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Chemistry Matters Department Newsletter

Chemistry

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12-2020

## Chemistry Matters December 2020

Otterbein University Chemistry Department

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# Chemistry MATTERS

Otterbein University

December 2020

## Letter from the Chair

Greetings from Otterbein's Chemistry Department! We know that this is a difficult time for many and hope that you and your friends and family are doing well. Despite the adversities facing us right now, the Chemistry Department has embraced these challenges and continues to offer an engaging student-centered program. In this *Chemistry Matters* newsletter, you will learn more about our recent graduates, unique classroom and extracurricular projects and programs, recent American Chemical Society (ACS) Student Chapter Award, student-faculty research, and faculty scholarship, including the publication of Dr. John Tansey's new textbook *Biochemistry: An Integrative Approach*. You will also discover that Otterbein was awarded a National Science Foundation grant to support the Cardinal Science Scholars program, which provides scholarships, academic and career support to new Chemistry majors and other STEM students. Lastly, but certainly not least, we celebrate Dr. Wendy Johnston as she receives the 2020 Part-Time Teaching Award and alumnus Jeremy Young '00 as Otterbein's Professional Achievement Alumni Award winner.



Whether you are a prospective student learning more about Otterbein or a Chemistry alum wanting to find out what the program has been up to, I hope you find a connection and something exciting within this newsletter. If you are a prospective student and want to learn more, feel free to contact me at any time. If you are a Chemistry alum, we would love to engage with you more. Please let us know what you're up to and we'll share that in our next newsletter. We would also love to have you give a seminar or be on a panel to talk about career options with our current students. If you are interested, let me know.

We also invite you to connect with us through the Otterbein University Department of Chemistry Facebook page and Otterbein STEM Facebook and Twitter pages.

Wishing you all the best,

Dr. Joan Esson, [jesson@otterbein.edu](mailto:jesson@otterbein.edu)

## Mentos and Diet Coke Challenge

In September, the Chemistry Department held a Mentos and Diet Coke challenge for STEM majors on campus. Students made video demonstrations, and awards were given for the tallest geyser, the most educational video, and the most creative video. Chemistry majors Lily Nichols '22 and Kaitlynn Gleich '24 worked as a team and won the award for the most creative video; Chemistry major Olivia Smith '22 won the award for tallest geyser; and Zoo and Conservation Science majors Brett McDowall '24 and Claudia Smallwood '24 worked as a team to win the award for the most educational video.



Kaitlynn Gleich '24 and  
Lily Nichols '22



Erin Kibby '22

## Update on 2020 Graduates

During the 2019-2020 academic year, the department honored three outstanding graduates.

We celebrated Jack Liu's graduation in Autumn 2019. Jack participated in several departmental activities during his time on campus, including the student chapter of the American Chemical Society. Since graduation from Otterbein, Jack has moved to Irvine, CA, where he is working as a pharmacy clerk and preparing for a graduate program in pharmacy.

The Class of 2020 graduated in spring under unprecedented circumstances, and we recognized the accomplishments of two chemistry majors, Sam Farrar and Nathan Forney, in this unusual semester.

While at Otterbein, Sam Farrar was a teaching assistant for multiple courses, including Organic Chemistry Laboratory, and he participated in the student chapter of the American Chemical Society. Sam also had an internship at SCI Engineered Materials, and he completed a research project with Dr. Johnston that culminated in an online poster (via SciMeetings) for the 2020 National ACS Meeting.



Nathan Forney '20

During his time at Otterbein, Nathan worked as an intern (summers of 2017 and 2018) at the Parker Hannifin Corporation, which gave him an understanding of what it is like to be an industrial chemist. Moreover, during Summer 2019, Nathan was part of the REU (Research Experience for Undergraduates) program at the University of Connecticut, which convinced him to attend graduate school. A successful member of Otterbein's track team, Nathan won championship titles, set school records, and made the podium at a national track meet. In the chemistry department, Nathan was an active member of the student chapter of the American Chemical Society and was a teaching assistant and tutor in several chemistry courses.

The department was pleased to hear recently from both Spring 2020 alumni about their graduate school experiences in this historic autumn.

Sam is currently completing graduate studies in the Department of Chemistry at Wright State University, working on his Master of Science degree in organic chemistry with Professor Eric Fossum.

In his update, Sam discussed how his undergraduate experiences prepared him for graduate school: "I feel that the experience that I got at Otterbein has really helped me succeed in my first semester of grad school. The experience that I got has been the same or greater than my classmates that went to larger schools for their undergraduate studies. The experience that has helped me the most has been the labs I have been a TA for. I taught a General Chemistry 1 lab this past semester, and having that experience helped me know what I was doing: how to help the students with their lab when they had problems and how to make the lab enjoyable for the students."

Nathan is now pursuing a Ph.D. in chemistry at the University of Illinois at Urbana-Champaign. He has taken courses in polymer chemistry and materials this past fall and has recently joined the research group of Professor Catherine J. Murphy, whose work focuses on developing inorganic nanomaterials for biological and energy-related applications.

Regarding starting graduate school during the COVID-19 pandemic, Nathan reported: "Graduate school has been a challenging but exciting new experience for me. Though I was intimidated at first, I have now become accustomed to graduate life. However, my experience of starting graduate school has been very different than those who came before me. Due to the current circumstances in the world, first-year graduate students have lost opportunities to socialize and get to know other members of our class. Nevertheless, we have adapted and now socialize online. I look forward to the day I can meet my peers in person and have new experiences with them."

If you're one of our chemistry alumni and would like to share your story or any recent updates, please email us! You can reach Donna Rhodeback, the chemistry department's administrative assistant, at [drhodeback@otterbein.edu](mailto:drhodeback@otterbein.edu).

## Otterbein University Awarded National Science Foundation Grant for STEM Education

STEM faculty at Otterbein University were recently awarded a National Science Foundation (NSF) S-STEM grant of \$999,348 to support recruitment and retention of students from under-represented populations in STEM fields through Otterbein's Cardinal Science Scholars (CSS) program.



This five-year program will support two cohorts of 11 students each for four years of undergraduate education in STEM subjects: a total of 22 four-year scholarships for students majoring in biology, environmental science, zoo and conservation science, biochemistry and molecular biology, chemistry, engineering or physics. Associate Professor of Chemistry Dr. Brigitte Ramos leads the project team of professors including Dr. Joan Esson, professor of chemistry; Dr. David Sheridan, associate professor of biology and earth science; Dr. Meredith Meyer, associate professor of psychology; and Dr. Elena Caruthers, assistant professor of engineering.

"This generous grant will make a quality education more attainable for low-income students, including first-generation students, who are traditionally under-represented in STEM programs," said Dr. Ramos. "We believe that adding diversity to our programs will enhance the overall learning experience for all of our students."

In addition to scholarship support, the Cardinal Science Scholars program provides curricular and co-curricular activities that support student success, professional preparedness, and graduation in STEM fields. Some of the planned activities include a summer immersion experience, a recurring CSS seminar course, peer and professional mentoring, internships, and research experiences. Scholarships vary in amount and will be awarded all four years as long as students continue in one of the sponsored STEM programs, participate in planned program activities, and maintain an overall G.P.A. of 3.0.

The overarching goal of the Cardinal Science Scholar Program is to increase the number of low-income students, including first-generation students, who succeed in STEM disciplines and acquire the skills needed to meet local and regional workforce demand. The CSS program also will help build targeted academic-industry partnerships that are the focus of Otterbein initiatives and enhance interdisciplinary collaborations among the university's STEM departments.

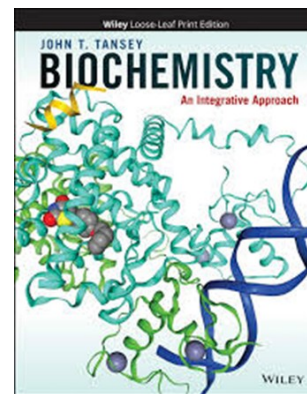
## Dr. John Tansey Authors New Biochemistry Textbook

Dr. Tansey is the author of a new biochemistry textbook published by John J. Wiley and Sons. The book, entitled *Biochemistry: An Integrative Approach*, uses the latest in examples and student-centered pedagogy to help lower barriers to student learning. The book has several unique features compared to other biochemistry texts. First, it uses worked problems embedded in the text, similar to what is seen in introductory chemistry and physics books. Second, descriptive biochemistry is integrated with metabolic biochemistry. In other texts the first third of the book is dedicated to describing and characterizing biological molecules, while metabolism is not discussed until much later. Here, descriptive and metabolic biochemistry are covered in the same chapter, lending relevance to the material. This format also helps students who can only take a single semester of biochemistry. The second half of the book delves deeper into more advanced topics, such as protein structure function, signal transduction, and bioinformatics.

In addition to the text, online resources include videos of Dr. Tansey solving worked problems from the text, electronic homework, and Dynamic Figures; an interactive, web-based tool for exploring biological molecules, processes, pathways, and mechanisms.

The project is the culmination of almost ten years of work. Dr. Tansey says that writing the book was actually a lot of fun. "One of the reasons I went into science is that I thought I would be writing less," says Tansey. "I guess I was mistaken."

Students and faculty have really liked the book. Overall, students have said that they enjoy the conversational tone of the writing, clear diagrams and current examples. Tansey says: "Many students who enroll in biochemistry are premed or have biomedical interests, so I've tried to use many biomedical examples. I hope this helps them think differently about biochemistry and science in general and helps them think more deeply than they had previously."

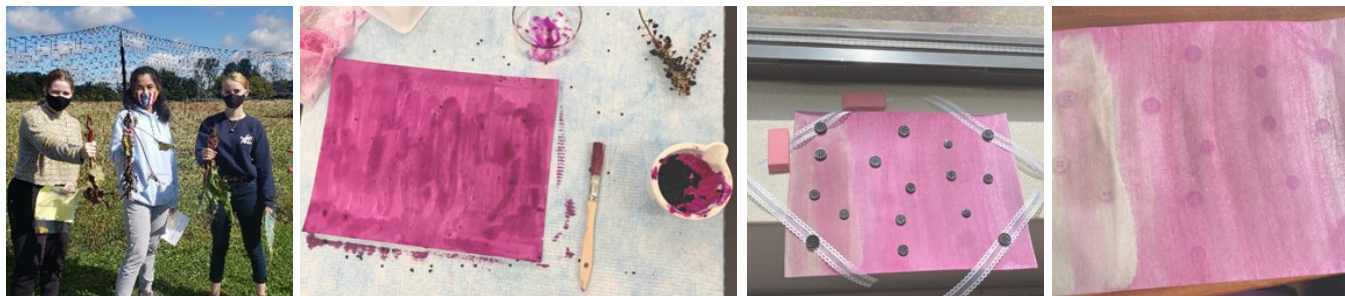




## Chemistry at the Community Garden

Otterbein's Community Garden is celebrating its tenth year of providing hunger relief to local food pantries, including our on-campus Promise House, and serving as an innovative study and research site for Otterbein students, faculty and staff. Two classes offered by Dr. Joan Esson spent time learning about and using products from the garden during Fall 2020.

Students from INST 2408, *Chemistry in Art*, were introduced to the garden on a beautiful sunny fall day by Dr. Melissa Gilbert; the students then harvested flowers or produce, such as berries and beets, that could be used as a source of natural dyes to create anthotypes. Anthotypes are a type of early 19<sup>th</sup> century photography that uses the photooxidative fading of the dyes to create an image as seen in the pictures below.



From left to right above: INST students at the Community Garden with their natural dyestuffs, Kelsie Kinsey '23, Tam Ordonez '23 and Claire Kivala '23; preparing the paper from natural dyestuffs; the button design left by a window for two weeks; the final product after two weeks (latter three pictures taken by Kelsie Kinsey).

Chemistry majors and minors in CHEM 3110, *Analytical Chemistry Laboratory*, also spent time at the Community Garden gathering over a dozen species of peppers. Some of these peppers had been planted and grown by Dr. John Tansey; Dr. Tansey and his family have been gardening there for five years, since they like the idea and philosophy of the Community Garden. Unfortunately, their plot doesn't drain well so they grow produce, like peppers, in containers that are off the ground. This year he got an odd mix of peppers from Baker's Acers Greenhouse in Alexandria, Ohio. These peppers have quite a range in expected heat values and some species were unknown. Otterbein students took the samples back to the laboratory where they were prepared and analyzed by high-performance liquid chromatography (HPLC) for their capsaicin levels; capsaicinoids are the class of compounds that give peppers their heat. The results, along with salsa and hot sauce recipes from Dr. Tansey, were shared at a Pop-Up Event run by the Center for Community Engagement, where students, faculty and staff could take home a pot of peppers along with a better understanding of the heat of each type of pepper.



Above: CHEM 3110 students with Dr. Esson at the Community Garden.

Through these experiences, students learned about chemistry, and many were also introduced to the Community Garden for the first time. During a strange term that produced additional anxiety for many, the students appreciated a different learning environment that provided a space for relaxation and reflection.

Dr. Esson will continue working with the Community Garden in future classes and is starting a dye garden that can be used to help her research. Look for more information in future newsletters about its progression!

If you are interested in supporting the Community Garden and its goal of providing food for those in need, please go to <https://www.otterbein.edu/give/>, select Other and enter Community Garden. (cont'd on page 5)

## First Offering of CHEM 4800 *Introduction to Cheminformatics*

In Fall 2019, a course entitled *Introduction to Cheminformatics* was offered for the first time at Otterbein as part of a collaborative teaching project called the Cheminformatics Online Chemistry Course (OLCC). This project was organized by the ACS Division of Chemical Education and the Committee on Computers in Chemical Education. Dr. Dean Johnston worked together with outside experts and faculty who were simultaneously teaching similar courses at four other institutions around the world. Cheminformatics combines the fields of chemistry, computers, and information science, and it has applications ranging from materials development to drug discovery. Topics covered in the course included basic Python programming, computer representations of molecules, programmatic searching of chemical databases (PubChem), molecular similarity, virtual screening and an introduction to machine learning. A paper describing the course and its development has been accepted by the *Journal of Chemical Education*, and the course will be offered again in Fall 2021.

## COVID Conversations

It's been one strange year with news coming out with different messaging almost daily as we learn more about SARS-CoV-2, the virus that causes COVID-19. To aid the Otterbein community in better understanding not only the science behind COVID-19 but also related issues (such as COVID's differential impacts on communities of color, as well as historical pandemics that could add context to our current one). Dr. Jennifer Bennett, Professor and Chair of Biology, collaborated with Dr. Joan Esson, Professor and Chair of Chemistry, to organize a series of weekly discussions led by Otterbein faculty around different themes. These talks were collectively termed "COVID Conversations." This series of talks brought together students, faculty, and staff, across campus, and they were also open to members of Otterbein's Lifelong Learning Community (LLC), a vibrant community of lifelong learners aged 55 and older who participate in a year-long menu of workshops, lectures and mini-courses at Otterbein. Dr. Esson presented on COVID-19 testing, while Dr. Robin Grote discussed the development of vaccines for SARS-CoV-2. So many faculty are interested in participating in this series that the COVID Conversations will continue into Spring 2021.

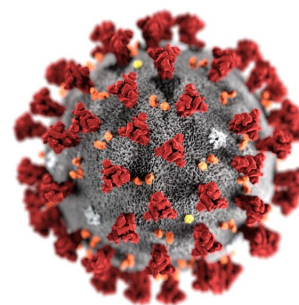


Photo credit: CDC/Alissa Eckert, MSMI; Dan Higgins, MAMS

## Otterbein Connections

In honor of alumnus Lieutenant Colonel Larry Schultz '74, his children established an endowed scholarship for Otterbein students. One of his children is Dr. Zachary Schultz, Associate Professor in the Department of Chemistry and Biochemistry and Member of the Comprehensive Cancer Center at The Ohio State University (OSU) and Fellow of the American Association for the Advancement of Science (AASS). We were privileged to have Dr. Schultz as the last in-person seminar speaker in Spring 2020, prior to the pandemic shutting down such events. He gave an excellent talk on *Enhanced Raman Scattering for Bioanalysis* and shared information with our students about the graduate program at OSU. We look forward to continued collaborations with Dr. Schultz.



(cont'd from page 4) Above: Olivia Smith '22, documenting the peppers before picking; Mackenzie Morrison '21, and Dr. Esson, sampling some peppers; Lily Nichols '22, showcasing a pot of peppers that were given away at the Pop-Up Event. Lily is also wearing a chemistry face mask that she designed and that were printed and given to all chemistry majors.



## Part-Time Faculty Teaching Award

We wish a very hearty and deserved congratulations to Dr. Wendy Johnston (right) for winning the 2020 Part-Time Faculty Teaching Award! Dr. Johnston, or “Dr. Mrs. Johnston,” as the students say, has tirelessly devoted herself to Otterbein students for 25 years, becoming a central leader of our General Chemistry Laboratory program. Not only has she developed an effective learning environment for all our diverse General Chemistry students, but Dr. Johnston also demonstrates an enduring, passionate commitment for the betterment of our students and entire department. She also works closely with our upper-level students who serve as teaching assistants, and it is clear that they benefit enormously from this mentorship. If you wish to join us in congratulating Dr. Johnston, you are welcome to email her at [wjohnston@otterbein.edu](mailto:wjohnston@otterbein.edu)



## Jeremy Young, Class of 2000, Honored with 2020 Alumni Award

Jeremy Young received the Professional Achievement Award at the Otterbein University Alumni Awards ceremony during Homecoming Weekend 2020. The virtual celebration highlighted Jeremy’s many accomplishments at SCI Engineered Materials, Inc. a central Ohio company that has seen tremendous growth under Jeremy’s leadership.

Jeremy began his work at SCI Engineered Materials in 2006 as a production manager. He advanced quickly through the company while also earning his MBA from Ohio University (2012). He was elected President in early 2019 and elected Chief Executive Officer in June of the same year.

In writing the nomination letter for Jeremy’s award, Dr. Dean Johnston stated: “SCI Engineered Materials is a medium-sized company with approximately 30 employees based in Columbus. They supply advanced materials used to manufacture solar energy devices, batteries, electronic displays and efficient window materials, among many other applications. In June 2019, SCI Engineered Materials was recognized by *Columbus Business First* as the Fastest-Growing Central Ohio Public Company. I have no doubt that Jeremy has contributed significantly to the success of SCI Engineered Materials.”

In addition to his professional success, Jeremy has given generously of his time and expertise to Otterbein in the years since his graduation. As Dr. Johnston discussed in his nomination letter, “Jeremy has kept in touch with faculty at Otterbein and given back in many significant ways. He has come back to campus numerous times, participating in Chemistry alumni panel discussions and giving seminars about his work. And Jeremy understands the importance of internships, having worked at Worthington Industries while a student at Otterbein. This internship led to his first job after graduation and set him on his path to success. And now Otterbein students are benefiting from internships at SCI Engineered Materials. Jeremy has also made connections with The Point and the Engineering Department at Otterbein. I am sure that Jeremy will continue to give back to Otterbein and be an amazing resource and inspiration for our students.”

The entire virtual ceremony can be seen at Otterbein’s YouTube channel. Jeremy’s award celebration in particular begins around Minute 10. We as a department look forward to Jeremy’s return to campus in 2021 or beyond, when we will recognize his outstanding accomplishment in person!

## Celebration of the International Year of the Periodic Table (IYPT)

Last year (2019) was the International Year of the Periodic Table ([iypt2019.org](http://iypt2019.org)), celebrating the 150th anniversary of Dimitri Mendeleev’s landmark publication. As part of this celebration, the Department of Chemistry invited Rich Tenaglia, retired metallurgist, back to Otterbein to speak about the rare-earth elements and to show off his extensive element collection. Rich shared his vast knowledge of the elements and demonstrated the many applications of the rare-earth elements. Everyone was impressed by his nearly complete collection of elements, with stories about each sample, including fascinating connections to Rich’s time working at Battelle.



Dimitri Mendeleev

## Presentations Paused Due to COVID-19

The following talks were scheduled during spring 2020 but were canceled due to the pandemic, and we want to acknowledge faculty and student scholarship regardless. Faculty names are underlined.

Matt Huston '21, "Characterization of a Splice Variant of Perilipin 5," ASBMB Spring 2020

Rebekah Dalton '20, "Probing the Function of Perilipin 5b," ASBMB Spring 2020

Lillian Cool '20, "Probing the Nature of the Hydrophobic Cleft of Perilipin 5," ASBMB Spring 2020

Rebekah Dalton '20, Lillian Cool '20, Matt Huston '21, "Scientific Outreach with the Otterbein University Student Chapter," ASBMB Spring 2020

Doan, J., Esson, J. M. "Pigmentation of Unionidae freshwater mussels," American Chemical Society National Meeting, Philadelphia, PA, March 22-26, 2020. This presentation was given virtually by Jenny Doan '21.

Lewis '22, H., Esson, J. M. "Differentiating sources of indigo in textiles via liquid chromatography-mass spectrometry," American Chemical Society National Meeting, Philadelphia, PA, March 22-26, 2020.

Moore '20, M., Esson, J. M., "Technical study of dyes in West African textiles," American Chemical Society National Meeting, Philadelphia, PA, March 22-26, 2020.

Kibby '22, E., Esson, J. M., Grote, R. "Encouraging chapter growth," American Chemical Society National Meeting, Philadelphia, PA, March 22-26, 2020.

More faculty presentations and publications can be found on our web page.

## STEM Art Show

The third annual Otterbein STEM Art Show and Competition took place this November, with a great turnout from students across campus. Students from Dr. Robin Grote's CHEM 4800, *Big Molecules*, class and Dr. Joan Esson's INST 2408, *Chemistry in Art*, class submitted a variety of art, including sculptures of enzymes and cyanotype photography. Pictured at right is Chemistry major Olivia Smith's '22 sculpture of ATP synthase.



## Seminars for Students and Faculty

Ronald Smith ('15, graduate student at Georgia Tech), October 24, 2019. RJ gave us an update on his career path, including his work for a start-up company in the Research Triangle area, where he worked on a project to detect date rape drugs using fingernail sensing and his current research as a graduate student in the Gutekunst Lab studying radical polymerization.

Dr. Jennifer Stockdill (Wayne State University): "Trimming the waste-line in macrocyclic peptide synthesis: N-acyl urea cyclization and photodesulfurization," October 25, 2019

Dr. Zachary Schultz (Ohio State): "Enhanced Raman Scattering for Bioanalysis," February 24, 2020. Zac is an Analytical professor in the Chemistry Department at the Ohio State University and the son of an Otterbein alum: Lieutenant Colonel Larry Schultz '74.

## Virtual Seminars

Dr. Jeff Bender, Global Head of Chemical & Instrumental Analytics of Roche Diabetes Care Incorporated, October 12, 2020

Dr. Ramesh Jasti (University of Oregon): "Bridging Carbon Nanoscience and Organic Synthesis," October 16, 2020

Dr. Karl Werbovetz (Ohio State University College of Pharmacy): "Antileishmanial Drug Discovery – Two Approaches Based on Heterocyclic Leads," October 21, 2020





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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 Dr. Joan Esson ([jesson@otterbein.edu](mailto:jesson@otterbein.edu)).



## ACS Student Chapter

The ACS Student Chapter has been especially active this year, despite the COVID-19 pandemic. In fact, for the first time ever, the Chapter won the *Commendable Student Chapter Award*. Otterbein is the only small university in Ohio to receive this recognition, and fewer than 100 universities across the U.S. and ACS international chapters earned this well-deserved award. This year's officers (President Erin Kibby '22, Vice-President Olivia Smith '22, Secretary Noah Highfield '22, and Treasurer Lily Nichols '22) have developed an engaging set of social, outreach and career development activities for chemistry and other STEM majors. Immediately prior to the pandemic, the Chapter held a tie-dye event for its members and an outreach event with Westerville South High School students. Over the summer, they hosted a virtual chemistry social and invited three younger alumni to share what they are up to now: Carolanne Norris '18, Liz Isaac '18 and Mallory Gasbarre '17. This Fall, the Student Chapter had to get more creative, with social-distancing measures in place, but still had a raucous game of Chemistry Bingo and a campus-wide Mole Day scavenger hunt, as well as a HyFlex session on finding summer research or internship opportunities led by Dr. Esson and Ryan Brechbill from the Student Success and Career Development Office. The Student Chapter was also excited to invite The Ohio State University's (OSU) Inorganic Chemistry Exchange (ICE) for a virtual discussion. ICE is a group of graduate students who, in part, are seeking to develop a better relationship with Otterbein so that our students are more aware of graduate opportunities at OSU and what graduate school is like. Otterbein's Student Chapter is looking forward to a continuing relationship with ICE.

