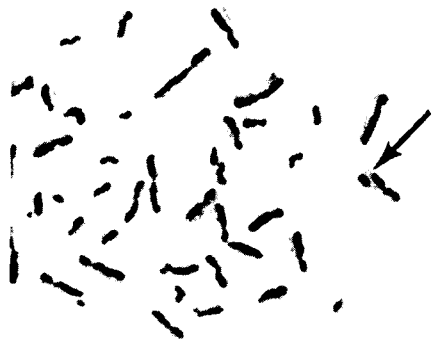


## Is DNA Repair The Same for All?



One of several sister chromatid exchanges (see arrow), photomicrographed at 1000x. An increased number of SCE's are induced in white blood cells by MNNG and Mitomycin-C.



Two micronuclei (see arrows), one per white blood cell, as seen through a photomicroscope at 1000x. Micronuclei result from exposing leukocytes to x-rays.

Do all normal, healthy people have equal ability to repair damage to their genes? And is this repair ability, or inability, related to people's risks of certain diseases, such as cancer?

To answer these questions, Michael Bender, Jay Leonard, Robin Leonard and Judith Wieland of the Medical Department, and Richard Setlow of the Biology Department are studying sets of white blood cell cultures established from blood samples donated by BNL employees. Medical Associates Bea Pyatt and Angela Boccio are assisting with the lab work. This is the first year of the project, which is funded by the U.S. Department of Energy.

"We want to know if normal people vary in the accuracy and completeness of their DNA repair after damage by four model genotoxic agents," says Cytogeneticist Jay Leonard. The four genotoxic agents to which human white blood cell cultures are being exposed are: ultraviolet radiation (UV), x rays, n-methyl-n'-nitro-n-nitrosoguanidine (MNNG) and mitomycin-C.

"All of these agents are genotoxic," explains Leonard, "that is, they can damage DNA, the material of which genes are composed. The two types of radiation and the two chemicals each damage different parts of DNA in different ways. We are looking for individuals whose white blood cells fall below the norm for DNA repair after being damaged."

All blood donors are required to

complete a questionnaire regarding their work, health and personal history. "Other studies, as well as ours, clearly show that some lifestyle factors cause measurable damage to DNA," explains Epidemiologist Robin Leonard. "For example, cigarette smoking causes an increase in sister chromatid exchanges. The questionnaire data is enabling us to control for many external factors that may affect our results."

"We know of the enormous number of dangerous substances in the environment to which we can be exposed," continues Jay Leonard, "and we wonder why everyone doesn't come down with a tumor of some sort. The reason we don't is that the body is engineered to take care of a great many things which will damage DNA."

"Normally, sets of enzymes recognize damaged portions of DNA, cut them out and insert the correct molecules," explains Leonard, "but some people do not have the necessary enzymes. Severe DNA repair deficiencies are seen in people with certain rare genetic diseases, such as xeroderma pigmentosum and ataxia telangiectasia. People having these diseases suffer neurological or immunological disorders and typically die at young ages due to infections or cancer. These diseases are extreme and dramatic examples of the importance of DNA repair."

DNA is a double helix formed by the association of two complementary chains of nucleotides. Each nucleotide has three parts: a base, a sugar and a phosphate. The base is either a purine (guanine or adenine) or a pyrimidine (cytosine or thymine). Each base is connected to a sugar molecule called a ribose, and the sugar is attached to the phosphate.

Additionally, the sugar of one nucleotide is bonded to the phosphate of the neighboring nucleotide to form the alternating sugar-phosphate backbone of the nucleotide chain. The two nucleotide chains of DNA are held together in a helix by the bonding between a hydrogen of a base of one chain to an oxygen or nitrogen of a base on the opposite chain. The structure of the bases requires that guanine always hydrogen bond with cytosine, and adenine bond with thymine.

The structure of DNA is distorted in a different manner by each of the four genotoxic agents under study. How-



Jay Leonard and Angela Boccio.

ever, the four types of damage can be repaired with great accuracy and efficiency. The residual damage or amount of repair is examined using established methods.

UV most commonly causes adjacent pyrimidine bases (cytosine or thymine), which normally are not bonded together, to become linked. A DNA enzyme system recognizes the distortion, cuts it out and replaces the nucleotides. The researchers study this repair process using autoradiography, by measuring the amount of radioactively labeled replacement nucleotides incorporated in DNA.

The most common effect of x rays is to break the sugar-phosphate backbone of the DNA chain. DNA breaks that are not properly repaired result in broken chromosomes, and these chromosome fragments form small nuclear fragments, called micronuclei, which are counted under the light microscope.

MNNG adds methyl molecules to DNA, particularly to an oxygen atom of guanine. DNA containing radioactively labeled methyl groups added by MNNG is exposed to a cellular extract which removes the radioactivity from DNA and transfers it to an acceptor protein. The radioactivity transferred is measured using a scintillation counter.

The second way of looking at the effect of MNNG on DNA is an index of the amount of residual damage. Under the light microscope, the researchers look for sister chromatids, the two daughter strands of a chromosome after it has duplicated. They see sections of genetic material exchanged between sister chromatids in direct proportion to the dose of MNNG.

Mitomycin-C also reacts with guanine, but it causes abnormal chemical bridging between the two nucleotide chains. Residual damage by mitomycin-C is gauged by counting sister chromatid exchanges under the microscope.

"Although the use of these assays for screening people for cancer risks is entirely theoretical at this point, we do expect to gain some basic knowledge about individual susceptibility to cancer," concludes Jay Leonard. "By finding out the extent of DNA repair variation in the normal population and following the study participants over a long term, we hope to determine if subtle differences in DNA repair capacity are related to the risks of acquiring the most common cancers." — Marsha Belford

William Marin Jr.

Peter Horton



(From left) Judith Wieland, Michael Bender, Robin Leonard and Bea Pyatt.



Representative William Carney (1st C.D.) visited BNL on Wednesday to discuss Lab programs. During the day, he met with members of the directorate and department chairmen. With Mr. Carney

(second from left) in the Director's Office are Vincent O'Leary (left), Associate Director; Michael Knotek, NSLS Chairman; Carney staffer John LaMura; and Martin Blume, Deputy Director.

Alex Reben



Representatives of the New York City Fire Department and the Brooklyn Union Gas Company came to Brookhaven on March 15. They witnessed combustion and cryogenic tests on insulating polymer concrete that the Process Sciences Division of DAS has been developing to improve the safety of liquid natural gas storage facilities at the gas company's Greenpoint Energy Center in Brooklyn. The material will be used to overlay the surfaces of the impounding dikes surrounding each of the two large storage tanks now in operation at the site. In case of a leak or rupture, the insulating material will reduce the rate of boil-off of the gas thus restricting the combustible mixture formed from traveling beyond the

property limits. The successful application of this material at the Brooklyn company could lead to adaptation at a number of other sites where liquid natural gas storage facilities are situated near populated areas.

At the BNL tests were (from left) David E. Rosentstoch, Asst. Chief Inspector, New York City Fire Department; George Kelly, Consultant, Brooklyn Union Gas Company; Peter Schorr, Principal Engineer, Brooklyn Union Gas Company; Meyer Steinberg, BNL; Morton Ingram, Ingram and Greene, civil contractors; Jack Fontana, BNL; and Steve Aurora, Sr. Engineer, Brooklyn Union Gas Company.

Peter Horton

## Coming Up

A week-long **Workshop on Experiments for a Relativistic Heavy Ion Collider** will be held at Brookhaven starting on April 15 at the Collider Center. Opening statements and presentations will be given at 9:30 a.m. until 4 p.m. when the conference will organize into working groups. Final presentations will be given on Friday, April 19, at the Physics Department seminar room. Interested staff members are invited to attend these sessions.

**Thomas Ludlam**, an organizer of the workshop, will give a Brookhaven Lecture on "The Quest for Quark Matter" on April 24, at 4:30 p.m., Berkner Hall. Ludlam, a physicist in the Physics Department, heads the FY 1985 Relativistic Heavy Ion Collider Task Force. 16570

## Inside Info

**Maurice Goldhaber**, AUI Distinguished Scientist, will receive a Golden Plate Award from the American Academy of Achievement. The Academy is a non-profit organization established in 1961 and dedicated to the inspiration of youth. Each year, 40 men and women who have achieved distinction in various fields are invited to participate in a "Salute to Excellence" weekend where they will meet one another and share their experiences with 350 outstanding high school honor students chosen from the 50 states. Among those who have been honored in the past are Val Fitch, Sheldon Glashow, Robert Hofstadter, Stephen Jay Gould, Alex Haley, Burt Reynolds and Chuck Yeager.

## ANS Meeting

Frederick M. Bernthal, Commissioner of the U. S. Nuclear Regulatory Commission, will speak at a banquet sponsored by the Long Island Section of the American Nuclear Society on Thursday, April 18, at 6:30 p.m. at the Bavarian Inn. His talk will be on "Safety Advances and the NRC: The New Face of Regulation." At the banquet, local ANS members and guests will be joined by those attending the Specialists' Meeting on Decay Heat Removal and Natural Convection in LMFBRs.

Reservations for dinner (\$13.50 for members and \$14.50 for non-members) may be made by calling Dorothy Thompson, Ext. 2444, before April 16.

## 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-51779

Workshop on Problem Areas Associated with Developing Carcinogen Guidelines. Held BNL Sept. 7-8, 1982. O. White, Jr., J.E. Brower

### NUREG/CR-3898

### BNL-NUREG-51802

An Evaluation of the Effects of Gamma Irradiation on the Mechanical Properties of High Density of Polyethylene. D.R. Dougherty, J.W. Adams, R.E. Barletta

### BNL-51804

Costs of Controlling Emissions from the Manufacture of Silicon Photovoltaic Cells Using Dendritic Web Technology. I. Wilenitz

The scholarship program received an assist from the AUI Trustees in January when they raised the 1985 scholarships from \$1700 to \$2000 per year for up to four years. The increase does not apply to scholarship winners currently in college. This year, 78 sons and daughters of BNL

employees applied for the AUI Trustee Scholarships and 14 were selected. The winners were chosen by an independent committee appointed by the College Scholarship Service, Princeton, N.J., which administers the program for AUI.

## 1985 Scholarship Winners



**Robert Benkovitz**...son of Carmen Benkovitz, DAS...student at Smithtown H.S. West...resident of Smithtown...will attend St. Lawrence or SUNY at Binghamton...major in science.



**William Casswell**...son of William Casswell, Accel. Dev...student at Miller Place H.S...resident of Miller Place...plans to attend Cornell...will study engineering.



**Liesel Gould**...daughter of John J. Gould, AGS...student at Cold Spring Harbor H.S...resident of Huntington...will attend Dartmouth...premed.



**Paul Lee**...son of Yong Yung Lee, AGS...student at Smithtown H.S. West...resident of Smithtown...plans to attend Princeton or Yale...premed.



**Matteo Pellegrini**...son of Claudio Pellegrini, NSLS...student at Ward Melville H.S...resident of Stony Brook...plans to attend Columbia...major in physics.



**Kathryn Rorer**...daughter of David C. Rorer, Reactor...student at Earl L. Vandermeulen H.S...lives in Port Jefferson...plans to attend Harvard...has chosen career in medical physics.



**Tomas A. Saulys**...son of Alfred C. Saulys, Physics...student at Shoreham-Wading River H.S...resident of Shoreham...will attend M.I.T. or Stanford...major in mathematics.



**Allen Bertsche**...son of Alfred Bertsche, Accel. Dev...student at Shoreham-Wading River H.S...resident of Shoreham...will attend Indiana Univ...major in languages.



**Kevin Chmiel**...son of Robert Chmiel, Physics...student at Miller Place H.S...resident of Miller Place...will go to Cooper Union...major in engineering.



**Scott Kramer**...son of Caroline Kramer, DAS...student at Shoreham-Wading River H.S...resident of Shoreham...plans to attend Columbia...will study engineering or computer science.



**Lenora Manzella**...daughter of Vito Manzella, Physics...student at Mercy H.S, Riverhead...lives in Center Moriches...plans to attend Princeton or Boston College...major in English/communications.



**James Reisman**...son of Ann W. Reisman, DNE...student at Southampton H.S...resident of Southampton...plans to attend Cornell or Carnegie-Mellon...expects to study physics.



**Jay A. Sanchez**...son of Jose Sanchez, DAS, and Lucy Sanchez, Chemistry...student at William Floyd H.S...lives in Shirley...will attend West Point...major in Middle East affairs.



**Diane Thompson**...daughter of Patrick A. Thompson, Accel. Dev...attends Schenley H.S...is a resident of Pittsburgh...will attend Cornell...major in political science.

# BROOKHAVEN BULLETIN

Published weekly  
for the employees of  
BROOKHAVEN NATIONAL LABORATORY

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## Report From WIS

The first event for the benefit of the Renate W. Chasman Scholarship Fund, a concert on March 23, netted \$1200. The Brookhaven Women-in-Science, sponsor of the fund, wish to thank those who bought tickets to the event and who sent in contributions.

This is a laudable first step on the way to the WIS goal of \$10,000, which will be used to create scholarships for Long Island women undergraduates. Contributions are tax deductible and are welcome at any time. Checks should be made out to the Renate W. Chasman Scholarship Fund and sent to Box 183, Upton, N. Y. 11973, or to any of the following committee members:

	Bldg.	Ext.
Penny Baggett	902B	5154
Mary Kinsley	426	5232
Mary Phillips	426	3282
Gail Williams	460	3338

## The Numbers Game

Two more life numbers have been placed in the Bulletin, so see if one of them is yours. Erich Willen spotted his last week, but the other number has not yet been claimed, (clue: the person is in the Medical Dept.).

## Car Rentals

As a result of recent negotiations with Avis, BNL is now entitled to lower rates on car rentals than in the past. Another change is a new identification number, A/A 242635. Employees may pick up the new cards and stickers at the Travel Office.

## Photo Sessions

To teach beginners how to take better pictures and develop their own film, the Suffolk County Farm & Education Center is holding a series of workshops. Subjects include "Getting Acquainted with your Camera" on April 21, "Contraptions and Gadgets: A Photographer's Toys," on May 18 and "Revealing What Your Film Has Captured," June 23.

All workshops begin at 1 p.m. There is a fee of \$2 per class or \$5 for the series. Bring your own camera. For further information call 924-4535, Ext. 507.

## Stony Brook Events

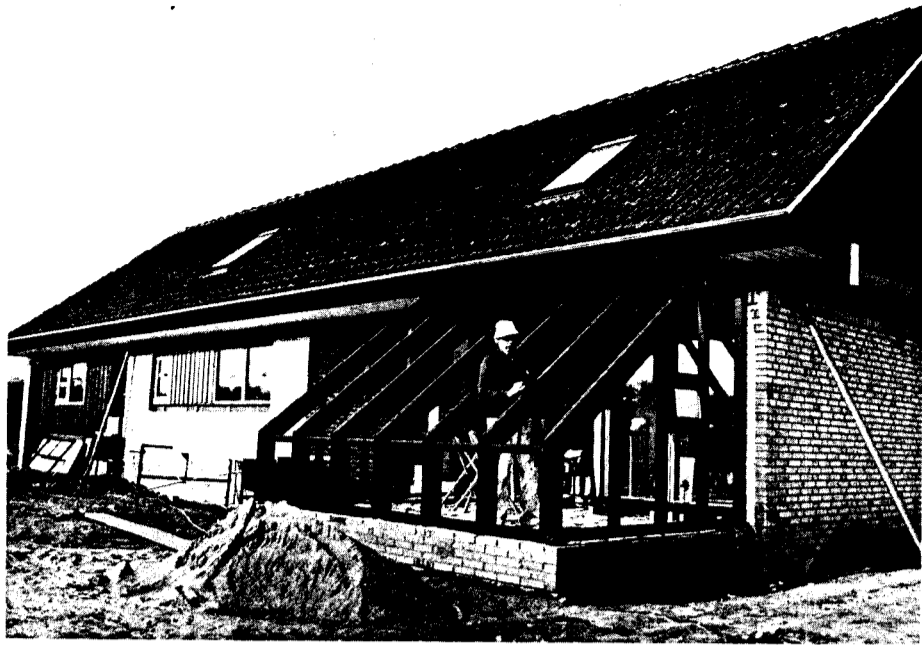
April 13 — N. Carolina Dance Theatre, 8 p.m., Main Stage.

April 20 — Elmar Oliveira, violinist, 8 p.m., Main Stage.

April 24 — Christopher O'Riley, pianist, 8 p.m., Recital Hall

April 27 — University Chorus and Symphony Orchestra, 8 p.m., Main Stage.

For information, call the box office, 246-5678.



Alex Reben

As of Tuesday afternoon, the exterior of the Danish House was nearing completion. Bjarne Pedersen is painting the wooden rafters of the greenhouse, soon to be enclosed in glass. This enclosed patio is accessible from the living room through a framed, triple glazed door and can be seen through the glass living room wall. The windows to the left of the winter garden are those for the master bedroom and, farther left, for its full bath. The windows of this house cannot be opened, but the slatted shutters can; even closed, they safely ventilate the house while safeguarding against burglary. At the far left is a tool shed, which is detached from the rest of the house, but is convenient to the double carport and a side door. The two skylights in the roof permit sunlight to enter the attic; though the second story can be utilized as living space, it is not being finished in this model. Inside the house, a staircase and cabinets are now being installed. Employees are invited to tour the Danish House on April 19, from 11 a.m. to 2 p.m. and from 4 p.m. to 6 p.m.

## Stockroom Closing

Building T-90 will be closed for inventory on April 25 and April 26. Please make all necessary withdrawals of stock prior to 3 p.m., Wednesday, April 24. This will give the Supply and Materiel Division sufficient time to prepare for the inventory. Emergency requirements should be processed through John Scharpeger, Ext. 2974.

## Arrivals & Departures

### Arrivals

James P. Pleickhardt..... Plant Eng.  
Regis Saitta..... Plant Eng.  
John P. Stone..... Medical

### Departures

This list includes all employees who have terminated from the Laboratory, including retirees:

Dennis G. Averill..... S&EP  
Norma R. Cicale..... Chemistry  
Tatiana Kolubayev..... DAS  
Karen M. Ratel..... Staff Svcs.  
Martha N. Simon..... Biology

## Cafeteria Menu

### Week Ending April 19

Monday, April 15	
Chicken rice soup	(cup) .65 (bowl) .85
London broil w/mushroom gravy & 1 veg.	2.35
Southern fried chicken & 1 veg.	2.15
Hot Deli: Monte Cristo	2.15
Tuesday, April 16	
Vegetable beef soup	(cup) .65 (bowl) .85
Short rib of beef & 1 veg.	2.35
Sweet 'n sour pork on rice	2.20
Hot Deli: Meatloaf	(bread) 2.00 (roll) 2.20
Wednesday, April 17	
Cream of mushroom soup	(cup) .65 (bowl) .85
Chinese pepper steak on rice	2.20
Spinach, bacon & Swiss cheese quiche & 1 veg.	2.05
Hot Deli: French dip	(bread) 2.05 (roll) 2.25
Thursday, April 18	
Potato leek bouillon soup	(cup) .65 (bowl) .85
Roast pork loin w/stuffing	2.20
Salisbury steak & 1 veg.	2.15
Hot Deli: Smoked turkey breast	(bread) 2.15 (roll) 2.35
Friday, April 19	
Manhattan clam chowder	(cup) .65 (bowl) .85
Oriental shrimp & snow peas on rice	2.15
Knockwurst & sauerkraut	2.10
Hot Deli: Hot Italian beef	(bread) 2.05 (roll) 2.25

## BERA News

### Swim Club

The Swim Club will meet informally at the Brookhaven Town/Mastic YMCA pool on Thursday, April 18, at 5:30 p.m. Swimmers who can offer rides and those who need one for this meeting or to swim after work should call Jim Lipka, Ext. 3372. For more information, call Marsha Belford, Ext. 3327, or Mark Catan, Ext. 2504.

### Cricket Club

As in previous years, the Brookhaven International Cricket Club is planning to arrange some matches with outside clubs during the summer. Please contact Dave Cox at Ext. 3818, or John Millener at Ext. 3853 if you are interested in playing or would like further details. 16912.

### Bowling

**White League**  
High games were bowled by Ken Asselta 256, Jim Griffin 248/247/681 scratch, Ken Riker 213, Ben Belligan 213, Ed Sperry 210, Charlie Tomesch 201.

**Purple League**  
Joe Ferrante rolled a 205, Dick Adams 204, Elaine Zukowski 197/193, Nancy Erickson 187, Pat Manzella 176.

**Red/Green League**  
J. Morris had games of 231/201/623 scratch, H. Arnesen 231, H. Marshall 222, D. Jesaitis 222, B. Jones 213, E. Sperry IV 208/204, R. Larsen 201, N. Combatti 200.

**Pink League**  
Ann Parrinello bowled a 187.

### Basketball

First Game	
Longshots - 62	Runaways - 67
P. Brown 7	S. Gilbert 5
J. Gaeta 4	T. James 25
J. Gaffney 10	G. Shepherd 14
J. Garrison 14	G. Smith 8
L. James 14	M. Tardd 15
R. Seymore 6	
E. Taylor 3	
L. Walcott 2	
R. Rowley 2	

Second Game	
Coasters - 49	Hollywood - 61
K. D'Amico 2	R. Domenech 7
R. Doty 8	G. Grigg 12
M. Fulkerson 3	A. Heard 2
F. Malone 10	R. Kowalski 2
B. Allen 8	G. Mack 12
A. Washington 4	E. Meier, Jr. 19
M. Williams 14	D. Nordstrom 7

## PSI News

Professional Secretaries International has designated April 21-27 as Professional Secretaries Week, and April 24 as Professional Secretaries Day. The theme for 1985 is "Pride in Performance."

Locally, the PSI Upton Chapter has planned the following activities:

April 18 — Dinner Theatre, "Love, Sex and the IRS," 7:30 p.m. at the Island Squire, Route 25, Middle Island. For reservations, call Patricia Durcan, 924-5533.

April 20 — Pennysaver News will issue a special Professional Secretaries Week edition honoring Upton, Twin Forks and Queen Anne PSI chapters.

April 22 — Film "She's Nobody's Baby" will be shown at Applied Math, Bldg. 515. A meeting will be held at 5:30 followed by the film at 6:30. Refreshments will be served.

April 17 — Seminar/Workshop on "Self Esteem: The Key to Personal Power" at Fairchild Republic Company, Farmingdale, sponsored by Queen Anne Chapter. A fee of \$45 includes lunch and seminar materials.

## Golf

The first tournament of the BGA golf season will be held on Thursday, April 25 at the Bellport Country Club. Tee times will begin at 11 a.m. and may be obtained by contacting Doug Sweely, Bldg. 535B, Ext. 4237. There will be a \$1 entry fee for BGA members and a \$2 entry fee for non-members. Deadline for signing up for the tournament is Monday, April 22. Greens fees will be \$9 (\$8 for Bellport residents). The tournament will be run using the Callaway handicapping system.

## Afro-American Culture Club

Members of the Afro-American Culture Club are invited to vote for new officers. A ballot box will be set up in the lobby of the Cafeteria on April 17 and 18 between 12 and 1 p.m. The slate of offices and nominees are:

Vice President  
Cosmore Sylvester, Bill Sells  
Recording Secretary  
Bettie Sylvester, George Grigg  
Corresponding Secretary  
Mary Cooper, Rosa Palmore

## Volleyball

C League	W-L
Captain Midnight	40-14
Tigers	36-18
Screw Balls	35-19
Craw	21-33
Quarks	18-36
Couples	12-42
Open League	
Phoenix	55-2
Odds & Sods	34-23
Half Lifes	28-29
Team 6	23-34
Rowdy Radicals	22-35
Generic	9-48

Congratulations to the Dinkers in the "A" Division for taking first place over UpFaGrabs and to TNT in the "B" Division for taking first place over Fossils in the 1984-85 season.

There will be a five-game series between Nuts & Bolts (A League) and TNT (B League) on Monday, April 15, at 5:30 p.m.

The Volleyball Awards Dinner will be held Friday, May 10, at 5:30 p.m. at the Rock Hill Country Club in Manorville. Tickets are now available from team captains at a cost of \$5 each for team members and \$9 each for guests. Captains can obtain tickets from Barry Karlin, Ext. 5624, or Walt Reams, Ext. 3408.

