

GROVE CITY COLLEGE

CHEMISTRY eNEWSLETTER

Fall 2013



Departmental News

By Dr. Timothy Homan, Chair

With this issue of the Chemistry Department eNewsletter, we are pleased to introduce our new home in STEM Hall. You can see me below in my new office on the third floor. Five members of the department (Drs. Augspurger, Cramer, Kriley, Shaw, and myself) are now in offices in STEM. The General, Organic, and Physical Chemistry labs also relocated over the summer.

As you should have received the Fall, 2013, issue of *the GeDunk* already, you have already had a chance to see and read about STEM Hall. We want to share with you pictures of our new labs, as well as pictures of the abundant spaces available for students to use outside of the classroom for study and interaction. If you have not read through the *GeDunk*, I encourage you

to read the profile on Lizz Michael (page 40). Lizz graduated in 2010 in chemistry, and the article profiles her graduate research work as she pursues a PhD at Penn State.

But STEM Hall is not finished. In Phase II of the project, Rockwell will be torn down and essentially a mirror image of STEM will be added to the current new building, which will be large enough to be the home for the entire Hopeman School of Science, Engineering, and Math and include a clock tower. Since some of the space in Phase II will be a couple more chemistry labs, some of the Chemistry department remains in Rockwell. The Analytical lab and the Instrument Room are still in the basement, and the Inorganic lab is still in Rockwell 104. The offices of Drs. Conder and Falcetta are still in Rockwell, too. So we will be a distributed department until the second phase of this construction project is completed, hopefully in not very many years.

So enjoy this brief tour of our new facilities!



Professor and Department Chair Tim Homan sitting at his desk in his new office in STEM 340B. Like many of the faculty offices, the funds for his office were provided by a specific donation. It is fitting that the donation was made by Jessica Bishop, '97, who was a student of Dr. Homan's.

General Chemistry Lab – 255 STEM

The General Chemistry lab is kept busy every day of the week. We currently are running five sections of Chem 101 labs and three sections of Chem 105 labs (Chem 105 is the one-semester chemistry course required by the engineering, physics, and computer science majors). It is one of the “center labs”, located inside the main hallways. They feature floor-to-ceiling glass walls to accentuate the “Science in Sight” philosophy used in the design of STEM Hall.



The new General Chemistry lab is located on the second floor. This view is taken from the main hallway, and lets you see students working on their experiments. The lab features four, five-foot ventilation hoods and bench space for 32 students. Next to the hood on the right is a whiteboard from which the professors can give instructions. It also serves as the screen for the projector hanging from the center of the ceiling which you can see if you look closely.



This view highlights one of the central features of STEM. It is taken from the side hallway, and the open area between the hallway and the lab extends from the skylights above the third floor down to the basement, allowing natural light to flow throughout the building.

Organic Chemistry Lab – 226 STEM Hall

The new Organic lab is also busy, running five lab sections for the first semester of Organic, Chem 241. It is located on the second floor with the Gen Chem lab, but is an “outside” lab, between the main hallway and the outside of the building. Its window faces down the street that formerly went through campus, toward the soccer fields.



Some of the most significant upgrades in the new Organic Lab are the 12, five-foot ventilation hoods located around the perimeter of the lab. They are large enough to be used by two students, so that this lab can hold up to 20 students with each being able to work in a hood. The benches are arranged so that individual lab drawers are situated near to the hoods, and students will work around the perimeter benches. The interior benches are then available for instruments, balances, etc.



Here's a close up shot of the hoods. They feature both a sash which can be raised and four sliding glass doors. The sliding glass doors can be arranged so that two students can be working side-by-side. The doors can be kept between the student and the reaction they are working on for maximum protection, or moved to the side during setup.

The bay window not only affords a beautiful view of the campus, but it also provides a convenient location for our 60 MHz Anasazi FTNMR, which the organic students use during the second semester. Before it was located in the basement, but now it can reside right in the lab where the students can use it.



Physical Chemistry lab – 050 STEM Hall

The Physical Chemistry lab is located in the basement. It is not nearly as heavily used as the General and Organic labs, with only one lab section in the fall semester and two in the spring. But it highlights another feature of the design of STEM Hall – dual use space. Not only is the lecture portion of PChem (Chem 345 – 346) also taught in the room, but this semester Professor Erin Bancroft '07 is teaching two math classes and Professor and Assistant Dean of the Hopeman School Tim Mohr is teaching an electrical engineering class. The idea is to maximize the utilization of the space in STEM.



The layout of the lab is with fixed benches and cabinets along the outer wall, and moveable tables on the interior, to provide flexibility. You can see instruments located in the foreground of this picture (fluorescent, UV-Vis, and Raman spectrometers). Lab work is primarily completed around the perimeter, and this leaves enough space in the center of the room for 20 students to sit at tables during class.

Dr. Mohr is pictured here teaching his EE class. You can see the dual projectors at the top of the right of the picture. You can also see on the left the nearly 40 feet long whiteboard space which can be used as both projector screen and for lecturing, using dry-erase markers. This makes 050 STEM a prime example of dual-use space (the only one of the chem labs to do so).



Biochemistry Lab – 155 STEM Hall

The Biochemistry lab is also one of the “center labs”, like the Gen Chem lab. It is located on the first floor directly below the Gen Chem lab, and is directly across from the Atrium (you’ll see it on the next page), which you can see hints of in the background of the pictures below.



The picture below, taken from the opposite corner, reveals once again how the center labs are in full-view from the main hallways, through the floor-to-ceiling glass walls. You can see in this picture how the main work space for the students is at tables in the center of the lab, with instruments on the perimeter. In the center background of the picture is our new AVIV 14D UV-Vis spectrometer. It is based on the venerable Cary 14 UV-Vis, but this instrument carries out fully-automated thermal denaturation studies of proteins.



Student Space in STEM Hall

Another key design feature of STEM Hall is the creation of spaces where students can congregate and work together on homework or research (or just to hang out together!). The main space is the two-story



open Atrium located on the side of STEM facing the new Breen Student Union Building. You can see smaller spaces in the upper background that are off of the main hallway on the second floor. All of the tables have outlets for plugging in computers, and the entire building is a wireless hotspot.

There are also tables and chairs located outside each of the office suites where students can work, either by themselves or in conjunction with the faculty during their office hours.



And Rockwell's not empty!

As mentioned earlier, there is still chemistry in Rockwell! The Inorganic Chemistry lab will remain in Rockwell 105 until Phase II of STEM Hall is completed.



Also, Analytical Lab and its instruments remain in the basement.



Here you can see our HPLC in the foreground, to the right our Thermal Gravimetric Analyzer and Differential Scanning Calorimeter, and on the left one of our gas chromatographs with a head-space sampler. The 300 MHz NMR is in the background.

Wet-lab analytical work is done here in Rockwell 54, which still has the lab benches painted in the blue and gray as they were painted during a 1960's renovation, the only chemistry lab which wasn't renovated in 1997.



Summer Research at GCC

Dr. Mike Falcetta supervised two students (Dan Ackerman, BIOC, '14, and John Barlow, CHEM, '15) in research last summer, supported by the Swezey fund. The students presented their results as part of the Hopeman Student Seminar series, during the poster session during homecoming, and in a poster session at the 16th Annual Undergraduate Research Symposium at University of Maryland, Baltimore County.

The research focused on temporary anions, which are species that have an extra electron compared to the neutral form of the molecule and this electron eventually leaves the molecular system. These systems are studied using computational chemistry techniques to determine the energies and lifetimes of temporary anions. Knowledge of the energy and lifetime of temporary anions is important in modeling such diverse phenomena as chemical processes in the upper atmosphere, the working of the CO₂ laser system, and the mechanism of some aspects of DNA damage resulting from radiation exposure. Students use commercial software as well as software written internally to accomplish this task.

Graduation!

Thirteen students graduated during the '12-13 academic year. One student graduated after the Fall semester, and twelve more finished their undergraduate studies in May. This class included seven chemistry majors and six biochemistry majors.

Of the students whose plans we know, two are beginning graduate studies towards PhD's, three have obtained industrial chemistry positions, three of them are in medical school (all in the Philadelphia area), one is in pharmacy school, and one is teaching in a private high school.

Dr. Charles Kriley directed Gabrielle Ahrens, BIOC, '14, and Michael Grennek, CHEM, '14, in the continuation of his researching into possible contamination due to Marcellus Shale fracking. This research project has continued on for four years. Water samples from eleven different sites continue to be monitored. As in previous years, ion-chromatography is used to measure nitrate, sulfate, phosphate, nitrite, and halide levels. Oxygen levels, pH, conductivity, and turbidity are measured using electrochemical probes. Iron and strontium levels are tracked with atomic absorption spectroscopy.

This summer's research added the measurement of methanol and ethylbenzene using the new headspace sampler with gas chromatography. The students successfully developed new protocols for these measurements. Their monitoring has not revealed any increase of the potential contaminants, despite numerous new wells being drilled.

The students presented the results of their research at the Homecoming Research Showcase. Dr. Falcetta and Dr. Kriley, along with the students, are planning to present their research at the national American Chemical Society meeting in Dallas next February.



Some of our graduates after our Graduation Day breakfast. From left to right, Hannah Tubb, Aaron Sircy, Jamie Alburger, Peter Foster, Jake Lytle, and Pat Miller. Not pictured are Cory Baker, Ryan Fisher, James Harbison, Dan Henley, Matt Moffett, David Schaeffer and Stephen Schaeffer.