

Lab Director Sam Aronson Elected Vice President of APS

Sam Aronson, BNL Director, has been elected to serve as Vice President of the American Physical Society (APS), one of the country's leading science organizations. Beginning in January 2013, Aronson will spend four years in key leadership roles, including president, representing the nearly 50,000 top scientists that comprise the APS.

Aronson was elected to APS Fellow in 2001, an honor limited to no more than one half of one percent of its total membership in a given year. An APS fellowship indicates recognition by leading scientists for singular contributions to physics, and election to its leadership signifies one of the highest honors in the U.S. physics community.

"I am much honored to have been given the opportunity to lead the APS. I hope to work with the rest of the leadership team over the next few years to leverage APS' considerable influence in advocating on



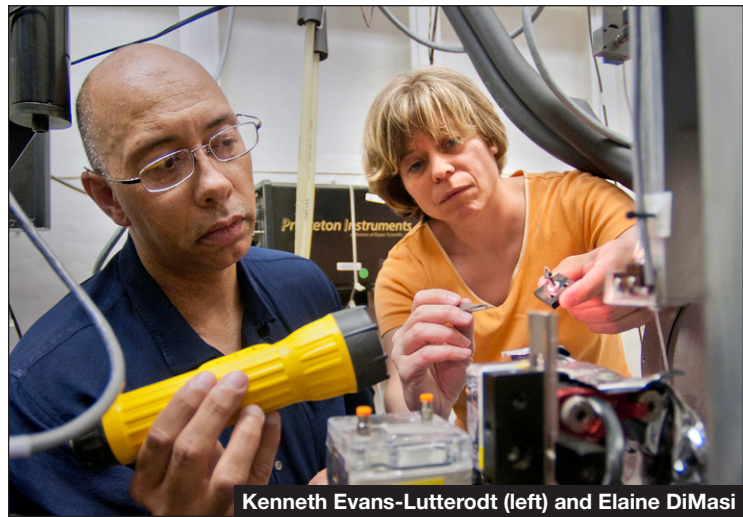
behalf of the U.S. physics community," said Aronson.

Aronson, who became BNL's Director in 2006, will serve in 2013 as the APS Vice President, and in the successive three years he will serve as President Elect, President, and Past President. During all four years, he will be a member of the APS Council and Executive Board, in addition to chairing and serving on other committees with responsibilities ranging from public outreach to fellowship selection.

The APS, a volunteer organization that relies upon the dedication of its member scientists and elected officers, is dedicated to supporting and promoting the global physics community and helping drive advances that will benefit humanity. Aronson will work closely with the APS as it issues research journals, conducts scientific meetings, and maintains aggressive international education, and outreach programs.

See *APS VP Aronson* on p. 2

Underwater Armor & the NSLS...



Kenneth Evans-Lutterodt (left) and Elaine DiMasi

The news release below, "Mantis Shrimp Could Inspire New Body Armor," was issued by the University of California, Riverside.

Brookhaven scientists played key roles in this experiment, using beamlines at the National Synchrotron Light Source (NSLS) to reveal the composition and structure of the mantis shrimp club. Physicists Elaine DiMasi and Kenneth Evans-Lutterodt performed x-ray diffraction experiments at two NSLS beamlines, combining expertise in high-throughput methods with high spatial resolution techniques to map the intricately structured samples on the whole-organ (millimeter) and fine-grained (micrometer) scales. The results provided crucial details about the multi-tiered structure of the biological "hammer," from the hard, crystallized minerals of the impact surface down to the underlying, shock-absorbing matrix of fibrous chitin, a complex sugar.

The micro-diffraction instrument used in this experiment is not available commercially and owes its assembly to efforts by Brookhaven Lab's Rick Greene, Gary Nintzel, and the recently retired Shu Cheung and Tony Lenhard. Read the release below:

Mantis Shrimp Could Inspire New Body Armor

Military body armor and vehicle and aircraft frames could be transformed by incorporating the unique structure of the club-like arm of a crustacean that looks like an armored caterpillar, according to findings by a team of researchers at the University of California, Riverside's Bourns College of Engineering and elsewhere published online on June 8 in the journal *Science*.

The bright orange fist-like club of the mantis shrimp, or stomatopod, a 4-inch long crustacean found in tropical waters,

accelerates underwater faster than a 22-caliber bullet. Repeated blows can destroy mollusk shells and crab exoskeletons, both of which have been studied for decades for their impact-resistant qualities.

The power of the mantis shrimp is exciting, but David Kisailus, an assistant professor at the Bourns College of Engineering, and his collaborators were interested in what enabled the club to withstand 50,000 high-velocity strikes on prey during...

See *Shrimp Club* on p. 3

Carbon is Key for Getting Algae to Pump Out More Oil

Findings may lead to new ways to produce raw materials for renewable fuels in microscopic "green factories"

Overtuning two long-held misconceptions about oil production in algae, scientists at BNL have shown that ramping up the microbes' overall metabolism by feeding them more carbon increases oil production as the organisms continue to grow. The findings — published online in the journal *Plant and Cell Physiology* on May 28, 2012 — may point to new ways to turn photosynthetic green algae into tiny "green factories" for producing raw materials for alternative fuels. This research was funded by the DOE Office of Science and the DOE Office of Energy Efficiency and Renewable Energy.

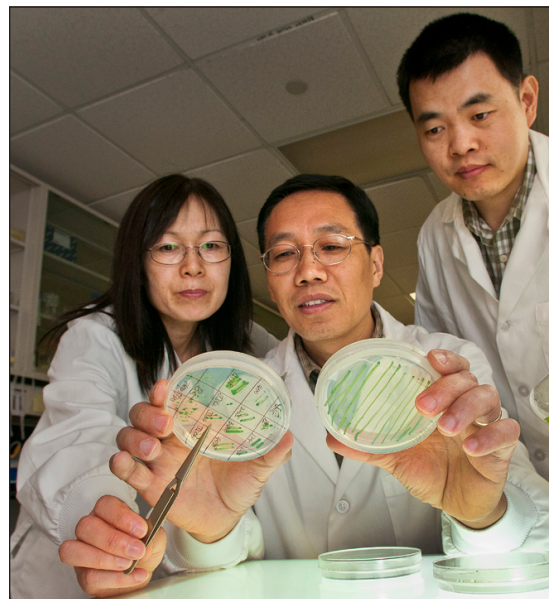
"We are interested in algae because they grow very quickly and can efficiently convert carbon dioxide into carbon-chain molecules like starch and oils," said biologist Changcheng Xu, the paper's lead author. With eight times the energy density of starch, algal oil in particular could be an ideal raw material for making biodiesel and other renewable fuels.

But there have been some problems turning microscopic algae into oil producing factories.

For one thing, when the tiny microbes take in carbon dioxide for photosynthesis, they preferentially convert the carbon into starch rather than oils. "Normally, algae produce very little oil," Xu said.

Before the current research, the only way scientists knew to tip the balance in favor of oil production was to starve the algae of certain key nutrients, like nitrogen. Oil output would increase, but the algae would stop growing — not ideal for continuous production.

Another issue was that scientists didn't know much about the details of oil biochemistry in algae. "Much of what we thought we knew was inferred from studies performed on higher plants," said biochemist John Shanklin, a co-author who has



Joseph Rubino D1250612

BNL researchers Jilian Fan, Changcheng Xu, and Chengshi Yan with samples that were shown to increase oil production in response to excess carbon.

conducted extensive research on plant oil production. Recent studies have hinted at big differences between the microbial algae and their more complex photosynthetic relatives.

"Our goal was to learn all we could about the factors that contribute to oil production in algae, including those that control metabolic switching between starch and oil, to see if we could shift the balance to oil production without stopping algae growth," Xu said.

The scientists grew cultures of *Chlamydomonas reinhardtii* — the "fruit fly" of algae — under a...

See *Algae Pumping Oil* on p. 3

\$27 Million Award Bolsters Research Computing Grid

Every day, researchers add another sea of data to an ocean of knowledge on the world around us — billions on top of billions of measurements, images, and observations of the tiniest subatomic particles up to the movement of planets and stars.

"Making sense of that — simulating, mapping, analyzing — this is how researchers work these days," said Miron Livny, computer sciences professor at the University of Wisconsin-Madison. "More and more researchers need more and more computing power to support that work."

To that end, the DOE Office of Science and the National Science Foundation (NSF) have committed up to \$27 million to the Open Science Grid (OSG), a nine-member partnership extending the reach of distributed high-throughput computing capabilities.

Distributed computing musters the power of a network of machines that reside at different institutions to make the best use of all available processing and storage capacity, giving scientists the muscle of a supercomputer that may otherwise be out of reach.

Expanded over the last six years to include more than 80 sites contributing users, data storage, and processing capacity, OSG now delivers more than 2 million computing hours and moves about a third of a petabyte of data on a daily basis.

"The commitment from the two agencies will take the



Left: Michael Ernst, an Open Science Grid co-principal investigator who directs the RHIC/ATLAS Computing Facility at BNL and coordinates computing activities across the United States for ATLAS, one of the largest particle physics experiments at Europe's Large Hadron Collider (LHC) at CERN, Switzerland.

"Computing know-how is providing our research in nuclear and particle physics at Brookhaven a significant advantage in the global race for discoveries at the Relativistic Heavy Ion Collider (RHIC) and the LHC," Ernst said. "As a computational scientist who invents, develops, and ultimately operates new ways of doing science with computers, I am very excited when the tools we develop for use in nuclear and particle physics find widespread application across biology, chemistry, economics, engineering, mathematics, medicine, and physics."

Heavy Ion Collider/ATLAS Computing Facility and coordinates computing activities across the United States for ATLAS, one of the LHC's largest particle physics experiments.

"Moving forward, the OSG will continue to bring these principles and technologies to the benefit of new research communities, and also expand its services, integrating networks, data and ever more complex user workflows," said Lothar Bauerdick, OSG Executive Director and head of the U.S. LHC Compact Muon Solenoid experiment software and computing project.

OSG, a full partner in the NSF Extreme Digital program and a...

See *Computing Grid* on p. 2

APS VP Aronson from p. 1

Aronson earned his degrees in physics from Columbia University and joined BNL as an associate physicist in 1978. Over the following decades, he rose through the ranks of the Lab's Nuclear and Particle Physics Directorate, led the groundbreaking PHENIX detector collaboration during construction of the Relativistic Heavy Ion Collider, and guided the Lab toward major new initiatives aimed at addressing the country's pressing energy challenges. He was elected a Fellow of the American Association for the Advancement of Science (AAAS) in 2005.

Recently, Aronson served as Chair of the National Laboratory Directors' Council and was recognized by the Federal Laboratory Consortium for enhancing the development and commercialization of Lab technologies through patents, licensing, and collaborations with industrial partners. He announced earlier this year that he will step down as Lab Director once a successor is found, and he plans to shift his focus back to research. — Justin Eure

Computing Grid from p. 1

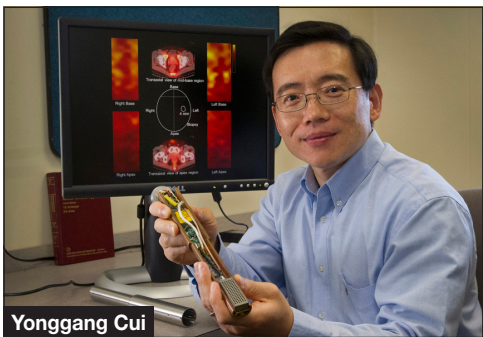
...member of the XSEDE (Extreme Science & Engineering Discovery Environment) Federation, will field new tools for distributed computing to facilitate sharing of computational resources both on and between campuses.

"The OSG has been developing the Virtual Data Toolkit [VDT] for over 10 years," said Frank Würthwein, an OSG co-principal investigator and physics professor at the University of California, San Diego. "This software service acts as an anchor for the distributed high-throughput computing community, supporting components that researchers need but are no longer supported elsewhere. Over the next five years, the OSG software services will expand into new, more community-specific, integrated software solutions via the VDT."

The DOE Office of Science portion of the funding — up to \$8.2 million — will support distributed computing efforts based at DOE national laboratories that make masses of data from experiments at the LHC available to U.S. researchers at their home institutions. The balance of the funding, contributed by NSF, will be used to promote distributed computing resources at U.S. universities.

Under the new award, nine institutions will receive funding: BNL, Fermi National Accelerator Laboratory, the University of Chicago, University of Wisconsin-Madison, Indiana University, the University of California, San Diego, University of Illinois at Urbana-Champaign, University of Nebraska, and Information Sciences Institute at the University of Southern California.

"The members of the OSG Consortium are fully committed to collaborating over the next five years to make this project a success," said Ruth Pordes, Chair of the OSG Council and the Fermilab Computing Sector associate head for Grids. "By working together, the OSG project and the scientists who use the OSG will be able to achieve great things."



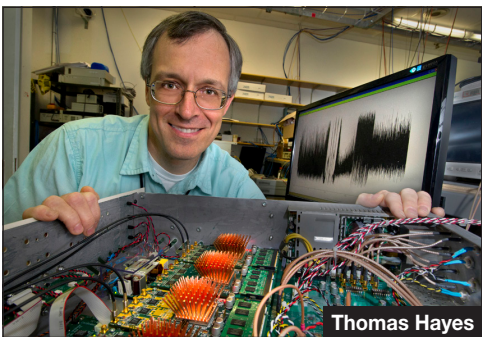
Yonggang Cui

Roger Stoutenburgh D0706012



Lewis Doom

Joseph Rubino D1100612



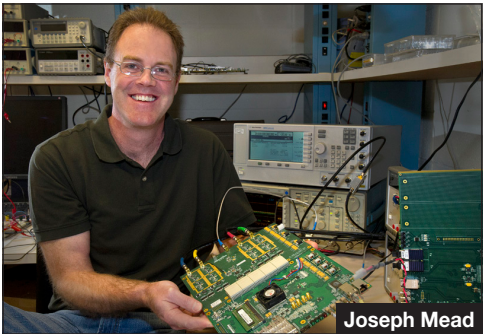
Thomas Hayes

Roger Stoutenburgh D0806012



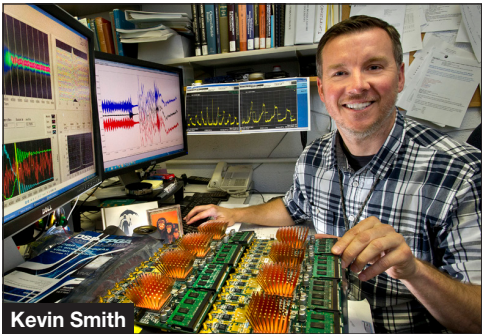
Andrew Marone

Roger Stoutenburgh D11306212



Joseph Mead

Roger Stoutenburgh D1100612



Kevin Smith

Roger Stoutenburgh D0806012

Meet 2012 Engineering Award Recipients Cui, Doom, Hayes, Marone, Mead, & Smith

Brookhaven Lab's Engineering Awards are given to recognize distinguished contributions to the Laboratory's engineering and computing objectives. The 2012 Engineering Awards were presented by Lanny Bates, Assistant Laboratory Director for Facilities & Operations, in June, and the recipients were:

Yonggang Cui, Nonproliferation & National Security Department

Yonggang Cui, an electrical engineer, is recognized for outstanding contributions to developing the compact gamma camera, ProxiScan.™ In this groundbreaking work, Cui benefitted from miniaturized Cadmium Zinc Telluride detectors developed for national security, and developed this technology for medical applications. Cui led most of the technical design work, including Monte-Carlo simulations, electronic system design, software development, and lab testing of the system. He provided vital support to the sponsor in the FDA 510(k) application, pre-clinical tests, and clinical trials. He effectively pushed this R&D project through prototyping to commercialization, and reinforced BNL's leadership position in the field of compact gamma cameras. Given the prevalence of prostate cancer in the male population, Cui's work on early diagnosis and effective treatment of the disease may prove pivotal to the quality of life of many people.

Lewis Doom, Photon Sciences Directorate

NSLS-II magnets are aligned on girders with a precision of 10 microns, which improves by an order of magnitude what has been previously achieved. This constitutes a technological breakthrough. The accomplishment is due to the effort

of a talented, committed, and ingenious team led by Lewis Doom. Doom carefully analyzed and optimized each step in the intricate alignment procedure, performed the engineering of the tooling and oversees the entire girder production and alignment process, meeting the challenge of precision aligning two girders per week.

Doom, who graduated from Vermont University with a bachelor's degree in engineering in 1981, joined the NSLS-II project in 2007 after an engineering career in industry. He soon became the lead engineer in the design of girders and girder alignment, beam line front-ends, and beam vacuum.

Thomas Hayes, Collider-Accelerator Department

Thomas Hayes is recognized for his outstanding contribution toward the design, engineering, installation, and operation of a new and innovative Low Level Radio Frequency (LLRF) platform in the Collider-Accelerator Department (C-AD), as well as for the design and engineering of the digital LLRF system originally deployed in the Relativistic Heavy Ion Collider (RHIC). He was responsible for one of the most important components of the RHIC LLRF system, the bunch-to-bucket phase detector. This detector provides the data necessary to dampen phase oscillations and thus maintain a small longitudinal beam size. The new LLRF platform design uses a small number of generic building blocks that can be programmed to address the needs of the many different C-AD radio frequency systems, and allows for a low spare inventory. To date, the system is deployed in RHIC, the Electron Beam Ion Source, the Energy Recovery Linac, and the RHIC Spin Tune Meter.

Andrew Marone, Superconducting Magnet Division

Andrew Marone has worked at BNL since 1987, with steadily growing responsibilities. For over two decades he has developed precision measuring systems to measure magnetic fields along the axes of superconducting magnets for particle accelerators, including the Relativistic Heavy Ion Collider (RHIC), the Large Hadron Collider at CERN in Switzerland, and others. He also invented the Superconducting Magnet Division's "Direct Wind" machines, which wind coils of infinite variation by depositing superconducting wire directly onto a magnet cold bore. Coils from these machines provide compact, precise magnetic fields and have been used at RHIC, DESY in Germany, China's Institute of High Energy Physics, KEK in Japan, and an anti-matter trap at CERN. Recently Marone has become responsible for the complete mechanical overhaul of the Magnet Division's aging cryogenic refrigerator. He redesigned parts and supervised the repair or replacement of major components. This work by Marone and others has the refrigerator operating with efficiency and reliability.

Joseph Mead, Instrumentation Division

Joseph Mead is a leading expert in extremely high data rate systems in a range of experimental programs. Some examples include a complex data acquisition system for high precision beam position monitors at the National Synchrotron Light Source II, an ultra-fast system for a new neutron diffractometer at the Nuclear Science & Technology Organisation in Australia, and new readout and trigger for the ATLAS calorimeter at CERN, Switzerland. In the latter, Mead

developed groundbreaking technologies for aggregate data rates in excess of 100 Petabits (100 million Gigabits) per second. He has led data acquisition efforts at BNL, Harvard, SLAC, and the *Laboratoire de l'Accélérateur Linéaire* in Paris for the Large Synoptic Survey Telescope international astrophysics project. In many of Mead's projects, both analog and digital components are incorporated on a common high frequency circuit board. His exceptional understanding of high speed, high bandwidth electronics and his ability to bring out the best from his staff represent an indispensable Laboratory asset.

Kevin Smith, Collider-Accelerator Department

Kevin Smith is being recognized for his outstanding contribution to the design, engineering, installation, and operation of a new and innovative Low Level Radio Frequency (LLRF) platform in the Collider-Accelerator Department as well as for the design and engineering of the Digital LLRF system for the Spallation Neutron Source ring at Oak Ridge National Laboratory. The new platform is applicable to all C-AD radio frequency systems in the Electron Beam Ion Source, the Booster, the Alternating Gradient Synchrotron, the Relativistic Heavy Ion Collider, and the Energy Recovery Linac that cover a wide range of frequencies from 100 kHz through 10 GHz and power levels from a few mW to MW.

Smith is a highly respected member of the global accelerator LLRF community. He is a member of the Scientific Program Committee for the biannual International LLRF Workshop series. He has been invited to present at a number of workshops and the Particle Accelerator Conference in March 2011, and has authored or co-authored numerous conference papers throughout the years.

TIAA-CREF to Mail Information Regarding Retirement Plan Fees

Employees who participate — or are eligible to participate — in the Brookhaven Science Associates, LLC (BSA) Retirement Plan and 401(k) Plan should receive mail at their home regarding a new Department of Labor regulation. This regulation is intended to help people make more informed decisions about their investment options. The mailing is expected to arrive between July 23 and August 30.

TIAA-CREF has aggregated its data with information from Vanguard and Fidelity into a consolidated fee disclosure package. On behalf of BSA, TIAA-CREF will mail one package for the BSA Retirement Plan

and a second for the 401(k) Plan. To understand services and fees associated with your retirement plan, you can also visit TIAA-CREF's website for helpful information, including understanding plan fees, how to receive the most value for your plan, and additional resources to help ensure that you are on the right track.

Please contact the Benefits Office if you have questions. You can also speak with a TIAA-CREF financial consultant Monday through Friday from 8 a.m. to 10 p.m. and Saturday from 9 a.m. to 6 p.m. (Eastern Time) by calling 800-842-2273.

Arrivals & Departures

— Arrivals —

Anthony GiambroneSite Res
Jose GomeraN&NS
Fei HeBiology
Michael Honigman.....Site Res
Joseph Stanisci Photon Scis
Gwen Wright CFN

— Departures —

Atanu Bhattacharya.....Chemistry
Robert ChandaSite Res
Stephen Springsteen.....Site Res

All-Employee Meeting Recap to Come

Stay tuned to *intranet.bnl.gov* for video and slides from Director Aronson's talk.

First Decade — ESOL Program Reaches Ten Years and Counting

Brookhaven's English for Speakers of Other Languages program turns ten this year. Students and teachers celebrated the milestone with a potluck lunch in the Recreation Building. Program Coordinator Jennifer Pieniazek, who is now out on maternity leave, spoke to the group about her experiences watching ESOL grow.

"Teaching you has taught me so much about cultures from around the world and different viewpoints," Pieniazek said. "I feel so grateful to have this opportunity to get to know you, to share with you the American culture, and to help you use English effectively in your daily life and work."

With the help of volunteer tutors James Higgins, Qingyan Ma, Anasatasia Bazilevskaya, and Izaskun Atorrasagasti Placencia, ESOL offers an array of free courses in English, Spanish, Russian, and French.

A typical class includes a mixture of grammar, vocabulary, and speaking lessons. Students practice tongue twisters, listen to music like Louis Armstrong's "What a Wonderful World," and read about American holidays and customs. Occasionally, the group goes on a field trip together.

Although the classes are nominally separated into different



Members of an English for Speakers of Other Languages class gather with volunteer tutors James Higgins (back center) and Qingyan Ma (bottom right).

levels, many students choose to attend a class every day in order to practice as much as possible.

"A very important part of our research work is communication with the other scientists and even with all the people who help us to implement our research. What foreign people need to know is English vocabulary, idioms, and the native style of conversation," said Galina Yakubova of the Environmental Research and Technology Division. Yakubova, who is from Russia, has been attending the classes for almost one year. "I have to learn to express myself."

Placencia, who teaches the Spanish classes, is also an ESOL English student. She came to Brookhaven with her husband,

who works in Instrumentation. "In many cases, our husbands speak better than we do, so we need to improve our English in real life," she explained.

Students often use what they learn in the classroom for real-world tasks like finding a job or buying a car. Additionally, ESOL tutors are available to help navigate these challenges.

"It's fun for me as an instructor because I get to meet people from different countries," said Higgins, who has been teaching English at Brookhaven for over eight years. "I get as much out of it as they do."

For more information about language classes at the Lab, visit the ESOL program website at bnl.gov/esol. — Aviva Hope Rutkin

Caterpillar's Armor from p. 1

...its lifespan. Essentially, how does something withstand 50,000 bullet impacts?

They found that the club is a highly complex structure, comprised of three specialized regions that work together to create a structure tougher than many engineered ceramics.

The first region, located at the impacting surface of the club, contains a high concentration of mineral, similar to that found in human bone, which supports the impact when the mantis shrimp strikes prey. Further inside, highly organized and rotated layers of chitin (a complex sugar) fibers dispersed in mineral act as a shock absorber, absorbing energy as stress waves pass through the club. Finally, the club is encapsulated on its sides by oriented chitin fibers, which wrap around the club, keeping it intact during these high velocity impacts.

"This club is stiff, yet it's light-weight and tough, making it incredibly impact tolerant and interestingly, shock resistant," Kisailus said. "That's the holy grail for materials engineers."

Kisailus said the potential applications in structural materials are widespread because the final product could be lighter weight and more impact resistant than existing products.

For example, with electric cars, less weight will reduce power consumption and increase driving range. With airplanes, less weight would reduce fuel costs, and better impact resistance would improve reliability and cut repair bills.

But Kisailus is primarily fo-



A mantis shrimp shows off its fist-like clubs, which can accelerate underwater faster than a 22-caliber bullet.

cused on improving military body armor, which can add 30 pounds to a service member's load. His goal is to develop a material that is one-third the weight and thickness of existing body armor.

Kisailus and James C. Weaver, who worked with Kisailus as a post-doctoral scholar and is now at Harvard University, began work on the mantis shrimp when Kisailus arrived at UC Riverside in 2007. They were later joined at UC Riverside by Garrett W. Milliron, a Ph.D. student, and Steven Herrera, an undergraduate student.

Kisailus, who studies the structures of marine animals for inspiration to develop new materials, has also worked with snails such as the abalone and chiton, as well as sea urchin.

Those animals were all studied for their defensive prowess, in other words their exterior protection from predators. The club of the mantis shrimp interested Kisailus because it's an offensive tool.

"We have been studying these

other organisms when we should have been studying this guy because he literally eats them for breakfast," Kisailus said.

The force created by the mantis shrimp's impact is more than 1,000 times its own weight. It's so powerful that Kisailus needs to keep it in a special aquarium in his lab so it doesn't break the glass.

Also, the acceleration of the club creates cavitation, meaning it shears the water, literally boiling it, forming cavitation bubbles that implode, yielding a secondary impact on the mantis shrimp's prey.

Kisailus and Pablo Zavattieri, of Purdue University, one of the co-authors of the *Science* paper, just received an additional \$590,000 in funding from the Air Force Office of Scientific Research to continue work on the stomatopod. They want to further understand the structure of the club and continue work designing materials inspired by that structure.

Since this project was multidisciplinary, Kisailus and his UC Riverside team continued working with Weaver after he moved on to Harvard University, and others including Ali Miserez, Nanyang Technical University in Singapore; Kenneth Evans-Lutterodt and Elaine DiMasi of Brookhaven; and Brook Swanson, Gonzaga University.

"The team we put together was excellent: having experts in zoology, mechanics, modeling, and synchrotron x-ray characterization gave us multiple views of the same problem, making it a very thorough investigation," Kisailus said.

Algae Pumping Oil from p. 1

...variety of nutrient conditions, with and without inhibitors that would limit specific biochemical pathways. They also studied a mutant *Chlamydomonas* that lacks the capacity to make starch. By comparing how much oil accumulated over time in the two strains across the various conditions, they were able to learn why carbon preferentially partitions into starch rather than oil, and how to affect the process.

The main finding was that feeding the algae more carbon (in the form of acetate) quickly maxed out the production of starch to the point that any additional carbon was channeled into high-gear oil production. And, most significantly, under the excess carbon condition and without nutrient deprivation, the microbes kept growing while producing oil.

"This overturns the previously held dogma that algae growth and increased oil production are mutually exclusive," Xu said.

The detailed studies, conducted mainly by Brookhaven research associates Jilian Fan and Chengshi Yan, showed that the amount of carbon was the key factor determining how much oil was produced: more carbon resulted in more oil; less carbon limited production. This was another surprise because a lot of approaches for increasing oil production have focused on the role of enzymes involved in producing fatty acids and oils. In this study, inhibiting enzyme production had little effect on oil output.

"This is an example of a substantial difference between algae and higher plants," said Shanklin.

In plants, the enzymes directly involved in the oil biosynthetic pathway are the limiting factors in oil production. In algae, the limiting step is not in the oil biosynthesis itself, but further back in central metabolism.

This is not all that different from what we see in human metabolism, Xu points out: Eating more carbon-rich carbohydrates pushes our metabolism to increase oil (fat) production and storage.

"It's kind of surprising that, in some ways, we're more like algae than higher plants are," Xu said, noting that scientists in other fields may be interested in the details of metabolic switching uncovered by this research.

But the next step for the Brookhaven team will be to look more closely at the differences in carbon partitioning in algae and plants. This part of the work will be led by co-author Jorg Schwender, an expert in metabolic flux studies. The team will also work to translate what they've learned in a model algal species into information that can help increase the yield of commercial algal strains for the production of raw materials for biofuels.

DOE's Office of Science is the single largest supporter of basic research in the physical sciences in the United States, and is working to address some of the most pressing challenges of our time. For more information, please visit science.energy.gov.

— Karen McNulty Walsh

CALENDAR Friday, 8/3

APAA Shows Korean Film, Part II
Noon. Berkner Hall.

Sunday, 8/5

*Summer Sundays: RHIC
10 a.m.-3 p.m. Berkner Hall and the Relativistic Heavy Ion Collider. Free program, open to the public. Visitors to the Lab of 16 and older must carry a photo I.D. See p.4.

— WEEK OF 8/6 —

Monday, 8/6

*Defensive Driving, Part I
6 p.m. Brookhaven Center South Room. See notice below. Part II will be held on 8/13.

Thursday, 8/9

Summer Interns Poster Session
12:30-1:25 p.m. Berkner Hall lobby. Poster Session for closing of summer internship program.

Summer Intern Closing Ceremony
2-4 p.m. Berkner Hall. Office of Education's Summer Internship Program Closing Ceremony. Invited speakers include Lab Director Sam Aronson, DOE Brookhaven Site Manager Frank Crescenzo, U.S. Congressman Tim Bishop, and State University of New York Chancellor Nancy Zimpher. All are welcome.

— WEEK OF 8/13 —

Monday, 8/13

*Defensive Driving, Part II
6 p.m. Brookhaven Center South Room. See notice below.

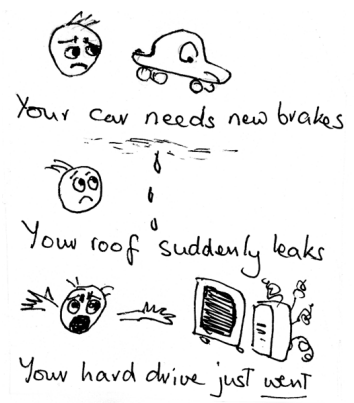
— WEEK OF 8/27 —

Tuesday, 8/28

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.

Defensive Driving: Two Parts, 8/6 & 13

The next six-hour Defensive Driving (Point & Insurance Reduction) course will be held in two parts on consecutive Mondays, August 6 and 13, in the Brookhaven Center South Room. The course will be from 6 to 9 p.m. on both nights. The course is open to BNL, BSA and DOE employees, BNL facility-users, contractors, guests, family members, and friends. The cost is \$33 per person. Preregistration is required. To sign up, call Ed Sierra, 821-1013, and leave a message. Or complete a New York DMV Approved Course Online for \$39.95 with discount (Use code: "SAVE10" for \$10 discount): www.lidrive-afe.com.



BUT none of that has to stop your giving to the BNL FOOD DRIVE!
BNL Food Drive containers are located in most buildings. The food is very much needed. Thank you.

See Something Unsafe? Call Ext. 8800



Alex Reben 00010712

Ergonomics Advice Tailor-made To Working Groups’ Tasks

By capturing repetitive work on video and with still images, the Lab’s ergonomic experts are able to provide detailed, personalized ergonomics advice to workers around the Lab. Learn more about this program from Safety & Health Representative Mark Marco in a video online: <http://bit.ly/OzeVNU>.

Safety makes science possible at Brookhaven National Laboratory

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 & Supplies

12 1999 DUCATI ST4 – 8.8K mi. Too much to list call for more details. \$4,500 neg. John, 772-359-9198.

11 TOYOTA RAV4 (MODEL 4432K) – 11.2K mi. Silv met, orig owner, 2.5L DOHC 4cyl w/dual vvt-i, 4spd, awd, a/t, a/c, p/s, p/w, abs, rf rack, moving sale, Free Garmin 1450LMT GPS on early closing. \$18,800 neg. 229-6162.

08 JEEP PATRIOT – 62K mi. vehicle in v/gd cond, orig owner, 2wd. \$9,000 neg. 828-6884.

04 BMW 325Xi – 130K mi. red w/blk htd lthr seats, p/moonrfl, sport pkg, xenon lights, 5sp, new clutch & tires, awd, 30mpg, gar. \$8,900. Ext. 2913, guida@bnl.gov.

04 SUZUKI DRZ400S – w/many aftermarket mods, cust. seat, Flex handlebars, Skid plate, carbon fiber front disk guard, Deer alert/avoidance syst. \$3,100 neg. Ext. 5335, 492-7175.

01 TOYOTA TACOMA – 43.3K mi. 4-cyl, 2wd, 4/spd a/t, a/c, 2.4 L eng, am/fm/cass, 4 spkrs, blk ext, styled steel whls, cargo bed liner, excel mech. \$9,000. Mary, Ext. 6344.

93 BUICK ROADMASTER WAGON – 77K mi. orig, new batt, front rotors, pads, runs well, ss exhaust, many opts. \$1,150 neg. Kenneth, Ext. 5110, 245-4757.

TRUCK TIRES – LT275/70R18 \$30. Call 404-8109.

Boats

13’ PERCEPTION KEOWEE 2 – Kayak seats 2+, v/stable, green, incls paddle, gd cond. \$300. Mark, Ext. 7978, 744-9308.

Furnishings & Appliances

COMPUTER DESK – blk w/wheels, well-made, excel/\$100; Pottery Barn Tanner Coffee Tbl, iron/glass, 24x48, \$25. 758-3952.

FREEZER – Imperial Heavy Duty Commercial, 20.8 cu ft, excel cond/\$500. 678-3299 or dgordon@bnl.gov.

GE MICROWAVE – GE 1.1 cu ft, 1100 watts microwave-Model WES1130D-MBB-in orig box/\$50. 929-4978.

GRACO SINGLE STROLLER – clean/\$30; Aloha Breezer, 30” tower fan, blk/\$30, all items in v/gd cond, non-smkg or pet family. Xiao, 344-1092 or xiaozhang@bnl.gov.

MICROWAVES – Emerson, .9 cu ft, 900 watts, mdl MW8997W, \$25; GE Microwave, 1.1 cu ft, 1100/watts model WES-1130DMMB-in orig box/\$50. 929-4978.

PIANO – Upright Hamilton built by Baldwin w/bench, LxHxW=55x45x25. \$400. Rachel, Ext. 4213, 681-7124.

SOFA – \$150, manuf. by Craftmaster Inc. Taylorsville, NC; excel cond, 84”l x 36”w, Floral pattern, too big for rm. 475-7891.

Audio, Video & Computers

12,000 XBOX LIVE POINTS – I have \$150 in Xbox live gift cards that I no longer need, will take \$130. Jesse, Ext. 2122 or jmontalto@bnl.gov.

LCD TV – 17” flat screen TV w/built-in DVD player, Articulating wall mount incl, Rick, Ext. 6183 or backofen@bnl.gov.

PHOTO PRINTER – HP Photosmart 7760 color/photo printer, hardly used, perfect cond, pics. \$50. Ext. 2017, bkosciuk@bnl.gov.

PRINTERS – HP Offc Jet wide format printer, brd new \$150; HP Desk Jet 9800 wide format printer, excel, \$65. 929-3388.

SLINGBOX PRO HD – Like new, in box. \$245. Ext. 3970 or mwahlert@bnl.gov.

TOSHIBA TV – Toshiba 14” TV - perfect for dorm rm/\$25; Panasonic 20” tv/35. Maryann, Ext. 4705, 929-4978 or mjulian@bnl.gov.

Sports, Hobbies & Pets

BAIT TACKLE BOX – \$7. Ext. 4905 or mbarsalo@bnl.gov.

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

CAMPER – KODIAK K235 – Exc Cond, 23’, slide out, dinette, couch, 2 qu beds, m/w, oven, stove, frig/freezer, full ba, heat/A/C, awning, cable, am/fm/CD, sleeps 6+ \$8k. 744-9308.

GAME TABLE – Poken & Blackjack, never used/\$40. Mary, Ext. 6344.

GOLF SET – Wilson Profile Senior Golfer Pkg Set, slightly used 12 pcs, w/stand bag, 2/shldr straps, set of head covers r/ hand player/\$190. 929-3388.

GITAR – Ibanez/Acoustic/elect mint, spruce top, mahog curved back, inlay, Fishman pickup/equalizer, hard case, 10 sets strings, \$325. Pete, Ext. 5761.

HYBRID TRAVEL TRAILER – 16’, Shamrock by Forest River, sleeps 6, a/c, full kitch, ba, am/fm/cd, antenna w/booster, awning; low wt, towable by light vehicles \$5450. 786-6814.

IBANEZ ACOUSTIC GUITAR – dark cherry red, fades to black w/a black scratch board, 1 yr old, perf cond, w/strap & picks, \$150. 744-0427, lacrosse95@yahoo.com.

MEN’S MOUNTAIN BIKE – 2012 Fuji Tahoe 4.0. Not even 50 miles. 19” frame. List \$1200 ask \$900. Mark, Ext. 3970.

PIANO – and bench, Yamaha, brown walnut, excel cond, \$1,500. 288-3112.

SURFBOARD – “Roxy”, 7.5’, light blue w/ pink details, cushioned non-slip surface, leash incld, excel cond, \$300. 219-7196.

Tools, House & Garden

ANDERSEN WINDOWS – Two, dble hung, 36x48. Wood inside, stained & poly’d. Installed in house for 9 years, gd shape. Screens also. \$50/obo. Jamie, Ext. 7781.

FIXED SKYLIGHTS – grt cond, 30”x45”. 404-8109.

WINDOW – Anderson, 25x70.5 vert.case/\$25; car recvr rack/\$40; Mach tool vise 6”/\$40; Backhoe Cat 01 580hrs, 420d, 4 in 1 bucket, extended hoe w/thumb/40K. 298-5625.

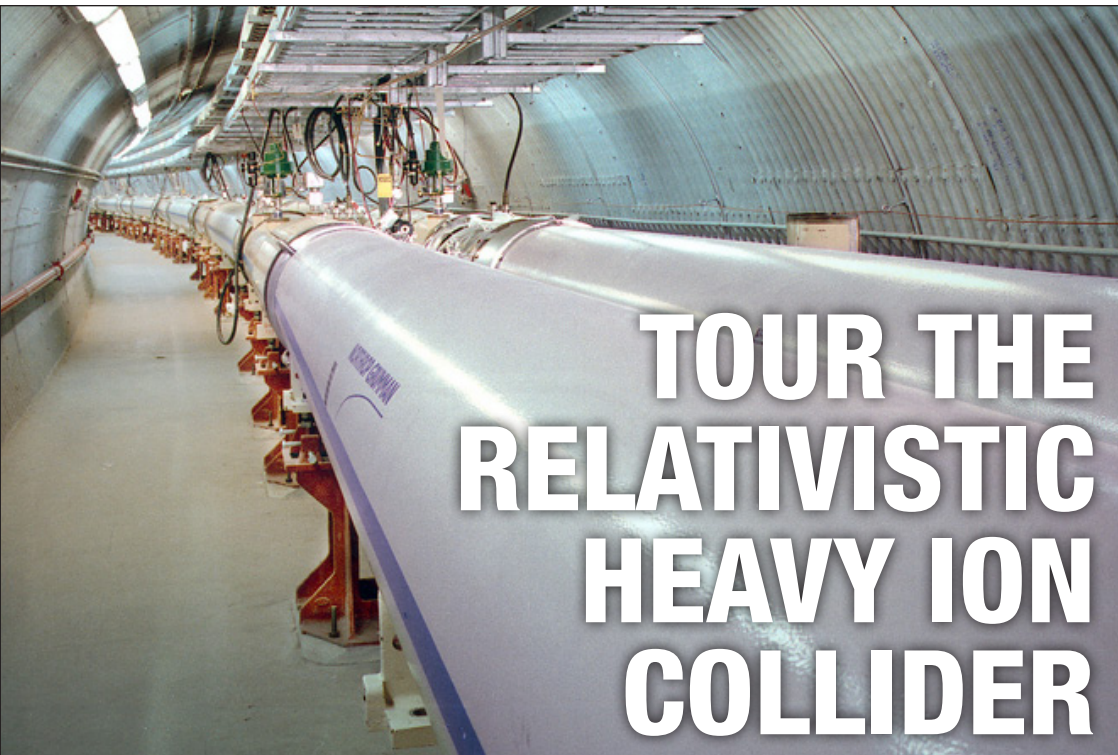
Free

MEDICAL ITEMS – Shower chair, bedside commode, walker, cane, bed pads. Lynda, Ext. 7235 or fitz@bnl.gov.

Miscellaneous

CHARCOAL GRILL – Master Forge Patio Barrel, steel ext, 16” x 18” cooking surface 280 sq in, new/\$69, used once, ask/\$50. Mary, Ext. 6344 or phraner@bnl.gov.

JIMMY BUFFETT @ JONES BEACH – 8/30. Orch G, Row PP, Seats 13&14: \$365. Orch E, Row SS, Seat 25: \$185. All face value tix. 478-8048 or thyberg@bnl.gov.



Roger Stoutenburgh 00230298

Last 2012 Summer Sunday, 8/5

Where can you go on a summer Sunday on Long Island to see exciting science shows, enjoy tours of world-class science facilities, and engage in hands-on science activities for the whole family — all for free? Visitors have been pouring into BNL on Summer Sundays since July 15 to enjoy a fun-filled day while learning about dynamic scientific developments at the Lab.

A different BNL facility has been featured each week. No reservations are needed, activities are first-come, first-served. Arrive any time between 10 a.m. and 3 p.m. — the last facility tour takes place at 3 p.m. Visitors age 16 and older must bring a photo I.D. Science shows will be held at noon, 1:30 p.m., and 3 p.m. in Berkner Hall. A cafeteria and gift shop, also in Berkner Hall, will be open until 2 p.m. and 4 p.m., respectively.

This Sunday, August 5: Atom Smashing Fun

Tour the Relativistic Heavy Ion Collider, a world-class particle accelerator where physicists re-create the conditions of the universe as it is believed to have existed microseconds after the Big Bang! See particle detectors as big as a house, and be mesmerized by the “Magic of Science” show.

KIDS STUFF – Cycle 12”, green, for 3-6 yrs old/\$5; frt facing car seat/\$5; booster seat/\$5, all in v/gd cond. 879-5263=.

TICKETS – craft wine and beer festival at Martha Clar, 4 Tkts avail, Aug 11th at 2pm. deb, 334-7809.

TUFF BIN STORAGE BOX – Lg capac blk storage box, molded-in hasps for more sec, rugged structural foam construction, 36”Lx21”dx19”h -used. Mary, Ext. 6344.

Yard & Garage Sales

EAST MORICHES – Collectibles, Science fiction, cookie jars, home items, baby items, and more. 8 AM to 2 PM, 44 Memorial Blvd. Ext. 5167.

WADING RIVER – Community Yard Sale – August 4, 9am – 3pm. 114 Hulse Ave, Wading River. Lois, 375-7264.

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, Ext. 8481.

BNL FAMILY MEMBERS IN MILITARY – If you have a family member that has been deployed overseas, please contact Adopt-a-Platoon so we may send them a goodie package. Joanne, Ext. 8481.

FIREARMS – wanted new or old, will pay Fair \$\$ depending on cond. Remember, no firearms on BNL site. Joe, 487-1479.

GROCERY STORE GIFT CARDS – Needed from King Kullen or Stop & Shop for families at Thee Island INN Soup Kitchen in Middle Island; any denomination greatly appreciated! Barbara, royce@bnl.gov.

HARLEY PARTS – old & new, buy & sell, ask for Frank. 435-689-1069.

JOHNSON OR EVINRUDE OUTBOARDS – 25hp, ‘85-’99, must have standard length shaft, running condition not nec, wanted for parts. Todd, Ext. 8464 or corwint@bnl.gov.

POP TOPS FROM SODA/BEER CANS – Collecting for Shriner’s Children’s Hospital. Please send or drop off @ Bldg. 400A, Transportation Office. Paula, Ext. 2535.

Lost & Found

HAT FOUND, BLDG. 515 – A baseball sytle, by vending machines, contact me w/ descript. Robert, Ext. 4123.

MOZART PIANO CONCERT SCORE – lost after 7/25 noon recital in Berkner Hall, Library copy in blue binding. Mail to G.Hind, Bldg 463, or call: Geoffrey, 878-0898.

For Rent

CANCUN, NY – Dec 1-8, Villa sleeps 6/\$1,00, suite sleeps 4/\$800 or 1 bdrm lockoff/microwave/coffee refrig. \$600/mo. 352-509-4265.

EAST PATCHOGUE – 1 bdrm apt, kitch, l/r, b/r, utils, cable/prtg incld, cac, d/w, microwave, Off st prkg, on cul-de-sac, no smkg. \$1,200/mo. Susan, 872-1874.

Upcoming BERA Trips

Purchase tickets at the BERA Store in Berkner (Bldg. 488), which is open Monday through Friday from 9 a.m. to 3 p.m. All tickets are non-refundable and are for those 21 years and older unless accompanied by BNL employee/parent. More details are available online: <http://www.bnl.gov/bera/recreation/events.asp>.

“Do As You Please” in NYC: Saturday, August 11. Depart BNL at 10 a.m., drop off near Bryant Park, and leave the city at 7 p.m. \$12 per person, no charge for children age two and under who free to sit on a parent’s lap.

Cruise Around NYC: Friday, August 17. Depart BNL at 4:45 p.m. and leave the marina at 11:15 p.m. Must be 21 and over. \$100 per person includes admission, dinner buffet, and luxury bus transportation.

U.S. Open Tennis: Tuesday, September 4, in Forest Hills, NY. Note: This is a regular workday. Tentative times: depart at 8:30 a.m., leave the event at 7:30 p.m. \$60 per person, includes admission and transportation.

Greenwich Village Scavenger Hunt: Saturday, September 22. Depart BNL at 9 a.m., leave the city at 5 p.m. Scavenger hunt from 11 a.m. to 1:30 p.m. and “Do As You Please” until 5 p.m. For ages 12 and older. \$40 per person.

NASCAR Race: Sunday, September 30, in Dover, Delaware. Depart BNL at 5 a.m., leave Dover at 6 p.m. \$200 per person includes admission, program, souvenir, and transportation on luxury bus with catered food and beverages.

MANOR PARK – bsmt apt, avail now, lg bdrm, lr/kitch combo, full bath, priv ent&off rd prkg, no smkg/pets, utils incl, 1 mo sec req. \$1,000/mo. Gina, 399-8491.

MASTIC – 3 bdrm 2 full bath hse, 10 min from bnl and 1 block from boat ramp and Moriches Bay. \$1,800/mo. Frank, Ext. 5217.

MIDDLE ISLAND – 2 bdrm mint condo, 1st flr, bamboo flrs, eik, l/r & den, 2nd flr: bdrms w/carpet, laundry area, full b/r & walk-in closet, \$1,700/mo neg. 384-5472.

MILLER PLACE – share furnd Colonial home in prof residential area, 10 mi to BNL, int, a/c/heat, TV cable, own bdrm, all incl responsible no pet non-smkr. \$750/mo. 744-8386.

N.SHIRLEY – 1 bdr furn apt, ground flr, close to Lab, clean and quiet, pvt ent, util incl, no smkg/pets, 1 mo rent/sec. \$850/mo. Ext. 3849.

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

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

SHIRLEY – 1 bdrm apt, l/r, full bath, eik, dble closet, priv ent, sep thermostat, off st prkg, all new appli, util incl, no smkg/pets, 1/mo rent/sec. \$1,100/mo. Thomas, 772-8529.

SHIRLEY – bdrm, no smkg/pets, clean, quiet neighborhd, 14 min to lab, all util, incl. \$600/mo. 344-4324.

SHOREHAM – 1 bdrm furn apt, l/r, d/r, full kitch & bath, no smkg/pets, pvt ent/drivwy, util incl, 1/mth sec, 5 min to Lab. \$1,150/mo. Judy, 375-7959 or judyb55@optonline.net.

For Sale

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

MANORVILLE – 8+ Acres in horse country, backs to Pine Barrens, trails, Peconic, Cape w/lg rms, 4 Bdrms, 3 ba, lg eik, den, lr/dr, <http://tinyurl.com/cz545>. \$525,000 neg. Nancy, Ext. 7548, 208-3066.

RONKONKOMA – 5 bdrm, 3.5/baths, both formals, updated kitch & bath, 2/masters, all new lighting, finished bsmt, igs, new fencing. \$390,000. dmcarthur@bnl.gov.

In Appreciation

A HUGE Thank You to all my friends and co-workers in the NS&T Dept. You were overwhelmingly supportive and generous during the illness and recent loss of my mother. Your outpouring of concern and thoughtfulness is appreciated.

– Lynda Fitz