

BC Chemistry

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Message from the Chair by Mark Kobrak

It has not been an easy year, but I am pleased to say it has not been as hard as it might have been. As you are no doubt aware, Brooklyn College and CUNY continue to be buffeted by the winds of New York's finances. State support continues to dwindle, tuition for our students has unfortunately risen, and budget and staffing issues continue to plague CUNY generally and the Department of Chemistry in particular. In spite of that, we have continued to see a steady increase in enrollments, continued enthusiasm for Chemistry as a major, and a good deal of success for our new graduates.

Congratulations in Order

I am pleased to report that Ms. Michelle Leuenberger, a Chemistry major, was one of two BC students to win a Fulbright Award this year. Learn more about Ms. Leuenberger's remarkable achievement and her plans on page 2.

Fond Farewells

Prof. James Howell and Chief College Laboratory Technician Carl Paparella both opted to retire this year, taking advantage of an incentive program offered by CUNY. Both have been an integral part of the organic chemistry curriculum for decades, and will be missed. Read about their careers on page 3.

Welcome to a New Friend

The department is pleased to welcome Dr. Ryan Murelli, who joined the department as an assistant professor in Fall 2010. In addition to his work as an in-

structor in organic chemistry, Prof. Murelli has established a laboratory to synthesize novel compounds of biological relevance. Read more about the man and his work on page 5.

Surfactants Symposium a Success

A symposium held in honor of Prof. Milton Rosen's 90th birthday drew many distinguished scientists to Brooklyn College, including both former students and leaders in the field. Learn more on page 7.

Faculty Research and Alumni Successes

The department continues to build its research base. Featured in this newsletter are Profs. Jarzecki and Juszcak, whose interdisciplinary work spans physics and chemistry with applications in medicine and biology. We also report on the career progress of two alumni, and can take pride in their success.

With Heartfelt Thanks

Let me once again express my gratitude to you, our friends and alumni, who have given so generously over the years. The funds you have supplied have been used to promote teaching and to support students in need, insuring that we maintain a quality educational program and can make it accessible to students who might otherwise never have the chance. Your generosity continues to pave the way for new generations of scientists, medical professionals, and scientifically literate laypersons.

Thank you,
 Mark Kobrak

Brooklyn College Chemistry Major Wins Fulbright Award *by Mark Kobrak*

College professors are used to hearing weak excuses when students say they are putting something off. But graduating senior Michelle Leuenberger has a pretty good reason for putting off graduate school: she was one of two Brooklyn College students to receive a Fulbright award this year and is going to Germany to pursue research in solar energy.

Ms. Leuenberger will be working at the Karlsruhe Institute of Technology with Prof. Frank Breitling. She will spend 10 months there and is already brushing up on her German. The project will involve synthesizing amino acid-porphyrin conjugate toner particles for use in a chemical printing apparatus, making it possible to lay out arrays of photoreactive particles. The goal is to create arrays that could be used in biomimetic solar cells.

The Fulbright Awards program was established by Congress in 1946 to foster cultural exchange between America and nations around the world. The national program is administered by the U.S. State Department, and supports students, scholars and professionals to pursue graduate study, research, and teaching opportunities abroad. It is the largest international exchange program in the U.S.

Ms. Leuenberger has already been accepted to the doctoral program at University of California: Berkeley, and plans to study there after she completes her work in Germany. She wants to become a professor some day and hopes that the chance to do a Fulbright fellowship will help her develop her credentials for the work.



Ms. Leuenberger and her undergraduate research mentor, BC Chemistry Prof. Brian Gibney



Michelle Leuenberger, Fulbright Awardee

Ms. Leuenberger began her studies at Brooklyn College as a Nutrition major, but changed majors after she found how much she enjoyed chemistry. Her interest in science goes back much further than that. “This sounds cliché,” she says, “but even as a very young child, I loved geology, astronomy and any other science I had a chance to learn about.” She says she was drawn to chemistry by the way the discipline begins with the details and works upward.

She has worked with Prof. Brian Gibney at BC since June 2010, studying the relationship between the chemical structure of peptides and the biological dysfunctions that lead to disease. She has worked on a number of aspects of the problem and has employed a range of techniques, including peptide synthesis, high performance liquid chromatography and optical spectroscopies.

Asked if there was anything else she wanted to say, Ms. Leuenberger offered a, “Thank you,” to all the department faculty who have put up with her incessant questions in class. She adds that she has enjoyed her time at Brooklyn College very much.

Ms. Leuenberger was one of two Brooklyn College students to win a Fulbright this year. The other was Ms. Christine Pigott, who will travel to England to complete a master’s program in media studies at Falmouth University in Cornwall.

James Howell and Carl Paparella Retire by David Goldberg

In January of this year, Brooklyn College said good-bye to two mainstays of the organic chemistry curriculum. Prof. James Howell and Chief Laboratory Technician Carl Paparella both retired, ending decades of committed service to the department and the students of the college.

Carl Paparella came to Brooklyn College in 1971, after earning his BA in Chemistry from Hofstra University in 1966 and working in industry. He originally supported the organic and analytical chemistry teaching labs, but later his duties expanded to the biochemistry and advanced inorganic courses as well. For each lab, he prepared materials and equipment and generally handled laboratory housekeeping; no mean feat with as many as 1500 students a year going through these labs. But these were only the beginning of his contributions to the students and the department.

Mr. Paparella has all the qualities that one could want in a coworker. He is intelligent, hard working, cooperative, dependable, responsible, likable, and willing to do even more than expected. He has a pleasant demeanor and is committed to getting the job done right. He has fine organizational skills. One faculty member once stated that Carl's only fault was not knowing how good he is.

It would be impossible to catalog all of Carl's efforts for the department. He has deployed and maintained numerous instruments, trained new laboratory technicians and aides, and initiated a computer inventory system for the stockroom. He prepared materials for lecture demonstrations and for the department's annual High School Day magic show. He worked with faculty to improve the laboratory curriculum, and advised more than one department chair on safety issues.

Mr. Paparella's body of work earned him the designation as the first Brooklyn College "Employee of the Month." We have been privileged to have had him with us these many years.



Carl Paparella with fellow technicians (left to right) Grace Kosiorek, Anna Belyayeva and Isanna Agrest.



Prof. James Howell has retired after almost 40 years of exceptional service as a teacher and scholar. Jim came to BC in 1973 with superb recommendations, including one from Nobel Laureate Roald Hoffman, his PhD mentor. An expert on quantum chemistry, he quickly became the top research user of the college's mainframe computer. He has published numerous papers in prestigious journals, and received research grants from a number of agencies.

Prof. Howell has been an excellent teacher. He taught an amazing range of courses, from a one-semester course in organic chemistry for pre-nursing students to high level doctoral courses at the Graduate Center. While his background is in theoretical physical chemistry, much of his teaching has been in the pre-medical track of the organic chemistry curriculum. Jim was particularly committed to the mission of the college to reach all students, and for many years taught in the evening for night students. He was well appreciated by his students both for his clarity and his extensive availability to them outside of class for individual help.

Faculty leadership is an important component of any department, and Jim Howell has always taken this responsibility seriously. He served in many roles, culminating in his election as department chair for 2005-2009. Above all, Jim Howell's judgment and commitment to excellence from his colleagues, his students and himself will be sorely missed.



Prof. James Howell lectures on organic chemistry.

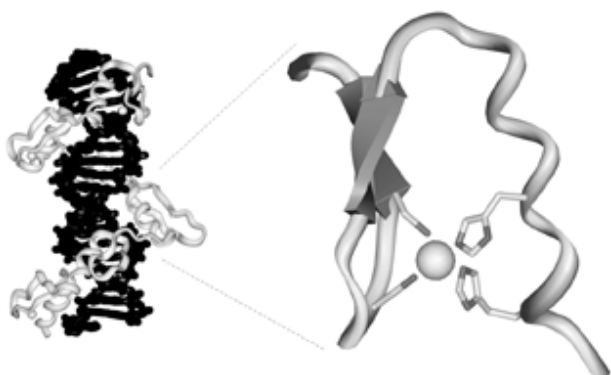


FACULTY RESEARCH HIGHLIGHTS

PROF. ANDRZEJ JARZECKI: *Understanding the Diverse Role of Metals in Life*

Our research is based on computational modeling of the interaction of metals with biomolecules. We focus on understanding chemical properties and the spectroscopic fingerprints metal-biomolecule complexes, with the goal of aiding in the interpretation of experimental studies. The bioavailability of essential metals such as Fe, Cu, Co and Mn is often controlled by siderophores, which are relatively simple chelating ligands synthesized by microbes.

We are currently working in collaboration with the Department of Soil Science at North Carolina State University, with the goal of understanding how the molecular structure of various microbial siderophores controls the binding and release of metals in metabolism. Our aim is to understand how the molecular structure of the chelating ligands relates to the biochemical storage, transport and delivery of metals. This could have important implications for the development of novel biometallic therapeutic agents.



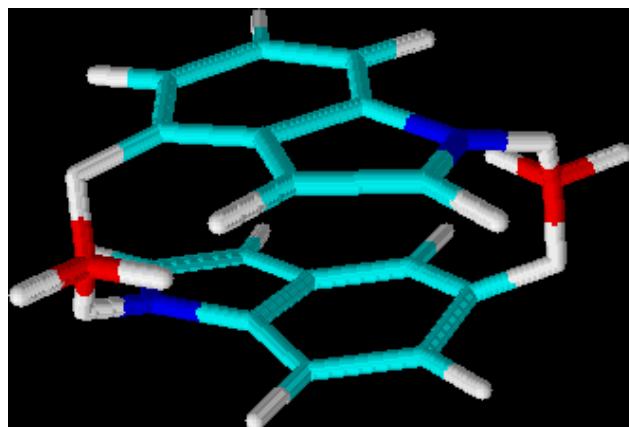
A protein, with metal/siderophore complex

In parallel with these efforts, our laboratory is investigating highly toxic metals, including lead. The toxicity of lead is believed to stem from its strong affinity for binding sulfur, oxygen and nitrogen. This affinity, combined with lead's unusual coordination preferences, disrupts protein structures and prevents their function. Most organisms have no defense against lead, but a few species demonstrate resistance to its toxic effects. We seek to understand this phenomenon.

Funding provided by the U. S. National Science Foundation and the U. S. National Institute of Health.

PROF. LAURA JUSZCZAK: *A Molecular Wire for Nanocircuits*

π - π stacking of aromatic rings is used by nature to transport electrons in photosynthesis and in DNA repair. Using a spectroscopic technique known as ultraviolet resonance Raman spectroscopy, we have found that indole, the residue of the amino acid, tryptophan, self-associates in both hydrophobic and hydrophilic solutions. In the presence of polar liquids such as water, light absorbed by the indole oligomer becomes delocalized over the molecular complex, forming an excited state known as an exciton. One proposed structure for the indole oligomer is the stacked ring dimer shown in the accompanying Figure. The anti-parallel indoles are mutually hydrogen bonded at the indole amine and the benzyl C6 hydrogen to two common aqueous oxygen atoms. Work continues to verify the structure of the indole oligomer, and study its electronic and vibronic properties. Besides providing for a model system to understand more complex electron transport in nature, such self-assembling complexes have potential as molecular 'wires' in nanotechnology.



A self-assembled dimer of indole molecules, bridged via hydrogen-bonding with two water molecules.

Funding provided by the U. S. National Institute of Health.

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

Ryan Murelli Joins the Faculty *by Ryan Murelli*

I grew up in a small industrial town in northwestern Connecticut called Torrington, and went to a private boarding school in an even smaller northwestern Connecticut town called Salisbury. I was a student athlete, and after having a strong cross-country season my senior year, I was contacted by the coach of Hamilton College who wanted me to run there. I looked into it and found out that it was a great school that matched the type of environment I was looking for, so I decided to attend.

I entered college thinking about medical school, but I enjoyed chemistry and did well in it and began contemplating a career in research. I was not sure about my career until the summer of my junior year, when I decided to teach at the Salisbury Summer School. It ended up being one of the most satisfying jobs I had ever had, and I realized I wanted to go on for a faculty position where I could both teach and do research.

I went on to graduate school at Boston College, drawn in by their strong organic chemistry program. I worked with Marc Snapper, whose diverse interests in chemistry and biology and commitment to total synthesis appealed to me. I worked on the total synthesis of an anti-inflammatory natural product for my first half of my degree and then started a new project developing synthetic methods employing ruthenium metathesis catalysts. The projects were so distinct that I ended up having to use two titles for my PhD thesis.

I went on to perform post-doctoral work with David Spiegel at Yale University. As exciting as Yale was, part of the decision was personal: I was planning on proposing to my girlfriend (now wife) who was living in Connecticut at the time. But Yale had many other benefits. Prof. Spiegel was just beginning his career, and I had the chance to help set up the lab and train new personnel. And the research in the lab was very medically driven, giving me a chance to learn about cancer, bacteria, and immunology. The experience broadened my perspective on research and molded my own research ideas immeasurably.

When the time came to move on to a permanent position, my experience at Yale had confirmed my desire to teach at both the undergraduate and graduate levels. When I got a job offer from Brooklyn College, I accepted the offer because it fit the bill and provided the infrastructure to support sophisticated research.



My research interests are broad, but center on the development of new synthetic methods that can enable the rapid synthesis of intricate molecular architectures. The goal is to develop methods that can be used to access structurally complex lead therapeutic targets, which can simplify otherwise difficult biological studies and can serve as the cornerstone for therapeutic development.

One of the projects that my group is currently pursuing involves studying the synthetic potential of γ -hydroxybutenolides. These are heterocyclic structures found in many important natural products, and they display remarkable properties in living systems. However, the use of these heterocycles as synthons in organic chemistry has received little attention. It is our goal to develop new reactions employing γ -hydroxybutenolides that can be used in total synthesis. Our targets include an anti-tubercular natural product, an anti-tumor compound, and a blood thinner.

Although my research is rooted in synthetic chemistry, I am working to branch into interdisciplinary research projects aimed at developing new therapeutics. Many of the targets that we hope to synthesize are lead therapeutics, meaning that while they have promising biological activity, they will not likely ever be clinical candidates. If the approaches we develop allow facile syntheses of these compounds, we will be in a position to rapidly generate analogs for further study, eventually producing molecules with improved potency and pharmacokinetic properties.

I am thankful to the chemistry department for this opportunity, and I look forward to working with my new friends and colleagues campus-wide to advance the educational and scientific missions of Brooklyn College.

ALUMNI SPOTLIGHT

OLUWATOSIN OGUNSILE: *From Teaching to Dental School*

Oluwatosin S. Ogunsile left Nigeria to come to the U. S. on January 5, 2002. He was the first member of his generation of his family to travel abroad. He was admitted to Brooklyn College in January 2003, and knew from the outset that he wanted to study science. As he puts it, he chose chemistry, which had been his best subject in high school, “[T]o explore the practicalities of everything I had been studying in Nigeria. This was the best decision I have ever made.” He credits the Department of Chemistry at BC as an environment that puts students first and creates a family atmosphere. He adds that departmental fellowships, funded by alumni donations, were necessary for him to help him earn his degree. He earned his Bachelors of Science degree, graduating in 2007.



He took a job as a teacher at a Brooklyn high school, and recalls that he frequently called on his faculty mentors for help designing laboratories and organizing high school science fairs. After several years in this role, he decided to enter dental school and is currently enrolled at the University of Maryland. “My knowledge in chemistry has been quite valuable in this new phase as well,” he reports. “It is safe to say that everything around us is chemistry, and that is what it has been like in dental school.” Mr. Ogunsile also reports that while he has encountered many challenges in dental school, he very much enjoys the clinical aspects of the work and is eager to complete his studies and begin his new career.

DR. ALFRED W. ALBERTS: *CELEBRATED SCIENTIST*

Alfred Alberts (B.S. '53) is a consultant specializing in drug discovery and development. He was Vice President, Biochemistry and Director of Natural Product Drug Discovery at Merck at the time of his retirement in 1995. While at Merck he directed programs in atherosclerosis, diabetes and obesity. He was responsible for the discovery and development of lovastatin (Mevacor) and simvastatin (Zocor). Prior to joining Merck, he was an Associate Professor in the Department of Biochemistry at Washington University School of Medicine. Alberts is the co-author of six patents including three for the discovery of lovastatin as well as over 100 publications. He is the recipient of a number of honors including the Pharmaceutical Manufacturers Association Discoverers Award, the “Inventor of the Year” award granted by the Intellectual Property Owners, Inc., the Thomas Alva Edison Award, the Merck Director’s Award and an honorary Doctor of Science from the University of Maryland. At present he is a member of the Board of Directors of Tripos, Inc. (St. Louis, MO).



This year, Dr. Alberts was kind enough to return to BC and, along with fellow alumnus Prof. Joel Liebman of the University of Maryland: Baltimore County, gave a special seminar on his work to BC students.

Correction to last year’s Alumni Spotlight: This newsletter mistakenly reported that Prof. Robert Moss had won the Arthur C. Cope Award. In fact, he was named an Arthur C. Cope Scholar, a different award. Apologies for the confusion, but congratulations are still due!

Surfactants and Chemistry a Success by Lesley Davenport



Prof. Rosen offers his perspective on the field



BC Prof. Richard Magliozzo (left) with Prof. Rosen (center) and Dr. Maria Rosa Infante (right).



Presenters Dr. Timothy Gao (left) and Dr. Tze-Chi Jao (right). In the back, BC Profs. Alexander Greer (left) and Rafael Ovalle (right).

On October 29th of last year, the Chemistry Department hosted a scientific symposium entitled “Surfactants and Chemistry” honoring the 90th birthday of Milton J. Rosen, Emeritus Professor of Chemistry and Director-Emeritus of the Surfactant Research Institute. Professor Rosen’s career began at Brooklyn College in 1946 and many distinguished scientists came from as far away as Spain to honor their distinguished colleague and his many ground-breaking contributions to the field of surfactant chemistry.

Provost William Tramontano and Chemistry Department Chair Mark Kobrak initiated the morning’s proceedings, which were followed by an outstanding series of presentations. The day’s events culminated with Professor Rosen’s inspiring retrospective on his long and productive career in a field that he helped

to mold. Today, Professor Rosen remains active as a consultant to both industrial organizations and governmental agencies. He also serves on the Editorial Boards of several surface and colloid chemistry based journals. Currently, Professor Rosen is working on the 5th edition of his popular and world-renowned text-book “Surfactants and Interfacial Phenomena”.



Symposium presenters, from left to right: Dr. Tze-Chi Jao, Afton Chemical Corp.; Prof. John Scamehorn, U. Oklahoma; Dr. Shireen Baseeth, ADM Research; Prof. Milton J. Rosen, Brooklyn College; Dr. Jack Emert, Infineum USA; Dr. Maria Rosa Infante, Inst. Quimica Avanzada de Catalunya (Spain); Dr. Peter Zhou, AkzoNobel; Dr. Timothy Gao, CRODA Inc.; Dr. Manilal Dahanayake, Rhodia, Inc.

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