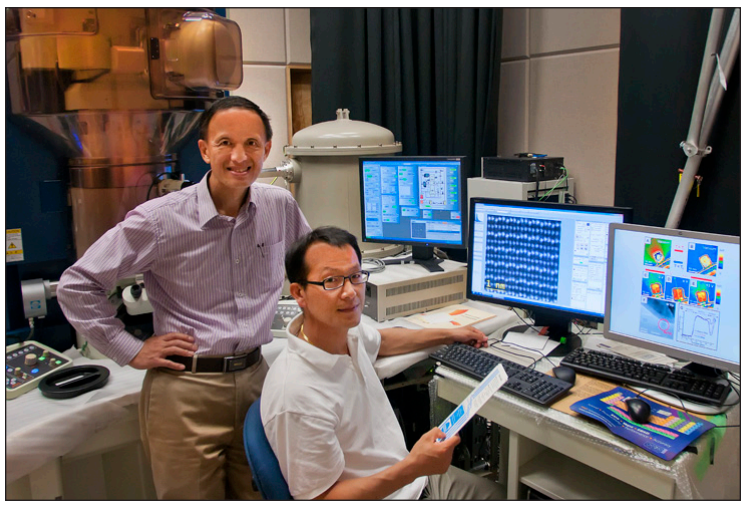
the Bulletin

BROOKHAVEN NATIONAL LABORATORY

Vol. 66 - No. 30

August 31, 2012



Joseph Rubino D0010112

Brookhaven physicists Yimei Zhu (left) and Myung-geun Han examine the breakthrough nanoscale images of ferroelectric polarizations.

Unprecedented Subatomic Details Of Exotic Ferroelectric Nanomaterials

Successful imaging of individual atoms and associated electric fields in ferroelectrics could lead the way to a new era of advanced electronics

As scientists learn to manipulate little-understood nanoscale materials, they are laying the foundation for a future of more compact, efficient, and innovative devices. In research published online on July 8 in the journal *Nature Materials*, scientists at BNL, Lawrence Berkeley National Laboratory, and other collaborating institutions describe one such advance — a technique revealing unprecedented details about the atomic structure and behavior of exotic ferroelectric materials, which are uniquely equipped to store digital information. This research could guide the scaling up of these exciting materials and usher in a new generation of advanced electronics.

Electron Holography Technique

Brookhaven scientists used a technique called electron holography to capture images of the electric fields created by the materials' atomic displacement with picometer precision — that's the trillionths-of-a-meter scale crucial to understanding these nanoparticles. By applying different levels of electricity and adjusting the temperature of the samples, researchers demonstrated a method for identifying and describing the behavior and stability of ferroelectrics at the smallest-ever scale, with major implications for data storage.

"This kind of detail is just amazing — for the first time ever we can actually see the positions of atoms and link them to local ferroelectricity in nanoparticles," said BNL physicist Yimei Zhu. "This kind of fundamental insight is not only a technical milestone, but it also opens up new engineering possibilities."

What Are Ferroelectrics?

Ferroelectrics are perhaps best understood as the mysterious cousins of more familiar ferromagnetic materials, commonly seen in everything from refrigerator magnets to computer hard drives. As the name suggests, ferromagnetics have intrinsic magnetic dipole moments, meaning that they are always oriented toward either "north" or "south." These dipole moments tend to align themselves on larger scales, giving rise to the magnetization responsible for attraction and repulsion. Applying an external magnetic field can actually flipthat magnetization, allowing programmers and engineers to manipulate the material.

*See **Nanomaterials** on p. 2*

SBU Launches Institute for Advanced Computational Science

Robert Harrison, Institute Director, will also lead Computational Science Center at BNL through a joint appointment

Robert Harrison

Stony Brook University (SBU) is launching a new world-class Institute for Advanced Computational Science, an innovative endeavor in which BNL will collaborate closely. The core mission of the Institute is to advance the science of computing and its applications to solving complex problems in the physical sciences, the life sciences, medicine, sociology, industry, and finance.

The new Stony Brook institute will work with BNL's Computational Science Center (CSC), which specializes in data-intensive computing. The collaboration will firmly establish the SBU-BNL partnership as a center of excellence in high-performance computing and their shared commitment to building the future.

*See **Computational Sci.** on p. 2*

Roger Stoutenburgh D1070812

BNL, SUNY, and Research Foundation For SUNY to Collaborate on Education, Public Service Programs

Photo above: (from left) Vice President of the SUNY Research Foundation Garrett Sanders, Brookhaven National Laboratory Director Sam Aronson and Vice Chancellor and SUNY Provost David Lavallee.

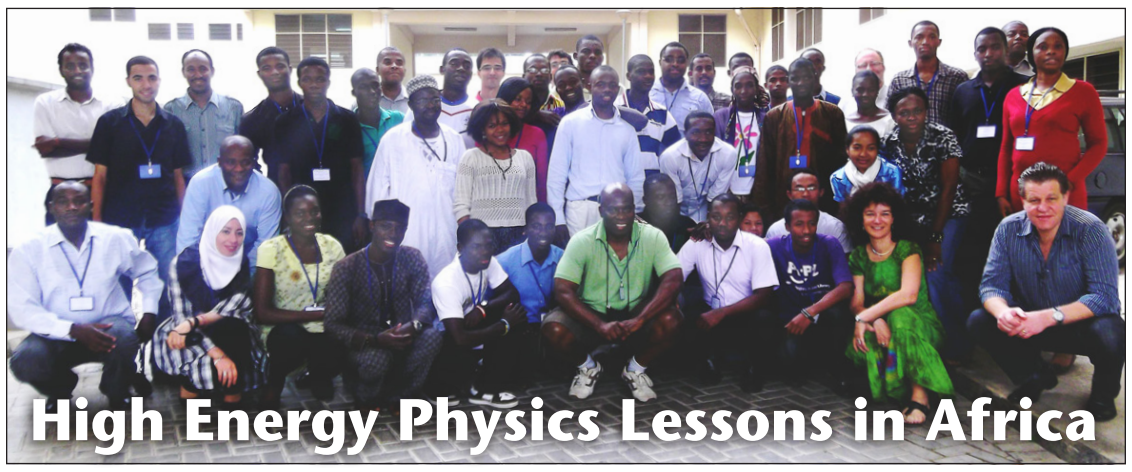
BNL, the State University of New York (SUNY), and the Research Foundation for SUNY (RF) formalized a Memorandum of Understanding (MOU) on August 8 under which the three organizations pledge to work together to develop education and public service programs to benefit students of all ages, from elementary school through postdoctoral studies.

The MOU was signed at BNL by principals of the three institutions — BNL Director Sam Aronson, SUNY Executive Vice Chancellor for Academic Affairs and Provost David K. Lavallee, and the RF's Vice President for Sponsored Programs Administration Garrett Sanders.

"Brookhaven is very pleased to formally confirm a research and educational collaboration with the State University of New York and its Research Foundation that will benefit all of our institutions in the years to come," said Aronson. "The many students who will take advantage of the programs and initiatives developed through this MOU will further extend its positive impact to our state and the nation."

"This MOU demonstrates how SUNY can effectively leverage its 'systemness' to serve the greater public good not only for New York but in partnership with top national researchers who are poised to position the United States as a leader in the new knowledge economy," said SUNY Chancellor Nancy L. Zimpher. "This joint venture is certain to help us make greater…

*See **MOU Signing** on p. 3*



High Energy Physics Lessons in Africa

BNL Supports 2012 African School of Fundamental Physics and its Applications

Photo above: Participants in the 2012 African School of Fundamental Physics and its Applications. BNL physicist and organizing committee member Ketevi Assamagan is in the middle row, left. Brookhaven was among 23 institutions from the United States, Europe, and Africa that supported the school.

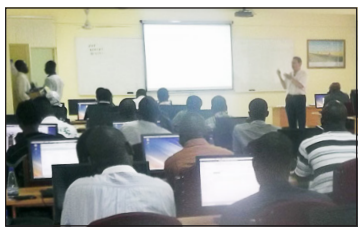
Five thousand miles from the Relativistic Heavy Ion Collider (RHIC) at Brookhaven Lab and 3,000 from the Large Hadron Collider (LHC) at CERN in Europe, 49 students from Africa and one from Iran gathered in the nation of Ghana to talk physics at the 2012 African School of Fundamental Physics and its Applications. There, 32 scientists from around the world introduced the students to the theories, experiments, and technologies that power major physics collaborations like those at RHIC and the LHC, where scientists are exploring the universe's tiniest building blocks of matter.

Fifty undergraduate, graduate, and Ph.D. students were selected from 132 applicants to attend this three-and-a-half-week-long program, where students participated in lectures and interactive exercises to learn the basics of theoretical and experimental subatomic physics, particle accelerators, medical applications of nuclear and particle physics, and cyber infrastructure. This second biennial event was held from July 15 until August 4 at Kwame Nkrumah University of Science and Technology in Ghana, about 125 miles from Africa's Atlantic coastline.

Brookhaven Lab was among 23 institutions from the United States, Europe, and Africa that supported the school by helping to pay for the program and for the students to attend.

Few African Scientists In International Collaborations

"We have noticed that participation of African scientists is very low for physics experiments and programs at major labs around the world," said organizing committee member and Brookhaven Lab physicist Ketevi Assamagan during a recent Skype interview from a collaborator's office at the University of Johannesburg in South Africa. "This program gives these students the opportunity meet each other and network with members of the international physics community, so they can be inspired, well informed, and well connected to succeed wherever they go.



Jan Govaerts from Universite catholique de Louvain in Belgium talks to students about the theoretical foundations of nuclear and particle physics.

"We also show the students that the mathematical and…

*See **Physics School** on p. 3*

Safety makes science possible at Brookhaven National Laboratory

Immediate Actions to Take Following a Serious Injury

By Jack Ellerkamp, Safety Engineer, Safety and Health Services Division, and Joe Falco, Manager, Occupational Medicine Clinic

When a person suffers a serious injury on site, immediately contact the Laboratory Protection Division by calling Ext. 2222 (631-344-2222 from a cell phone) or 911. An injured person should not be moved before the Fire Rescue Group arrives, especially if the person has a head, neck, or spine injury, or a possible broken bone — none of which may be immediately apparent. Moving him or her could worsen the injury and result in paralysis or other severe complications. The only exceptions are to:

- Administer basic life support or use an automated external defibrillator (AED), if needed
- Apply pressure to a wound that is seriously bleeding
- Get the person out of imminent danger. (Note that a person is not in imminent danger just because he or she is in an area controlled for radiological purposes.)
- The Fire Rescue Group knows how to brace or splint an injured person so that he or she can be transported safely. They may call upon you to provide assistance after their arrival.

*See **Important Actions** on p. 3*

Stony Brook University Student Wins 2012 Gertrude Scharff-Goldhaber Prize


Marija Kotur

Marija Kotur, who recently received her Ph.D. from the Department of Physics and Astronomy at Stony Brook University (SBU), has been awarded the 2012 Gertrude Scharff-Goldhaber Prize. Currently funded by Brookhaven Science Associates, the company that manages BNL for DOE, the award was established in 1992 by Brookhaven Women in Science (BWIS), a nonprofit organization that supports and encourages the advancement of women in science.

The annual prize is given to recognize substantial promise and accomplishment by a woman graduate student in physics. The prize honors the outstanding contributions of the late nuclear physicist Gertrude Scharff-Goldhaber. In 1950, she became the first woman Ph.D. appointed to BNL staff and later was a founding member of BWIS. The award is administered by BWIS and consists of a certificate and a check for $1,000.

Kotur earned a B.S. in theoretical and experimental physics at the University of Belgrade, Serbia, in 2005. Her prize-winning work, performed at SBU under the guidance of SBU Professor Thomas Weinacht, is in the area of strong-field ionization of polyatomic molecules. Strong-field ionization has been the focus of recent research efforts in ultrafast atomic, molecular, and optical science, due to its role in the generation of attosecond pulses and as a probe of both nuclear and electronic dynamics, and in imaging molecular orbitals, which describe the wave-like behavior of an electron in a molecule.

Kotur has recently taken a postdoctoral position at Lund University in Sweden and has left the U.S. to pursue her research. — Liz Seubert

See Something Unsafe? Call Ext. 8800

Materials Management Workshop at BNL


Roger Stoutenburgh D5830512

Pictured are: (rear, from left) Jon Cleveland, Lawrence Berkeley National Laboratory; Jeffrey Lyons, Argonne National Laboratory; Kenny Speer, Honeywell Federal Manufacturing & Technology (FM&T); Jeremiah Holthaus, Honeywell FM&T; Tim Bowman, Savannah River National Laboratory (SRNL); Dave Eggenberger, SRNL; (middle, from left) Bill Brisiel, Thomas Jefferson National Accelerator Facility; Jerry L. Butler, Oak Ridge National Laboratory (ORNL); Mike Lovely, Y-12 Plant; Scott Neely, Sandia National Laboratories, Don Schneider, Lawrence Livermore National Laboratory; Matt White, BNL; (front, from left) Marcus Phillips, Y-12 Plant; Conference host Frank D'Agostino, BNL; Janet Soper, BNL; Workshop Chair Melissa Ward, ORNL; Gary Golinski, Fermi National Accelerator Laboratory, and Donna King, BNL.

BLUEPRINT

Two Blueprint topics — the Competitiveness Improvement Project and Lean Six Sigma methodology — were among subjects of interest.

At the 56th annual Materials Management Association's Workshop, which was hosted at BNL earlier this year, two BNL Blueprint topics — the Competitiveness Improvement Project and Lean Six Sigma methodology — were among the subjects of interest. First held in 1956, the Materials Management Association Workshop is the longest-running workshop in the DOE, providing a means for participants to meet and exchange ideas, address common problems, and share successful practices on functions such as inventory management, storeroom facilities, receiving, shipping, property and warehouse management, and materials distribution.

BNL's Competitiveness Improvement Project — which seeks to identify and institutionalize effective business processes that could attract more investment and research opportunities — was one of the workshop agenda items. Another BNL topic was Lean Six Sigma methodology — a way to study wide-ranging processes and devise the best approach to improving procedures. A third BNL topic focused on the Lab's bar code tracking system.

Other agenda topics included Kansas City's improved delivery process, the Radio Frequency Identification (RFID) integration used at the National Security Complex's Y-12 Plant, and Oak Ridge National Laboratory's safety shoe delivery process. In addition, vendors and BNL's Procurement & Property Management (PPM) staff presented outlines of their daily processes and customer service techniques.

The Materials Management Association is comprised of participants representing multi-disciplined research and development organizations that operate under contract with DOE and the National Nuclear Security Administration. PPM's Frank D'Agostino hosted the 56th workshop, which was chaired by Melissa Ward of Oak Ridge National Laboratory.

Said D'Agostino, "Discussing our common issues and sharing resolution tactics is an invaluable part of this workshop. It's an excellent opportunity for learning how other labs perform and ensuring that we are all modernizing our processes. The size and scope of the members' facilities vary greatly, giving us a wealth of troubleshooting and pre-emptive problem-solving techniques to share with each other." — Liz Seubert

Computational Sci. *from p. 1*

"We are especially pleased that this exciting endeavor further partners Stony Brook and Brookhaven National Laboratory," said SBU President Samuel L. Stanley Jr. "BNL is a world leader in the storage and analysis of scientific data generated by its own facilities and the Large Hadron Collider at CERN. Together with BNL, Stony Brook has long been a partner in the New York State High Performance Computing Consortium, and New York State has generously supported our efforts to gain a leadership position in this rapidly emerging field."

Fresh Leadership With Robert Harrison

The new collaboration will also bring fresh leadership to the groundbreaking work conducted at both institutions. Robert Harrison, a distinguished expert in high-performance computing, joins Stony Brook as the Founding Director of the Institute for Advanced Computational Science. Through a joint appointment, Harrison has also been named Director of BNL's Computational Science Center, where he will lead efforts in the fundamental and applied sciences, making use of the Lab's supercomputers and other computing facilities deployed by DOE.

"Robert Harrison combines an extraordinary record of accomplishment in the mathematical and computational sciences with outstanding expertise using the high-performance computing systems at the very leading edge of technology," said Reinhold Mann, BNL's Associate Laboratory Director for Environment & Life Sciences. "We are excited about his leading our expanding efforts at BNL and this important partnership with Stony Brook University."

Harrison comes to Long Island from the University of Tennessee and Oak Ridge National Laboratory, where he was Director of the Joint Institute of Computational Science, Professor of Chemistry, and Corporate Fellow. He has a prolific career in high-performance computing with over one hundred publications on the subject, as well as extensive service on national advisory committees. Harrison's combination of experience made him an ideal candidate to launch this new initiative.

"This is another example of the close and impactful collaboration between the University and the Laboratory," said Mann. "Both institutions have seen the need for some time to build up the expertise in high-performance computing and data-intensive computing. By joining our efforts, we are able to move farther and faster than either of us could separately."

Supercomputers play an ever-increasing role in cutting-edge, cross-disciplinary research. From decoding the chemistry underlying the next generation of electric vehicle fuel cells to mining the particle collisions that unlock the secrets of the early universe, computing expertise and top technology are essential ingredients.

"Modern high-performance computers will soon reach the capability of performing a billion times a billion numerical operations per second," said Harrison. "This breathtaking rate of computation will provide the means to compute problems of extreme complexity and enormous numerical scale. It will allow sifting through huge arrays of data, scanning images with billions of pixels, and finding the proverbial needle in a haystack in a reasonable time. I am looking forward to making Stony Brook University and BNL a valued partner with the federal government in its effort toward computational leadership."

— Justin Eure

Nanomaterials *from p. 1*

Similarly, ferroelectric materials also have a molecular-scale dipole moment, but one characterized by a positive or negative electric charge rather than magnetic polarity. This polarization can also be manipulated, but flipping the charge requires an external electric field. This critical, tunable characteristic comes from an internal subatomic asymmetry and ordering phenomena, which was imaged in detail for the first time by the transmission electron microscopes used in this new study.

Current magnetic memory devices, such as the hard drives in most computers, "write" information into ferromagnetic materials by flipping that intrinsic dipole moment to correspond with the 0 or 1 of a computer's binary code. Those manipulated polarities then translate into everything from movies to web sites. The remarkable ability of these materials to retain information even when turned off — what's called non-volatile storage — makes them an essential building block for our increasingly digital world.

Data Storage — Scaling Up

In the emerging ferroelectric model of data storage, applying an electric field toggles between that material's two electric states, which translates into code. When scaled up similarly to ferromagnetics, that process can manifest on a computer as the writing or reading of digital information. And ferroelectric materials may trump their magnetic counterparts in ultimate efficacy.

"Ferroelectric materials can retain information on a much smaller scale and with higher density than ferromagnetics," Zhu said. "We're looking at moving from micrometers (millionths of a meter) down to nanometers (billionths of a meter). And that's what's really exciting, because we now know that on the nanoscale each particle can become its own bit of information. We knew very little about manipulating ferroelectric behavior in nanomaterials before this."

The trick to scaling up individual ferroelectric nanoparticles into useful devices is understanding just how tightly together they can be packed and ordered without compromising their distinct polarizations, which theory suggests should be extremely difficult to achieve. The electron holography experiments conducted at BNL demonstrated a method for determining those parameters under a range of conditions.

"Electron holography is an interferometry technique using coherent electron waves," said BNL physicist Myung-Geun Han. "When electron waves pass through a ferroelectric sample, they are influenced by local electric fields, yielding a so-called phase-shift. The interference pattern between the electrons that pass through electric fields and those that don't creates what's called an electron hologram, which allows us to directly 'see' those local electric fields around individual ferroelectric nanoparticles."

Local electric fields emanate from ferroelectric nanoparticles, and these "fringing" fields are like the functional footprint of a particle's polarity. Consider the way a small magnet's effects can be felt even at a slight distance from its surface — a similar field exists in ferroelectric materials. When imaged by electron holography, the fringing field indicates the integrity of electrical polarity and the distance required between particles before they begin to interfere with each other.

Elbow Room Needed

The study revealed that the electric polarity could remain stable for individual ferroelectric materials, meaning that each nanoparticle can be used as a data bit. But because of their fringing fields, ferroelectrics need a little elbow room (on the order of five nanometers) to effectively operate. Otherwise, once scaled up for computer storage, they can't keep code intact and the information becomes garbled and corrupted. Understanding the atomic-scale properties revealed in this study will help guide implementation of these exotic particles.

"Properly used, ferroelectrics could ramp up memory density and store an unparalleled multiple terabytes of information on just one square inch of electronics," Han said. "This brings us closer to engineering such devices."

Particles Engineered at LBNL

The ferroelectric nanoparticles tested, semiconducting germanium telluride and insulating barium titanate, were engineered at Lawrence Berkeley National Laboratory and brought to Brookhaven Lab for the electron holography experiments. Additional experiments using x-ray diffraction were conducted at Argonne National Laboratory's Advanced Photon Source.

The work featured collaborators from Brookhaven National Lab, Lawrence Berkeley National Lab, the University of California at Berkeley, the University of New Orleans, and Central Michigan University. In addition to Zhu and Han, Brookhaven scientist Vyacheslav Volkov was also involved in the project. The research was funded by DOE's Office of Science, the single largest supporter of basic research in the physical sciences in the United States: *science.energy.gov*.

— Justin Eure

In Memoriam: **David Alburger**

By John Millener, Physics Department, with contributions from BNLers Peter Bond, Chellis Chasman, and Keith Jones


R.S. D0450105

David Alburger, a retired senior physicist who held a guest appointment in the Physics Department, died on June 13, 2012. He was 91. Alburger, who graduated from Swarthmore College in 1942 and worked for Naval Research during the Second World War, received his Ph.D. in physics from Yale University and joined Brookhaven as an associate scientist on July 1, 1948. In November 1948 he was named an associate physicist, in 1954, physicist, and in 1961, senior physicist. He was granted tenure in 1957.

Alburger's research activities at BNL spanned more than six decades, resulting in well over 200 publications, mostly in *Physical Review*. Thomas Ludlam, Physics Department Chair, said, "Dave was a consummate scientist, and one of the longest-serving members of the Physics Department. His hands-on, can-do approach to experimental physics was universally admired."

The central theme of Alburger's work involved studies of nuclear beta decay, the process by which a neutron in an unstable nucleus turns into proton (or vice versa) with the emission of an electron and an antineutrino (or positron and neutrino). These studies often required the detection of electrons — for which he built a number of spectrometers — and the gamma rays from the decays of excited levels in the final nucleus. In this way, many properties of the decaying nucleus (mass, half life, spin, parity) and final nucleus could be determined. Over the years, as accelerators and detectors improved, there were many firsts, meaning the studies of new isotopes, along with a steady accumulation of data on nuclear structure that theorists could attempt to explain.

Alburger's experimental prowess attracted strong long-term collaborators with complementary skills, notably Denys Wilkinson, Oxford University and later University of Sussex, England, and Ernie Warburton of BNL, who both also excelled in theory. Wilkinson (already a Fellow of the Royal Society) came to BNL for the summer in 1958 (and in summer for the next 20 years). This resulted in an important paper on the beta decay of Berillium-11. All three were authors on four papers, out of at least 11 that bore Alburger's name, published in 1963 (1971 and 1972 would be similarly productive years). Also involved in a number of the 1963 papers was Andre Gallmann from Strasbourg, another long-term collaborator, as the experimenters used small Van de Graaff accelerators at both BNL and Strasbourg.

Alburger was Group Leader for work on the 3.5 MeV Van de Graaff for 25 years from 1953. He was the primary author of a two-page proposal for a new Tandem Van de Graaff facility consisting of two MP tandems, approved in 1962 and completed in 1970. As far as beta-decay studies were concerned, the extra energy and availability of heavy-ion beams from this facility meant that a much wider range of isotopes could be produced and studied. In fact, more experiments were often needed to track down the origin of the wide range of activities produced by heavy-ion beams. Productivity soared.

Alburger later made useful contributions to the new heavy-ion program at the Alternating Gradient Synchrotron (AGS) (injected by the tandems), produced several compilations for nuclear data sheets at the National Nuclear Data Center at BNL, and worked in the medium-energy group's hypernuclear program at the AGS. He also continued to work with BNL nuclear chemists, as he had periodically throughout his career, on the measurements of long half lives.

At the time of his death, Alburger was deeply involved in a benchtop experiment to detect the rare process in which a nuclear level decays by the emission of two gamma rays that sum to the transition energy rather than by a single gamma ray. Thousands of examples of this rare decay, which occurs about three times per million decays, have been seen since data-taking started in November 2010.

Alburger's scientific legacy is a large body of precise experimetal measurements, many of which continue to be important, often for reasons not thought of at the time that the measurements were made.

A longtime resident of Brookhaven Hamlet, Alburger was active in local activities and affairs. He was an avid runner — at 82, he joined the 278 runners in the 2003 Earth Day 4-mile run at Brookhaven, clocking in at 51:38. Mary Mickle Alburger, Alburger's wife of over 60 years, died in 2008. He is survived by two sons, David Reid and Andrew, and two daughters, Mary Jo and Eve. A memorial service will be held September 16 at 3 p.m. in St. James Parish Hall, Beaver Dam Road, Brookhaven Hamlet.

A more detailed article will appear on the BNL online Obituary Page: *http://1.usa.gov/Nvjutu*.

Arrivals & Departures

— Arrivals —

None

— Departures —

Sudeep Mitra ..... Env Sciences
Avishai Ofan ..... NST
David Starr ..... CFN

Two Surveys

Vending Machine Survey

Please take the new survey about BNL's vending machine program, which is managed by the New York State Commission for the Blind. The survey will be available online until August 31. Your comments are important in helping to target areas for improved service. See *http://1.usa.gov/R170oe*.

Cafeteria Survey

An survey on the services provided at BNL's Cafeteria has been posted online. Your comments will help in making the best possible improvements. Complete the survey here: *http://1.usa.gov/NAWXpo*.

Calendar

— WEEK OF 9/3 —

Monday, 9/3

Labor Day, Lab Holiday

No Bulletin issued this week.

Tuesday, 9/4

BERA Trip to U.S. Open

$60/person. See *www.bnl.gov/bera/*, click on Events/Trips.

Wednesday, 9/5

WAGO Demo Van on Site

1-3 p.m. Berkner Hall parking lot. Display of terminal block, ethernet switches, other electrical control panel components made by WAGO. Contact Joe Kanzenberg, Powertech Controls, Inc., 63-368-6678, Ext. 218.

— WEEK OF 9/10 —

Wednesday, 9/12

Day 1 of ASAP Career Workshop

8 a.m. Medical Research Center, Bldg. 490, Large Conference Room. Two-day workshop for the Association for Students & Postdocs (ASAP) at BNL on "Preparing for a Career After Your Postdoc," presented by the American Chemical Society and coordinated by Suzanne Golisz, Ext. 3816. Registration required (deadline, Sept. 5). See *www.bnl.gov/pcapworkshop/*.

Thursday, 9/13

Day 2 of ASAP Career Workshop

***BNL Blood Drive**

9:30 a.m.-3 p.m. Brookhaven Center. Donors must be 16-75 years of age, in good health and over 110 lbs. Some restrictions may apply. Donors also must have photo ID and know their social security number. Make an appointment at www.bnl.gov/hr/blooddrive/ or call Liz Gilbert, Ext. 2315. See story, p. 4.

Saturday, 9/15

Two BERA Trips

Big E State Fair, Mass., $45/person; Bally's Casino, Atlantic City, $30/person (21 & older). See *www.bnl.gov/bera/*, click on Events/Trips. Buy tickets at BERA Store, Berkner Hall.

Safety makes science possible at Brookhaven National Laboratory

Important Actions *from p. 1*

After the injured person is attended to, it is important to preserve and restrict access to the accident scene so that a thorough accident investigation can be performed. The supervisor should also contact the Occupational Medical Clinic (OMC) at Ext. 3670 and report the injury to an OMC nurse.

In cases where an injury does not require hospital transport, the supervisor should bring the person to the OMC for evaluation, and should wait at the OMC for further instruction by an OMC staff member on whether an employee can return to work, and if work restrictions are required. It is also the supervisor's responsibility to take the lead in the accident investigation, working with the Environment, Safety, and Health coordinator and Safety Engineering Group.

We encourage managers and supervisors to discuss this information at toolbox and staff meetings. More information is available at the *Injury Management* (*http://1.usa.gov/SNQYUT*) and *Injury and Illness — Notification and Analysis* (*http://1.usa.gov/RqOGt9*) Subject Areas.

Physics School *from p. 1*

…scientific principles we teach are applicable for medical applications of nuclear physics, computing, and even finance," Assamagan added. "Based on the feedback we've received from the participants, this year's school was a great success."

Assamagan himself was born in the African country of Gabon and raised in Togo, which is about 700 miles northwest as the crow flies. He earned a Ph.D. in nuclear and particle physics and is a physicist at BNL and member of the U.S. ATLAS collaboration at the LHC. In the hunt for the Higgs Boson, the possibly discovered particle (*http://1.usa.gov/OsXDkO*) postulated in the Standard Model of Physics — the theory that identifies all known subatomic particles and explains how they interact — Assamagan has worked with the ATLAS Detector's muon spectrometer to measure paths and momenta of charged particles called muons that emerge from collisions and are about 200 times heavier than electrons. He also works with ATLAS analysis software, led the ATLAS Higgs Physics Working Group for two years, and is currently involved in various analyses in search of possible new physics discoveries.

Fostering Scientific Literacy and Future Scientists

"The African School of Fundamental Physics and its Applications is possible because our sponsors, including Brookhaven, are very supportive of capacity building, from promoting scientific literacy to helping develop the next generation of scientists who will work to answer serious scientific questions," said Assamagan, noting that Brookhaven's Nuclear & Particle Physics Directorate and the Diversity Office were particularly supportive of this year's school.

Now is a bit early to plan for the next school scheduled for 2014, but Assamagan and his four fellow members of the international organizing committee will begin making preparations later this year. In the meantime, they are staying in touch with nearly all 115 students who have completed the program — 50 in 2012 and 65 in 2010 (*http://1.usa.gov/PojICE*) — sending the students updates about opportunities such as internships and scholarships. Participants also stay connected via Facebook.

"We may be separated by thousands of miles, but our questions about what the universe is made of are unanswered — and this a great time in history to collaborate!" Assamagan said.

Watch a video about the 2012 African School of Fundamental Physics and its Applications online: *http://bit.ly/OGXh8D*.

— Joe Gettler

MOU Signing *from p. 1*

…contributions in green technology and new, innovative methods to bring science into the classroom, something that is so critical to teaching and learning in our schools."

"We are always pleased when our campuses come together with established partners such as BNL to collaborate on research of vital interest to our nation and the world," said Lavallee. "This kind of collaboration allows for our students and faculty to have direct access to a research facility of critical national stature. We are particularly excited to partner with BNL researchers in the development of curriculum for the kind of STEM programs SUNY is working to bring to scale across the state."

"We're tremendously excited to partner with our Stony Brook and Brookhaven colleagues to support the education pipeline," said RF President Timothy Killeen. "This joint effort demonstrates the common sense of mission, scope, and scale of the SUNY community. SUNY research — its people, infrastructure and technology — and the entire SUNY system play a key role in advancing our students and growing our knowledge economy now and for the future."

Stony Brook University (SBU), a co-partner with Battelle Memorial Institute in Brookhaven Science Associates (BSA), which since 1998 manages BNL for the DOE Office of Science, is the largest academic user of BNL facilities. President Samuel L. Stanley Jr., M.D., who serves as the Vice Chairman of BSA, said that this MOU will enable many of the SUNY campuses to benefit from the opportunities that students and faculty at Stony Brook University have been involved in for nearly 15 years.

"Stony Brook's relationship with BNL has been prolific and significant in terms of providing amazing research opportunities and academic growth for our students, faculty and for the prospect of economic development for Long Island and the region," Stanley said. "It's an important asset for student and faculty recruitment and retention and certainly other SUNY campuses will benefit enormously from the relationship, as will BNL."

Under the agreement, the three institutions will identify areas of research that are compatible with SUNY's faculty and expertise, and that are germane to Brookhaven's mission. They further agree to establish procedures for engaging BNL staff and SUNY faculty in course or curriculum development; promotion of underrepresented minorities in science and technology disciplines; exploration of avenues to expand educational opportunities for undergraduate, graduate and postdoctoral students; and a strategic collaboration to improve educational initiatives for students from kindergarten through high school.

The agreement will remain in effect for 10 years. Its genesis was a proposed association between Brookhaven Lab and SUNY's School of Environmental Science and Forestry (ESF), but it quickly gained traction as a broader collaboration, to include all SUNY campuses and the Research Foundation.

"We at the State University of New York College of Environmental Science and Forestry are very pleased to assist in developing the Memorandum of Understanding with Brookhaven National Laboratory," said SUNY-ESF President Cornelius B. Murphy, Jr. "Our faculty members are excited about the opportunity to collaborate with the research staff at BNL. This MOU will help catalyze new research and development opportunities for all involved." — Kay Cordtz

Play Volleyball!

For its 2012–13 season, the BERA Volleyball League resumes play on Monday, October 8. The League offers teams for players of every ability and skill level, so come and join in the fun! All players are invited to get warmed up for the season by playing in open sessions in the gym on Monday and Wednesday nights. See the Doodle poll (*www.doodle.com/5mrdvev73scaz5wq*) to find out when play will begin on those evenings. Also, note that there will be more open play at the gym on Saturdays after Labor Day.

Captains Meeting, 9/19

Captains interested in fielding teams for the league should attend the captains meeting on Wednesday, September 19, at noon in Berkner Hall, Room A. Bring a signed roster form with you. For more information, visit the League's web site at *www.vb.bnl.gov*, or contact Marie Van Buren, Ext. 4727 or *vanburen@bnl.gov*; or Alain Domingo, Ext. 7060 or *domingo@bnl.gov*. Nominations for the 2012-2013 executive board should be directed to Van Buren or Domingo before the captains meeting.

New Phone Number for Badging Office

The Badging Office in Bldg. 400 has a new telephone — 344-8711. Call if you have questions regarding badges and vehicle stickers. The Badging Office is open Monday to Thursday from 8:30 a.m. until 4 p.m. and Friday from 8:30 a.m. until 1 p.m.

Aqua-Aerobics Class For Seniors, 9/5

BERA is again offering a low-impact, aerobics-based fitness class for active seniors. Exercises will include strength and balance, stretching and toning. Participants should check with their physician before starting any exercise program. Parents of employees are eligible to attend; they will need a family badge for entry at the main gate.

Classes will be held in the BNL pool on Wednesdays, 9–10 a.m., September 5 through December 19. The fee for this 16-week class is $80. Advanced registration is necessary and cannot be pro-rated. Make checks payable to BERA. Mail to Rec. Office, Bldg. 400A.

Starfish Swim Lessons For 4 Year-Olds

Swim lessons will be offered on Saturdays at the BNL pool for BNL families' children of four years old only. The children must be four by June 2012. Classes cost $80 per child and will be held September 15 through October 27, from 9 to 9:30 and 9:30 to 10 a.m. To register, send your name, life number, home phone, cell phone, and email address along with your child's name, age, and date of birth with a check for $80 made out to BERA to the Recreation Office, Bldg. 400A, by September 4. For more information contact Joanne Rula, Ext. 8481.

Sister Act

BNL siblings are regular blood donors

Brookhaven Lab siblings Patti Bender and Sue Perino are blood relatives in more ways than one — the close-knit sisters are also regular blood donors.

Bender, a Facility and Operations Directorate Project Engineer, says she has been a donor at BNL blood drives since she first joined the Lab 34 years ago. "I've been donating for so many years that the dates of the BNL blood drives are a standard entry on my calendar." said Bender. "My own family and friends have needed blood, so I realize how important it is. It's a small personal effort with a big payoff."

Perino, Deputy Director of the Business Division in the Photon Sciences Directorate, agrees with her sister Patti. "This small gesture really is huge," said Perino. "And, since some people don't meet the criteria to be a blood donor, I think it's very important that those of us who are able to donate take the time to do so. After all, someday someone you love may need blood and you would hope that it is readily available for them."

Both sisters also agree that blood, a "gift of life," is something we can only get through the generosity of those who donate. It can't be manufactured and you can only get it from another person who cares enough to give their blood.

— Jane Koropsak

Sue Perino (left) and Patti Bender

Roger Stoutenburgh D1880812

Consider rolling up your sleeve for the next BNL blood drive on September 13, 9:30 a.m. – 3 p.m. at the Brookhaven Center. You can schedule an appointment on the BNL Blood Drive website: *http://1.usa.gov/PODlut*.

Classified Advertisements

Current job openings and a statement of job placement policy at BNL are available on the homepage at *www.bnl.gov/HR/careers/*. To apply for a position, go to *www.bnl.gov* and select "Search Job List." For more information, call Ext. 2882.

Motor Vehicles

10 PORSCHE CAYENNE GTS – 20.5K mi., hemi, a/c, am/fm/cd/mp3, 20" wheels, great cond, $24,500 neg. 516-946-4124.

04 HONDA ACCORD LX SEDAN 4D – 89.7K mi. blk, 4-cyl, a/t, a/c, p/s, p/w, am/fm/cd, orig owner, rem strt. $8,400 neg. 331-0311.

04 CHRYSLER PT CRUISER – 56.161K mi. Ltd Ed, 4dr, 4 cyl, abs, a/t, a/c, c/c, pwr/l/s/w, r/rack, lthr/htd seats, m/rf, $6k neg. 504-2122.

01 JEEP GRAND CHEROKEE – 196K mi. Orig owner, runs well, mechanically sound. $3,800. 516-885-6037.

01 SUZUKI VITARA – 85K mi. 2dr, 2wd rear/4wd, pwr/w/l; tilt whl, AM/FM,CD, Added pwr outlet, AC, rr defst, $4,300 neg. Ext. 3235.

98 TOYOTA CAMRY LE – 108K mi. 4 door 6 cyl red w/ tan cloth int, a/c, reliable, runs well. $4,500 neg. Charlie, Ext. 2800.

Boats

18' RENKEN BOW RIDER – '82 w/a 70 horse Evinrude, '94/Trailer ez loader, fuel effic, w/fish finder, etc. $1,100 neg. Ext. 2305.

Furnishings & Appliances

3-BULB HANGING LIGHT FIXTURE – w/ globes, photo avail/$15. Steve, Ext. 7570.

AIR CONDITIONER – GE model #AS-W08FKS1; 8,000 Btu/hr; w/remote/$90. Matt, 301-974-2994 or meisaman@bnl.gov.

BARSTOOLS, MORE – 2 barstls, $35/ea; Game chr $45; Cmputr desk $10; TV-Std for up to 50", $25; 2 nightstd, $20/ea. 331-0311.

COFFEEMAKER – Black & Decker 8-Cup Programmable, excel, $20. Ext. 3235.

CONVECTION OVEN – GE, full sz, bisque, new extra ceramic cooktop in box, $250. 924-7374 or jgjet@optonline.net.

COFFEE TABLE, TRELLISE WOOD – Beveled glass Ask: $140. Ext. 7370, 331-0311.

DINING ROOM – dk wood, hutch, tble w/2/ leaves, pads, seats 10, 6 chrs, $1,200; Chandelier/glass/brass, pics, $100. difilip@bnl.gov.

DINING ROOM – Formal tble, 42"x66" w/3 leaves, 11" ea, 6 chrs, sits at least 12, pics, ask/$600. Ext. 7235 or fitz@bnl.gov.

DRESSER W/MIRROR – Looks new; Ask: $180, 331-0311 or goldbear8@yahoo.com.

EDINBURG 7-PC DINING SET – table, 4 side chrs, 2 arm chrs; cherry finish; antique brass hardwr, nr new, $750 neg; also buffet server & hutch, $700. Ext. 7370, 331-0311.

GIRL'S BEDRM FURNITURE – 7 Pc, Desk, Hutch, Chair, Bureau, Dresser, Mirror, End Tbl, Cream wood, floral. $950. 525-1286.

IKEA FURN – indiv 50% off, or $150 combodeal: dining tbl/chr/coffee tbl, u-pic-up, pics/price http://tinyurl.com/7xpnhpx. 229-6162.

JUICEMAN 2 – 700-w elec juicer w lge feed chute, 2 spd, Stainless-steel perm-mesh filter & basket; safety switch. $40, Ext. 8119.

LEATHER SOFA – Top Grain Italian lthr on all seating areas, dk burgundy leather color Lthr match on sides, back. ask $380. 331-0311.

LEATHER SOFA W/RECLINER – Tan. Lthr match on sides, back. Ask: $370. Ext. 7370, goldbear8@yahoo.com.

MATTRESS: IKEA SULTAN FIDJETUN – L:189cm, W:135cm, T:14cm; like new. Mach. wash covr. Ask$125. 229-6162.

MATTRESSES – King-sz w/ 2-Mattress box; Ask: $90; Qu bed w/mattress Ask: $100; Full sz w/box Ask: $45. Ext. 7370, 331-0311.

MICROWAVE – Emerson, .9 cu ft, 900/ watts, MW8997W, $25, grt for coll' student. Maryann, Ext. 4705 or mjulian@bnl.gov.

OAK BEDROOM SET – 6 Drawr Chest, w/2 mtchg night stands, Qu Bed & frame w/ Brass headbrd, pics, $500 OBO. 264-2421.

POMEROY 60" TV CONSOLE – Universal removbl w/Flat Panel Bracket, storage/holds 4+ components w/ventiltd, ask: $220. 331-0311.

REFRIGERATOR – Kenmore Elite 26 cu/ ft, s-by-s. in-dr ice dispenser & water, Bisque. excel cond, $600. 924-7374.

SOFA – 88x34, light floral tapestry, gd cond, lg enough to sleep, ask/$200. Jane, Ext. 2198, 909-7080.

TABLE, DESKS – Dining tbl w/4 chrs, wood, $60; 60" Exec. Desk, 29"h,59.5"w, 29 1/2"D,$80; Cmptr dsk/$40. Ext. 7370.

TRIBECA BEDRM – Espresso wood q/sz bed, headbrd/springbox/mattress, night std, drssr w/mirror, $550, pics, Ext. 3235.

TV BASE CABINET – Silver trim & black, open, for 40-50 in. flat TV, w/2 glass shelves. $50. Ext. 8219.

TVs – 27" non-brand name $35; 13" Sharp $25; 9" Panasonic $20. Ext. 7235.

TWIN BEDS – 2 sets, Sealy Posturepedic, mattress, box spring, metal frame/headbrd, excel cond, $200. 751-8351.

UPRIGHT PIANO – Hamilton by Baldwin, oak color, LxHxD=55"x45"x25", $400. Rachel, Ext. 4213, 681-7124.

WARDROBE, BOOKCASES – Wdrobe w/2 drs/$75; 2-dr Bkcse, 71+H x 29 3/4"W x 13"D, cherry/$70; also 2 @ $40; 3 @ $25. Ext. 7370.

WROUGHT IRON – 48' rnd tbl w/4 chrs, end tbl, $200; 12 chrs/$25/ea; 2 lounge chairs/$30/ea; 928-5185, 283-0034.

Audio, Video & Computers

BAND HERO SUPER BUNDLE WII GAME – Guitar world tour; Wireless Band Hero Drum Set; much more, $100 neg. Ext. 7370.

CAR AUDIO EQUIPM'T – Brand new Kicker 11ZX700.5 5 ch amp & 10DC122 subwoofer syst. Remote contr. $600 all. Ext. 3970.

DIGITAL CAMERA – HP Photosmart 735, 3.2 MP, 3x optical/5x digital zoom. Excellent condition. $15 obo. Frank, Ext. 4620.

NINTENDO GAME CUBE GAMES - 15 – Sonic Riders, Mario Kart Dbl Dash, Street Hoops, MVP baseball '05, more. Ext. 5753, 252-3356.

POWERED SAMSON MONITORS – 2, slightly used, 15", in/outdr, Samson DBA500 pwrd, built in amp, pics, $500/neg. 347-581-3731.

SONY BRAVIA 55" HDTV – 55EX710, LCD Digital Color TV 1080p/120Hz/Smart/Wi-Fi /Ultrathin orig/$1500, $980/neg. 331-0311.

TOSHIBA TV – 14", $25, great for college student. Maryann, Ext. 4705, 929-4978.

WII ACCESSORIES – Gaming Tower, holds controllers, guitar, console and games, white/blue, more. 252-3356.

Sports, Hobbies & Pets

09 JAYCO TRAVEL TRAILER – 26', model-22fb, q/bed, rear bath, A.C., m/wave, sleeps 6, like new, $7,500. John, Ext. 5930.

AB LOUNGE 2 MAX $30.00 – Like new. All set up an ready to go. brookhaven@optonline.net.

BEAGLE PUPPIES – A.K.C. reg, pure breed, all shots, great family pets/hunting, 8 avail. Frank, 965-1587.

DOG CRATE – Large, "Lifestyles" Brand, 31" Tall, 42" Long, 28" Wide, gently used, new condition. $50. Ext. 4929.

GUITAR CASE – Ovation Hardshell Case, Like New Cond/$35. Rich, Ext. 8186.

SURF BOARD – "Roxy", 7.5', light blue w/ pink detail, cushioned non-slip surface, leach incld, excel cond, $300. 219-7196.

THULE ROOF SOFT BAG – Escape II soft bag, 15 cf storage, works on any vehicle w/ side rails, excel shape, $75. shrey@bnl.gov.

TREADMILL – Landice 8700 programmable, 3hp motor, 10 yrs old, lightly used, ask/$250. Mike, 476-5810.

YANKEE TIX IN BALTIMORE – 6/tix (Sec 324, R6, Seats 19-24), vs Balt. Orioles @ Camden Yards, Sat 9/8, 7:05p. $35/ea. 929-7289.

YANKEE TICKETS – vs Baltimore, Sat 9/1, 1:05 pm, field level seats, cushioned, sec 133 2/seats/$150 for pair. Ext. 8162.

Tools, House & Garden

LAWN TRACTOR – Agway/MTD, 14.5 HP, 42" cut, $650, 16" chainsaw, $75, Crftsmn 10" band saw, $85, 10" tablesaw, $75. 831-3469.

Miscellaneous

CAR SEAT – Britax Roundabout 55 Convertible, mildly used, $99, email for pics. Eli, Ext. 5910 or istavitski@bnl.gov.

TELESCOPE – Celestron Pwersker, user-friendly 127 EQ. two 1.25" eyepces; 127mm Grmn Equtrial reflector; Ask: $70. Ext. 7370.

CONCERT TICKETS – 2/Florence & The Machine,$150/pair. SOLD OUT concert!! comes w/VIP entrance. 559-410-0967.

ELECTRIC GUITAR – 1960s Kimberly Guitar (4 pick-up) & Lafayette amplifier w/2 Jensen 12" spkrs. Extras. Best offer over $200. Ext. 4450.

EZGOAL OUTDOOR LACROSSE WALL – 1/mo old, barely used, $200; Gas Grill, $150. u-pick-up. dmcarthur@bnl.gov.

FAMILY PARTY GAME, WII – 30 games in 1/ pckge, outdr fun Ed, never opened. Ext. 5753.

IBENEZ GUITAR & AMPLIFIER – combo start up kit, gd cond/$100; Violin w/ case/$50. ERIK, 578-9365.

PIANO AND BENCH – Yamaha, walnut, excel cond, $1,500. 288-3112.

PIANO, UPRIGHT – Kohler & Campbell, 57"long-38"high-26"deep. $300. 922-3985.

TOYS – Acrobat Bar $20, Hulk Chair $5, Toss Across $5, Play Hut $15, FP Basketball Hoop $15, more. pics. avail. difilip@bnl.gov.

Community Involvement

CAR SHOW AT THE BIG DUCK – Cars and Vendors Wanted- 9:00 to 4:00 Sunday, 9/16 rain date 9/23. Cars $15 in advance, Vendor spots $40. Info: 284-3737 or visit bigduck.org. Ext. 8962.

14TH ANNUAL BAR-B-QUE – Cycletrons Motorcycle Clubs family Bar-B-Q, Sat. 9/15, at BNL Gazebo, noon. $10pp, kids under 12 free. Food, fun, games, 50/50.All welcome. Andy x-5786,Rich x-3386. Frank, Ext. 2022.

BUILDING BUSINESS EXPO – FREE 9/27/12 5:30-8:00pm @ Brookhaven Town Hall, Farmingville. Over 60 exhibit tables. Call 631 451-6563 for more info. www.BrookhavenBAC.org. Jill, Ext. 3173.

Wanted

ADOPT-A-PLATOON – Monetary donations gratefully accepted towards mailing shipments to our platoon stationed overseas and to send goodie packages to BNL family members. Thank you. Joanne, jrula@bnl.gov.

BNL FAMILY MEMBERS IN MILITARY – If you have a family member who has been deployed overseas, please contact Adopt-a-Platoon so we may send them a goodie package. Joanne, jrula@bnl.gov.

ENCLOSED TRAILER – size to fit Harley. Joe, 831-4830 or mheinrich@bnl.gov.

HOUSE FOR RENT IN LAKE GEORGE – looking to rent house/cottage in/near Lake George from 8/31-9/2 that can accomodate 7 adults. 646-339-5777.

PLASTIC STORAGE SHED – looking for a plastic storage shed 7'x7' or larger, reasonable price. Peter, Ext. 5551, 772-4751.

For Rent

BROOKHAVEN HAMLET – 2 bdrm hse, quiet, wd flrs, f/p, all-season porch w/heat, full bsmt, yd, walk to water, S.Country Schls, util add'l. $1,650/mo neg. 516-885-5174.

CALLICOON, NY – Villa Roma resort. Golf. Hiking. POOL 2bdrm 2bath Timeshare Sept 2-9. $700/wk. 806-2124 or progers@bnl.gov.

CORAM – priv rm & b/r, share lg home w/2 males, $550/mo incls all, off stt prkg, quiet, furnd/unfurnd, backgrd/credit check, 1st mo rent/1 mo sec. $550/mo. Ext. 8477.

EAST SETAUKET – Three Village School District, Town-hse, 9/yrs young, 3 bdrms, 2.5 ba, water view; 1 gar, 1800 sq ft. $2,480/mo neg. Ext. 7370, 331-0311.

MANORVILLE – gated comm, Townhse,2 bdrms, 2 bath, l/r, d/r, kitch, 1 car gar, starting Oct1st-April 30th, plus util, non smkr, no pets. $1,250/mo. 878-8442.

MIDDLE ISLAND – lg 2nd flr 2/bdr apt in Fairfield Village, avail immed. $1,450/mo neg. Ext. 2008, 806-4935.

N. SHIRLEY – 1 bdrm furn apt,ground flr, nr Lab & shopping ctr, pvt ent, util inc, no smkg/ pets, 1mo rent/sec. $800/mo. Ext. 3849.

RIDGE – oversized legal 1 bdrm apt, a/c, util incl, no pets/smkr, 1 mo sec. $1,300/ mo. 275-0694.

RIDGE – rm for rent, all utils incld plus int, mins to BNL. $600/mo. 917-721-2277.

Ballroom Dance Lessons Start, 9/5

The BNL Ballroom Dance Club will start a new series of six lessons on Wednesday, September 5, in the North Ballroom at the Brookhaven Center.

- 5.30 p.m. Beginner Foxtrot
- 6.30 p.m. Intermediate Hustle
- 7.30 p.m. Intermediate Bolero

The cost is $45 per person for each six-week series. The class on September 12 will be postponed because of a BNL blood drive. For the beginners, foxtrot is really basic for all the smooth dances. Hustle is danced to disco music, and bolero is danced to a very slow rumba.

For registration information, contact Vinita Ghosh, Ext. 6226, *ghoshvj@bnl.gov*; Arup Ghosh, Ext. 3974, *aghosh@bnl.gov*; Mike Hanson, Ext. 2947, *hanson@bnl.gov*; or John Millener, Ext. 3853, *millener@bnl.gov*, or go to *http://1.usa.gov/MNg6Zq*.

RIVERHEAD – 3 bdrm, 2 full ba, ranch, kit, dw, l/r, d/r, w/d, gar, new furnace, nr shops, no smkg/pets, refs, credit ck reqd, 1/mo sec + util, Sec8 ok. $2,150/mo. 512-6470.

SHOREHAM – 1 bdrm furn apt, l/r, d/r, full kitch & ba, pvt ent/drvwy, no smkg/pets, util incl, 1/mth sec, 5 min to Lab. $1,150/ mo. Judy, 375-7959.

WADING RIVER – 1 bdrm apt, eik, lg l/r, full bath, priv ent, 10 min to BNL, util incl, 1 mo sec, single non smkr only. $1,000/ mo. 929-3419.

For Sale

CORAM – lg 1 bdrm co-op, updated kitch & b/r, laundry across from unit, in/outdr pool & gym. $104,900 neg. Warren, Ext. 8329 or whalbig@bnl.gov.

EAST SETAUKET – 3 Village Sch Distr; Town-hse Birch; 3 bdrm, 2.5 ba, water view; 1 gar; 1800 Sq ft, 1st flr, Ef, Lr w/gas fpl, $384,000 neg. Ext. 7370, 331-0311.

PORT JEFF STATION – 3 BR 2 bath Coop (2nd flr), new: bathrms, neutral w/w rugs, appliances. Gated comm w/swim pool, BBQ, laundry on prem. $142,000. 431-4551.

RIDGE – mins to Lab, 3 bdrm, 1 ba, l/r, laundry, granite kitch, new applis, 1 car gar, cac, igs, full finished bsmt, new roof, wood flrs. $259,000 neg. Joe, Ext. 3252.

ROCKY PT – lg, nicely landscaped 3/ bdrm, 1.5 bth ranch, walk to beach, 15 min to Lab. $244,900 neg. 744-8215.

SAYVILLE – Expnd'd ranch, 10 rms + Florida Rm. Den w/fp, 3BR & 1 1/2 ba up, 3 rms + 1/2 ba dwn, IGP, CAC, 1 car gar. New kitch, heating, gutters. 1st $350,000. 750-3385.

SMITHTOWN – Open & airy high ranch,v/ priv dd end, rm for Mom suite, fp, gar, attic, master + 3 bdrms, 3 ba, office, lndry rm, walk town, RR. $429,000 neg. 516-808-3422.

the Bulletin

Published weekly by the Media & Communications Office for the employees, facility users, and retirees of Brookhaven National Laboratory.

Liz Seubert, editor
Joe Gettler, assistant editor
Roger Stoutenburgh, photographer

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

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