

# Periodic Trends

December 2020



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It's such a great time to get involved with Chemistry and Biochemistry at Old Dominion University. This year we launched four new undergraduate degrees. For students with an interest in pursuing chemical/biochemical research after graduation or in graduate school, or simply for those seeking a deeper understanding of research and its applications, we now offer a Bachelor of Science in Chemistry/Biochemistry with Research Concentration. Students in Research Concentration will begin research-based courses their first year and continue research every year during the four-year degree. This opportunity to carry-out research in PhD research groups during their entire un-

dergraduate career is unique to Old Dominion University in the Commonwealth.

For students with an interest in the life sciences, we now have a Chemistry Major with Pre-Med Concentration which will prepare them for medical school while also maintaining a multitude of additional career options, post-graduate options and chemical instrumentation expertise. This Pre-Med Concentration offers training that is directly applicable to medical school curricula, making students attractive applicants for pre-health-related programs. By completing the core science classes in Pre-Med, students will fulfill the chemistry major and standard medical school course requirements all at once.

This spring we will also graduate our first student from our new BS/MS Degree Program. This new program allows exceptional students to earn both a BS in Chemistry and a Masters in Chemistry in five years.

This semester we were able to offer all of our undergraduate laboratory courses and all of our core chemistry lecture courses to students on campus while still maintaining social distancing and wearing PPE. For undergraduate students wishing to remain remote, we also offered all of our chemistry lecture courses remotely using both Zoom and Blackboard. It was quite an extraordinary effort by the entire faculty to accomplish this.

The Department is also growing quite rapidly. This year we had our largest graduating class of undergraduate majors and MS students, and this coming spring we will have our largest class of graduating PhD students. We also had many promotions and added several new members to the faculty. Perhaps the biggest news in the department is our New Building which we will be moving into in January 2021. With the new building comes enhanced interactions with both students and alumni, so for more details about the exciting things going on, please read on...

John Cooper, Chair



## ~New Chemistry Building



Construction on the new Chemistry building began in February 2019 and is scheduled to be completed by spring 2021. ODU's newest building will be a four-story 110,000 square-foot innovative learning center. The new Chemistry building is being funded by a state bond issue, in part intended to increase the number of students in STEM-H, those majoring in science, technology, engineering, math and health. Old Dominion is the second-largest producer of STEM-H.

### Stated Goals for the New Chemistry Building:

- ✓ increasing undergraduate student retention and success
- ✓ increasing academic and research interaction
- ✓ making research more accessible and appealing to Undergraduates
- ✓ fostering interaction and collaboration
- ✓ elevating the chemistry department's visibility to the campus community and scientific community as a whole

Control Click below for a sneak peek of the

[Enjoy a tour of the New Chemistry Building](#)

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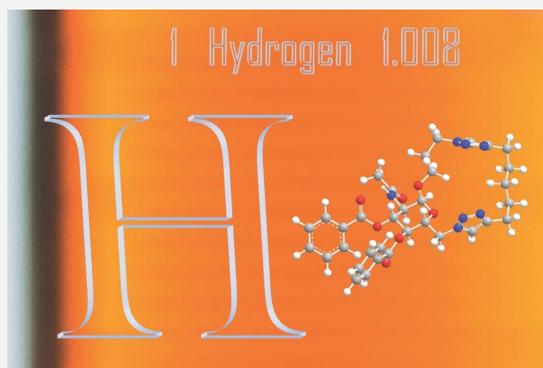
## Support the Department of Chemistry

You have the opportunity to purchase an element and put your name on this one of a kind periodic table. The periodic table is located on the first floor of the new chemistry building. You will have maximum exposure to students, faculty and guests. Your generous contribution will increase endowment funds for the department, enabling us to expand our support for our students research experiences.

To make a purchase, contact Krista Kimme, Major Gifts Officer, at [kkimme@odu.edu](mailto:kkimme@odu.edu).

## Close-Up Sample of Element

Control Click Hydrogen Element Below to view Elements of giving web page



~Elements of Giving

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## ~Faculty Promotions

Dr. Craig Bayse  
*Promoted to*  
Associate Dean  
College of Sciences



Dr. Jingdong Mao  
*Promoted to*  
Full Professor



Dr. Pinky McCoy  
*Promoted to*  
Assistant Chair



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Dr. Janet Moloney  
*Promoted to*  
Senior Lecturer

## ~Faculty Promotions (continued)

Dr. Ken Mopper  
*Promoted to*  
Eminent Scholar



Dr. Josh Wallach  
*Promoted to*  
Associate Dean &  
Director of the Math &  
Science Resource Center



## Winners of This Year's Above and Beyond

Two of our faculty received this year's **Above and Beyond Faculty Awards!** This award was started in 2019 and is funded by the College of Sciences Advisory Board to recognize those faculty who, through their teaching, research, or service, go above and beyond their usual role. These faculty serve the educational mission of ODU in many ways, some of which are not recognized through the usual teaching or research awards. These faculty are problem solvers, the ones who take initiative to improve the lives of our students, staff, and faculty.



**Dr. Bala Ramjee**



**Dr. Kalpana Mahadevan**



Congratulations to **Tammy Subotich** for receiving the College of Sciences 2020 award for Outstanding Staff Member of the Year! Her hard work and dedication is integral to the New Building and the department.

~Faculty Awards

~Staff Awards



## Undergraduate Achievements



**Richard Chen**

Congratulations to undergraduate honor students Richard Chen and Mehmet Kerem Gokus for their publication titled: "Tetrathiafulvalene: A Gate to the Mechanochemical Mechanisms of Electron Transfer Reactions" under the direction of Dr. Silvina Pagola. The paper was accepted on June 2nd, 2020 in the *Crystals* journal and published on June 5th, 2020.



**Mehemet Kerem Gokus**

*Crystals* (ISSN 2073-4352; CODEN: CRY5BC) is a [peer-reviewed](#) open access journal, published monthly online by MDPI, that covers all aspects of crystalline material research, including liquid crystals and biomolecular crystals.

~Undergraduate Achievements



**Scarlet Aguilar-Martinez**  
**Perry Honors College Grant Awardee**  
**Summer 2020**

Scarlet Aguilar-Martinez was awarded a \$3000 Undergraduate Research and Creativity Grant by the Perry Honors College in Summer 2020. She was one of only seven students selected. The project investigating the transformation of lignin-



derived terrestrial dissolved organic matter (tDOM ) under photooxidative conditions challenged Scarlet to perform research during a global pandemic and entailed mastering programming skills to model, analyze, and visualize data. The results to date are demonstrating that the vanillin is readily converted to compounds that resemble compounds found in tDOM associated with natural waters. Such results have the potential to change the current dogmas regarding the microbial source of compounds contributing to DOM in natural waters.

~Undergraduate  
Achievements  
(continued)



## Departmental Student Awards

Due to the COVID-19 pandemic our students were not able to attend our annual awards ceremony in person. Thanks to Dr. Cooper and Dr. McCoy we were able to honor the wonderful achievements of our students with a video ceremony ( <https://youtu.be/fW14DjX0Nxs> ) Student certificates were signed by the Chair and Dean and mailed to this years winners, GREAT JOB!

**Outstanding Freshman Chemistry Student:** Eleni Zivla

**Outstanding Student in Organic:** Jubilee Benedict

**Outstanding Student in Inorganic:** Nicholas Collett

**Outstanding Student in Analytical Chemistry:** Trey Halsey

**Outstanding Student in Biochemistry:** Pooja Patel

**Outstanding Student in Physical Chemistry:** Rachel Nimitz

**Outstanding Teaching Assistants:** Oumar Sacko and Andrea Clark

**Outstanding Senior Thesis Award:** Alexis Tran-Thompson

**Undergraduate Award in Organic Chemistry:** Mary Olson

**Undergraduate Award in Inorganic chemistry:** Alicia Bryan

**Outstanding Graduating Senior in Chemistry:** Alicia Bryan

**Outstanding Graduating Senior in Biochemistry:** Paige Royal

## Provost's Awards for Undergraduate Research

Congratulations to Alden Rinehold and Mary Olson for winning the Provost's Award for Undergraduate Research. There are only two of these awards given to the entire campus and both this year were given to our department! Great job Alden and Mary! <https://www.youtube.com/watch?v=EdThflm0GzQ>

~Student Awards



## New BS-MS Linked Degree

The Linked BS chemistry/MS program in Chemistry and Biochemistry allows for exceptionally successful students to earn both a BS Chemistry and MS in Chemistry in five years by allowing them to count up to 12 credits of graduate coursework toward both their Bachelor's and Master's degrees in Chemistry.

**Andriana Zourou** is the department's first Linked BS-MS Major and she will graduate in Spring 2021.



### Benefits:

Obtain 2 highly-marketable degrees in 5 years.

Count 12 graduate-level credit hours towards both the BS Chemistry and MS degrees. After completing the BS in Chemistry, only 18 graduate credit hours remain for the MS - Thesis. These can be completed in a Fall/Spring/Summer academic year.

The GRE requirement for MS admission is waived for students successfully participating in the Linked Program.

### Program Eligibility:

To be eligible for admission to the Linked Program, students must have completed at least 60 undergraduate credit hours (with at least 24 credit hours from ODU) Students must have completed CHEM 213, 214 and CHEM 321 and all prerequisites for those courses.

Hold an overall GPA of 3.0 or higher and a GPA of 3.0 or higher in CHEM courses

~BS-MS Linked Degree

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**Dr. Trandon Bender** will be joining the Department of Chemistry and Biochemistry at Old Dominion University as an Assistant Professor in December 2020. He and his family will make their adventure back to the east coast from UC-Berkeley where Trandon has been working as an NIH post-doctoral fellow in the labs of Professor's F. Dean Toste, Kenneth N. Raymond, and Robert G. Bergman. Prior to this, Trandon went to graduate school at UNC-Chapel Hill just down the road where he worked with Michel R. Gagné. During both of these experiences he has worked at the intersection of organic and inorganic chemistry to investigate catalysis. Catalysts are the entities that chemists rely on to perform reactions in an efficient manner and make up the basis of most industrial applications. This desire to pursue catalytic applications arose during his time as an undergraduate at Weber State University in Ogden, Utah. Trandon attended Weber State as a first-generation college student and was exposed to lab research early in his undergraduate program planting the seed that drives him to pursue research and science education today. His lab at Old Dominion will continue to be driven by the desire to discover new and more efficient catalysts, while providing undergraduate and graduate students with the same fulfilling research learning experience that he has had in his career. If you would like to learn more about Trandon and his future lab at Old Dominion visit the lab website at <https://fs.wp.odu.edu/tbender/>



**Dr. Kyle Lambert** joined the Department of Chemistry and Biochemistry at Old Dominion University as an Assistant Professor this past summer. He joins the department following his studies as an NIH Postdoctoral Fellow at Baylor University, working under Prof. John Wood. While exploring the area of natural product total synthesis, Kyle involved the development of a ring-expansion strategy to access diketopiperazine and alkaloid natural products, such as haenamindole and phyllantidine, which contain labile nitrogen-oxygen bonds. Prior to his postdoctoral studies, Kyle obtained his PhD in Chemistry from the University of Connecticut in 2017 under the guidance of Prof. William Bailey where his doctoral work focused the development of selective oxidations using oxoammonium salts and investigations into the role of electrostatic interactions in the conformational equilibria of saturated heterocycles. Kyle also holds two Bachelor of Science degrees in Chemistry and Forensic Science from the University of New Haven, where he was first introduced to organic synthesis while doing undergraduate research under the tutelage of Prof. Pier Cirillo. More about Kyle's research can be found at <https://sites.wp.odu.edu/thelambertgroup/>

~New Faculty

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## ~New Faculty (continued)



**Dr. Emily Hardy** joined the Department of Chemistry & Biochemistry at Old Dominion University as a Lecturer. She grew up in Hampton Roads and earned her bachelors degree in chemistry at ODU in 2013. She spent the next five years studying f-block coordination chemistry, learning X-Ray crystallography and doing science outreach at Auburn University where she earned her doctorate in Inorganic Chemistry in 2018. For the last two years

Dr. Hardy was a Visiting Assistant Professor at Roanoke College teaching organic and general chemistry. Dr. Hardy is excited to join the faculty at Old Dominion and help grow the department where her chemistry education started!



## ~New Graduate Students

### ***New Graduate Students***

Duaa Alarjoush, Ph.D.

Louis Boundurant, Ph.D.

Hannah Hamontree, Ph.D.

Reda Massawe, Ph.D.

Amanda Mink, MS

Samantha Sullivan, Ph.D.

Bayan Alharbi, Ph.D.

Morgan Daniels, Ph.D.

Areej Malik, Ph.D.

Austin Medley, Ph.D.

Ramsey Ritter, Ph.D.

Elizabeth Zengel, Ph.D.



## ~2020 Graduates

### ***2020 Graduates***

Michael Celestine, Ph.D.

Macey Cohen, MS

Michael Miller, MS

Wenying Chu, Ph.D.

Alex Goranov, Ph.D.

Raj Gurung, Ph.D.



## Dr. Erin Purcell's Research Group

The pathogenic bacterium *Clostridioides difficile* (*C. diff*) causes highly recurrent gastrointestinal infections that plague the healthcare system. These infections are difficult to treat, and the bacteria are difficult to eradicate from contaminated environments, because *C. diff* is highly resilient to extracellular stresses caused by the mammalian immune system and by antibiotics. The Purcell lab studies the molecules that transmit information from the environment to *C. difficile* sensory systems, and from sensors to stress response pathways.

The development of more effective treatments for *C. diff* infection has been slow because so little is known about this bacterium—its scientific name is actually due to the difficulty researchers had in isolating and growing it! Research has been slow because *C. diff* is an obligate anaerobe, an organism that is poisoned by oxygen. While it can form dormant spores that survive in oxygen and spread the infection to new patients, researchers have difficulty studying the active form of the bacteria that causes disease. As a result, we know very little about how it moves around and selects locations to attach to. The Purcell group has built a device to allow microscopic investigation of live *C. diff*. We have demonstrated that *C. diff* stops moving and attaches to surfaces in the presence of sialic acid, a component of intestinal mucus. This is the first indication that *C. diff* regulates its motility in response to nutrient availability, and suggests that testing to diagnose *C. diff* infection should be performed on the mucus that lines the intestines and not just the intestinal contents. Now that we have shown that *C. diff* stops swimming and settles down in the presence of 'good' substances like nutrients, we are eager to see if it tries to swim away and avoid 'bad' substances like antibiotics.

We have also focused on small ribonucleotide signals—guanosine tetraphosphate and pentaphosphate (together called (p)ppGpp)—that some bacteria synthesize under stress. We were the first group to show that *C. diff* makes these signals, and we have developed molecular reporters to identify which antibiotics stimulate (p)ppGpp production. We have discovered that a low affinity inhibitors of (p)ppGpp synthetase enzymes reduce *C. diff* antibiotic resistance, and are working to characterize the *C. diff* enzymes to enable the development of high-affinity inhibitors that could be administered with antibiotics to make them more effective against *C. diff*.

~Research Spotlight

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Due to COVID the Departmental gatherings that everyone looks forward to have been placed on hold, however, we did have some good social time prior to COVID.



## ~Department Events