Fall 2019

Chemistry Matters Fall 2019

Otterbein University Chemistry Department
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Otterbein University **Fall 2019**

A Word from the Chair

Greetings to current and prospective Otterbein Chemistry students, alumni, and friends!

As we start the 2019-2020 academic year, I am excited to begin my 12th year at Otterbein University and my first year as Department Chair. I want to begin by thanking Dr. Dean Johnston for his tireless devotion to our Department and service as Department Chair for the past five years. His passion for Chemistry and Otterbein University even came out during his appearance as Cardy at the inaugural COSI Science Festival! See inside the newsletter for pictures and more details.

The excellence of the Chemistry Department comes from our amazing faculty, staff, and students. In this newsletter, we celebrate two of our long-term part-time faculty members, Professors Emily Tansey and Matt Grote who both received well-deserved teaching awards over the past year, and Dr. Carrie Hayes who won the *C&E News* "Periodic Poetry" contest! Additionally, we are excited to share the research accomplishments of our students. The joy of chemistry lives in the discoveries made in the laboratory, and many of our students have presented their work at national meetings over the past year – from the synthesis of new materials or development of new synthetic routes to studies characterizing the materials in cultural heritage artifacts. We are proud of our students' contributions to new chemical knowledge and are eager to showcase it here.

The undergraduate research experience also sets up our alumni for success in their careers, and we are happy to share updates about some of our fantastic alums. If you are one of our alumni and have not communicated with us recently, we would love to hear from you!

I also want to take this moment to thank all of our alumni who have generously supported the Department over the past year. Your gifts help us ensure that students can attend national conferences and that we can offer excellent curricular experiences for our students. If you are looking for opportunities to become more engaged with the Chemistry Department, we welcome alumni who wish to give a seminar about their current work or who are willing to serve on an alumni panel to discuss career opportunities with current students. One of my goals for the Department is to establish an industrial advisory board and I also welcome any alumni who are willing to serve in this capacity.

Best wishes for a happy and rewarding year.

Regards,

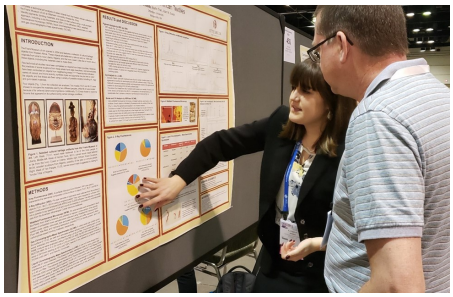
Joan M. Esson, Ph.D.
jesson@otterbein.edu

Homecoming Tailgate

Chemistry and BMB hosted a tailgate to celebrate Homecoming Weekend on Saturday, September 21 (right). Thanks to all the students and alumni who joined us for hot dogs, nachos, and great conversation! This will be an annual event, so mark your calendars for next year.

Students Present at National Meetings

In April 2019, Kathryn (Katie) Dodds ’19, Bethany Giedeman ’19, Evan Miller ’19, Elizabeth Tinapple ’19, and Dr. Joan Esson traveled to the national American Chemical Society (ACS) Meeting in Orlando, FL to present their research. Ironically, a week later, Dr. John Tansey traveled to the same location with two of his research students, Derek Wei ’19 and Erin Hughes ’19, for the national American Society of Biochemistry & Molecular Biology (ASBMB) national meeting. Apparently, chemists and biologists of all sorts want to visit sunny Florida in the spring!


Kathryn Dodds ’19 presenting her work

As Otterbein ACS Student Chapter President for the 2018-2019 year, Elizabeth described recent chapter activities in a poster presentation at the national ACS meeting entitled “Otterbein University Student Chapter: Getting Involved!” She also gave a second presentation describing her work with Dr. Dean Johnston on “Exploring the formation of ionic cocrystals with zinc(II) salt.” Dr. Johnston also mentored Evan, who presented his work on the “Synthesis of p-block containing oxyfluorides.” Katie and Bethany gave presentations on their research done in the Esson laboratory: Katie described the “Characterization of materials in Western African artifacts,” while Bethany shared her “Characterization of a paper-based analytical device for heparin.” Dr. Esson couldn’t let the students have all the fun and gave a presentation entitled “Retaining and Preparing Student Scholars” that described the design of and findings about the Cardinal Science Scholar program, which is funded by the National Science Foundation.

At the ASBMB meeting, Derek presented research he conducted as part of a summer research program at Michigan State University. He worked in Dr. Cheryl Kerfeld's laboratory studying photoprotection in cyanobacteria through the purification and characterization of the Orange Carotenoid Protein (OCP) and its homologs. Meanwhile, Erin presented the research she conducted in Dr. Tansey’s laboratory on interaction partners of perilipin 5 which help explain roles for trafficking of this protein and lipids within the cell.

> *We wish to especially thank Sadie Bartholomew Ingle ’07 for her donation that supports student travel to the ASBMB meeting, and opens up this opportunity to students who might not otherwise have funding to engage in such professional development.*

Class of 2015 Updates


Stephanie Gnewuch

Stephanie Gnewuch is a fifth-year graduate student in the Rodriguez group at the University of Maryland Department of Chemistry and Biochemistry. Stephanie is studying the synthesis and characterization of materials with toroidal moments. Congratulations to Stephanie for winning the 2019 Pauling Poster prize at the American Crystallographic Association meeting for her poster *Symmetry Analysis of the Toroidal Moment in Magnetoelectric Crystalline Materials*.

Allie (Weber) Brackbill has been working at CEM, Inc. in Matthews, North Carolina for the past two years, specializing in automated solid-phase peptide synthesis. She describes her work as a “fun mix of travel, research, and technical writing.” Allie is married to Alex Brackbill (BMB ’13) who is working in sales at Novogene in the Charlotte, NC area.

Katie Childers is a fifth-year graduate student in the Nuclear Chemistry program at Michigan State University. Katie was a Chemistry and Physics double major at Otterbein. At MSU, Katie is working as part of a large group at the Facility for Rare Isotope Beams.

Part-Time Faculty Recognized for Outstanding Teaching

The chemistry lab sequences and general education chemistry coursework at Otterbein depend heavily on the outstanding efforts of our dedicated part-time faculty: in Autumn 2019, that list includes Professor Matt Grote, Dr. Fatmata Jalloh, Dr. Wendy Johnston, Professor Emily Tansey, and Professor Jeffrey Trent.

We are particularly proud to announce that two of our part-time faculty were celebrated at the university level in November 2018, winning special recognition at the Fifth Annual Part-Time Faculty Appreciation Reception and Teaching Awards.

Professor Emily Tansey was recognized as the exemplary teacher for a general student audience, demonstrating mastery in interdisciplinary teaching. In addition to teaching in Otterbein's general chemistry labs, Professor Tansey has taught in the nursing chemistry sequence and the Integrative Studies program. She recently developed an entirely new course for the Biochemistry and Molecular Biology (BMB) program: "Biochemistry is a Piece of Cake," which focuses on food chemistry as an accessible and engaging introduction to chemical and biochemical principles. The first few offerings of the course have enrolled multiple students in a wide variety of majors (and included a visit from Otterbein President John Comerford)!

Professor Matt Grote was recognized as the exemplary teacher in a disciplinary setting. While he has taught multiple lecture and lab courses in the introductory and nursing chemistry sequences, Professor Grote's work with the organic chemistry labs has been particularly significant. He and Dr. Robin Grote have thoroughly revamped this course sequence over the past several years, developing a variety of pre-lab lecture materials and lab experiments. Moreover, over the summer, Professor Grote worked with student researchers to develop and write an in-house lab manual, ensuring that Otterbein students enrolled in the organic lab courses will no longer need to purchase an additional lab textbook.

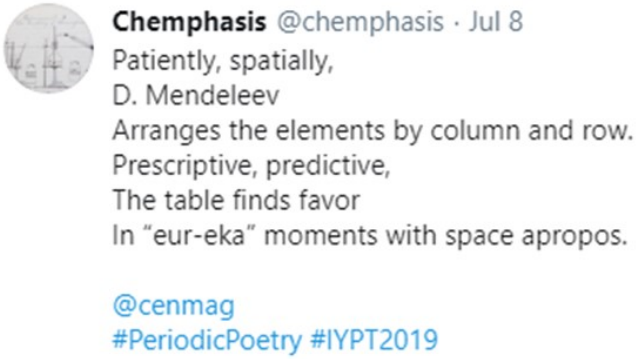
The department enthusiastically echoes the thanks of the university to both of these outstanding part-time faculty members. We likewise were pleased at the November reception to celebrate all of our part-time faculty members and their ongoing, crucial support for our many introductory lecture and lab sequences.

Writing Poems, Periodically

Associate Professor Carrigan Hayes was recently awarded first place in a "Periodic Poetry" contest sponsored by *Chemical and Engineering News*, a publication of the American Chemical Society. The contest was held as part of UNESCO's International Year of the Periodic Table, celebrating the sesquicentennial of Dmitri Mendeleev's development of the first version of the modern periodic table in 1869. The contest was open to *C&E News* readers worldwide via Twitter and Instagram during July 2019; readers entered their poems using the hashtag #PeriodicPoetry.

In her poem, Dr. Hayes incorporated various aspects of Mendeleev's story: his use of the card game patience (similar to solitaire) as a model for the repeating patterns of the periodic table, as well as the gaps he left in his table for the "eka" elements that had yet to be discovered. The contest was judged by renowned chemistry poets Dr. Mala Radhakrishnan and Mary Soon Lee, who noted these allusions and the poem's overall rhythm in awarding it first place.

Dr. Hayes has had a career-long interest in the overlap of science and literature, earning her undergraduate degree in both chemistry and English. Collaborating with Dr. Margaret Koehler in the Department of English, Dr. Hayes currently co-teaches an Integrative Studies course entitled "Of Protons and Poetry: Creativity Across the STEM/Humanities Divide." She started her Twitter account (@chemphasis) in April 2019 to celebrate the overlap of the International Year of the Periodic Table and National Poetry Month; many other chemistry-related poems can be found there.

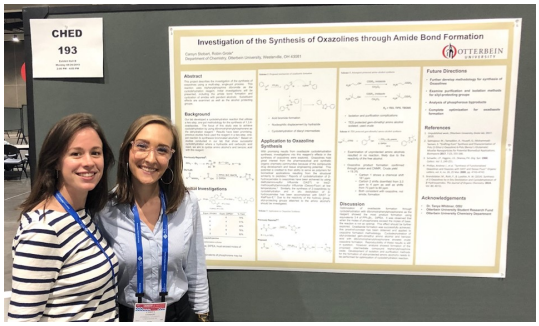


Faculty Sabbatical at the Interface of Chemistry and Art

Dr. Joan Esson looking at an indigo-producing species in Huanggang Dong Village, China

Dr. Joan Esson spent her sabbatical in Spring 2019 working at the Conservation Science Laboratory at the Indianapolis Museum of Art (IMA) and living in the adjacent Scholars Residence, a historic family home donated to the IMA by the Lilly family of the pharmaceutical enterprise Eli Lilly and Company. Although she made small contributions to studies on pigments used by Gauguin and Van Gogh, Dr. Esson spent most of her time studying dyes in textiles primarily using liquid chromatography-mass spectrometry (LC-MS), and to a lesser extent Raman spectroscopy and X-ray fluorescence. In part, she chose dye analysis as her focus to become more adept at LC-MS, since Otterbein's Chemistry Department recently acquired a LC-MS with funding from the Clements Foundation. Dr. Esson studied the previously unidentified colorant in the dyestuff *Justicia spicigera*, a plant native to Central America and Mexico. This plant was documented by Western explorers in the 16th century as a source of blue dye, which is still used today. She was one of only 24 scholars chosen to give an oral presentation at the international Dyes in History and Archeology conference in Amsterdam in November 2019 where she will present this work. While on sabbatical, Dr. Esson also conducted experiments to determine the authenticity of ancient textiles by identifying if dyes extracted from the textiles were natural or synthetic. The first synthetic dyes were not created until the mid- to late 1800s, which allows dating of the terminus post quem of textiles if made using synthetic dyes. Dr. Esson ended her sabbatical by attending the Biennial Conference on Natural Dyes in Hangzhou, China in May 2019 and participating in a study tour throughout Guizhou province, where she learned about how different Chinese ethnic groups grow, process, and use indigo in their textiles. Since returning to campus, Dr. Esson has continued studies on blue dyes, including additional experiments on *Justicia spicigera* as well as indigo. Two undergraduates, Miranda Moore '21 and Hope Lewis '22, are beginning projects in the Esson laboratory to examine methods to differentiate sources of indigo and identify dyes present in textiles from the West African collection at the Frank Museum of Art at Otterbein University.

Fall ACS Meeting



Dr. Robin Grote and Carsyn Stobart '21

This August, professors Joan Esson and Robin Grote and Chemistry major Carsyn Stobart '21 attended the National Meeting of the American Chemical Society in San Diego, California. Carsyn presented a poster on her research, which focuses on cyclodehydration reactions for the synthesis of biologically relevant heterocycles, such as oxadiazoles and oxazolines, completed in conjunction with Dr. Robin Grote.

In addition to seeing presentations given by prominent chemists in the field, Carsyn enjoyed sightseeing and networking opportunities with chemists and other chemistry students.

"Attending this conference was so enlightening and fulfilling. Being able to converse with so many different people with such diverse backgrounds and being able to connect on a common ground was amazing," said Stobart.

Katie Childers '15, Allie Brackbill '15, Dr. Joan Esson, Carsyn Stobart '21, Dr. Robin Grote

While in San Diego, professors Joan Esson and Robin Grote met up with Otterbein alumni Katherine (Katie) Childers '15 and Alexandria (Allie, née Weber) Brackbill '15, who were also in San Diego for the ACS national meeting. Katie is currently a graduate student in the Nuclear Chemistry program at Michigan State University. Allie is an Applications Chemist at CEM Corporation.

Summer Student Internships

Otterbein chemistry majors had some exciting summer experiences this year. Nathan Forney ’20 completed an REU (Research Experiences for Undergraduates) at the University of Connecticut in the lab of Dr. Eugene Pinkhassik, studying polymer nano-capsules.

Of his experience, Nathan says: “This was a very educational and enjoyable experience for me. The UConn Summer REU program gave me an idea of what graduate school is like. It was especially helpful to work with graduate students and gain firsthand knowledge from them. Not only did I gain research experience from this program, but I also gained knowledge on applying to graduate school. Overall, my experience at UConn has made me feel more confident and prepared for graduate school.”

Sam Farrar ’20 completed a summer internship at the Columbus company, SCI Engineered Materials Inc. He says: “My summer internship at SCI Engineered Materials was a very valuable experience for me. I worked in research and development making sputtering targets of different metal oxide compositions and testing the resistance and densities of the targets. The experience that I got while working the internship helped me make a decision in what career path that I wanted to pursue after I graduate. The internship also helped me develop how to work independently in a lab and the decision making process in research.”

2019 Science Lecture Series

Professor Richmond Sarpong

In February of 2019 the Chemistry Department hosted Professor Richmond Sarpong of the University of California, Berkeley as the annual Science Lecture Series speaker. While at Otterbein for two days, Professor Sarpong gave a lecture to the public entitled “A Life Shaped by Disease in Sub-Saharan Africa” and a technical lecture to Otterbein science students and faculty entitled “Building the Molecules that Make Medicines.” Dr. Sarpong’s research focuses on developing new chemical reactions and methods to make molecules of medicinal interest.

The George W. and Mildred K. White Science Lecture Series was established in 1987 by Dr. Philip Barnhart, former Chair of the Department of Physics and Astronomy, and Dr. Jerry Jenkins, former Chair of the Department of Chemistry and is funded by the George W. and Mildred K. White Science Seminar Fund.

Class of 2019 Updates

The Department of Chemistry had four graduates in the Spring of 2019: Katie Dodds, Evan Miller, Erin Hughes, and Elizabeth Tinapple.

Katie Dodds is currently working at local R&D company Quanta Biodesign, Ltd. and applying to graduate programs in environmental chemistry. She hopes to combine her interest in chemistry with her love of caving. While at Otterbein, Katie worked with Dr. Esson, analyzing the dyes and pigments of selected artifacts from the Western African art collection at Otterbein’s Frank Museum of Art.

Evan Miller is a first-year graduate student in Inorganic Chemistry at Colorado State University. Evan spent the summer before his senior year working in the Shores research group preparing coordination complexes with applications in amine sensing. Evan also conducted research with Dr. Johnston at Otterbein, investigating the hydrothermal synthesis of new titanium oxyfluorides.

Erin Hughes began her first year in the Molecular and Cellular Bioscience Ph.D. program at Wake Forest University. Erin was a Chemistry and BMB double-major at Otterbein and worked with Dr. Tansey, identifying interaction partners and trafficking proteins involved in the broader function of the lipid droplet protein perilipin 5.

Elizabeth Tinapple is working at S-E-A, Ltd. in the forensics laboratory where she had an internship in the summer of 2019. Elizabeth also worked with Dr. Johnston during her senior year, investigating the formation and characterization of zinc-based cocrystals with various aromatic amides.

OTTERBEIN UNIVERSITY

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CONNECT WITH US

Are you interested in keeping up-to-date more regularly with Chemistry Department activities and people, and in networking with other Otterbein alumni? Then join the Otterbein Chemistry Department LinkedIn page and/or Facebook page!

We also invite alumni to interact with current students. If you are an alum who wants to give a technical talk, participate in a panel about careers, or is willing to mentor a current student, please reach out to Joan Esson (jesson@otterbein.edu).

COSI Science Festival

The inaugural COSI Science Festival was held in May 2019. Over the course of four days, over 100 events were held throughout the region, culminating in the Big Science Celebration on Saturday, May 4, at COSI. More than 100 STEM exhibitors provided hands-on activities, including key sponsors NASA and Battelle and, of course, Otterbein University! The theme of Otterbein's activities was "Grossology: The Science of Icky, Sticky, Disgusting Things," where several Biology and Chemistry faculty, including Drs. Joan Esson and John Tansey, created opportunities for attendees to explore the science of smells, animal scat and eyeball dissection. Dr. Dean Johnston went above and beyond the call for volunteerism by donning the Cardy costume for the day and interacting with the thousands of children, parents, and others who enjoyed the Big Science Celebration!

A Celebration of the International Year of the Periodic Table

The Chemistry Department celebrated the International Year of the Periodic Table by hosting an event entitled "Pi, Pizza, and the Periodic Table" on March 14 (Pi day!). Retired metallurgist and guest speaker, Rich Tenaglia, shared his extensive personal collection of chemical elements (left) and gave a presentation about the origins of the periodic table. His talk provided insights into the life of Dmitri Mendeleev and historical perspective on his achievements that led to the development of periodic law. Rich also detailed some element name etymologies, bringing the periodic table to life.

Following Rich's talk students took part in a Chemistry "Quiz Bowl" where teams competed to correctly answer questions related to the periodic table. Our winning team even won some very cool chemistry socks (right)!