

## BNL-Swedish Research First Step to 'Designer' Vegetable Oils

Plant biochemists from a BNL-Swedish collaboration have successfully used genetic techniques to manipulate the way plants transform saturated fat molecules into mono-unsaturated fat molecules.

The work may lead to "designer" plant oils for the \$100-billion oil-crop industry — making it possible to use renewable plant oils instead of non-renewable petroleum products.

In a paper published in a recent issue of the *Proceedings of the National Academy of Sciences*, Biochemists John Shanklin and Edgar Cahoon, Biology Department, in collaboration with colleagues from Sweden's Karolinska Institute, describe their efforts to alter an important plant enzyme called desaturase.

"Desaturase changes fat molecules called fatty acids from straight and saturated to bent and mono-unsaturated," Shanklin explained. "The chemical change that desaturase causes — turning a single chemical bond in the fatty acid into a double bond — is small, but significant because it can turn a solid, 'bad-for-you' saturated fat into a liquid, mono-unsaturated one that's not so bad."

He continued, "What we've done is deliberately change a desaturase just slightly, so that it transforms fatty acids slightly differently and makes a



Roger Stoutenburgh

Gathering seeds in a growth chamber are Biology Department staffers: (from left) Edgar Cahoon, a key participant in the BNL-Karolinska Institute's designer vegetable-oil research; and Edward Whittle and John Shanklin.

slightly different oil."

The team's achievement lays the groundwork for future advances in designing vegetable oils — and therefore everything from low-calorie margarine to nylon — by altering desaturases at the molecular level in

order to change the resulting plant oil's properties, whether melting point or digestibility.

"This will likely lead to the development of crops that can make fatty acids with particular properties and applications," Shanklin said. "Such

plants could become an alternate source of materials for which we now use nonrenewable petroleum products. So, if we needed more of a given industrial material, we could just plant more of a certain designer oil crop."

### Tiny Change, Big Difference

As part of their study, Shanklin and Cahoon used a variety of genetically related desaturases with different properties from several plant sources. The researchers then used a genetic approach to identify which region of the desaturase molecule was responsible for each property of the resulting oil.

Then, with their Swedish collaborators Ylva Lindqvist and Gunter Schneider, they combined this genetic information with information from (continued on page 2)

## RFP Issued Friday; Proposals Due 9/28

The formal Request for Proposals (RFP) from organizations that wish to be BNL's next contractor was issued by the U.S. Department of Energy last Friday, July 18. According to a DOE press release, "The RFP reaffirms DOE's previously proposed plan to seek a nonprofit organization to operate the Laboratory."

The RFP is posted on the World Wide Web at <http://www.ch.doe.gov/bnlseb>.

Among other relevant information, the RFP spells out: the qualifications which offerors must have to be eligible to be awarded the contract; the criteria that DOE will use to evaluate the proposals that it receives; and a proposed contract, including measures for gauging the contractor's performance in science and technology; environment, safety and health; and involving the community in BNL's operations. (continued on page 2)

## 1997 Sambamurti Lecture: Exploring the Standard Model

One of the pillars of modern high-energy physics is the standard model (SM) of electroweak interactions.

This early 1960s theory unifies electromagnetism and the weak force, two of the four known ways by which matter interacts. It was the first step toward the grand unified theories, which hypothesize that all four known interactions — electromagnetic, weak, strong and gravitational — are unified at very high energies.

Despite its success, some of the phenomena that the SM describes are still postulated, rather than understood from basic principles. For physi-

cists, this unknown territory is a call to adventure.

One way to complete the SM and explore beyond it is to measure its parameters with very high precision and then look for deviations from the predicted values. This identifies the less complete sectors of the model and narrows the scope of new physics that could be responsible for an observed



Greg Landsberg

discrepancy.

To report on three measurements of this kind performed by the D-Zero experiment at Fermi National Accelerator Laboratory (Fermilab), Greg Landsberg, a D-Zero researcher, will give the 1997 Sambamurti Memorial Lecture. Entitled "Precision Electroweak Measurements at D-Zero," his talk will begin at 3 p.m. in the large seminar room in the Physics Department, Bldg. 510. Students and summer visitors are especially encouraged to attend.

In his talk, Landsberg will consider (continued on page 2)

## BNL Brain Tumor Therapy: Clinical Trial Third Phase Under Way

Three patients have already been treated since the end of May, in the third phase of BNL's clinical trial of boron neutron capture therapy (BNCT), an experimental radiation treatment for a type of brain cancer.

Under a protocol sanctioned by the U.S. Food & Drug Administration (FDA), Medical Department researchers, in collaboration with physicians from the University Medical Center at Stony Brook and the Beth Israel Medical Center in Manhattan, are now injecting a higher dose of a tumor-seeking compound into patients who have a lethal brain cancer called glioblastoma multiforme. The compound collects in the tumor, where it is activated by a beam of neutrons from the Brookhaven Medical Research Reactor, thereby destroying the tumor cells.

Since September 1994, 33 patients with glioblastoma multiforme have come to BNL from across the nation to be treated with BNCT. Glioblastoma multiforme strikes about 7,000 Americans annually. Patients usually survive no more than a year after the cancer's diagnosis, despite their conventional treatment with radiation

and chemotherapy.

Results from the first phase of the study involving 15 BNCT patients showed that the single treatment of approximately one hour gave many patients a better quality of life for their remaining months than they would have had after conventional treatment.

The trial also confirmed that the initial radiation dose could be delivered safely to the tumor, without serious damage to nearby healthy tissue.

Said BNL's Arjun Chanana, principal investigator for this research, "In addition to undergoing much less treatment time, the first 15 patients survived on average about 15 months. In fact, two patients are still alive, and one has no signs of tumor recurrence. These are encouraging results."

It is too early as yet to assess results from the second phase of the trial, in which researchers increased the radiation dose delivered by the neutron beam aimed at the tumor. However, of 15 patients treated since May 1996, 11 are still alive.

Last year, physicians at the Massachusetts Institute of Technology (MIT) received FDA permission to begin treating glioblastoma patients with

**A demonstration of how patients with glioblastoma multiforme are treated with boron neutron capture therapy at the Brookhaven Medical Research Reactor.**



Roger Stoutenburgh

BNCT. Other institutions in the U.S., Europe and Japan are also using or researching the effectiveness of this therapy.

Earlier MIT studies had focused on BNCT's effect on melanoma. At BNL, scientists Jeffrey Coderre and John Glass are investigating BNCT's potential for other cancers, including lung cancer and leukemia.

"We are cautiously optimistic that, at the higher dose levels, we will begin

to see some significant improvements in survival," said Coderre of BNCT's third phase. "It seems that we are very close to offering something more substantial than hope to patients with this dreaded disease."

Patients with glioblastoma multiforme, their families and physicians can obtain more information about the BNCT clinical trial by calling Jane Hodgkinson, Ext. 3684.

— Kara Villamil and Liz Seubert

**RFP Issued** (cont'd.)

In the RFP, DOE specifies that the new contract will be for five years, with the possibility of a one-year extension. According to a provision within the proposed contract, however, if the new contractor's performance in critical areas is not excellent, then DOE will be allowed to replace the contractor after one year.

The value of the new, five-year contract is estimated at \$2 billion.

In developing the RFP, DOE evaluated more than 360 documents and over 500 comments from the public, employees and retirees, and prospective offerors through information exchanges held in May, strategic solicitation plan workshops held in June, and a site tour for offerors in July.

Proposals submitted in response to the RFP are expected to detail offerors' past performance, demonstrated success and proposed approach to carrying out BNL's scientific research missions, protecting the environment, ensuring safety and health, and involving the community.

Prospective offerors are invited to a preproposal conference, to be held on Tuesday, August 5, from 8 a.m. to 4:30 p.m. at the Radisson Hotel Islandia in Hauppauge.

During the preproposal conference, prospective offerors may ask questions and gain assistance in developing proposals responding to DOE's requirements for the next contractor. Although intended for prospective offerors, the proposal conference is open to all interested parties.

Register in writing by contacting: Susan Borthwick, DOE Chicago Operations Office, 9800 South Cass Avenue, Argonne IL 60439; fax (639) 252-0914; e-mail brookhaven.panel@ch.doe.gov.

In September, offerors will make oral presentations to DOE's Source Evaluation Board (SEB) responsible for evaluating the proposals to operate BNL. The SEB will then negotiate potential contracts with all offerors that they consider to be competitive. The competitive offerors will be required to submit signed copies of the negotiated contracts to the SEB by mid-October.

After being presented with the SEB's evaluations of the competitive offerors' written proposals, oral presentation and negotiated contracts, the Source Selection Official will make the final decision on the Lab's next contractor and award the negotiated contract in November.

**Note to Employees:**

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

**Designer Oils** (cont'd.)

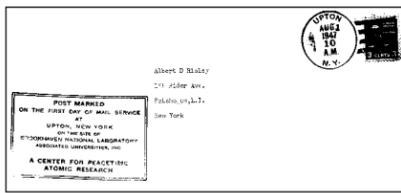
their studies of desaturase's three-dimensional (3-D) atomic structure — studies they had performed using the intense x-rays from beam line X12C at BNL's National Synchrotron Light Source.

The 3-D structure revealed a cleft on the desaturase molecule that fits around a saturated fatty acid like a glove on a hand. The researchers then identified parts of the desaturase molecule near the cleft that are most crucial to desaturase's action.

The next step in creating a designer desaturase was to change just a few crucial sites in the long chain of 360

**Get Your 50th-Anniversary Postmark On Lab Postcards, Other Mail on 8/1**

On August 1, 1947, the Upton Branch of the U.S. Postal Service (USPS) began serving BNL. The cost of a first-class stamp was 3¢, and mail posted that day at the new Post Office (P.O.) was stamped "Post Marked on the First Day of Mail Service at Upton, New York, on the site of Brookhaven National Laboratory, Associated Universities, Inc., A Center for Peacetime Atomic Research" (see graphic).



On August 1, 1997, the Upton Branch of the USPS will celebrate 50 years of serving BNL. The cost of a first-class stamp is 32¢ (though postcard stamps cost 20¢), and mail posted on Friday, August 1, at the 50-year-old Upton P.O. will be hand-stamped with a special pictorial cancellation based on the Lab's 50th-anniversary logo designed by BNL graphic designer Theresa Esposito.

So, on Friday, August 1, come on down to the Upton P.O., where, between 8 a.m. and 4:30 p.m., mail post-

marked that day will make post-office history.

To encourage participation, the Public Affairs Office is providing official Lab postcards, to be given away free at the Upton P.O. window to those wanting to purchase postcard stamps to be hand-canceled.

From 11 a.m. to 1:30 p.m., the Upton Post Office will have a special-cancellation table with postcards and stamps in Berkner Hall, where cafeteria-goers may not only obtain the 50th-anniversary cancellation, but also purchase original 1955 Atoms for Peace 3¢ stamps designed by the late George Cox, another BNL graphic designer.

At noon, a ceremony will take place, during which the Mayor of Upton for the day — Bernard Manowitz, the only employee to celebrate his 50th service anniversary during BNL's 50th anniversary year — will receive the mail addressed to that office, as well as a plaque commemorating the event. So, write those cards and letters, and buy your stamps and post them August 1!

**BNLers Serve as Lab Ambassadors**

The BNLers who staffed the Lab's exhibit at the Mattituck Strawberry Festival on June 14, helping with community outreach by publicizing the then upcoming Community Day, are:



(from left) John Dabrowski, National Synchrotron Light Source (NSLS); Bernie Stepnoski, Alternating Gradient Synchrotron (AGS); Dan Ferber, Public Affairs Office (PAO); Peter Cameron, Relativistic Heavy Ion Collider (RHIC) Project; Sue Norton, RHIC; Bill Graves, NSLS; Howard Gordon, Physics Department. PAO, Ext. 2345, will gladly help employees set up and staff exhibits for events in their communities.

**Sambamurti Lecture** (cont'd.)

three precision electroweak measurements recently done by the D-Zero experiment at Fermilab's Tevatron accelerator, which collides high-energy proton and antiproton particles to probe the constituents of matter.

The experimenters test the SM by measuring the masses of the W-boson and the top quark, and by searching for unusual couplings between the W-boson, the Z-boson and photons.

Landsberg will recall that the charged W boson and the neutral Z boson were two new particles predicted by the SM to carry the weak force. Their discovery in the 1980s by physicists at CERN, Switzerland, was a triumph for the model. Since then, the Z has been extensively studied, but only in the past few years have sufficient statistics existed to study the W.

In addition, the top quark, which is

the last observed of the six quarks that, according to the model, make up all matter, was discovered by two collaborations at the Tevatron, the Collider Detector at Fermilab and D-Zero.

As Landsberg will explain, accurate measurements of the W-boson mass and the top-quark mass will restrict the possible mass range for the Higgs particle, the last missing block of the SM foundation.

Also, according to Landsberg, investigating the couplings between the W and Z and photons could reveal the existence of some unknown interaction between the force carriers.

Landsberg will conclude by describing the current upgrading of the D-Zero detector, which will be ready to study the most interesting aspects of particle physics in a second run, expected to start around the year 2000.

Landsberg received his M.S. from

**Engineering Village Information on Line**

For the benefit of BNL's engineers, the Research Library of the Technical Information Division subscribes to a World Wide Web version of Engineering Information's *Ei Compendex*. This comprehensive commercial database contains summaries of journal articles, technical reports and conference papers starting from 1980. Major disciplines covered include civil, electrical, mechanical and structural engineering; bioengineering; solid-state physics; and waste management.

*Ei Compendex* can be reached by selecting *Digital Library* on BNL's home page, then clicking *BNL Research Library*, and then selecting *Engineering Information Village*.

The Village homepage is aimed at engineering interests worldwide and offers choices such as: *Library*, for a convenient-to-search publications database; *Industry Mart*, a catalog shop listing equipment, parts and supplies, along with technical specifications; and the *Research and Industrial Park*, with access to the Standards & Specifications Bureau, as well as workshops, industrial zones and engineering departments.

By discipline, one can find news, products, professional societies, journals, career opportunities and experts who help users locate more information on the Internet.

For more news about this rapidly growing site and other sources of information, see the current issue of LINK.bnl.

**Arrivals & Departures**

**Arrivals**

William McGrath.....Biology  
Xuehui Sun.....App. Science

**Departures**

This list includes all employees who have terminated from the Lab, including retirees:  
Melissa A. Collichio.....App. Science  
Joan C. Depken.....AGS  
Maldonado Gonzalo.....RHIC

Moscow Physical Technical Institute in 1989 and his Ph.D. from the State University of New York at Stony Brook, in 1994.

He joined D-Zero in 1992 and did mostly electroweak physics, searching for anomalous couplings between vector bosons. A Fermilab research associate since 1995, he began this year to head the D-Zero exotics group.

The research on leptiquarks that he led has just resulted in ruling out the explanation of HERA high Q<sup>2</sup> event excess with the leptiquark in a broad variety of models.

The Sambamurti Memorial Lecture was established in 1992 to commemorate the life of Aditya Sambamurti, a young BNL physicist who succumbed to cancer in 1992, at age 31. Each year, an outstanding young physicist whose professional interests overlap those of Sambamurti is selected to deliver the lecture. — Liz Seubert

amino acids which make up each desaturase molecule.

"In desaturase, or any enzyme, the smallest changes can make the biggest difference — but only if they're the right changes," said Shanklin. By changing only five amino acids in one plant's desaturase to the equivalent amino acids from the other plant's desaturase, the properties of the first desaturase were changed to that of the other.

"One surprising finding from this work is that this interdisciplinary approach of combining information from both genetic and x-ray crystallographic studies has yielded knowledge that neither study would have provided

alone," commented Shanklin.

The final goal, though, was even more ambitious: to create an entirely new desaturase.

Armed with the validated 3-D desaturase structure, they redesigned a desaturase with certain properties in mind — a process known as "rational design." They were recently granted a patent for this new enzyme and for the methods they used to switch the properties of two desaturases.

"The implications of this work are quite exciting because we're no longer constrained by the variation of desaturases found in nature," Shanklin explained. "If we can't find an existing enzyme with properties

that we want, then we'll design one for ourselves. Also, these designer enzymes may be more efficient than the variant desaturases found in nature."

The next step will be to test the new desaturase by introducing it into a plant.

"We still need to confirm that the changes we see in the test tube will translate into changes in the composition of fatty acids in oil crop plants," Shanklin said.

This research was funded by the United States Department of Energy's Office of Basic Energy Sciences and the Swedish Natural Science Research Council.

— Kara Villamil with Liz Seubert

# Community Open House Changes Neighbors' Minds for the Better; High Flux Beam Reactor Most Popular Stop on the Tour

The Lab's Community Open House held on Sunday, June 29, drew 500-plus BNL neighbors onto the site, where 11 Lab facilities — from the Alternating Gradient Synchrotron to the new Waste Management Facility — opened their doors for tours. Held as part of Brookhaven's 50th-anniversary celebration, the Community Open House changed people's minds about BNL — for the better.

According to a survey completed by one-fourth of the day's visitors, their positive experience eliminated all negative opinions, impressed all those who had no opinion about the Lab before that day, and converted most of those with neutral opinions into having a positive view of BNL.

Two-thirds of those survey-responders who attended Community Open House came from Suffolk County, but 5 percent came from New York City and some 11 percent from beyond Long Island and the city. Almost half were 41-60 years of age, and almost 80 percent had obtained education beyond high school.

Some 97 percent of these visitors came to learn and be entertained. Over 80

percent of the survey responders felt that the day's programs were "just right," that is, not too simple or too technical for someone to gain an appreciation of the Lab's research and facilities. In fact, 96 percent would return to see more of the Lab, and 99 percent would recommend that others visit BNL.

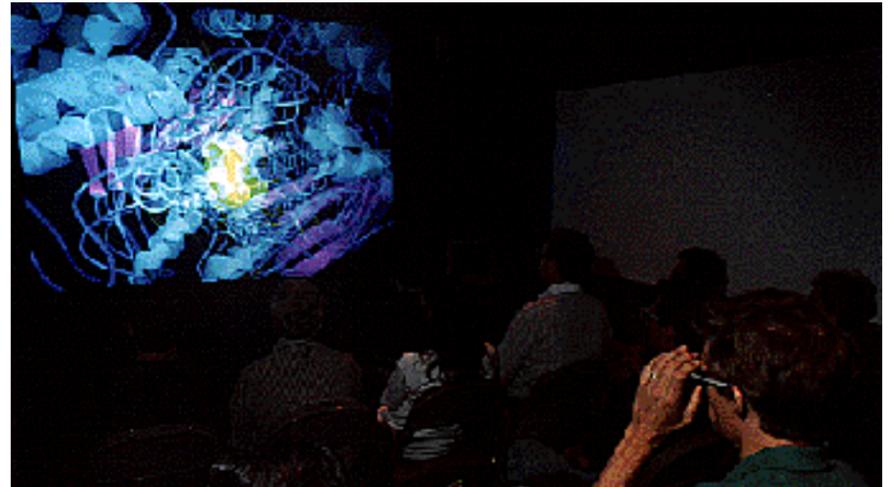
The most popular stop on the tour was the High Flux Beam Reactor (HFBR) — almost half of that day's visitors saw for themselves why the HFBR is one of the best sources in the world for intense beams of neutrons used for important research into superconductivity, medical radiotracers and the like.

Janet Tempel, Supervisor of Museum Programs in the Public Affairs Office, who organized the Community Open House, thanked the hundreds of BNL volunteers who toured visitors around their departments and divisions. "Without them, we couldn't have opened all those facilities, introduced people to the important and exciting research that goes on here, and changed people's minds about the Lab," she concluded.

— photographs by Roger Stoutenburgh



In the HFBR lobby, visitors study the cutway model of the reactor.



Ballard Andrews (right) narrates the show at CCD's 3-D Theater.



At CCD, a family surfs the World Wide Web.



A WWII vet, who was inducted into the Army at Camp Upton, learns about RHIC's STAR detector.



BNL's Community Day visitors as seen through RHIC's STAR.



In the NSLS control room, Tom Dickinson (right) explains how the NSLS' two synchrotron light sources are operated.



Jeff Coderre (right), Medical Department, describes BNL's experimental boron neutron capture therapy for brain cancer.

## BROOKHAVEN BULLETIN

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The Reactor Division's Joel Scott (right) describes the HFBR's experimental and operations floors.



In the NSLS lobby, visitors view screens displaying the synchrotrons' workings.

## BWIS Reception

Brookhaven Women in Science (BWIS) will hold its 18th annual Summer Reception, on Monday, July 28, from 5:15 to 7 p.m., in the courtyard of the Physics Department, Bldg. 510.

At 5:45 p.m., the 1997 Renate W. Chasman Scholarship will be presented to Janet Dowdy of Sayville.

All employees and visitors are invited to enjoy light refreshments, beverages and wine, though a donation for the wine will be appreciated. For more information, call Vinita Ghosh, Ext. 3527; Louise Hanson, Ext. 7709/5849; or Lisa Tranquada, Ext. 7731.

## IBEW Meeting

Local 2230, IBEW, will hold its regular monthly meeting on Monday, July 28, at 6 p.m. in the Knights of Columbus Hall, Railroad Avenue, Patchogue. There will be a meeting for shift workers at 3 p.m. at the union office. The agenda includes regular business, committee reports and the president's report.

## Amateur Radio

The BERA Amateur Radio Club will next meet at noon on Thursday, July 31, in Room C, Berkner Hall. A critique of Field Day is on the agenda. All BERA members and licensed amateur-radio operators are invited. For more information, call Chris Neuberger, Ext. 4160; or Nick Franco, Ext. 5467.

## Service Awards

*The following people celebrated service anniversaries during June:*

### 45 Years

**Jerome Hudis**.....AUI

### 40 Years

**Robert E. Chrien**.....Physics

### 35 Years

**Martin Blume**.....Physics

**David P. Dayton**.....RHIC

**Russell N. Dietz**.....App. Science

**Stephen A. Kochis**.....AGS

**Richard L. Lane**.....AGS

### 30 Years

**John E. Barry**.....Chemistry

**Charles I. Goldstein**.....App. Science

### 25 Years

**Nancy R. Harris**.....Contracts & Proc.

### 20 Years

**John L. Boccio**.....Adv. Technology

**William S. Guthrie**.....Plant Eng.

**Edward T. Lessard**.....AGS

**James McBreen**.....App. Science

**Jonathan B. Sanborn**...Adv. Technology

### 10 Years

**Stephen A. Barcelo**.....Plant Eng.

**Yu-Shin Ding**.....Chemistry

**Bruce J. Dionne**.....Adv. Technology

**Charles F. Edwards**.....Plant Eng.

**Ann M. Emrick**.....Biology

**Juan C. Gallardo**.....Physics

**Bart J. Giuliano**.....Plant Eng.

**Michael J. Kijowski**.....Plant Eng.

**Elaine G. Landry**.....AGS

**Allen R. Licata**.....Safety & Env. Prot.

**Albert Liotta**.....Plant Eng.

**Alan A. Morgillo**.....RHIC

**Dolores C. O'Connor**.....Director's Off.

**Celso Ponce**.....Plant Eng.

**Richard N. Reciniello**...Safety & Env. Prot.

**Craig F. Rochon**.....Plant Eng.

**Alessandro G. Ruggiero**.....AGS

**Clinton R. Sampson**.....Central Shops

**Celeste C. Samuels**.....Info. Services

**Randolph P. Seibel**.....Central Shops

**Udo Von Wimmersperg**...Adv. Technology

**Richard L. Wall**.....Physics

**Patricia Williams**.....Plant Eng.

## Softball

### Results reported as of July 18

League E1		League M1	
Phoubars	10-2	Stingrays	7-1
Magnuts	9-3	Gour-Mets	7-2
Blue Jays	7-5	Happy Hour	6-2
System	5-7	Hit'n Run	2-6
Cleen Sweep	4-8	OER Wellheads	2-6
Hammerheads	1-11	Good Timers	1-8
League E2		League M2	
Scram	9-1	Varmints	6-1
CCD	7-3	Skeleton Crew	4-2
Phytinphytos	7-3	Mixed Nuts	2-4
Contaminators	6-3	What's on 2nd	2-4
Gas House Gorillas	5-5	No Names	2-5
Hy Tech	4-6	League E3	
Lights Out	4-6	Sultans of Swat	6-3
Feds	3-6	Sure Fire	6-3
Phase Out	3-7	Bombers	4-5
Mesocyclones	1-9	Medical	2-7

## Classified Advertisements

### Placement Notices

The Laboratory's placement policy is to select the best-qualified candidate for an available position. Candidates are considered 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, disability or veteran status.

Each week, the Human Resources Division lists new placement notices, first, so employees may request consideration for themselves, and, second, for 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; call the JOBLINE, Ext. 7744 (344-7744), for a complete list of all job openings; use a TDD system to access job information by calling (516) 344-6018; or access current job openings on the World Wide Web at <http://www.bnl.gov/JOBS/jobs.html>.

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

NS 3127. PROGRAMMER/ANALYST POSITION - Requires a BS in computer science or related field with at least five years' experience in real-time software development and hardware-software integration. Experience in C and C++ programming, demonstrated problem-solving skills and experience debugging networked systems is required; VxWorks experience is highly desirable. Will participate in designing and developing embedded software for real-time systems in the AGS-RHIC control system. RHIC Project.

DD 3125. TECHNICAL POSITION - (term appointment, reposting) Requires an AAS in a technical field or equivalent experience, and knowledge or experience in one or more disciplines, such as mechanics and/or electromechanical assembly. Must be able to adhere to written procedures and follow quality-assurance standards in all work assignments. Knowledge of superconducting magnet-assembly procedures highly desirable. Responsibilities will include but are not limited to assignments in magnet assembly that require developed skills and performance of functions with minimal supervision. RHIC Project.