

BNL Researchers Raise Gold Standard To Combat Colon and Brain Cancers

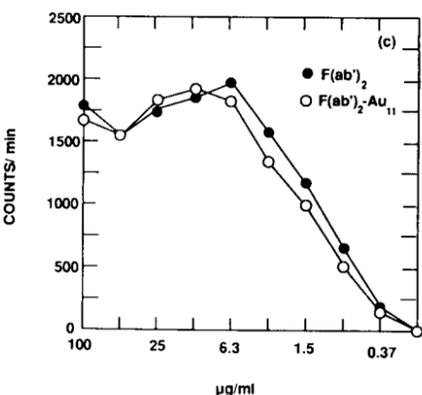
This is the second in a series of articles on the four grants awarded in July to BNL scientists in the Biology and Medical Departments by the U.S. Department of Energy, Office of Energy Research, under a new, special grant program for nuclear medicine research.

Over the next three years, the "gold standard" of electron microscope labels will be turned into a lethal weapon in the war against colon and brain cancer — with a special research grant in nuclear medicine from the U.S. Department of Energy (DOE).

The "gold standard" is a cluster of 11 gold atoms bonded to the fragment of an antibody, a protein produced in the blood in response to infection by foreign substances called antigens.

Since the gold-antibody compound was synthesized by biophysicist James Hainfeld of BNL's Biology Department in 1987, it has been the smallest antibody label for use under electron microscopes, such as BNL's Scanning Transmission Electron Microscope (STEM).

By attaching the gold label to proteins, nucleic acids or other biological molecules, biologists are able to view structures as small as five billionths of a meter — a resolution



This graph compares the immunoreactivity of unlabeled antibody fragments $F(ab')_2$ to the immunoreactivity of antibody fragments labeled with 11 gold-atom clusters, $F(ab')_2-Au_{11}$. As the graph clearly shows, the immunoreactivity of $F(ab')_2$ is not affected when labeled with Au_{11} .



Leonard Mausner (foreground) and James Hainfeld use remote manipulators in a hot cell to handle the highly radioactive gold-199.

five to ten times greater than with other antibody labels.

Recalls Hainfeld, "Because the gold cluster attaches to almost all of the antibody fragments we are using, and because the resulting label is stable and immunoreactive, it started me thinking about the medical applications — about using the label for locating, imaging and destroying malignant cells."

So he teamed up with radiochemist Leonard Mausner of the Medical Department.

An Arsenal of "Magic Bullets"

Supported for the past two years by funding from the Laboratory Director's Exploratory Research Program and now by DOE, the two have been investigating the possibility of attaching radioactive gold onto antibodies and antibody fragments for use in radioimmunotherapy for cancer.

Hainfeld and Mausner have been assisted in their work by Candice Foley, who has developed the synthesis of the 11 gold-atom clusters from radioactive gold metal, and Fred Furuya, who is developing a larger cluster, with 55 gold atoms.

Radioimmunotherapy — the use of "magic bullets," that is, antibodies attached to radioisotopes to locate and destroy cancer cells — is an old idea being reinvestigated using new antibodies and radioisotopes, such as Hainfeld and Mausner's.

"The problem with radioimmunotherapy in the past has been that the antibodies do not just go to the tumor," explains Hainfeld. For every three to five that attach to the cancerous tumor, one will bind to noncancerous tissue — thereby unnecessarily delivering lethal doses of radiation to healthy cells.

Despite this drawback, 30 percent of the cancers treated with radioimmunotherapy responded at least partially. Says Hainfeld, "So the thought is that, if we have more specific antibodies, that is antibodies that bind only to the cancerous tumor, then radioimmunotherapy may be more successful in causing remission of the disease."

Monoclonal Antibody Fragments

The specific antibodies that Hainfeld and Mausner are using are antitumor monoclonal antibodies, for

(Continued on page 2)

Update: 1990 Funding

In the Brookhaven Bulletin of August 4, it was reported that the U.S. Senate, in the fiscal year (FY) 1990 Energy and Water Development Appropriation Bill, had cut funding for the operation of BNL's Alternating Gradient Synchrotron (AGS) by \$10 million. The corresponding appropriations bill passed by the House of Representatives contained no such cut, it was also reported.

On September 7, a Senate-House Conference Committee resolved their differences in the Appropriations Bill. This bill, which has passed both houses of Congress, must now be sent to the President for approval.

The Conference Committee reduced the \$10 million cut in AGS funding to \$5 million. To reduce spending plans by this amount, the Laboratory is currently assessing various options.

"Unfortunately," said Henry Grahn, Associate Director for Administration, "as a consequence of this cut, there will have to be some reduction in the number of positions in the AGS-related program. However, we are pleased that the reduction was only \$5 million, which is a significant improvement from the \$30 million cut that was originally proposed by the Senate Appropriation Subcommittee on Energy and Water Development in July."

In other areas of the Appropriation Bill, Congress added and subtracted monies from the President's request. The net changes in the FY 1990 Energy and Water Appropriation still provide an increase over FY 1989's total budget. However, Congress has included specific instructions in the Appropriation Bill on how some of the funds must be spent.

At this time, the Laboratory does not have any information on how the BNL programs may be affected by these instructions. Until the budget picture is more complete on the funding levels that BNL can expect to receive in FY 1990, the Lab-wide freeze on hiring will remain in place.

Detector Idea: "Nonmagnetic" but Nevertheless Attractive



As the Superconducting Super Collider (SSC) takes shape near Dallas, scientists elsewhere are making plans for the detectors that will be used to observe the collisions of the SSC's two particle beams, each with an energy of 20 trillion electron volts. At BNL, for example, on August 28-30, some 70 scientists from all around the U.S. gathered for a "Workshop on a Nonmagnetic Detector for the SSC."

The idea for such a detector was originated by Michael Marx (above, left), a physics professor at the State University of New York at Stony Brook and a long-time collaborator with BNL physicists.

Many detectors used in other high energy colliders have a central magnetic field, thanks to a large solenoidal coil surrounding the center of the apparatus. The "nonmagnetic" detector would not have this central magnetic field, although a 42-foot-long toroidal magnet would be part of the design, as would a calorimeter being designed by BNL physicist Howard Gordon.

BNL physicists John Haggerty (center) and William Morse (right) organized the workshop along with Marx. The workshop was run with the aid of Nancy White, the conference coordinator.

Gold Standard (cont'd)

human colon cancer and for a human brain cancer, neuroblastoma. The monoclonal antibodies are to be provided by collaborator Zenon Stepleski at the Wistar Institute, Pennsylvania.

Monoclonal antibodies are produced from laboratory culture of cells cloned from a single antibody-secreting cell taken from a mouse spleen. Each antibody-producing cell in the spleen makes only one type of antibody, which bind with a specific site on an antigen to eliminate the source of infection. So, by first cloning and then stimulating a specific spleen-cell line, antibodies that react with a selected site can easily be produced.

Actually, Hainfeld and Mausner utilize only the immunologically active part of the antibody, the fragment that does the binding to the specific antigenic site. The antibody fragment is what will be attached to a radionuclide of gold — gold-199.

Glittering Gold-199

According to Hainfeld, gold-199 is

one of the best radionuclides to attach to monoclonal antibodies for radioimmunotherapy because it has a short half-life, 3.1 days, and because it emits beta particles of an intermediate energy that are lethal to tissue within a ten-cell radius. In addition, gold-199 releases gamma rays, which can be used to image the distribution of the antibody-gold compound about the tumor.

Usually, only one to three atoms of a radionuclide are attached to an antitumor antibody used in radioimmunotherapy.

"What is unique about the gold-antibody compound," explains Hainfeld, "is that each antibody may carry up to 11 radioactive gold atoms to a tumor. This should be a therapeutic advantage since the tumor sites to which the antibodies bind are limited. The antibodies have access only to the outer layer of a tumor because of its poor blood supply."

Using STEM & the HFBR

To deliver an even greater radiation dose, Hainfeld and Furuya are also working on binding a cluster of 55 gold atoms to monoclonal anti-

bodies. STEM will be used to check the stability and positioning of the gold clusters after they are bound to the monoclonal antibodies.

To prepare radioactive gold, the researchers will be using BNL's High Flux Beam Reactor (HFBR) to irradiate gold metal. The activated gold will be used to synthesize the 11- and 55-atom clusters.

To obtain the higher activity per unit weight of gold that is necessary for therapeutic use, platinum-198 will be turned into platinum-199 by the neutrons at the HFBR. This then decays into gold-199, which will be

An arsenal of "magic bullets," antitumor monoclonal antibodies labeled with 11-atom gold clusters (bright spots), as magnified by BNL's Scanning Transmission Electron Microscope. Top four rows: smallest antibody fragments, called Fab', each labeled with one to four 11 gold-atom clusters; rows 5 and 6: larger antibody fragments, called F(ab')₂; bottom row: label IgG, the largest antibody fragments.

chemically separated from the unreacted platinum-198 at the Hot Lab.

"In parallel with the radiochemical and cluster chemistry development, we will check the stability and distribution of the preparations in mice. Eventually, we will try therapeutic dose levels in tumor-bearing mice, as we hope to demonstrate an advantage of radioimmunotherapy over conventional radiotherapy techniques," concludes Mausner.

— Marsha Belford



Note to Employees:

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

An Artist's Adventure Into Physics

Standard Model (abandoned) is a 40-foot-long eclectic sculpture that begins before a gleaming brass trumpet heralding a new age of knowledge and ends beyond a bounding deer with a quantum leap of understanding.

Beyond the sculpture sits a giant frame of a chair. The implied presence of the chair's invisible occupant affects what is being observed: the dialectical march of human understanding and science since antiquity, in parallel with the travels of a particle beam through an artistic interpretation of a modern linear accelerator.

Since August 17, this conceptual sculpture has been on display at BNL's Collider Center, Bldg. 1005. The exhibit will continue for two more days: It can be viewed today, September 22, from 11 a.m. to 2 p.m., and tomorrow, Saturday, September 23, from 11 a.m. to 4 p.m.

The sculptor, 35-year-old Stephen Rueckert, will be on hand Saturday to discuss his work and the reason for it being here.

The Linac as Inspiration

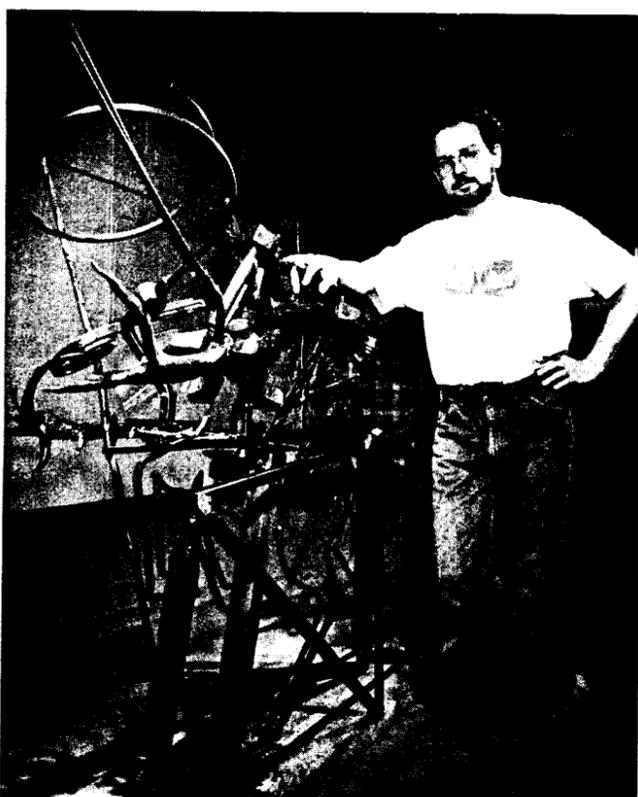
According to Rueckert, "Art shouldn't just be displayed in art galleries and museums. I was inspired by what I had seen at BNL — the work going on here, as well as the beauty of the Lab's machines — so I wanted to bring my sculpture back to its origins."

In collecting and assembling the parts of the sculpture over the past year, Rueckert had drawn inspiration from Brookhaven's own linear accelerator for the Alternating Gradient Synchrotron (AGS). The 480-foot-long linac accelerates a 750-thousand-electron-volt proton beam to an energy of 200 million electron volts, before the beam is injected into the AGS.

"Up to that point, my work had been about imitating nature," Rueckert explains, "and I was fascinated with how form follows function. I had been trying to draw things as beautifully as nature originally created them."

Some of the drawings that Rueckert had produced during his earlier period can be seen in the permanent collections of the Metropolitan Museum of Art in New York City and the Brooklyn Museum. To support his art as well as himself, Brooklyn-based Rueckert also welds models, displays and other artists' works under the name Sculptural Engineering.

"In the process of drawing, I began



Stephen Rueckert, standing by the collision point of his sculpture. Behind him and before a long trumpet are four glass cases, etched with physics equations and standing on trolley-like tracks. Under the glass is an assortment of human artifacts, grouped with like objects in a progression. Beyond the sculptor and the chaos before him is a break in the tracks and the emergence of a running white-tailed buck.

Roger Stouenburgh

questioning why things are the way they are, and the closer I came to imitating nature, the more abstract were the answers that I found in my art," continues the sculptor. "To save myself from the lure of chaotic thinking, I began to investigate something more tangible — matter — but from an artistic standpoint."

Discovering Particle Physics

So, he began selecting and organizing symbolic objects with common denominators into sculpture. A few sculptures later, his artistic search into matter and physics led him to discover the existence of particle physics.

Two summers ago, not yet knowing any physicists, Rueckert had phoned another artist — his friend William Chamberlain, to whom the exhibit of *Standard Model (abandoned)* is dedicated — to ask about particle accelerators.

After describing the Stanford Linear Accelerator Center (SLAC), Chamberlain suggested that Rueckert should sign up for a course at the New School for Social Research in New York — the late Nobel laureate Richard Feynman delivering a series of popular physics lectures on videotape.

So, this became the first and only physics course taken by Rueckert, who had been graduated with a BFA in sculpture from the Rhode Island School of Design in 1975 and who had

studied drawing and anatomy at the Ecole des Beaux Arts in Paris in 1979.

Not able to travel to SLAC in California to see a linear accelerator and not knowing at the time of the existence of circular accelerators or colliders, Rueckert called Brookhaven. After taking a general Lab tour, Rueckert was guided through the AGS to see the linac by physicist Peter Yamin, Physics Department, in the summer of 1988.

Later, Rueckert again called upon Yamin, as well as Howard Gordon, Physics, asking them to check the physics equations that the sculptor had selected to be etched on the glass of the display cases in his sculpture.

In the meantime, Rueckert had begun reading about the history of particle acceleration. "It wasn't the history of science itself that excited me, but the feeling of search and discovery, and the evolution of understanding — my own, as well as that from the beginning of time," explains Rueckert. "I wanted to put the same feelings into my work."

In his artistic adventure into the science of physics, the sculptor found that he not only had to deal with matter, but also to translate the physical realities of energy, motion and force into visual metaphors. These challenges once again brought his thinking and his conception of the sculpture "to the edge of chaos."

"Toward the end of the project, I

stopped reading about physics because the sculpture is not only about science or the history of particle acceleration, but it is also an expression about the moment of impact and the process of discovery — the paradox of the simultaneous creation and destruction of matter and our understanding.

"The sculpture was difficult to finish," admits Rueckert. "I originally had the deer facing my linac, but it didn't work — I didn't want the impact to be humankind against nature. By having it emerge from the destruction, the deer better symbolizes the process of creation."

Increasing his knowledge of particle acceleration and further inspired by BNL's plans for the Relativistic Heavy Ion Collider, Rueckert would like to go on to sculpt a collider as another visual metaphor. However, as creating such an accelerator would require an even bigger budget, Rueckert is awaiting the sale of this sculpture to fund such a project.

After leaving BNL, *Standard Model (abandoned)* will be shown at the Tomoko-Liguori Gallery in New York from October 21 to November 25.

— Marsha Belford

Inside Info

Herbert Kouts, Senior Physicist and Chairman of the Department of Nuclear Energy from 1978-88, has accepted a three-year Presidential appointment to the Defense Nuclear Facility Safety Board in Washington, D.C.

The board is responsible for overseeing safety at the defense facilities run by the U.S. Department of Energy. In addition, the board advises the Secretary of Energy on safety at these facilities and makes recommendations.

As Kouts' appointment to the board requires Senate approval, he will be appearing at a Senate Armed Services Committee hearing in the near future. When his tenure on the board begins, Kouts will retire from BNL.

Arrivals & Departures

Arrivals

None

Departures

This list includes all employees who have terminated from the Laboratory, including retirees:

Gaetano Vignola NSLS
Mary Ann Castrogiovanni DNE
Ronald C. Johnson AGS

Runners Corner

Overcoming the heat and humidity of the evening of August 1, BNL's Roadrunners finished sixth among 50 women's teams, seventh among 101 men's teams and twentieth among 67 coed teams following the Manufacturers Hanover Corporate Cup race.

The flat and fast 3.5-mile course in East Meadow drew a good mix of BNL runners, ranging from novices through the well-seasoned:

Women's Team		Coed Team	
Sharon Zuhoski	24:30	Skip Medeiros	25:32
Joan Congemi	27:39	Nick Gmur	26:26
Swapna		Jack Brennan	28:08
Mukherji	29:42	Crystal Price	30:22
Men's Team		Coed Team	
Paul Geiger	19:50	Ronnie Evans	38:10
Russ Tonkyn	20:15	Sharon Spark	41:21
Ted Lazo	21:58		
John DeRico	22:04		

Stony Brook Event

Herman Feshbach, physicist and professor at the Center for Theoretical Physics, Massachusetts Institute of Technology, will be the first speaker in the 1989-90 University Distinguished Lecture Series at the State University of New York at Stony Brook. He will speak about "The World of the Nucleus" on Tuesday, September 26, at 4 p.m., in the Recital Hall of the Staller Center for the Arts. The lecture is free and open to the public.

Scoop of the Week

The last Scoop of the Week for the summer of 1989 goes to Neil Baggett, Director's Office, for suggesting "An Artist's Adventure Into Physics."

With the autumnal equinox tonight at 9:20 p.m., summer ends and so does the Bulletin's Scoop of the Week contest for 1989. But, there is no end in sight to the good ideas that have piled up at the Bulletin office.

As summer is only so long, and the Bulletin and its staff is only so big, we will be following up on the leftover summer scoops this fall.

So as not to shortchange the tipsters whose good ideas for news and features have yet to metamorphose into published Bulletin stories but will in time, we hereby award scoops to: David Alburger, Department of Nuclear Energy (DNE); Kathi Barkigia, Department of Applied Science (DAS); Michelle Cummings, Management Information Systems Division (MIS); Susan Foster, Personnel Division; William Gunther, DNE; Gene Kaplan, Alternating Gradient Synchrotron Department (AGS); Bom Soon Lee, DNE; Peter Pohlig, MIS; David Potter, Instrumentation Division; Arthur Scholtz, AGS; Satinder Sidhu, National Synchrotron Light Source Department; Joyce Tichler, DAS; Gene Weinstock, DNE; and Michael Zguris, AGS.



Local Users Group

An "Overview of New VAX and RISC Architecture Products" will be presented by a representative from Digital Equipment Corporation (DEC) at the next meeting of the Upton Local Users Group, on Wednesday, September 27, at 10:30 a.m. in Room B, Berkner Hall.

The presentation will provide information on networks, VAX 6000s, Micro VAX 3100s, DEC systems 5800 and 5400, and DEC stations. All interested users are welcome. For more information, call LUG chairperson, Zohreh Parsa, Ext. 4748.

Amateur Radio Club

The BERA Amateur Radio Club will meet in Berkner Hall, Room A, on Thursday, September 28, at noon. The agenda includes discussion of the progress of the UHF repeater and of the amateur radio licensing classes. The club's current schedule for meetings and activities for the balance of the year includes:

- Monthly executive board meetings, on the second Tuesday, at noon, in the Contracts & Procurement Division conference room, in the lower level of Bldg. 355.

- Amateur radio licensing classes every Wednesday through the end of January in the Management Information Systems Division conference room, Bldg. 459, at noon.

- Monthly club meetings on Thursdays at noon, on October 26, November 30 and December 21, at locations to be announced in the Bulletin.

All licensed radio amateurs employed at the Lab and those interested in obtaining their licenses are invited to attend. For more information, call Andy Feldman, Ext. 3264, or Bob Bacharach, Ext. 7790.

Bowling

White League

Joe Fernandez bowled a 214 and converted the 2/4/10 split, Ken Riker had a 203/202, Andy Warkentein 200, Renee Flack 199, Mary Addessi 199, Caryl MacDougall 182, Jeanne Penoyar 182, Gerry Riker 180.

Purple League

Paul Callegari had a 221, Ed Sperry 200, Gail Schuman 192, Betty Jellett 192.

Red/Green League

M. Guacci had a 229, R. Mulderig 217/207/225/649 scratch series, C. Bohnenblusch 220, B. McCarrick 220, N. Combatti 211, D. Jesaitis 209, M. Kelly 208, A. Warkentien 203, E. Sperry IV 202, W. Kain 201.

Softball Standings

In the final games of the 1989 Softball season:

- **League I** — Blue Jays defeated Phoubars, 4-3.

- **League II** — Magnuts defeated Cutting Edge, 17-5.

- **League III** — Dirty Sox defeated Blue Knights, 7-6.

- **League IV** — Snakebites defeated Kidz-R-Us, 8-5.

- **League V** — Source defeated Far Side, 9-8.

Harvest Festival

Children and adults can celebrate Long Island's agricultural lifestyle and products at the seventh annual Long Island Fall Harvest Festival on Sunday, September 24. Rain or shine, the festival will be held at the eastern campus of Suffolk Community College in Riverhead, from 11 a.m. to 5 p.m.

The Cornell Cooperative Extension requests a \$3 donation per car, to help defray costs of the festival, which will feature live music, food, demonstration, a farmers' market, wine-tasting, a livestock exhibit and an opportunity to get gardening advice from the Cooperative Extension's master gardeners.

For more information, call 727-7850 today.

A Suggestion of Savings



Roger Stoutenburgh

The Laboratory's bicycle riders will be pleased to know that handlebar-mounted rearview mirrors are now available from stock, as item H-27730 — thanks to a suggestion from Joseph Modjeska, an office machine repair mechanic in the Supply & Materiel Division.

Weather permitting, Modjeska rides a bike on site, and he has noticed an increase in traffic. He also noticed a tendency to swerve when turning around to check on traffic, which prompted his suggestion. The mirrors are easily mounted: Only a pair of pliers is needed.

For this safety-related idea, Modjeska received \$25 from the Employee Suggestion Program.

Camera Club

The upcoming photo contest will be one of the topics of discussion at the Camera Club's next monthly meeting, at 5:30 p.m. on Thursday, September 28, in the lobby of Berkner Hall.

Interested nonmembers are invited to attend. Both members and nonmembers are encouraged to bring framed photographs to the meeting, for display in the photo exhibit located in the Berkner lobby.

For information, contact Lew Jacobson, Bldg. 134C, Ext. 5193; Ripp Bowman, Bldg. 911B, Ext. 4672; or Anne Baittinger, Bldg. 134, Ext. 5055.

Cafeteria Menu

Monday, September 25

Soup: Navy bean	(cup)	.75
	(bowl)	.95
Shrimp scampi over rice		3.10
Turkey tetrazzini w/pot. or veg.		3.10
Lite-line: Broiled turkey w/stuffing & pot. or veg.		3.10
Hot deli: Foot-long chili dogs	(each)	.75

Tuesday, September 26

Soup: Dutch potato cheese chowder	(cup)	.75
	(bowl)	.95
Lamb chops w/pot. or veg.		3.10
Beef tidbits w/red wine mushroom gravy over rice		3.10
Lite-line: Marinated vegetable platter		2.85
Hot deli: Pastrami		2.85

Wednesday, September 27

Soup: Turkey noodle	(cup)	.75
	(bowl)	.95
Mussels marinara over linguini		3.10
Fresh ham w/pot. or veg.		3.10
Lite-line: Caesar salad		2.85
Hot deli: Open roast beef		2.85

Thursday, September 28

Soup: Garden vegetable	(cup)	.75
	(bowl)	.95
One-half Cornish hen w/stuffing & pot. or veg.		3.10
Macaroni & cheese blanco		3.10
Lite-line: Smoked salmon salad plate		3.10
Hot deli: Corned beef		2.85

Friday, September 29

Soup: Seafood gumbo	(cup)	.75
	(bowl)	.95
Filet mignon w/pot. or veg.		3.10
Seafood fiesta		3.10
Lite-line: Broiled whitefish w/pot. or veg.		3.10
Hot deli: Open turkey		2.85

IBEW Meeting

Local 2230, IBEW, will hold its regular monthly meeting on Monday, September 25, at 6 p.m., in the Knights of Columbus Hall, Railroad Avenue, Patchogue. On the agenda is regular business, committee reports and the president's report.

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.

The vacancies listed below have been exempted by the Director's Office from the current freeze on open requisitions.

LABORATORY RECRUITMENT - Opportunities for Laboratory employees only.

4105. TELEPHONE OPERATOR - Requires prior working experience operating a large telephone console; GTE knowledge helpful. Must be able to work varying day hours. Computing and Communications Division.

4106. SECRETARIAL POSITION - Requires AAS in secretarial science or equivalent and a thorough knowledge of Laboratory policies and procedures. Excellent communication skills and well-developed interpersonal skills are necessary. Word processing required; IBM PC WordPerfect preferred. Will perform diverse secretarial duties including processing research proposals, distribution of computer runs, material requisitions, ILRs and correspondence. Budget Office.

4107. NUCLEAR REACTOR OPERATOR TRAINEE - Requires AAS or equivalent experience in reactor operations, as well as demonstrated mechanical ability. Previous reactor

(continued on page 4)

BROOKHAVEN BULLETIN

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ANITA COHEN, Editor
MARSHA BELFORD, Assistant Editor
LIZ SEUBERT, Reporter

35 Brookhaven Ave., Upton, N.Y. 11973
(516)282-2345

Classified Ads (cont'd)

experience desired, with a naval reactor experience preferred. Ability to obtain and maintain a security clearance required. Must be able to work rotating shifts. (Reposting of Job #4092). Reactor Division.

OPEN RECRUITMENT - Opportunities for Laboratory employees and outside applicants.

4108 RESEARCH SERVICES POSITIONS - (part-time) Duties will include monitoring low-energy accelerator, taking hourly recordings and making minor tuning adjustments if necessary. Must be available to work evenings and possibly weekends. One year appointment. Physics Department.

4109. PROGRAMMING POSITION - Requires a BS/AA degree in computer science or equivalent, and a minimum of two years' experience as a programmer. Must have broad knowledge of computers working in an IBM PC, Hewlett Packard 3000 environment. Experience with FORTRAN, COBOL, R-BASE, NEWASK, and LOTUS 1-2-3 is necessary. Familiarity with Harvard and DB graphics, IPAP, JCARS and TeX is desirable. (Reposting of Job #4102). Physics Department.

Motor Vehicles & Supplies

87 MAZDA 323 LX - 4-dr., a/t, a/c, p/s, am/fm cass., sunroof, 5 yr. service contract, \$5,500. Linda, Ext. 3147 or 924-1038.

86 SUBARU GL-10 - 4wd turbo, s/w, warranted, 70k mi., every option, mint cond., asking \$8,500. Henry, Ext. 4547 or 727-7227.

86 FORD ESCORT - p/s, p/b, a/c, a/t, excel. cond., asking \$4,800. Ext. 2343 or 563-2889 after 6 p.m.

86 CHEVY SPRINT - 2-dr., 5-spd., body damage, best offer over \$500. Joe, pager 0925 or 728-1859 eves.

86 MUSTANG G.T. - T-top, a/c, 34k mi., fully loaded, \$7,995. Farmer, Ext. 4638 or 289-0152.

84 COROLLA VAN - 70k mi., m/t, \$2,000. Ext. 4795 or 3073 after 6 p.m.

84 CHEVY CAVALIER - sta. wagon, clean in & out, runs well, needs pressure plate, asking \$800. Phil, 744-5079.

84 OLDS OMEGA - 65k mi., 2-dr., p/s, p/b, a/c, am/fm cass., good cond., \$3,500. Jim, Ext. 4606 or 654-5049 after 6 p.m.

84 FORD LTD - V-6, 69k mi., gray, p/s, p/b, a/t, a/c, cruise, am/fm cass., moving, \$3,200. Yoshiyuki, Ext. 4795 or 3073.

84 DODGE OMNI - 2.2L, 5-spd., stereo, 110k highway mi., runs well, \$950. Cliff, Ext. 4713 or 563-8931.

83 BUICK RIVIERA - sunroof, all options, V-8, excel. cond., \$5,500. 447-5461.

83 PLYMOUTH HORIZON - 5-spd., 4-dr., 87k mi., runs well, must sell, \$850. Chris Robertson, Ext. 3355.

83 PONTIAC SE2000 - p/s, p/b, a/c, a/t, 78k mi., good cond., asking \$2,800. Xuan, Ext. 3677.

82 TOYOTA TERCEL - 2-dr. sedan, 4-spd., fwd, blue, very good cond., \$1,400. Ext. 2733 or 878-8491.

82 HONDA ACCORD LX - p/b, p/s, a/c, 5-spd., stereo cass., excel. cond., asking \$3,200. Ext. 3175.

82 BUICK CENTURY - 4-dr., limited, V-6, a/t, all power, body & interior excel., high mi., \$2,000 firm. Tony, Ext. 2462.

81 BUICK SKYLARK - a/t, p/b, p/s, runs well, \$300. Ext. 3449.

81 HONDA ACCORD - 2-dr., 5-spd., radio, new brakes, 93k mi., good cond., \$1,550. 727-7741.

81 BUICK SKYLARK - 2-dr., 89k mi., runs well, must sell, asking \$1,200. Steward, Ext. 5280.

80 PLYMOUTH HORIZON - h/b, 65k mi., a/t, asking \$1,000. Ext. 5840.

80 CADILLAC SEDAN DEVILLE - new carb., tires, battery & brakes, etc., good cond., \$1,600. 399-6151.

79 SUNLINE TRAVEL TRAILER - sleeps 6, new tires, battery & brakes, will deliver, \$4,300 neg. Artie, Ext. 4988 or 325-0743 eves.

79 MONTE CARLO - runs well, \$1,500 neg. Jerry, 281-5802.

79 DATSUN 280ZX - black w/maroon interior, 5-spd., a/c, p/s, p/b, am/fm cass., \$1,750. Karen, Ext. 4536.

79 TOYOTA SR-5 - lift-back, gold, mint cond., asking \$2,000. 473-7667.

79 FORD BRONCO - 84k mi., needs p/s box, many new parts, good cond., \$3,000. Neal, 286-2435.

79 BUICK LESABRE - 8-cyl., a/t, asking \$800; '80 Ford Pinto, a/t, asking \$650; '80 VW Rabbit, diesel, s/t, parting out. 654-4661 eves & wknds.

78 BUICK REGAL - 2-dr., 350 eng., burgundy, runs well, \$2,200 neg. Sammy, 281-5802 eves.

78 PONTIAC FIREBIRD - motor A1 cond., very clean in & out, mint cond., must see, asking \$2,500. Ext. 5105 or 286-1615.

78 CAMARO RALLY SPORT - no rust, needs some engine work, \$1,200. Richie, 878-1580 after 5 p.m.

77 CAMARO - 6-cyl., 3-spd., s/t, \$700; '75 F250 pickup, 4wd, rebuilt a/t, cap, many new parts. Dave, 369-0517.

77 LINCOLN CONTINENTAL - engine & interior good, needs rear body work, \$150. 821-0250.

76 MAZDA RX3 ROTARY - 30k mi. on new engine, headers, new exhaust, runs well, needs some work, \$500. Charlie, Ext. 4447.

74 CHEVROLET G-10 VAN - 350 V-8, a/t, f/r heat & a/c, p/b, stereo, orig. owner, clean, \$1,500. Jim, Ext. 5439 or 434-3342.

74 MERCURY COUGAR - 350 engine, \$150. 821-0250.

71 MERCEDES - mint cond. in & out, new paint, 4-dr., 220, needs eng. work, runs well, looks great, \$1,200. Mike, Ext. 3430.

70 PLYMOUTH FURY - new trans. & brakes, 70k mi. on new motor, excel. running cond. Frank, Ext. 2343

69 VOLVO 1800S - sports car, red w/black int., 4-spd. w/o d., dual carb., good cond., \$2,500. 924-6619.

DODGE ST. REGIS - 68k orig. mi., new parts, brakes, starter & muffler, excel. cond, \$1,200. Ext. 4162 or 345-3060.

CAR COVER - extra-large, 225"x80", custom deluxe, polycotton, used only twice, \$35. 878-1580 after 5 p.m.

AIR-FLOW BOX - Datsun, for fuel-injected car, paid \$450, will neg. Janet, Ext. 2345 or 929-3910.

TIRE - Goodyear, A-T Tracker 10-15, new, \$50. 269-9510 after 6 p.m.

CAP - Viper, fiberglass, fits '78-'86 El Camino, 8 windows, \$350. Ext. 5329.

TIRES - 4 Bridgestone, Desert Dueler, P21575R15 m&s on 6-lug rims, new, \$200; 60-mo. battery, \$30 or best offer. Donna, Ext. 4103 or 821-2875.

ENGINE - Ford 351W, good cond. Mark, Ext. 2599 or 261-7250 eves.

Boats & Marine Supplies

36' TROJAN - 1984, 350-h.p., FWC enclosure, gen., loran, stereo, VHF, flybridge, low hrs., must sell, \$95,000. Gregg, Ext. 4446 or 874-8631.

29' ULRICHSON - flybridge, FWC, 327, runs well, sleeps 5, galley w/range & oven, elec. head, excel. cond., must sell, asking \$3,500. Jack, 732-2754.

28' SLOOP KIT - 90% completed, dark blue hull, Holman & Pye design, solidly built, sacrifice, \$18,000 neg. Jim, Ext. 4584.

22' CATALINA SAILBOAT - 3 sails, trailer & motor, good cond., asking \$4,500. 929-8912.

21 1/2' CLIPPER SAILBOAT - 1984, 9.9-h.p. Evinrude, c/b, VHF, sleeps 4, fully equipped, trailer, \$3,200 neg. Wesley Howell, 878-1777.

19' BOWRIDER CRUISER - 1972, w/1976 115-h.p. Johnson, Coast Guard pkg., trailer w/electric winch, \$3,000. Frank, Ext. 2314 or 567-5131.

18' FIBERGLASS SLOOP - 4 sails, sail cover, knotmeter, depth sounder, new battery, galvanized trailer. Bergoffen, Ext. 7898.

17' ARISTOCRAFT - fiberglass, 60-h.p. Merc cruiser, I/O, recently rebuilt, w/trailer, ready to go, \$1,575. Mark, Ext. 2599.

15' SILVERLINE - 1969, 33-h.p. Johnson, rebuilt, new chairs, controls, tellex steering, trailer, asking \$800. Pat, Ext. 4500 or 744-2017.

15' MFG - good boat & trailer, repairable 60-h.p. Evinrude, \$850. Bill, Ext. 2807 or 281-0557.

12' ROWBOAT - alum., 9 1/2-h.p., trailer & many access., \$650. 281-5792.

12' SEARS SEMI V - alum., A1 cond., 5 1/2-h.p., Ted Williams outboard motor, \$500 firm. 732-5445.

7 1/2' DINGHY - fiberglass, needs oarlocks installed, \$60. 744-7549.

OUTBOARD MOTOR - 1985, 110-h.p. Johnson, new powerhead in '88, power T/T oil injection, s/s prop., excel. cond., \$2,000. 589-3072.

RAFT - 3-person, inflatable, w/oars, good as dinghy, \$50. Paul, 689-2829.

MOTOR - 9 1/2-h.p. Evinrude, 1968, standard shaft, 100 hr., fresh water, \$375. Emil, 581-7841.

Furnishings & Appliances

CABINET - hi-fi console, cherry, needs work; hanging lamp, antique brass w/globe; woven wood blinds, natural, several sizes. 878-1805.

AIR CONDITIONER - 5,200 Btu, casement window, high efficiency, used 2 seasons, \$250. Ext. 4293.

BEDROOM SET - solid cherry wood, w/dresser, armoire, 2 night tables. 924-0333 after 6 p.m.

DISHWASHER - Hotpoint, portable, good cond., \$75. Larry, Ext. 3065 or 473-1157 after 6 p.m.

EXECUTIVE SECRETARY DESK - walnut, high back swivel chair, excel. cond., \$350/each or \$650/both. Herman, Ext. 7333 or 744-3443.

WATER BED - Somma, queen size, deluxe model. 473-1732 after 5 p.m.

BLINDS - wood, natural color, one 48", one 36", good cond., \$15/both. Lois, Ext. 4904 or 929-4753.

UPRIGHT FREEZER - Revco, 17 cu. ft., \$150 neg.; Akai reel-to-reel deck, w/23 tapes of 60's music, \$50. 281-8894 after 6 p.m.

MATTRESS - and boxspring, Stearns and Foster, twin, excel. cond., \$150. Susan, Ext. 7716.

RECLINER - Lazy Boy, good cond., rust color, \$50. Nancy, Ext. 3309.

CHANDELIER - capriz shell, \$50; 3 decorative stack tables, \$15; glass & chrome coffee table, rectangle, \$25. 924-5419 eves.

SOFAS - peach velour, \$60; earth tones, chevron stitch, \$40; two children's desks, solid wood, \$10/ea. Brant or Marcia, Ext. 4552 or 929-3310.

BRASS OWL - \$5; silver candle holders, \$20/pair; silver spoons, \$4/each. Kathy, 744-2203.

SOFA - print, excel. cond., \$150; love seat, rust color, like new, \$100. Pat, 281-5802.

BEDROOM SET - double, bed, triple dresser, nightstand, mirror, oak, \$600. Garry, Ext. 2924 or 281-8296.

DINING ROOM TABLE - French provincial, white, fruitwood, w/4 chairs, brown, \$200; BMX bike, \$100; riding hats, \$20. 399-1868.

BEDROOM SET - Burlington, girl's, desk, dresser, hutch, cheval mirror, day bed, hand painted detail, light pine, \$500 neg. Bill, Ext. 7625 or 732-9102.

UPRIGHT FREEZER - Gibson, 16 cu. ft., very good cond. 447-5461.

TELEVISION - Sony, 17", best offer; Sony am/fm stereo, cassette. Ext. 4162 or 345-3060.

Tools, House & Garden

PATIO FURNITURE - table, 2 benches, 2 chairs, 2 little benches & 2-seat settee, \$85. Marion, Ext. 2902.

COPING CEMENT BLOCKS - for 20'x40' pool, reasonable offer. Noreen, Ext. 4470.

CAST-IRON RADIATORS - several sizes. 878-1805.

CIRCULAR PUMP - stainless steel, Grundfos UP25-64SF, \$40. Joe, pager 0925 or 728-1859 eves.

GARAGE DOOR - double, nearly new, \$100. John, Ext. 4394.

ATTIC STAIRS - standard size, fits all, new, still in box, \$25. Ext. 2372 or 281-2669 after 6 p.m.

LAWN MOWER - Murray, \$60. Kathy, 744-2203.

SOLAR POOL COVER - for 12'x18' pool, used, \$20. Pete, Ext. 4100.

KEROSENE HEATER - Hamai, round convection, 5,000 Btu, w/5 gallon can, excel., \$30. Bill, Ext. 7625 or 732-9102 after 6 p.m.

Sports, Hobbies & Pets

WEIGHT-LIFTING SET - steel, barbell/dumbbell set, w/bench, 130 lbs., \$100. Frank, Ext. 2314 or 567-5131.

PUPPIES - Lhasa Apso, 7 weeks old, from champion stock, \$200/each. Ramona, 928-3088.

WORK OUT CASSETTE - Jane Fonda Complete workout, new; woman's softball mit, like new, \$20/each. Noreen, Ext. 4470.

PSE COMPOUND BOW - 30" draw, 60 lb. draw weight, quiver, mongoose sights, w/guard, more, \$150 neg. Donna, Ext. 4103 or 821-2875.

TAP SHOES - Capezio, girl's size 7, used only once, \$5. Ady, Ext. 4531 or 331-3785.

WET SUIT - O'Neill, size 14 jr., full suit, worn only a few times, \$50. Pat, Ext. 2300.

PIANO - Lester Betsy Ross, spinet, w/bench, excel. cond., \$700. Tony, Ext. 3658 or 929-4903 after 6 p.m.

SEWING MACHINE - Kenmore, \$50. Larry, Ext. 3065 or 473-1157 after 6 p.m.

CAMERA - Minolta Maxxum 7000 w/50mm/1.7 flash, AA battery, case, excel. cond., \$300. Marc, Ext. 2585/4574 or 874-3729.

FLUTE - Bundy edition, cobalt plated, very rare, like new, sacrifice at \$125. Maureen, 281-7873.

ROWER - Sears, combo exercise machine, very good cond., \$35. Paul, Ext. 7697 or 689-2829.

WARM-UP SUITS - 2 Adidas, woman's size large, one white w/blue trim, one turquoise, w/fully lined pants & jacket, brand-new, never worn. Ext. 3805.

JET SKI - Kawasaki 300, 1987, new engine, looks good, runs well, \$1,400. Mike, Ext. 3430.

TENNIS RACKET STRINGER - Omega, portable, orig. \$210, asking \$150. motorcycle helmet, size large, excel. cond., \$20. 589-0625.

CAR RACING SET - electric, \$15; stereo, \$10; ice hockey helmet, boy's, \$20. 473-6546.

ICE SKATES - Bauer, like new, size 9 1/2 youth, \$10; TDS iron weights, 4-25 lb., 2-10 lb., 2-5 lb., curling iron, & much more, all for \$50. Larry, 4295.

ELECTRIC GUITAR - Memphis-style, red, excel. cond., \$75; Mudan Stradivarius, full size, rosin case, \$65. Bill, Ext. 7625 or 732-9102 after 6 p.m.

TENNIS RACKET - Wilson Ultra FPK, midsize, 95", 4 1/2" grip, excel. cond., orig. \$150, asking \$99. Damian, 744-5079.

Audio, Video & Computer

COLOR TELEVISION - Amark, 20", 1 year old, \$90. Steward, Ext. 5280.

VIDEO CAMERA/VCR - General Electric, excel. cond., \$500; Kaul Tromes satellite antenna, 10', \$250. Tom, Ext. 2372 or 281-2669 after 6 p.m.

COLOR TELEVISION - 13", remote control, warranty, \$115, moving 9/30. Andre, Ext. 2365.

STEREO - Sansui 8900ZOB receiver, Akai M40R cass. deck., Pioneer PL-L1000 turntable, Sansui 4-way speaker system, \$400 neg. 744-7549.

STEREO - Sony HP610, compact stereo, wood cabinet, turntable built into top, works well, \$125. Jim, Ext. 4584.

Miscellaneous

AIRLINE TICKET - American Airlines, one way to San Jose, CA, Monday, Oct. 2, 2:59 p.m., best offer. Ext. 2683 or 751-2469.

BABY CRIB - \$30; car seat, \$20; rocking chair, \$10. Ext. 4162 or 345-3060.

DOLLS - vinyl "Classical Children" by Hildergard Günzel, porcelain "Collectibles" by Phyllis Parkins, Cassandra, Butterfly Babies. 286-3623.

TILES - Italian, ceramic, 8"x8", almond color, 20 boxes, covers over 200 sq. ft., \$250/all. Bob, Ext. 4672 or Lois, Ext. 4904.

BABY STROLLER - Cosmos brand, w/carriage feature, \$30. Ext. 4985 or 331-8459.

Car Pool

BOHEMIA-OAKDALE-SAYVILLE - need 2 more drivers for car pool, also can meet at Exit 59 LI Expressway. Frank, Ext. 2314.

Free

REFRIGERATOR - in working order.

DOG - Bichon Frise, AKC, 1-yr.-old male, needs a loving home, after 6 p.m. 924-0496.

KITTEN - male, white w/gray spots, very cute and always uses litter box. John, Ext. 3406.

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

Yard Sale

SHIRLEY - 56 Appel Drive, Sat. & Sun., Sept. 23 & 24, 10 a.m. to 5 p.m.; sewing mach., chairs, sofa bed, kerosene heaters, more. 399-1868.

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

BLUE POINT - new 2 1/2-rm. apt., sep. bdrm. w/his & her closets, closets in bath, l/r w/cathedral ceiling, sep. ent. w/deck, \$800 + util., refs. Rich, 363-6845.

BROOKHAVEN HAMLET - share house w/2 professionals, 4 bdrms., wooded lot, convenient to Lab, \$350/mo. includes all. Sidney, 286-4028.

CENTER MORICHES - 2-bdrm. apt., l/r, d/r, first floor, d/w, f/p, priv. ent., \$750 + sec. 878-0897.

EASTPORT - 1-rm. studio apt. in priv. home, 20 min. from Lab, \$475/mo. includes all, no pets. 325-0976.

MASTIC BEACH - waterview, 3-4 bdrms., jacuzzi, Andersen windows, oak floors. f/p, cedar siding, decks, \$1,000/mo. Ext. 3430.

MASTIC BEACH - 1 bdrm., new, l/r-kitchen, quiet street, walk to Bay, 15 min. to Lab, \$500 includes all, refs., security, lease a must. 281-3979.

MEDFORD - 1-bdrm. apt., l/r, eik, priv. ent., deck, walk to shopping, 12 min. to Lab, single or working couple, \$625 + electric. Bobbie, Ext. 2456 or 654-1993.

MIDDLE ISLAND - share 2-bdrm. condo w/female professional, 5 min. to Lab, \$450/mo. + 1/2 util., avail. Oct. 1. 751-8351 eves.

RIDGE - Strathmore, 2-bdrm. townhouse, 5 appl., ca/c, w/w, storage, \$700/mo. 433-9036 or 924-4983.

RONKONKOMA - Nob Hill, 2-bdrm. condo, all appl., w/w, patio, a/c, pool, tennis courts, clubhouse, avail. Oct., \$900/mo. incl. heat, refs & sec. req. Ext. 4525 or 981-4696 after 6 p.m.

SELDEN - 1-bdrm. apt., full kitchen & bath, \$650/mo. includes all utilities. John, Ext. 3277 or 732-6275 after 5 p.m.

EAST SETAUKET - 3-bdrm. house to share, l/r w/fp and priv. ent., gar., backyard, w/d, \$415/mo. + 1/3 utilities. Joe, Ext. 2215; Joe or Chris 689-7719.

SHIRLEY - 4-bdrm. Colonial, igp, gar., bsmt., fdr, eik, fam. rm., den, woodburning stove, \$1,300/mo., \$400/bdrm. 399-1868.

SHIRLEY - 1-bdrm. apt., l/r, eik, full bath, w/w, for single working adult, no pets, \$575 + sec., incl. utilities, avail. 10/1. 281-1840 after 6 p.m.

NORTH SHIRLEY - unfurn. 1-bdrm. apt., w/w, full bath, l/r-kitch. combo, 3 miles to Lab, \$600/mo. incl. utilities & cable. 395-9112.

SHOREHAM - N. of 25A, 4-bdrm. Colonial, l/r w/fp, den, 2 1/2 baths, bsmt., 2-car gar., SWR schools, \$1,250/mo. 744-8632.

TERRYVILLE - one bdrm., eik, l/r w/fp, priv. ent., \$750 pays all. Bob, Ext. 2309 or 473-9180 leave message.

YAPHANK - restored Victorian house, large, treed property, 4-bdrms., 10 min. to Lab, avail. Oct. 1, \$950/mo. 924-4872, 924-3066, Ext. 4342.

YAPHANK - Colonial Woods, 2 bdrms., 2 baths, l/r, d/r, kitch., gar., avail. 10/1, \$875/mo. + util., 1 mo. sec. 874-8631 after 5 p.m.

SURFSIDE BEACH, SC - 2-bdrm. condo, oceanfront, sleeps 6, 2 baths, full kitchen, beach, pool, tennis, golf, October openings, \$325 per week. 929-4530.

For Sale