



### THE DEPARTMENT CHAIR

#### **B**ARRETT (BARRY) EICHLER

I have been teaching my usual General Chemistry (Chem 116 and 117) and Inorganic Chemistry (Chem 222 and 341) over the past few years. I have also taken care of the Trustee's Fellows in Chemistry class (Chem 102). A major note is that I continue to revamp the labs and curriculum for Chem 222 and 341 as the American Chemical Society has mandated, and that is taking a lot of my time now.

Sadly, my time as Department Chair is almost up. After this year, Dr. Jared Mays will be the Chair and I am very happy for him. Any complaints may be sent directly to him.

My research continued to work well last summer in that my students and I developed methods to use fluorescent quantum dots to detect prostate cancer. The previous year we created a method for attaching RNA aptamers to quantum dots, and this year we used that combination to work with cancer cells to differentiate malignant vs. benign ones. We have begun a strong collaboration with researchers at Sanford Research that we hope will continue. Next summer we hope to use actual patient tissue to see if our technique works and if we can stage cancer based on our quantum dots.

On a personal note, my family and I have taken vacations to northern Minnesota and the Twin Cities. Our family sold the cabin that we have been going to for 30 years, so we will be looking for a new one next summer (let us know if you know of any for sale!). Our daughter, Maddie, is 10 years old and goes to Brandon Elementary, where she is in the Gifted Education program and plays the piano and clarinet.

#### DEPARTMENT

##### PERSONNEL

We have also welcomed some new faces in the Department, so I invite you to read their notes in this newsletter. As many of you know, Dr. Weisshaar retired last fall, but he is still with us as our new Instrument and Computer Technician. He is finally doing what he has wanted to do for years and has the time to do it. He has already worked wonders for us. Replacing him as our tenure-track Analytical Chemist, Dr. Cyndey Johnson-Edler is no stranger to us as she joined us in the Spring of 2016. Dr. Charlie Weiss joined us this year as a continuing-term faculty member and comes to us from Wabash College. Laura Heidbrink is our new stockroom manager and NMR coordinator. She previously worked at Gevo in Luverne, MN.

##### NAME CHANGE

Change is the only constant in life. For the Augustana University Department of Chemistry, that comes as no shock to us as we are now called the "Department of Chemistry *and Biochemistry*"! This provides more structure and better advising to students who are pursuing a biochemistry major.

## FROM THE FACULTY

Continued from page 1 - BARRY EICHLER

### RESEARCH

Research is rolling in the Department of Chemistry and Biochemistry. Summer 2018 had us working with 16 students in the Department and all of the students presented their research at the Sioux Valley ACS Local Section Meeting and Poster Competition in September, as well as the ACS Midwest Regional Meeting in October in Ames, IA, at Iowa State University. We won the top 2 awards at the Sioux Valley ACS poster competition. We are also sending 6 of those students to the National ACS Meeting in March and April in Orlando.

### INSTRUMENTS

Last year we purchased a research-grade Nicolet iS50 FT-IR infrared spectrometer using our Wright Fund (if you are interested in contributing to this fund, please contact me). This instrument is used to detect the stretching and bending frequencies of bonds, which can tell you about which atoms and/or functional groups are present in your substance. We now have two IR's in the Department.

### CURRICULUM

We updated the "Augie" (non-ACS) Chemistry major curriculum to match that of other majors. We are currently working on developing courses in polymers, computational chemistry and a junior seminar course to help with career development.

### FUNDRAISING

If you are interested in giving to the Department of Chemistry and Biochemistry, here are a few current funds that you may contribute to, but you may also create your own fund and there are a number more that are not listed. Also, there are too many student scholarships to list here, but donations to scholarships is always welcomed. Please contact me if you are interested in giving (barrett.eichler@augie.edu).

1. Viste Fellowship – Provides a stipend and travel for a student to perform research in the Department.
2. Earl/Boyd/Strandjord Fellowship – Provides a stipend for a student to perform research in the Department.
3. Wright Fund – Provides funding to purchase instruments.
4. Gifts Fund – If you simply want to give a gift to the Department, we may use this fund to purchase various things as we see fit that don't fall into other categories.

### JETTY DUFFY-MATZNER, PH.D.

Greetings to the Augustana Chemistry Department alums, friends and family. I have been keeping fairly busy, our group had three major research topics: the production of novel biologically active molecules, producing polymers for solar cells and ocular drug delivery via modified contact lenses. It has been quite a busy Fall semester adjusting to life after the lovely sabbatical last year. I had a chance to work with three bright young women this summer: Hayley Masching, Emily Wanous and Annika Carlson. We participated in the Midwest Regional ACS meeting in Lawrence Kansas this past October with three posters and will also be presenting in Orlando Florida for the Spring National ACS meeting. We discovered that we could have our posters printed on fabric – no more poster tubes on airlines. I love it!!

I am teaching Organic Chemistry and Advanced Organic. This past Fall I had a chance to teach 10 great students for Advanced Organic and we took full advantage of our new space. It is such a joy to teach in this new science building. It is also really nice not to teach an advanced class in the interim.

On a personal note our oldest son is now teaching Biology at a local middle school. Our middle son is still at Augustana. He is an Art major and we have benefited from the many creations that have come from this journey. Our youngest son is an enthusiastic member of the Lincoln High School Symphonic Band, where he will graduate this May. My husband and I are also continuing our interest in ballroom dancing. As always I would be more than happy to welcome back any alumni, please keep in touch – we love to hear from you!

### LAURA HEIDBRINK

I am pleased to have been selected to join the Chemistry Department and assume responsibilities as Stockroom Manager and NMR Coordinator this past May. After graduating from South Dakota State University, I worked as an environmental scientist for 10 years with Twin City Testing which later evolved to Maxim Technologies, a company that offered construction materials testing, geotechnical engineering and environmental testing. Prior to coming to Augustana University, I managed a lab at an ethanol facility, Agri-Energy, (founded in 1997) in Luverne, MN. As the ethanol industry grew, Agri-Energy became a focus as a pilot plant and was purchased in 2010 and operates as a subsidiary of Gevo. The plant was converted to isobutanol production.

My husband, Brian and I have raised our 3 sons in Brandon, SD. Braden is studying architecture at Montana State University in Bozeman, MT. Spencer graduated in Civil Engineering in May 2018 and will finish his graduate degree with his emphasis on Structural Engineering in May 2019 from SD School of Mines & Technology. Our youngest son, Kyle, is a Freshman at SDSM&T also studying Civil Engineering. Brian and I were active as Brandon Valley Wrestling Booster reps and are still passionate about the wrestling program. We are looking forward to continuing to catch Augustana Viking matches. Our family loves to hunt and fish. There is nothing greater than spending time together as a family viewing mountain scenery, wildlife and beautiful sunsets from a SD lake.

**C**INDY JOHNSON-EDLER

I am very pleased to have been given the opportunity to try to fill Dr. Weisshaar's shoes (a feat that is impossible as we all well know), but I am up for the challenge and will do my very best. I was given the chance to teach General Chemistry (Chem 116) in the fall and am very excited to teach Analysis (Chem 242) this Spring. In preparation for my new teaching responsibilities I attended a Mobile Summer Institute on Scientific Teaching developed by the Howard Hughes Medical Institute and the National Science Foundation, and was chosen to travel to Washington, D.C. to attend the American Chemical Society's New Faculty Workshop. Both workshops focused on active learning techniques which I have incorporated in my General chemistry course and plan to use in Analysis as well.

I am working to get my research program started and will begin setting up my lab during the spring. Personally, my family and I moved from Brookings to Brandon during August so my commute and my husband Dave's are much shorter, for which we are both very thankful. Our son Eli is 14 and now attends Brandon Valley High School where he is enjoying playing in the orchestra and making new friends

**A**NDREW KLOSE

The current academic year marks my fourth year at Augie. Over the past few years I have been teaching our Accelerated General Chemistry course (Chem 120), Physical Chemistry I and II (Chem 301 and 302) as well as a Nuclear Chemistry course. Additionally, Dr. Strandjord and I are very excited to lead a study abroad course during Interim of 2019. We will be traveling around Germany studying the history of the chemical industry in Europe for 3.5 weeks. Stops will be made at BASF, Merck, Bayer, Linde, as well as a number of academic institutions. We'll be saying in Potsdam, a sister city of Sioux Falls, for roughly one week during the course and hope to foster relationships we can build on moving forward.

My research over the past few years has involved the building of lasers and spectrometers at Augustana as well as collaborative work at Michigan State University. At MSU, our group uses laser-probing techniques to study fundamental properties of rare isotopes. We have had some nice success recently studying neutron-deficient  $^{36-39}\text{Ca}$  isotopes. Some of results from this experiment have been accepted for publication in *Nature Physics*. The manuscript is currently in press. We have another manuscript submitted to *Physical Review Letters* and hope to receive referee comments in the coming weeks.

The Klose family is now at 5 members; my wife Kristen, and daughters Brittany (6), Erika (4), and Natalie (1) round out the crew. Brittany started kindergarten this year, and Natalie just started walking. Things are busy now... and I'm sure they will be for the next 15 years.

**J**ARED MAYS

Greetings from Augustana! It's hard to believe that 2018 is almost over and another year of life in the Department of Chemistry is coming to a close.

This past summer, research projects conducted by members of my group were successful in advancing two distinct sub-projects which built on past work. Ellie Ronning '21 (Wayzata, MN), Marie Anderson '20 (Worthington, MN), and Lexi Snyder '20 (Bloomington, MN) worked together on two discrete projects. The first project was a continuation of the work performed by Sarah (Fisher) Pauley '15 (Chamberlain, SD) toward the synthesis of two target non-natural glucosinolates, whose resultant isothiocyanates (ITCs) were flagged through our screening efforts as especially potent chemopreventive agents. Although all three students were new to the Mays Group and undergraduate research, they were quick learners and worked exceptionally well as a team. These studies resulted in several methodological improvements, advances toward both of our goals, and a few unexpected outcomes that, independent of the broader goals of the work, could become separate sub-projects in the future.

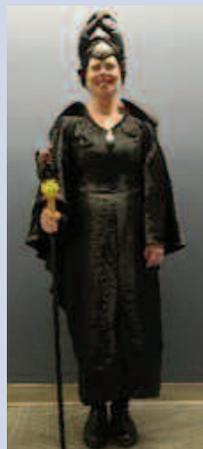
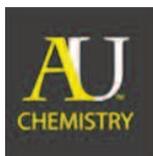
The second project was related to the kinetic evaluation of glucosinolates against human MCF-7 breast cancer cells. Although our research group has published several manuscripts concerning both (1) the kinetics describing the enzymatic conversion of non-natural glucosinolates to non-natural isothiocyanates and (2) the anticancer properties of non-natural aryl isothiocyanates, studies merging these two topics had not yet been performed. The team of students utilized previously-published kinetic parameters for two non-natural glucosinolates (prepared by former research students) to conduct dose- and time-dependent antiproliferation assays in the presence of variable enzyme. These studies demonstrated that biologically-inactive substrates (glucosinolates) could be converted to their biologically-active products (isothiocyanates) in an enzyme-dependent fashion, with antiproliferation curves that matched the published analytical kinetic data. All told, the body of work was impressive and should constitute the basis for a manuscript in the coming years. The Summer 2018 research crew was wonderful to work with and I am proud of all of their accomplishments, including their 1<sup>st</sup> place poster at the Sioux Valley American Chemical Society Symposium Poster Competition (Sioux Falls, SD). We are currently planning to have all three students travel to Orlando, FL to present their work at the Spring 2019 National Meeting of the American Chemical Society.

Over the summer, our research group had a manuscript titled "Differentiating antiproliferative and chemopreventive modes of activity for electron-deficient aryl isothiocyanates against human MCF-7 cells," accepted for publication in *ChemMedChem* (2018, 13, 1695). Former group members Cody Lensing '12 (Mound, MN) and Elle (Tornberg) Anderson '14 (Harrisburg, SD) were featured as co-authors, as well as members of Peter Vitiello's research group at Sanford Research (Sioux Falls, SD).

Throughout the past year, we have continued to implement the changes to Augustana's curriculum for the ACS Biochemistry

## SMACS

The Student Members of the American Chemical Society (SMACS) have been active organizing a number of events this past year. These included float building for the Viking's Day parade (100 years in Sioux Falls), outreach programs to local schools, tutoring sessions for underclassmen, preparing their famous Valentine's Day rice crispy treats (with witty poems), and a number of social and fundraising events. SMACS organized a Halloween fundraiser this fall, convincing faculty to dress in costume to raise money for a local charity. The club also sold chemistry jackets to both current students and alumni (very cool, you should consider buying one this spring).



## FROM THE FACULTY

Continued from page 3 - JARED MAYS

major. As I shared last year in the newsletter, my former junior/senior-level course, CHEM 330: Biochemistry & Medicinal Chemistry, was split into a two-course sequence. The second course in the sequence, CHEM 330: Medicinal Chemistry, was offered for the first time in Spring 2018 and built on the content from CHEM 305: Biochemistry. Overall, the new two course sequence appears to be much improved over the original one-semester offering and has provided the opportunity to explore these topics with students in greater depth, with better day-to-day pacing.

This past Interim, I offered a course for Civitas, Augustana's Honors Program. This course was designed to address Bonhoeffer's theme of "pertinence" and is titled, "Taking Our Medicine?: An Evaluation of Drugs and the Pharmaceutical Industry." In this course, (prescription) drugs were the central focus and class topics provided the platform to understand and evaluate 1) the history of drugs, 2) drug development strategies and approaches, 3) considerations relating to the pharmaceutical industry (e.g. pricing, marketing, generics), 4) the nature of diagnosis and prescription, and 5) factors affecting drug use and abuse. This intentionally-interdisciplinary course was reliant on examining the multiple perspectives and considerations relating to the science of drugs, their role as a product or commodity, and the way(s) in which they reach patients and affect their behavior. I plan to next offer this course in Interim 2020.

On a personal note, life outside the confines of Augustana remains as busy as ever! My wife, Jennifer, and our three children, Elliot (9), Aurelia (7), and Rosalind (5) are always on the run. Elliot was awarded his 2<sup>nd</sup> degree black belt in Taekwondo, Aurelia is enrolled in level 3 Junior Olympics gymnastics practice – between those two activities, it always seems like we're on the go. Although the winter isn't even properly here, cabin fever is already starting to set in and we're all looking forward to the spring and being able to enjoy the outdoors without freezing!

## FROM THE FACULTY

### ANDREW STRANDJORD

I continue to teach Organic Chemistry (Chem201), A Survey of Organic and Biochemistry (Chem145), and Chemistry in Our Changing World (Chem130). We had over 100 students in Chem145 last spring and the numbers look to continue to grow as we increase the number of nursing and sports science cohorts at Augustana. I went on a course-planning trip to Germany over Spring Break with Dr. Klose and my wife, Ruth. We visited a number of chemical companies and research institutes in preparation for our student led course to Germany this January. We walked into the headquarters of companies like BASF, Bayer, Merck, Linde GSI,... and inquired about bringing a group of 20 students to their facility for tours, technical talks, and business discussions. The German companies were very accommodating; we only got kicked out of one company without arranging a visit. We also visited a number of cultural and historic sites, including Heidelberg Castle, Wittenberg, The Reichstag, Potsdam City Center,...



### CHARLES J. WEISS

This is my first year teaching at Augie which has me teaching General Chemistry lectures (Chem 116), Chemistry in Our Changing World (Chem 130), and General Chemistry and Organic Chemistry labs (Chem 116, 117, and 201). I earned my B.A. from Carleton College (Northfield, MN) and Ph.D. from Northwestern University (Evanston, IL), and was a postdoc at Pacific Northwest National Laboratory (Richland, WA). I spent a few years as a visiting faculty member teaching chemistry at Whitman College (Walla Walla, WA) and Wabash College (Crawfordsville, IN) and am very excited to back in the upper midwest.

My research has historically centered around the development and study of transition metal (Zr, W, Ni, Th, La, etc...) complexes as catalysts for organic reactions. This has resulted in me straddling the fields of organic and inorganic chemistry. I also have a strong interest in scientific computing and data visualization.

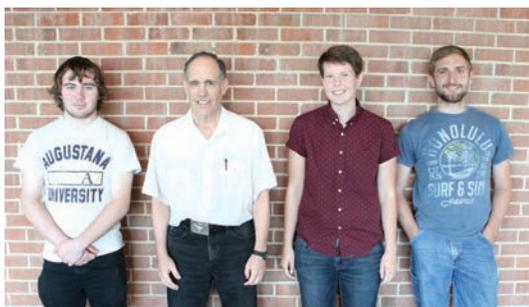
### DUANNE WEISSHAAR

Semi-retirement is good. The Chemistry Instrument and Computer Technician position has been keeping me plenty busy doing what I have wanted/needed to do a long time ago but didn't have time to do. As part of that job, the Department is resurrecting the Instrument Proficiency courses we used to teach on a regular basis until faculty were too strapped with regular courses. This spring I will offer one on UV-Vis and one on GCMS.

This Fall the Department had a larger General Chemistry demand than expected and needed to add two lab sections. I took one of those. I don't mind teaching a lab (it's still fun), but I hope the Department can get appropriate staffing so it is not necessary in the future.

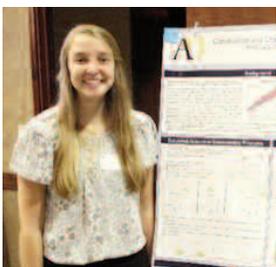
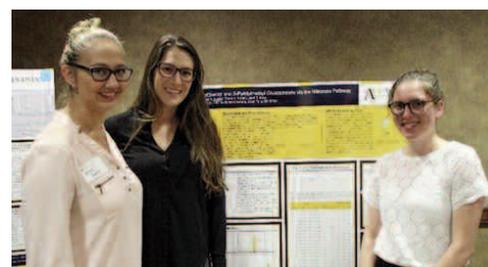
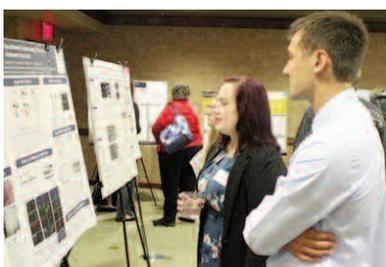
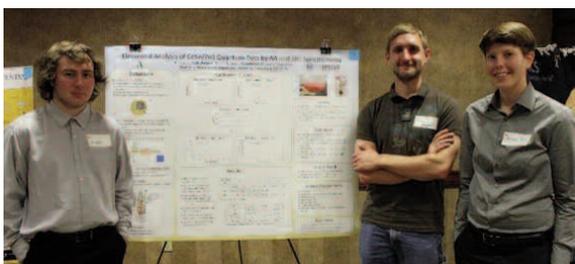
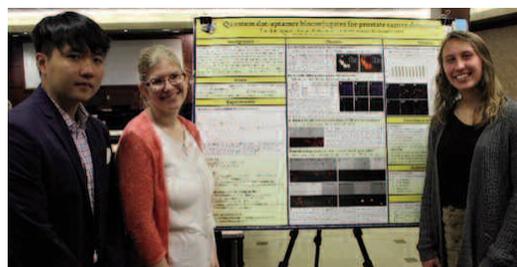
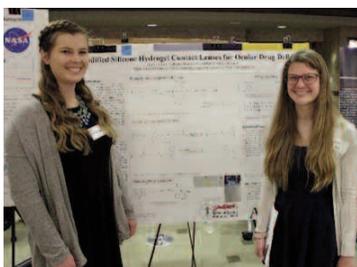
This past summer I did research with three students: Peter Ruppelt a senior chemistry major from Yankton, Brianna Roth a junior Math and French major from Sioux Falls, and Jace Woodward a sophomore ACS biochemistry major from Custer. They also worked as the Department Stockroom Assistants half time. We continued developing an x-ray fluorescence method for analyzing Barry's quantum dots. The first thing they did was clean up two samples from last summer and a new sample from Barry followed by atomic absorption analysis to provide a comparison. The amounts we had were much smaller than we worked with last summer which would require a major revision of the method we had developed. Since time was short, we opted to use dissolved samples. The new method we developed gave 10-15% accuracy and precision on the new sample (only had one sample with enough to work with). I think the accuracy and precision could be reduced further with a little perfection of the process and some practice. I will probably step back from active research now and let the new faculty build their program, so I'm not likely to take this project any further.

I have nothing specific planned for my new freedom in retirement. I've been known to put in a little extra time at the Department, and I have started with some cleaning and organizing of things in my apartment which will take a while.



## SIoux VALLEY SECTION OF THE AMERICAN CHEMICAL SOCIETY

The Sioux Valley Section of the American Chemical Society held their annual Undergraduate Chemistry Research Symposium at Poet Research this fall. ACS members from all across South Dakota, Minnesota, Iowa, and Nebraska attended. The symposium included a poster session for undergraduate research students and tours of both Poet and Sanford Research. Augustana students won 1st and 2nd place awards (and money) for their research posters. It was great learning experience for both faculty and students alike.



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## 2019 CHEMISTRY ALUMNI FILE UPDATE

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**What's  $\nu$  (nu) With You?** Fill us in on what's happening in your life. If you find that any of the information mentioned in this newsletter is inaccurate, please let us know.

Name: \_\_\_\_\_  
                    FIRST                    MAIDEN                    MARRIED

Year Graduated: \_\_\_\_\_ Phone: \_\_\_\_\_

Address: \_\_\_\_\_  
\_\_\_\_\_

Email: \_\_\_\_\_

Occupation/Place of Employment: \_\_\_\_\_  
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Graduate/Professional School Preparation in Progress or Completed: \_\_\_\_\_  
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Personal News/Professional News you want us to know: \_\_\_\_\_  
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If you know of potential students for Augustana University, please provide us with their name, address and phone number so that we may contact them.

Name: \_\_\_\_\_

Address: \_\_\_\_\_  
\_\_\_\_\_

Phone: \_\_\_\_\_

Name: \_\_\_\_\_

Address: \_\_\_\_\_  
\_\_\_\_\_

Phone: \_\_\_\_\_

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