

BC Chemistry

Volume II

Spring 2010

Message from the Chair *by Mark Kobrak*

This is an exciting time for the department. Our new faculty are establishing themselves, emerging as prominent researchers in their fields and taking on leadership roles in the department. Recent efforts to revitalize the undergraduate experience have born fruit, with the number of chemistry majors at Brooklyn College quadrupling in the last 6 years to stand at almost 200. And despite the competitive climate, we have the pleasure of watching our graduates move on to exciting careers.

A Fond Farewell

Last July found the faculty and staff at a bittersweet luncheon, celebrating the retirement of departmental secretary Harriet Weinrieb. For almost three decades, Ms. Weinrieb welcomed visitors to the office and took care of the needs of students and faculty alike. On page 3, James Howell offers a perspective on the woman who served as the face of the department so long and so well.

A Hearty Welcome

In January this year, the department welcomed Dr. Gail Horowitz as a full-time lecturer. One of a number of lecturers recently hired by the college, Dr. Horowitz is tasked with teaching and curriculum development. She will bring her extensive experience and insight to bear on the organic chemistry curriculum, where she has already begun to contribute to the continuing development of the laboratory program. You can learn more about her on page 4.

A Celebration for an Old Friend

A face that will be familiar to all is that

of Professor Emeritus Milton J. Rosen. Prof. Rosen celebrated his 90th birthday in February this year, and a symposium is planned in his honor on October 29th. Prof. Rosen remains an active researcher, continuing his study of surfactants almost two decades after his retirement. Learn more about his inspiring career on page 5.

Letting Brooklyn Teach for Us

Since 2007, the department has maintained an industrial internship program, placing students in local companies that seek to put their chemical knowledge to work. Students give the program glowing reports, and our commercial partners express great pleasure at working with our best and brightest. Learn more on page 7.

What the Future Holds

Despite all of this good news, we cannot ignore the turbulence of the times. New York State's finances have been battered by recent events, and the coming years are sure to be lean. Your support has meant that the department has been able to continue developing its curriculum, its facilities and above all its students. This year, the department has made a special effort to make funds available to undergraduate and masters students who need assistance. Your contributions have made that possible, and for that, you have the gratitude of all of our students and faculty. We hope that our friends and alumni can find the means to continue their tradition of generosity, even in these difficult times.

Thank you,
Mark Kobrak



Inside this issue:

| | |
|---|---|
| Harriet Weinrieb Retires | 2 |
| Faculty Research Highlights | 3 |
| Lecturer Gail Horowitz Joins the Department | 4 |
| Celebrating Milton J. Rosen | 5 |
| Alumni Spotlight | 6 |
| Industrial Internship Program | 7 |

Learn more on the web:

<http://academic.brooklyn.cuny.edu/chem>

Contact us:

Department of Chemistry
Brooklyn College of CUNY
2900 Bedford Ave.
Brooklyn, NY 11210
V: (718) 951-5458
F: (718) 951-4607

Harriet Weinrieb Retires *by James Howell*

The support staff of an academic department is very important, frequently serving as the link between the students and the faculty and making each more understandable to the other. One person who did that with wonderful ease and charm was Harriet Weinrieb, who retired from the department last year.

Harriet started working part-time in the purchasing office of the college in 1978, transferring to Chemistry in 1980. Soon after, she moved to the front office and began working full time. Harriet's outgoing personality made her the ideal person to greet students and triage their problems. She always had a smile and was genuinely interested in helping all those who came to the office. My own memory of Harriet's philosophy is that "students can come into the office feeling happy or angry, disappointed or enthusiastic, but they should all leave happy — or at least cared about." Leon Gortler, one of the department chairs during Harriet's tenure, recalls, "She made everyone know that she was there to help". He added, "She always made you feel as though she was happy to do whatever you asked her to do."

Many people have their favorite "Harriet Stories". Dave Goldberg, another chair with whom Harriet worked, was impressed with Harriet's shopping acumen. "She is the only one I know who can go into a supermarket with a large shopping bag and \$5 in her wallet and emerge with the bag full of groceries and \$7 in the wallet." Gary Mennitt, an early chair, recalled, "Several years after I had retired, my niece,

fresh out of college, got a position as a textbook salesperson. When she came to the office and introduced herself, Harriet immediately treated her as one of the department family." He added, "This is Harriet to me, a caring person always concerned for your welfare."

Leon Gortler said it well. "She was the most thoughtful individual that I knew. Besides the warm greetings and the willingness to help, she could be counted on to remember birthdays, anniversaries, births, deaths and holidays. She kept small toys and books in the office in case someone brought in a child or a grandchild. Even in retirement she sends a card or makes a call for special occasions." In my own case, Harriet found kitchen linen that could be used on my sail boat. It serves to this day.

Harriet, indeed, had two families. One was her husband Cliff and her daughter Pam, and the other was the department. Sometimes conflicts occurred particularly when Harriet would remain late in the office. Apparently this would was a cause of some concern to Cliff. Harriet attempted to smooth things over by telling him that the buses were not running on time or had an accident.

When asked what were her favorite memories of the department Harriet recalled the feeling of family, the pride in her job and the recognition she received. Harriet received Merit Awards for her work and served on the Strategic Planning committee for the college. She had a more substantial relationship with Christoph Kimmich, president of the college, than many faculty members had. The president's regard for Harriet was evident when he came to her retirement party.

Harriet's retirement party last summer was attended by the entire department and various administrators in the college. Both Cliff and Pam came to the celebration. There were many testimonies to the contributions she made to the college. Since retirement, Harriet and her husband Cliff have spent a good deal of time in Florida, enjoying the company of their daughter.



Harriet Weinrieb retired in July 2009 after almost 30 years in the department.

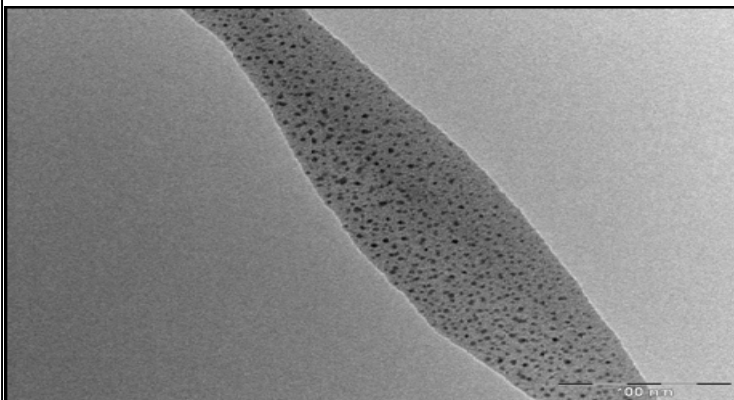


Harriet and the chairs with whom she worked. Left to right, Mark Kobrak, Jim Howell, Maggie Ciskowska, Harriet Weinrieb, Dominick Labianca, David Goldberg, Seymour Aronson and Gary Mennitt. Not present were Norman Indictor, Evan Williams and Leon Gortler.

FACULTY RESEARCH HIGHLIGHTS

PROF. ROBERTO SANCHEZ-DELGADO: *New Catalysts for Better Fuels*

According to the US Department of energy “It is likely that the nation’s reliance on fossil fuels (oil, coal and natural gas) to power an expanding economy will actually increase over at least the next two decades even with aggressive development and deployment of new renewable and nuclear technologies.” Our society is not finished with fossil fuels, and technologies will be needed to minimize their impact for the foreseeable future. Our research addresses the development of novel catalysts designed to reduce the levels of pollutants in transportation fuels, which would make them both more efficient and environmentally cleaner.



An electron micrograph of a new catalyst. The material is composed of ruthenium nanoparticles (dark grains) embedded in a poly(4-vinylpyridine) polymer matrix.

A parallel line of research focuses on finding more efficient ways to produce biodiesel. We are studying ways to embed metallic nanoparticles in specially-designed solid supports to create improved catalysts by design. That means that in addition to testing their activity as catalysts, we have to characterize the structure of these new materials using state of the art techniques such as transmission electron microscopy and X-ray diffraction. The project is exciting not only because of the value of the science, but also because it gives Brooklyn College’s graduate and undergraduate students the chance to work with cutting edge techniques.

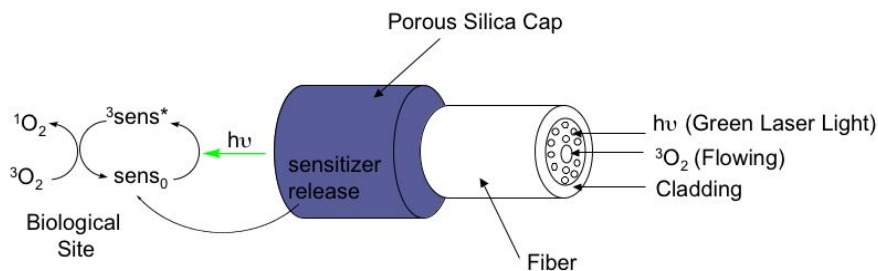
This work is supported by the U. S. Department of Energy and the Petroleum Research Fund.

PROF. ALEXANDER GREER: *Using Light to Target Tumors*

We are developing a fiber optic device that can be used in photodynamic therapy for cancer. Singlet oxygen, an excited form of oxygen that is toxic in high concentrations, is generated when molecules that act as sensitizers are exposed to light. Many have tried to target tumors by doping a patient with sensitizers, and targeting the tumor with light while keeping the rest of the body in the dark. Such techniques are frustrated by the low concentrations of molecular oxygen typically present in tumors, which means little singlet oxygen can be generated.

We have constructed a prototype of a device that uses hollow core fiber optics to deliver both light and molecular oxygen to a porous glass plug. The plug is coated with the sensitizer, and when exposed to light generates singlet oxygen. We envision a medical device in which the plug can be implanted at a tumor site, and used to generate toxic singlet oxygen at the site of the tumor. Because singlet oxygen reacts quickly, it will not diffuse past the bounds of the tumor and will kill cancer cells without affecting the healthy tissues surrounding it. Such a “magic bullet” has always been the goal of cancer research, and while much work remains, the potential value is enormous.

This research is funded by the U. S. National Institute of Health.



Fiber optic device for *in vivo* singlet oxygen generation.

Want to know more? Check out the department website for more information on faculty research:
<http://academic.brooklyn.cuny.edu/chem>

Organic Chemistry Education by Gail Horowitz

I am excited to be joining the Chemistry Department of Brooklyn College as a Lecturer of Organic Chemistry. With degrees in both Organic Chemistry and Science Education, I view myself as both a Chemist and an Educator. In fact, I think I fell in love with Organic Chemistry around the same time that I fell in love with teaching.

Initially, I took Organic Chemistry simply because it was required for my Biology major. But I found that I loved it and that the mechanisms and logic of my Organic course were much more appealing than my fact-based Biology courses. As a result, I switched majors and became a Chemistry major. I then went on to earn a Masters Degree in Organic Chemistry at Columbia University and to conduct synthetic organic research under the direction of Dr. Gilbert Stork.

But as a graduate student, I found myself pulled away from the research lab and into teaching. I loved teaching organic recitation and lab and enjoyed tutoring and working with students during office hours. So after spending two years at Columbia, I left to accept a faculty position at Yeshiva College of Yeshiva University where I served as Chemistry Department laboratory coordinator and instructor for almost twenty years.

During the decades that I spent at Yeshiva, I focused primarily on designing more pedagogically effective laboratory experiments (better learning tools). I also became very interested in environmental science and designed and taught a chemistry-focused environmental science course for non-science majors which explored topics such as fossil fuel consumption, nuclear energy and global warming.

Over the course of my years at Yeshiva working on curricular and pedagogical design, I became more and more interested in Chemical Education as an area of research. I began to attend the Biennial Conference on Chemical Education and became an avid reader, contributor and reviewer of the *Journal of Chemical Education*.

"I found that...freedom of choice, feelings of responsibility and ownership [were] most motivating to students..."

In 2003, I decided to return to school to learn about educational research in a more formal and structured way. I enrolled in a Ph.D. program in Science Education at Teachers

College, Columbia University. I spent six years learning about educational research methods, curriculum development and science education research. While I trained in both quantitative and qualitative research methods, I found myself most drawn to qualitative data collection as a tool most suitable for obtaining rich, detailed and descriptive data.

My dissertation research also led me to the field of student motivation, an area within social psychology in which I ultimately developed an expertise. Initially, I became interested in motivational theory because of my experiences with Yeshiva University students, who were primarily pre-health students who took Organic Chemistry because they had to, not because of an inherent interest in the subject. Ultimately, my dissertation research focused on the design and study of a research-based organic laboratory curriculum that I designed with the deliberate intention of trying to enhance students' intrinsic motivation. In my dissertation work, I explored what curricular features or elements (such as enhanced suspense or autonomy) could be tweaked or modified in order to maximize student motivation and engagement. I found that enhanced autonomy (freedom of choice, feelings of responsibility and ownership) was most motivating to students as compared to other curricular features such as enhanced authenticity or suspense.

Having spent almost twenty years at Yeshiva University, I recently decided that it was time for a change, time to broaden my horizons, and time to move to a larger institution where I could learn, grow and also impact a broader population of students. I am excited about my new position at Brooklyn College. I look forward to working with Brooklyn's diverse population of pre-health students. I am confident that my combined background in Educational Research and Organic Chemistry can be put to good use at Brooklyn College to help Organic Chemistry students succeed and achieve their career goals.

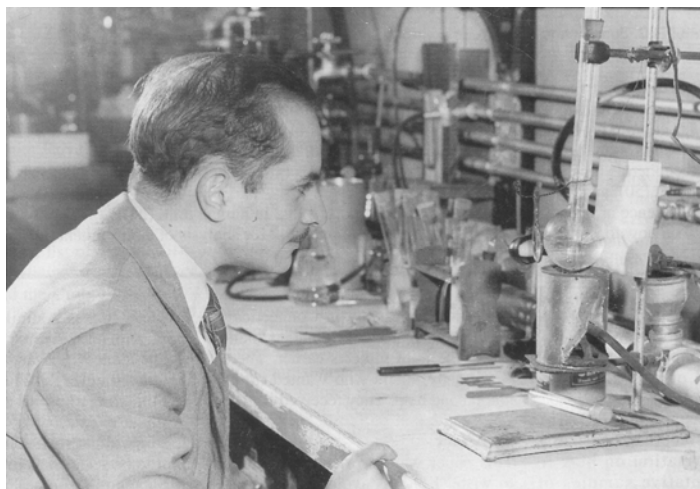


Dr. Gail Horowitz
joined the department
in January 2010 as a
lecturer for Organic
Chemistry.

Celebrating Milton J. Rosen by Joann Mathias

In February this year, Prof. Emeritus Milton J. Rosen celebrated his 90th birthday. A leader in the study of surfactants, Prof. Rosen is one of BC's most distinguished scientists and beloved teachers.

Prof. Rosen's career at Brooklyn College began in 1946, following his discharge from the U. S. Army after having served in the Pacific Theater during the Second World War. The influx of students returning to college on the G.I. bill meant that there was a great demand for instructors. Another result of the war was a large surplus of styrene, a chemical used in wartime production of synthetic rubber, and Prof. Rosen's first research project discovered a use for that surplus in the synthesis of novel surfactants.



Prof. Rosen in his laboratory, circa 1951.

Having become fascinated by the major changes in the physical properties of a system induced by a single layer of surfactant molecules at an interface, the stage was set for a career which was to result in groundbreaking contributions to surfactant science. Collaborations with research groups in Jerusalem, Beijing and Barcelona produced solutions to problems ranging from increasing the permeability of desert soil to improving the viability of fish in hard river water. Industrial collaborations with major corporations such as Exxon-Mobile, Proctor & Gamble and Dow Chemical led to patents in a wide range of surfactant applications, as well as providing support for Brooklyn College graduate students.

Paralleling these activities, Professor Rosen's laboratory continued to study the physical chemistry of surfactant molecules, particularly the relationship between fundamen-

tal interfacial properties and performance properties. In 1979, "Surfactants and Interfacial Phenomena", became the first book of its kind and a world-wide best seller, and is now in its fourth edition.

Another major breakthrough came in the 1980s with the development of a set of equations that predicted whether a mixture of two surfactants would exhibit synergism, i.e. when the properties of the mixture are better than those of the individual components. A simple, experimentally-derived interaction parameter incorporated in these equations predicts quantitatively the various physicochemical parameters of the mixture, and is in wide use today.

Later in that decade, Professor Rosen became a pioneer in the field of Gemini surfactants. Gemini surfactants have two hydrophobic and two hydrophilic groups in the surfactant, in contrast to conventional surfactants which have only one of each. In 1988, in one of the first articles on this topic, Professor Rosen described his research which found that Gemini surfactants were orders of magnitude more surface-active than conventional surfactants. The article generated intense interest from academic and industrial researchers and today commercially available Gemini surfactants are readily available.

These are but a few examples of the research that has spanned over 60 years and produced over 150 papers and patents.

Today Professor Rosen continues to maintain a presence in the field as a consultant to industrial organizations and government agencies. He is on the board of several journals in surface and colloid chemistry and continues to review manuscripts and research proposals.

The Chemistry Department will host a scientific symposium on October 29, 2010 honoring Milton J. Rosen, Professor of Chemistry and Director of the Surfactant Research Institute at Brooklyn College.

A Symposium in Honor of Prof. Milton J. Rosen

In celebration of his 90th birthday, Brooklyn College will host a day-long symposium in honor of Prof. Emeritus Milton J. Rosen. The symposium will be held on October 29th. Details are available under the News link at <http://academic.brooklyn.cuny.edu/chem/>

ALUMNI SPOTLIGHT

MR. ALEKSANDR CHERTOK: *On to Graduate School*

One of the program's newest alumni, Mr. Aleksandr Chertok (BS, 2009) was born in Kursk, Russia, and moved to Brooklyn in 1994, at the age of 7. He attended Brooklyn Technical High School, and entered Brooklyn College in 2005. He is currently pursuing a PhD in Chemistry at The Pennsylvania State University.

At Brooklyn College, Mr. Chertok worked with Prof. Stacey Brenner on the synthesis of substrates for her experiments in organocatalysis. Mr. Chertok received the David Davidson Memorial Summer Research award in summer 2008, providing support for this work.

Since arriving at Pennsylvania State, Mr. Chertok has begun work with Prof. Ayusman Sen, investigating active chemotaxis of functionalized microparticles in response to ion gradients. The work is part of a larger thrust to create nanomachines capable of directed collective motion, which would be an enabling technology for a wide range of industrial and medical applications. In addition to his chemistry coursework, he has taken courses in Chemical Engineering to gain a deeper understanding of hydrodynamics and colloidal thermodynamics.

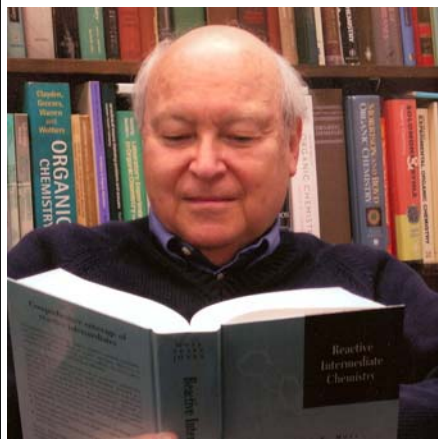
PSU has required some adjustment. "All of a sudden, I am not only a full-time student, but also a half-time TA while at the same time I am trying to get something done in the lab," Mr. Chertok reports. He adds, "I am just as glad today as I was a year ago that I went to Brooklyn College for my undergraduate education because it is quite clear to me that my level of preparation is easily on par with that of that of my peers here. I've come away from BC with a strong knowledge of the sciences and the kind of work ethic that one needs to succeed in graduate school."



PROF. ROBERT MOSS: *Winner of the 2010 Arthur C. Cope Award*

Now a professor in the Department of Chemistry at Rutgers University, Robert Moss (BS, 1960) earned his doctorate from the University of Chicago with Gerhard Closs and performed post-doctoral research at Columbia University with Ronald Breslow. He began his career at Rutgers in 1964, and the past 46 years have been punctuated by sabbaticals and fellowships at institutions including M.I.T., the University of Oxford, the Weizmann Institute of Science and the Hebrew University of Jerusalem. In 1993 he was appointed the Louis P. Hammett Professor of Chemistry at Rutgers, though he retired from teaching in 2007. He was awarded the title of Research Professor, and continues working with a small, externally-funded research team to this day.

Prof. Moss' work has spanned a broad range of organic chemistry, including the chemistry of reactive intermediates, reactions in organic aggregates (micelles and liposomes), and the decontamination of organic phosphorous compounds. The work has been supported by a wide variety of agencies, and has led to over 400 scientific publications, including 7 coedited books. Sixty graduate students and fifty postdoctoral associates have worked in his research group. Among his many honors, he received the Distinguished Alumnus Medal of Brooklyn College in 1991.



This year, Prof. Moss was awarded the Arthur C. Cope Award from the American Chemical Society, which recognizes excellence in organic chemistry. The award is among the most distinguished offered by the ACS.

Prof. Moss recalls several Brooklyn College professors as having been particularly helpful to him, including Donald D. Wright, J. G. Sharefkin, T. S. Ma and Louis Sattler.

The Industrial Internship Program *by Mark Kobrak*

It can be hard to convince college students that their courses are preparing them for the real world – Until you put them in it. Since 2007, the Department of Chemistry has maintained an internship program for its undergraduates, placing them in local businesses where they can apply their chemical knowledge to real problems. To date, 10 students have participated in the program, including two who opted to work full time for their host company after graduation. Students universally report exciting and informative experiences, and are grateful for the chance to see chemistry in action.

The college currently has two corporate partners for the program: Virginia Dare in Sunset Park, Brooklyn, and Propper Manufacturing in Long Island City. Virginia Dare, a company of 175 employees, was founded in 1923 and maintains manufacturing and research facilities in Brooklyn. The company manufactures vanilla on site, but students have been involved with the other arm of the business: the development of flavors and fragrances. Virginia Dare does contract work creating flavors for products ranging from soft drinks to pharmaceuticals.

The program's other host is Propper Manufacturing in Long Island City. The company was founded in 1935 and employs 160 people in its operations. Propper makes a wide range of medical products, including a line of indicators used to validate sterilization in autoclaves. The company's manufacturing, research and development are all on site, and students are typically involved in product development and validation.

Enrollment in the program is competitive, with students interviewing with prospective hosts. Typically, each host organization brings in only one or two interns in a semester, insuring there is extensive supervision and mentorship. Students usually work one day a week on site on whatever projects they are assigned, and interns and their supervisors maintain regular contact with the department to insure that everything is going according to plan. Interns report on their experience at the end of the semester, informing other students about their activities. While the presentations have to be tailored to avoid revealing proprietary information, students in the audience are often excited to learn about the life of an industrial chemist. Indeed, one benefit of the program has been an increasing awareness among the BC student body of career opportunities in science.



Brooklyn College student Guy Monahan tests the use of a new sterilization protocol at Propper Manufacturing's facility in Long Island City.

When asked about the experience, students are always enthusiastic. "Working for Virginia Dare has been a wonderful learning experience," reports Stephanie Garafola, a current intern. "I have learned many new techniques." She adds, "There is a lot more chemistry that goes into food than most people realize."

The program's hosts also report great satisfaction. "The internship program with Brooklyn College has been a great success," says Dr. Don Marmo, Vice President of Development at Virginia Dare. "[T]he experience gives us an infusion of smart, high energy, motivated people who work alongside our employees and have many questions and suggestions that help us with our processes."

The Department of Chemistry hopes to build on the success of this program by finding additional partners, and by opening the internship program to Masters students. This will raise student awareness about careers in science, give more students a chance to experience chemistry in action, and support Brooklyn College's role as a resource that serves Brooklyn and New York City.

Help us out!

Do you know a company or government laboratory in NYC that might be interested in hosting BC interns? We're interested!

Contact Prof. Mark Kobrak
E-mail: mkobrak@brooklyn.cuny.edu
Phone: (718) 951-5758

Be a Catalyst for Change!

Your gifts will help us to continue to transform and modernize our department in these critical times.

Yes! I want to help sustain the tradition of excellence at Brooklyn College!

Enclosed is my check made payable to the Brooklyn College Foundation
in the amount of: \$_____

(Please write Chemistry Department Resource Fund on your check memo.)

I prefer to charge my gift (please select one):

☐ VISA ☐ MasterCard ☐ American Express

Card# _____ Expiration Date: ____/____

Signature: _____

Name _____

Street _____

City, State, Zip _____

Phone _____

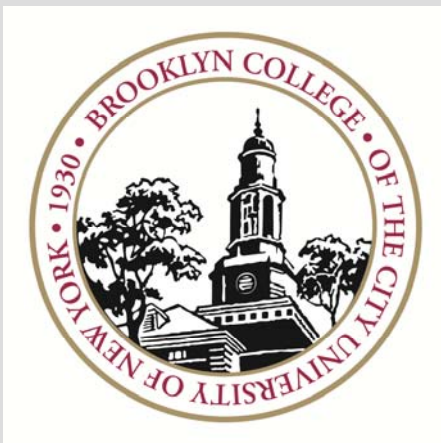
E-mail _____

Please return this form along with your check to:

Brooklyn College Foundation
2900 Bedford Avenue
Brooklyn, NY 11210-2889

Have you included your company's Matching Gift Form? ☐ Yes ☐ No

To make your gift online, go to www.brooklyncollegefoundation.org.



*Your gift to the Brooklyn College Foundation
is tax-deductible to the full extent of the law.*