

Tech Transfer Success Story: Two Firms License BNL-Developed Corrosion-Resistive Coating System

The annual cost of corrosion is approximately 3 to 5 percent of the U.S. gross national product, which was \$5,685.8 billion in 1991 alone. But, a new corrosion-resistive coating system developed by BNL researchers may considerably ease this national burden.

In 1988, Chemical Engineer Lawrence Kukacka, Chemist Toshifumi Sugama and Chemistry Associate Neal Carciello, all of the Department of Applied Science (DAS) — won an R&D 100 award sponsored by *Research & Development* magazine for devising an environmentally safe, zinc-phosphate coating system that protects steel surfaces against rust and corrosion, and enhances adherence of paints and plastics to steels.

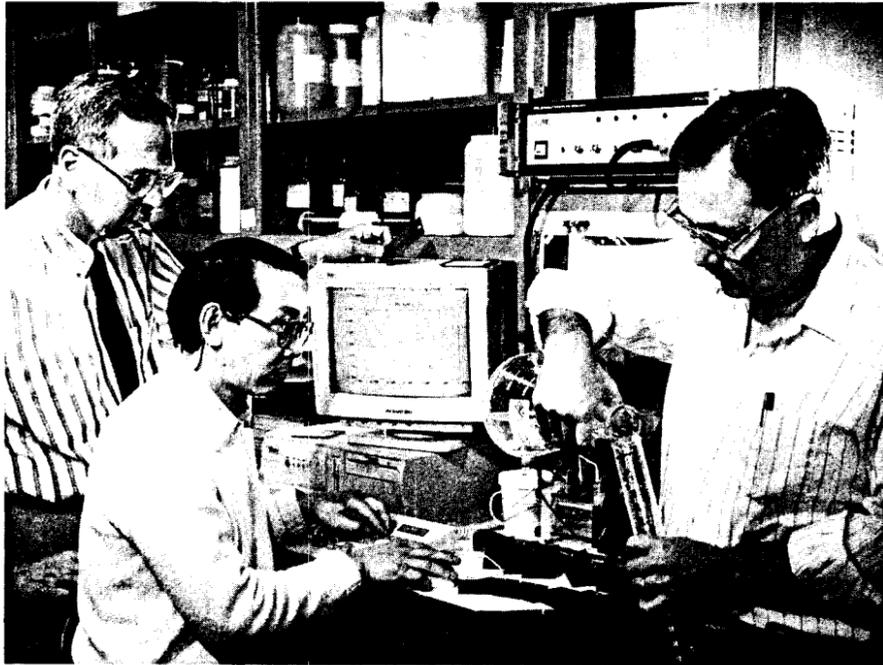
Today, the patented zinc-phosphate coating system is a tech transfer success.

It has been licensed by two firms: Novamax in Norcross, Georgia, and TRW, which is headquartered in Cleveland, Ohio. In addition, at least 75 other companies have expressed interest in it.

While Novamax, a specialty chemical company, is still developing the product for sales, TRW is using it in manufacturing automotive parts, by applying the coating to hundreds of thousands of automobile clips. These clips — about 100 in every car — are essential for holding the vehicle together — from its bumpers to its motor. With 8 million cars manufactured in the U.S. annually, the potential market for the improved zinc-phosphate coating system is huge.

Polymers: The New Ingredient

BNL's zinc-phosphate coating process is less expensive, more efficient and environmentally safer than conventional corrosion-resistance methods. It cuts corrosion prevention



Using an electrochemical analyzer in their laboratory, Department of Applied Science researchers (from left) Lawrence Kukacka, Toshifumi Sugama and Neal Carciello test steel samples treated with their patented zinc-phosphate coating system.

— Photos on this page by Roger Stoutenburgh

from a complicated eight-step process requiring the use of 25 chemicals to a five-step method using only three chemicals and water.

By adding organic polymers to zinc phosphate, the DAS researchers found they markedly improved corrosion resistance, flexibility and bonding characteristics. Unlike many corrosion-protective processes now on the market, the new coating contains no toxic metals such as chromium, cadmium or lead.

The research is funded by the Geothermal Division of the U.S. Department of Energy and the Army Research Office of the U.S. Depart-

ment of Defense (DOD), with technology transfer efforts supported by DOD's Tank Automotive Command. In fact, the U.S. Army Research Office has estimated that effective corrosion resistance may lead to savings of over a billion dollars on their tactical vehicles.

Kukacka explained that the project started as basic research, "to understand the fundamentals of bonding polymers to metals."

The technological breakthrough came when the researchers placed an organic polymer into a zinc-phosphate crystal.

Sugama explained, "The polymer is incorporated into the zinc-phosphate crystal, making the crystal more flexible and nonporous, thereby blocking out moisture. While conventional corrosion-resistance methods provide only a mechanical bond between the metal and paint or polymer topcoats, our zinc phosphate

coating also forms a chemical bond with them."

Initial salt-spray tests of the coating on carbon steel showed that it prevents rust and corrosion for longer than 400 hours, while conventional zinc phosphate coatings generally show rust after 24 hours.

Other Potential Uses

Besides automotive companies, the utilities industry soon may be using the BNL-developed coating. The Gas Research Institute is investigating its potential use on condensing heat exchangers for high-efficiency gas furnaces.

As Kukacka explained, "A heat exchanger — normally constructed from an expensive, high-alloy steel tube — is placed on the discharge of a gas burner to transfer heat from the flue gas to incoming air. Our coating, applied to a far less costly, mild steel, might be able to counteract the highly corrosive environment of the heat exchanger, while helping to maintain the economic competitiveness of the gas furnace."

Kukacka added that the Long Island Lighting Company also will be testing variations of the BNL-developed coating to determine which would be most effective in preventing corrosion of heat exchangers in the company's oil-fired, electric-generating power plants.

Sugama has recently developed a patented coating to protect aluminum surfaces from corrosion. This new coating formulation consists of mixtures of water and polymetallo-siloxane, which combines the characteristics of organic and inorganic polymers. Again, the use of chromium or other toxic substances in the coating is avoided, making it environmentally safe.

When the solution is heated, a very thin, 0.5-micron film is created, resulting in a tough, flexible coating with efficient corrosion protection. Sugama said the airline industry may be interested in licensing this coating, since many airplane parts are made of aluminum.

— Diane Greenberg

Hall Cited for Tech Transfer



For outstanding work in technology transfer, Robert Hall, who heads the Division of Engineering Technology in the Department of Nuclear Energy, recently won a 1992 Federal Laboratory Consortium Award of Merit. Hall (right) is pictured with Sy Baron, Associate Director for Applied Programs, and Margaret Bogosian, Deputy Manager, Office of Technology Transfer, as he receives the award citing his "perseverance and persistence above and beyond the responsibility to the Department of Energy and Nuclear Regulatory Commission programs to get information into and establish capability of value to the power industry."

Nominated for his creativity in developing key points of contact in multiple utility companies, Hall's technology transfer efforts involved research and development on electricity generation for utilities. One major effort — a study establishing a database and performance measurement techniques on gas turbine longevity — led to Con Edison's new planning in this area, with savings that benefited both the utility and the rate payers.

BNL Scientist Honored by Japanese Medical Society

A working visit to Japan can bring surprises, as Scientist Prantika Som of BNL's Medical Department found last February while she was at Tohoku University, Sendai.

Invited there by the Tohoku Medical Society to give a lecture on cocaine's effects on heart blood flow and metabolism, Som was presented with the plaque and citation pictured here, which translated reads: "In memory of the valuable contributions you have made to the Tohoku Medical Society."

At BNL, Som focuses on cardiovascular nuclear medicine, studying heart blood flow and metabolism in disease conditions, and the effects of cocaine and hypertension. She is also working on the noninvasive detection of blood clots using monoclonal antibodies and adhesive peptides.

Som's first stop in Japan was as an invited speaker and panelist at the Third International Workshop on Radioiodinated Free Fatty Acids held February 10-11. The workshop was at Kyoto University's Faculty of Medicine, a leading world center for heart



Prantika Som

and brain studies.

Another piece of good news awaited Som soon after this visit — she was made full professor at the State University of New York at Stony Brook, where she also works as part of the close collaborative effort between Stony Brook and BNL's Medical Department.

Budding Scientists Show Off Their Skills

For 650 Suffolk County children, this past Saturday was a day to show off their skills as budding scientists, as about 400 projects involving 89 schools throughout the county were entered in BNL's 1993 Elementary School Science Fair.

According to Janet Tempel, head of the Tour Program and Science Museum in the Public Affairs Office, whose group runs the fair, "There has been a steady interest in this event and, every year, children display in their projects a wonderful combination of creativity and curiosity about science."

The science projects, all done by students from kindergarten through grade 6, included experiments, demonstrations, and charts, diagrams or collections with a scientific objective. Considering that almost every project entered in the BNL Science Fair had already won previously in a school fair, the competition was stiff, as it is every year.

"In recognition of the effort these kids put into their projects," says Eloise Gmur, who coordinated the entries, "every child who enters receives a ribbon because they are all winners."

Seven first-place blue ribbons were awarded, one for each grade level,



and many honorable mention ribbons were given out. The top seven winners also received banners to display back at their schools.

Judging was done by teams of Brookhaven scientists and local elementary school teachers.

The following BNL staff volunteered their time on Saturday to judge: Derek Lowenstein, Alternating Gradient Synchrotron Department; Paul Kalb, Department of Applied Science; Ann Emrick and Kathleen Griffin, Biology Department; Trevor Sears, Chemistry Department; Mel Schwartz, Director's Office; Graham Smith, Instrumentation Division; Kathryn Kolsky, Medical Department; Erik Johnson, Jack Lazarz and Gwyn Williams, National Synchrotron Light Source Department; Sally Dawson, Physics Department; Richard Scheidet, Plant Engineering Division; and Yousef Makdisi, RHIC Project.



Scenes from BNL's 1993 Elementary School Science Fair, photographed by Roger Stoutenburgh.

The Younger Set At Brookhaven

Kids Meet the Cops On the BNL Beat



Over two days last week, the 12 kindergartners in BNL's Child Development Center (CDC) learned firsthand about police work at the Lab.

For the first day, Chief Al Berretta invited the youngsters to Police Headquarters, Bldg. 50. Under the supervision of Lieutenant David Peter and Patrol Officer Elke Dedner, the children toured headquarters, learned about fingerprinting and watched a police training film.

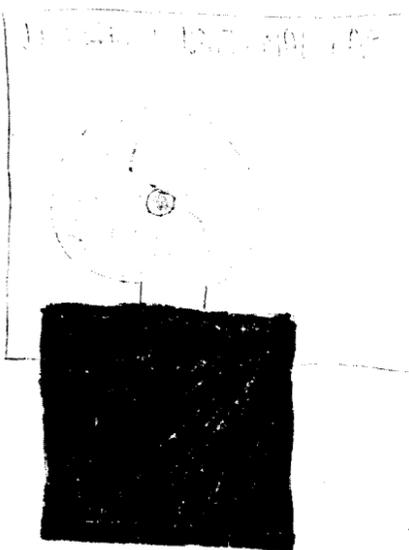
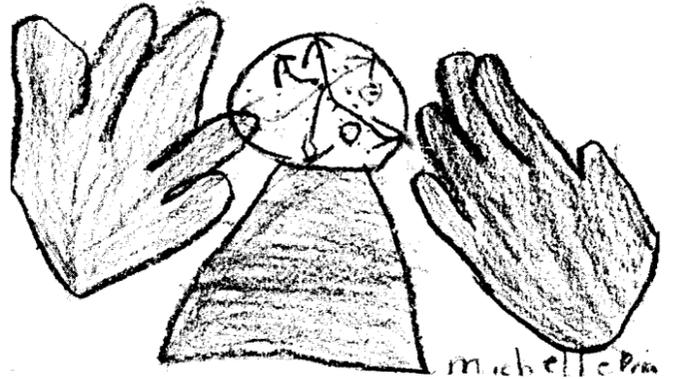
The next day, Lt. Peter (right above) and Sergeant Sharol Busby (left) returned the visit, stopping by the CDC kindergarten in a patrol car. This time, the tots saw how the car's sirens and red lights work, and they got a look at the items that fill the police equipment bag, including a bulletproof vest and the gas mask that one child is trying on in the photo above.

Berretta was impressed by the "extremely intelligent questions that the children asked." The youngsters, in return, were so impressed with the police officers they met that they sent the sparkling thank-you note in the shape of a badge, shown at right.



'Discovery' Gets Fan Mail

Last year, on Brookhaven's Discovery Tour, more than 3,000 kindergarten-through-third-graders were introduced to some of the fun and fascination of science. On a Discovery Tour, each group of children participates in three hands-on sessions chosen from seven scientific themes — magnifiers and microscopes, magnets, mirrors, safety clothing, structures, light or sound.



Brookhaven Elementary School 11719 Brookhaven, NY

Dear Carol I loved the things that we did it was fun I wish that we could come again I liked the microscope and the fabric I appreciate what you did for us.

BROOK have n Elementary school Preice Neck Rd. Brookhaven, N.Y.

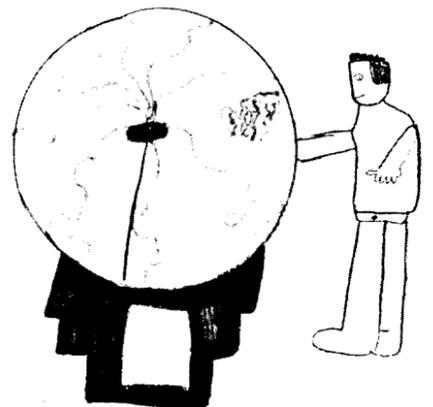
Dear Carol, I like the mirror when you chng your heads. I like the globe that gave you socks and you take a feather or fabric under a microscope and cool.

Dear Carol

I really, really appreciate do what that we are aloud to do what ever we want to do. If you touch a person after touching the electric ball you will get shocked. When I put my object under the microscope it looked like a giant net. When every body was done I saw a picture and it had green and red sun glasses and it had a weird picture and the picture had green around the edges and the middle.

Discovery is one of several types of group tours organized by the Public Affairs Office's Tour Program, headed by Janet Tempel. As a result, in 1993, the Science Museum hosted over 16,000 school children. The interest and enthusiasm generated by Discovery is evident in this typical selection of thank-you letters and pictures. These were sent to Tour Guide Carol Otto, but other tour guides — including Penny Byrne, Gail Donoghue and Adrienne Ince — have led equally popular sessions.

As their letters indicate, most of these young visitors want to return. So, in later years, they may join the Science Museum tours that the Tour Program arranges for grades four through 12.



In Memoriam

Ezekle O. Bell Jr., who would have been with the Lab 30 years on July 1, died suddenly on May 6. He was 56 years old.



Otis Bell came to BNL's Plant Maintenance Division as a janitor, in 1963. Beginning in 1970, Bell alternated his time between his custodial duties and a helper's position in the Central Shops Division (CSD). He joined CSD permanently in July 1974.

"When any organization loses an employee with over 18 years of experience, it has to have an adverse effect," CSD Manager Richard Spellman said. "Otis's unexpected death has saddened all of us at Central Shops, and we wish to express condolences to his family."

Bell, who had lived in Riverhead, is survived by his wife Louise Bell; mother Mabel Bell; two sons, Ezekle Otis Bell III and Eugene Keith Bell; two daughters, Leonora Price and Andrea Bell; two sisters, Carrie Davis

and Barbara Flether; two brothers, Robert Bell and Franklin Bell, and two grandchildren.

He also had several relatives working at BNL, including: Marylin Banks, Technical Information Division; Carol Bell, CSD; Howard Bell Jr., Plant Engineering (PE) Division; James Bell, CSD; Lee Collier, PE; Carnal Hobson, PE; Marysa Johnson, Alternating Gradient Synchrotron Department; Larry Jones, PE; Milton Jones Jr., PE; and Frances Ligon, Office of Equal Opportunity.

David R. Christman, who had continued as a consultant to the Chemistry Department since his retirement as a chemist in January 1989, died on May 17, after a short illness. He was 69 years old.



Christman's 37 years in Chemistry began on July 1, 1951, as assistant to R.C. Anderson. A few years later,

when Anderson moved to the Director's Office, Christman began a long and productive association with Senior Chemist Alfred Wolf.

Early on, Christman developed the counting techniques and assay methods for reactor samples Wolf prepared. He became an expert in carbon-14 analysis and helped other groups set up modern methods, such as a carbon-14 assay lab in Hungary. He also assisted Wolf in studies of reaction mechanisms.

Some years later, Christman became involved in positron emitter tomography (PET) research, in which measurements of positron-emitting radionuclides in the brain are used to provide detailed images of brain activity.

Said Wolf, "Dave made many seminal contributions to PET research, particularly in the area of precursor preparation. He also began the syntheses of positron emitter-labeled compounds long before this field emerged as a major area of research."

A major career change came in 1976, with Chemistry's purchase of a PET machine, known as PETT III. Christman's interest in computers and electronics led to him setting up

and operating PETT III and its components.

"In one sense," mused Wolf, "this career change was a considerable loss to our lab's radiotracer chemistry efforts, since Dave had a 'green thumb' in the lab. From that point on, he devoted himself to the PET devices and played a basic role in our construction of the current PETT VI. He did a superb job in running and preparing data for PETT VI and in helping others carry out their experiments.

"Dave was a pleasure to work with," Wolf added. "His positive attitude and helpful, colorful manner always made lab work — and indeed anything he was involved in — both an adventuresome and productive experience."

David Christman took his D.Sc. from Carnegie Institute of Technology, in 1951, then came directly to ENL as an associate chemist. He was named Chemist in 1964.

A resident of Setauket, Christman is survived by his wife Harriet, daughter Leslie and son Paul. A memorial open house will be held today, Friday, May 21, at 4 p.m., in the Neighborhood House, North Country Road, Setauket.

Spring Into Summer Contradance!

Tomorrow, Saturday, May 22; at 8 p.m. Brookhaven Center; featuring "Spontaneous Combustion"; tickets \$8.



Sponsored by Brookhaven Women in Science to benefit the Renate W. Chasman Scholarship Fund.

Nursery School Plans Yard Sale

The Upton Nursery School, an on-site parent cooperative for 3- and 4-year-olds, will hold a fund-raising yard sale on Saturday, June 5, from 10 a.m. to 4 p.m., at 23 Beachfern Road, Center Moriches.

The sale will consist mostly of children's clothing, toys and other items. In addition to your patronage, the school is interested in donations of the above items for the sale.

For more information or to donate items, contact Anna Martin, 878-6760, or Cindy Salwen, 874-3652.

Bowling

Red/Green League

The Designers topped the Source II team to win the Red/Green League. 7-4, in a great match. Total pinfall was 3116 vs. 3108. R. Mulderig bowled a 267/235/693 scratch series, E. Sperry IV 214, S. Thompson 211, S. DiMaiuta 210, R. Wiseman 209/201, E. Sperry III 209, K. Koebel 201.

Purple League

Terminators won the playoffs.

White League

Pin Gobblers won the playoffs.

Bowling Dinner

The bowling dinner will be held on Friday, June 4, at 5:30 p.m., at the Brookhaven Center. Purchase tickets from Debbie Keating, Bldg. 902C, no later than May 28. For more information, call Keating, Ext. 7673.

IBEW Meeting

Local 2230, IBEW, will hold its regular monthly meeting on Monday, May 24, 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's office at 31 Oak Street, Patchogue. On the agenda will be regular business, committee reports, the president's report and nomination of officers.

BROOKHAVEN BULLETIN

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CCD Seminar

The Computing & Communications Division (CCD) will present a user-oriented overview of the X terminal and discuss CCD support, on Wednesday, June 2. The class will be held in the seminar room of Bldg. 515, from 9 a.m. to noon. All are invited. For more information, call Pam Mansfield, Ext. 7286.

Summer Program For Children

BERA's summer recreation program for children features swimming and tennis lessons for children of Lab employees.

Swimming Classes

A child will be scheduled for one lesson each week for a total of eight lessons. American Red Cross certificates will be awarded to children who qualify.

- **Time** - Monday through Friday, 2:15 to 3:15 p.m., starting July 6, ending August 27.

- **Fee** - \$40 per child at registration, plus \$2 daily admission fee or present season ticket.

- **Safety requirement** - Each child must be a minimum 42 inches tall.

- **Registration** - Pick up applications in Personnel, Bldg. 185, 8:30 a.m. to 5 p.m.; the BERA Sales Office, Berkner Hall, 9 a.m. to 2 p.m.; or the swimming pool during scheduled hours. Mail or deliver applications with registration fees, checks payable to BERA, to the Recreation Office, Bldg. 185, by Friday, June 18.

Tennis Program

Provides basic tennis instruction.

- **Time** - Monday through Thursday, 3:15 to 4:15 p.m., starting July 12, ending August 20.

- **Fee & Registration** - None required, but children must provide their own rackets and balls, and pay a \$2 fee to play in the end-of-season tournament.

Heard It Through the Grapevine?

To verify it: Call the Rumor Hotline, Ext. ASK1 (2751), operated by the Public Affairs Office.

When you reach the hotline's answering machine, state the rumor, and leave your name and extension. Don't worry -- Public Affairs will keep it confidential and get back to you with an answer as soon as possible.

Tennis Anyone?

Tennis Fun Day

The Tennis Committee has scheduled a Tennis Fun Day on Saturday, June 12, beginning at 9 a.m., with a rain date of June 13. This free event is open to all Lab employees and family members. Bring a can of balls and join the fun. To sign up, call Joe Carbonaro, Ext. 5139, or Ruth Ann Lutz, Ext. 7774.

Annual Tournament

The Lab's annual tennis tournament will get under way on Saturday, July 17, and players can sign up at the BERA Sales Office beginning Friday, June 14. Further details will be given in an upcoming issue of the Bulletin. Tournament play will take precedence over other play during tournament weekends.

Arrivals & Departures

Arrivals

Catherine A. Ennis..... Staff Services
David G. Johnson..... Biology
Jeffrey S. Swenson..... Staff Services

Departures

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

Dominick G. Bartolomeo..... AGS
Gerald W. Bennett..... AGS
Ralph Brown..... AGS
Basil De Vito..... AGS
Robert Glasmann..... AGS
Edward T. Grahn..... AGS
Robert L. Monaghan..... AGS
Archer J. Post..... AGS
Graham F. Ryan..... AGS
Dominick Salimando..... AGS
Chester A. Smith..... AGS
John D. Tilley..... AGS
Franklin D. Timm..... AGS
George C. Warner..... AGS
Jack Weisenbloom..... AGS
Baorui Yang..... Chemistry
Michael A. Zguris..... AGS

Amateur Radio Club

During the regular monthly meeting of the Amateur Radio Club at noon on Thursday, May 27, in Room D, Berkner Hall, the upcoming Field Day will be discussed.

All Lab employees, guests and licensed amateur radio operators are invited to attend. For more information, contact Chris Neuberger, Ext. 4160, or Nick Franco, Ext. 5467.

Cafeteria Menu

Monday, May 24

Soup: Minestrone	.80/1.10
Entree: Chicken tarragon over rice	3.65
Entree: Sausage, peppers & onion hero	3.35
Carvery: Hot pastrami sandwich	2.95
Grill: Philly cheese steak sandwich	2.95
Taster's Bar: Egg roll (each)	.75

Tuesday, May 25

Soup: Split pea	.80/1.10
Entree: Baked cheese manicotti	3.35
Entree: Traditional chicken Kiev	3.65
Carvery: Hot roast beef sandwich	2.95
Grill: Pizza burger w/fries	2.95
Taster's Bar: Wing dings (oz.)	.25

Wednesday, May 26

Soup: Chicken rice	.80/1.10
Entree: Knockwurst & sauerkraut	3.35
Entree: Baked seafood quiche	3.65
Carvery: Hot ham sandwich	2.95
Grill: Chicken club on kaiser roll	2.95
Taster's Bar: Corn fritters (oz.)	.25

Thursday, May 27

Soup: Cream of spinach	.80/1.10
Entree: Flank steak w/mushrooms	3.85
Entree: Eggplant Parmesan	3.35
Carvery: Hot corned beef sandwich	2.95
Grill: BBQ pork sandwich w/fries	2.95
Taster's Bar: Fried mixed vegetables (oz.)	.25

Friday, May 28

Soup: Provincial fish chowder	.80/1.10
Entree: Catch of the day	3.85
Entree: Pasta display cooking	3.35
Carvery: Hot turkey sandwich	2.95
Grill: Fried clams w/fries	3.25
Taster's Bar: Baked clams (each)	.50

Movie Night... Brookhaven Center

Wednesday, May 26... 8 p.m.
Cool World... free popcorn!

Classified Advertisements

Placement Notices

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

Each week, the Personnel Division lists new placement notices. The purpose of these listings is, first, to give employees an opportunity to request consideration for themselves through Personnel, and, second, for general recruiting under open recruitment. Because of the priority policy stated above, each listing does not necessarily represent an opportunity for all people.

Except when operational needs require otherwise, positions will be open for one week after publication.

For more information, contact the Employment Manager, Ext. 2882, or call the JOBLINE, Ext. 7744 (282-7744), for a complete listing of all openings.

OPEN RECRUITMENT - Opportunities for Laboratory employees and outside candidates.

DD8091. CHEMISTRY ASSOCIATE POSITION - (term appointment) Requires a BS in chemistry, a strong background in analytical chemistry and environmental microbiology, and a familiarity with GC, HPLC, FTIR and AA techniques. Will investigate gas generation from microbial degradation of alpha-irradiated plastics under hypersaline conditions. Department of Applied Science.

NS2715. ENGINEERING POSITION - Requires a bachelor's degree in an engineering discipline, or equivalent, and at least five years' experience implementing large corporate or institutional energy-management programs. An in-depth knowledge of energy systems, energy-management controls, energy-conservation technologies, and engineering economics and cost estimating is also required. A master's degree, a professional engineering license and previous supervisory experience are desirable. Responsibilities will include directing BNL's overall energy management program. Plant Engineering Division.

Motor Vehicles & Supplies

63 VALIANT - a/t, 40k orig. mi., excel. cond. in & out, \$2,500. Barry, Ext. 5624.

57 WILLYS PICKUP - \$1,200. Shane, Ext. 7145.

51 DODGE PICKUP - runs, some body work done, new glass, make offer. Guy, 758-6892.

KAWASAKI VULCAN MOTORCYCLE - 750cc, low mi., excel. cond. Charles, Ext. 5211.

YAMAHA Y2 125 - mint cond., asking \$600. Mike, 878-1617 after 4 p.m.

TIRES - 2, Sears Roadhandler Treadlocks, 31x10.50 15, v.g. cond., \$75. Gary, Ext. 2214.

REAR TOW/STEP BUMPER - for full-size Ford pickup truck, \$35. Tom, Ext. 4507 or 878-1060.

CARBURETOR - Rochester Quadra-Jet for pre-computer car, \$20. Ext. 5400 or 878-6098.

TIRES - 4 nearly new radials w/alum. wheels & lugs for Isuzu/Mazda 6-lug pickup, \$200 or best offer. Larry, Ext. 3506 or 281-2002.

CAR SPEAKERS - Jensen JCX-200, JVC CS-414, Targa S-6393; car cass. radios, Sansui, Dolby, Audiovox, make offer. Mike, 698-3414.

MOTOR - Atomic 4-type UJ, used, new manifold, points, condenser, ignition wires, \$250; distributor, \$35; more. Dmitri, 669-9202 after 6 p.m.

92 HONDA NIGHTHAWK MOTORCYCLE - 250cc, \$1,500 neg. John, Ext. 4225.

91 NISSAN - hard body w/cap, 33k mi., 5-spd., asking \$5,000; '86 Renault, 60k mi., great shape, \$1,700 neg. Kathy, Ext. 2267 or 395-6520.

90 CHEVROLET CAVALIER - blue, 61k mi., orig. owner, excel. cond., \$4,900. 744-9594.

89 PLYMOUTH SUNDANCE RS - 18k mi., 2-dr., fully loaded, excel. cond., \$5,775. Eric, Ext. 5875.

89 NISSAN SENTRA - 4-spd., 2-dr. sedan, ac, 80k mi., am/fm, new tires & battery, runs well, \$3,100 neg. Wei, Ext. 4213 or 744-5310.

89 HONDA ACCORD DX - 4-dr. sedan, ac, stereo, p/s, low mileage, dealer maintenance record, ext. warr., \$8,700. 345-5882.

87 CAMARO - V-6, a/t, ac, alarm, stereo, blue/black int., v.g. cond., \$3,500 firm. 874-3796.

87 FORD ESCORT - 4-dr. h/b, 5-spd., high mi., runs well, \$1,250 or best offer. Zhou, Ext. 5855.

86 MERCURY LYNX WAGON - 87k mi., a/t, am/fm, good rubber, runs well, asking \$1,450. Marty, Ext. 2521 or 286-7480.

84 BMW MOTORCYCLE R65LS - 40k mi., runs well, \$1,050. Fan, Ext. 3869 or 341-1051.

82 AMC CONCORD DELUXE - 84k mi., am/fm cass., excel. mech. & exterior cond., \$1,200. Gordon, 929-4173.

81 FORD FAIRMONT - 6-cyl., ac, p/s, a/t, 72k mi., new exhaust, tune-up, good cond., \$675. John, 864-1798.

81 DODGE VAN - custom, new tires, motor, paint, asking \$2,800, price neg. Brett, 929-4753.

78 DATSUN 510 WAGON - \$275. Bob, Ext. 4637 or 692-8659.

Boats & Marine Supplies

26' SEA RAY - 1979, aft cabin, new i/o, dock side Halon w/9', 5-h.p. inf., water heater, \$9,900. Rich, 363-6845.

24' CHRIS CRAFT LANCER - good cond., make offer. Ron, Ext. 5905 or 298-5625.

22' MARSHALL CATBOAT - freshwater-cooled Yanmar diesel, VHF, radio, depth sounder, Danforth compass, head. Gordon, 477-2269.

20' BOSTON WHALER OUTRAGE - 1978, 175-h.p. Mercury, EZ-Load trailer, elec. winch, excel. cond., asking \$8,200. Bill, Ext. 4175.

20' RENKEN - 1986, w/140 i/o, trailer, v.g. cond., \$4,700. 929-4369 after 6 p.m.

19' BAYLINER BOWRIDER - 1988, 125-h.p. Force, p/tilt & trim, am/fm cass., galv. trailer, extras, great bay boat, \$4,000. Jeanne, Ext. 7125.

18' DIXIE MOTORBOAT - 1972, '85 50-h.p. engine w/300 hrs., '88 Caravan trailer, immac., must see, \$2,700 neg. Ann, Ext. 2114.

17' SAILING CANOE - sail, mast, leeboards, rudder, etc. all by Old Town, \$600. Bob, 261-3890.

14' BOAT - alum., 7 1/2-h.p. Evinrude, \$300. Vince, Ext. 4660.

18' VICTORIA - 1982, shoal draft, 2' keel, '82 4.5-h.p. Mercury, Magic Tilt trailer, excel. cond., 4 sails, KM, DF, \$2,900. Mike, Ext. 5972 or 744-4579.

CONTROLS - Mercury Morse top mount, like new, \$125. Mike, 878-1617 after 4 p.m.

DEPTH RECORDER/FISH FINDER - Sitex paper print out Model #HE-357, cost \$340, asking \$70. Toner, Ext. 2769.

Furnishings & Appliances

BLINDS - white, 1" Louver, 68-68 1/2" wide, 64" long, used 6 mos., \$20; 45-45 1/2" wide, 64" long, never used, \$30. Jean, Ext. 5843.

HEADBOARD - brass, king-size. Dresher, as new, \$200. Bill, 878-6639.

HUTCH - country pine, new cond., cost \$3,000, sell \$350. S. Saxon, 744-3842.

KITCHEN SET - 48" round glass table w/4 chrome chairs, \$175. Al, Ext. 5010.

LIVING ROOM - couch, 2 chairs, end tables, lamps, pine stained, \$300 or best offer. Steve, 369-4922.

MICROWAVE - large, Litton, \$60; G.E. toaster oven, \$15; refrigerator, 18 cu.ft., Amana, w/top freezer, coppertone, \$75. Bob, Ext. 4551 or 475-3612.

MICROWAVE - G.E. programmable w/sensor & timer controls, full-size countertop model, \$95 neg. Hurst, Ext. 3844.

MOVING SALE - living room set, beds, book-cases, toys, etc. Sheling or Ku-Ding, 345-5882.

PRESSURE COOKER - 6 qt., 4 qt., \$15 ea. Jack, Ext. 4447 or 744-3919 eves.

REFRIGERATOR - chest freezer, household items, 722-3905.

SEWING MACHINE - Morse, w/stand, \$75; iron lawn furn., 2 chairs, 2 tables, sofa, \$100. Ext. 4676.

SOFA - 5-piece sectional, blue, \$200. 751-1884.

SOFA - 3 cushion; rocker, upholstered; kneehole desk, pine; l/r lamps, 2; dressers, glider, daybed; dining set; recliner; lamp. Sharon, Ext. 3995.

STOVE - White Westinghouse, as new, self-cleaning, oven speed broiler, solid elements, \$100. Bill, 878-6639.

WASHER - Norge, HD large cap., Westinghouse, HD large cap. gas dryer, \$120 ea. or best offer. Frank, Ext. 7519, or Vita, 277-0464.

WASHER/DRYER - works, \$50. Tony, Ext. 7861.

WASHER/DRYER - portable, apt.-size, hooks directly to the sink, no plumbing req. Sheling or Ku-Ding, 345-5882.

WATER BED - Somma deluxe, King, topper only, new, \$75. 878-0898, leave message.

WATER BED - complete custom twin, drawers, black, \$300; rugs, 2, blue & white, 9x12. 289-8212.

CHANDELIER - 5 lights, w/hanging crystals, made in Spain, asking \$150. Jutta, Ext. 2671 or 744-3284.

CHEST - Colonial, cherry, 5 drawers, excel. cond., \$80. 924-0960.

CHILD'S BEDROOM - Atlantic, Formica, 3 yrs. old, 10 pieces, tan & wood, orig. \$4,000, will sell for \$1,500. Sue, Ext. 3492 or 734-6680.

DINING ROOM TABLE - 48" round, two 12" leaves, 4 captain's chairs, 4 straight chairs, excel. cond., dark pine, \$600. 286-1214.

DINING ROOM - fruitwood, French provincial, 6 chairs, table, leaf, pads, breakfast, buffet, v.g. cond., \$600. Ext. 2809.

FURNITURE - desk & 3-drawer dresser w/hutch, brown, \$50/all. Ext. 5287.

HIGH RISER - like new, headboard, \$80. 878-2421.

HOOVER VACUUM - upright, 4.8 A, no attachments, \$30. Ext. 2733 or 878-8491.

MIRRORS - two 36"x48", one 36"x60", \$10/ea. 744-4386.

PORCH SET - 3 rocking chairs, custom upholstery, 1 overstuffed antique chair, \$100. 722-3905.

REFRIGERATOR - 18 cu. ft., Amana, coppertone, top freezer, v.g. cond. Bob, Ext. 4551 or 475-3612.

TABLE - wrought iron, w/glass top, 4 chairs, wagon wheel coffee table w/glass top, oak desk. 924-4927.

TRASH COMPACTOR - KitchenAid KCS-200, white, fits under kitchen cabinet, v.g. cond., \$30. Ext. 3103 or 728-0992.

TRASH COMPACTOR - G.E., heavy-duty, \$40. Ext. 7699 or 821-1435.

SOFA - Key City, very comfortable, excel. quality, \$300. Karen, Ext. 4262.

Tools, House & Garden

AUSTRIAN PINE SEEDLINGS - 50 for \$10. Tom, Ext. 4507 or 878-1060.

BBQ SMOKER - excel. cond., \$15. 751-8240 eves.

COAL STOVE - Surdiac, black textured, glass front, excel. cond., \$350; deep well pump, 1/2-h.p., excel. cond., \$100. 744-2060.

DOOR - full-size, external, w/glass pane, solid core, \$25. Denise, Ext. 5873.

DOOR - folding, 7-sections, 8'x44", new, still in box, \$45. Ext. 7699 or 821-1435.

HAULING CART - Craftsman, 10 cu. ft., non-dumping, for use behind garden tractor, excel. cond., \$75; grass edger, Craftsman, \$40. 549-5935.

KEROSENE HEATER - Koehring, portable, 1.9-gal. tank capacity, make offer. Mike, 698-3414.

The Brookhaven Bulletin is printed on paper containing at least 50 percent recycled materials, with 10 percent post-consumer waste.



LAWN MOWER - Briggs & Stratton, \$30; traveling sprinkler, \$10; weedwacker, electric, \$10. 821-5266.

LAWN MOWER - Mastercraft, 21" cut, self-dr., rear bag, excel., \$85. Dan, Ext. 4987 or 698-7322.

MACHINIST'S TOOLBOX - 7-drawer, excel. cond., \$45. Bill, Ext. 2043 or 563-1940.

MAPLE TREES - Japanese red, \$10-\$45+; Sears riding tractor, 12-h.p., 4' deck, snow blower, battery start, tow trailer, excel. Mauro, 265-6542.

PLATE GLASS - bronze, 1/4"x26"x89 1/2", 5-pieces, \$35 ea. Ernie, 588-4987.

ROTOTILLER - 1992, 7-h.p., Troybilt, electric start, like new, \$1,200; oil-fired trailer furnace, Miller burner, \$40. Keith, 727-6517 after 5 p.m.

ROTOTILLER - 5-h.p., front tines, \$125. Adams, 475-0002.

SHALLOW WELL PUMP - 1/2-h.p., w/micromet unit, \$50; towable Scott lawn spreader, \$25. Ext. 4676.

SHREDDER - heavy-duty. 475-3553.

WINDOW - Andersen Narrow Line, white, double hung, 30310, \$125. Gary, Ext. 2214.

WINDOWS - vinyl replacement, double hung, 36" w x 38" h, 90/two. Biays, Ext. 2946.

DRILL PRESS - Atlas, tabletop, 3/8", chuck, 1/3 h.p., \$80. Keith, 727-6517 after 5 p.m.

LOG SPLITTER - gas powered, vertical. 369-2889 eves or MaryAnne, 727-4718 days.

OIL TANK - 250 gal., used for K-1 kerosene, indoors, make offer, you haul away. Fred Kuehl, Ext. 7947.

POOL TABLE - Minnesota Fats, needs new covering, \$200. Jeanne, Ext. 2614 or 286-1290 eves.

RADIAL ARM SAW - cast aluminum, mitre box, wood planes, reel lawn mower, rakes, shovels, hoses, spreader. 924-4927.

ROTOTILLER - 5.0 h.p., heavy duty, 17", rear tine counter rotating, less than 100 hrs. use, \$500; birch paneling, 1/4" wood, 10 1/2 pc., \$100 584-6250.

ROTOTILLER - 5 h.p., 24" blade, Sears Craftsman, used one 1 season, mint cond., asking \$265. 399-4821.

TOPSOIL - 2 yards, delivered, \$30; wood chips, delivered, \$30. 696-6011.

TRAILER - utility, steel, 4'x6', donut hitch for pintle hook, 16" tires, \$300 neg. Jim, 758-0423.

WINDOW - Andersen, patio door, double glazed, 4'x6 1/2', w/framing, \$200 or make offer. Hughes, 286-3301.

Sports, Hobbies, & Pets

BEES - strong Italian colony in 4 boxes, \$100. 878-0898, leave message.

BICYCLES - two girl's 20", 1/\$15, 1/\$30; 1 girl's 16", \$25; man's 26", ATB, \$65. Bart, 924-6761.

POOL VACUUM - cleaning robot, Questa, used twice, orig. \$500, ask. \$300. Ady, Ext. 4531 or 331-3785.

RACING CARS - tracks, transformers, Aurora, \$5. Jack, Ext. 4447 or 744-3919 eves.

RC 12 CAR - new, assembled, never used, needs transmitter, electronic speed control, custom body, ask. \$120, must see. Chris, Ext. 4672.

SURF ROD - 12' U/S, \$65; tire rims, 8", 4-hole, new, \$25. Tony, Ext. 7772.

TELESCOPE - w/tripod, 2.4" refractor 60mm, F12, needs eyepiece. Sharon, Ext. 3995.

WEIGHTLIFTING BENCH - by DP, many features, excel. cond., \$75; rower by DP, \$50. 924-2298 eves., weekends.

BIKE - child's, 20", 1-speed, \$20. Joe, Ext. 2898.

BORDER COLLIE MIX - female, 2 yrs. old, free to loving family, loves children, spayed, all shots. Ron, Ext. 2525 or 286-0353 after 6 p.m.

EXERCISE MACHINE - Pro Stepper, computer timer, rate, steps, speed, calories, 6 mo. old, \$80. 399-4821.

FISH TANK - 10 gallon, complete setup, fish, extras included, \$50. Bob, 878-5631.

FISH TANK - 30 gallon, stand, top, filter, all extras, fish optional, \$110. Frank, 821-1726.

Audio, Video & Computer

COMPUTER - PC/AT clone, 2 MB RAM co-processor, high-resolution color display, wide carriage printer, \$950. Ext. 3922.

COMPUTER - 286 VGA AT-compatible, 1024k RAM, 40 MB hard drive, color monitor, math coprocessor, more, \$1,000. John, Ext. 3108.

COMPUTER - IBM-XT comp. turbo, 30 MB hard drive, dual floppy drives, monochrome display, printer, \$200. Sheling or Ku-Ding, 345-5882.

COMPUTERS - Commodore 64 and VIC-20 w/disk drive w/tape koda pad, printer, joysticks, monitor, software cartridges. John, Ext. 2544.

CD-ROM - Sony 7205 external drive, 340 ms access MPC compliant, 6 CDs, speakers, headphone, upgraded software, \$400. Lap, Ext. 2336.

CD PLAYER - Magnavox 4x oversampling, dual 16-bit d/a converter, shuffle play, 20-track programmability, mint, \$80, eves. Jim, 924-3641.

MODEM - Hayes, \$40. Ext. 7699 or 821-1435.

PRINTER - C. Itoh wide carriage w/spare ribbons, compatible w/pc printer port, \$25. Ext. 3454.

TV - color, Sharp 21", 1989, \$120. Victor, Ext. 3823.

AMATEUR RADIO EQUIPMENT - PK88 TNC, excel. cond., like new, complete, w/orig. boxes, manuals, \$100. Tom, Ext. 2075.

CD PLAYER - Sharp, 20 track, v.g. cond., \$75. Tom, Ext. 2075.

CD ROM - Philips CDD461, ext., 2 CDs, PCGlobe, PC USA, Microsoft Bookshelf, plays music & CDs, \$280 neg. Mark, Ext. 7978 or 744-9308.

LASER DISC PLAYER - Magnavox, good cond., works, \$200. Tom, Ext. 2075.

TV - color, 19", remote, \$50; beta VCR-hifi, w/70 tapes, \$100. 732-8837.

Miscellaneous

BOOKS - *Special Relativity*, French, \$4; *Biochemistry*, Stryer, \$19; *Enzymes*, Haldane, \$4. Margaret, 473-9129 or 924-5533, Ext. 272.

CRIB - maple, Ethan Allen, used, \$80. Ext. 7236.

NURSING PUMPS - Evenflo manual, \$20; Mag Mag a/c batt. pump w/adaptor, new \$58, sell \$40, both used once, sterilized. Lorraine, 929-3910.

TICKETS - May 16, 2 adults, 2 children, for "The Chinese Golden Dragon Acrobats" at Taipei Theater, NYC, \$35 for all. Ext. 2683 or 751-2469.

WEDDING GOWN - Ellissa by Demtrios, size 8, w/headpiece, new, never used, org. \$1,700, ask. \$1,000. Teri, Ext. 5800 or 289-2925.

WEED WACKER - \$10; folding bed, \$20; 2-door hutch, \$50; range hood, \$20; lobster traps, \$20. Kathy, 744-2203.

CRANK UMBRELLA - \$30; twin bed, \$30; suitcase, on wheels, \$20; outdoor metal, \$30; box fan, \$18. Kathy, 744-2203.

Freezer - chest type, works well, looks good, \$75. Bob, 878-5631.

GOLDEN TOPAZ RING - 38 1/2 carats, 6 diamonds, \$1,400; antique sterling flatware, service for 8, excel., letter H, \$1,400 or 265-3208 or 286-1571.

LETTERING SETS - K&E pen & ink, full sets, Greek & English, plusd extras, \$100/set. Sue, Ext. 3492.

SUIT - wine leather, M12, long jacket, short skirt, v.g. cond., worth \$375, asking \$150. Ruth Ann, Ext. 7774 or 929-6235.

Free

FIREWOOD - oak, old but good, you pick up, 751-8240 eves.

ORGAN - Lowery spinet, needs work, you pick up. Carole, Ext. 4151.

REFRIGERATOR - w/freezer underneath, works well, you pick up in E. Moriches. Tom, Ext. 3454.

SAILBOAT - 19' wooden Lightning, 80% rebuilt. Bob, Ext. 5314.