

BNL, USB Link High From Drugs to Brain Chemistry; Show Chemical Clues to Drug-Abuse Vulnerability

In studies using positron emission tomography (PET), researchers from BNL and the State University of New York at Stony Brook (USB) have uncovered two new findings on the biochemistry of drug addiction.

In one study, the researchers are the first to show that dopamine levels surge in certain areas of the brain when humans experience a “high” from an injected dose of Ritalin, a drug used in treating attention-deficit disorder. Dopamine, a brain chemical, is associated with movement, well-being, pleasure, and reward.

The results of the study are published in the October issue of the *Journal of Pharmacology and Experimental Therapeutics*.

The results from another study, published in the September issue of *The American Journal of Psychiatry*, are the first to show in humans a link between the brain’s receptors for dopamine and the reinforcement of responses to psychostimulants.

Dopamine Surge With Drug High

Regarding the results published in October, the researchers found that the high derived from an intravenous dose of Ritalin is similar to the euphoric high experienced by cocaine abusers after they take cocaine.

“These results support the development of drugs that treat cocaine addiction by interfering with cocaine-induced increases in dopamine,” said lead author and psychiatrist Nora Volkow, Associate Laboratory Director for Life Sciences. Volkow collaborated with BNL coauthors Gene-Jack Wang, Joanna Fowler, Jean Logan, S. John Gatley, Christopher Wong, and Naomi Pappas, as well as Robert Hitzemann of USB.

Volkow and coauthors also reported that the intensity of the euphoria derived from taking psychostimulant drugs is correlated with the increase in brain dopamine and the degree to which dopamine occupies its receptors. Dopamine receptors transmit signals from dopamine into brain circuits that trigger various sensations.

In general, the subjects’ reaction to Ritalin was related to the amount of dopamine released into the brain after Ritalin was administered. In the brains of those who felt euphoria from



Nora Volkow and Joanna Fowler

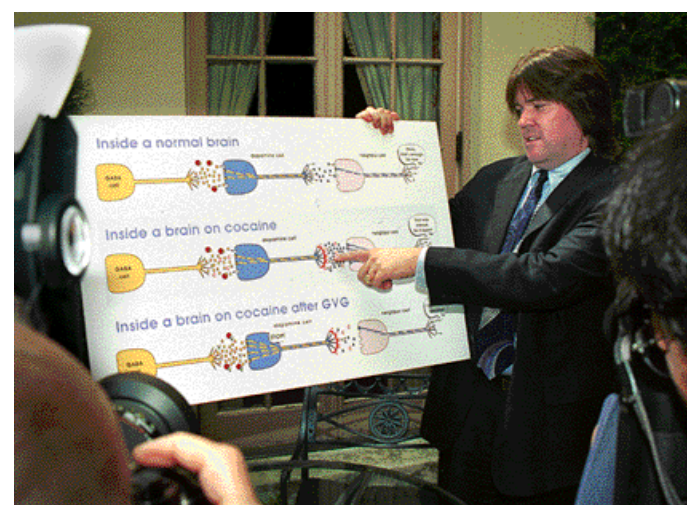
Ritalin, the researchers found, in every case, an increase in dopamine. Those who did not feel high had no change in dopamine levels.

The researchers also found variability in the subjects’ euphoric feelings that could not be completely

accounted for by the amount of Ritalin taken. This could result from limitations in experimental procedure or from differences in dopamine-receptor sensitivity among individuals. Other brain chemicals, such as serotonin, may also

(continued on page 2)

Drug that Fights Cocaine Addiction, Pioneered at BNL, Is Now Licensed by David Pharmaceuticals, Inc.



Stephen Dewey

All-Hands Meeting

Tuesday, 10/26, 11 a.m.-noon

On Tuesday, October 26, the DOE Task Force Against Racial Profiling will visit BNL.

Laboratory Director John Marburger will hold an open all-hands meeting with task force members that day in Berkner Hall, 11 a.m.-noon. The Laboratory community’s comments and questions will be invited.

As was announced by the office of Deputy Energy Secretary T.J. Glauthier, the task force is visiting national labs to reiterate Energy Secretary Bill Richardson’s pledge of fairness, vigilance and equity in the DOE workplace, and to assess the impact of racial profiling following the espionage case at Los Alamos.

Lab Director Marburger, who is fully committed to supporting the task force’s mission, will also invite senior management, employee interest groups, a group of Asian employees, and randomly selected employees to meet with the task force during that day.

BNL has licensed the use of the drug vigabatrin for its potential application in treating cocaine addiction. BNL granted this license to David Pharmaceuticals, Inc., of Burlingame, California.

Vigabatrin, a drug used to treat epilepsy outside the U.S., may prove to be highly effective in treating cocaine addiction. In August 1998, led by Stephen Dewey, Chemistry Department, a team of scientists from BNL, St. John’s University, New York University, Albert Einstein College of Medicine and Boston University reported in the journal *Synapse* that the drug, also known as gamma vinyl-

(continued on page 2)

On October 2, BNL hosted “Open Source/Open Science ’99,” the first conference ever to focus on the relationship between open source software and the scientific community. “Open source” refers to software that can be downloaded free from the Internet.

Over 230 participants attended the day of talks by scientists, engineers, software experts and others from all over the world. The conference also showcased the Lab’s contributions to software in scientific research. Many attendees toured the Relativistic Heavy Ion Collider (RHIC), the RHIC computing facility, the National Synchrotron Light Source, the Center for Imaging and Neurosciences and the Information Technology Division (ITD), areas at BNL where open source software is routinely used.

Originally conceived of by: Stephen Adler, Physics; Malcolm Capel and Sean McCorkle, Biology; and Tim Sailer, RHIC; the conference was organized by committee members: Ann Emrick and Donna Zadow, Biology; Ed McFadden, Sue McKeon, and Tom Schlagel, ITD; Elaine DiMasi and Pat Meehan, Physics; Mark Sailer, Bonnie Sherwood, and Tom Throwe, RHIC.

For more details on the conference and to listen to the talks through video technology, visit the conference Web site at <http://open.science.bnl.gov>.



Confluence of Science and Open Source Software

McLerran Heads Nuclear Theory Group

On September 1, Larry McLerran joined the Physics Department to head the Nuclear Theory Group. He came to BNL from the University of Minnesota, where he was a professor and the first Director of the Theoretical Physics Institute. “Larry is credited with being one of the founders of the field of ultra-relativistic heavy-ion physics and was one of the principal drivers in the establishment of the Relativistic Heavy Ion Collider [RHIC] at Brookhaven,” noted Chairman of Physics Michael Murtagh.

Murtagh also thanked Physics’ Rob Pisarski “for his superb job over the past two years in leading the Nuclear Theory Group, attracting new young physicists, and improving and fostering excellent relationships with DOE, the nuclear physics community, and the new RIKEN BNL Research Center.”

Pisarski will continue his position as a member of the High Energy Physics Theory Group.



Larry McLerran

“My most important short-term goal is to continue the wonderful job which Rob Pisarski has done in developing the Nuclear Theory Group,” said McLerran. “We need to maintain and further develop an exciting atmosphere that interfaces with the RIKEN

BNL Research Center and the particle theorists, and provides support for the physics program at RHIC. We now have an extremely talented young group, and I hope we shall be able to keep the dynamism at such a level that we can continue to hire the best young physicists in the field.

“On a longer time scale,” continued McLerran,

“our group should be providing ideas which stimulate the evolution of the RHIC experiments, and further in the future, will do seminal work for new projects such as accelerating electrons at RHIC.

McLerran earned his Ph.D. in physics at the University of Washington in 1975.

Ludlam Named Deputy Associate Lab Director

On October 1, Thomas Ludlam became Deputy Associate Laboratory Director for High Energy and Nuclear Physics. He will assist Associate Laboratory Director Thomas Kirk in providing oversight for planning and conducting BNL’s programs in high energy and nuclear physics.

Ludlam, who joined the Physics Department in 1978, served as Associate Project Director for Detectors & Experiment Support for the Relativistic Heavy Ion Collider (RHIC) construction project from its inception in 1990 through its formal completion this year. He has also played an active part in BNL’s community outreach for the RHIC Project.

“With RHIC, we now have both a tremendous opportunity and a special responsibility to get the physics results flowing,” said Ludlam. “I am especially eager to work with Tom Kirk to help make this happen as quickly and effectively as possible.

“At the same time,” he continued,



Tom Ludlam

“with my own roots in high-energy physics, I am equally keen to help make sure that BNL remains at the forefront of the field and continues its traditional leadership in the development of new instrumentation for both high energy and nuclear physics research.”

In his new position, Ludlam will assist Kirk in setting directions for BNL’s research activities in high energy and nuclear physics, including the operation of the RHIC detectors. He will retain management responsibility for the capital equipment projects, known as Additional Experimental Equipment, to upgrade

the large detectors at RHIC.

Ludlam will also continue his scientific outreach, coordinating the Lab’s efforts to communicate goals and achievements in high energy and nuclear physics to the general public and the wider scientific community.

Ludlam earned his Ph.D. in physics from Yale University in 1969.

BNL-USB Drug Study (cont’d)

come into play in determining the response to psychostimulant drugs.

This study was funded by the National Institute on Drug Abuse (NIDA), the Office of National Drug Control Policy and DOE. The study followed guidelines set at BNL by the Institutional Review Board (IRB), which regulates research involving humans.

Clues to Addiction Vulnerability

Regarding the study published in September, lead author Volkow and her coauthors noted significant progress in answering why some people who experiment with drugs become addicted, while others do not (see sidebar). In this study, Volkow worked with BNL’s Wang, Fowler, Logan, Gatley, Andrew Gifford, Yu-Shin Ding, and Pappas, and USB’s Hitzemann.

Specifically, the researchers found that PET images of the brain revealed the number of dopamine receptors that each subject had. Subjects who described the effects of a dose of injected Ritalin as pleasant had significantly fewer dopamine receptors than those who found the drug’s effects unpleasant.

Commented Volkow, “We know from past studies that drug addicts and alcoholics have fewer dopamine receptors than people who are not addicted to drugs or alcohol. In our current research, subjects who were not drug abusers and who reported that the effect of the stimulant was pleasant — as most cocaine abusers do — had dopamine levels similar to those in cocaine abusers.”

Thus, Volkow concluded, the hypothesis that people with fewer dopamine receptors may take drugs to activate these pleasure circuits may be one of the factors that predisposes a person to drug abuse. However, other biological, genetic, and environmental factors are also likely to contribute to the susceptibility to drug abuse and addiction.

Fewer dopamine receptors, the researchers found, could predispose a person to drug abuse by favoring ini-

tial pleasurable drug responses. And a high number of dopamine receptors may protect against drug abuse by favoring unpleasant drug responses.

Funded by NIDA and DOE, this

study also followed IRB guidelines.

More information on these studies and the related story (right) can be obtained from the news releases posted on BNL’s Home Page, www.bnl.gov/.

— Diane Greenberg and Liz Seubert

Images of Vulnerability

Why do some people become addicted while others do not?

Dopamine is a brain chemical that transmits signals associated with movement, well-being, pleasure, and reward. Signals are transmitted when dopamine binds to dopamine receptors, which are sites in the brain that receive dopamine.

When people take a stimulant drug, dopamine is released, exciting the receptors. The brain may have more or fewer receptors, and people can find stimulating drugs pleasant or unpleasant.

Investigation

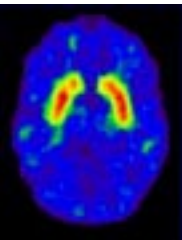
Using positron emission tomography, BNL and USB researchers imaged the dopamine receptor levels of 20 subjects



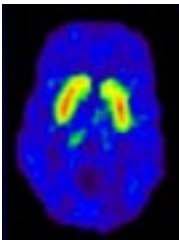
who had taken a dose of the stimulant drug Ritalin. The subjects also reported on how they responded to the stimulant.

Results

People with more receptors — i.e., their brain dopamine system is optimally stimulated — found Ritalin effects unpleasant.



more receptors:
“unpleasant effect”



People with fewer receptors — i.e., their brain dopamine system is under stimulated — found Ritalin effects pleasant.

fewer receptors:
“pleasant effect”

Conclusion

The results suggest that individual dopamine receptor levels may determine the response to psychostimulants.

(See *The American Journal of Psychiatry*, 156:9, September 1999.)

Anti-Cocaine Drug (cont’d)

GABA, or GVG, blocked cocaine’s effect in the brains of primates, and significantly decreased drug-seeking behavior.

In subsequent studies, Brookhaven collaborations found that the drug effectively blocked test animals’ cravings for nicotine, heroin, alcohol and methamphetamine.

Said Dewey, “We are pleased to have entered into a long-term research collaboration with David Pharmaceuticals to expand the scope of our discoveries. Addiction is a terrible disease, so I am hopeful that our collaborative efforts will lead to a safe and effective treatment.”

Glenn Diamond, founder and CEO of David Pharmaceuticals, commented, “In light of the compelling public health interest, we are determined to rapidly develop these significant discoveries made at Brookhaven Lab.”

David intends to file with the U.S. Food & Drug Administration within 14 months to initiate clinical trials for vigabatrin to treat cocaine abuse. Future filings are planned for smoking cessation and for treating heroin, alcohol and methamphetamine addiction.

Dewey and his collaborators did this research at BNL’s Center for Imaging & Neurosciences, where positron emission tomography and other medical imaging techniques are used to study the brain mechanisms underlying addiction. — Diane Greenberg

Benefit Notes

For more information on the following, contact the Benefits Office in the Human Resources Division, Bldg. 185, 8:30 a.m.-1 p.m., Monday through Thursday, Ext. 2877 or (800) 353-5321.

Sign-Up Deadlines

Next Friday, October 30, is the deadline for making changes to medical and/or dental coverage for 2000.

Those who want to participate in the health care or dependent day care reimbursement accounts for 2000 have until November 30 to sign up.

Pick a Student

Until Monday, November 1, those interested in sponsoring an undergraduate in spring 2000 may review the applications on an electronic database submitted to the Energy Research Undergraduate Laboratory Fellowship (ERULF) program. Addresses and passwords are available from the Office of Educational Programs (OEP), Bldg. 438, or from the departmental education coordinators.

This 16-week undergraduate program will run from January 24 to May 12, 2000, though the dates may be flexible. OEP will pay each student's stipend of \$350 per week plus their round-trip transportation. Those departments sponsoring students will be asked to pay each student's housing expense of \$125 per week.

For more information, call OEP, Ext. 7171 or e-mail Karl Swyler, swyler1@bnl.gov.



game
set
match!

On October 14, BERA Tennis Committee had its annual awards luncheon for players and fans. This year's champions and finalists were: (front, from left) Terry Maugeri and Akiko Tohmatsu-Redlinger, Mixed Doubles Champions; Bob Meier, Men's Singles and Men's Doubles Champion; Joe Carbonaro, Men's Doubles Champion; Steve Shapiro, Men's Singles and Doubles finalist; (second row, center): Frank Kito, Men's and Mixed Doubles finalist; Rita Kito, Mixed Doubles finalist.

Photos on these pages are by Roger Stoutenburgh.

Arrivals & Departures

Arrivals

Jae-Yong Kim Chemistry

Departures

James R. Curto C-A
John Czachor C-A
Rodger A. Hubbard C-A
Karl M. Kohler C-A
James E. Leskowicz C-A
John W. Olness Physics
Ralph T. Sanders C-A
Niels F. Schumberg C-A
Anastasios Soukas C-A
Patrick A. Thompson C-A
Frank Toldo C-A
Eugene A. Tomblor C-A
John H. Weinmann C-A
Anthony J. Wisowaty C-A
Yujun Yin Applied Sci.

Computing Corner

The following PC training classes have been scheduled for November and December:

date	class	level
11/4	PowerPoint	intermediate
11/9	HTML	
11/10	Outlook	
11/12	Word	intermediate
12/2&3*	Access	intermediate
12/16&17*	Project	intermediate

*2-day classes

See the ITD training page at www.ccd.bnl.gov/bnl/training/ for registration information and course outlines. Classes are scheduled based on the number of requests received.

For more information, contact Pam Mansfield, Ext. 7286 or pam@bnl.gov.

BROOKHAVEN
BULLETIN

Published weekly by the
Media & Communications Office
for the employees of
BROOKHAVEN NATIONAL LABORATORY

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IBEW Meeting

Local 2230, IBEW, will hold its regular monthly meeting on Monday, October 25, 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.

BGRR Roundtables

To update employees and community members on the Brookhaven Graphite Research Reactor (BGRR) Decommissioning project, the second in a series of roundtable sessions will be held. During these sessions, alternatives for BGRR decommissioning will be presented. Community members and Lab employees will be able to provide input in the planning process.

To attend one of the sessions scheduled for the evenings of October 26 and November 1, or the morning of October 28, call Joanne Rula, Ext. 5768.

Sight Turkeys on Site

If you see a group of wild turkeys around the Lab site, jot down the location, time, date, and number of birds. Also, attempt to note the exact number of adult and young, and/or male and female birds, and add that to your list. Send the information to Jan Naidu or Tim Green, Environmental Services Division, Bldg. 535; or e-mail tgreen@bnl.gov, jnaidu@bnl.gov; or call Green, Ext. 3091, Naidu, Ext. 4263.

The information will be reported to Harry Knoch, Regional Wildlife Manager for the New York State Department of Environmental Conservation (NYSDEC).

Knoch runs a program to reintroduce native species of wild life into its one-time natural habitat. He needs feedback on the results of this program on Long Island (see Brookhaven Bulletin, November 20, 1998).

To find out more about wild turkeys and how to distinguish between them, visit web site <http://www.go2pa.com/panwtf/turkeyprofile.html>.

HazWoper Refresher

On-site Local 1-431 of PACE will offer an eight-hour HazWoper refresher course on Wednesday, November 17.

To reserve a spot, e-mail Lou Evers, evers@bnl.gov, Ext. 4417, or Steve Coleman, coleman@bnl.gov or Ext. 2760.

Free Flu Shots

The Occupational Medicine Clinic (OMC) has begun offering free flu shots to employees. For more information or to make an appointment to be vaccinated, call OMC, Ext. 3670.

Service Awards

The following employees celebrated service anniversaries during September:

50 Years	
Seymour Rankowitz Instrum.	
35 Years	
Lester G. Epel DAT	
Geoffrey Hind Biology	
Kelvin K. Li Physics	
30 Years	
Barbary Boerjes Admin. Support	
John Czachor AGS	
Theophilus A. Gray Plant Eng.	
H. Ronald Manning Admin. Support	
James T. Muckerman Chemistry	
25 Years	
Thomas W. Burrows DAT	
Joseph M. Carraba Central Shops	
Tzi-Shan Chou NSLS	
Theodore Ginsberg DAT	
C.R. Krishna DAS	
Richard R. Ryder Central Shops	
Richard B. Setlow Director's Off.	
Nancy L. Sobrito Human Resources	
Rosemary Taylor Environ. Rest.	
Otto White Director's Off.	
20 Years	
Richard A. Ferrieri Chemistry	
William J. Foyt Director's Off.	
Ronald L. Gill Physics	
Phillip R. Hayde Plant Eng.	
Chuen-Ching Lin DAT	
Yousef I. Makdisi RHIC	
Edward A. Meier Physics	
Gary A. Ninzel NSLS	
Peter E. Sikinger Physics	
10 Years	
Kelly J. Backofen Info. Services	
Jeanne H. D'Ascoli Comm. Rel.	
Elisabeth M. Deazley Central Shops	
Jean M. Frejka DAT	
Robert D. Pisarski Physics	
Margaret B. Sparrow Ind. Oversight	
Nicole L. Trent Plant Eng.	

Gorman-Metz Scholarship Alert

Application forms are now available for the Gorman-Metz Scholarship, which is offered to children of BNL employees and retirees.

The annual scholarship is a one-time, \$5,000 award for a student who has a disability, as defined by the Americans with Disabilities Act, and who is matriculating at an accredited institution to pursue a graduate or professional degree, with preference given to studies in science, engineering and math.

If approved by the Gorman-Metz Scholarship Committee, then other courses of study may be deemed eligible. Undergraduates will be considered if there are no graduate-student applicants.

Qualified applicants are: children of BNL employees who began regular, full-time, or regular, eligible part-time employment no later than November 1, 1998, and whose parents are employed by BNL when the award is announced next May; or children of retired employees or employees who died while in regular service at the Lab.

Stepchildren are eligible if employees regularly claim these children as dependents for income-tax purposes, or if the stepchild has resided in the employee's household for the two years immediately before application.

The application deadline is March 1, 2000, and the scholarship winner will be selected by May. The names of applicants and their parents will be kept confidential. The name of the scholarship winner will be announced only with the consent of the recipient and his or her parents.

For applications or more information, contact the Diversity Office, Bldg. 185A, Ext. 3318.

Healthfest '99 – Last Day Today

Today is the last day of the October 18-22 Healthfest — the Lab's seventh annual celebration of personal health, fitness and safety.

BNL employees, retirees, facility-users, and other on-site guests are invited to participate in the following activities:

- **Tennis skills workshop** - 11:30 a.m. - 1:30 p.m., at the BNL tennis courts on Bell Avenue.
- **Golf skills clinic** - 11:30 a.m. - 12:30 p.m. and 12:30 - 1:30 p.m., at gazebo by the ball fields.

Starry Party Tonight

The BNL Astronomical Society will have its first star party with its new telescope tonight at 9 p.m., outside the Brookhaven Center. All are welcome — bring a telescope if you have one. New memberships will be available. Rain date will be in November.

Contact Keith Power, Ext. 5355 or power@bnl.gov for more information.

Halloween Madness

Let your broomstick to carry you to BERA's Halloween Madness Party on Friday, October 29, at the Brookhaven Center, from 6 to 11 p.m. The party is for adults only, and everyone is requested to wear a costume.

Admission will be \$5, paid at the door, and it includes refreshments, games, prizes, and music by ET. A cash bar will be available.

For more information, call Andrea Dehler, Ext. 3347, or M. Kay Dellimore, Ext. 2873.

Amateur Radio

The BERA Amateur Radio Club will next meet in the cafeteria at noon on Thursday, October 28. Membership fees are due at this time. All BERA members, guests and licensed amateur-radio operators are invited to attend. For more information, call Chris Neuberger, Ext. 4160, or Ron Dobert, Ext. 4175.

No Bulletin Nov. 12

In observance of Veteran's Day, the Lab will be closed on Thursday, November 11, so there will be no Bulletin that Friday, November 12.

Defensive Driving

The training group of the Safety & Health Services Division will offer a six-hour defensive driving course on Saturday, November 6, 9 a.m.-3:30 p.m., in Berkner Hall, Room B.

The course will be taught by a Metropolitan Life instructor and is open to BNL, BSA and DOE employees, BNL facility-users, and their families, at a cost of \$23 per person. Completing the course entitles participants to a 10-percent discount on vehicle collision and liability insurance for three years.

The class will be limited to 35 participants. To register, send a check made out to Empire Safety Council, in care of Scott Zambelli, P.O. Box 670, Mount Sinai, NY 11766. All checks must be received by Friday, October 29. So that your registration can be confirmed, include your phone number with your name. For more information, call Zambelli at 249-3000, Ext. 5877 (*not* the on-site Ext. 5877).

BERA News

The BERA Sales Office is open from Tuesday-Friday, 9 a.m.-1:30 p.m., in Berkner Hall. For more information, call Andrea Dehler, Ext. 3347, or M. Kay Dellimore, Ext. 2873.

Today: One-Day Book Fair

Start early with holiday shopping at BERA's one-day Book Fair today, 10 a.m.-3 p.m. Children's stories, cook-books, and *The New York Times*' best sellers will be available at Berkner Hall at a 50-70 percent reduction. Charge cards, Discover, Master Card and Visa, will be accepted.

Holiday Bash, December 17

Start up the holiday spirit by reserving a place at BERA's Second Annual Winter Holiday Bash, which will be held on Friday, December 17, at the Knights of Columbus in Patchogue. Plan to mingle with a party of fellow employees over dinner and perhaps some dancing. A cash bar will be available. Before December 10, obtain tickets at \$20 per person, from Charles Gardner, Ext. 5214, chuckg@bnl.gov, Louie Nieves, Ext. 4897, nieves@bnl.gov, or at the BERA Sales Office.

Bowling

Purple and White League - October 14

G. Mehl 212/204/192/608 scratch, P. Wynkoop 217/192, J. McCarthy 210/187, S. Logan 212, J. Bigrow 209, B. Mullany 207, C. Johnson 193, P. Callegari 187, T. Dilgen 186, G. Riker 184, J. Addessi 182, B. Ross 182, D. Keating 177, H. Ross 176, Kathy Krygier 174/173, I. Sperry 173, M. Musso 171.

Hospitality Committee

The Hospitality Committee invites all on-site residents, their spouses and friends to join in the following events. More details are posted in the laundry and on the door of the Recreation Building. For more information, call Julie Kim-Zajonz, 929-0405.

Welcome Coffee

Coffee is served to apartment area residents on Tuesdays, 10-11:30 a.m., in the lounge of the Recreation Building in the apartment area.

Parent-Toddler Group

Parents of two- and three-year-olds are invited to bring the children to the Recreation Building every Wednesday, 9:30-11:30 a.m. For more information, call Sarah Zill, 821-2602.

Volunteers Wanted

The Committee needs volunteers to help organize hospitality events, including the welcome coffee, family nights, bus trips, and other special events. If you are interested, call Julie Kim-Zajonz, 929-0405.

Halloween Party

Children of all ages and their parents are invited to the Hospitality Halloween Party on Sunday, October 31, starting at 3:30 p.m. There will be lots of fun and games. Parents are also invited to dress up! Bring a snack to share, please. Beverages will be provided. For more information, call Halina Goraczniak at 205-1525.



Placement Notices

The Lab'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>.

LABORATORY RECRUITMENT - Opportunities for Laboratory Employees.

DD7480. P&GA SPECIALIST C - (reposting) Under direct supervision and technical direction carries out phases of the Laboratory's graphic arts work. Works from written or oral direction to execute tasks associated with printing, micrographics, word processing, illustration, bindery operation, composition, copy-machine operation and delivery service. Performance of these duties requires knowledge of some phases of graphic arts. Must possess valid New York State driver's license. Information Services Division.

OPEN RECRUITMENT - Opportunities for Laboratory Employees and Outside Candidates.

MK7921. POSTDOCTORAL RESEARCH ASSOCIATE - Requires a Ph.D. in nuclear or high energy physics or related field with an emphasis on computational aspects of physics desirable. Will work in the Laboratory's Center for Data Intensive Computing on computational issues arising from BNL's High Energy and Nuclear Physics program. This includes the simulation and processing of RHIC or ATLAS detector events while working together with physics staff and computational scientists from BNL and SUNY at Stony Brook. Under the direction of A. Peskin. Department of Applied Science.

MK7922. POSTDOCTORAL RESEARCH ASSOCIATE - Requires a Ph.D. in chemistry, biology or related field, with an emphasis in computational aspects of life sciences, such as protein structures and medical imaging desirable. Will work in the Laboratory's Center for Data Intensive Computing on computational issues arising from BNL's life science programs. This includes areas such as protein structure and medical imaging while working together with computational and life scientists from BNL and SUNY at Stony Brook. Under the direction of A. Peskin. Department of Applied Science.

DD8288. TECHNICAL POSITION - Requires an AAS degree in electronic technology or equivalent experience. Must have experience in electronic circuits and electronic instrumentation including the use of oscilloscopes, digital voltmeters and other test equipment. Must possess strong construction and troubleshooting skills and be able to work from electronic schematics, rough sketches and verbal instructions. Experience with high voltage techniques, programmable logic controllers (PLCs) and/or high vacuum instrumentation is highly desirable. Duties will include the assembling, testing, calibrating and troubleshooting of analog and digital circuits and systems. Collider Accelerator Department.