

If You Knew SUSY...

In the quest to unify all known forces in nature by a common highest symmetry, some physicists have arrived at a theory called supersymmetry, or SUSY for short. Although the theory has been widely studied in many branches of physics, there has been no direct experimental evidence of SUSY except in one area — nuclear physics.

Nuclear physicist David Warner of BNL, collaborating with Richard Casten, head of the Neutron Nuclear Physics Group in BNL's Physics Department, as well as several other scientists from Grenoble, France, has succeeded in finding evidence for nuclear supersymmetry, in an experiment on platinum-195. In fact, Casten's group has an impressive track record in relation to SUSY, and indeed, to the general question of symmetries in nuclei.

Pre-SUSY

The story of SUSY goes back to 1974, according to Casten. That's the year Franco Iachello, now of Yale University, and Akito Arima, from the University of Tokyo, proposed a predecessor to SUSY, the Interacting Boson Approximation model, or IBA. IBA is applicable to even-even nuclei, that is, nuclei having even numbers of both protons and neutrons.

As Casten explains, throughout the history of nuclear physics, scientists have tried to come up with a theory that simplifies calculating the properties of nuclei. "Before IBA, it was an impossible task for most nuclei because the calculations were so complicated," he says. "Just to print out the results would probably take all the trees on Long Island!"

The standard picture of the nucleus shows a central mass of protons and neutrons, with additional protons and neutrons orbiting this core. There are different ways in which the particles can arrange themselves, and these arrangements lead to different types of motion. The IBA model only considers the types of motion where the protons pair up in certain ways with each other, and the same is true for the neutrons. Anything else is neglected and assumed to be unimportant.

"IBA greatly simplified the problem by making these pair assumptions, which then opened up a new way of calculating nuclear properties," says Casten.

Football and Basketballs

That new way exploits a mathematical technique called group theory. In the groups used in the IBA, there are

three categories of symmetries, which can be described by shapes. One corresponds to a basketball and can vibrate. The second resembles an American football, which can vibrate and rotate end-over-end. And the third is like a squashed football that flexes back and forth from one squashed shape to another. Such a nucleus can also vibrate and rotate.

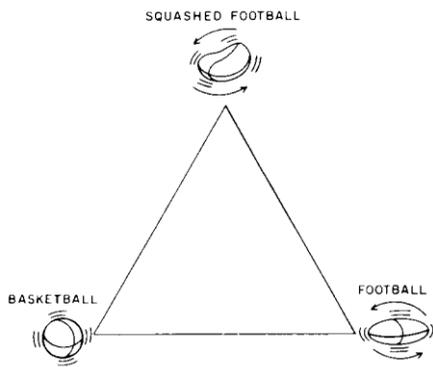
Limited evidence of basketballs and footballs had been found before Iachello and Arima developed the IBA. But the flexing, squashed football symmetry had never been seen.

Experimental Proof at BNL

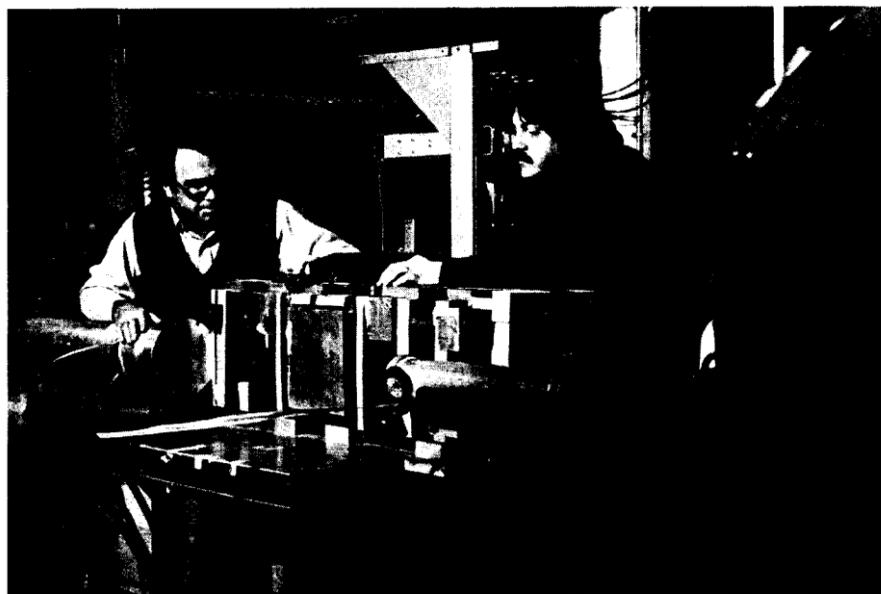
At this point, the story returns to Brookhaven, in 1977. "We were studying platinum-196 at the High Flux Beam Reactor," says Casten, the "we" including his graduate student Jolie Cizewski, whose thesis project was that experiment. "Using a technique called the (n,γ) reaction, we found something bizarre, something we had never seen before."

Then one week in July, Iachello came for a visit. "He had this weird symmetry, which his theory predicted," recalls Casten, "and we had a weird set of empirical results. We compared, and they were nearly identical." What Casten and Cizewski had found was evidence for the squashed football symmetry.

It seems that this discovery is what really put IBA on the map. "The IBA had been around for a few years, creating a lot of excitement," says



The triangle symbolizes the three IBA symmetries, represented by the fanciful drawings of the nuclear shapes corresponding to each symmetry. Nuclei that are intermediate in structure between these symmetries can be described by positions along the legs of the triangle or in interior positions. For such nuclei, the symmetries act as benchmarks that can be used to simplify the calculation of their properties.



At the High Flux Beam Reactor, Richard Casten (left) and David Warner check the alignment of a sample for (n,γ) studies.

Mort Rosen

Casten. "But here was a symmetry it predicted that hadn't been observed."

According to Casten, the IBA does not specify that all nuclei have to be one of the three shapes. It says merely that these shapes are available and that there can be intermediate ones as well. Indeed, what people had thought were examples of basketballs and footballs turned out to be intermediates. (One of the most famous of these is erbium-168, a nucleus studied at Brookhaven and Grenoble by Walter Davidson, now of the National Research Council in Ottawa, Warner, Casten, and others.)

In the last couple of years, Casten and collaborators from Cologne, in Germany, and Grenoble did a series of experiments on hafnium-178. Casten realized from the experimental results that this region of nuclei was the closest example yet of the football-shaped symmetry.

And, from 1984-85, Ani Apprahamian, a graduate student from Clark University working in Casten's group, discovered the first true example of a basketball-shaped nucleus during an experiment on cadmium-118. That work was done at TRISTAN, at the High Flux Beam Reactor, where highly unstable nuclei can be studied.

The Rest of the Story

The IBA model applies only to even-even nuclei. What about odd-even nuclei?

Odd-even nuclei have either an odd proton or an odd neutron. In such a nucleus, the protons and neutrons form pairs, as in an even-even nucleus, but there is always one particle left over. This accounts for differences in properties.

One way to view an odd-even nucleus is to calculate the properties

of the even-even core, plus the properties of the odd particle, plus some interaction. "If the odd particle can be in just one orbit, then the calculations are pretty simple," Casten says. "But if it can choose any of several orbits, then the calculations become extremely complicated. You may have 30 or 40 different parameters."

In response to that challenge, Iachello, Baha Balantekin, now at Oak Ridge National Laboratory, and Itzhak Bars, now at the University of Southern California, developed another theory called Bose-Fermi symmetry. In effect, what it does is arbitrarily choose only certain parameter values. "Now, the ones chosen may not exist, because nature may not have chosen them," says Casten. "But if they do, then the calculations can literally be done on the back of an envelope. And like the IBA symmetries, there are also geometric pictures of these nuclei."

Iachello's next step was SUSY. SUSY states that the same parameters that describe the even-even nuclei simultaneously describe its odd-even neighbor.

Cizewski, now at Yale, did an experiment in 1981 on iridium-193 and found reasonable agreement with SUSY. Casten notes that the particular SUSY involved assumed the odd particle to be in only one orbit. A more realistic SUSY would allow more flexibility.

Soon, theorists developed a multi-orbit SUSY based on the squashed football symmetry, and evidence for this has resulted from the experiment on platinum-195 that was mentioned at the outset of this story. The Brookhaven/Grenoble collaboration led by Warner found rather good agreement, but with some obvious and characteristic discrepancies. But those irregularities are just wrinkles on an encouraging overall pattern, and they have subsequently led other theorists to formulate an improved SUSY. Very recently, Warner and Alison Bruce, a graduate student from Manchester University in England, discovered evidence in the nucleus tungsten-185, relating to a SUSY based on the football shape.

Says Casten, "It's still too early to make sweeping conclusions concerning the validity of nuclear supersymmetries in general. At the moment, the evidence is encouraging, but discrepancies remain nevertheless. We need more data. But even if it turns out that no nuclei truly follow the predictions of SUSY, the concept can still be of immense value."

One thing is for sure, BNL's nuclear physicists are in the thick of the search.

— Mona S. Rowe

Computing Corner

The Software Story

This article is the fourth in an occasional series of stories addressing the changing role of the Applied Mathematics Department (AMD) at BNL.

What's the difference between hardware and software? About 447 years, if you consider the question in relation to when those words first entered the English language. Hardware has been an English noun since 1515, but software didn't appear on the scene until 1962.

Hardware could stand alone when it referred only to metal wares, such as fittings, cutlery, tools, utensils or parts of machines. But then, people formed hardware into computers, devices that could operate by built-in

instructions, or programs, which became known as software.

Software is intangible, so when one thinks of a computer, whether it be an IBM PC or one of the powerful mainframe computers in AMD's Central Scientific Computing Facility (CSCF), one invariably pictures its hardware. But software is also essential; the hardware that is so easy to picture cannot work without it.

Keeping the Lab's computer hardware in suitable software is a primary concern at AMD, where there are two major approaches to generating software. Whenever possible, pre-packaged software is used. This philosophy is generally fine for meeting administrative needs or providing re-

searchers with basic scientific programs. But when a complex scientific system is needed where none exists, AMD provides custom programming services.

Art Harris, who heads the programming services group, says, "Our programmers are familiar with a wide range of professional techniques associated with scientific processes, and they use these techniques both in and out of our department." For example, AMD programmers may help design, implement and manage data bases for keeping track of documents and material for the AGS Magnetic Measurements Group. Or, they may go to the AGS to develop a new control

(Continued on page 2)

Lifestyles of the Rich and Famous

Has his first year of being a Lotto millionaire changed Mel Tardd?

December 15, 1984, Tardd, an AGS technical specialist, held one of 11 winning tickets in a \$20 million New York State Lotto jackpot. Of course, he and his then girlfriend, now wife Dian Tardd cashed in their ticket with the winning combination of 2, 5, 9, 18, 25, 44. So over the last year, they received \$90,000 before taxes, roughly \$70,000 after, the first of 20 annual installments of their Lotto winnings.

Immediately after he won, Tardd stated for the record that he was going to learn how to invest the money wisely, to let the money eliminate his worries and open new horizons for him, to remain "the same old Mel," and not rush out to buy his dream car: a Corvette.

"I bought the 'Vette," admits Tardd with a grin. "For the first two months I worried about making a bad mistake with the money by buying that car. But during that time I learned that it's O.K. to spend a bit of the money on something just for fun." Tardd now proudly sits behind the wheel of a red 1985 Corvette with a charcoal black interior.

Besides purchasing the car, Tardd was true to his word, but he thinks he's changed — for the better. "In a year, I matured a lot," says Tardd. "I've learned that there are more

things in life than money, things that I could have done before if I had only known about them — but it took the money for me to be introduced to them. I've met interesting people, gone new places, and read and seen a lot of things I hadn't before — the money's opened up the world to me.

"I've also gotten insight into what it must be like to be a celebrity because my life has become an open book," continues Tardd. "My biggest irritation is learning how to handle the rumors. But I learned that I don't have to worry anymore whether or not people like me because I know I'm being my same old self."

Tardd is learning how to cope with the local fame that went along with his Lotto fortune by talking with other New York State Lotto winners at the reunions held for them by Lottery officials. "We understand each other and work together," reports Tardd. At these outings as well, he gets a taste of the pleasures of the rich and famous. "The last one was held at the Waldorf-Astoria — I had never been there before," says Tardd, "I have been invited to the Lotto's tenth anniversary dinner in 1986 — and, by the way, Bob Hope will be there too."

At these gatherings, Lotto millionaires also trade tips on how to invest their winnings wisely. By working with an accountant and studying real



Mel Tardd

estate, Tardd is doing just that. He has ranked his monetary goals and is working towards them through a tiered system of investments. His first investment was to buy a duplex in Westhampton, and he wishes to invest further in real estate as a tax shelter.

One "investment" he continues to make is in New York State public education through Lotto. Says Tardd, "I don't like the new Lotto 40 or 48; I miss Lotto 44, the game we won." But in 1985, unlike 1984, he didn't hit the jackpot. "But I don't care, I can afford not to win now," concludes Tardd.

The winnings and investments

have eliminated worries about not having enough money, a problem that can often drive couples apart. So, "after going together for six years, Dian and I got married last July — by the Caribbean in Jamaica," says Tardd. The money also enables him to raise his two sons "like doctor's kids," says Tardd. "They're taking lessons: tennis lessons, music lessons — I want them to have a good education and to be introduced to a lot of different things. At first I was spoiling them, but now I'm giving them a good start in life."

— Marsha Belford

Computing

(Continued)

system for the Tandem/AGS Heavy Ion Project, staying as long as needed, until the job is done.

Such an arrangement offers a department several advantages. An AMD programmer comes with a scientific background, as well as a knowledge of the Laboratory that might be difficult for a newcomer to pick up in a hurry. And when the project is completed, the department does not have to let the programmer go; he or she returns to the AMD programming pool for another assignment. Though most programming assignments still involve designing software and integrating it with the hardware for a system, Harris says that there has also been an increase of work in such diverse fields as graphics, workstations, personal computers, or networking with the CSCF.

The CSCF provides conventional user access to commercial software packages, which are the responsibility of computer analyst Carole Saurino. Guided by the motto, "Don't write it. Use it," Saurino says, "I identify pieces of software that would be useful for BNL. Then I try to make that software available by telling people about it and encouraging people to use it to get their work done more easily."

In selecting software, one major consideration is licensing, and Saurino often gets involved in the complexities that arise when one copyrighted software package will be available on one processor that is part of a multi-computer system, or when several copies are purchased for departmental computers. She also must consider such things as whether a package is documented sufficiently, if manuals are available, whether the computers at the CSCF can handle the program, how to assure the software's security without infringing on its accessibility to users, and how the software will be supported in terms of corrections, additions or hotlines. And, of course, there are cost considerations.

Because she is aware that software dollars go only so far, Saurino tries to be responsive to users' needs. Of such CSCF programs as SPSSX, a statistical and data management package; DISPLA, a graphics package; or INSL



Carole Saurino and Art Harris meet to discuss a subject of mutual interest — software.

and NAG, which are mathematical libraries, Saurino says, "The software is there because users have said it is good and necessary — not because we thought so ourselves." To reduce costs, AMD will obtain trial licences, so users can test software before a buy is made, or tries to acquire software jointly with other departments. Some software is also available through DOE's National Energy Software Center at Argonne National Laboratory. This listing is maintained in the CSCF manual library.

Though Saurino is very familiar with most of this software, her primary interest is in providing a convenient interface for it with the CSCF. For that reason, she recommends that users form groups to exchange information about the software. "Each package is a very complex thing, and most people don't use all the features," Saurino says. "As packages increase in numbers and sophistication, it becomes impossible for one person to keep up with it all. Forming user groups and asking questions of other users is one way to get the best use out of software."

— Anita Cohen

It's a fact: As of March 1985 the Lab's buildings shared a grand total of 3,542,700 square feet.

Patents Awarded

Suresh C. Strivastava and George E. Meinken, Medical, and Powell Richards, a former BNL employee, were awarded U.S. Patent #4,533,541 for inventing a new class of reagents and the method for making and using those reagents.

The radiopharmaceutical reagents of this invention and the class of tin-117m-labeled radiopharmaceuticals incorporate gamma-emitting nuclides that localize in bone after intravenous injection in mammals. This class of reagents is therapeutically and diagnostically useful in skeletal scintigraphy and for the radiotherapy of bone tumors and other disorders.

In studies done with mice, rats, dogs and rabbits, images reflecting bone structure or function are obtained by a scintillation camera that detects the distribution of ionizing radiation emitted by the radioactive agent.

Terje Skotheim, DAS, was awarded U.S. Patent #4,520,086 for inventing a rechargeable solid polymer electrolyte battery cell for conversion of solar energy to electricity. In the parent applications of which this forms a continuation-in-part, there is described in one embodiment a photovoltaic cell having a semiconductor layer and an adjacent polymer electrolyte. To improve the electrical properties at the interface, there is included a conductive film between the semiconductor and the adjacent solid polymer electrolyte.

An object of the present invention is to provide a conductive film that increases the interfacial contact area and improves the charge transfer characteristics between the semiconductor and polymer electrolyte. The new method offers the possibility of ease of manufacture, attendant low cost, and manufacturing of large surface areas of good quality.

Reports Available

The following reports are now available to the Laboratory staff and to affiliates of the DOE, AUI and NRC. Others may purchase the reports from the National Technical Information Service, U.S. Dept. of Commerce, 5285 Port Royal Rd., Springfield, VA 22161. Staff members should call Ext. 5068.

BNL-51829
Empirical Analysis of Residential Wood-burning Impacts. F.W. Lipfert, et al.

BNL-51853
Hazards from Radio-Frequency and Laser Equipment in the Manufacture of α -Si Photovoltaic Cells. V.M. Fthenakis

NUREG/CR-4156
BNL-NUREG-51861
Operating Experience and Aging-Seismic Assessment of Electric Motors. M. Subudhi, et al.

NUREG/CR-4253
BNL-NUREG-51887
Review of TRAC Calculations for Calvert Cliffs PTS Study. J.H. Jo, et al.

BNL-51891
Automatization of Coal-Water Mixtures with Surfactants. C. Swain, et al.

NUREG/CR-4292
BNL-NUREG-51898
A Comparative Analysis of Constitutive Relations in TRAC-PF1 and RELAP5/MOD1. U.S. Rohatgi, et al.

Coming Up

William H. Adams, Medical Department, will present the next Brookhaven Lecture on January 22 at 4:30 p.m., Berkner Hall. Adams will speak on "Preventing the Toxicity of Cyclic Peptides of Blue-Green Algae and Mushrooms."

BROOKHAVEN BULLETIN

Published weekly for the employees of BROOKHAVEN NATIONAL LABORATORY

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Open House At the Fire House

Employees are invited to the dedication of the new Fire House on Brookhaven Avenue and Upton Road, Tuesday, January 14. Speakers will start off the ceremony at 4 p.m. and then everyone will tour the building. The Fire Fighters will hold open house until 6 p.m., and they hope that those who can't make the tour during office hours will drop by on their way home from work.

Reduced Tuition At Dowling College

Dowling College is offering reduced tuition to BNL employees beginning with the spring 1986 semester. Employees, their spouses and dependent children are eligible for a reduction by one-third of the current cost of tuition only. Spouses and dependent children are eligible for reduced tuition for a maximum of six credits per term. Dowling offers four terms of instruction each year. For BNL employees, the number of credits per term is not limited, and our present tuition refund policy will apply. Depending upon enrollment, there is also the possibility that Dowling will offer on-site courses in the future.

Registration is now in progress for the spring semester. If you are interested in applying for admission, please contact Steve Dougherty at the Dowling Admissions Office in Oakdale at 589-1040. Dowling has a transfer agreement with Suffolk County Community College, and course transfer information is readily available. Scholarships are also available for qualifying students.

A Dowling College information booth will be set up in the lobby of Berkner Hall on Wednesday, January 22, from 10:30 a.m. to 2 p.m., or you may call Mary White at BNL on Ext. 7994.

Can You Help?

In the aftermath of a disaster, Ida Curry and her family could use some help. On January 5, the Currys escaped injury when a fire broke out in their rented house in Coram, but the house was burned to the ground, destroying all their possessions. Ida Curry, who works in Accounts Payable, is temporarily living in a hotel with her husband and her three children, ages 5, 9 and 12. With no insurance on their belongings, the Currys must start again from scratch. Anyone who would like to make a contribution to this family, or has clothes that are suitable for any family member, should call Joyce Mortimer, Ext. 2456.

Arrivals & Departures

Arrivals

Leroy D. Chapman NSLS
Moon-Hyun Chun DNE
Sue Ellen Gerchman Biology
James A. Gibney Central Shops
Michael A. Goldman AGS
Joseph G. Modjeska Supply & Mat.
Michael Seul Physics
Robert J. Strzelinski Physics
Andreas F. Warkentien Physics

Departures

This list includes all employees who have terminated from the Laboratory, including retirees:
Manny Hillman DAS
Lewis Morgenstern Physics
Helen L. Quinby DAS

NYC Train Trips

The L.I.R.R. trips to New York are scheduled for the first and third Wednesdays of every month. In a month where there is a fifth Wednesday, there will be a trip on that day. Saturday trips are scheduled on the last Saturday of every month, except during December when additional trips are scheduled. We travel into the city as a group; but you receive individual return-trip tickets and may return on any train the same day, including the train at midnight.

Tickets are sold on a first-come, first-served basis. The fare for the Wednesday trips is \$5.25/ticket; Saturday trips are \$6.75. Children under five years of age ride free. Make your reservation by sending a check (made out to BNL or Cash) to BNL, P.O. Box 322, Upton, N.Y. 11973. For the Wednesday trips, checks must be received by the Friday preceding the trip; for the Saturday trips, the checks must be received by the Thursday preceding the trip. Put your telephone number and the date of the trip on the back of the check. Please send a

separate check for each trip. Your reservation is made when your check is received. If you would like to have a confirmation of receipt of your check, please enclose a self-addressed, stamped envelope.

Departure is from the Patchogue LIRR Station: Wednesdays, 7:55 a.m.; Saturdays, 8:31 a.m. You should be at the train station 15 minutes before departure time.

The trips are sponsored by BNL and organized by Adrienne Usher, a member of the Hospitality Committee.

Trips for 1986 are:

Wednesdays	Saturdays
January 15, 29	January 25
February 5, 19	February 22
March 5, 19	March 29
April 2, 16, 30	April 26
May 7, 21	May 31
June 4, 18	June 28
July 2, 16, 30	July 26
August 6, 20	August 30
September 3, 17	September 27
October 1, 15, 29	October 25
November 5, 19	November 29
December 3, 17	December 6, 13, 27

SCCC Courses

Only one week is left in which to register for on-site courses offered this spring by Suffolk County Community College. Registration is at the Personnel Office, Bldg. 185. Check the listing below and see if there is a course that interests you.

Course	Cr.	Day	Hours	Start
CM11-Introduction to Computing	3	M/W	5:15-7:05	1/27/86
BL72-Business Law II	3	T	5:15-8:15	1/28/86
BA21-Business Mathematics	3	Th	5:15-8:15	1/30/86
ST11-Oral Communication	3	W	5:15-8:15	1/29/86
EG33-English Grammar and Vocabulary Development	3	T	5:15-8:15	1/30/86

Violinist in Concert Here

Violinist Nai-Yuan Hu, the 1985 winner of the prestigious Queen Elisabeth International Music Competition of Belgium, will give a concert at Berkner Hall on Thursday, January 23, at 8:30 p.m. This marks Hu's first appearance in the New York metropolitan area since winning the Queen Elisabeth gold medal.

Nai-Yuan Hu was born in Taiwan in 1961. He began studying the violin at the age of five and, showing an early gift for music, was a soloist with the National Youth Orchestra of Taiwan at the age of eight. Hu came to the United States in 1972 to continue his violin studies. In 1979, he won the Young Artists Competition and made his debut at Carnegie Recital Hall.

He has performed widely in the United States and is engaged for the 1985-86 season on a concert tour of Europe, where critics have acclaimed his recent appearances.

For his recital at Brookhaven, Hu has chosen a program of Beethoven, Faure, Stravinsky, Kreisler and Wie-



Nai-Yuan Hu

niawski. Accompanying him on the piano will be Kyoko Hashimoto.

Tickets for the concert are \$5 and will be available at the door.

Swim Club

The BNL Swim Club will meet on Thursday, January 16, at 5:15 p.m. at the BNL pool for a half mile and up graduated workout. All those who can swim at least two laps of the pool using the crawl stroke are invited. Swim Team members are reminded that Claire Woodhead will coach two special practices on Monday, January 13, and Wednesday, January 15, at 5:30 p.m. at the BNL pool. The Swim Team will practice as usual on Thursday, January 23, at 5:30 p.m. at the BNL pool.

Singles Club

The next meeting will be held on Tuesday, January 14, at the Berkner Hall lobby, from 12:20 to 12:40 p.m. The balance for the Lake Placid ski trip is due now. There are still openings for the Mt. Snow ski trip, February 21-23. Plans for the final ski trip of the season in March to Deer Run, N.Y., or Brodie, Mass., are under way. For further information call Doris Terry, Ext. 2228.

Birder Program

Applications are now being accepted for a Master Birder training program jointly sponsored by the Cornell Laboratory of Ornithology and the Cooperative Extension Association of Suffolk County. Beginning March 4, 1986, classes will be held at the Seatuck National Wildlife Refuge in Islip, on ten consecutive Tuesdays, from 7:30-9:30 p.m.

Participants will cover such topics as principles of ornithology, waterfowl, colonial waterbirds, upland game birds, song birds, habitat ecology and endangered species, birds of prey, and conservation practices. In return for this free training, the new Master Birders are expected to volunteer time for such activities as working with 4-H clubs, leading bird walks, giving talks in libraries, working on habitat improvement projects at wildlife refuges and collecting data for research projects.

For applications and/or information, contact Robert Kent, Cooperative Extension, 246 Griffing Ave., Riverhead, NY 11901; 727-7850.

Cafeteria Menu Week of January 13

Monday, January 13	
Chicken noodle soup	(cup) .65 (bowl) .85
Corned beef & cabbage	2.45
Beef & broccoli stir fry	2.45
Hot Deli: French toasted club	2.45
Tuesday, January 14	
Cream of cauliflower soup	(cup) .65 (bowl) .85
Breast of chicken Italiano w/choice of one veg.	2.45
Macaroni & cheese casserole	2.40
Hot Deli: Tuna melt	2.35
Wednesday, January 15	
Minestrone soup	(cup) .65 (bowl) .85
Braised liver & onions w/choice of one veg.	2.45
Baked Italian lasagna w/garlic bread	2.45
Hot Deli: Italian meatball hero	2.45
Indoor Picnic Day See our special picnic buffet each Wednesday in January	
Thursday, January 16	
Beef barley soup	(cup) .65 (bowl) .85
Beef stew w/baking powder biscuits	2.45
Tuna noodle casserole	2.45
Hot Deli: BBQ meatloaf sandwich	(bread) 2.25 (roll) 2.40
Friday, January 17	
Boston clam chowder	(cup) .65 (bowl) .85
Top round of beef w/choice of one veg.	2.45
Cajun shrimp over rice	2.45
Hot Deli: California bacon burger	2.40

EAP Hot Lines

As previously announced to all employees, Judith Katsin, Employee Assistance Program Manager, has left the Lab to relocate on the West Coast. Until such time as a replacement is found, she has left these numbers for employees who may need help. These mental health resources were developed by Dr. Katsin and have proven valuable to employees:

Alcoholics Anonymous: 654-1150
Al-Anon (for family members of alcoholics): 654-2827
Coalition for Abused Women: 542-0404
Eastern Long Island Hospital Psychiatric Unit: 477-1000
Suffolk County Drug Abuse Services: 582-4141
SUNY at Stony Brook - University Hospital 24-hour emergency: 444-2494
1-800-COCAINE

For emergency counseling, please contact the Clinic Nurses Maureen Sacker or Camille Saville on Ext. 3670. They can provide a confidential referral to a doctor in your community.

Tax forms — The supply of tax forms is now located in the Public Relations lobby, Bldg. 134, 37 Brookhaven Avenue.

Classified Advertisements

Placement Notices

The Laboratory's placement policy is to select the best-qualified candidate for an available position, with consideration given to candidates in the following order of priority: (1) present employees within the department and/or appropriate bargaining unit, with preference to those within the immediate work group; (2) present employees within the Laboratory as a whole; and (3) outside applicants. In keeping with the Affirmative Action plan, selection decisions are made without regard to age, race, color, religion, national origin, sex, handicap or veteran status.

Each week, the Personnel Office lists new personnel placement requisitions. The purpose of these listings is, first, to provide open placement information on all non-scientific staff positions; second, to give employees an opportunity to request consideration for themselves through Personnel, and, finally, for general recruiting purposes. Because of the priority preference policy stated above, each listing does not necessarily represent an opportunity for all candidates. As a guide to readers, the listings are grouped according to the anticipated area of recruitment.

Except when operational needs require otherwise, positions will remain open for one week following publication date.

For further information regarding a placement listing, contact the Employment Manager, Ext. 2882.

OPEN RECRUITMENT - Opportunities for Laboratory employees and outside applicants

2397 TECHNICAL POSITION - Requires associates degree in electronic technology or equivalent experience in the nuclear science field. Knowledge of control and process instrumentation and reactor safety systems is required. Previous reactor experience and the ability to obtain a Q clearance required. Will be assigned to the Reactor Division Instrumentation Group. (2 positions.) Reactor Division.

2398 MEDICAL ASSOCIATE - Requires BS in biology or equivalent experience. Will be responsible for the organization and analysis of data, preparation of reagents, operation of common laboratory equipment, and working with laboratory animals including maintenance and autopsy. Experience with a light microscope is essential. Work will include weekend and night duties when necessary. Laboratory courses including cytogenetics and computer experience are desirable. Medical Department.

Autos & Auto Supplies

83 MERCURY MARQUIS - Brougham, a/c, stereo, auto. o/d, like new. \$6,000. Debbie, Ext. 2896 after 4 p.m.

75 FORD GRANADA - 81k mi., 4 dr., 6 cyl., CB, am/fm cass., a/t, p/s, p/b, a/c, (2) new Sears radials, runs well. \$1,000, neg. Bob, 281-5605.

74 DATSUN 610 - steel radials, am/fm cass., Diehard batt., new alt. & water pump, \$650. Ext. 5288 or 878-8177.

79 CJ7 RENEGADE JEEP - 304, a/t, p/s, p/b, a/c, many options, excel. cond., \$5,000. 286-3865.

80 MERCURY CAPRI - 4 cyl., a/t, p/s, a/c, am/fm, 48k mi., excel. cond., \$3,900. Barry, Ext. 5624 or 727-5956.

78 CHEVY VAN - a/t, 305 V8, custom int., black, new snows, am/fm cass., \$3,500. Tony, Ext. 3198 or 924-5248.

68 CUTLASS - good transp., new trans., vinyl roof, starter, rad., carb., tires. \$450. Bob, Ext. 4615 or 744-3224.

79 FORD BRONCO - 4 WD, 2-tone paint, a/c, p/s, a/t, excel. cond., \$7,000. Ext. 2350.

SNOW TIRES - (2) 15", mounted on 73 Buick rims, \$20 for both. Oster, 589-2648.

85 KX80 DIRT BIKE - excel. cond., \$650. Lois, Ext. 4904 or Brett, 929-4753.

80 CAMARO - 3 spd., V6, p/s, am/fm stereo cass., low mi. 727-3348.

74 TORINO - 4 dr., a/t, p/s, p/b, am/fm cass., 74k mi., recent tires, brakes, water pump & batt., \$950. 281-0360 after 6 p.m.

83 HONDA CIVIC - 4 dr., grey, \$5,600 firm; '81 GS-1000 Suzuki, w/helmet & cover, 9,500 mi., \$1,350. Ext. 2231 or 589-8533.

81 MAZDA GLC - 42k mi., 4 spd., manual, 2 dr., am/fm, 6 more mos. dealer warr. Ollie, Ext. 3137.

79 PINTO - a/t, p/s, a/c, \$1,500. Ext. 4846 or 363-6940 after 5 p.m.

CAP - 8 ft., white, clearance lights 8" above cab, excel. cond., \$200. 928-5628.

78 HONDA CIVIC - 14k mi., new eng./brakes, am/fm cassette, \$1,300. Ed, Ext. 3293 or 477-2880.

TIRES - (4) radial, 195/75R14, Michelin-X, used, good cond., \$50. 751-8403 after 6 p.m.

78 CADILLAC FLEETWOOD BROUGHAM - new cond., a classic, \$4,500. 475-4596.

79 FIAT 128 - 4 spd., 83k mi., new brakes & front tires, \$500. Ext. 3978 or 3226.

73 PINTO - excel. cond., clean, 4spd., 26 mpg, new parts, \$650 firm; (4) rims, new, 4x4 wide, for Toyota or Datsun truck. 226-1828 after 5 p.m.

71 INTERNATIONAL SCOUT II - a/t, 2k mi., rebuilt eng., excel. running, needs minor work. \$750. Mark, 473-7752.

74 DUSTER - a/t, p/s, new starter, snow tires, muffler, runs great. \$750. Dave, Ext. 4360 or 269-5319.

79 TOYOTA CELICA GT - hatchback, 5 spd., sun-roof, am/fm tape, 75k mi., excel. cond., \$3,500. 567-8609.

81 CHEVY CITATION - 4 dr., hatch., p/s, p/b, a/c, a/t, c/c, am/fm stereo, excel. cond., \$3,000. Bob, Ext. 5308/3172 or 878-1731 eves.

83 MERCURY MARQUIS BROUGHAM - fully loaded, like new, \$6,000. Debra, Ext. 2895 after 4 p.m.

78 FORD PINTO WAGON - new tires, battery, runs well, \$800. Joe, Ext. 4661 or 878-2203 after 5 p.m.

76 MERCURY MONARCH - V8-302 cyl., a/c, a/t, 2 dr., excel. cond. Ext. 3421 or 727-8631.

82 CAMARO SPORT COUPE - T-roof, a/c, V-6, 4 spd., manual, 38k mi., dark blue, clean, \$6,500 neg. 286-3847.

79 PLYMOUTH HORIZON - good cond., \$2,000. Ext. 3755 or 3222.

81 DODGE OMNI - low miles, good running cond., reason. 363-7032.

80 MERCURY CAPRI - 4 cyl., a/t, p/s, a/c, am/fm, 48k mi., excel. cond. Barry, Ext. 5624 or 727-5956.

82 BUICK SKYLARK - a/t, a/c, p/b, p/s, c/c, am/fm stereo cassette, 40k mi., excel. cond., \$5,895. Bill, 472-4684 after 6 p.m.

74 BLAZER - blue, V8-350, 4x4, rollbar, 36" tires w/rims, many new parts, good cond., little rust, \$1,800. Rich, Ext. 4688 or 929-8294 eves.

82 SUBARU WAGON - 4x4, 45k mi., a/c, am/fm cassette, roof rack, Michelins, great cond., \$5,500. Ext. 3506 or 281-2002.

TIRES - (4) Michelin, 205x15, w/w, self sealing, \$75 for all. Larry, Ext. 4821 or 727-1412.

80 VOLVO 245DL WAGON - low mi., excel. cond., \$5,950. 751-8707.

77 OLDS CUTLASS - 4 dr., a/t, a/c, p/s, p/b, am, clean, new lifters, rocker arm, push pads, water pump, master cyl., \$950. Richie, Ext. 3815 or 929-5329.

81 MUSTANG - 4 spd., 57k mi., new radials, am/fm stereo, 4 cyl., \$3,000. Lynanne, Ext. 7918 or 744-3068.

CUSTOM CAP - cream, fiberglass, fits Toyota short bed, excel., \$375. Jack, Ext. 4411.

82 CHEVY MALIBU CLASSIC - very good, \$4,500. 475-4596.

75 TORINO WAGON - a/t, a/c, new tires, recent batt., alternator, \$900. Ext. 2591.

77 SUNBIRD - rebilt. trans. w/guarantee, good tires, battery etc., needs some work or good for parts, \$300. Jody, Ext. 2907 or 654-9094 after 6 p.m.

68 CHEVELLE SS - 396/325 HP, a/t, p/s, am/fm, 68k mi., red, new snows, brakes & ing., int. excel., ext. good, runs great. \$2,950. Henry, 472-1182.

74 MATADOR PARTS - new suspension, starter. Brett, Ext. 3579 or 654-8343.

74 DODGE DART - Special Edition, 4 dr., 8 cyl., reliable, body good, clean int., excel. tires incl. snows, \$900. Bud, Ext. 4423.

Boats & Marine Supplies

23' CHRYSLER - cabin, twin 4 cyl. engs., sleeps 3, sink, stove, refrig., head, good cond., \$2,500. 399-3381 after 6 p.m.

Miscellaneous

ELEC. TYPEWRITER - port., Sears/Graduate Correct-a-type, very good cond., \$100. Dan, Ext. 2319.

APRICA STROLLER - Labelle with pad, like new, reversible handle, \$125. Karl, Ext. 4410 or 929-8680.

ELEC. RANGE - Okeefe & Merritt, 30", double oven, glass doors., deluxe, good cond., \$39. Ext. 2180 or 286-3937.

HAM OPERATORS - HW16 transceiver, VFO, antenna tuner, SWR meter, coax switch, \$200. Oster, 589-2648.

REFRIG./FREEZER - Westinghouse, frost-free, 17 cu. ft., side-by-side, white, good cond., \$75. 924-3783.

RABBIT FUR JACKET - size med., \$150; Blue Fox jacket, size sm., \$350. 878-9217.

GUIAR - Gibson J-45, large folk type, good cond., \$295. Ext. 4745 or 722-4076.

ROLLER SKATES - girl's, size 12; girl's ice skates, size 1; both white, \$7 ea. Ext. 2432.

WOMAN'S BICYCLE - 10 spd.; baby items; Baldwin organ, church model. 928-2803.

PINE BEDROOM SET - twin beds, dresser, chest of drawers, night table, good cond. 475-1254.

BABY ITEMS - infant car seat, \$20; lullabye rainbow for over crib, \$10, both like new. 744-9677.

BABY ITEMS - white wicker bassinet, \$25; plaid umbrella carriage, \$25; both good cond. 281-0360 after 6 p.m.

COLONIAL PINE FURNITURE - 2-piece hutch, 50"x79", very good cond., \$200; chair, \$50; rocking chair, \$60, both removable covers, excel. uphol. 286-9510.

TRANSFER SWITCHES - for motor generators, easy inst., (6) emerg. circuits, 20 amps. J. Medina, Ext. 7636 or 654-3472.

CLARINET - Signet Special, repadded, excel. cond., \$215. Dick, Ext. 4255 or 744-6794.

AKAI REEL-TO-REEL - excel. cond., Dolby NR, cost \$450, sell for \$180 or best offer. 821-1525.

DINING ROOM SET - 2pc. china, 66" long table, 2 leaves & pads, 6 chairs, cost \$5,000, sell for \$1,000; corner chest, bookcase combo., butternut maple, Ethan Allen, 2 sets, 4 pc., \$400. 744-9632.

DINING ROOM - 1925, walnut, china, table, (1) arm chair, (4) side chairs, reglued, brocade cushion seats, \$350. 744-3792.

KEROSENE DRUM & PUMP - 55 gal, \$30. Linda, Ext. 5141 or 567-3923 after 6 p.m.

LIVING ROOM - couch, chair, rocker, ottoman, pine frames, coffee table, three side tables, mint, \$1,000. 588-7989.

FRANKLIN STOVE - Atlanta Stove Works, two large brass knobs, cast iron, excel., \$200. 588-7989 after 5 p.m.

EXERCISE CYCLE - triple-action, excel. cond., \$35. Hal, Ext. 2522 or 286-0810.

EARTH STOVE - A-1 cond., used one season, coal/wood burning, \$350. 588-4703 after 5 p.m.

COCKATIEL - and Africian gray parrot. Kevin, 751-6100.

FOLDING BED - w/mattress, \$50. Rajiv, Ext. 5161 or 924-1460 eves.

SKI EQUIPMENT - Rossignol, 175 cm, 140 cm, 110 cm, w/bindings and poles, used, good cond., Lange boots, 7-1/2. 751-8403 after 6 p.m.

HEAVY METAL DESK - 45L 34D 30H, \$20; sled, \$4; exercise bike, \$10; 6 qt. pressure cooker, Presto, \$8. 878-6637.

COUNTRY-STYLE SOFA - loveseat and ottoman, blue floral print, excel. cond., \$575. Ext. 2876 or 543-4099 after 6 p.m.

GE FREEZER - upright, white, old but never used, excel. cond., \$50. Rich, Ext. 3988.

DRESSER - antique tiger oak, \$220; 8" table saw, running cond., \$60. 878-4304 after 5:30 p.m.

STEREO EQUIPMENT - (2) Hafler 220 power amps, 120 w/ch. mono, 350 watts, \$250 ea. Chris, Ext. 2089.

MEXICAN HANDCRAFTS - African violets, different colors and other house plants. Ext. 3222 or 3755.

MICROWAVE OVEN - Magic Chef, 1.5 cu. ft., needs handle latch, works fine, \$50. Marty, Ext. 4028 or 654-5888.

SOFA - brown velour, sleeper, queen, \$50; crib, Childcraft, mattress, \$25; bassinet, wicker, \$10; changing table, \$10; Perego stroller, \$20. Ext. 7644 or 744-2733 eves.

Free

INFANT CAR SEAT - Strolee. Jag, Ext. 5080.

BOAT - 18' runabout, wood, 130 HP Volvo Penta, I/O, w/steering & controls, you pick up. 281-0360 after 6 p.m.

CATS - 6 mo. and 1 yr. old, w/shots, neutered. 744-2821 or 928-9537.

CAT - female, 10 mo. old., spayed, house trained. Steve, Ext. 3370.

Car Pools

ROCKY POINT - Tides vic., 4th driver needed, 8:30-5:00 p.m. Sal, Ext. 2460.

BABYLON/W. ISLIP - driver needed for on-time car pool, 8:30-5:00 p.m. Mike, Ext. 2705.

Real Estate

Real Estate advertised for sale or rent is available without regard for the race, color, creed or national origin of the applicant.

For Rent

SHOREHAM VILLAGE - fully furn. house, 4 bdrms., very big l/r, \$675 mo. plus util. 744-4792.

CENTER MORICHES - S. Montauk, 1-1/2 block to water, 3 bdrms., eik, 2 baths, full bsmt. w/outside entrance, nicely landscaped, attached garage, \$800 mo. 878-8177.

S. JAMESPORT - cozy 1 bdrm. cottage, l/r, eik, bath, porch, furn., suitable for couple, walk to beach, 20 mi. from Lab, no children or pets, \$350 mo. plus util. Walt, Ext. 2907 or 698-0576.

PORT JEFF. - \$600 mo. winter rental (3 bdrms., 2 baths), \$900 mo. summer rental (5 bdrms., 3 baths), plus util., security, ins. for furn., mo. to mo., refs. (202) 429-9705.

NEW HAMPSHIRE - White Mountains, ski Loon, deluxe 3 bdrm., 2 bath condo., f/p, color TV w/HBO, clubhouse, jacuzzi, 1/4 mi. slopes, free shuttle, \$450 for 4 nights, \$600 weekly. (914) 232-4039.

SHOREHAM VILLAGE - SWR school dist., fully furn., 4 bdrm. house, large living room, avail. immed. 929-6313.

FARMINGVILLE - 1 bdrm. apt., single, \$500 includes all util. plus cable. 732-2141 before 1 p.m.

LAKE RONKONKOMA - cottage, 1 bdrm., minutes to SUNY, Smithtown, 20 min. to Lab, \$500 incl. elec. & water. 588-1889.

BELLPORT - 2 bdrm. house, s. of S. Country, \$600 mo. plus util. 286-1147.

WADING RIVER - small, 1 bdrm., suitable for single, \$425 mo. incl. all, avail. Feb. 1. Ext. 3919 or 929-4310 eves.

CORAM - new Bretton Woods condo, 2 bdrms., 2 baths, l/r, d/r, kitchen, w/w, 5 appliances, golf course, tennis, clubhouse facilities, no pets, 1 yr. lease. 289-0413.

BROOKHAVEN - 3 bdrm. furn. house, l/r, d/r, dens, eik, near water, marina, avail. Mar. 86 to Jan. 88. Ext. 3861 or 286-1975.

RONKONKOMA - near LIE, across beach, beautiful, private, 2 bdrm. apt., l/r, w/w, eik, storage room, yard, \$595 plus util. Ext. 2676 or 543-0487 eves.

LAKE PANAMOKA - 2 bdrm. ranch, walk to lake, Franklin stove, washer & dryer, porch, deck, w/w carpet in bdrm., freshly painted, \$550 mo. 929-4996.

HILTON HEAD, SC - 2 bdrm. condo, sleeps 6, golf, tennis, & scenery, \$300 wk. 585-9149.

SHIRLEY - 2 bdrm. apt., l/r, eik, walk to ocean, \$650 includes util., 1 mo. security. 744-2821.

For Sale

PORT JEFF. - Harbor Hills, 3 bdrms., 2-1/2 baths, 1 car gar., lg. den, l/r w/cathedral ceiling, d/r, eik, bsmt., patio, 1/3 landscaped acre, pvt. beach rghts., \$169,000 w/some financing flexibility. 928-2803.

YAPHANK - Colonial Woods condo, 2 bdrms., 2 baths, full basement, a/c, 2 mi. to Lab., \$85,000. 269-9510 after 7 p.m.

BROOKHAVEN - 4 bdrm. colonial, 2-1/2 baths, l/r, d/r, fam. room, 2 car garage, w/w, on secluded 2 acres, \$249,000. 286-4973.

COOPERSTOWN VIC. - 190 acres, adjoining state land, \$425 per acre, half wooded, half in crops. 363-7032.

OTSEGO COUNTY - 3 bdrms., modern kitchen & bath, basement, 17-1/2 acres, wooded w/stream, 15 mi. from Oneonta, \$60,000. 929-8287.

AQUEBOGUE - reduced for quick sale, 3 bdrm. ranch, 20 min. to Lab, 1-1/2 baths, fpl., 1/3 acre, 1-1/2 car garage, extras. 722-4644.

SAYVILLE - 3 to 4 bdrm. California ranch, brick front, 2 full baths, garage, central a/c throughout, incl. full basement, eik, d/r, l/r, fam./rec. rm., lg. patio w/outside shower, can be made M/D, \$147,000. 589-2681.

Wanted

BEDS - twin & queen size, with mattress & box springs. 744-4792.

DEAD VCR - only need tuner section. Richie, Ext. 2175.

RIDERS - interested in motocross racing, organized races sponsored by L.I. Sports Committee. Lois, Ext. 4904.

AUTO PARTS - hub caps, rear, chrome; floor mat, front; arm rest, drivers side; for 1972 Blazer. Ext. 3552.

RIDE - from Lab to mass on Sundays. Michael Murray, Ext. 3157.

Classified Ad Policy

Deadline is 4:30 p.m. Friday for publication Friday of the following week.

- The Brookhaven Bulletin's classified section may be used only by active and retired Laboratory employees.
- All items for sale or rent must be the advertiser's property.
- Ads for material acquired for resale in association with a full or part-time business cannot be accepted.
- Ads for the sale or trade of firearms will not be accepted.
- Ads not carried because of space restrictions will be held for publication in the next issue.
- Ads are run only once and must be resubmitted if they are to be repeated. One ad per person per week.
- Property for sale or rent cannot be accepted on this form. Special Real Estate Ad Forms are available at the office of the Brookhaven Bulletin, Building 134.

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|--|--|---------------------------------------|-------------------------------|
| <input type="checkbox"/> For Sale: Autos & Auto Supplies | <input type="checkbox"/> For Sale: Miscellaneous | <input type="checkbox"/> Lost & Found | <input type="checkbox"/> Free |
| <input type="checkbox"/> For Sale: Boats & Marine Supplies | <input type="checkbox"/> Car Pools | <input type="checkbox"/> Wanted | <input type="checkbox"/> |

Please print your ad below in 15 words or less using one word per block. Include name and phone number to call.

Note: The following must be completed for your ad to appear.

NAME (Please Print)

Employee's Signature..... Life No..... Ext.....

Send to: Brookhaven Bulletin, Building 134 (Ext. 2345)