

Molecular 'Nanowires' Could Yield Smaller, Faster Circuits

In the world of electronic circuits, smaller is better: Small circuits, such as those used in computers, run faster and process more data. One key to developing smaller circuits is making tiny wires.

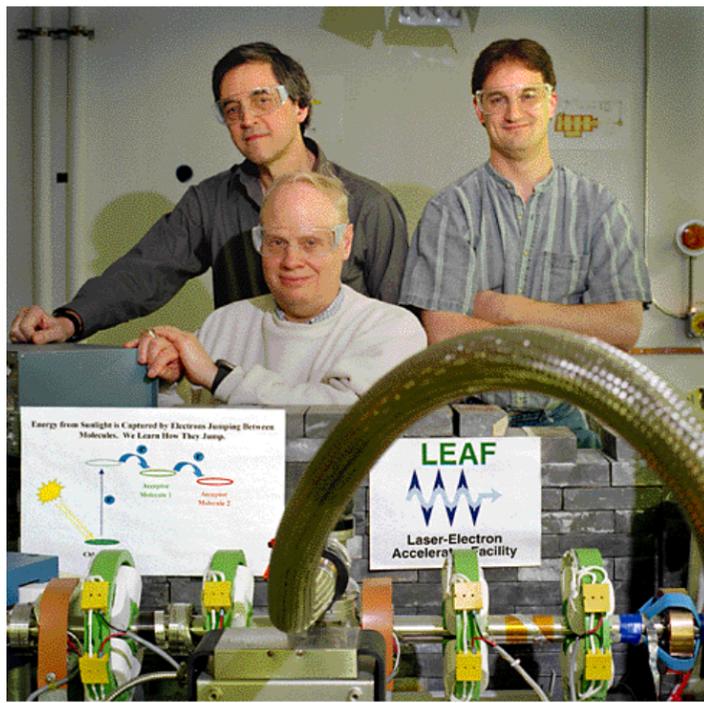
Scientists at Brookhaven and Stanford University think they have developed a good candidate, molecular wires millions of times smaller in diameter than a human hair. Described in a paper appearing in

Small circuits, such as those used in computers, run faster and process more data.

the February 23, 2001, issue of the journal *Science*, these "nanowires," so called because they have dimensions on the order of a nanometer (a billionth of a meter), have high rates of electron transfer with very low resistance.

"That means less impedance to the flow of current, with little or no loss of energy," says chemist John Smalley of the Energy Sciences and Technology Department (ES&T), the lead BNL researcher on the study.

In their search for tiny wires, Smalley and his colleagues, Stephen Feldberg, ES&T, and Marshall Newton and Andy Cook, Chemistry



From left, nanowire researchers Marshall Newton, John Smalley, and Andy Cook, in the Chemistry Department's Laser-Electron Accelerator Facility.

Department, as well as Christopher Chidsey, Hadley Sikes, and Steven Dudek — all at Stanford — were interested in an organic molecule called oligophenylenevinylene (OPV). "These molecules, synthesized at Stanford, are essentially 'chains' of repeating links made up of carbon and hydrogen atoms arranged to promote strong, long-range electronic interactions," Smalley says.

To learn if these molecules would make good wires, the scientists used the chain-like

molecules to connect a gold electrode and ferrocene, a substance capable of accepting and giving off electrons. Then,

One key to developing smaller circuits is making tiny wires.

using a technique developed at Brookhaven, they measured the rate of electron transfer through the chain.

The technique, called the indirect laser-induced tem-

perature jump method, or ILIT, uses a laser to heat up the gold electrode and change its electrical potential. A very sensitive voltmeter then measures the change in electrical potential over time as electrons move back and forth across the connection formed by the molecular wires. The faster the change, the faster the rate of

'Nanowires' have dimensions on the order of a billionth of a meter.

electron transfer, and the lower the resistance in the wire.

Two different ILIT instruments have been constructed, one of which uses the laser in the Chemistry Department's Laser Electron Accelerator Facility (LEAF). The very short pulse width of this laser (as short as 50 femtoseconds, or quadrillionths of a second) enables researchers to study extremely fast electron transfer reactions.

The scientists found a very high rate of electron transfer. "We think the electrons are actually popping across through a process called electron tunneling in less than 30 picoseconds (trillionths of a second)," Smalley says. "That means OPV might make pretty good comparatively low-resistance molecular wires."

(continued on page 2)

Hansen Wins Two Federal Awards

Doan Hansen, a project engineer in the Emergency Services Division, recently received two awards for his work on developing exposure guideline levels for selected airborne chemicals.

In two ceremonies in Washington, D.C., he was honored with then Vice President Al Gore's Hammer Award and the Environmental Protection Agency's (EPA) "Outstanding Contributions Award," presented by then EPA Administrator Carol Browner.



Doan Hansen

With the Hammer Award, he received a note from former Vice President Al Gore that reads: "With appreciation to Doan Hansen, Acute Exposure Guideline Levels Team, for your contribution to building a government that works better and costs less."

Hansen is cited on his EPA award plaque for "outstanding contributions" to the Acute Exposure Guideline Levels Program. Hansen represents DOE on the National Advisory Committee for Acute Exposure Guideline Levels for Hazardous Substances (AEGLS), which,

"The AEGLS guidelines will allow anyone involved in preparing for emergencies to have plans in place to reduce public injuries or deaths in case of an accidental chemical release."

since 1994, has been developing guidelines for exposures to acutely hazardous airborne chemicals.

"It is great to receive both of these awards," said Hansen. "The AEGLS guidelines will allow anyone involved in preparing for emergencies to have plans in place to reduce public injuries or deaths in case of an accidental chemical release."

"Many organizations participate in developing these guidelines," Hansen continued. "Everyone involved in preventing chemical exposures to communities — from scien

(continued on page 2)

Indusi Named Nonproliferation, National Security Chair

Joseph P. Indusi has been appointed chair of the Nonproliferation & National Security Department (N&NS), effective January 1. He had been acting chair of N&NS since May 2000, when the new department was created.

N&NS's staff of 33, as well as about six staff members from other BNL Departments, helps DOE and other government

N&NS's staff helps to safeguard nuclear materials in the U.S. and the world and helps to prevent the proliferation of nuclear, chemical and biological weapons.

agencies to safeguard nuclear materials in the U.S. and throughout the world, including Russia, and helps to prevent the proliferation of nuclear, chemical, and biological weapons. The Department has an annual budget of \$26 million, of which \$11 million is subcontracted to Russian nuclear facilities.

"We are entrusted with a job that is of utmost importance to the U.S. government, and we have a staff of experts who can do that job extremely well," Indusi said.

"A new initiative in our department will be to provide technical support in the area of anti-terrorism," he continued. The attack on the Twin Towers in New York City was the first major foreign terrorist incident directed against the U.S. on U.S. soil. We will be helping to safeguard U.S.



Joseph Indusi

facilities, particularly facilities in the Northeast, against such attack."

N&NS had its beginnings in the Technical Support Organization (TSO), established by the Atomic Energy Commission, the precursor to DOE, in 1968. BNL's N&NS has five major programs:

- U.S.-Russian Security: In cooperation with Russian nuclear facilities, provides technical assistance in promoting enhanced safeguards and security systems for the protection and accountability of weapons-grade nuclear materials, such as uranium and plutonium.
- Safeguards & Arms Control: Develops safeguards systems and arms control verification approaches and technology to stem the spread and reduce the danger

from nuclear, chemical, and biological weapons worldwide.

- International Safeguards: Provides technical oversight of projects designed to strengthen the International Atomic Energy Agency's safeguards.
- Environmental Threat Reduction: Addresses environmental and proliferation concerns associated with the dismantlement of Russian nuclear submarines.
- Initiatives for Proliferation Prevention: Supports nonproliferation of nuclear, chemical, and biological weapons by providing sustainable non-weapons related jobs to Russian weapons scientists.

Indusi earned a B.S. in electrical engineering from the University of Bridgeport in 1965, an M.S. in applied analysis from Stony Brook University (SBU) in 1969, and a Ph.D. in applied mathematics and statistics from SBU in 1971. After working as

A new initiative will be to provide technical support in the area of anti-terrorism.

a systems consultant at Burndy Corporation in Norwalk, Connecticut, Indusi joined the Lab's TSO in 1973, working as an assistant mathematician. In 1979, he moved to the Nuclear Waste Management Division as a mathematician, and, in 1980, returned to TSO. From 1986 to 2000, Indusi was Division Head of the Safeguards & Arms Control Division. In May 2000, he became acting chair of the department for which he now serves as chair.

— Diane Greenberg

Calendar of Laboratory Events

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

— EACH WEEK —

Tuesdays: Welcome Coffee

10-11:30 a.m. Recreation Bldg. Newcomers meet friends. Mimi Luccio, 821-1435
— Hospitality event

Wednesdays: On-Site Play Group

9:30 a.m.-11:30 a.m. Recreation Bldg. Parents meet while children play. Free, drop in any time. Monique de la Bey, 399-7656. — Hospitality event.

Wednesdays: beg.-adv. Dance Lessons

6-9 p.m., Brookhaven Ctr. North Ballroom
Marsha Belford, Ext. 5053.

Wednesdays: Yoga Practice Sessions

12:10-12:50 p.m., Recreation Bldg., free. For more information, contact Ext. 3924.

Tues. & Thurs: Aerobic Dance

5:15 p.m., Recreation Bldg. \$4 per class or \$35 for any ten classes. Pat Flood, Ext. 7886; or Susan Monteleone, Ext. 7235.

Mon., Tues., & Thurs:

Cardio Kickboxing

noon-1 p.m., Mon. & Thurs. and 5:15-6:15 p.m., Tues. & Thurs. Mary Wood, Ext. 5923, or wood2@bnl.gov.

— TODAY —

Friday, 3/9

GLOBE Meeting

For more information and for the time and location of the gay and lesbian club's meeting, contact Mike Loftus, Ext. 2960, or Chris Gardner, Ext. 4537.

Hospitality Pot Luck Party

5:30 p.m., Recreation Bldg. All are welcome, especially newcomers to the Lab. Bring your family, friends, and your favorite dish to share. For more information, contact Mimi Luccio, 821-1435, or Luise Woltering, 744-7964.

— NEXT WEEK —

Tuesday, 3/13

*EAP Outreach Program

noon-1 p.m., Berkner Hall Psychologist Cheryl Kurash will present a workshop entitled "Learning to Meditate, Part III". For more information, contact Dianne Polowczyk, Ext. 4567.

Income Tax Workshop

noon-1:30 p.m., Recreation Bldg.

Wednesday, 3/14

Voicemail Wireless Demo

10 a.m.-2:30 p.m., Berkner Hall For more information, contact Richard Goll, (516) 353-5900.

Molecular Nanowires

(cont'd.)

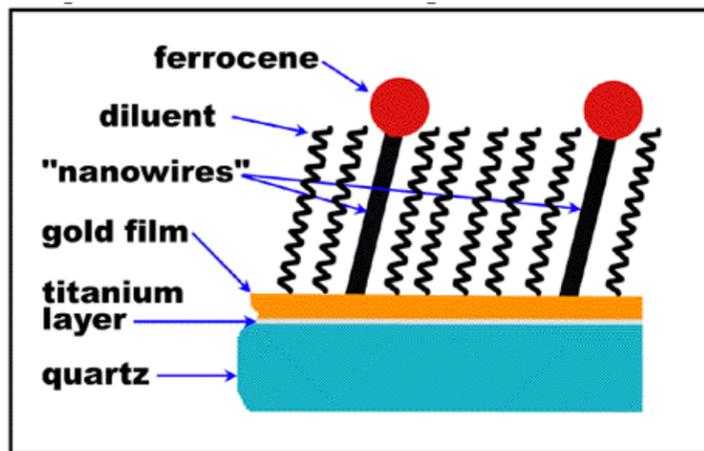
Furthermore, while the scientists expected the rate of electron transfer to decrease as more links were added to the molecular wire chain, making it longer, this did not happen. The rate remained fast, and the resistance low, up to lengths of nearly three nanometers — relatively long on a nanometer scale. "That means wiring circuits will be easier because you don't have to worry so much about the distances," Smalley says.

Smalley points out that the wires are not perfect, however. The resistance is not as low as it should be according to certain theoretical expectations. "Something

else seems to be increasing the resistance," he says. But this drawback could even turn into a benefit if the scientists can figure out what that factor is and how to control it. That might enable them to make electronic components such as tiny transistors and diodes, which work by varying the electrical resistance.

This research was funded by the U.S. Department of Energy, the National Science Foundation, the National Institute of General Medical Science, and the Stanford University Office of Technology Licensing.

— Karen McNulty Walsh



Experimental Setup

The BNL team measured the rate of electron transfer between a gold electrode and ferrocene molecules tethered together with OPV "nanowires" in a monolayer film comprised mostly of inert molecules. This film is in contact with an electrolyte solution. The scientists found a high rate of electron transfer, which means the wires have low resistance.

Meditation Workshop

Meditation is a time-proven method of relieving stress and promoting mental and physical health. Join Psychologist Cheryl Kurash next Tuesday, March 13, as she presents "Learning to Meditate, Part III" a workshop sponsored by the Employee Assistance Program from noon to 1 p.m. in Berkner Hall. Audio cassettes of the workshop will be available in the Research Library. Check your mailbox for registration forms. For more information, call Dianne Polowczyk, Ext. 4567.

Successful Book, Video Drive Improves Guest Services

During the recent Book and Video Drive, BNL, DOE, and Physical Review Society employees donated almost 2,000 books for the use of Lab guests and their families. Six libraries have been established: at the Recreation Building, Bldg. 317; Curie House, Bldg. 258; Cavendish House, Bldg. 153; Fleming House, Bldg. 180; the Guest House, Bldg. 257; and the residents' laundry, Bldg. 363.

The Recreation Building library, which, like the laundry library, includes children's books as well as novels, is open on Tuesdays 10a.m.-noon and 5:30-9:30 p.m.; and on Wednesdays and Thursdays, 5:30-9:30 p.m. Guests may return books to any of the libraries.

Videos are still needed, but anyone wishing to donate books should save them at home for the next book drive.

Hansen

(cont'd.)

tists and rule makers to industry and the public — sits at the same table and has input. By bringing everyone into the same room, we resolve and avoid conflicts, litigation, mistakes and oversights."

A certified industrial hygienist, Doan Hansen received a B.A. in biology in 1975 from Albion College, a master's degree in public health in 1981, and a Ph.D. in industrial health in 1986, both from the University of Michigan. He joined BNL in 1986 and joined the Emergency Management Division in 1999.

— Diane Greenberg

Letter to the Editor

Interns — Why Host One?

Every year, BNL staffers help to build our nation's scientific and technical workforce by hosting a summer student. Why do they do it?

For some, they're giving back to a mentoring process that enabled them to reach their goals. Others do it for the satisfaction it brings them seeing a young student learning in an exciting research environment like BNL. Still others have found that the project sitting on the mental shelf collecting dust can be brought to life and funded through the efforts of an intern.

Just ask Ady Hershcovitch. He has landed several projects through the assistance of interns. Whatever the reason, BNL has a long history of supporting the education of tomorrow's scientists and engineers.

The summer-undergraduate-student selection process is now under way, with fall selection close behind.

Three types of students are currently available through the Lab's Office of Educational Programs (OEP). The Energy Research Undergraduate Laboratory Fellowship accepts applicants from virtually any college or university. Community College Initiative students, from regional schools, are often mature, have workforce experience, and are highly motivated. The third program is for pre-service teachers — students who will become pre-college science teachers. Because this program gives them a research experience that will strengthen their classroom performance, hosting a pre-service teacher enables you to indirectly affect literally hundreds of students during that teacher's lifetime.

Most of a student's cost is funded through OEP by the DOE's Office of Science. Host departments/divisions cost share \$1,000 of each student's expense. If interested in hosting a student, you need to act quickly; the selection process closes on March 30, 2001.

Requests should be submitted no later than March 23, 2001. For more information about hosting a student, or for a standard request form, contact OEP, Ext. 4503, or review available students at <https://www.scied.science.doe.gov/secure/mentor/login.htm>. Note that the "s" at the end of "http" is necessary to gain access. We look forward to hearing from new and previous mentors alike about making your summer a memorable one by hosting a student.

— Ken White
OEP Interim Manager

MCSE Training

The Information Technology Division is sponsoring a Microsoft Certified System Engineering program.

Classes will be held in the evenings starting in April. For more information, contact Pam Mansfield, Ext. 7286, or pam@bnl.gov.

'Science, Politics, & Budgets' a talk by Peter Bond, Director's Office, will be held Thursday, March 15 noon

Berkner Hall, Room B

Sponsored by the
Brookhaven Organization
of Scientists
and
Friends of Brookhaven.

Bond plans to focus on two main topics: how scientists' role in the political process can be either destructive or constructive and how Washington, DC, works. You are invited to attend.

Service Awards

The following employees celebrated BNL service anniversaries during January 2001:

35 Years

James H. Bell
Central Shops

Hans Ludewig

Energy Sciences & Technology

Andrew J. McNerney

Collider Accelerator

Kenneth Wenger

Plant Engineering

30 Years

Stephen M. Shapiro

Physics

Shelby L. Williams

Procurement & Property Management

25 Years

Joan A. Barrow

Business Systems

Robert E. Caulfield

Staff Services

Peter Eterno Jr.

Plant Engineering

Lamar Gardner

Procurement & Property Management

Patricia A. Giacalone

Budget

David M. Gordon

Nonproliferation & National Security

Kenneth A. Kowalski

Plant Engineering

William R. Leigh-Manuell

Emergency Services

Juanita McKinney

Business Systems

Vinod Mubayi

Energy Sciences & Technology

Michele M. Rabatin

Nonproliferation & National Security

T. J. Reddick Jr.

Plant Engineering

John F. Ryan

Collider Accelerator

Thomas E. Walters

Plant Engineering

Charles E. Whiting

Procurement & Property Management

20 Years

Rolf H. Beuttenmuller

Instrumentation

Thomas R. Le Maire

Budget

Anthony C. Sturcken

Plant Engineering

Kevin M. Tisch

Plant Engineering

Abass Wessen

Plant Engineering

10 Years

Michael M. Blaskiewicz

Collider Accelerator

Susan L. K. Briggs

Environmental Services

Mildred A. Laster

Fiscal Services

Andrew J. Marone

Magnet

Gary L. Schroeder

CIGPA

Subhash Sengupta

Radiological Control

Douglas J. Warren

Waste Management

Five-Year-Old Boy Recovers After Seizure

Thanks to BNL Firefighters, Police Officers, English Classes

Last Thursday, Samuel Leite and his parents, Marcia and Marco Leite, who live in the BNL apartment area, stopped by the BNL firehouse to thank Fire/Rescue Group members for their timely response to a call for help last month.

On Thursday, February 8, five-year-old Samuel was suffering from a viral infection and a 103°F temperature. This triggered a febrile seizure — a seizure resulting from an elevated body temperature.

Marcia was alone with Samuel at the time. Suddenly, her son stopped breathing, and she knew she had to call for professional help.

For Marcia, whose native language is Portuguese, placing such a call could have been difficult. But, last fall, she had attended BNL's English for Speakers of Other Languages Program, run by Joe O'Connor, Medical Department, and sponsored by the Suffolk County Chapter of the Literacy Volunteers of America. As part of the program, Marcia and other class members had practiced several "survival skills," including placing a phone call to BNL's emergency dispatcher at Ext. 2222.

So, Marcia knew what to do. Her call was answered by Sergeant Louis Figueroa. "He was so kind and calm, and so was everyone who came to help," she said. "I can't thank everyone enough — they were all so kind and helped me to be less worried. I am so grateful."

BERA Elections

The BERA nominating committee has selected the following slate of candidates to run for the 2001 BERA Executive Board:

- Susan Cataldo Medical
- Charles Gardner C-A
- Jo Ann Reed ... Cont. & Proc.
- Peter Pohlot ES

From March 26 to 30, all eligible employees of BNL, DOE, and other permanent, on-site employees may cast ballots to elect two of the four candidates to serve on the BERA Board.

More information on the candidates and the election process will be published in next week's Bulletin.

March Into May

Physical Activity Program Begins 3/19

March Into May, a ten-week physical activity program, is designed to help everyone, regardless of fitness or activity level. Participants who sign up through the Health Promotion Program should receive a questionnaire and daily activity record from a contact person in their area.

Participants set personal goals for "moderate" or "vigorous" exercise, then check off points on the activity chart. One point is earned for 10 minutes of exercise, the point goal for a week being at least 10.

Last year, 303 employees participated in March into



Joined by his parents Marcia and Marco, 5-year-old Samuel Leite (center) stopped by the BNL firehouse to meet some of the people who came to his aid on February 8. Pictured are: (front, from left) Louis Figueroa, BNL Police Group; Ken Licata, BNL Fire Rescue Group; Joseph O'Connor, Medical Department (kneeling); Marcia Leite; Samuel Leite; Marco Leite; and Tony Realmuto, Fire Rescue; (back, from left) Jeffrey Davis, William Peterson, and William Strelecki, all of Fire Rescue. Not pictured: Daniel Chapman, Police Group.

The BNL ambulance was dispatched to the Leite's apartment. Firefighter Ken Licata, who was the acting Captain on February 8, said that when they arrived at the Leite's apartment at 9 p.m., firefighters William Peterson and William Sterlecki assessed the young boy. Samuel was just coming out of the seizure, dis-

oriented and unresponsive.

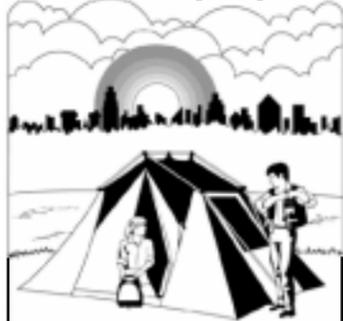
"We decided to take him, with his mother, in the BNL ambulance to St. Charles Hospital in Port Jefferson," said Licata. "He was treated and later released."

Samuel's father, Marco Leite, a visiting scientist working in the Physics Department, also expressed his grati-

tude to everyone who was involved, from O'Connor and the other literacy volunteers who help Lab visitors and their families become familiar with the language and what to do in an unexpected emergency, to the BNL Fire/Rescue group, who, as his wife had found, were so efficient and kind.

— John Galvin

Summer Camp Expo



On Wednesday, March 14, 11 a.m.-2 p.m., in Berkner Hall, several Long Island summer camps will provide facility and registration information to BNLeers.

For more information, contact Sue Foster, Ext. 2888, or foster2@bnl.gov.

Join BERA's Lab Community Events

For more information about the following events, visit the BERA Sales Office, or call Andrea Dehler, Ext. 3347.

Daffodil Sale

To benefit the American Cancer Society, order a \$7 bouquet of daffodils to pick up on Thursday, March 29, in the BERA Sales Office.

Book Fair

On March 28 & 29, 10 a.m.-3 p.m. discounted best-seller books will be on sale in Berkner Hall.

Spring Fling

Party with BNL friends and community at the Rock Hill Country Club, Friday, March

30, from 6 p.m. Hot buffet, DJ, cash bar, \$15. Buy tickets from Andrea Dehler, Ext. 3347, John McCaffrey, Ext. 2075; Louie Nieves, Ext. 4897; Laurie Pearl, Ext. 5520.

Atlantic City

On Saturday, April 21, 8 a.m.-10:30 p.m., bus with BERA to Resorts Hotel/Casino on the Atlantic City Boardwalk. \$25 per person includes bus transportation and a coin return with movies, games, free donuts on the bus.

Hot Hoops

Basketball scores from games on March 1

Chemically Imbalanced (55) vs. Titans (53)

Joel Carney 24 points (4 three-point shots)	Troy Mayo 18 points (3 three-point shots)
Shane Stadler 14	Charlie Edwards 9
Jan Chaloupka 6	Rob Singleton 8
Chris Fockenber 6	A Walker 6
Steve Springston 3	Pat Moylan 4
Todd Clatterbuck 2	Jim Rank 4
	Steve Jao 2
	Chuck Karns 2

Heavers (90) vs. Bombers (40)

Seth Legrand 30 points	Tracy Fountaine 12 points (1 three-point shot)
Jim Garrison 18 (3 three-point shots)	Nick Kling 6
Reggie Sanchez 18 (1 three-point shot)	Kevin Woodson 6
Al Boerner 10	Brian Hobson 4
Hector Machado 8 (2 three-point shots)	Mitch Williams 4 (1 three-point shot)
Sean Baugs 4	Tim Powers 3 (1 three-point shot)
Mike Malardi 2	Rusty Towell 3
	Andrew Meyer 2

Calendar

(continued)

*Summer Camp Expo

11 a.m. - 2 p.m., Berkner Hall
Long Island summer camps will be providing facility and registration information to BNLeers. For more information, contact Sue Foster, Ext. 2888, or foster2@bnl.gov.

Thursday, 3/15

Income Tax Workshop

noon-1:30 p.m., Recreation Bldg.

*Science, Politics, & Budgets Talk

Noon, Berkner Hall, Room B.
The talk will be presented by Peter Bond, Director's Office.

BERA Bridge Club

7 p.m., Berkner Hall cafeteria
For more information, contact Morris Strongson, Ext. 4192, mms@bnl.gov.

— WEEK OF 3/19 —

Monday, 3/19

BWIS Lecture

4 p.m., Berkner Hall
Mildred Dresselhaus, MIT Professor, and Former Director of DOE's Office of Science, will present a lecture entitled, "Perspectives on Women in Science" The lecture is free and open to the public.

Wednesday, 3/21

BERA Ski Trip

Brodie Mt., Massachusetts
\$45, includes bus transportation and lift ticket. Bus leaves Brookhaven Center at 5 a.m.

Noon Recital

noon, Berkner Hall
Matthew Hinsley and Jennifer Lynne Rhynne present "The Two Muses" a recital for flute and guitar. Free and open to the public.

Brookhaven Lecture

4 p.m., Berkner Hall.
Jose Rodriguez will speak on "Unraveling the Mysteries Behind Desulfurization Reactions."

Thursday, 3/22

Apheresis Blood Drive

Brookhaven Center. BNL volunteers from the previous apheresis drive are scheduled to donate platelets. For more information, contact Sue Foster, Ext. 2888, or foster2@bnl.gov.

Friday, 3/23

Women Engineers' Lunch Networking Meeting

Noon, Berkner Hall, Room A.
Contact Arlene Zhang, Ext. 5369.

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

Classified Advertisements

Placement Notices

The Lab's placement policy is to select the best-qualified candidate for an available position. Candidates are considered in the following order: (1) present employees within the department/division and/or appropriate bargaining unit, with preference for those within the immediate work group; (2) present employees within the Laboratory; and (3) outside applicants. In keeping with the Affirmative Action Plan, selections are made without regard to age, race, color, religion, national origin, sex, disability or veteran status. Each week, the Human Resources Division lists new placement notices, first, so employees may request consideration for themselves, and, second, for open recruitment. Because of the priority policy stated above, each listing does not necessarily represent an opportunity for all people. Except when operational needs require otherwise, positions will be open for one week after publication. For more information, contact the Employment Manager, Ext. 2882; call the JOBLINE, Ext. 7744 (344-7744), for a list of all job openings; use a TDD system to access job information by calling (631) 344-6018; or access current job openings on the World Wide Web at www.bnl.gov/JOBS/jobs.html.

OPEN RECRUITMENT - Opportunities for Laboratory employees and outside candidates.

MK8917. POSTDOCTORAL RESEARCH ASSOCIATE - Requires a Ph.D. in high-energy particle or nuclear physics and experience in techniques for event simulation and large-scale data analysis for multi-detector experiment. Knowledge of C++ is desirable. Will work on the Relativistic Heavy Ion Collider (RHIC) experiment, BRAHMS, and will take part in the data analysis, detector development, and running of the experiment. Under the direction of C. Chasman. Physics Department.

NS2041. SCIENTIFIC ASSOCIATE POSITION - Requires an MS or equivalent experience in physics or engineering, or comparable training to work in the NSLS hard x-ray microfabrication program. Knowledge of LabView programming, MS Office applications, and basic mechanical and electronic skills highly desirable. Will coordinate operation and development of the two NSLS micro-fabrication beamlines. National Synchrotron Light Source Department.

Defensive Driving

A six-hour defensive driving course will be offered on Saturday, March 31, 9 a.m.-3:30 p.m., in Berkner Hall, Room B. The course is open to BNL, BSA and DOE employees, BNL facility-users, and their families, at \$23 per person. To register, send a check to Empire Safety Council, care of Scott Zambelli, P.O. Box 670, Mount Sinai, NY 11766. All checks must be received by March 26. Include your phone number in case you need to be contacted.

Scotch Doubles

Enjoy the Scotch Doubles Tournament to be held on Sunday, March 25, beginning at 1:30 p.m. at the Port Jeff Bowl. The cost of \$38 per couple includes bowling, prizes, and buffet. The tournament is open to all the BNL community and their family members

and friends. Contact Debbie Keating, Bldg. 211, Ext. 3888, on weekdays, 8 a.m.-4:30 p.m., for information and applications. The application deadline is Friday, March 23.



the Bulletin

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LIZ SEUBERT, editor
JOHN GALVIN, reporter
ROGER STOUTENBURGH, photographer

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

Bldg. 134, P.O. Box 5000
Upton NY 11973-5000
phone (631)344-2345, fax (631) 344-3368
e-mail: bulletin@bnl.gov