Department Sweeps Awards at Graduation

The Chemistry department swept the teaching awards at graduation last May. Dr. Keri Colabroy received the Lindback Award in recognition of her commitment and dedication to her students and the biochemistry program. In addition, Dr. Charlie Russell received the Empie Award posthumously for his over twenty years of excellence in the classroom.

On the student side, Mike Baer’12 was a co-valedictorian, graduating with a perfect 4.00 average in biochemistry. Mike started medical school at the University of Pennsylvania this Fall. Way to go Mike! Mike becomes the third biochemistry student in the last 5 years to graduate as valedictorian. An interesting connection between the three biochemistry valedictorians is that they were all members of the cross country or track teams while at Muhlenberg.
The Department is pleased to welcome Dr. Sherri Young as a visiting assistant professor. Dr. Young received her BS from Albright College and her PhD last spring from Lehigh University. She is teaching organic chemistry lecture, labs and recitations. Her research interests are in the area of medicinal chemistry.

The junior class has 16 declared biochemistry majors! This is by far the most that we have had in any single year.

Sophomore Chemistry major Ian Gimble was honored by D3football.com as a third team All American for the South region. When Ian is not in the organic lab, he manages to find time to play linebacker for the Mules. Congratulations Ian! See the link for more information.

http://www.muhlenberg.edu/main/athletics/winter13/1204page2.html

Nine students performed undergraduate research at Muhlenberg last summer working on projects involving everything from lasers to transition metals to laboratory robots.

James Gumkowski’13 spent last summer at Virginia Tech University as part of their summer Research Experiences for Undergraduates program.

Dr. Joseph Keane is teaching his First Year Seminar on the Nuclear Genie again this year. In the course, they discuss ethical issues relating to nuclear energy, the development of the atomic bomb and the proliferation of nuclear weapons.

During the Spring semester, six chem/biochem majors will be studying abroad. We will have two in Denmark and four in South Africa. Safe travel to all and we look forward to hearing about your adventures upon your return.
Update on the Class of 2012

It has only been six months since graduation, but the Class of 2012 is already making a name for themselves. Below is a list of the chemistry and biochemistry alums from 2012 and what they are doing now. Keep up the good work!

Michael Baer University of Pennsylvania, medical school
Matthew delCiello AccuTest, Dayton, NJ, research assistant
Meredith Colwell University of Maryland, dental school
Nicholas Housel RPI, PhD program in analytical chemistry
Jessica Listwa University of Pennsylvania, dental school
George McClung Temple University, research assistant in neuroscience
Brendan Phelan Princeton University, PhD program in materials chemistry
Lauren Pioppo accepted to medical school for Fall 2013
Jon Shikora University of Buffalo, PhD program in organic chemistry
Lauren Sterner University of Pittsburgh, dental school
Brandon Turner Vanderbilt University, PhD program in biochemistry
Melissa Ugelow University of Colorado, PhD program in analytical/environmental
Alec Vlahos Penn State University- Hershey, research assistant
Kellie-Ann Yamane University of Utah, research assistant in biochemistry

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Characterization of Cell Culture Media by Gas Chromatography/Mass Spectrometry and Optimization of Automated Sample Preparation

Katie Casty ’15

The Ingersoll research group has been working with Johnson & Johnson on a collaborative project to characterize various cell culture media, complex aqueous solutions containing the necessities for cell growth. As these media are used in the early stages of drug development, it is important for pharmaceutical companies to understand the constituents and any changes that may occur during the culturing process.

Gas Chromatography/Mass Spectrometry (GC/MS) is being investigated as an analytical technique to establish a metabolic profile of each medium. The media are derivatized in a two-step process with ethylchloroformate, and analysis by GC/MS generates a unique fingerprint for each medium. One of the main focuses of this semester has been on the optimization of an automated sample preparation procedure. We are working with a Gilson Automated Liquid Handler, Design of Experiments (DOE), and statistical analysis to ensure efficiency and reproducibility of the derivatization.

The other major focus has been on how changes in the media are reflected in gas chromatograms. Numerous calibration curves have been generated for each individual media constituent in order to help identify the concentrations of each constituent within the media based on GC/MS analysis. These findings are important for Johnson & Johnson since the concentrations of media constituents change throughout the culturing process.

Further collaboration with Johnson & Johnson researchers will help us to fine-tune our research to provide a comprehensive, detailed analysis of media constituents, with the ultimate goal that it will become a useful reference in their work.
Course Spotlight: The Chemistry of Fragrances

Melanie Henry '13

The course Chemistry of Fragrances is about how chemistry works in an industry. This involves many areas of study such as biology, biochemistry, organic chemistry, analytical chemistry, and physical chemistry. This course also briefly touches other aspects of the industry of fragrances like advertising, business, and ethics. In industry, it is important to learn that science is a collaborative effort and industry requires work in many different areas. Throughout the course, Dr. Fuller brings in samples of different fragrances for students to sample. There are no labs or exams; by the end of the course, each student has to give a presentation on a topic that he or she researched that has to do with fragrances.

Since this is a chemistry course, most of what students learn is what goes into making fragrances, how fragrances are analyzed, and what characteristics a mixture must have before it can be sold as a “fragrance”. It lists many of the various compounds that are used, what they are used for, and how to synthesize them. We see a reappearance of functional groups that we learn in inorganic chemistry, such as aldehydes, alcohols, esters, ketones, and (of course) aromatics. We also learn new terms based on what fragrance the compounds produce, such as alphatics, sesquiterpenes, jasmonates, and others. This course also covers how chirality affects the fragrance of a compound.

Here is a sample of one of the syntheses shown in class.

Synthesis of Citral:
Chemistry of Fragrances includes a lot of analytical and physical chemistry. The course goes through various methods that chemists extract and distill fragrances from their sources, as well as how they use gas chromatography to determine the composition of fragrance mixtures. Students also learn that fragrance chemists use Rault’s Law and Henry’s Law to determine the solubility and volatility of a fragrance. One aspect that would interest biochemists would be how olfaction works. This course covers the anatomy of the nose and olfactory receptors in the brain. It also covers different models of smell. For example, do odorants fit into receptors based on their shapes like puzzle pieces or do they chemically bind to the receptors?

Dr. Robert Fuller graduated from Muhlenberg College with a B.S. in chemistry in 1984. He got his PhD in physical and organic chemistry from Princeton. He worked in the fragrance industry for twenty years, getting his post-doc at Rutgers, working for Colgate Palm Olive and various other companies in the fragrance industry. This is his first year teaching at Muhlenberg. He went into teaching hoping to contribute what he learned to a new generation of chemists.

“Money has never motivated me. If you work hard and do what you like, you will succeed.” – Dr. Robert Fuller.

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Beyond ‘Berg: Summer Research at the University of Michigan
Hudson Roth ‘14

This past summer I had the opportunity to participate in the University of Michigan’s REU program for ten weeks in Ann Arbor. This program not only gave me experience in the lab doing research, but it also an idea of what it is like to be at a large institution for graduate school.

During my time in Michigan, I worked in the lab of Dr. Gary Glick where my research focused on synthesizing a series of benzodiazepines to test for their ability to inhibit the protein kinase ROCK II. The goal of this project is to develop a novel drug that has a high specificity for ROCK II to treat chronic inflammation in individuals with autoimmune disorders. The hope is that the specificity of the drug will allow individuals
suffering from these illnesses to take it on a daily basis without significant, negative side effects. My lab experience in Michigan helped grow my interest in organic/medicinal chemistry and doing research in general. I was also able to get a sense of what it is like to be a graduate student through interacting with the graduate students in the lab and doing research on a daily basis.

Aside from the research, being a part of the REU program at the University of Michigan helped me feel even more grateful for choosing to attend a small, liberal arts institution like Muhlenberg as an undergraduate. Though there are some advantages to a big school, I think that the opportunities I have had at Muhlenberg have by far outweighed those benefits. The interactions with my professors and the opportunity to participate in research as an undergrad a Muhlenberg have definitely played a big part in my desire to go to graduate school and pursue my PhD after graduation. While previously attending a large institution for graduate school was intimidating, considering the size of Muhlenberg, my participating in the University of Michigan’s REU program definitely helped me prepare for this next step in my future. I feel very privileged for having this summer experience, and I would strongly recommend fellow students to consider attending an REU program at some point as an undergraduate.

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Muhlenberg College Chemistry and Biochemistry Club Update
Matt Fitzsimons ’13 and Jenna Kotak ’13

The Chemistry and Biochemistry Club had another exciting and activity packed semester this fall. With the incoming freshman class, our club ranks grew in number. In September the club went on a hiking trip to Glen Onoko, about half an hour north of Allentown. It was great time for students to get some fresh air, exercise, forget about exams, and work for a little bit to just de-stress. It was also a great time for some club bonding. Next on our agenda was a potluck with the chemistry department faculty. Many of the underclassmen got the opportunity to meet some of the faculty who teach advanced courses and some of the students prepared a periodic table of cookies for the potluck. In honor of National Chemistry Week, the CBC had a liquid nitrogen ice cream
fundraiser. Despite the brisk October weather, there was plenty of interest in ice cream, and the event went well.

In addition to these events, the November/December issue of *inChemistry* magazine, the ACS’s undergraduate magazine featured a piece on the passing of Dr. Charlie Russell, as well the bike rack that this club helped to donate in his memory. The article can be found here: http://digital.olivesoftware.com/Olive/ODE/inChemistry/ on pages 31 and 32.

In addition to those events, the CBC also met with the speakers before chemistry seminars, allowing an opportunity for students to discuss both exciting chemistry and possibilities for graduate school. Students were also offered an opportunity to meet in a similar setting with each of the candidates for the open organic chemistry professorship. Overall it was a fantastic semester for the club, and we are excited to see in what directions Hudson Roth ‘14, the new president of the CBC, will lead.

At top: Chemistry and Biochemistry Club on a hike at Glen Onoko Falls trail. At right: Chemistry and Biochemistry Club Spring 2012 picture.