0250.

### Miscellaneous

PHOTOBOOKS - Filter Book by Clauss, \$5; Bigger and Better Enlarging by Kodak, \$7; Susan, Ext. 7716.

LOUNGE CHAIR & OTTOMAN - \$75; Eureka upright vacuum, \$40; B&W 19" Zenith TV, \$35; punch bowl, \$25. Ellie, Ext. 3395 or 325-1537.

FOAM INSULATION - 2'x8'x2". \$2.50 ea.; hang glider, Quicksilver B-monoplane, \$225; rowing machine/gym, practically new, \$98. 286-1829.

STRAWBERRIES - U-pick, no chemicals used, Meadows Farm, Old Stump Road, Brookhaven, 7 days, 9 a.m.-5 p.m.

WHALE WATCHING TICKET - one only, Sunday, June 12, with BNL group, \$21 or best offer. Ext. 2346 or 286-8563.

COMPUTER MONITOR - Monochrome Tandy VM-2 model, RCA connector, excel. cond., orig. \$140, asking \$75. John, 286-1348.

DOG RUN - chain link, 6' high, 5'x12', w/gate. Ext. 7225.

SOFA - w/form cushions, good cond., \$50; ice chest, 34 qts., brand-new, in box, \$10. 751-1884.

LOVE SEAT - antique, Lakewood Victorian, w/2 chairs, orig. burgundy upholstery, good cond., \$350. 929-8725.

BICYCLE HELMET - Bell V.I. Pro, m/l, white, new, \$35. Bill, Ext. 2377 or 399-6168.

FRIGIDAIRE FREEZER - 15.3 cu. ft., chest, white, good cond., \$25. 878-9169.

TRACTORS - 1 diesel, 1 gas; International Ariens rototiller, needs motor; poly-type 100'x22' greenhouse, equipped. Jim, Ext. 4040 or 289-0876.

BLACK LAMINATE TABLE - contemporary, 36"x36", chrome base, w/4 matching Bruer chairs, excel. cond., asking \$300. 924-4879.

SCHWINN BICYCLE - 3-speed, woman's, good cond., \$30. Ted, Ext. 2620.

BICYCLE HELMET - Bell, small, \$25. 473-2473.

WATER PUMP - water rinsing system. 399-1249.

AIR CONDITIONER - high-efficiency, 90 EER, 6,200 Btu, almost new, Carrier Siesta. Ext. 2610 or 924-5272 eves.

BIKES & PARTS - 26". Ext. 4475.

LAWN MOWER - Sears, new bag, \$35; nylon carpet, 11'x11', orange print, \$75. Bill, 929-6442 or Ext. 3369 after 6 p.m.

CAMERA - Pentax K-1000, accessories, lenses & flash. Ext. 3359.

SCREENS & STORM WINDOWS - wood, 9 each, good cond. Cliff. Ext. 3794.

ZOOM LENS - Sakar 80 to 200mm Pentax or Ricoh bayonet mount, \$60. 289-5216 after 5 p.m.

DROP SPREADER - Sears, 24", \$15. Ext. 4672.

PRINTER - Oki ML82 parallel, w/IBM cable, excel. cond., \$140. 924-6712 after 6 p.m.

POOL - 24'x4', filter, pump, hoses, chemicals, you take down, \$200. 669-5181.

SLEEPER SOFA - full size, very good cond., brown rust/beige plaid, \$125. Ben, 289-1605.

LAWN MOWER - Craftsman, 20" cut, 3.5 h.p., 1-year-old, excel. cond., \$150. Ext. 7868 or 758-6773 eves.

SPEARGUN & FLIPPERS - \$20. crib w/mattress, \$30; pipe threading tool & vice, \$35. Artie, Ext. 4987 or 325-0743.

MONITOR - Sanyo, composite b/w graphics, w/color graphics adaptor, for IBM-PC/XT or compatibles. John, Ext. 2710.

WOMAN'S BICYCLE - Fuji, 10-speed, \$75; adult tricycle w/basket, \$125; 18 cu. ft. frost-free freezer, \$125 neg. 589-4407 after 7 p.m.

MOTORCYCLE HELMET - red, excel. cond., \$25. Jim, Ext. 3372 or 821-0250.

DRYER - Sears, \$50; student desk, \$15; marble-like rolling table, \$15; stereo speakers, \$15. Ext. 4558 or 325-0013.

STEREO RECEIVER - turntable, loud speakers, will sell separately, \$250/both. Susanna, Ext. 3959.

### Yard Sales

BROOKHAVEN HAMLET - multi-family, Beach Street & Atlantic Street, Sat., June 11, 9 a.m.-4 p.m., rain or shine. 286-0353 or 286-8119 for directions.

SHIRLEY - 167 Grand, June 11 & 12, 9 a.m.-4 p.m., furniture, tools, china, glassware. 281-8118.

### Free

BLACK LAB - 5-year-old, female, spayed, w/papers, good w/children. Madeline, Ext. 7527.

CHICKENS - John, Ext. 3675 or 924-3528.

PUPPIES - adorable, black & white mix, healthy. Ellen, 727-3535 or 474-1243.

KITTENS - 2, in desperate need of homes. Paul, Ext. 2447 or 878-1486.

### Car Pools

BAYPORT/BLUE POINT - need 1 driver. Phil, Ext. 3500 or 363-2070.

BELLPORT - 5th member for established car pool. Liz, Ext. 2346 or Ed, 286-7539 after 6 p.m.

NESCONSET TO PATCHOGUE - ride needed, during summer, willing to pay, not on Saturday. 981-5646.

### Real Estate

Real Estate advertised for sale or rent is available without regard for the race, color, creed, sex or national origin of the applicant.

### For Rent

BELLPORT - 4 bdrm., 3 1/2 baths, Jacuzzi, in walking distance of bay and village. 286-0269 eves.

BROOKHAVEN HAMLET - room, share house, 4 bdrm., 2 bath, w/two other professionals, 3/4 acre, wooded, \$350. Sidney Stafford, 286-4028, or Randy, Ext. 3835.

CALVERTON - 2 bdrm. townhouse, 5 appliances, fp, cac, w/w, fenced patio, upper deck. 878-0874 after 5 p.m.

EAST NORTHPORT - 1 bdrm. apt., kit., l/r, bath, priv. ent., one person. 368-6115 after 6 p.m.

EAST YAPHANK - 2 large rooms w/kitchenette & bath, ground floor, priv. ent., no children, no pets, 1 mo. sec., \$600/mo. incl. util. & cable. 281-5781 after 5 p.m.

HAMPTONS/EAST QUOGUE - share a charming summer house, 20 min to Lab. Leon, Ext. 3761 or (718) 646-8599.

HUNTINGTON - apt., kit., l/r, bdrm., bath, 2nd fl., priv., \$465/mo. + util., no pets, avail. July 1. Ext. 2907, 2913 or 698-0576.

MILLER PLACE - 2 bdrm. house, f/p, walk to beach, furnished, washer/dryer, quiet, \$975/mo. + util. 473-3349.

RIDGE - Strathmore, 2 bdrm. townhouse, 1 1/2 baths, close to Lab, \$675/mo. + util. Ext. 3346 or 345-3584.

ROCKY POINT - furnished studio apt., kitchen-l/r-bdrm. combo., clean, nice area, one person, non-smoker, \$425/mo. incl. all. 744-8659.

SOUND BEACH - 3-4 bdrm. house, cozy, l/r, eik, 1 1/2 baths, laundry rm., close to beach, avail. 7/1/88, \$750/mo. + util. 744-5930.

SOUND BEACH - new 1 bdrm. apt., priv. ent., single, non-smoker, \$600/mo. incl. all. Ext. 7918 or 744-3068.

STONY BROOK - 3 bdrm. Cape, 1 1/2 bath, large l/r w/fp, eik, screened porch, bsmt., 1-car gar., walk to RR & SUNY, avail. July 1 or Aug. 1, one-yr. lease, \$1,100. 751-0453.

LAKE PLACID, NY - modern 2 bdrm. A-frame, loft, sleeps 8, fully furn., near swimming, boating, golf, tennis, hiking & more. 757-1775 after 3 p.m.

NORTH MYRTLE BEACH, SC - 1 bdrm. ocean-front condo, sleeps 4, near golf, fishing, amusements, piers, \$375/week. Bill, Ext. 2377 or 399-6168.

### For Sale

EASTPORT - 2 bdrm., l/r, kit., bath, full bsmt., 100x120 property, good loc., close to school & shopping, beautifully landscaped, \$115,000, firm. Ext. 2232 or 325-0835.

EAST QUOGUE - 3 bdrm. ranch, l/r w/fp, d/r, eik, 2 baths, fin. bsmt., double garage, 20x40 in-ground pool, decks & patios, priv. beach & tennis, \$210,000. Ext. 4470.

FT. SALONGA/KINGS PARK - sprawling 4 bdrm. ranch, paneled w/fp, bsmt., large brick patio, 2-car garage, wooded area, close to beach, \$229,900. 269-1093.

MEDFORD - 4 bdrm. Colonial, fenced 1/2 acre, 2 1/2 baths, family rm., oversized garage, in-ground sprinkler, prof. landscaped, w/1 bdrm. apt., many extras, must see, mint cond., \$184,900. Anne, Ext. 7814 or 475-8456.

MIDDLE ISLAND - 3 bdrm. A-frame house, eik, l/r, den, 2 fp's, attached 1 bdrm. apt., redwood deck w/outdoor year-round hot tub, 1 1/2 miles west of Lab's main gate. Ext. 2075 or 924-3855.

MILLER PLACE - 3 bdrm. ranch, l/r, d/r, fin. bsmt., in-ground pool, low taxes, \$155,000. Fran, Ext. 4835 or 744-4061.

MILLER PLACE - Scotts Beach, 4 bdrm. ranch, 1/2 acre plus, private beach community, sunroom, spa, pool, city water, \$190,000. Judy, 473-6631 after 5 p.m.

RIDGE - 3 bdrm. modern ranch, cedar skylight bath, newly carpeted, bsmt. w/bar & priv. ent., energy efficient, low taxes, 5 min to Lab, \$145,000. 924-7677.

RIVERHEAD - mobile home in over 55-adult park, 2 bdrms., 1 1/2 baths, water-view, on Peconic River, new floors, carpeting & bath, \$35,000. 369-2838.

RIVERHEAD - 4 bdrm. 2-level ranch, 2 baths, possible M/D, 3/4 acre, large l/r, den, deeded beach rights, quiet neighborhood, 5 appliances, \$150,000. 727-0499.

ROCKY POINT - 3 bdrm. ranch, l/r, d/r, 1 bath, family rm., w/skylights, full bsmt., city water, on beautiful dead-end street, \$137,000 neg. Matt, Ext. 5215 or Pat, 744-4494.

WADING RIVER - 3 bdrm. ranch, foyer, l/r w/fp, d/r, eik, 2 baths, 2-car oversized garage, 10'x24' deck w/screen rm., 1 acre, SWR schools, \$192,000. 929-3251 after 6 p.m.

YAPHANK - beautiful 3 bdrm. townhouse condo, priv. end-unit, brick front, full bsmt., attached garage, central a/c, w/w, 5-appliances, pools, tennis, clubhouse, many extras, \$129,900. Ext. 4631.

HOLLYWOOD, FL - 10 min. S. of Ft. Lauderdale, 3 bdrms., screened porch, fenced, shed, fruit trees, many extras, taxes \$327, \$67,000. 289-3586.

ROCKLEDGE, FL - block & stucco, 2 bdrms., 2 baths, fam. rm. 11x25 porch, carpet, shades, some drapes, extras, good loc., \$64,500. 407-631-2840.

HILTON HEAD, SC - 3 bdrm. condo, sleeps 8, 2 baths, washer/dryer, wet bar, 6 tennis courts, 3 pools, whirlpool, golf, ocean view, asking \$89,000, will rent. 929-8912.

### Wanted

HOUSE - for family of 4, Aug./Sept. for 1 year, pref. SWR school dist., Pen Spanne, Rad. Phys. Dept., Faculty of Health Sciences, Linköping Univ., S-581-85, Linköping, Sweden.

HOUSE TO SIT - free, caring, reliable, experienced, any duration, June to Sept. Jack Allentuck, Ext. 2412.

MINERALS - mineral collections, mineral books, any language. Plotkin, Ext. 7974 on Wednesdays, or 798-2887 other days.

10-SPEED BICYCLE - good cond., reasonable. 924-7262.

PEOPLE FOR PRAYER GROUP - Tues./Thurs., noon-12:30, Bldg. 490 chapel, sing, discuss, pray. P. McHugh, Ext. 3297 or M. Cooper, Ext. 4105.

23 CHANNEL CB - 689-9234.

CEMENT MIXER/WET SAW/BOBCAT - to buy or rent. Tony, 698-9274.

CHILD CARE - E. Moriches at your home, for 8-yr.-old girl, before and after school, starting in the fall. Mona, Ext. 5056 or 878-9384 eves.

AIR CONDITIONER - used, for window installation, good cond. Ext. 7697 or 689-2829.

HOUSE OR APT. - to rent, 3/4 bdrms., 1 1/2 baths, l/r, d/r, kit., w/d, family neighborhood, end of June. 245-0907.