

BNL Nuclear & Radiochemistry Summer School

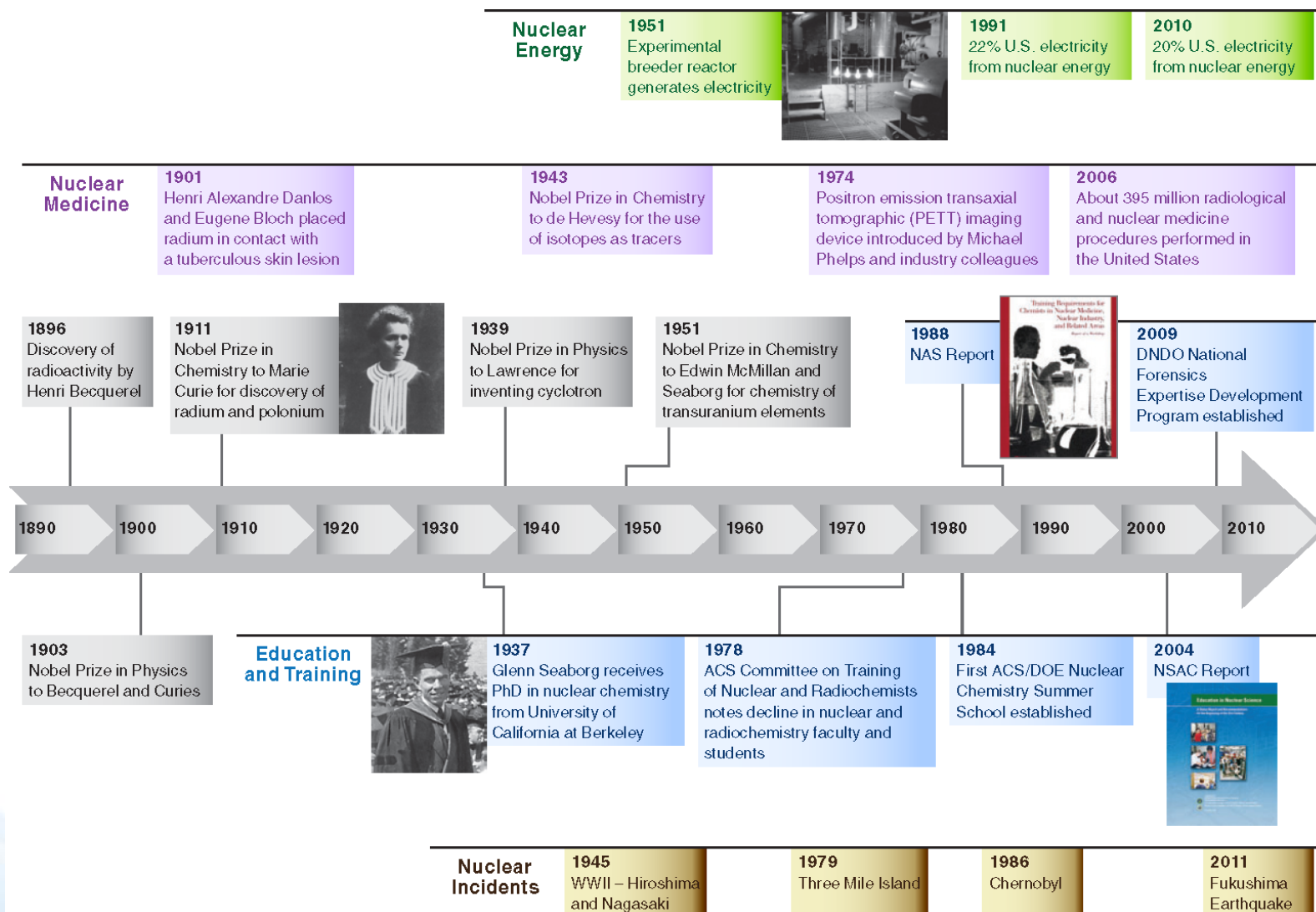




Orientation

- Overview of NCSS Program
- *CHE-361 & CHE-362 Grading Policy*
- Environmental, Safety & Health Program
- Life at BNL
- Where to be during your first week
- Student Check-in (*OEP forms, BNL ID cards*)
- Student stipends
- Photos at ~10:30

Nuclear & Radiochemistry Milestones



Source: National Academies of Science, "Assuring a Future U.S.-Based Nuclear and Radiochemistry" Report, 2012

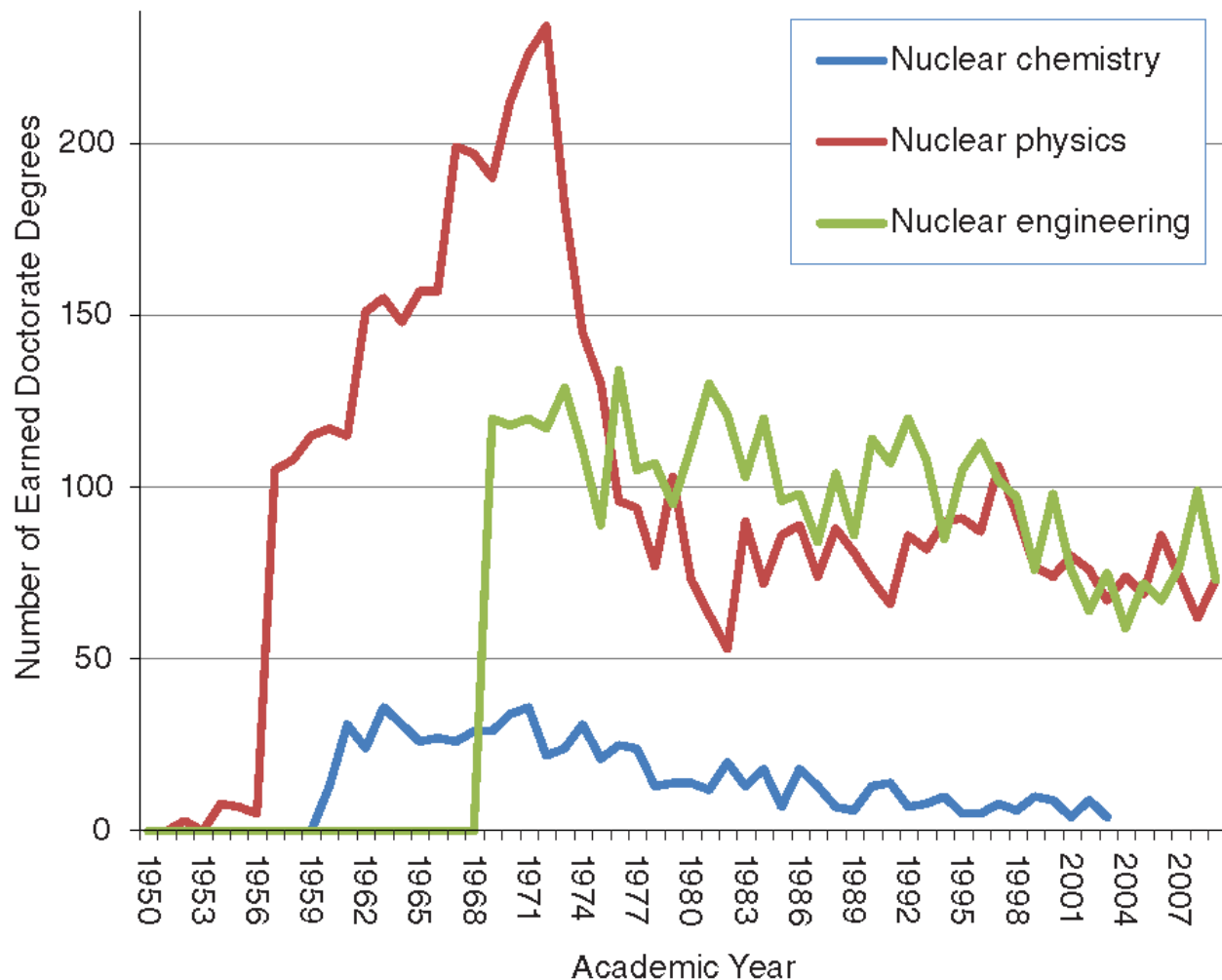
Nuclear Science Manpower Issues

- A significant decline began in the 1970s

- National Research Council, 2007

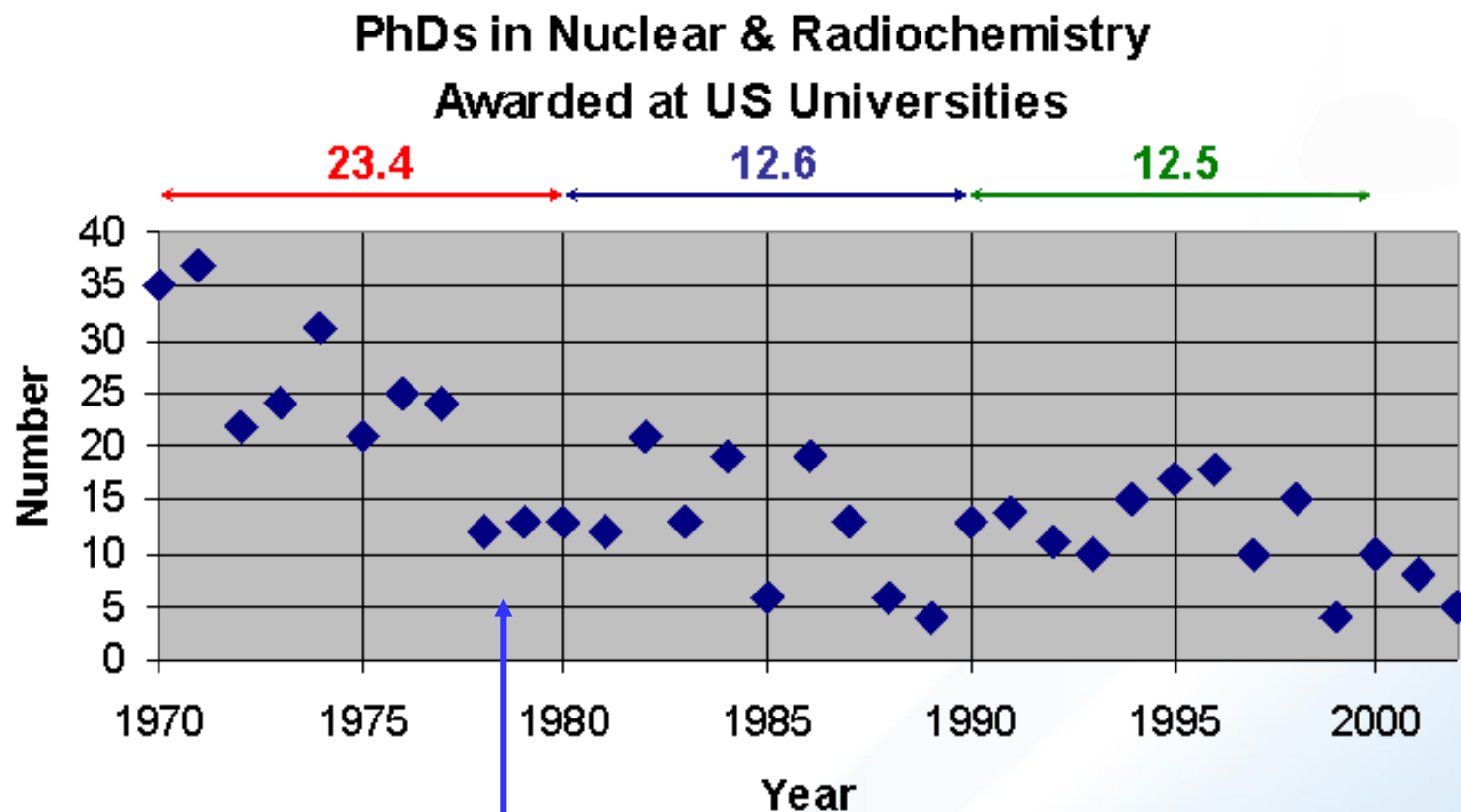
“Although the United States still leads chemical research worldwide, its dominance in nuclear science and radiochemistry is being challenged.”

Nuclear Science Education



Source: National Academies of Science, "Assuring a Future U.S.-Based Nuclear and Radiochemistry Expertise," Report, 2012

Nuclear Chemistry Education



1978—ACS DNCT reported on the declining vigor and magnitude of academic training in nuclear science.

NCSS History

1984 — 1st school created at San Jose State University

1989 — 2nd school created at BNL



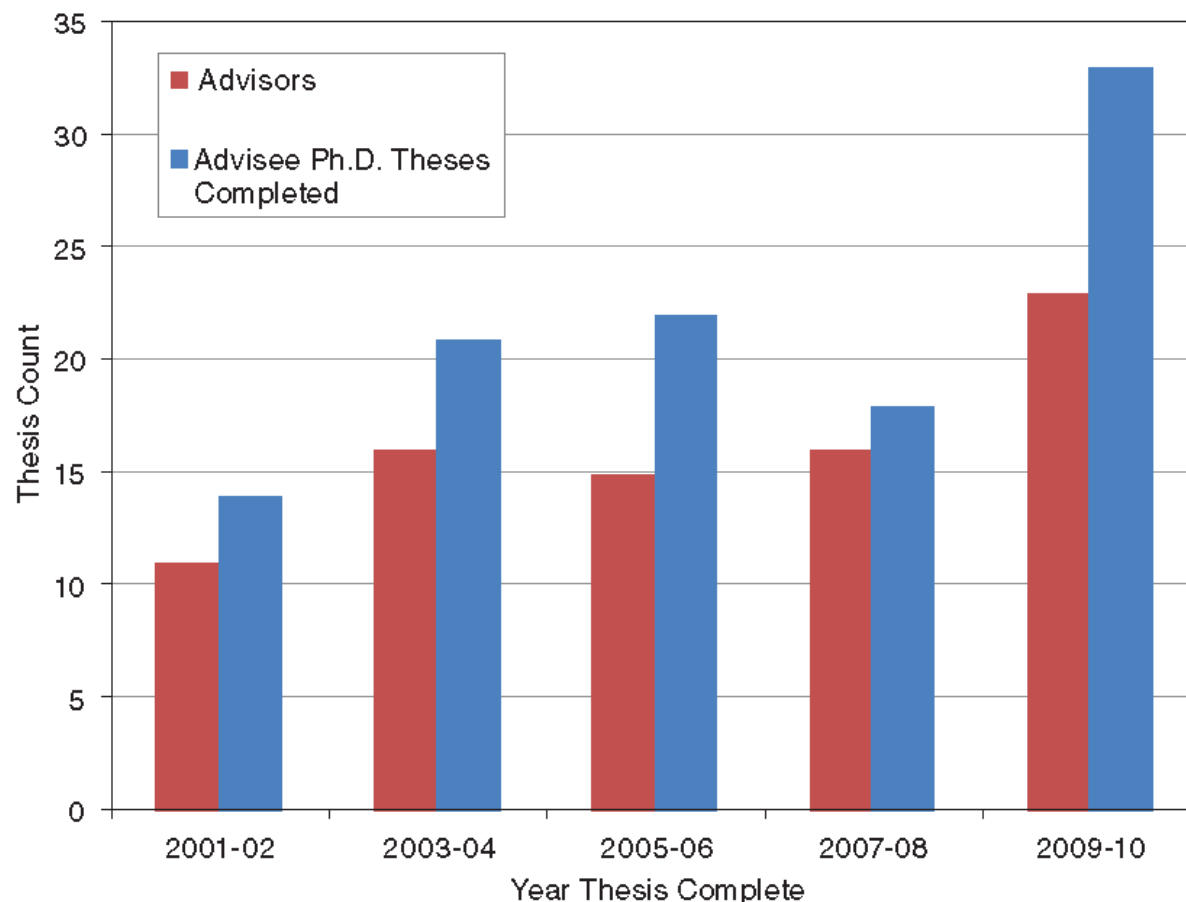
“Neutral site” schools are “sponsored” by the ACS Division of Nuclear Chemistry and Technology. Program support (\$\$\$) comes from the US Department of Energy, Office of Basic Energy Sciences.

NCSS Program Mission

Undergraduate nuclear education to help meet the needs for enhancing the workforce pipeline into radiochemistry and chemical physics academic programs. This is a long-term investment in the training of future nuclear scientists.

Philosophy: By attracting “*the best and the brightest*” to the field of nuclear science, there will be a positive impact on the field in the long term as these students will emerge as the scientific leadership of tomorrow.

NCSS Program Mission is Working



Source: National Academies of Science, "Assuring a Future U.S.-Based Nuclear and Radiochemistry" Report, 2012

CHE-361 Course Description

Director:

Louis Peña, Ph.D.

Scientist, BNL Collider Accelerator Department
(x8041 cell: 631-495-9655)

Adjunct Professor, Stony Brook University
Department of Biomedical Engineering

CHE-361 Course Description

Description:

- The lecture course introduces students to properties of radioactive substances, nuclear stability and structure, radioactive decay, interactions of radiation with matter, nuclear reactions, nuclear energy, and applications of radiochemistry in medicine, industry and the environment.
- The principal lecturers in 2019 will be Professors **Cody Folden from Texas A&M University, Christopher Klug from Augusta University, Alice Mignerey from University of Maryland, Romauldo de Souza from Indiana University, Ken Czerwinski from University of Nevada at Las Vegas**. Additional **guest speakers** will include staff members from BNL and invited speakers from outside BNL. You can find a schedule of guest lectures on the CHE-361 Syllabus online.
- Honor code, attendance policies, etc. are discussed in the Summer School Policies.

Term Paper:

- Students will investigate additional topics, not included in the regular lectures or in the assigned readings, and present their research with a 1500 word [term paper](#) and a 15-minute power point presentation.

Homework:

- Read the assigned pages prior to each lecture and then study them more thoroughly afterward when you are working on the homework problems. Homework will not be graded, but will be reviewed the next morning involving student participation at the blackboard. This will count toward your classroom participation grade—it is in your best interest to attempt all homework assignments!

CHE-361 Course Policies

- BNL/NCSS Code of Conduct
- SUNY Stony Brook Academic Integrity code
- Attendance is mandatory for all official NCSS functions
- 4 major exams (*no final exam*)
- Term paper and oral presentation (*note critical dates*)
- 3 credits through SUNY Stony Brook

CHE-361 BNL/NCSS Code of Conduct

While NCSS is primarily a university-level course, BNL is not a college or university. ***BNL is a workplace in a secure federal facility.*** Furthermore, NCSS is a semester long course compressed into six intense weeks. Therefore, traditional policies, practices, and accommodations at colleges and universities do not – and cannot – apply to NCSS at BNL.

Participants in good standing may continue in the program at the sole discretion of the Program Director. Anything that interrupts the safe and normal operations of BNL and/or has a negative impact on the NCSS program may constitute a loss of good standing and is grounds for immediate dismissal.

This determination is made by the Program Director, in consultation with appropriate stakeholders, and is NOT subject to appeal. Participants will be required to sign an agreement to this effect. If individuals cannot agree to these conditions, they cannot participate in NCSS at BNL.

CHE-361 Academic Integrity

Intellectual honesty is a cornerstone of all academic and scholarly work. Therefore, the faculty view any form of academic dishonesty as a very serious matter. The AJC and CEAS-CASA are responsible for the establishment of general guidelines for dealing with academic dishonesty in the colleges and for the consideration of individual complaints as outlined below.

<http://www.stonybrook.edu/uaa/academicjudiciary/policies.shtml>

Definition

Academic dishonesty includes any act that is designed to obtain fraudulently, either for oneself or for someone else, academic credit, grades, or other recognition that is not properly earned or that adversely affects another's grade. The following represents examples of this and does not constitute an exhaustive list:

- Cheating on exams or assignments by the use of books, electronic devices, notes, or other aids when these are not permitted, or by copying from another student.
- Collusion: two or more students helping one another on an exam or assignment when it is not permitted.
- Ringers: taking an exam for someone else, or permitting someone else to take one's exam.
- Submitting the same paper in more than one course without permission of the instructors.
- Plagiarizing: copying someone else's writing or paraphrasing it too closely, even if it constitutes only some of your written assignment, without proper citation.
- Falsifying documents or records related to credit, grades, status (e.g., adds and drops, P/NC grading, transcripts), or other academic matters.
- Altering an exam or paper after it has been graded in order to request a grade change.
- Stealing, concealing, destroying, or inappropriately modifying classroom or other instructional material, such as posted exams, library materials, laboratory supplies, or computer programs.
- Preventing relevant material from being subjected to academic evaluation.
- Presenting fabricated excuses for missed assignments or tests.

Electronic Devices

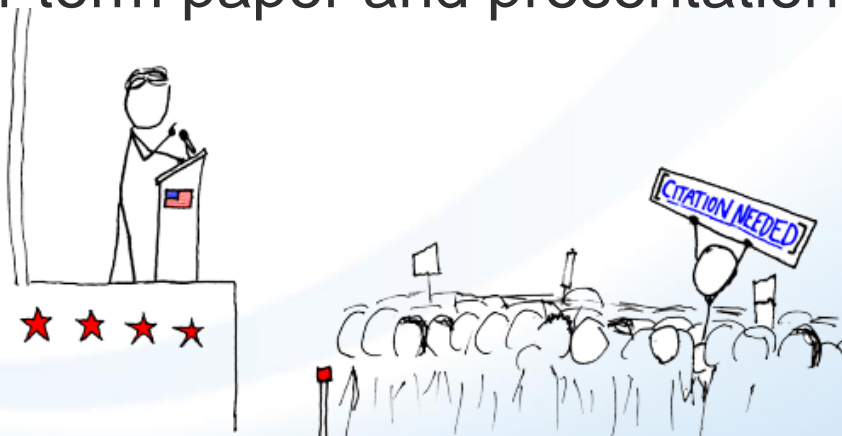
Electronic communication devices, including cellular phones, beepers, speakers, calculators and headphones must be secured in a closed container (and not, for example, worn on a belt or around the neck) and must be turned off (and not, for example, simply set on vibration mode) during any examination. This policy shall be announced before each examination.

Note: even if a student does not answer a ringing cell phone during an exam, it can be considered academic dishonesty for not having it turned off.

CHE-361 Grading Policies

Your final grade for CHE-361 will be determined as follows:

- 10% classroom participation (including homework)
- 60% weekly exams
- 30% for term paper and presentation



CHE-362 Lab Course Description

Instructor:

Jonathan Fitzsimmons, Ph.D.
BNL Collider Accelerator Department
Building 801
(x7234)

CHE-362 Lab Course Description

Experiments:

- The 8 experiments performed in the CHE-362 laboratory course are designed to familiarize the students with the properties of radioisotopes, their applications in nuclear and radiochemistry, and with the measurements of their radiations by means of various detectors and associated electronic systems. This course is also designed to develop students' scientific writing skills.
- Major topics are gamma-ray spectroscopy, beta counting, parent-daughter decay rate relationships, and radiopharmaceutical preparations.
- Emphasis will be placed on laboratory safety and on procedures for preventing radiation exposure and contamination. Early in the first week of the program, lectures will be given on proper laboratory practice and radiation safety.
- The laboratory and lecture courses are given in parallel. While they are complementary, the order of topics in one does not dovetail well with the order of topics in the other. Thus, it is especially important that you acquire the necessary background information for each experiment beforehand by reading the assigned pages in this manual and in the textbooks listed on below. There will also be brief pre lab and/or post lab sessions to promote understanding of the experiments.

Laboratory Writing Assignments:

- Each student will be required to maintain a notebook of raw data. Students will be provided with scientific laboratory notebooks on arrival. Each experiment will have a section on Post-Lab Deliverables which will list required inclusions into the notebook. Additionally, a formal laboratory report will be written by each student. A total of 6 laboratory reports must be handed in for grading — students will be doing 7 laboratory experiments during the program. It will be up to individuals to budget their time to meet this requirement. Each experiment will contain specific guidance in the Post-Lab Deliverables Section on what information should be included in the report.
- Reports are due by start of class on their respective due dates unless otherwise noted on the laboratory course schedule. Reports should be given to the Teaching Assistants in person. They are graded and handed back in a timely fashion. Notebooks will be collected periodically for grading to ensure students are compiling the required experimental data in an organized fashion.
- Each laboratory experiment will include a pre-lab quiz that will be given following the pre-lab lecture, but prior to the start of the lab. There is NO Lab Practical Exam.

CHE-362 Lab Course Policies

- Attendance is mandatory for all pre-lab lectures and laboratories. Each lab module will be preceded by a quiz.
- Required to hand in 6 formal reports of the 7 labs you will be doing in the next 5 weeks.
- Lab Reports are due at 9:00 AM on the due date assigned -- give to TAs in person. Reports handed in up to 24 hours post due date will be graded with a 20% penalty.
- 3 credits through Stony Brook University

CHE-362 Lab Grading Policies

Your final laboratory grade will be based on the following (no lab final exam):

- ~ 70% lab reports
- ~ 20% preparation (pre-lab quizzes)
- ~ 10% record keeping (notebook)

NCSS Operations and ES&H Staff

Program Support

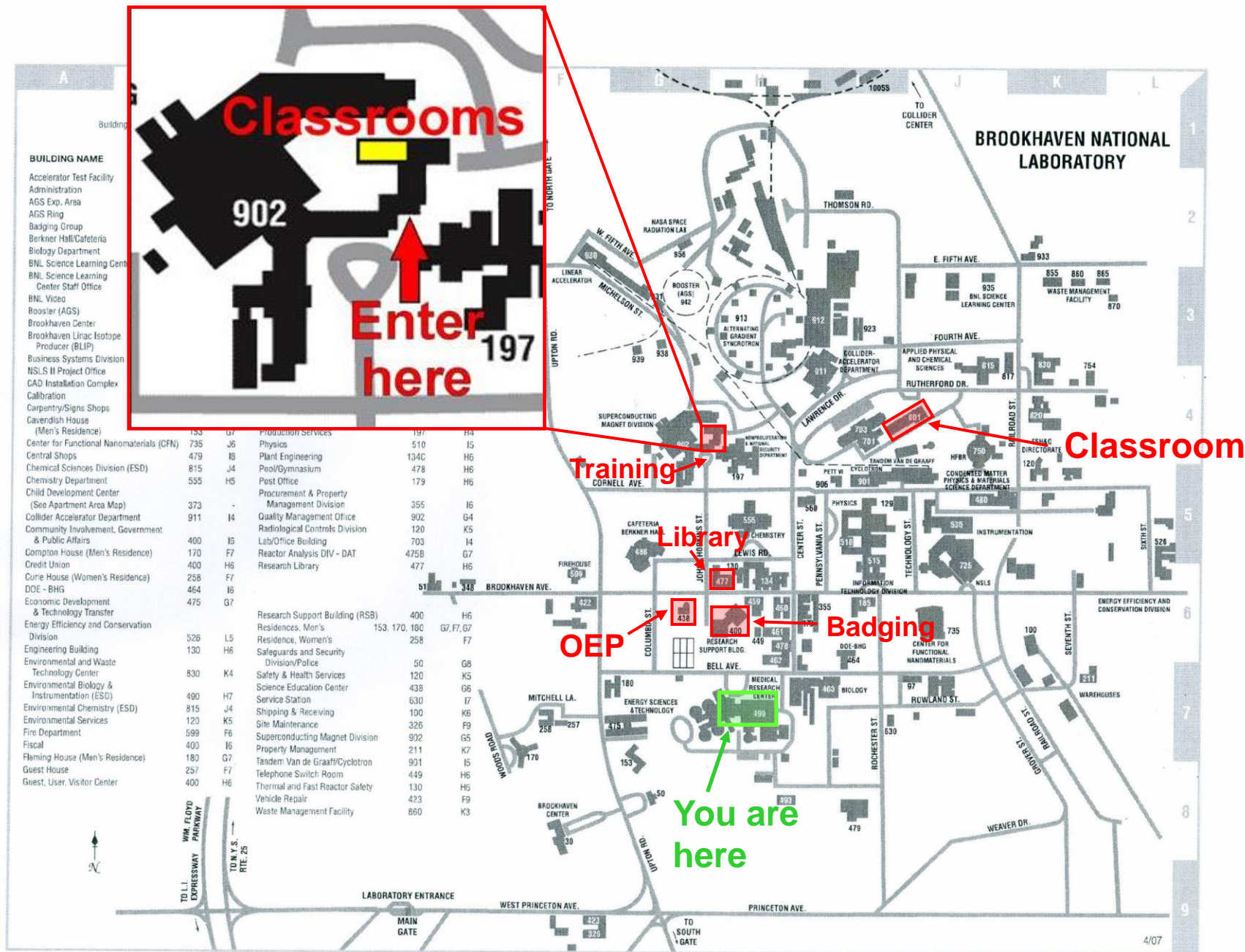
- Cindi Biancarosa (x4000), Office of Educational Programs
- Caitlin Hoffman (x7432), Collider-Accelerator Dept.

Building 801 (MIRP)

- Steve Pontieri (x5575), Building support
- Pat Sullivan, John Aloï (x4482), Radiological support

Training

- Online safety courses
 - Done before arrival to BNL
- Classroom safety courses
 - Radiation Worker - Part II (Tues morning, Bldg 902)
 - Benchtop Dispersibles (Wed morning, Bldg 902)



Hazard Analysis

The key to a good ES&H Program is identifying the hazards and controls and ensuring that people are aware of them.

- Experimental Safety Review
- Routine Work Planning
- Job Training Assessments
- Location Specific Training

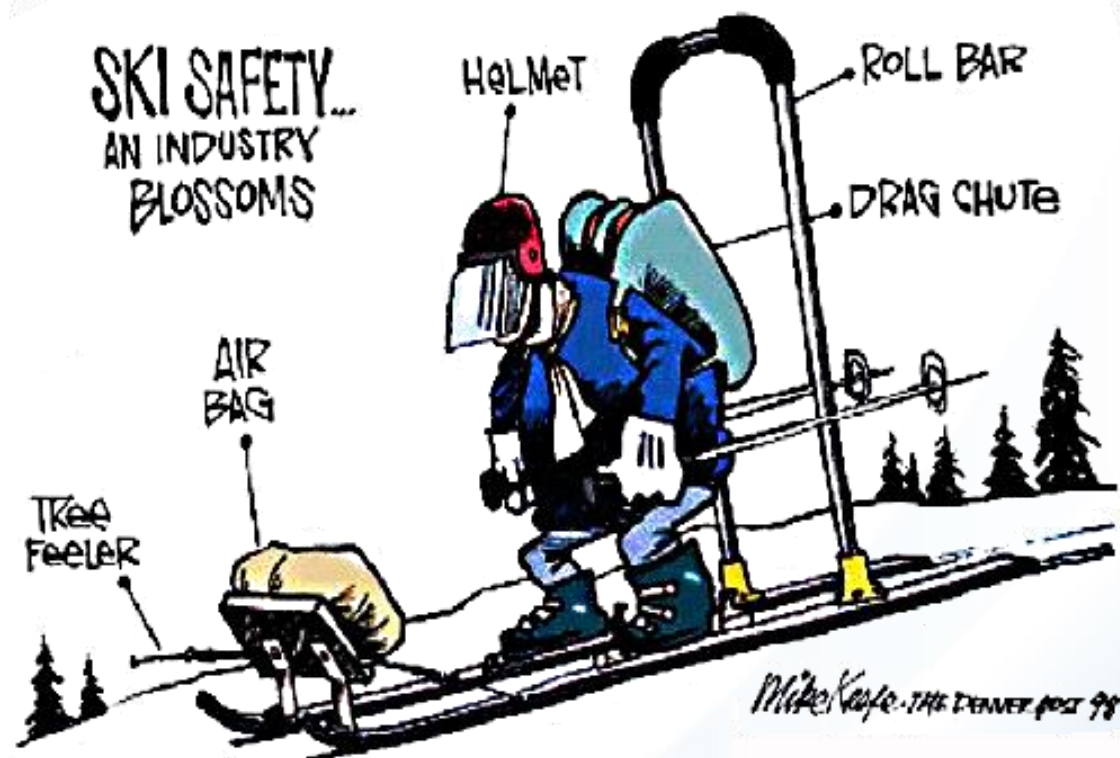
Chemical Hygiene

- No eating and drinking in labs (including gum chewing, applying of cosmetics)
- No food in chemical storage refrigerators or chemicals in food refrigerators
- No wearing of lab coats outside assigned lab space
- Proper street clothes must be worn in labs—long pants and covered shoes/sneakers

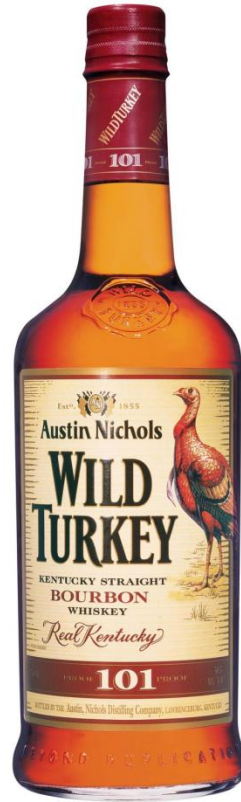
Radiation Protection Program

- Radiological Postings: Read on every entry and follow guidance.
- Radiological Work permit: Ensures that your training and all other requirements on the RWP are followed especially PPE.
- Any Questions regarding Postings or RWP—speak with FSR or FST's.

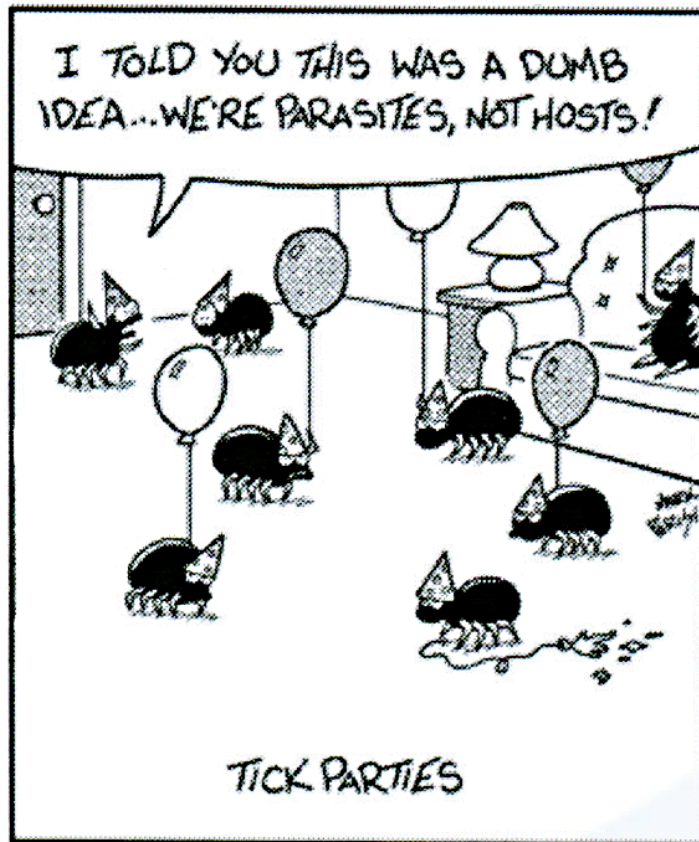
The Right PPE for the Job !



Other Safety Issues: Wildlife at BNL



Beware of Ticks in Grassy Areas



Pedestrian Safety

- Always use sidewalks
- Cross at corners using marked crosswalks
- Don't assume traffic will stop
- Don't cross while **texting**



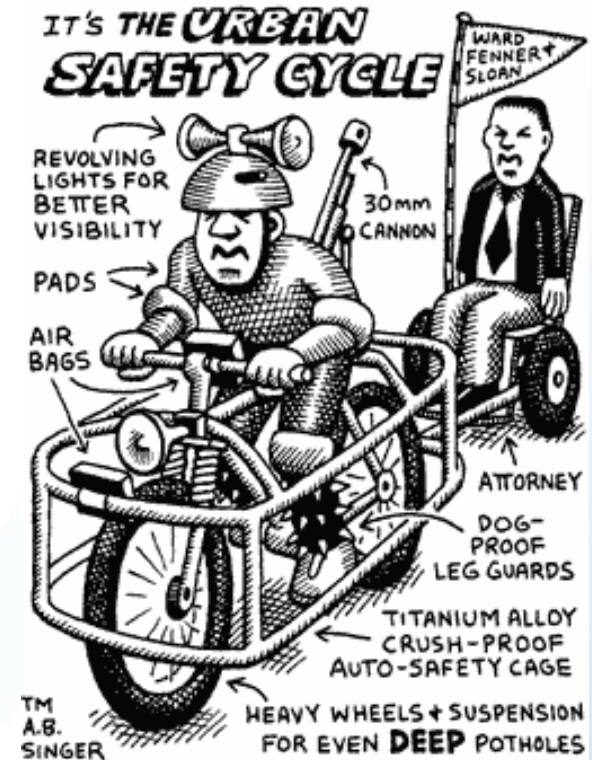
Bicycle Safety

■ DO

- Wear helmet at all times
- Allow cars & pedestrians right of way
- Obey all traffic signs and lights
- Avoid riding on busy streets
- Use bike lights if riding at night

■ DON'T

- Don't ride double
- Never ride in-and-out of traffic
- Never ride between two cars



Motor Vehicle Safety

- Vehicles must be registered with BNL Police
- Speed limit on site is 30 mph unless posted otherwise. *Front gate speed is 20 mph!*
- BNL Police will issue tickets!
- Obey all traffic signs and lights.
- Pedestrians and bicyclists have right of way
- No parking where curbs are painted yellow or posted.
- No parking in handicap spots.




"That woke me up, too!"


<https://www.bnl.gov/visitorinfo/a-z.php>

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 **Brookhaven**
NATIONAL LABORATORY

Guide to Brookhaven National Laboratory
The Quality of Life Office

 U.S. DEPARTMENT OF
ENERGY

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Banking



- On-site credit union/bank: Bldg 400, Ext. 2790
- **Teachers Federal Credit Union (TFCU)** is a full-service financial institution located on site in the Research Support Building (Bldg. 400).

Mon-Wed 9:00 am to 4:30 pm

Thu 9:00 am to 5:00 pm

Fri 8:30 am to 4:30 pm

Automatic Teller Machine (ATM)

- Two ATMs are on-site for use by everyone 24/7: Berkner Hall (Bldg 488) and the Research Support Building (Bldg 400).
- The ATMs accept credit and debit/ATM cards that are in the following networks: CIRRUS, HONOR, NYCE, and PLUS. The amount that you can withdraw using the ATM depends upon your bank's limit. If you have any questions about the on-site ATM, contact the on-site branch of TFCU at x2790, Monday - Friday.



Cafeteria



- Located in Berkner Hall, Bldg 488, BNL's 400-seat cafeteria is operated by Metz Culinary Mgt and is open for **breakfast** and **lunch**. Major credit cards accepted.

Mon-Fri 7:30 am to 1:30 pm

Sat-Sun Closed

- Menu changes daily, featuring hot and cold entrees, salads, sandwiches, sushi and grill items. The week's menu is available online:

<http://www.metzbrookhaven.com/menu.html>

Vending Machines & Snacks



- Starbucks coffee, tea, snacks in the Research Support Bldg 400 (9:00 – 4:30 pm).
- The Snack Stop in Bldg 179B (by the Post Office) is open 24/7, has a coffee/hot chocolate machine, microwave oven and seating.
- Soda vending machines are located in each dormitory, Laundry Bldg 363, and Science Education Bldg 438.
- Ice machines are located in each dormitory and the Lobby of the Guest House.

Laundry



- Available 24 hours a day, 7 days a week, at Building 363 (apartment area), the Curie Dormitory (Bldg 258) & Cavendish Dormitory (Bldg 153).
- For washing machine, obtain a laundry card from the Housing Office, \$1.50 per load.
- For dryers, 50 cents per 10 minutes.
- Soap and soda vending machines available.
- Coin exchange machine, in building 363 only.

US Postal Service



- Upton branch of the United States Postal Service:
Ext. 2539, Bldg. 179
- Hours of operation: Mon–Fri 8:00 am to 4:30 pm.
- U.S. Mail truck leaves site at 11:55 am and 4:45pm.
Express Mail pick up is at 11:45 am and 3:45 pm.
- This is a full service Post Office. The lobby is
accessible 24 hours a day, seven days a week.

Train to NYC



- The Long Island Railroad (LIRR) serves all of LI with service to New York City's Penn Station. Connections are available from there to Amtrak and regional lines.
- The closest LIRR Station with regular service is Ronkonkoma (Exit 60 of the Long Island Expressway US-495)
- Schedules & fares: <http://lirr42.mta.info/> (off-peak ~\$13/19; peak ~\$18/24)

BERA

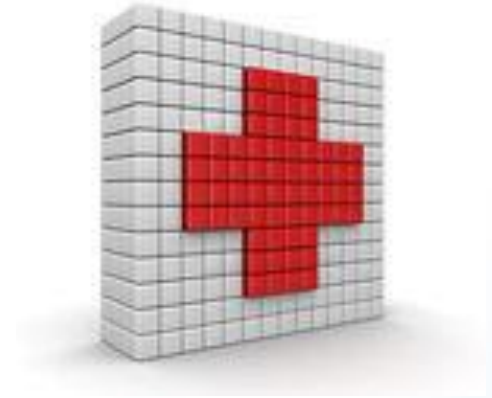
www.bnl.gov/bera

- Student Summer Pool Hours 5 pm-8:30 pm. **FREE !!**
- Student Gymnasium Use 11am-9pm Monday-Friday or Basketball, Badminton & Volleyball. (No Gym use from 3:30-5 pm during camp in July & August)
- Gym membership is \$20 for Summer Students. To SIGN UP see Christine Carter @ Recreation Office, Bldg 400, **from 8 am-9:30 am daily ONLY. Have exact cash or check & a copy of health insurance card.**
- The Gym & Pool are closed on Saturday & Sunday during the summer
- The BERA Store in Berkner carries health & beauty aids, phone cards, souvenirs, as well as *discount* SPLISH SPLASH & movie tickets & more. See the BERA website for many trips, discounts & programs for BNL guests.
- ASAP LOUNGE for 18 & over only. **NO ALCOHOL** is permitted. Your badge will be encoded as a key for entry. Pool table, Ping Pong, TV.
- For assistance or more information please call the QOL/BERA/Recreation Office at Ext. 5090 or ccarter@bnl.gov

Life at BNL

- substance abuse
- illegal internet sites / streaming
- cohabitation in dormitories

Life at BNL



- ANY and ALL MEDICAL ISSUES:
 - **Contact the Course Director !**
 - Contact the TAs

- URGENT Medical Emergencies (on site) dial x2222.

Date	Time	Activity	Host / Location
Sun June 16	12:00 p 3:00 p	Pizza Reception Lunch Grocery Run	Bldg 490, Louis Peña, Joel Castillo, Pauline Boning-Huang TAs will arrange van pick up at dorms
Mon June 17	9:00-10:45 a 10:45-11:30 p 12:00-1:30 p 1:30-4:30 p	Orientation ID badges Lunch Lecture 1	Bldg 490, Louis Peña (Site Director), Cindi Biancarosa (OEP) Bldg 400 Bldg 488, Berkner Cafeteria Bldg 801, Cody Folden
Tue June 18	9:00-12:00 a 12:00-1:30 p 1:30-4:30 p	Radiation Safety Training II Lunch Lecture 2	Bldg 902, Jay Adams -- Bldg 801, Cody Folden
Wed June 19	9:00-12:00 a 12:00-1:00 p 1:00-1:30 p 1:30-4:30 p	Benchtop Dispersibles Training Lunch Photos Lecture 3	Bldg 902 (Lab 2-37), Jay Adams -- Bldg 801 Bldg 801, Cody Folden
Thu June 20	9:00-12:00 a 12:00-1:00 p 1:00-5:00 p	Lecture 4 Lunch Lab 1 & Bldg 801 Check-in	Bldg 801, Cody Folden -- Bldg 801, Jonathan Fitzsimmons Pat Sullivan, John Alois, Steve Pontieri (RWP, TLDs, PPE)
Fri June 21	8:30-9:30 a 10:00-12:00 p 12:00-2:00 p 2:00-3:00 p 3:30-4:30 p	Review Exam 1 Lunch (local restaurant) Seminar Term paper Topics	Bldg 801, Cody Folden Benten Sushi, Rocky Point Bldg 801, Eszter Boros, SBU, Special Topic Seminar Bldg 801, Louis Peña
Sat June 22	8:00 a	NYC trip by minivan caravan	WTC 911 Memorial, Battery Park, Brooklyn Bridge, Stomp

Social Events

- Sat. June 16: NYC trip (WTC 9/11 Memorial, Battery Park, Brooklyn Bridge, Stomp
- Other weekends: to be self-arranged
- Weekly lunch at LOCAL RESTAURANT with Primary Lecturer and/or Seminar Speakers (Thursday or Friday)

Pepper ... and Salt

THE WALL STREET JOURNAL



"The body scan, bone scan, head scan and internal organ scan were all negative. The bad news is that you're radioactive."