Grove City College
Chemistry eNewsLetter
Review of 2023/2024

Departmental News

From Dr. Joe Augspurger, Chair (one last time)

By the time you receive this, my second term as chair of the chemistry department will have come to an end, effective June 30, 2024. The last six and a half years have been a time of lots of change – three department members took sabbaticals (and a fourth will take one next year), four children were born to faculty, COVID upset the world, one faculty left and was replaced (Dr. Foster will be fully introduced later in the newsletter), a new Dean came to the Hopeman School of Science, Math, and Engineering, and we are halfway through the two-year renovation of Rockwell. But so much has remained the same – God continues to bring us exceptional students, they go on to get great jobs, into great grad schools, and medical careers.

Dr. Rich Savage came to Grove City to be Dean of the Hopeman School beginning in the summer of 2019. He is retiring this summer, and our own Dr. Tim Homan has been appointed to serve as interim Dean for the upcoming year. He will continue to teach, but only three contact hours each semester. Dr. Abby Wolfe, the wife of Dr. Britton Wolfe of the Computer Science department, will be helping to cover some of Dr. Homan's load. Abby helped us similarly during the 22-23 year when we were searching for a new faculty.

Operating without Rockwell for this past year, as we will continue to do for the next year, was made a little easier by Dr. Kriley's Fall 2023 sabbatical. We only had a single chemistry major this past year, and she agreed to take Advanced Inorganic and Inorganic Lab during her junior year, so we didn't have to offer those classes. But we will have to offer them this Fall, and so the Organic Lab will have to host both Organic and Inorganic labs. It will be tight, but we'll make it work. There will be pictures and more about the Rockwell renovation later.

Dr. Falcetta was chosen to be the Professor of the Year and spoke at the Awards Convocation April 24. It is a testament to the department that he was the fourth member of the department to be so honored, following Dr. Tim Homan (2002), Dr. David Jones (2008, retired) and Dr. Chuck Kriley (2016).

One area impacted by the Rockwell renovation was research space. Much of our research space had remained in Rockwell. Dr. Wong relocated her analytical research to the PChem lab, since that was where we also moved the analytical instruments and lab. Synthetic research was carried out in the Organic lab that had been in the old Inorganic lab (Rockwell 105).

We were very excited to welcome 22 new freshmen into the department this past year: eight chemistry, three chemistry secondary education, and eleven biochemistry majors. It was unusual that only three of them come from outside the PA-OH-NY-MD region, but one came all the way from China. We already have students coming for next year from Florida, Indiana, Minnesota, Nevada, and one from Italy. It is more typical for us to draw several from outside the local region.

Lastly, who will be the new chair? Over the past few years, the Provost, Dr. Frank, has instituted a new structure where all department chairs serve three year terms, with a maximum of two terms served consecutively. Many departments have also created assistant chair positions to spread the growing administrative workload. Dr. Chuck Kriley has been selected to serve as the new chair. I will take on a new role as assistant chair, keeping the responsibilities of new student recruitment.

Dr. Augspurger

Congratulations, Class of 2024 Graduates!

On Saturday, May 18th, the Chemistry Department Class of 2024 took the annual picture of our graduates on the central stairs in STEM after our Graduates & Families Breakfast.

Top Row (left): Daniel Mathes, Megan Mathes, Katie Baller, Titus Richardson, and Julian Burns
Bottom Row (left): Sabrina Bergey, Renee Weight, Anne Leaman, and Anisha Karunananthan
Not pictured: Erica Judt, Clayton Meredith, and Jett Curran (Dec. 2023)

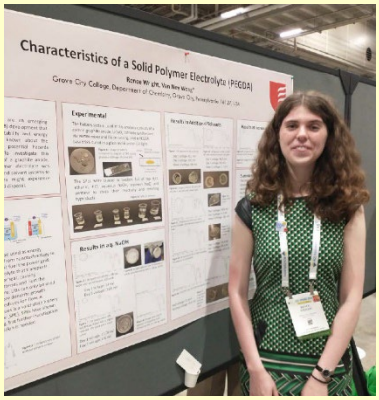
Of our 12 graduates, one wil begin an industrial job, two PhD programs (University of Chicago and WVU), one a masters of forensic science (after earning our Forensic Chemistry concentration), two medical school (WVU), one dental school (WVU), one pharmacy school, one doing research for a year while applying for medical school, and three are seeking their next step. Note that we are developing a close connection with West Virginia University.

Four of the new graduates, Daniel & Megan Mathes, Anisha Karunananthan and Titus Richardson, joined their older siblings who graduated before them: Jon and Abby Mathes (yes, two sets of twins!), Johann Karunananthan and Micah Richardson. Also, Anne Leaman's aunt, Michelle Leaman Llorens was a 1998 grad. It was a treat to make all these family connections at our annual graduate breakfast before graduation.

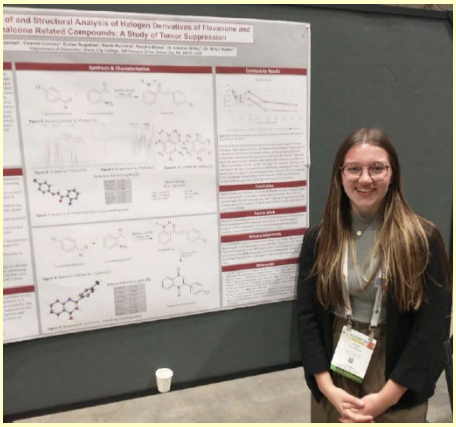
Congratulations, Graduates!

ACS Meeting, New Orleans, March 2024

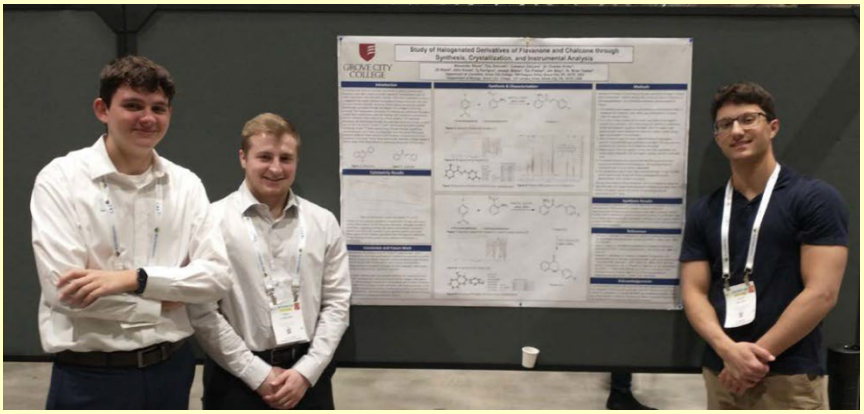
Dr. Kriley accompanied six of our student researchers, Renee Wright (CHEM, ’24), Anne Leaman (BIOC, ’24), Katie Baller (BIOC, ’24), Alex Blank (BIOC, ’25), Trey Zabroski (BIOC, ’25) and Cameron DeCarlo (BIOC, ’25) to the spring National ACS meeting at New Orleans March 16-19, 2024.



Renee presented research into lithium battery technology she started during her Summer REU at the University of Akron in 2022. She continued her research at GCC under Dr. Wong and in the summer of 2023, she participated in another REU in the lab of Prof. Stanley Whittingham (Nobel Prize winner for lithium-ion technology).



Anne presented her work synthesizing halogenated derivatives of quercetin and resveratrol, compounds known to have anti-cancer activity, determining the structure of her new compounds, and testing their cytotoxicity, under the supervision of Dr. Kriley.



Cameron, Trey, and Alex also presented their work to synthesize novel derivatives of quercetin and resveratrol and test their tumor-suppressing properties on lab grown HeLa cancer cells.

Katie (not pictured) presented her work supervised by Dr. Wong to develop methodologies to identify the products of partially combusted household materials using Fourier Transform Infrared Spectroscopy for forensic applications.

New Faculty – Dr. Peter Foster

Where did you grow up, how did you get interested in chemistry, and how did you end up at GCC as an undergraduate?

I grew up in Corning, New York where my mom was a writer, and my dad ran a couple of restaurants. No one in my family had ever studied science before, but I fell in love with math and the natural sciences in school. In particular, my favorite class was chemistry, where I could see that the study of the world around me could be understood as the behavior of materials described through the predictable behavior of the molecules of which they consisted, and the behavior of the molecules in turn could be understood based on the elements bonded within them and the behavior of the elements in their turn could be understood based on their subatomic particles and the their place on the Periodic Table. In short, chemistry made the world around me make sense. I was passionate about this, and I wanted to study chemistry at a school that would challenge me with a rigorous program of study in chemistry and the related fields of math and physics, all within a context of a Christian education. I knew grad school and my career would take me into the secular world, but I wanted my foundation to be built on seeing my work and my faith as complementing one another, not competing. Such environments are rare, but that is exactly what I found at Grove City.

Where did you go to graduate school, what was the focus of your research, and what do you want to work on in the future?

After my four years at GCC, I headed to graduate school at the University of Colorado Boulder where I would study under Dr. David Jonas. My senior research project at Grove City had investigated conical intersections and nonadiabatic dynamics and I was fascinated by the research of the Jonas group into that field. Basically, there are times in the vibration of certain molecules where there is a degeneracy between the potential energy of multiple electronic states, and this causes unusual ultrafast dynamics. I studied this phenomenon in my graduate studies and discovered the presence of point singularities in some nonadiabatic states, called conical nodes. Since leaving Colorado, I have wanted to further this research, but in the context of teaching at a primarily undergraduate institution like Grove City College.

What did you do between finishing your PhD and returning to GCC?

Immediately after earning my degree, I took a position as a Visiting Assistant Professor at St. Olaf College in Minnesota. There I got to teach some general and physical chemistry with a great group of colleagues. It cemented my love of teaching and my desire to teach at the undergraduate level. Unfortunately, the pandemic struck while I was teaching there, so the end of my term there was completed remotely. From there, I continued to South Carolina where I taught for three years at Newberry College. At Newberry, I taught General Chemistry and Analytical Chemistry, along with Organic Chemistry, Physical Chemistry, Instrumental Analysis, Inorganic Chemistry and more. I loved the students at Newberry, but I knew I was still not where God was ultimately calling me to be. When I found out that Grove City had an opening in the Chemistry department, I jumped at the opportunity.

How was your first year at GCC? What did you teach? What was it like being a professor at GCC compared to being a student at GCC?

It has been fantastic being back at Grove City. While some buildings have been updated since I was a student, GCC remains the Christ-centered learning community that I remember. Many of the professors I had as a student are now my colleagues and I have enjoyed getting to know them in a new context. This past year I taught lectures in General Chemistry I and II as well as General Chemistry I labs and an upper-level Advanced Synthesis Lab course, so I have gotten the opportunity to teach and get to know both the students who are just incoming and the students who are ready to graduate.

What are you looking forward to in the years to come at GCC?

I look forward to continuing to become more a part of the Grove City community in future years. I love the students I taught this year and I look forward to seeing them grow as scientists and as men and women of God while we get to welcome new students as well. I look forward to getting my research going more fully and seeing how students can be a part of studying these concepts that I find so fascinating.

What can you tell us about your personal life?

I live with my wife Katie, and we've been married for eight years. She never went to Grove City, but I have known her since high school, and she has been with me as we have crisscrossed the country with the different places I have worked. We love to visit state and national parks to learn about history and see God's beautiful nature. We are avid sports fans and enjoy following the Buffalo Bills, the Colorado Avalanche, the Denver Nuggets and now, as newly minted Pennsylvanians, we are beginning to follow the Pittsburgh Pirates. We rescued a corgi named Lexi together a few years ago and Katie and I love to take her with us on our adventures. Grove City has welcomed us, and we feel like we are finding a home here in the town, in a church and in a wonderful campus community.

Curriculum Update

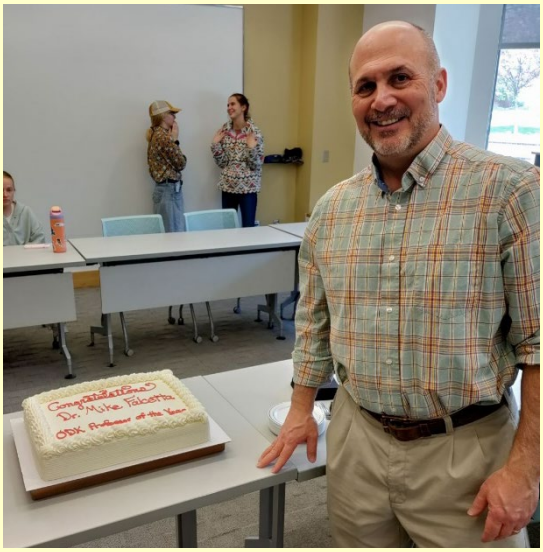
This year saw a new course added to the biochemistry major: CHEM 141 Beginning Biochemistry, two credits. This course, taught by Dr. Shaw, is now part of the schedule for the freshman spring semester. The course provides a gentle introduction to the major themes of biochemistry (macromolecules, purification, reassembly of systems from purified components) for the freshman biochemistry students as well as providing a course in their major field prior to the fall semester of junior year (biochemistry has long been described as an undergraduate major students take on faith).

The course meets once weekly for two hours allowing for a variety of instruction modes. There are early lectures on western science and the discipline of biochemistry, followed by laboratory activities, reading of the primary literature or specific technical instruction. The course design is flexible to allow topics to change freely as understanding changes. In the spring of 2024, freshman focused on serial and specific dilutions, purification of DNA and lipids, enzymology, molecular visualization with PyMol and reading both classic and contemporary papers. Students also solved the fictitious campus case of the "Term Paper Terminator" by analyzing short tandem repeats (STRs, also known as microsatellites) amplified by the polymerase chain reaction (PCR), the most common method used for DNA profiling in forensic and criminal cases. Beginning Biochemistry is a valuable addition to the biochemistry major.

Professor of the Year 2024

Dr. Mike Falcetta became the fourth member of the Chemistry department to be named the Professor of the Year by ΟΔΚ honorary society. The selection process involves votes by students and faculty, and then the Professor of the Year is selected by a committee consisting of ΟΔΚ members, faculty and administrators from a list of finalists.

Mike spoke in the Chapel during the Award Convocation. But the Award Convocation has undergone major changes since the COVID epidemic. Traditionally, it was held the Saturday morning of Family (formerly Parent's) Weekend, when all awards and scholarships were announced. Now, each department separately holds a ceremony to announce the winners of its scholarships and awards. The Award Convocation is held in the Chapel the Wednesday evening before Family Weekend, the Professor of the Year is announced and gives an address and the the Senior Man and Senior Woman of the Year are announced. The Department held a reception in his honor the following day.



Mike's outgoing personality and clear connection to his students (including regularly bringing them homemade muffins or cookies), his highly productive research program, and his ready willingness to serve the department make him highly deserving of this award.

Dr. Harold L. Conder Inorganic Scholarship

Thanks to the generosity of our alumni, over $32,000 has been donated to the Dr. Harold L. Conder Inorganic Chemistry Endowed Scholarship since it was created in 2019, which is enough to vest the scholarship. We were excited to name the first recipients of the scholarship this year. The award goes to the top student or students in CHEM 231, Descriptive Inorganic/Biorganic Chemistry, typically taken in the spring of the sophomore year by all chemistry, biochemistry, and chemistry secondary education majors. This year, two students stood out. Alexandar Fix, a sophomore biochemistry major and Reilly Welsh, a freshman chemistry major, were chosen to share the award.

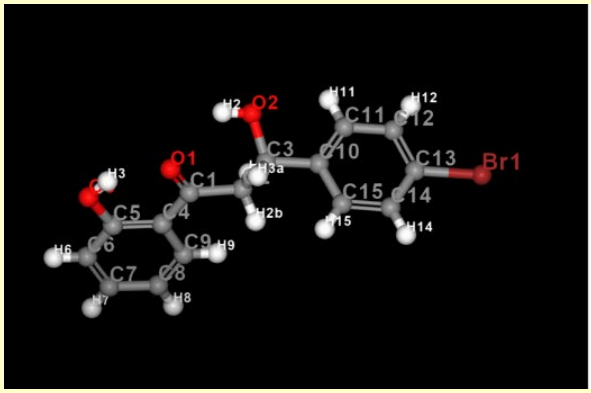
We as a department are blessed to have many awards to offer our outstanding students. We have the John T. Shaw scholarship for Organic Chemistry for the top student(s) in Organic Chem I and II, the Walter E. Page scholarship to our top student at the end of their junior year, and the SACP Award that goes to our top graduate. As well, having an ACS approved degree program allows us to give awards in Organic, Analytical, and Physical Chemistry that provide the recipients a free membership to the respective divisions for one to three years.

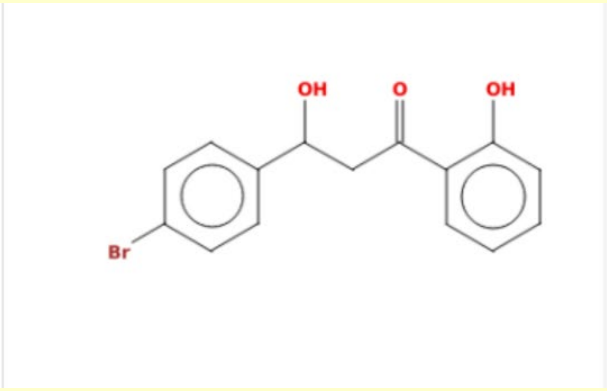
Sabbatical for Dr. Kriley

Dr. Chuck Kriley took a sabbatical during the Fall, 2023 semester, becoming the third chemistry department faculty to do so. He spent time working at the Air Force Academy and Notre Dame working with two x-ray crystallographers, Dr. Gary Balaich and Dr. Allen Oliver.

During his time at the Air Force Academy, Dr. Kriley worked with his former graduate school colleague, Dr. Gary Balaich. Days were spent running a Rigaku XtaLAB Synergy-i, which allows samples to be evaluated using both Cu and Mo sources. Samples from Dr. Kriley's research on flavonoids were run, analyzed, and submitted to the Crystal Structure Data Base for future publication. While in Colorado, Dr. Kriley was able to reconnect with some of his former rugby players and their families, making the trip an overall enjoyable experience.

After the Air Force Academy, Dr. Kriley spent time back at Grove City College working on isolating some additional compounds for his cancer research project, preparing them for the next phase of his sabbatical at Notre Dame University. These compounds were then taken to Notre Dame where he was able to work with their crystallographer, Dr. Allen Oliver. The instrument used at Notre Dame University was a Bruker Quest Photon-III instrument. As with all research there were successes, failures and perhaps more importantly some surprises. One of the surprises ended up in a communication being published**: Charles E. Kriley, Allen G. Oliver, Alexander J. Blank, Anne A. Leaman, Jed A. Speers CCDC 2302276; Experimental Crystal Structure Determination, 2023, DOI: 10.5517/ccdc.csd.cc2h8pzg** for those that are interested. This compound was not the one that was expected.





Dr. Wong will be our fourth member to take a sabbatical in the Spring, 2025 semester. Since Dr. Wong is from Malaysia, she will be working at two different universities in the southern Asian region. She will be working with Professor Emily Goh Joo Kheng from Monash University Malaysia (Monash University is an Austrailian university) learning extraction techniques to isolate bioactive cpompounds from aloe vera, fruits, and other plants. She will also spend time learning from Dr. Jason Yeo Boon Siang of the national University of Singapore how to apply operando spectroscopy to the understanding of electrochemical reactions, which are key in energy conversion reactions.

Rockwell Renovation

With the start of the complete renovation of Rockwell (to be rechristened Smith Hall upon completion) and its connection to STEM Hall last summer, we had to make many adjustments to move the laboratories that had still been in Rockwell. The Analytical, Inorganic and many of our research labs had to be relocated. We took advantage of Dr. Kriley's absence for his sabbatical in the Fall to not offer CHEM 422, Advanced Inorganic Laboratory (while ensuring that all the students who required it were able to take it previously). We moved the analytical lab supplies and instruments into the PChem lab pictured at right. Circled are the HPLC, UV-Vis, and GC/MS, which were all purchased in the last three years.

Meanwhile, this summer the connector between STEM and Rockwell has begun to be built. Here is a view looking from the road between the PLC and MEP at the steel girders being assembled. The picture to the right is from the Library side of the construction and you can see the enormous crane being used to raise the steel girders over STEM and then lower them into position for the connector.

This view is from the Organic Chemistry lab in STEM, looking at what was formerly Rockwell 216, the General Physics lab closest to STEM. We show this, because the former RO 216 space will be where the new Inorganic Lab will be located, and some of the new space created by these girders will be additional chemical storage space adjacent to the new lab.

The new Analytical/Instrumental Labs will occupy what was the General Physics Lab on the Quad side (formerly RO 218) and the physics offices next to it.

We are told that the construction continues to be on schedule for us to be able to move into the newly Renovated Smith Hall in time for the Fall 2025 semester.