the Bulletin

BROOKHAVEN NATIONAL LABORATORY

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At the NSLS, Working Toward Better Batteries

As more and more people rely on cell phones, laptop computers, personal organizers, and even hybrid electric-gas vehicles, scientists are working to develop rechargeable batteries that are ever smaller, cheaper, lighter, safer, and longer lasting. At the National Synchrotron Light Source beam line X18B, a collaboration of scientists is deeply involved in this effort. Funded by DOE's Office of Energy Efficiency & Renewable Energy, they are investigating a group of promising new materials for use in lithium-ion batteries, the most common type of battery found in portable electronics and the most promising type for hybrid cars. Their research is published in the December 14, 2005, edition of the *Journal of the American Chemical Society*.

Lithium-ion batteries work by shuttling positively charged lithium ions between the "cathode," which is the battery's positive terminal, and "anode," the negative terminal. As the battery is charged, lithium ions are forced out of the cathode and moved into to the anode through the "electrolyte," which is the solution inside the battery. When the battery is in use, the process reverses. The scientists are studying a group of new cathode compounds consisting of the elements lithium, cobalt, nickel, manganese, and oxygen.

"Despite the wide use of lithium-ion batteries, there have been very few studies on exactly how the cathode material behaves in the charging process," said the study's lead researcher, Won-Sub Yoon of the Chemistry Department. "How are the oxygen atoms involved?

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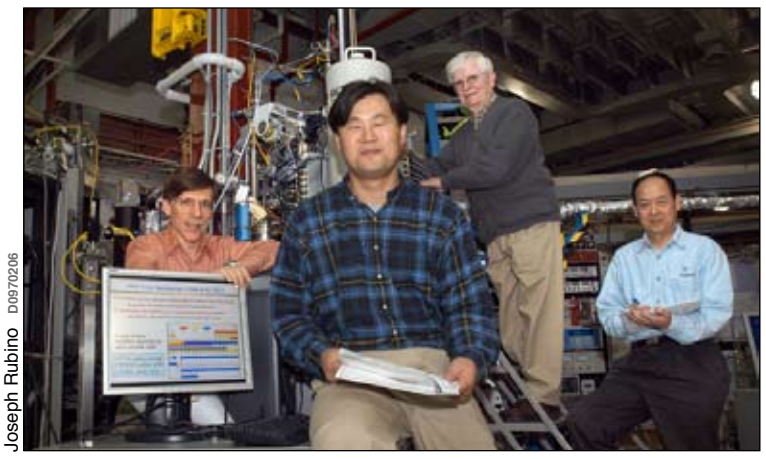

Joseph Rubino D0970206

Several members of the lithium-ion battery research team: (from left), Daniel Fischer, Won-Sub Yoon, James McBreen, and Xiao-Qing Yang.

New Study on Cosmic Proton Radiation Questions Effects on Human Cells

In deep space, protons are the most abundant type of charged particle. Therefore, before astronauts can safely travel far from Earth for long periods of time, it is important to know how protons affect cells — particularly the cells' DNA.

Roger Stoutenburgh D0331199

Betsy Sutherland

Megumi Hada

Now, at BNL's NASA Space Radiation Laboratory, scientists have found that protons produce a spectrum of DNA damage differing from those produced by x- or gamma-rays, which have otherwise similar properties. This research, funded by the NASA Biomedical Research & Countermeasures Program, with the Office of Biomedical and Environmental Research within DOE's Office of Science, the National Institutes of Health, and the National Space Biomedical Institute, is published in the February 2006 edition of the journal *Radiation Research*.

"Scientists have been assuming that protons damage cells in a way similar to x-rays, but our results indicate that these assumptions have been wrong. The new data show that protons produce more potentially lethal double-strand breaks, a type of severe DNA damage, than other kinds of complex DNA damages," said BNL biologist Betsy Sutherland, the study's lead researcher. "This means that scientists don't really know how human DNA is affected by the most numerous particles in space."

Of the various radiation types, protons, like x-rays and gamma rays, are classified as low linear energy transfer (LET), meaning they do not lose much energy as they pass through matter. Therefore, scientists have assumed that protons would damage biological systems in the same way as other forms of low LET radiation. But Sutherland and colleague Megumi Hada, senior research associate at BNL, now at the Universities Space Research Association, found that the protons produced a spectrum of damage that is very similar to that of high-energy iron ions and other heavy charged particles.

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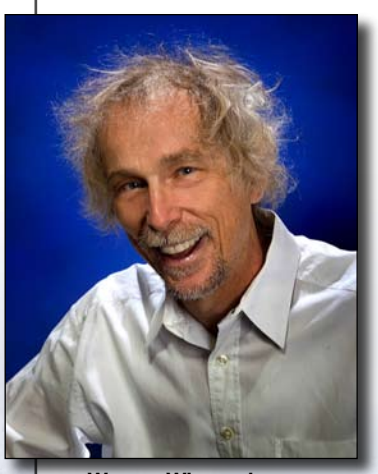
New ARM Chief Scientist Team Now 'At Home' at Brookhaven



Roger Stoutenburgh D0090206

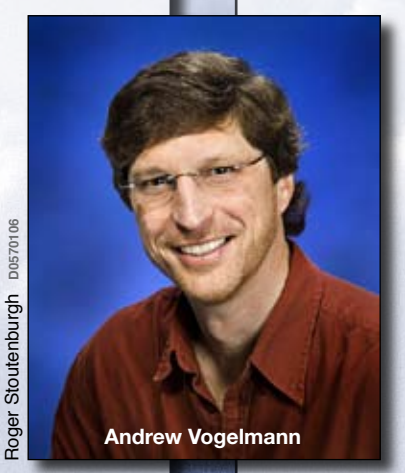
Warren Wiscombe

Thanks to an innovative proposal approved recently by DOE, BNL is now home to the Chief Scientist Team for DOE's Atmospheric Radiation Measurement (ARM) program. In October, Warren Wiscombe succeeded outgoing ARM Chief Scientist Tom Ackerman of Pacific Northwest National Laboratory, becoming the third person to hold the job. Wiscombe, a National Aeronautics & Space Administration scientist stationed at the Goddard Space Flight Center, now spends 50 percent of his time working on ARM under an Intergovernmental Personnel Act transfer, and visits BNL for at least one week each month. Three of the four ARM Associate Chief Scientists — Mark Miller, Andy Vogelmann, and Yangang Liu — also work at BNL. Sharon Zuhoski of BNL serves as the full time Administrator for the Chief Scientist Office at BNL.

"Clouds are the most important and least understood part of the climate system," Wiscombe said. "The U.S. National Academy as well as international climate organizations like the Intergovernmental Panel on Climate Change have all identified lack of knowledge of clouds, and their disparate treatment in models, as the single thing creating the current uncertainty among predictions of climate under doubled carbon dioxide conditions. Thus, ARM fits importantly within the U.S. climate modeling effort. We are the only U.S. effort devoted exclusively to both measuring and modeling clouds in ways that will help climate models."

Wiscombe was one of the founders of ARM, which sprang from a field campaign called SPECTRE (SPECTral Radiance Experiment) created to test the radiation sub-models used in climate models. SPECTRE was held in late 1991 at Coffeyville, Kansas, and became the prototype for ARM.

"Almost all the instruments in the initial ARM deployment near Ponca City, Oklahoma (the Southern Great Plains site) were clones of instruments fielded in SPECTRE," Wiscombe said. "What ARM added was an explicit climate modeling component which has now grown to be a larger part of ARM than the initial radiation-measurement component."



Roger Stoutenburgh D0570106

Andrew Vogelmann

BNL has been involved in the ARM program since its inception in the early '90s. Steve Schwartz, Department of Environmental Sciences (ES), was part of the team that organized and wrote the program's first science plan. An important scientific focus of the ARM program is surface-based remote sensing of the microphysical properties of non-precipitating

(continued on page 2)

Aerosols In Many Arctic Clouds Warm Up Ground Surface

Enhanced aerosol concentrations increase the amount of thermal energy emitted by many Arctic clouds, according to scientists supported by DOE's Atmospheric Radiation Measurement (ARM) program. In research published in the January 26 issue of *Nature* magazine, Andrew Vogelmann of BNL's Department of Environmental Sciences and lead author Dan Lubin of the Scripps Institution of Oceanography conclude that the increase significantly affects the Arctic energy balance.

Scientists believe that the warming of the Arctic climate and decreases in the area and thickness of sea ice are caused by greenhouse gas warming. The Arctic region also experiences large periodic influxes of aerosols originating from the industrial regions to the south.

Funded by DOE's Office of Biological & Environmental Research and using data from the DOE ARM Climate Research Facility in Barrow, Alaska, Vogelmann and Lubin determined that enhanced aerosol amounts can make clouds emit more thermal energy to the surface. In an aerosol-cloud process, increased aerosol concentrations cause the cloud droplets to become smaller and, within clouds of fixed water amounts, more abundant. Vogelmann and Lubin discovered that this process makes many clouds more opaque and emit more thermal energy to the surface, by an average of 3.4 watts per square meter, which is comparable to the amount emitted by increased greenhouse gases.

"Before this study, we didn't really know how this process would affect emission of thermal energy from the cloud to the surface," Vogelmann said. "It's now clear that it contributes significantly to warming at ground level.

"We have concluded that the aerosol-cloud process — called the first aerosol indirect effect — operates in the clouds we studied, and results in a greater downward thermal emission from the cloud," Vogelmann continued. "Its contribution to the surface warming is comparable to that by the so-called greenhouse effect."

"The Arctic is showing the first unmistakable signs of climate warming caused by human activities, in the form of rapidly retreating and thinning sea ice," Lubin said. "This rapid climate change in the Arctic may have profound implications for both fragile ecosystems and unique modes of human habitation."

The key to understanding the thermal impact of this aerosol-cloud effect lay in the long-term measurements made at the DOE ARM Climate Research Facility. These data were used with aerosol measurements made by the National Oceanic & Atmospheric Administration Climate Modeling & Diagnostics Laboratory facility. Six years of data were used to determine the impact of aerosol on Arctic clouds and the surface thermal energy budget.

— Kay Cordtz

For more details on this research, see www.bnl.gov/bnlweb/pubaf/pr/PR_display.asp?prID=06-09

Calendar of Laboratory Events

- *The BERA Sales Office is located in Berkner Hall and is open weekdays from 9 a.m. to 3 p.m. For more information on BERA events, contact Andrea Dehler, Ext. 3347, or Christine Carter, Ext. 2873.*
- *Additional information for Hospitality Committee events may be found at the Lollipop House and the laundry in the apartment area.*
- *The Recreation Building (Rec. Hall) is located in the apartment area.*
- *Contact names are provided for most events for more information.*
- *Calendar events flagged with an asterisk (*) have an accompanying story in this week's Bulletin.*

— EACH WEEK —

Weekdays: Free English for Speakers Of Other Languages Classes
Beginner, Intermediate, Advanced classes. Various times. All are welcome. Learn English, make friends. See www.bnl.gov/esol/schedule. html for schedule. Jen Lynch, Ext. 4894.

Mondays & Wednesdays: Pilates
Mondays at noon, Wednesdays at 5:30 p.m., both in Rec. Hall. 9-week session, $60 for once a week, $70 for twice a week. Registration is required. Christine Carter, Ext. 5090.

Mondays & Thursdays: Kickboxing
$5 per class. Noon-1 p.m. in the gym. Registration is required. Christine Carter, Ext. 5090.

Mon., Wed., & Fri.: Tai Chi
Noon-1 p.m., Brookhaven Center North Rm. Adam Rusek, Ext. 5830, rusek@bnl.gov.

Tues. & Thurs: Aerobics
5:15-6:30 p.m., Rec. Hall. 10 classes for $40, or $5 per class, pay as you go. Pat Flood, Ext. 7866.

Tues. & Thurs: Aqua Aerobics
5:15-6:15 p.m. $20 to attend once a week, $40 to attend twice a week. For more information, call Ext. 2873.

Tues. & Thurs: Jazzercise
Noon-1 p.m., Rec. Hall. $88 for twice-a-week eight-week session, you may use the membership at several Jazzercise locations. Christine, Ext. 5090.

Tues. & Thurs.: Ving Tsun Kung Fu
Noon-1 p.m., Brookhaven Center, North Room. $80/month or $10 per class, pay as you go. Taught by Master William Moy. Scott Bradley, Ext. 5745 or bradley@bnl.gov.

Tue., Thu. & Fri: Upton Nursery School
8:30 a.m.-noon, Rec. Hall. 2- and 3-day programs available. Kati, 821-4131.

Tuesdays: Welcome Coffee
10 a.m-noon, Rec. Hall. First Tuesday of every month is special for Lab newcomers and leaving guests. Lisa Yang, 979-3937.

Tuesdays: BNL Music Club
Noon, North Room, Brookhaven Center. Come hear live music. Joe Vignola, Ext. 3846.

Tuesdays: Jiu Jitsu Club
6:30-7:30 p.m. in the gym. All levels, ages 6 and above. $10 per class. Tom, Ext. 4556.

Tuesdays: Toastmasters
1st and 3rd Tuesday of each month, 5:30 p.m., Bldg. 463, room 160. Guests, visitors always welcome. www.bnl.gov/bera/activities/toastmstrs/.

Tues., Wed. & Thurs: Rec Hall Activities
5:30-9:30 p.m. General activities, TV, ping pong, chess, games, socializing. Christine Carter, Ext. 5090.

Wednesdays: On-Site Play Group
10 a.m.-noon. Rec. Hall. An infant/toddler drop-in event. Parents meet while children play. Fang Dong, 871-5362.

Wednesdays: Weight Watchers
Noon-1 p.m. Michael Thorn, Ext. 8612.

Wednesdays: Yoga
Noon-1 p.m., B'haven Center. Free. Ila Campbell, Ext. 2206, ila@bnl.gov.

Wednesdays: Ballroom Dance Class
Brookhaven Center, N. Ballroom. Instructor: Giny Rae. New series starts 3/15. See notice, page 3. John Millener, Ext. 3853; Madeline Windsor, Ext. 5069.

Thursdays: Reiki Healing Class
Noon-1 p.m., Bldg. 211 Conference Rm. Nicole Bernholc, Ext. 2027.

Fridays: Family Swim Night
5-8 p.m. BNL Pool. $5 per family.

Fridays: BNL Social & Cultural Club
6-9 p.m., North Ballroom, Brookhaven Ctr., dance lessons, 9-11:30 p.m. general dancing. Rudy Alforque, Ext. 4733, rudy@bnl.gov.

Better Batteries *(cont'd)*

is the relationship between the oxygen atoms and the other metal atoms in the compound? To design a better cathode material, and thus a better battery, these questions must be answered. An in-depth understanding of these problems will provide a road map for the development of these new materials."

Using various x-ray techniques, Yoon and his colleagues have done just that. Yoon is working with Kyung Yoon Chung, Xiao-Qing Yang, and James McBreen, all of Chemistry; Mahalingam Balasubramanian, Argonne National Laboratory; Clare Grey, Stony Brook University; and Daniel Fischer, National Institute of Standards & Technology. They discovered that as lithium ions leave the cathode material during the charging process, changes occur on the manganese and cobalt atoms that are quite different from those that occur on the nickel atoms. Specifically, the manganese and cobalt atoms do not lose electrons as the lithium ions are removed, while the nickel atoms, in contrast, do lose electrons. The group also learned more about how the cathode material compensates for the positive charge it loses as the lithium ions move to the anode. They found that empty regions with positive charge, called "holes," are created in the cathode. In addition, their x-ray data show just where these holes are located: within the electron orbitals of oxygen atoms that are bound to cobalt atoms.

Gathering these details on the cathode's electronic behavior is an important step in lithium-ion battery research. This new knowledge will help the material become a common component of a new series of better lithium-ion batteries.

— Laura Mgrdichian

New ARM Chief Scientist Team *(cont'd)*

clouds. Mark Miller, ES, a member of the Penn State University Cloud & Radiation (PSUCR) Group prior to joining BNL, subsequently formed a Cloud Properties Research Group here at the Lab. This group became a focal point for cloud properties research in the ARM program, and Vogelmann and Michael Jensen, also original members of the PSUCR Group, joined ES in 2004. Pavlos Kollias, a University of Miami graduate closely associated with the same group, joined ES in 2005. In essence, three members and a close associate of the PSUCR Group, one of the first groups conducting research in long-term studies of cloud microphysical and radiative properties, migrated to BNL over an 11-year period.

In 2003, Yangang Liu joined ES scientists Peter Daum, Schwartz, and Robert McGraw on the ARM Science Team. Last March, BNL combined many of its cloud properties research efforts into a single science proposal to the ARM program, receiving the largest grant issued by the program in calendar year 2005.

In addition to Wiscombe's leadership, the science of ARM is also guided by four ARM Working Groups: Instantaneous Radiative Fluxes, Cloud Properties, Cloud Parameterization & Modeling, and Aerosols. There is also a Focus Group on Clouds of Low Optical Depth, led by Vogelmann. These groups have the power to recommend and prioritize instrument purchases and the production of certain data products to the ARM infrastructure, which then implements those recommendations as funds allow.

Sharing the ARM Chief Scientist job responsibilities was crucial to the BNL proposal's success, because these responsibilities had increased dramatically in recent years, not only because ARM had grown but also because it has recently become a DOE User Facility, welcoming outsiders to use the six ARM sites for the first time.

"The Associate Chief Scientists, who also include Ric Cederwall, an ARM stalwart recently retired from Lawrence Livermore [and a former member of the BNL Atmospheric Science Division], make my job possible and give me the time to think at a high level about ARM science strategy," Wiscombe said. — Kay Cordtz

For more details on this story, see intranet.bnl.gov/today/ARM.asp. See also related story on Arctic cloud research, page 1.

In Memoriam

Peter Kreh, who, as a stationary engineer, joined the Heating Section of the Plant Maintenance Division on December 6, 1948, and retired as a senior stationary engineer on January 31, 1980, died at age 78 on January 5, 2003.

Margaret Fleming, who joined the Physics Department as a clerk B on December 14, 1964, and retired from Physics as an office services assistant on May 8, 1981, died at 84 on May 10, 2003.

Cosmo Azzara, a Lab guest from June 1975 to June 1978, joined the Accelerator Division as a design engineer III on June 12, 1978, and died at 88 on November 18, 2005. He had retired as a design engineer on December 18, 1981.

Robert Schmidt, who joined BNL's Shielding Group as a technician C on January 11, 1950, and moved to the Accelerator Division in 1972, died on December 12, 2005, at age 82. He had retired as a senior technical associate on February 25, 1983.

James Roesler, who, on November 30, 1964, came to the Instrumentation & Health Physics Division as a technician II trainee, and, on December 1, 1989, became BNL's Fire Chief, died at 63 on December 19, 2005. He had retired from the Lab on June 30, 2001.

Frances Green, who joined the Medical Department as a lab assistant III on September 24, 1958, and retired as a research series assistant IV on July 14, 1978, died at age 85 on January 27, 2006.

Johannes Claus, who, on October 1, 1966, joined the Accelerator Division as an associate physicist, and retired as a physicist from the RHIC Project on September 30, 1994, continuing until September 30, 1996 as a guest scientist, died at 77 on February 14, 2006.

Oscar 'Ken' Mirjah, who joined the Plant Engineering Division as a heavy equipment mechanic operator on August 19, 1985, and retired on December 20, 2002, died at 65 on February 23, 2006.

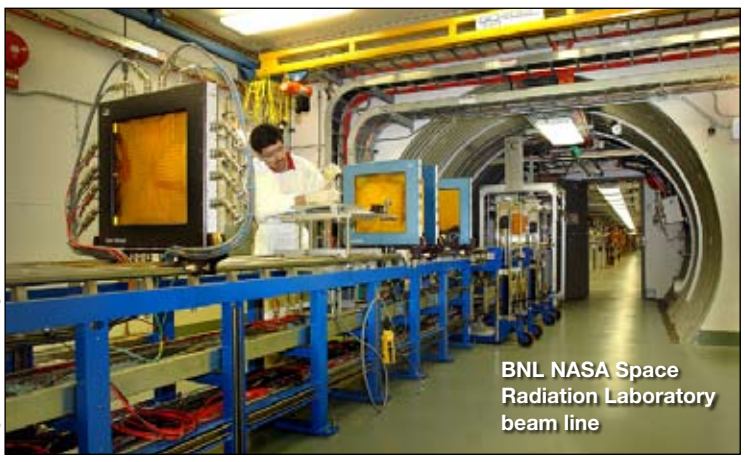
Cosmic Proton Radiation *(cont'd)*

"Our study shows that we need to re-evaluate the effect of protons on biological systems, even the effects of low-energy protons," said Sutherland. "For example, low-energy protons are routinely used in cancer-tumor therapy, but there has been almost no research done on the effect of protons in tumor cells because everyone has assumed that they act similarly to other low LET radiation types, like x-rays. Therefore, this work may help lead to improved cancer therapy."

Sutherland and her group are now extending the research to human cells irradiated with the same beams. This will help them more accurately predict the effects of radiation on human cells and tissue.

— Laura Mgrdichian

For more detail about this research, see www.bnl.gov/bnlweb/pubaf/pr/PR_display.asp?prID=06-10


Roger Stoutenburgh D5720903
BNL NASA Space Radiation Laboratory beam line

Coming Up: Talks of General Scientific Interest

The ATLAS Experiment, 4/4

Peter Jenni, CERN, Switzerland, will talk on "The ATLAS Experiment: Getting Ready for the Large Hadron Collider — Exploring the High-Energy Frontier of Particle Physics," at 3:30 p.m., Tuesday, April 4, Physics Seminar Room, Bldg. 510. All are welcome.

414th Brookhaven Lecture, 4/19

Anat Biegon of BNL's Medical Department will talk "Of Boys and Girls and Bumps on the Head," at 4 p.m., Wednesday, April 19, Berkner Hall. All are welcome.

BSA Distinguished Lecture, 4/21

Nobel Laureate Frank Wilczek will talk on "The Origin of Mass and the Feebleness of Gravity," at 4 p.m., Friday, April 21, Berkner Hall. All are welcome.

Answering Employees' Concerns

BNL is committed to the highest ethical standards, to working safely, and to protecting the environment. The Lab's Employee Concerns Program was established to safeguard these commitments. Should any employee have unresolved issues concerning: the environment, safety, health, waste, fraud, or abuse, he or she may proceed in the following way:

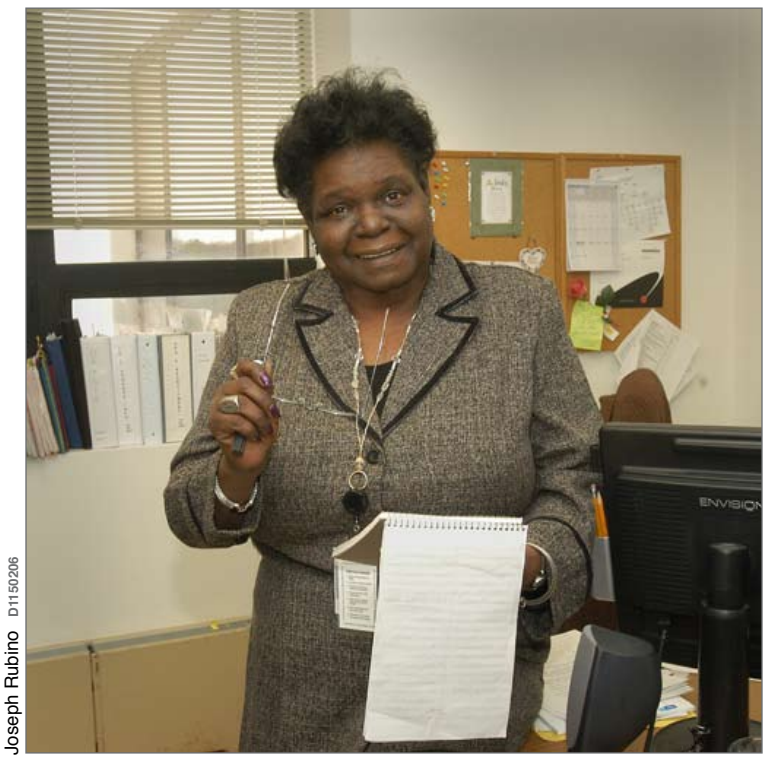
- Alert your line management to your concern
- Is your environment, safety and health problem still not resolved? Contact your Environment, Safety & Health Coordinator or Facilities Support Representative. Concerns covered by labor agreements must be addressed through the labor grievance process
- If you still believe a condition or practice violates BNL standards, contact the Employee Concerns Program Manager, Susan Foster, Ext. 2888, or EmployeeConcerns@BNL.GOV. A formal and confidential investigation will be conducted and you will receive a response. The Lab will not discriminate against any employee who has filed a complaint.
- Still not satisfied? You may request an inspection from a DOE representative by filing a request directly with the Brookhaven Group Office. For information call Ext. 4089. DOE will maintain confidentiality, if requested.

Joseph Rubino D1680306

On the Job With Frances Ligon

During her 30 years at BNL, Frances Ligon has gone through a career shift, but she hasn't shifted her attitude about BNL. "I have been very happy with my career growth and the wealth of knowledge I've learned since being at the Lab," Ligon said. "People here are so willing to be helpful and share their knowledge. I've met lifelong friends of all colors, races and nationalities."

After Ligon graduated from Riverhead High School in 1969, she moved to Washington, D.C., where she landed a job working as a secretary in the computer support center for the Department of Defense at the Pentagon. "I loved my job, and it was exciting to be in Washington, D.C., but, two and a half years later, I returned to Riverhead to take care of my Mom, who was ill," she said.



Joseph Rubino D1150206

Deciding upon her next big career move, Ligon recalled that during her elementary school days a BNL recruiter had told the students about career opportunities at the Lab. Ligon was hired to work in the Laboratory's secretarial pool in 1975, and she was promoted that same year to secretary in the former Department of Applied Science.

Ligon worked her way up to executive secretary in the Director's Office (DO) by 1979, and, a year later, she became an equal opportunity assistant in that office. In 1991, she was promoted to senior equal opportunity representative and, a year later, she moved to the Human Resources Division (HR) with that title.

"Affirmative action and equal opportunity was not just my job — it is my lifestyle," said Ligon. "I actively marched and participated in the Poor People's Campaign in the spring of 1968. Since the early 70s, I have been deeply involved in the civil rights movement."

Ligon recalled that during her role as an equal opportunity representative, she had attended a conference in Dallas as part of her job, and there, while waiting for an elevator, she met the late Coretta Scott King, who was the keynote speaker at the event. Ligon was inspired by King's quiet dignity and her calm but determined resolve to carry on her husband's nonviolent fight for peace, justice, and racial equality. Reflecting on what she learned from Coretta Scott King, she said, "You must be a lady, even when it's hard, and you feel like turning over tables."

Of her 17 years as a senior equal opportunity representative, Ligon said, "The Lab was paying me to help people get along and respect each other. I enjoyed the job, but when I reached the end of my career path, I sought a change." Upon her request, Ligon was transferred to the position of systems specialist in HR, and, in 2001, she joined the Business Systems Division (BSD) as an applications engineer, a position she still holds today.

"As a business analyst, I review HR's paper processes and convert them to computer processes along with a programmer," Ligon explained. "The long-range goal is to eliminate many of the manual processes being performed today." For example, employees now use electronic time-reporting, one of many on-the-job functions being performed on the web. In addition, she is responsible for PeopleSoft Security for HR applications.

Ligon has taken courses to keep up with changing technology, and she has also given them. Sponsored by BNL in the mid-1980s, Ligon taught and sponsored free classes in elementary computing to adults and children in the communities of Bellport, Coram, Greenport, and Riverhead. Schools in the area provided transportation, and space was donated, mainly in church basements, while BNL provided computers and instructors. "The Lab accepted that it was a central part of the community and offered this educational opportunity to local residents," she said.

Ligon is also proud of her two published papers that can be found in the BNL Research Library. They are: "Introduction to Computers: A Reference Guide," March 21, 1995; and, co-authored with Ahovi Kponou of the Collider-Accelerator Department, "Affirmative Action: The Future is Yours — Get Ready — Career Options in Scientific and Technical Fields," September 18, 1991.

In 1991, Ligon took on a new challenge. She became the director of the newly formed BNL Gospel Choir, which has remained an institution at BNL up to the present day. The choir has performed at the Lab, but it also gives concerts around the community about ten times per year. The BNL Gospel Choir has recorded two CDs.

Ligon is also a member of a community gospel choir called D.C. Hatcher and the Holy Family, which is comprised of people from all over Long Island. The group recently was featured in a live, on-air broadcast in London, and they are in the process of recording their second CD.

To commemorate two former gospel singers — the late O.J. Bright, who was the BNL Gospel Choir pianist, and the late Joseph Brown — Ligon started a Gospel Music Scholarship, Inc., offered to Long Island musicians who want to pursue music with a religious focus. Local churches, synagogues and clergy help her to raise the $1,000 annual grant for the scholarships. Funding is also received from fund raisers and personal donations.

In her spare time, Ligon also is a Literacy Program volunteer, teaching adults in the local community to read and write.

Despite her full schedule, Ligon has not neglected her own education. She earned an A.S. in Secretarial Science from Suffolk County Community College in 1981, a B.S. in business administration from St. Joseph's College in 1991, and she is certified by Cornell University in equal opportunity employment studies. Now she is working on earning an MBA from Dowling College, as well as a degree in seminary school, which she is completing through on-line courses.

Ligon is a wife, mother, and grandmother, and she serves as a minister at the House of Praise Christian Revival Center in Riverhead.

One more accomplishment that Ligon is proud of is her healthy life style. Over the last two and a half years, she lost 78 pounds on a modified Atkins diet. "I'm focusing on me now. I am happy and at peace inside," she said.

— Diane Greenberg

CIGNA Representative on Site, Mondays

Each Monday, Janice Petgrave of CIGNA Healthcare will be in Human Resources, Bldg. 185, to assist CIGNA medical plan participants with claims issues during 30-minute meetings, 10 a.m.-3 p.m., by appointment only. Be sure to bring all pertinent documentation.
☎ For an appointment, call Linda Rundlett, Ext. 5126.

At BNL's cafeteria on March 20, cutting two cakes as part of the opening celebration to mark a new catering service contract between BNL and Nayyarson Corporation, are Anil Nayyar (left), President of Nayyarson; and Jeffrey Swenson (right), Staff Services Division Manager; with (back, from left) Phil Negro, Nayyarson Food Service Manager; Sal Nayyar, Nayyarson Vice President; Chef Peter Osterloh; and Andy Seelin, SS's Resident Services Supervisor. Nayyarson Food Service took over the job of catering for the Lab from FLIK International on March 10.

Fidelity Investment Counseling, 3/30

A Fidelity Investment representative will be at the Lab on Thursday, March 30, to hold sessions with individual employees interested in learning more about their retirement-savings and investment options.
☎ Schedule one of the 30-minute appointments by calling (800) 642-7131.

Arrivals & Departures

— Arrivals —

Amy Csorny ..... CEGPA
Lilach Ephraty..... Medical
Alexa McGill.....ITD
Wen Wen.....Chemistry

— Departures —

Robert Hwang..... CFN
Gina Paveglio..... CFN
Michael Razmek ..... PPM

Easter Egg Hunt, 4/15

All BNLers are invited to join the BNL Hospitality Committee on Saturday, April 15, at 11 a.m. at the Recreation Bldg. (Bldg. 317) for the annual egg hunt. Participate in many games, arts and a raffle. Bring a snack or dessert to share. Bagels, fruits and drinks will be provided.
ℹ For more information, contact Petra Adams, 821-9238, petra@adamsovi.com

CALENDAR
(continued)

— THIS WEEKEND —

Friday, 3/24

***Employee Tour, Stardust, NSLS**
Noon-1 p.m. Berkner Hall lobby. Meet to visit the NSLS to learn about Stardust samples from the recent NASA voyage. See notice page 4.

Saturday, 3/25

See Bill Cosby Show, Tilles Center
Leave BNL 3:30 p.m. $45/person includes great seats, luxury bus. BERA Store, Berkner Hall, 9 a.m.-3 p.m. Ext. 3347.

***Rock Band 'Afterlife'**
8 p.m. Berkner Hall. See page 4.

Sunday, 3/26

New York City Bus Trip
9:30 a.m. Rec Hall, depart for NYC on Hospitality Committee trip. Leave city 5 p.m. Tickets: $10, adults, $5, children 2-12. Hanne Herman, haniaherman@yahoo.com or 849-2249.

— WEEK OF 3/27 —

Monday, 3/27

IBEW Meeting
6 p.m. Centereach Knights of Columbus Hall, 41 Horseblock Rd., Centereach. A meeting for shift workers will be held at 3 p.m. in the union office. The agenda includes regular business, committee reports, and the president's report.

Wednesday, 3/29

Costco Presentation
9 a.m.-3 p.m. Berkner Hall. Costco reps. will present BNLers with discounted membership rates and offer a $10 cash card, free 1-hour photo and other coupons to those who join. Renewals are $48.88 for BNLers. Nick Henn, 982-2070.

Friday, 3/31

Child, Family Safety Presentation
11 a.m.-noon. Rec Hall. All are welcome. Talk by Jim Nemeth, BNL Training Office, on home safety & the Heimlich maneuver as it applies to children. A children's movie will be shown in the lounge during the talk. Contact Christine Carter, Ext. 5090, ccarter@bnl.gov, to attend.

— WEEK OF 4/3 —

Mon.-Fri., 4/3-7

National Library Week
Events to be held at BNL's Research Library to mark National Library Week will be announced next week.

Tuesday, 4/4

***Talk on ATLAS Experiment**
3:30 p.m. Physics Seminar Room, Bldg. 510. Peter Jenni, CERN, talks on "The ATLAS Experiment Getting Ready for the LHC — Exploring the High-Energy Frontier of Particle Physics." Tea at 3 p.m.

— WEEK OF 4/10 —

Wednesday, 4/12

BSA Noon Recital
Noon. Berkner Hall. Roebling Ensemble piano quartet.

— WEEK OF 4/17 —

Wednesday, 4/19

414th Brookhaven Lecture
4 p.m. Berkner Hall. Anat Biegon, Medical Department, who uses medical imaging for her research on brain injury from trauma and other causes, will talk on "Of Boys and Girls and Bumps on the Head." All are welcome.

Note: This calendar is updated continuously and will appear in the Bulletin whenever space permits. Submissions must be received by the preceding Friday at noon to appear in the following week's Bulletin. Enter information for each event in the order listed above (date, event name, description, and cost) and send it to bulletin@bnl.gov. Write "Bulletin Calendar" in the subject line.

Classified Advertisements

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 benefits-eligible employees within the department/division and/or appropriate bargaining unit, with preference for those within the immediate work group; (2) present benefits-eligible 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. Access current job openings on the World Wide Web at www.bnl.gov/HR/jobs/.

OPEN RECRUITMENT – Opportunities for Laboratory employees and outside candidates.

MK2684. ASSISTANT PHYSICIST (S-1) – Requires a Ph.D. in physics or a related field, 2 years' post-doctoral experience in the field of accelerator physics, a good understanding of beam physics, an excellent understanding of collective effects in accelerators, and knowledge of modern simulation tools of beam instabilities. In addition, knowledge of theoretical and experimental aspects, and practical experience with high current energy recover linacs (ERLs) is essential. Familiarity with the UNIX operating system and C++ is desirable. Research work will include, but not be limited to, development, construction and commissioning of high current, high brightness energy recovery linacs for the Relativistic Heavy Ion Collider (RHIC) program, including R&D ERL, electron cooling ERL for RHIC II, and the R&D program for ERL based on eRHIC. Will take leadership in the collective effects in the variety of ERLs and other accelerators, which are in consideration for RHIC II and eRHIC projects at BNL, and will participate in RHIC operations as a member of the C-AD Accelerator Physics group. May also have an opportunity to participate in other department efforts such as the design of the NSLS II. Under the direction of V. N. Litvinenko, Collider-Accelerator Department.

MK2682. POSTDOCTORAL RESEARCH ASSOCIATE - Requires a Ph.D. in physics or a related field and a detailed understanding of some aspects of beam physics and nonlinear dynamics. Familiarity with beam dynamics simulations is desirable. Research will involve the experimental and theoretical analysis of problems such as beam-beam effects, or luminosity monitoring. Under the direction of D. Trobojevic and W. Fischer, Collider-Accelerator Department.

MK3961. POSTDOCTORAL RESEARCH ASSOCIATE – Requires a Ph.D. in radiochemistry, radiation biology, biochemistry or a closely related field with knowledge of cytokine/growth factor receptor signal transduction. Should have practical experience working with some of the following: radioisotopes, MRI, PET, microscopy, histology/immunocytochemistry, Western Blot, PCR, purification chromatography (affinity, HPLC or FPLC), receptor binding assays, cell culture, and handling of small animals (rodents). Will be involved with two ongoing, related projects that require some degree of independence in evaluating, selecting, and applying scientific techniques. Use of anesthetics requires that employment is contingent upon the successful completion of a DEA background check. Research programs include: the pharmacological modulation of radiation tolerance using cell culture and animal models by synthetic peptides and the development of PET/SPECT radiotracers for animal models of inflammation and degeneration in the CNS using synthetic peptide ligands. Under the direction of L. Pena, Medical Department.

MK3242. POSTDOCTORAL RESEARCH ASSOCIATE – Requires a Ph.D. in a relevant field and experience relevant to the development of state-of-the-art CMOS analog circuits tailored to the requirements of the LCLS Project. This requires in-depth practical knowledge of radiation detectors and detector readout systems and of low-noise, low-power analog and mixed signal integrated circuits design. The LCLS is the DOE's x-ray free-electron laser project currently under construction at SLAC. The source will produce x-ray beams of unprecedented peak power and brightness, in pulses of order 100fs long, at a 120Hz repetition rate. This project will develop silicon pixel detectors optimally matched to the needs of experiments to be performed with this facility. Under the direction of P. Siddons, National Synchrotron Light Source Department.

NS2679. SR. RESEARCH ENGINEER (P-10) – Requires an advanced degree in physics or engineering, or equivalent capabilities, comprehensive experience in the field of SRF accelerators, and demonstrated outstanding abilities in engineering leadership. The candidate must have attained distinction by specific outstanding engineering achievements in the field of SRF. Considerable experience in Superconducting RF (SRF) and RF engineering of superconducting accelerators, conducted in an environment of large R&D facility and expertise is in auxiliary systems such as power couplers, fast tuners and cryomodules, infrastructure such as clean rooms and niobium chemistry, microwave measurements and similar techniques is essential. The ability to run software suites relevant to this field such as Microwave Studio, and hands-on experience in preparing and operating SRF structures is necessary. Responsibilities will include planning and conducting major projects in SRF accelerators and devices, including conducting research of considerable scope and complexity in SRF accelerators requiring innovative approaches and techniques, and development work of considerable scope and complexity, requiring the formulation and use of highly innovative approaches to SRF accelerators and essential techniques such as power feeds, frequency and stability control, or for the direction of a group of engineers and technicians involved in such efforts. Collider-Accelerator Department

TB2680. PHYSICS ASSOCIATE IV (P-1) (3 positions, reposting) – Requires a BS in physics and excellent written and oral communication skills. Background experience in high power pulsed power supplies, digital electronics, computer controls and programming, as well as laboratory test and measurement techniques is desirable. Primary duties, as part of a rotating shift team, include the operation and troubleshooting of the Collider-Accelerator Complex for the experimental physics program. Will be part of emergency response team while on shift. Collider-Accelerator Department.

TB3962. VETERINARY SERVICES ASSISTANT (CW-1 - part-time, 50 percent; term appointment) - Requires the ability to lift 50 lb. feed bags and work weekend/holiday hours. Prior experience working with animals is desired. Under direct supervision, performs tasks connected with the care, feeding, cleaning, treatment, and bedding of laboratory animals. Performs general cleaning of quarters and similar duties as assigned. Medical Department.

TB3653. STAFF SPECIALIST (A-6, reposting) – Requires a bachelor's degree in accounting, business administration or equivalent plus at least four years' related experience. Extensive administrative experience should include financial performance, contract administration, coordination of program funding, grant preparation, and financial reporting. Excellent written and oral communication skills, proficiency in Excel and other MS Office products and experience with PeopleSoft is required. Will assist in overall management for the department administrative business activities including budgets, subcontracts, and grant preparations for DOE and other federal agencies. Medical Department.

Motor Vehicles & Supplies

02 FORD EXPLORER - excel. cond. 67K mi. $11,500/neg. Mary, Ext. 3670.

01 VW JETTA WOLFSBURG ED 1.8T - 5 speed APR chip & sst exh. LSD, mint cond. 77K mi. $13,000/neg. 902- 8188.

98 NISSAN ALTIMA SE - excel. cond. w/ sun-roof and rear spoiler. 76K mi. $4,700/ neg. Mei, Ext. 3397.

97 PONTIAC GRAND AM - 4cyl., 4dr., excel gas mileage. 160K mi. $1,000/neg. Ed, Ext. 4080.

97 DODGE GR. CARAVAN - 3.3L, new a/t, CD/cass, dual sld. drs, r/rk & hitch. 135K mi. $2,775. 758-3284 or WJLeonhardt@bnl.gov.

91 HONDA CIVIC - head gasket brkn, all else gd cond., gd for parts or fix up. 133K mi. $500/neg. Anne, Ext. 2209 or 880-2032.

90 NISSAN 240SX - 2dr, 4cyl, 5spd, am/ fm/cd, p/l, p/w, runs excel., black. 95K mi. $1,100/neg. 921-6859 after 5 p.m.

90 BUICK LESABRE - must sell, 6cyl., always garaged, well maint., excel.cond., 60K mi. $3,000/neg. Frank, 286-3232.

88 CHEVY SUBURBAN - runs excel., gd work truck. 130K mi. $2,000/neg. 597-6874.

ENGINE & TRANS - Chevy L48 (fr. Corvette) long block & Turbo 350 Trans; need rebildg, free, you pick up. Ext. 3803 or 874-4017.

SNOW TIRES - 4 Bridgestone Blizzak WS-50, 195-65-R15 on Saab steel wheels, 3K mi., cost $360, sell for $120. 878-0071.

Boats & Marine Supplies

24' SEARAY SUNDANCER - 120 hrs, used for day trips only, kit., bath, 2001 trailer incl., new cond. $35,995/neg. 654-5607.

OUTBOARD MOTOR BRACKET - Garelick st/less steel, 4-psitn locking ht adj., max 100 lbs. $80. Mark, Ext. 3837 or 281-5060.

Furnishings & Appliances

CABINET/ARMOIRE - pine, 1 full-length sliding drawer, 3 adj./rmvbl. pine shelves. 48"wx80"hx24"d. Ask $500. 676-3670.

BABY'S ITEMS - Pottery Barn changing table, Gracco basinett & swing, Snap N'Go stroller, infant front/back carrier. 258-4607.

DINING TABLE - Ikea, round, solid wood, expandable, like new, $130. Ext. 3319.

END TABLES - 20"x20"x21"h, weathered carved wood, jewel green tile tops, eclectic/vintage, $55/pair. 803-0506.

FOODSAVER KIT MODEL V1080 - 1-touch op. vacs. & seals, barely used, cutter, bags, canisters incl. $60. Ext. 4627 or 928-6469.

FURNITURE - armoire, drsser, hdbrd, $300; sofa/love seat, $400; glass d/r table/chrs, $300; 51-in TV, $750. Jerald, Ext. 3988.

FURNITURE - IKEA: glass dng. table, $35; coffee tbl., $20; night std., $20; Futon fr. Walmart, $50. Fan, Ext. 4353 or 836-9958.

GLASS LAMP - 1930s cranberry glass lamp, marble base, 26" tall, floral lampshade, needs rewiring, $45. 803-0506.

HEADBOARD - for queen bed, w/footboard, cherry, will e-mail photo. $50. Jane, Ext. 2531 or 369-2719.

OFFICE CHAIRS - 2 leather chairs, used 5 months, $30 each. Ext. 5877 or 344-1041.

SERGER - Model SL350 w/video & accessories, extra spools of thread, http://tinyurl.com/e9vzg. $100. Ext. 5322.

TODDLER BED - never used, medium colored wood, $70; crib mattress that fits into toddler bed. $50. Mary, Ext. 3670.

WASHER/DRYER - Kenmore, stackable, gd wkg cond. $50/ea., $90/both. 654-5474.

Audio, Video & Computers

INFINITY IL60 SPEAKERS - hardly used, paid $1,500, sell for $600. Mary, Ext. 3670.

PRINTER - HP Color Deskjet 832C $35, Scanner HP Color Scanjet 2300C $30, SONY P/top PEG-T665, $80; more, Ext. 5336.

Sports, Hobbies & Pets

BICYCLES - 1 ladies', 1 man's, 27 in. 10 spd. Ross Euorsports, good cond., best offer. Austin, 286-1097.

NORDIC RIDER - exerciser by Nordic Track, pics. avail. $150 obo. Tom, Ext. 3085 or 744-4535.

TELESCOPE - Orion 4.5" reflector, equatorial mount, motor dr., $60. Mark, Ext. 3837.

Tools, House & Garden

ROTOR TILLER - Troy Work horse, runs well, all manuals, new tines, 7hp Kohler eng., rear 21"w tilling. $400. Tony, Ext. 6153.

Miscellaneous

ATKINS LIFE KIT - Tools, Tips, and Techniques $3. Ext. 5322.

BOOSTER SEAT - faces f/wd, child wt. 30-100 lbs., ht 29-57" flip down, wshbl. pads, cup hldr, hand rests, $12. Sam, Ext. 1064.

ENGAGEMENT RING - 1 carat, platinum, appraised $5,400, ask $4,500. Jeanette, 379-6274 after 6 p.m.

WINDOWS - DH/3-31x57, 2-24x36, 4-28x42, 1-16x48, 1-30x55 Andr's DH/1-42x53, 1-48x48, 1-36x24 casemt/36x24; 654-5607.

SPRUCE, WHITE PINE & FIR TREES - B&B, 5-8 ft., $45-65 avg., excel. for yard/ privacy planting. Ext. 4507 or 878-1060.

Free

BLENDER PARTS - only the Glass jars with s/less stl blades of Blk & Dckr Blender, Mdl No. Problend BL550. Sam, Ext. 1064.

OUTDOOR FOLDING CHAIRS, COT - items in good shape, first caller receives items listed. Fred, Ext. 5319 or 369-9720.

Wanted

2 ADULT MOUNTAIN BIKES. - new or used, in good cond. Amber, Ext. 3807.

BABY JOGGING STROLLER - seek to buy, used, in running cond. Linda, Ext. 4303.

BREEDER OF PERSIAN CATS - names and phone #s of Suffolk county breeders of Persian cats. Linda, Ext. 5384.

CARPENTER'S HELPER - full time, some exp. desired, pay comensurate w/exp., must have own transp. Brett, 252-1088.

RABBIT HUTCH - outdoor, will pick up. James, 872-8966.

RIDING LAWN TRACTOR - prefer John Deere, others considered. Jim, Ext. 4843 or 567-6227.

Lost & Found

LOST: CELL PHONE - silver LG speakerphone, between Berkner and Physics, Thu., 3/9, reward. Todd, Ext. 5826.

For Rent

CENTER MORICHES - 2-bdrm. house w/ carport, w/d, f/p, freshly painted, new w/w carpet, nr shops, 1 block to water, no pets/ smkg., util. extra. $1,400/mo. 878-6016.

FARMINGVILLE - 1-bdrm. ground-flr. apt., lg. bdrm., l/r/kit combo, c/a/c, util. incl., no pets/smkg., one month sec. $850/mo. Thomas, Ext. 4866 or 974-0771.

MILLER PLACE - share lg., furn., non-smkg. Col. house in prof. resid. area, cable, cac, internet, fenced bk yrd, deck, own 14x12 w/w bdrm. 9 mi. to BNL. $675/mo. 744-8386.

MILLER PLACE - spacious 1-bdrm. apt., l/r, kit., bath, pvt. side ent., yard & driveway. 12 miles to Lab, no pets/smkg., elec. extra. $950/mo. 821-1525.

MILLER PLACE - share lg. furn. non-smkg. Col. house in prof. resid. area, cable, cac, internet, lg. kit. own w/w 14x12 bdrm. 9 mi. to BNL. $675/mo. 744-8386.

RIDGE - 1 lg. studio, bright & warm, w/full bath, priv. ent. and fenced garden, house apart from owner, park in drway, quiet & safe n'hood. $700/mo. Zhen, 821-0859.

SHIRLEY - 1-bdrm., eik, walk-in closet, lg. l/r, full bath, pvt. ent., util. incl. $1,000/ mo. 891-8844.

SHIRLEY - 4 bdrm., 2-car attach. gar., 2.5 baths, 2 kitchens, washer/dryer, bsmt., fenced yard. $2,200/mo./neg. 745-2495.

WADING RIVER - 2 bdrm., eik, lg. l/r., lg. den, lg. deck, pvt. pkg., no kids/pets/ smkg. util. extra. $1,500/mo. 928-9328.

COROLLA, NC - Outer Banks, Oceanside Vac. Home, 5 bdrm, 3 bath, pool, hot tub, nr. ocean/lake/shops/golf, $2,695/wk. www.family-vacation-homes.com, 889-5303.

For Sale

CENTEREACH - 4-yr.-old Center Hall Col., 5 bdrm., 2-1/2 baths, eik, great room, d/ r, fin. bsmt., f/p,1st flr laundry, 20 min to Lab & 5 min to SBU. $509,990. 981-2471.

EAST QUOGUE - new 2/2 condo up unit w/1-car grg., Sr commty, cust. shades & closets, carpet, tile, cac, maint. free, low comm chgs/taxes, $629,900/neg. 723-0770.

HOLTSVILLE - 3 bdrm., 3 bath., kit., l/r, d/r, den, new appliances, new roof and siding, a/c, igp, igs, garage, 15 min. to Lab. $479,900/neg. 484-6657.

KISSIMMEE, FL - Indian Creek Comm., 3.5 mi. to Disney, 5 bdrm/3 bath, vac. home bordering nature reserve, pool/spa, fully furn. $435,000/neg. 889-5303.

Rock Band 'Afterlife' in Concert, Tomorrow, 3/25

Afterlife: The Ultimate Progressive Rock Experience will perform in concert on Saturday, March 25, at 8 p.m. in Berkner Hall. Sponsored by the BNL Music Club, the concert is open to the public. All visitors age 16 and over must bring a photo ID. Tickets cost $15 each, and may be bought in advance at the BERA Store, Berkner Hall, or www.ticketweb.com; or at the door at the show.

☎ Call Ext. 3413 for more information.

Employee Lunchtime Tour, Today, 3/24
Stardust Analysis at the NSLS

Today, Friday, March 24, the Employee Lunchtime Tour will visit Tony Lanzirotti of the University of Chicago at BNL's National Synchrotron Light Source to learn about the analysis of space dust collected by NASA's Stardust spacecraft. All interested employees should meet at the upper lobby of Berkner Hall by noon.

ℹ For more information, contact Elaine Lowenstein, Ext. 2400.

Vote for Two BERA Board Members

Four candidates are running for two four-year positions on the Executive Board of the Brookhaven Employees Recreation Association (BERA). The candidates are: Celeste Tymann, Staff Services Division; Joseph Gadbois, Plant Engineering Division; Thomas Nolan, Collider-Accelerator Department; and Edward Sperry IV, Superconducting Magnet Division. More information on the candidates is available in last week's Bulletin or at the web address below.

This contest will be decided through an election to be held March 27-31. All employees of BNL, BSA, DOE, and employees of permanent, on-site contractors are BERA members — and are urged to vote. Voting will be: Monday-Wednesday, March 27-29, at Berkner Hall, 11 a.m. to 1:30 p.m., and Thursday-Friday, March 30-31, 11 a.m.0-3 p.m. at the Teachers Federal Credit Union.

Votes may also be cast on the web from the BERA homepage, which is located at www.bnl.gov/bera/.

New York City Bus Trip, 3/26

The Hospitality Committee invites all BNLers to join a bus trip to New York City on Sunday, March 26. The bus will depart the Recreation Bldg. at 9:30 a.m. and leave the city at 5 p.m. to return to BNL. Tickets cost $10 for adults, $5 for children age 2-12.

ℹ To make a reservation, contact Hanne Herman, haniaherman@yahoo.com or 849-2249.

Hispanic Heritage Club Elections, Meeting

The Hispanic Heritage Club (HHC) election has resulted in one nominee per position. Therefore, these nominees will accept their position at the HHC's general meeting, to be held in Berkner Hall, Room C, 12:05-12:45 p.m. today, Friday, March 24. In addition, a summary of the Club's FY05 activities will be presented. All are welcome.

ℹ For more information, contact Omar Gould, Ext. 2656.

Weight Watchers

Register for the next Weight Watchers session on Wednesday, April 5, from noon to 1 p.m. in the Brookhaven Center.

ℹ Contact Michael Thorn, Ext. 8612 or mthorn@bnl.gov.

Pool Closed for Maintenance, 3/27-4/2

The swimming pool will be closed for maintenance, Monday, March 27, through Sunday, April 2, reopening on Monday, April 3.

Children's Swim Lessons, Summer Camp

ℹ Applications for swimming lessons and summer camp are now available at www.bnl.gov/bera, in the Recreation Office in 179B, and at the gym & pool.

On-Site Services

VEHICLE SERVICING - The Lab's on-site service station offers oil changes, check-ups, NYS inspections, new batteries, tires, timing belts, repairs, etc., while you are at work. Ext. 4034.

Happenings

SBU Univ. Cafe, 2 p.m. Sun. 4/2. Show features David Olney. $20, $15/students. 632-6027 or gpalaia@notes.cc.sunysb.edu.

In Appreciation

Brenda and Tom Kirk wish to thank their many BNL friends and colleagues for ten wonderful and satisfying years as members of the BNL family. We depart with our very best wishes for continuing success and happiness to all!

Thanks to all my friends and coworkers for your kind words of support during a difficult time. The loss of my brother Richard will stay with my family for a long time to come. You have eased the pain.

— Ben Mastrocola

Services

Service ads from BNLers who perform work for others are available on the web. Go to the link "See all ads" bottom right of the Intranet homepage. Those outside the Lab firewall cannot access this list. Request an e-mail copy from bulletin@bnl.gov; or call Ext. 2345 or write to The Bulletin, Bldg. 134, BNL, Upton, NY 11973-5000, for a paper copy.

the Bulletin

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Liz Seubert, editor
John Galvin, reporter
Roger Stoutenburgh, photographer

On the Web, the Bulletin is located at www.bnl.gov/bnlweb/pubaf/bulletin.html. A calendar listing scientific and technical seminars and lectures is found at www.bnl.gov/bnlweb/pubaf/calendar.html.

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