

# BADGER CHEMIST

University of Wisconsin-Madison Department of Chemistry

Established 1953, No. 62, 2019

**IN THIS ISSUE:**  
EXPLORE THE  
INTERSECTION OF  
ART & SCIENCE

**ALSO INSIDE:**

**MEET THE NEW  
BADGER CHEMISTS**

**LEARN ABOUT PUBLIC  
ENGAGEMENT & OUTREACH**

**SEE HOW WE  
CELEBRATE MENTORS**



**Department of Chemistry**  
UNIVERSITY OF WISCONSIN-MADISON



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ON THE COVER: Graduate students Diana Wang, Alyah Chmiel, and Dylan Holst, Professor Zach Wickens and artist Mario Fregoso work with children at the Wisconsin Science Festival, helping them understand how the elements of the periodic table exist in everyday life. Mario will work with other Department of Chemistry representatives (not pictured) Desiree Bates and Professor John Berry to use the children's art as part of a Periodic Table mural in the Science to Street Art project. [Photo by Tatum Lyles Flick]

ON LEFT: Master glassblower Tracy Drier's work is on display as the Sidewalk Surprise: The Crossroads of Art & Science at the Madison Children's Museum. He also created glasswork for the beginning of the Wayback Machine exhibit, in Possibleopolis. Check out the glasswork story on our website at [www.BadgerChemistNews.chem.wisc.edu](http://www.BadgerChemistNews.chem.wisc.edu). [Photo by Ilia Guzei]



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# LETTER FROM THE CHAIR

JUDITH N. BURSTYN

Dear Alumni & Friends

I am excited to bring you the 62nd issue of Badger Chemist, as we explore the many connections of art and science, and how those links can open eyes to the importance of scientific advances and discovery.

In this issue, you'll meet a new group of Badger Chemist graduates, who head out into the world to be part of technological advances, grow our scientific knowledge and teach others the discipline we love. We celebrate 79 Bachelors of Science degrees, 7 Masters of Science degrees, and 23 doctoral degrees.

The bachelor's recipients include six with honors, three Hilldale Fellows, one Barry M. Goldwater Scholarship honorable mention, and three undergraduate authors of published research. In addition, 69.3 percent of the graduating class conducted at least one semester of undergraduate research. The graduate students received one Advanced Opportunity Fellowship, four Wisconsin Distinguished Graduate Fellowships, nine National Science Foundation fellowships, one Graduate School fellowship, one National Institutes of Health fellowship, and four National Institutes of Health traineeships. We are very proud of their hard work and grateful for the many faculty and staff who helped them on their way to becoming professional scientists, worthy of the Badger Chemist distinction.

The faculty and staff have kept up their tremendous work through some trying situations. As you may have heard, in February our building suffered substantial flooding, as a result of temperatures that reached as low as -30 degrees. This flood necessitated a complete shutdown of our building, a concerted effort to move and protect chemical inventories, and relocation of classes, which lasted several weeks. The helpful attitudes of our employees, and the quick thinking and availability of our chemical hygiene officers, teaching assistants, and other graduate students, made this trying situation manageable.

Our department reorganization, designed with guidance from the Office of Strategic Consulting and an external consultant team to create healthy, fulfilling jobs in a highly productive atmosphere, is moving forward. Our teams are creating structures that better support our department mission, and we will have the opportunity to hire additional staff and faculty to enhance our enterprise.

We hope you enjoy this issue of Badger Chemist, through which we explore the connections between science and art. Sometimes those links are about the thought process similarity between chemistry and art, and sometimes they are about how we effectively communicate our work to the public. You'll find that our scientists, staff and students participate in outreach activities, many of which are art-related, that spread the message that scientific research is exciting and critical to our future.

Our many educational initiatives, research discoveries and outreach activities are possible because of the generous contributions of Badger Chemists like you. Thank you for all that you've done to help the UW-Madison Department of Chemistry be a leader in education and research. We know that we are a top-ten department because of those who support our mission. If you would consider a 2019 donation to enhance science education, research and outreach, please visit [supportuw.org/giveto/chemistryfund](http://supportuw.org/giveto/chemistryfund) or use the donation envelope on page 17.

As always, we are interested in what's happening with our alumni and friends, and would love to hear from you. Email us at [BadgerChemist@chem.wisc.edu](mailto:BadgerChemist@chem.wisc.edu) with your updates and news, or contact me personally at the email address below. On behalf of the entire department, thank you and all the best in 2020!

Sincerely,



Professor Judith Burstyn  
Irving Shain Chair of Chemistry and Department Chair  
[burstyn@chem.wisc.edu](mailto:burstyn@chem.wisc.edu)





*Congratulations!*  
**NEW BADGER CHEMISTS**  
 2018-2019 BACHELOR'S DEGREE RECIPIENTS



**SUMMER 2018**

Kunal Dani  
 Chase Gould  
 Will Guy  
 Tyler Hafeman  
 Bright Harichanwong  
 Zhenyang Jia  
 Kadina Johnston  
 Lexie Korndorf  
 Griffin Lynch  
 Zachary Matusinec  
 Hercules Nikolaou  
 Jessica Nurre  
 Tyler Rybarik  
 Ariana Saffold

Adarsh Suresh  
 Natha Tansukawat  
 Logan Tenney  
 Zachary Titel

**FALL 2018**

Dhruva Ajit Nair  
 David Beshensky  
 Jenna Caragiulo  
 Manish Dhungana  
 Grace Hyland  
 Sarah Jacobsen  
 Rezwana Karim  
 Tomoki Kato  
 Devin Ketelboeter

Jeewoo Kim  
 Emily Krueger  
 Runzhou Lai  
 Kelsey Lee  
 Jack McCann  
 Brock Milkent  
 Jacob Redovich  
 Nickolas Ruark  
 Emma Safrlit  
 John Schroeder  
 Jenna Szalewski  
 Kayleigh Webber  
 Jessica Wu

**SPRING 2019**

Dylan Adams  
 Kasey Anton  
 Grace Armstrong  
 Joshua Berg  
 Karishma Bhawnani  
 Amber Bo  
 Sylvia Bohling  
 Jacob Buboltz  
 Tess Carlson  
 Jason Carmichael  
 Weston Cracraft  
 Benjamin Eliason\*  
 Weiyang Guan\*  
 Katie Hall

Tianhou Huang  
 Charlie Kirsh  
 David Klitzka  
 Analee Kosaian  
 Tevin Shu Li  
 Bernard Lim  
 Cody Owens  
 Jieun Park  
 Erin Patrick  
 Caitlin Pavelec\*  
 John Piemonte  
 Timothy Pinkerton  
 Sarah Quinn\*  
 Tyler Rasmussen  
 Alex Rodriguez

Soren Rozema  
 Lydia Schackel  
 Minjung Shin  
 Jennifer Sowin  
 Katherine Thielen  
 Pajeon Uchupalanun  
 Nic Wahl  
 William Wimbish  
 Zhi Yuan  
 Guansen Zhao

\* Graduated with Honors



Photos on this page by Tatum Lyles Flick

Undergraduate student participants in the 2019 Department of Chemistry Graduation Celebration

**FIND MORE GRAD PHOTOS ONLINE AT**  
**BADGERCHEMISTNEWS.CHEM.WISC.EDU**



*Congratulations!*

## NEW BADGER CHEMISTS

2018-2019 MASTER'S & DOCTORAL DEGREE RECIPIENTS

### Masters

Becker, Greg  
Hong, Jiewei (Cui)  
Mat Lani, Amirah Syamila (Schomaker)  
Peters, Sean (Coon)  
Simmons, Christopher Joseph (Tang)  
Utt, Caitlin Noelle (Schomaker)  
Yang, Miao (Hamers)

### Doctoral

Agrawal, Anurag (Weisshaar)

Understanding Spatiotemporal Aspects of Antimicrobial Peptide Attack on Single, Live Bacteria Using Time-Lapse Fluorescence Microscopy

Cardiel, Allie (Choi)

Developing Cu-based Photoelectrodes and Electrocatalytic Processes for Efficient Solar Water Splitting and Biomass Conversion

Cesnik, Anthony Joseph (Smith)

Computational Tools for Discovering Proteoforms in Complex Systems

Cheloha, Kristine Nicole (Brunold)

Spectroscopic and Computational Study of the Role of Second Sphere Residues in Superoxide Dismutase and Extradiol Dioxygenase Metalloenzymes

Eddinger, Geoffrey Alan (Gellman)

Diverse Design Strategies for the Development of Peptide Inhibitors of Protein-Protein Interactions

Govindaraju, Gokul Vinayak (Choi)

Development of Ternary



Students had the opportunity to celebrate with faculty who supported them through graduate school. For more photos, visit [BadgerChemistNews.Chem.Wisc.edu](http://BadgerChemistNews.Chem.Wisc.edu)

Oxide-Based Semiconductors as Photoanodes for Use in Photoelectrochemical Water Splitting Applications

Guillot, Sarah Lucienne (Hamers)

Stability and Solvation Properties of Organosilicon Electrolytes for Lithium-Ion Batteries

Hilleke, Katerina (Fredrickson)

Every Atom Heard: Advancing the Chemical Pressure Analysis and Elucidating Point Substitutions in Intermetallics

Hinton, Daniel Austin (Goldsmith)

Enabling Single Molecule Fluorescence Microscopy Investigations of Chemical Reactions Using a Spiroconjugated BODIPY Fluorophore

Huang, Wen-Tsung (Nathanson)

Investigation of Nitrogen Reduction by Electrochemically Generated Hot/Solvated Electrons and Hydrogen Atoms Using Insulator-covered and Metal-oxide-semiconductor Electrodes

Hutchins, Paul D (Coon)

Computational Strategies for the Generation and Analysis of Mass Spectrometry-based Lipidomics Data

Jaffett, Victor Ariel (Golden)

Methods to Access Highly Functionalized Amidines, Novel Ring-Fused Quinazolinones, and Guanidines via Quinazolinone Rearrangement

Kearns, Nicholas Matthew (Zanni)

Development of Ultrabroadband Non-linear Spectroscopy and Microscopy with Applications to Materials Systems

Knapper, Kassandra Ann (Goldsmith)

Advanced Fabrication of Toroidal Optical Microresonators for Label-free Photothermal Imaging and Spectroscopy

Krericowicz, Sam John Waara (Schwartz)

Restructuring of Large, Double-Stranded DNA Molecules through Self-Assembly to Form Microscale Objects

Kubota, Stephen Riley (Choi)

Developing Catalytic Pathways for the Valorization of Biomass-Based Platform Molecules via Electrochemical Reduction and Oxidation Reactions

Li, Shuo (Hamers)

Silver Nanoparticles Embedded in Diamond with Tunable Optical Properties

Love, Alyssa Marie (Hermans)

Fundamental Studies on the Structure of Surface Oxide Sites on Supported Oxidative Dehydrogenation Catalysts

Ng, James David (Goldsmith)

Single-Molecule Studies of Non-Aqueous Systems

Rank, Leslie (Gellman)

Expanding upon the Antimicrobial Activity of Nylon-3 Polymers, Sequence Random Analogs of Host Defense Peptides

Rich, Kacie Lynn (Zanni)

Cytotoxic Intermediates of Human Islet Amyloid Polypeptide Studied Using Two-dimensional Infrared Spectroscopy

Wang, Larry (Stahl)

Homogeneous Oxygen Reduction Catalyzed by Monomeric Cobalt Complexes

Wheeler, Garrett Paul (Choi)

Electrochemical Synthesis of Iron-Based Semiconducting Electrodes for Photoelectrochemical Water Splitting



Photos on this page by Tatum Lyles Flick

Graduate student participants in the 2019 Department of Chemistry Graduation Celebration

NOTE: Some students, who are not listed above, were included in the 2018 issue of Badger Chemist. Those who graduated in the summer of 2019 may be pictured, but will be listed in the 2020 issue of Badger Chemist.

**FIND MORE GRAD PHOTOS ONLINE AT  
[BADGERCHEMISTNEWS.CHEM.WISC.EDU](http://BADGERCHEMISTNEWS.CHEM.WISC.EDU)**



# Department Welcomes Five New Faculty in 2019

## **Jeff Martell**

Assistant Professor of Chemistry

Jeff Martell arrived at UW-Madison May 20, from a postdoctoral researcher position with Jeff Long at UC Berkeley's Miller Institute. Martell received his B.A. in chemistry and mathematics from Northwestern University in 2009 and his Ph.D. in chemistry from the Massachusetts Institute of Technology in 2015. He and his research group work primarily on the development of enzyme-mimicking catalysts.

### WHY DID YOU CHOOSE UW-MADISON?

I was impressed that UW-Madison has world-class research and teaching while also boasting a friendly and collegial atmosphere. In the Department of Chemistry specifically, I was struck by the collaborative approach, the emphasis on interdisciplinary research, and the strength in all sub-fields of chemistry. This well-rounded expertise, together with the collegial atmosphere, will be extremely helpful for my group! Our ideas will require us to draw from many different areas of chemistry, so expert advice from our colleagues will be hugely beneficial.

### WHY DID YOU CHOOSE A CAREER IN CHEMISTRY?

In college I was interested in many subjects and considered many different majors. Once I started doing independent chemistry research during my sophomore year, I fell in love with research, and I've been doing it ever since. I enjoy tackling difficult problems that require intense focus as well as creativity and a flexible mindset. Research in chemistry is particularly exciting because there is potential for impact in many different areas of society. My research experience to date has spanned multiple sub-fields of chemistry, including organic, biological, inorganic, and materials. This experience informs my goal moving forward: I hope to combine ideas and tools from different areas of chemistry to create new solutions to challenging problems.

### WHAT CAN STUDENTS EXPECT FROM YOU IN THE LAB?

I hope to foster a group culture in which we hold ourselves to very high standards of technical skill, productivity, focus, creativity, and integrity. I will push myself and my group members to improve continually in everything we do. At the same time, I believe it's my responsibility as a mentor to provide coaching, guidance, and support throughout this process. Arguably the most important part of the Ph.D. training is for the students to become confident, independent thinkers, so I will always encourage my students to develop greater independent thinking and creativity. A huge part of my job is to help students prepare for whatever careers they are interested in and to serve as a resource to make them aware of different opportunities. It will also be extremely important for me to foster diversity within the group and to create an environment where everyone feels empowered to voice opinions without fear of reprisal or judgement. Finally, I hope to create an environment where the students feel comfortable giving me feedback. It's common that graduate students are criticized frequently by the PI, but never get the opportunity to provide suggestions on how the PI can improve. I am committed to seeking feedback from my students so that I can learn and improve as a mentor.

## **Sam Pazicni**

Assistant Professor of Chemistry

On July 1, chemist and educator Sam Pazicni joined the University of Wisconsin-Madison Department of Chemistry from his faculty position as associate professor of chemistry at the University of New Hampshire. Pazicni received his B.A. in chemistry and music in 2001 from Washington and Jefferson College, his M.S. in chemistry in 2003, and his Ph.D. in chemistry in 2006 from UW-Madison, under Prof. Judith Burstyn. He completed his postdoctoral work from 2006-2009 in Biophysics and Chemistry Education at the University of Michigan. His group conducts research in chemistry education, with a focus on mechanisms of language and learning

chemistry, equity in the chemistry classroom, and inorganic chemistry education

### WHY DID YOU CHOOSE UW-MADISON?

It is clear to me that the University strives for excellence in all aspects of its mission and that the members of the Department of Chemistry community (faculty, staff, students) all push each other in pursuit of that excellence. It is very intoxicating to walk around the building and chat with so many who are excited about their Science, as well as the things they are doing in the classroom. I'm very excited to be a part of those conversations! Additionally, I attended UW-Madison for graduate school some years ago, and I know first-hand that Madison is a very special place to live and work.

### WHAT DRIVES YOUR DESIRE TO TEACH?

What drives my teaching? Learning! The most profound conclusion I've come to after seventeen years in the classroom is that the commonplace interpretation of "teaching" is fundamentally at odds with education. I began teaching under the notion that experts impart knowledge to students, as if they were empty vessels; students learned as a consequence of an expert speaking to them. I now regard this belief as naïve as it is egotistic. This model of learning ignores the tremendous advances in psychology and cognitive science that inform our ideas about how humans learn. I believe my current thinking about education and learning has been shaped for the better by this wealth of scholarly inquiry. So, I'd rather call it a "learning philosophy" than a "teaching philosophy". However, an aspect of my practice that has varied little over the years is the belief that education is a fundamentally human activity. Theoretically, I could gather copious amounts of data about my students and use it to match each of them to sets of the most rigorously vetted evidence-based instructional practices, all but assuring optimized conditions for learning—this would certainly align with the current trend in learning analytics, cognitive tutors, and the view of education



as a customizable product. I do truly believe that if we understand the way students learn, we can adjust our practices to lead to better outcomes. However: learning is not analytics, education is not solitary, and students are not customers. Education is community. Education fosters deep, lasting relationships among students, their peers and instructors, and the different groups with whom they engage.

### WHAT CAN STUDENTS EXPECT FROM YOU IN CLASS?

Whether it be in a large lecture undergraduate course, a small graduate seminar, or research group meetings, students working with me can expect my respect and trust. I hope to, in turn, earn the same from the students. Students can also expect me to make our learning environments as accessible, open, and welcoming as possible. While we bring different experiences and values to, and have different roles within, these learning environments, we all fundamentally pursue the same goal. Finally, students can expect to be challenged! I find it relatively ineffective to "know" things. I find it much more meaningful if one is able to do things with the knowledge they possess. So, students can expect to "do" things; in turn, they can expect me to provide useful feedback so as to achieve the finest performances possible.

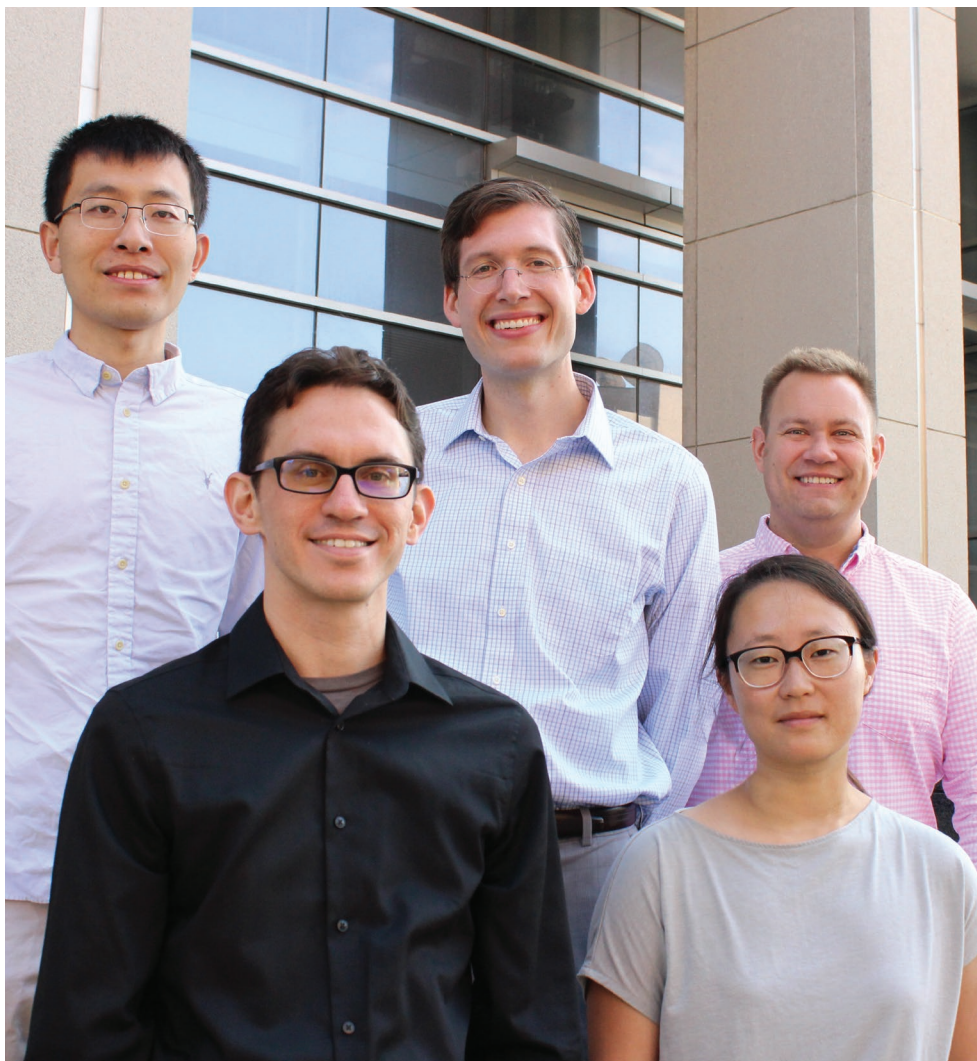
## Ryan Stowe

Assistant Professor of Chemistry

On August 1, 2019 chemist and education researcher Ryan L. Stowe, joins the Department of Chemistry.

Stowe received his B.A. in chemistry from Albion College (2010) in Michigan and his Ph.D. in chemistry from The Scripps Research Institute (2016). He most recently worked as a postdoctoral research associate with Melanie Cooper at Michigan State University, where he worked on high school and college chemistry curricula, studied transformation of STEM learning environments, and examined student engagement in practices characteristic of work in science.

The Stowe group will work primarily on improving chemistry learning environments and refining the theoretical commitments that could and should inform chemistry education research.



Five new faculty members joined the department in 2019. Front row from left are Jeff Martell and Tina Wang. Back row from left are Yang Yang, Ryan Stowe, and Sam Pazicni.

Photo by Tatum Lyles Flick

### WHY DID YOU CHOOSE UW-MADISON?

I chose to join the community at UW Madison in large part because of the widespread dedication among students and faculty to supporting student learning. It is impressive that one of the pre-eminent chemistry departments in the world is so reflective and data-driven with regard to assessing learning environments. I have no doubt that this dedication to teaching and learning, coupled with expertise in the chemistry department and the school of education, will enable truly transformative chemistry education research.

### TELL US ABOUT YOUR LAST POSITION AND WHAT MADE IT INTERESTING.

My last position was as a postdoctoral fel-

low with Melanie Cooper at Michigan State University (MSU). Melanie created a space for me to transform my enduring interest in problems that fall under the umbrella of "STEM education" into a passion for chemistry education research. I learned a great deal from her and other colleagues at MSU about how learning environments should be designed and how we might get insight into what students know and can do.

### TELL US ABOUT YOUR RESEARCH.

My research is focused on supporting students in connecting atomic/molecular behavior to the world around them through engagement with high school and college learning environments. There are decades of work cataloging the many struggles of chemistry-enrolled students in leveraging particulate-



level models to understand phenomena. I aim to advance beyond listing “things kids can’t do” toward designing, assessing, and refining learning environments that help students build up, organize, and use their intellectual toolkit in productive and progressively more complex ways. This agenda has far-reaching implications for both local learning environments at UW and nationwide approaches to chemistry instruction. I hope that, through meaningfully engaging in chemistry learning environments as scientists, students will appreciate the immense power of particulate models of matter to explain aspects of everyday existence.

### Tina Wang

Assistant Professor of Chemistry

Assistant Professor Tina Wang arrived at UW-Madison on July 8, to conduct research in chemical biology, exploring the interplay between protein folding and function, and development of robust sensors and gene circuits. Wang received a bachelor’s of science from the California Institute of Technology (2009) and a Ph.D. from Yale University (2015). She also completed a five-year postdoctoral fellowship at Harvard University.

#### HOW DID YOU GET STARTED IN CHEMISTRY?

I found the classes interesting, so I wanted to learn more. Toward the tail end of my undergraduate degree, I took some biology classes that made me want to explore chem-bio. As an undergraduate, I worked for John Roberts, a chemist who, I think, mentored more undergraduates than anyone else in the department. This experience was nice because it was the first time I saw how theory could predict experimental results.

#### WHAT DID YOU FIND MOST INTERESTING ABOUT YOUR POSTDOC?

I did my postdoc with David Liu at the Broad Institute, where I worked on direct evolution of various proteins, using a system called PACE. That research is something I plan to continue to do here at UW-Madison, with the goal of improving and discovering protein functions. David had a unique ability

to bring in a group of people, from all sorts of backgrounds, who were all extremely smart and creative. That was a great environment. A lot of good ideas came out of that lab.

#### WHAT DO YOU LOOK FORWARD TO IN RUNNING A NEW LAB?

I definitely plan to do interdisciplinary work. I understand the importance of bringing in people from diverse backgrounds – scientific and otherwise – and how that can be beneficial. Also, I would like to develop new methods to evolve proteins that have been historically difficult to evolve. That might open up the scope of direct evolution more. One class of proteins we will target is chaperone proteins. This is a pretty underexplored class, in terms of direct evolution, so that might open up new opportunities for therapies and protein expression.

#### WHAT IS YOUR PHILOSOPHY ON MENTORSHIP?

I think it’s important to be organized in teaching, so students understand what the expectations are. I see teaching students through research as mentoring. When you start out, you show students what they have to do. Then you step back and assume a mentoring role, where they can become scientifically competent. We will work closely in the first year, so that they will all have a solid foundation in the techniques and concepts.

### Yang Yang

Assistant Professor of Chemistry

Assistant Professor Yang Yang arrived at UW-Madison August 19, 2019, to conduct research in theoretical and computational chemistry with the Department of Chemistry. He encourages students and postdocs interested in quantum chemistry to contact him about joining the lab. Yang received his bachelor’s degrees in chemistry and physics at Peking University (2011) and his Ph.D. in chemistry at Duke University (2016). He most recently worked on method development in multicomponent density functional theory, as a postdoctoral associate in theoretical chemistry at Yale University, under the direction of Sharon Hammes-Schiffer.

#### WHY DID YOU CHOOSE MADISON?

UW-Madison has one of the best chemistry departments in the world. It has great resources for doing research and also attracts a lot of great people, including both faculty and students. During my interview, I learned about the exciting research people are doing here, and felt people’s interest in my research. Therefore, the opportunity of doing science with smart and friendly people is the main reason that I chose Madison. In addition, I also heard of a lot of good things about Madison. For example, it has beautiful scenery, it is also a very safe city, and it is very bike-friendly.

#### WHAT CAN STUDENTS EXPECT FROM YOU IN CLASS OR IN THE LAB?

I am going to teach Physical Chemistry for the first semester, with the main focus on quantum mechanics. Quantum mechanics is not an intuitive subject, so my goal will be to build a clear physical picture in students’ minds. In addition to the qualitative picture, I also hope my students can get good mathematical training in my class, which includes both derivations of equations and practical computations.

READ THE FULL STORIES ONLINE AT  
[BADGERCHEMISTNEWS.CHEM.WISC.EDU](http://BADGERCHEMISTNEWS.CHEM.WISC.EDU)

### WELCOME NEW STAFF (2018-2019)

Léa Gustin  
Asst Gen Chem Lab Director

Nicole Meyers  
Financial Specialist- Senior

Catherine Clewett  
Senior Instrumentation Technologist

Olivia (Liv) West  
Path Coordinator

Sarina Strnad  
Undergrad Services Specialist

# Named Professorship Offers Prof. Helen Blackwell Opportunity to Celebrate Mentor

By Tatum Lyles Flick  
Communications Specialist

Norman Craig, an emeritus physical chemist from Oberlin College in Ohio, didn't realize the profound effect he had on the career of Helen Blackwell, a chemist and professor at the UW-Madison Department of Chemistry, until she called one day to ask his permission to honor him by using his name for her WARF Named Professorship.

"When she called me several months ago to tell me of her decision to honor me with her named WARF professorship, I was overwhelmed," Craig said. "I wondered if I deserved such an honor. I thanked her profusely. Because Helen is one of our most distinguished graduates, I was especially honored by her choice."

"I always thought that if I ever received this award - and I am amazed that I actually did - I would name it after him, because he was a real fixture at Oberlin College," Blackwell said, adding that Craig served as an important life and career mentor.

A small department at a small college, with only about 20 chemistry majors at a time, allowed Craig and the other faculty to interact often with students.

"I had to give an oral presentation as part of a class and he encouraged everyone to do a practice talk first," she said. "Afterward he said, 'Okay, Helen you can do this anywhere now. You've done it and you're great.' He believed in young people, that young people can do significant things."

Craig was an inspiration to hundreds of the students he taught and mentored, and he was dedicated to supporting the next generation of scientists.

"He was always the most positive and the most supportive person," Blackwell said. "He gave me the feeling that I could do anything and that Oberlin had prepared me well."

Blackwell and Craig kept in touch over



Helen Blackwell stands with Norman C. Craig at a reception at Oberlin College.

the years, as she attended graduate school, and worked her way up to professor at UW-Madison.

Now the Norman C. Craig Professor of Chemistry, Blackwell uses what she learned from Craig in her own interactions with students.

"He was the consummate experimentalist," she said, adding that Craig liked to try things out in the lab. "That's something I use with my students. Even if we think it might not work, there's a chance. Something completely unexpected might happen - and it might be cooler than we originally thought."

Many people and experiences throughout Blackwell's life helped shape her perception of science and her career direction, but she remembers specific instances where Craig made a difference.

"I don't think he's the only reason I am here today," she said, "but he is definitely one of the reasons."

When asked to share the best part about receiving the WARF Named Professorship, Blackwell said, "I was thrilled to be able to honor him this way. I called him, and he was flabbergasted that someone would ask him to do this. He agreed, of course, but that part - having that conversation with him and explaining why I picked him - that was better than getting the award, just having that conversation. It was awesome."

## Named Professorships in the Department

Some names for professorships were \*chosen by the recipient, while others are pre-selected. Here's a list of named professorships within the Department of Chemistry:

- Beckwith-Bascom Professor
- John F. Berry, Lester R. McNall Professor of Chemistry
- Helen Blackwell, Norman C. Craig Professor of Chemistry\*
- Judith N. Burstyn, Irving Shain Chair of Chemistry
- Kyoung-Shin Choi, Evan P. and Marion Helfaer Professor of Chemistry
- Mark D. Ediger, Hyuk Yu Professor of Chemistry\*
- Samuel H. Gellman, Vilas Research Professor
- Robert J. Hamers, Steenbock Professor of Physical Science
- Ivo Hermans, John and Dorothy Vozza Professor of Chemistry
- Thomas Kuech, Milton J. and A. Maude Shoemaker Professor of Chemical Engineering
- Clark Landis, Evan P. and Marion Helfaer Professor of Chemistry
- John W. Moore, W.T. Lippincott Professor of Chemistry\*
- Joel Pedersen, William A. Rothmel Bascom Professor in Soil Science
- David Schwartz, Kellett Professor of Chemistry and Genetics
- Bassam Z. Shakhshiri, William T. Evjue Distinguished Chair for the Wisconsin Idea
- Lloyd M. Smith, W. L. Hubbell Professor of Chemistry\* and Hall-Fischer Professor of Chemistry
- Shannon Stahl, Steenbock Professor of Chemical Sciences
- James C. Weisshaar, Richard J. Burke Professor of Chemistry\*
- Daniel Weix, Wayland E. Noland Distinguished Chair of Chemistry
- John C. Wright, Andreas C. Albrecht Professor\*
- Arun Yethiraj, V. W. Meloche-Bascom Professor of Chemistry
- Martin Zanni, V. W. Meloche-Bascom Professor of Chemistry





Photos on this page by John Moore

# REACHING FOR THE SKY

## New Chemistry Tower Grows More Every Day

By John Moore and Bob McMahon  
Project Leaders

We have come a long way since groundbreaking in September 2018, but there is more to do before construction and renovation are completed in 2022. A great team of architects and engineers, construction companies, university and system administrators, and state government workers are helping us build state-of-the-art laboratories, lecture rooms, active-learning classrooms, meeting spaces, and offices. When complete this project will directly affect more than 14,000 student enrollments per year.

To date there have been three major achievements: abatement and demolition; site excavation; and beginning to build the new chemistry tower.

In the fall of 2018

abatement experts removed asbestos and mercury waste from the section of the Daniels wing that had housed lecture halls, the library, and three classrooms. Then a wall was built to separate the remainder of Daniels from the construction zone and demolition began. Demolition was a slow, careful process because classes were being held a

few feet beyond the separation wall. It was poignant to see the old facility eaten away by heavy machinery, but exciting to think about what will rise in its place.

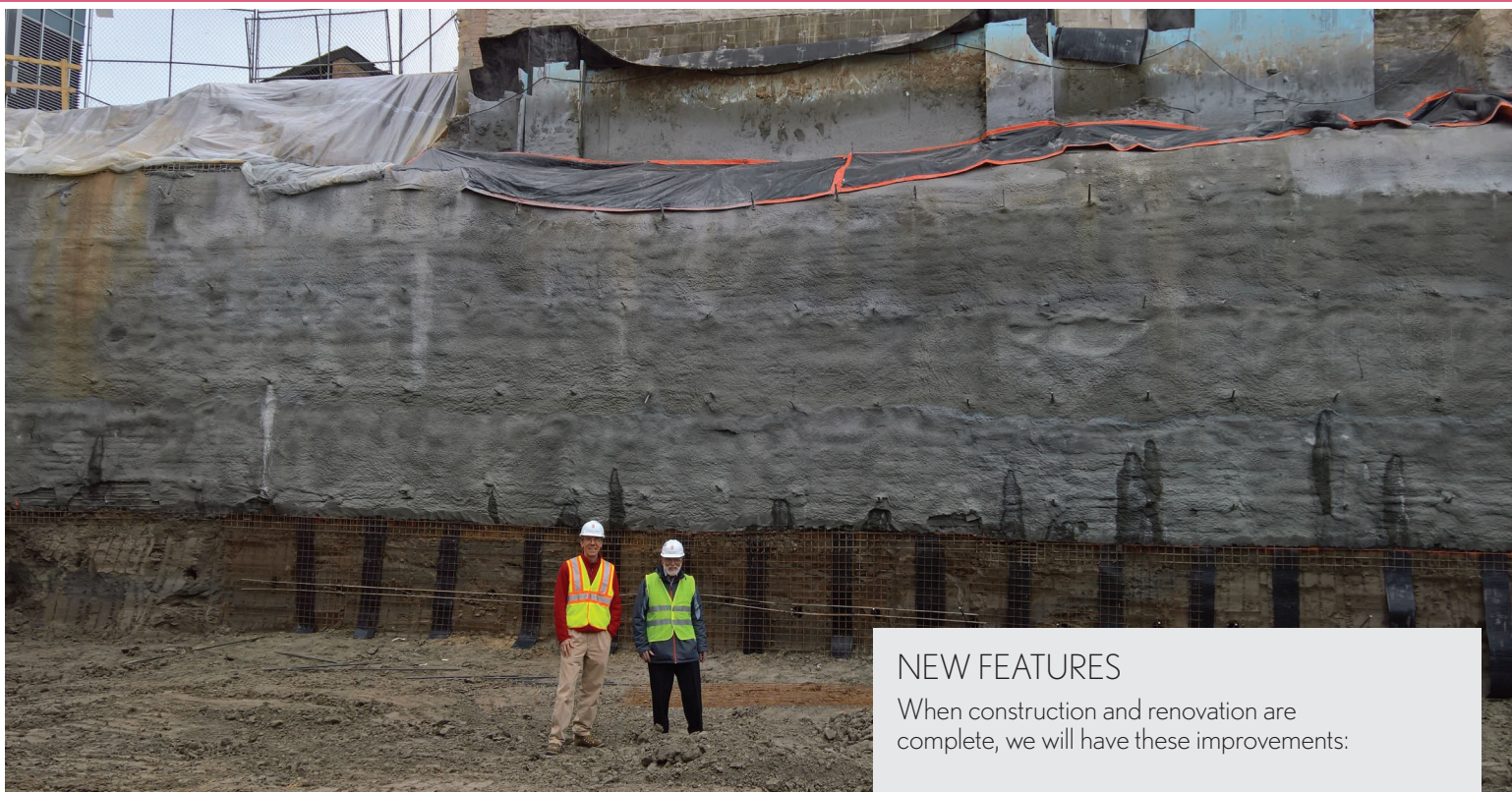
After debris from demolition was hauled away, excavation began for the foundation of the new tower. The excavation was wide and deep because two big new lecture rooms in the sub-basement level will extend under the sidewalk along University Avenue.

Then our building began to grow out of the excavation. During Memorial Day weekend a 265-foot tower crane was erected, with its base below the floor of what will become the new chemistry demonstration laboratory. Soon thereafter two huge trusses were installed to support a research floor, four teaching floors, and a mechanical penthouse above the 360-seat lecture room



TOP PHOTO: Construction workers install the second of two main trusses that will support the building above the larger lecture room and learning studio. BOTTOM PHOTO: In December, the jaws on this and two other demolition machines tore away steel and concrete from the north side of Daniels. [Photos by John Moore]





Bob McMahon and John Moore stand in the excavation area. A corner of Shain Tower is visible at the upper left.

and new learning studio. At the time of this writing, concrete has been poured for the walls surrounding the sub-basement and basement of the new tower, as well as for the basement floor and part of the first floor.

The new building is not the only capital construction project that the chemistry facilities committee has been involved with this year. Other projects include upgrading utilities under Charter Street (which closed Charter Street during the winter), design of a new home for the Chemistry Learn-

ing Center, planning for expansion of some general chemistry laboratories into the Medical Sciences Center, major renovations of labs for two research groups, and remodeling of space for several new faculty colleagues.

It has been a busy year and next year may be even busier. Keep up with the new building and everything else about our department via regular visits to our website.

## NEW FEATURES

When construction and renovation are complete, we will have these improvements:

## INSTRUCTIONAL LABORATORIES

with adjacent write-up rooms for all undergraduate courses

## ADVANCED SYNTHETIC CHEMISTRY & UNDERGRAD SPECIAL PROJECTS LABS

## STATE-OF-THE-ART LECTURE ROOMS WITH FLEXIBLE SEATING

to facilitate small-group interactions and support active learning

## MULTIPURPOSE LEARNING STUDIO

for active-learning classes, poster sessions, and other events

## LARGE ATRIUM & OTHER SPACES

where students can study and interact

## INFORMATION COMMONS

to pioneer future facilities plan of the library system

## SAFETY FEATURES

new air supply and exhaust systems for Mathews and Daniels wings, integrated fire-alarm system, with sprinklers and fire doors, for enhanced safety

# Stay up-to-date on the CONSTRUCTION

with photos, stories, links to news coverage and more, at Badger Chemist News Online



## CHEMISTRY BUILDING PROJECT

[PROJECT OVERVIEW »](#)

[WEEKLY UPDATES »](#)

[CONSTRUCTION PHOTOS »](#)



# Department Celebrates 150th Anniversary of the Periodic Table

By Stephanie Blaszczyk,  
Department Communications &  
Graduate Student (Tang Group)

2019 marks the 150th anniversary of Mendeleev's compilation of the periodic table, and the United Nations has proclaimed 2019 to be the International Year of the Periodic Table of Elements.

Here in Madison, the UW Department of Chemistry is celebrating this momentous occasion with outreach programs through the Wisconsin Science Festival and a unique display of tables inside the office of department chair Judith Burstyn.

Burstyn, who became chair in 2017, long wanted to liven up her relatively plain office in Shain Tower with various artifacts that represented significant achievements in the field of chemistry or paid homage to work done by members of the department - and Betty Moore was the person to make that happen.

Moore, a 30-year veteran of the chemistry department, is the program manager for the Institute of Chemical Education, a national center for science educators to develop and distribute science ideas and knowledge based at UW-Madison. In fact, according to Burstyn, Moore has been involved in selecting most of the artwork throughout the chemistry building.

Moore explained that the incorporation of periodic tables in Burstyn's office was actually quite fortuitous. "I knew that periodic tables are visually interesting to both chemists and non-chemists, so displaying them seemed obvious," she said. "The fact that 2019 is the 150th anniversary of the periodic table was just icing on the cake."

Moore chose a large printed version of the periodic table as the backdrop and six additional three-dimensional periodic tables in front. While most people are accustomed to seeing a horizontally-aligned periodic tables (like the backdrop), three dimensional versions help students grasp the magnitude of differences in chemical properties, such as atomic size, weight or electronegativity.

"There has been a diminution in our appreciation of descriptive chemistry and valuation of the periodic table," Burstyn said.



This mural-in-progress on Raymond Road in Madison, shows different compositions of elements from the Periodic Table.

Photos on this page by Tatum Lyles Flick

"But inorganic chemists look at it more holistically. They care about all of the elements so they have a deeper appreciation for why element A is different than element B."

Professor Zach Wickens and his graduate students worked with the Wisconsin Science Festival and the Science to Street Art project to involve children in designing tabs for the element mural.

"The science to street art project, broadly, aims to engage local communities with scientific ideas through the universal language of art," Wickens said. "This part of the project is a collaboration between a local street

artist, a small team of scientists, and folks from the Wisconsin Institute for Discovery. Together, we assembled artistic prompts for children of all ages to engage with every single element of the periodic table. We want to provide people, particularly children, an accessible means to learn about how chemistry positively impacts their lives."

Professor John Berry and Desiree Bates, computational chemistry leader, will oversee the accuracy of the periodic table mural as it is installed in Madison. Wickens is also working to ensure the accuracy of a separate mural on molecular structure.

In its most basic form, the periodic table is a reference where one can find the atomic weight of an element or other chemical data. However, a closer look at the table reveals the history and development of an entire scientific discipline, with people and places memorialized for generations of future scientists.

The table bridged the gap between medieval alchemy and modern chemistry, and while many scientific theories and laws have come and gone, the periodic table is here to stay.



Betty Moore and Department Chair Judith Burstyn stand among a variety of periodic table representations in the chair's office.

# Department Glassblower Partners with Colleague to Teach Others

By Tatum Lyles Flick  
Communications Specialist

Shedeen Barnett, a scientific glassblower from Jamaica, spent six weeks training with the UW-Madison Department of Chemistry's master glassblower, Tracy Drier, and his colleague from Wild Rose Glass, Erich Moraine.

Barnett, from the Department of Chemistry at the University of the West Indies, is the only scientific glassblower in Jamaica. With just three years of experience, she jumped at the opportunity to advance her skills.

"When the glassblowers at my university first approached me to be an understudy, I didn't know what scientific glassblowing was," she said. "I tried it and fell in love with it."

A professor in Barnett's department in Jamaica requested that she produce a piece of equipment originally designed at UW-Madison. When Barnett needed help, that professor introduced her to Drier, who invited her to train for the summer at UW-Madison. Barnett's department chair, Dr. Roy Porter, strongly supported her and was instrumental in facilitating her trip.

"You can start blowing glass straight out of high school," Drier said, adding that practice and guidance help develop the skills. "It's about technique, it's a craft. You need to know how to manipulate your hands and your glass and how to make it do what you want it to do."

Barnett learned to create new types of glassware, and to work with new materials, such as quartz, a much harder glass

used for photometric analysis.

"They have different techniques," she said. "I learned one way from Tracy and another way from Erich, so I could come up with the Shedeen way - that's the way I am most comfortable with."

Barnett worked with Drier and Moraine to practice different ways to accomplish new tasks, such as creating smooth transitions between tubes, to make more durable glassware, and even how to run her glass shop like a self-supporting business.

"Technical support is awesome, manipulating glass is like learning how to play a musical instrument," Moraine said. "There's no substitute for practice time."

Through this process Barnett learned new skills and improved old ones.

"When I look at the projects I did in the past, they were crooked, they were ugly - I'm being honest - but now, after this month with Tracy, we don't do ugly," she said. "The glassware looks beautiful, they are straight, they are not crooked. I've come a long way. I said to my supervisor, I feel like a real scientific glassblower since I came here."

Glass pieces needed for scientific work in Jamaica must be imported, which makes the ability to fix broken instruments also extremely valuable. In addition, she now has people to call for help.

"We like to see how other people solve the same problems," Drier said, adding that it's helpful to work with and learn from others.

Barnett cooked Jamaican-



Shedeen Barnett, a scientific glassblower from Jamaica, shows off glassware she created while visiting UW-Madison to learn from glassblowers Tracy Drier and his colleague Erich Moraine, pictured on bottom.

Photos by Tatum Lyles Flick

food for Drier and Moraine and they shared the Wisconsin culture of ice cream and cheese curds. In the end, Barnett went back to Jamaica with a newfound sense of confidence.

"Now I feel competent - and the good thing is that if I fall short, I have two experts to call for help," Barnett said.

Drier and Moraine enjoyed the experience and want to find other opportunities to spread the knowledge and art of their trade by helping early career glassblowers hone their skills.

"We talked about this idea of

finding glass shops that aren't well supported locally and to see what we can do to help - either with training or equipment, to try to lift the programs in each location," Moraine said. "So maybe this is the first try."

Drier felt that the intensive training offered added value.

"We both have taught a lot, through demonstrations and classes, but not at this level - six weeks nonstop," Drier said, adding that he and Moraine learn from seeing how people across the world solve different challenges.



# Chemist & Artist Team Up to Show How Bacteria Communicate

By Tatum Lyles Flick  
Communications Specialist

Scientists spend countless hours at the lab bench, scrutinizing data, and working to solve problems and uncover new information. These often complicated topics can be challenging to share outside of the scientific community, but a chemist/artist team has discovered that creativity may be the key.

"Where does environment begin and end?" asks Sonja Bäumel, an artist whose interest lies in the microbial layer, a second layer that can be found on top of all bodies.

For more than 10 years she has been collaborating with scientists, artists, designers, cultural historians, anthropologists, philosophers and filmmakers to find out more about this microbial layer. One of Bäumel's fascinations is bacterial communication. Through her own artistic research she became aware of the work of UW-Madison Professor Helen Blackwell, which has now evolved into a fruitful collaboration for many years.

"As a chemist, I am really interested in the molecules bacteria use to communicate with each other," Blackwell said. "We study these molecules in my lab and retailor them using chemistry to make molecules that Nature can't make. Then we reintroduce them to the bacteria to see what that does to them and how the bacteria behave and interact."

Blackwell currently has a National Science Foundation (NSF) grant to support that fundamental research - making compounds, studying them, and understanding how they work in bacteria using both chemistry and biology. However, one of the other goals for the NSF award was to demonstrate how the research would impact the world beyond the scientific community. She chose to do so through art, collaborating with Bäumel.

Blackwell and Bäumel worked together on a performance art piece that serves to communicate aspects of their scientific and artistic research, called "What would a microbe say?", which was shown in October 2019 at the Frankfurter Kunstverein in Ger-

many. People in Madison will have a chance to see a further development of the project at the Design Gallery in the School of Human Ecology from April 20 through June 7, 2020.

"Sonja likes to expose the microbiome, how microbes are in you and on you and changing your health, through her art," Blackwell said. "It's good for people to have general knowledge that bacteria are not all bad, and that not every microbe is going to cause strep throat. They do lots of great things that we don't understand yet, and fundamental science is necessary to try to build that knowledge."

"Bacteria can do things differently as a group than individually," Blackwell said. "We want to understand how groups engage and impact the health of the host."

In turn, Bäumel's artistic work stages encounters with these beings living inside and on us to explore possible futures for further coexistence.

"If 50 percent of the cells that constitute our body are not human but microbial, who are we and how can we get in touch with our co-habitants?" asks Bäumel.

Bäumel is investigating the influences scientific knowledge has had on the way we have perceived and interpreted the human body historically and how this affects our current society and the cultural contexts in which we act. As an example, to show people this connection, Bäumel created a life-sized petri dish of her body's bacterial colonies by using a full-body sized agar slab.

"Sonja wants to make the hidden universe of the microbe tangible to the average person," Blackwell said.

In the new dance piece for the exhibition in Madison, conceptualized in Frankfurt, Bäumel will collaborate with a local choreographer and dancers. The piece will investigate and showcase the movement of bacterial communication.

Not only does this project bring science to the public, it is also a great example of the Wisconsin Idea in action. In addition, the

project shows how scientific and artistic research can merge together, learn from each other and enrich each other's world.

"We are giving back, as the borders of the University are indeed the borders of the state," Blackwell said. "The exhibit will be open to everyone, we hope to attract people across many disciplines and outside the University."



Photos by Maurizio Montali

TOP: Expanded Self by Sonja Bäumel

Since 2008, Sonja Bäumel is exploring human skin and its potential. This project is part of her on-going research and creative process. She has found a unique way of visualizing the invisible surface of the human body. Sonja uses a gigantic petri dish as canvas and the bacteria living on her own body as color. She develops and speaks a language combining art and science and thus creates a biologically living whole-body picture.

BOTTOM: Crocheted membrane by Sonja Bäumel

How would a piece of clothing, which is defined by personal physical needs or, for example, our body temperature look like? The crocheted membrane translates scientific data into crochet pieces representing a visual language in-between art and science.

Catch the exhibit in Madison:

4/30/2020 - 6/7/2020

at the School for Human Ecology

See more of Bäumel's work at  
[www.sonjabaeumel.at](http://www.sonjabaeumel.at)

## Professor Shares Passion for Chemistry & Music

By Kaylie Greuel  
Department Communications

Microscopes and spectrometers aren't the only instruments used within the University of Wisconsin-Madison Department of Chemistry. Professor John Berry is dedicated to his scientific research at UW-Madison, but also has a passion for musical performance and composition. Berry, an avid violinist and violist, also leads a research group studying transition metal chemistry.

Though music and chemistry may seem to be polar opposites at first glance, they have a lot more in common than what we see on the surface. For example, both require a sense of inventiveness.

"There has to be a creative idea behind it," Berry said, explaining how musicians create melodies they test with harmonies, similar to how chemists create compounds they test with chemical reactions.

The end results are also similar in that sometimes the reaction works, and sometimes it needs some re-writing.

When asked about the similarities between composition and research, Berry said, "each note I put on the staff is an experiment."

He explained that both have similar end goals and require a lot of hard work.

According to the Mead Witter School of Music at University

of Wisconsin - Madison, almost one third of UW music majors choose to pair their music degree with another, proving that it is possible to pursue multiple interests at the collegiate level. But how do college students find the time to pursue multiple hobbies while seeking a scientific degree?

"It's a valid concern," Berry said, "Ultimately, you have to make value judgements on how you spend your time."

When Berry pursued his two majors in music theory and chemistry at Virginia Tech, he was able to successfully balance his time between his interests.

"Looking back, I don't know how I did it ... you just have to follow your passion," he said.

This same sense of passion is important in both music and chemistry, according to Berry. Obtaining a degree in any field, let alone degrees in two different fields, is a long journey that requires hard work, but he also emphasizes the importance of motivation and passion, which are things that cannot always be taught.



Professor John Berry plays at the Concert in Chemistry, February 2019.

Photo by Frank Weinhold

SHARE HOW YOUR  
**CREATIVITY**  
CONNECTS WITH SCIENCE

Do you live and work at an intersection of art and science?  
Share your story with fellow Badger Chemists on **BadgerChemistNews.chem.wisc.edu**

Email us at **BadgerChemist@chem.wisc.edu** for more information.



# Graduate Student Explores Art of Science Communication

By Aaron R. Conklin  
L&S Communication

Stephanie Blaszczyk can trace the origin of her current career trajectory straight back to her mother.

But not quite in the way you'd expect. Like a lot of moms, Blaszczyk's deployed her fair share of eye-rolling mom-isms to guide her children's behavior, such as telling Stephanie that if she swallowed her gum, it would stay in her stomach for seven whole years. Or that the path to curly hair involved eating her bread crusts. Ten-year-old Stephanie was more than a little skeptical—and she wanted to know the truth.

"I knew the science wasn't always there behind what she was saying," said Blaszczyk. "And I've always been interested in accurate information."

That interest eventually led her to combine two areas of study that are fundamentally concerned with accurate information: science and journalism. Blaszczyk, a graduate student in the Department of Chemistry, just wrapped up a prestigious American Association for the Advancement of Science (AAAS) Fellowship, which gave her the opportunity to spend the summer working as a science reporter in the newsroom of the Milwaukee Journal Sentinel.

Working under the direction of deputy managing editor Tom Koetting, Blaszczyk produced and published a sizable list of attention-grabbing, science-based stories about topics like pediatric asthma, aquatic invasive species and the irresistible pull of puppy eyes. And, of course, her favorite piece: A story about how cows keep cool in the summertime (think bovine Gatorade and a cow car wash).

"I went into the fellowship thinking that science communication was stories that included the nitty-gritty details that explored how fireworks work," she said. "What I learned is that it's really about bringing these scientific issues to the attention of the public."

That's not an easy task in today's polarized media and political environment. While public trust in scientists seems to be grow-

Other alumni of the program from the Department of Chemistry are:

- Steven Feldgus (2000, Landis)
- Jennifer Laaser (2013, Zanni)
- Eleanor Nelsen (2014, Landis)



Photo by Colin Boyle

As part of her fellowship, Stephanie Blaszczyk visited an animal shelter to research a story on the evolution of puppy dog eyes.

ing—a recent Pew Research Center poll put it at 86 percent—high-profile attacks by politicians and public figures on science have created controversy and confusion. Meanwhile, media outlets across the country, including the Journal Sentinel, continue to struggle with budget and staffing issues. That's one of the things that makes science communicators like Blaszczyk, individuals who have a foot in both the scientific and the journalism world, so important.

Blaszczyk lives in Rockford with her family and commutes to UW-Madison each day, where she works in the chemistry laboratory of professor Weiping Tang in the School of Pharmacy. She develops new ways to make carbohydrates so that scientists in other disciplines, such as biology, can use them to better understand key processes in the body, such as immune response and cell signaling.

Tang remembers being impressed with Blaszczyk's ability to handle a full slate. When she first began working in his lab, she asked his permission to participate in four different communication/outreach projects, in addition to her lab work.

"I thought it would be impossible for her to be productive in the laboratory while en-

gaging in this many other activities," Tang said. "But I still encouraged her to pursue what she would be most passionate about. It turned out that I was completely wrong. After working in my laboratory for about two years, she has published seven co-authored papers and has two in preparation. Among these nine publications, she is the first author for five of them."

As she returns for the home stretch of her chemistry graduate program — she's set to complete her Ph.D. in 2021—Blaszczyk will be using her newly honed writing skills to promote the Department of Chemistry's research and programs. After she completes her degree—"It's critical to satisfy my own sense of determination," she said—she'd like to pursue a career as a public information officer or science reporter.

"I have seen the rifts between science, academia and the public firsthand," Blaszczyk said. "There's a huge knowledge gap between what we know and what we're able to communicate to the public. There's a legitimate need for more science communication."

READ THE FULL STORY ONLINE AT  
[BADGERCHEMISTNEWS.CHEM.WISC.EDU](http://BADGERCHEMISTNEWS.CHEM.WISC.EDU)

# Graduate Students Use Podcast as Science Communication Tool to Help Others Navigate Chemical Literature

By Stephanie Blaszczyk,  
Department Communications &  
Graduate Student (Tang Group)

There's no shortage of things to learn and papers to read when pursuing a Ph.D. Oftentimes, it can be hard for graduate students to wade through the never-ending publications.

When students read a new paper, they can usually understand the chemical transformation that's being presented. Putting this transformation in the context of what's already been done and understanding why it's important, however, is more challenging.

Grace Lutovsky struggled with this context and knew she was not alone.

That's why two students from the Yoon group, Lutovsky and Matt Genzink, and a postdoctoral researcher, Wesley Swords, launched The Cyclo Edition, a podcast and YouTube channel to help students better understand the organic chemistry literature.

"The purpose of The Cyclo Edition is to help other students become familiar with each paper and how we approach understanding the background," Lutovsky said. "We've realized that a lot of people that are following us are at international schools or other smaller state schools so it's been neat to share our perspective from a big research university."

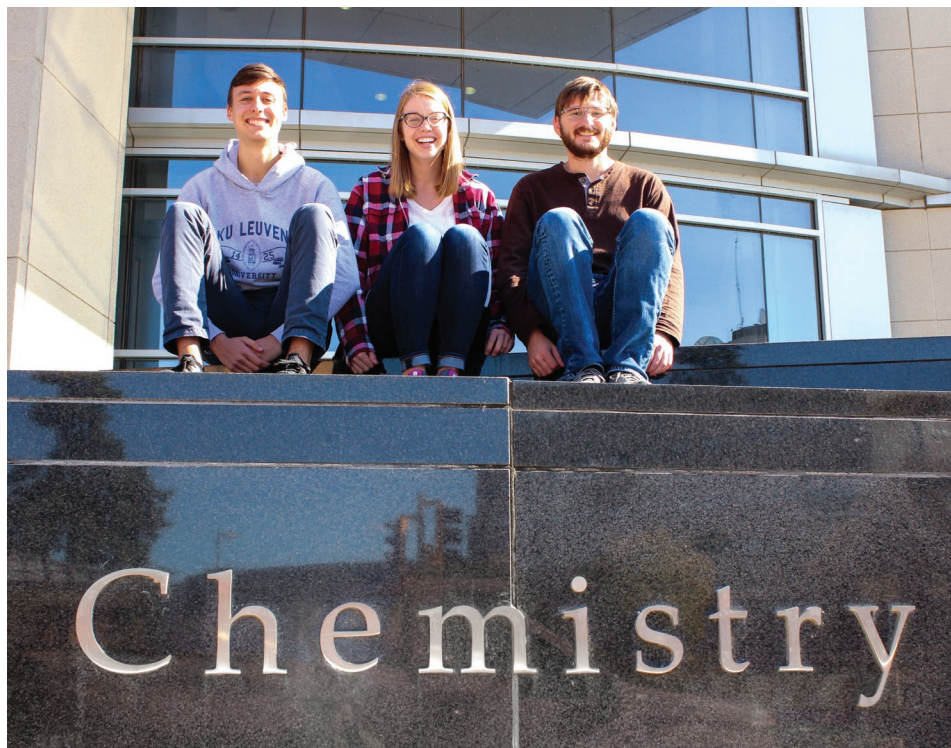


Photo by Tatum Lyles Flick

Matthew Genzink, Grace Lutovsky, and Wesley Swords, from the Yoon Group, created The Cyclo Edition podcast to help others better assess and understand chemistry research papers.

The first season of The Cyclo Edition, which features 10 episodes, is set to wrap up in October. They intend to release season two next spring and summer, during which they hope to start interviewing seminar speakers that visit Madison. Until then, the creators are working hard to increase their

following and reach more graduate students.

"We are really proud of how well this has taken off," Lutovsky said. "We thought that we might have only 20 or so followers, but people from Europe, Asia and everywhere are commenting and getting excited about this idea."

FIRST SEASON AVAILABLE NOW!

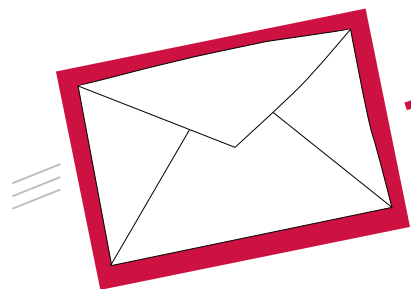
## The Cyclo Edition

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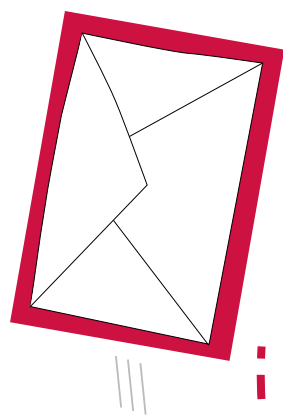
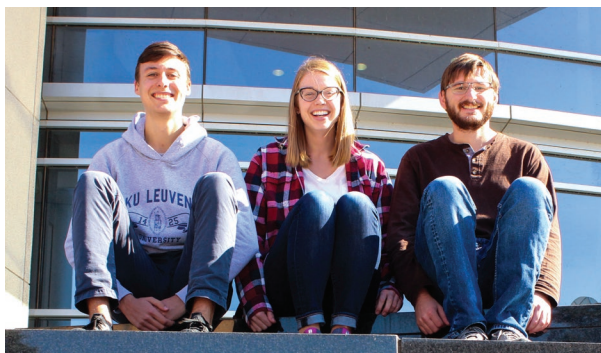


# Oh, the good that can come



## Graduate Students

Graduate students work diligently at the lab bench to understand chemistry and then reveal exciting new scientific discoveries. They spend their formative years here, in Madison, where they learn to be responsible and innovative scientists. They use their creativity to find new ways to share their passion for and communicate science (See related stories on pages 15-16.)



## Students in the Classroom

The Department of Chemistry connects with more undergraduate students than those who major in chemistry. That means that we have the unique opportunity to showcase the exciting nature of our field. We're doing that now, and plan to have a greater impact when our new active learning classrooms are constructed in the new building. In addition, we have two new faculty who study how students learn and the best ways to teach the subject. (See related story on page 24.)

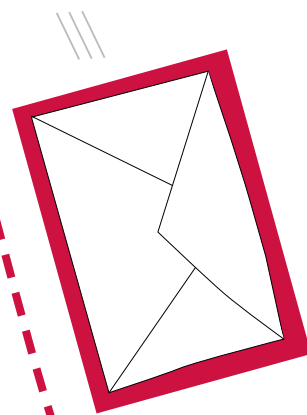


# from this one little envelope

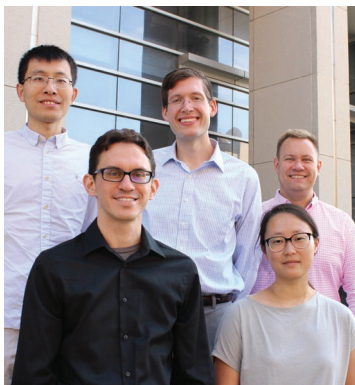
## Undergraduate Researchers



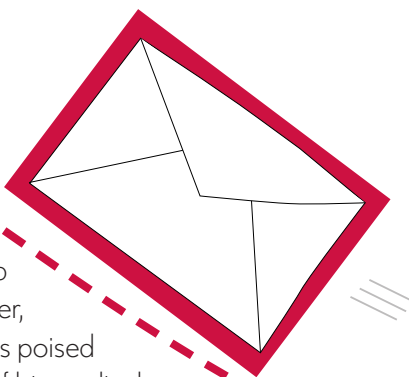
Undergrads love research too! That's why they're working in the lab with graduate student mentors, writing research papers for publication, and presenting posters on campus and at conferences. When they spend their early academic years at the lab bench, they get to see what it would be like to have a research career. (See related story on page 26.)



## New Faculty



It takes a lot to set up a new faculty member, especially one who is poised to change the face of biomedical research, outreach or education. Your donation can make the difference in our ability to hire, the new faculty member's ability to secure needed equipment, and their ability to spend time working with graduate students to change the face of research. (See related stories on pages 5-7 and 24.)





# Thriving Diversity Programs Promote an Inclusive Department

By Jessica Roberts  
Department Communication &  
Graduate Student (Schomaker Group)

The UW-Madison Department of Chemistry works to promote an inclusive environment through a number of established programs serving as resources for students from different backgrounds. These include Chemistry Opportunities (CHOPs), Catalyst, and most recently the UW-Madison Bridge to the Chemistry Doctorate program.

Desiree Bates, CHOPs and Catalyst program director, and Cheri Barta, founder of CHOPs and Catalyst program director, lie at the forefront of these efforts, having served as diversity program advocates.

CHOPs, which was originally designed by Barta nearly a decade ago, has been a resource from which undergraduate students from marginalized groups can learn about the graduate school program at UW. Accepted applicants receive an all-expense paid trip to UW-Madison to learn about the chemistry program, as well as Madison as a whole, prior to applying to graduate school.

"CHOPs definitely started out as an outreach program," Barta said. "It has evolved into a targeted recruiting program, where we have the opportunity to engage with highly qualified, underserved students - first-generation, underrepresented minorities, and low-income students - and help them get excited about Madison and ultimately apply to our program."

While the majority of CHOPs interactions during the preview weekend are typically between the graduate student hosts and CHOPs participants, the faculty members also have the ability to make a profound impression on participants and aid in their recruitment through one-on-one interactions.

"The process to diversify the program is greater than staff going out and trying to connect with other universities to encourage students to apply," said Arrietta Clauss, Director of Graduate Student Services and active participant in the CHOPs program. "The faculty have realized that their interac-



Photo submitted by Jessica Roberts

Participants in the 2019 Catalyst Program are pictured with Arrietta Clauss, Director of Graduate Student Services (on bottom). Catalyst offers graduate students from underrepresented backgrounds the opportunity to work with an experienced graduate student mentor. From left, Catalyst participants are Rui Wang, Philip Lampkin, MacKinsey Smith, Jairo Villanova, Marshall Padilla, and Tesia Janicki.

tions with the CHOPs students are quite important and that they are not just selling their research and the department, but they really have an opportunity to delve down and understand these students on a personal level."

In a similar vein, the Catalyst program was introduced in 2016 and was born in an effort to provide continued support for students throughout their endeavors in the UW-Madison chemistry program. Participants are paired with an experienced graduate student mentor, who can serve as a resource to help with the transition from undergraduate to graduate school - anywhere from general questions about living in Madison, to joining a research group to balancing the rigors of the first year in a graduate program.

"We wanted to help students, particularly during their first year, acclimate to graduate school and give them the skills they need for success," Barta said. "This program not only helps the department show that diversity is really important, but it also gives the department, as a whole, an opportunity to promote a more inclusive environment by better supporting all individuals in our graduate program and appreciating the diversity that

is our department."

While initially the Catalyst program was offered to first-generation, low-income, or otherwise underrepresented students, this has expanded to include any individual who feels they may benefit from being a part of this community.

"Everyone can learn how to be a supportive person in a diverse community," Bates explained. "Overall we have gone from 15 mentees to more than 45. We also started with 88 percent retention rate, which has now increased to 100 percent, higher than the department as a whole, as well as the national average, so we can see that the program is working."

These combined efforts have been recognized at the national level, with the American Chemical Society (ACS) designating UW-Madison as one of two schools participating in the ACS-sponsored UW Bridge to the Chemistry Doctorate program, which helps students interested in pursuing graduate studies. This is one more program the department has to help build and support a diverse population.

**READ THE FULL STORY ONLINE AT  
BADGERCHEMISTNEWS.CHEM.WISC.EDU**

# Department & ACS Partner to Train Underrepresented Students

By Tatum Lyles Flick  
Communication Specialist

The University of Wisconsin-Madison and the American Chemical Society (ACS) partnered to increase the numbers of students from underrepresented backgrounds in chemistry doctoral programs.

The ACS-sponsored UW Bridge to the Chemistry Doctorate program, which started this fall, brings these talented students to the UW-Madison campus. These aspiring scientists, who previously experienced limited course or research opportunities, will build stronger application portfolios for chemistry doctoral programs and provide an opportunity for the UW-Madison chemistry department's current faculty and graduate students to serve as mentors.

In just 21 months, the UW-Madison Bridge fellows will hone their research and writing skills, take courses, present a poster at a national ACS meeting and earn a research master's degree.

Support comes from the Department of Chemistry, the College of Letters & Science, the Graduate School, ACS, and the National Science Foundation's INCLUDES program, which will jointly contribute approximately \$200,000 per year for the first three cohorts.

Each year, students may apply through ACS, which shares the information with the Bridge Programs at UW-Madison and Georgia Tech.

"This creates a new pipeline through which students can enter graduate school," says Desiree Bates, computational

chemistry leader, chair of the diversity committee, and co-lead for the department's Bridge Program. "For reasons other than ability, they did not have strong enough applications to get into a Ph.D. program."

The new group of future scientists enters with different experiences and backgrounds than many of the department's current graduate students, but those differences bring the program and the department a unique opportunity to grow.

"This strengthens the efforts of our diversity programs and gives us the opportunity to fund an initiative that could have a large impact on increasing diversity," Bates says.

Chemistry Professor Robert Hamers, who was instrumental in bringing the program to UW-Madison, says the benefit of this effort is in adding to the pool of diverse applicants, rather than redistributing those already in the field. As students complete their first year of Bridge requirements, they will apply for admission into a doctoral program.

"The intent is for this to prepare them for national admittance into any Ph.D. granting institution," Hamers says. "If it suits their best interest and our best interest to go into our program, that is also an option."

The program's main goal is to increase the number of underrepresented minorities who hold a doctorate in chemistry, which requires a solid plan to ensure the success of admitted students.

"We have critical support networks in place, essential to the success of Bridge fellows in our program," Hamers says.



Photo by Tatum Lyles Flick

ABOVE: Desiree Bates and Bob Hamers speak with a reporter from Spectrum News One about the new bridge program. BELOW: The first cohort of ACS-sponsored UW Bridge to the Chemistry Doctorate program students arrived in the fall of 2019.



Gressel



Riusech



Schweitzer



Villalona

"The Graduate Student Faculty Liaison Committee, Catalyst mentorship program, and external advisory board serve as resources for these students. We also have a large amount of support up and down the academic chain, from current graduate students to faculty mentors."

The department's steering committee interviewed finalists and selected the first four students: Danica Gressel, from Occidental College; Olga Riusech, from Iowa State University; Beau Schweitzer, from Berea College; and Jairo Villalona, from Westfield State University. They looked for students with a passion for chemistry and for whom participation in the Bridge Program would make a significant difference.

Hamers believes the key to the program's success lies in the dedication and excitement faculty and current graduate students have shown toward the program and taking additional mentorship training. In reviewing proposals by faculty to participate in the program, Hamers looked for those with passion, a personal commitment, and research groups that provide strong mentorship.

"I knew this was going to work when I received 20 one-page research proposals from faculty, and faculty and students packed the room to discuss the program," Hamers says. "The room was full of energy. The faculty and graduate students are ready to mentor the new Bridge fellows."



# Institute for Chemical Education

By John Moore  
W. T. Lippincott Professor of Chemistry

The Institute for Chemical Education (ICE) continues its extensive outreach program under the direction of John Moore and with the contributions of Andrew Greenberg, Linda Fanis Craft, Elizabeth Moore, Jack McCann, and several undergraduate student workers.

The major ICE activities are SCIENCECountErs, a national program headed by UW-Madison that collaborates with Boys & Girls clubs to bring science to underrepresented groups (<http://ice.chem.wisc.edu/outreach/sciencounters>); ChemCamps, whose unique program of hands-on science attracts middle-school children from as far away as either coast (<http://ice.chem.wisc.edu/camps>); distribution of science kits (<http://icestore.chem.wisc.edu/>); Research Experiences for Undergraduates programs (<http://ice.chem.wisc.edu/education/REU>); and support of SPICE (<http://ice.chem.wisc.edu/outreach/spice>), a student group doing science outreach. In Dane County, SCIENCECountErs reached more than 125 children from groups underrepresented in science this year. The REU program supported 31 students with 18 in chemistry. ChemCamps enrolled 117 middle school aged children.

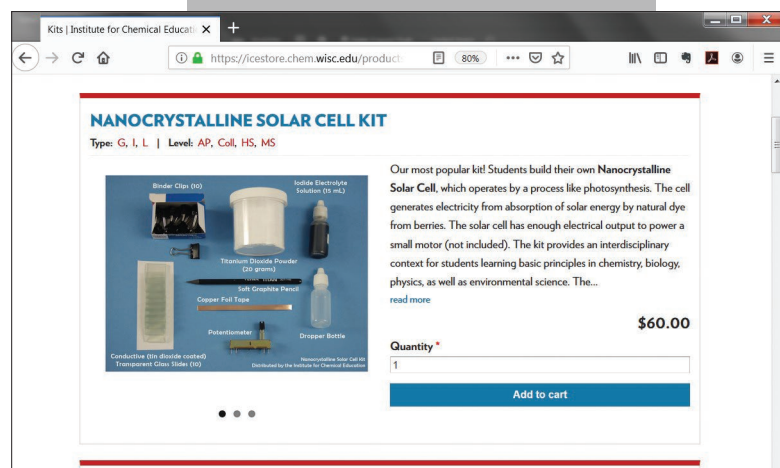
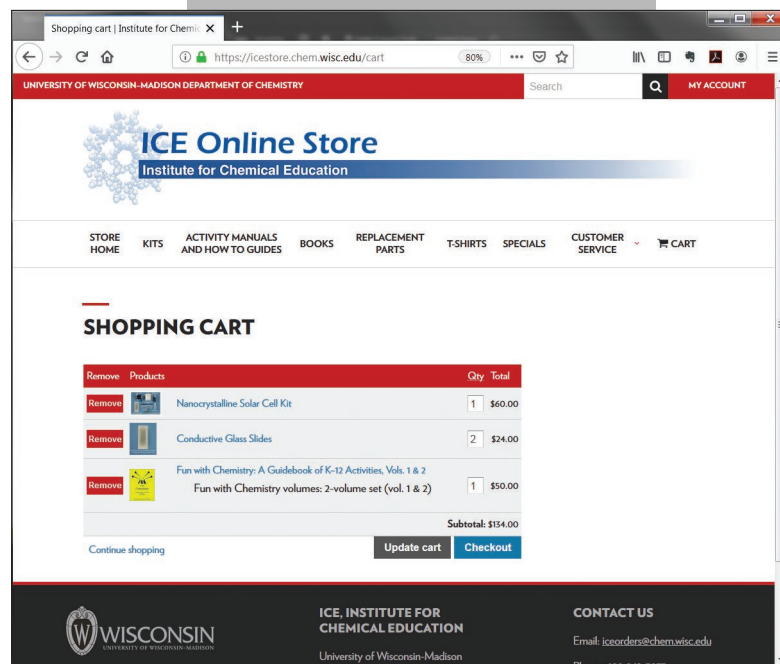
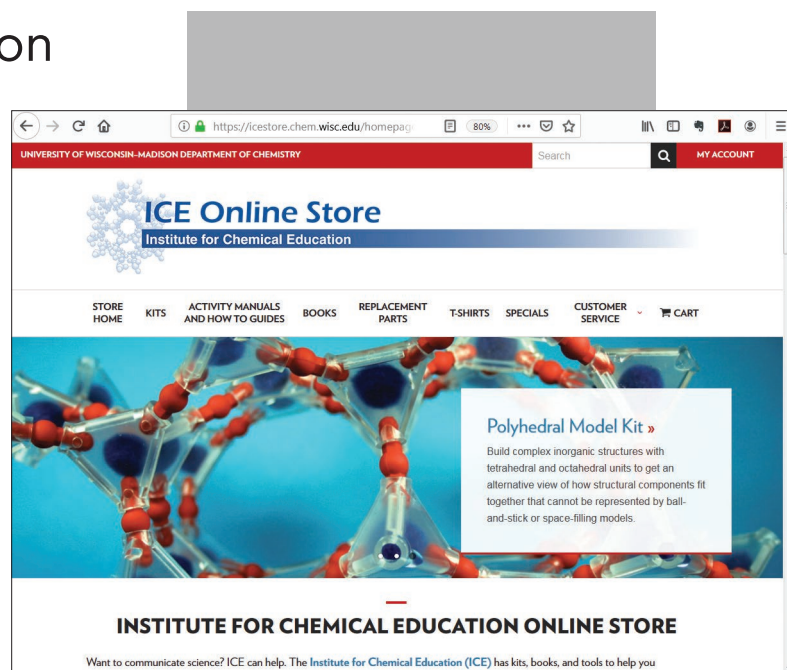
## New ICE Online Store

For more than 30 years ICE has provided high quality kits and publications for students and teachers. This year, thanks to the work of Linda Craft and Elizabeth Moore, there is a much easier way to order those materials: the ICE Online Store (<https://icestore.chem.wisc.edu/>). With a few clicks, teachers, parents, students, and anyone else can conveniently order ICE materials and replacement parts online and pay through a secure payment-processing page using a credit card or institutional purchase order. Purchasers can even create an account to track orders and maintain an order history.

ICE ships to the United States, Canada, Mexico and throughout the rest of the world. During the past decade alone ICE has shipped thousands of kits. Here are our top sellers:

- Nanocrystalline Solar Cell Kit: 4060
- Try This! Nanoscience Packets: 2064
- Solid State Model Kits: 1861
- Memory Metal Kits: 893
- Exploring the Nanoworld Kit: 829
- Optical Transform (X-ray Diffraction) Kit: 414
- DNA Optical Transform Kit: 316
- Polyhedral Model Kit: 265

ICE gratefully acknowledges the American Chemical Society Wisconsin Section, which supports science activities on Earth Day and National Chemistry Week, and the Boys & Girls Clubs of Dane County (B&GC), which collaborate with us in SCIENCECountErs.



# Climate Change: The Greatest Challenge to Society & Science

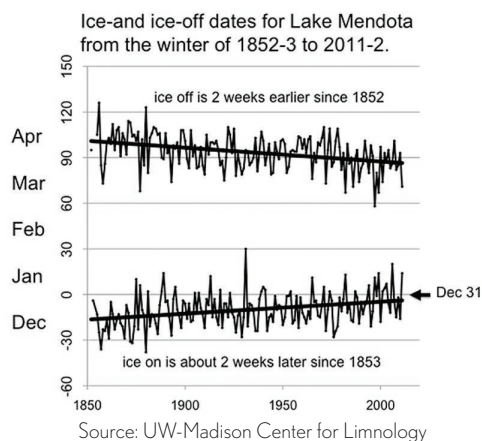
By Bassam Z. Shakhshiri  
Professor of Chemistry & William T. Evjue  
Distinguished Chair for the Wisconsin Idea

As I begin my 50th year as a UW-Madison chemistry faculty member, I call for more action on the part of all Badger Chemists to better connect science and society—responsible action to address and to mitigate climate change. This is the greatest challenge that humanity has faced. We must act responsibly.

We know that the concentrations of greenhouse gases in Earth's atmosphere are higher and increasing faster than at any time in the past 1 million years. The average temperature of Earth is increasing, ice is melting, oceans are acidifying, and extreme weather events are more frequent. Human activities, principally the combustion of fossil fuels, are a major source of greenhouse gases and a major driver of climate change. To share this knowledge with the public and be credible, chemists must acquire a good grasp of the science of climate change and must also develop skills for affecting attitudes in and out of the classroom.

The effects of global warming are clear and well documented. For example, note the changes in the plant hardiness zones in Wisconsin between 1990 and 2012 in the upper right graphic.

Also, note the decrease of the duration of ice on the surface of Lake Mendota:

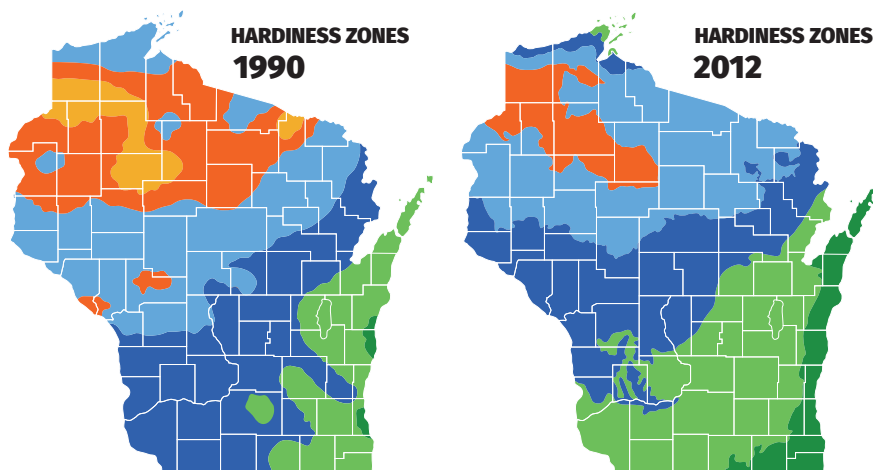


Our department is home to excellent graduate research groups and centers in the chemical sciences. We thrive on the intellectual prowess of our faculty. Basic research can greatly increase our understanding of

## USDA PLANT HARDINESS ZONES

This is the USDA Plant Hardiness Zone Map for the state of Wisconsin. Plant hardiness zones are used to select perennials, landscape plantings and fruit trees that will survive over winter in specific locations.

■ -35° to -40° F ■ -30° to -35° ■ -25° to -30° ■ -20° to -25° ■ -15° to -20° ■ -10° to -15°



SOURCE: U.S. Dept. of Agriculture, PRISM Climate Group, Oregon State University

The zone color key shows the lowest observed winter temperatures in that area.

nature, expand frontiers of inquiry, trigger creative waves of invention and innovation, and prompt technological breakthroughs—all to serve society. It is through research, education, and innovation that we contribute to advancing science and to serving society.

At Wisconsin and elsewhere, research is underway to deepen our understanding of the science of climate change. At Wisconsin and everywhere, teaching must effectively reach every student to learn the science of climate change and to take responsible action for benefitting Earth and its people. Our curriculum must deeply connect the science of climate change to societal progress. This requires integrating climate science with course content. For example, ocean acidification with acid base chemistry, IR spectroscopy with greenhouse gas properties, thermodynamics with the carbonate cycle, and isotope studies for prehistoric temperature analysis.

My research and public engagement group is sharply focused on reaching audiences everywhere. Our activities include workshops for faculty, teachers, and graduate students; events for musicians and other artists; visits to schools, libraries, farmers

market, service clubs, and other community groups; TV, radio, print, and electronic media programs; conversations with local and federal elected officials, and other public venues. Climate change is one of our major themes in fostering community appreciation of science.

What we do in our chemistry classrooms and research laboratories can have profound effects on the minds of students, staff, and the Campus community. What we do outside the classroom in reaching the public-at-large can also influence attitudes and behavior. Let us all strive to: reduce our dependence on fossil fuels for daily life needs; adopt a diet with less stress on natural resources; address the economic impacts of climate change; engage in civil and respectful conversations about all matters affecting the quality of life locally and globally; and demand government action locally and nationally to preserve and improve the quality of water, land, and air. Let us become better at connecting science to society.

Long Live the Wisconsin Idea!

Learn more at [www.scifun.org](http://www.scifun.org).

Illustration by Brandon Raygo, The Capital Times

Graph by Cecilia Vollbrecht, Wisconsin Initiative for Science Literacy



# Young Scientists and Artists Compete to Send Crystals to Space

By Ilia A. Guzei  
Director of Crystallography

In 2019 the Molecular Structure Laboratory conducted the state-wide Wisconsin Crystal Growing Contest (WICGC) for the sixth time. This multifaceted competition is open to middle and high school students, home-schooled youths ages 11-18, and science teachers. The popular outreach project promotes the Wisconsin Idea, introduces participants to the scientific method, inspires the next generation of young scientists, and showcases the Department of Chemistry.

The main objective of the competition is to grow large, well-formed crystals of inorganic salts such as  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ ,  $\text{KH}_2\text{PO}_4$ , and  $\text{KAl}(\text{SO}_4)_2 \cdot 12\text{H}_2\text{O}$ . The second, optional objective is to create crystal-inspired artworks in a media of the student's choice. More than 621 Wisconsin residents took part in the 2019 contest and submitted 85 crystals as well as numerous artworks in a variety of media choices – short movies, drawings, multimedia, 3D-printing, and photography. All entries were evaluated by a nine-member learned committee comprised of crystallographers, chemists, and microscopists from the Department of Chemistry and sponsoring organizations.

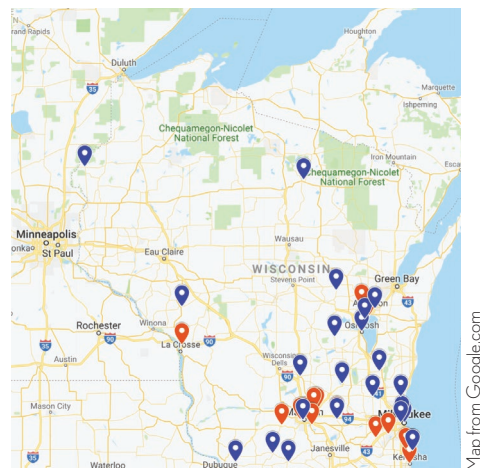
All contestants were invited to the Department of Chemistry in May 2019 for the award ceremony that featured outstanding speakers. Department Chair Prof. Judith Burstyn welcomed the participants and described the educational and research functions of the department; Prof. John Moore delivered a lecture with chemistry and diffraction demonstrations; guest speaker, a Lake Mills high-school student, Katy Twesme shared her experiences in the two Wisconsin Space Crystal Missions; another guest speaker Dr. Paula Piccoli (PPD) spoke about the sci-



ence and joys of crystal growing, and then Dr. Ilia Guzei awarded prizes to contest winners. All laureates were recognized with certificates, books, T-shirts, and cash prizes.

Organization of the WICGC is supported by numerous volunteers from the Department of Chemistry, whereas industrial and non-profit organization sponsors provided financial support to this important outreach activity.

Year 2019 also marked the second time the six WICGC top prize winners completed the Wisconsin Space Crystal Mission, a project organized in collaboration with the Center for the Advancement of Science in Space (CASIS), the manager of the International Space Station U.S. National Laboratory. The program exposed the students to the special characteristics of engineering, research, and operations in a space environment. The students had to translate and optimize ground laboratory experiments to spaceflight conditions aboard the ISS NL. Scientists from UW-Madison (Dr. Ilia Guzei), Covance (Department of Chemistry alumnus Dr. Galina Bikzhanova), a volunteer parent (Stephanie Twesme from Lake Mills, WI), and colleagues from CASIS guided and educated the students through all phases of the project. However, the students (ages 11-18) were treated as adults and had to perform all the work themselves. The students traveled to Florida to prepare



More than 621 Wisconsin residents took part in the 2019 contest.

the crystallization devices for the SpaceX rocket launch in May 2019 and to give oral and poster presentations at the Kennedy Space Center.

Participants' efforts were fruitful and at the end of this 10-month endeavor crystals of KDP were obtained by the evaporation technique in custom-designed containers aboard the ISS NL. Special thanks go to the Chemistry Department Instrument Shop Supervisor Steve Myers and Advanced Instrument Maker Matt Martin for advice and manufacturing of the crystallization vessels. The crystals were expected to be of higher quality than on Earth due to the diffusion-controlled crystallization dynamics in the absence of convection and sedimentation in space. You are welcome to stop by the Molecular Structure Laboratory to examine space-grown crystals for yourself!

The WI Space Crystal Mission was celebrated at the ISS R&D Conference in July 2019: Dr. Ilia Guzei received the "2019 ISS Innovation Award – STEM Education" that recognizes "Pioneering researchers, companies or institutions who use the ISS to push the boundaries of space-based STEM experiences."

All details are at <http://wicg.chem.wisc.edu/>.



Photo by Frank Weinhold

Students traveled to Florida to prepare the crystallization devices for the SpaceX rocket launch and to give oral and poster presentations at the Kennedy Space Center.

# New Faculty Plan for Chemical Education Graduate Program

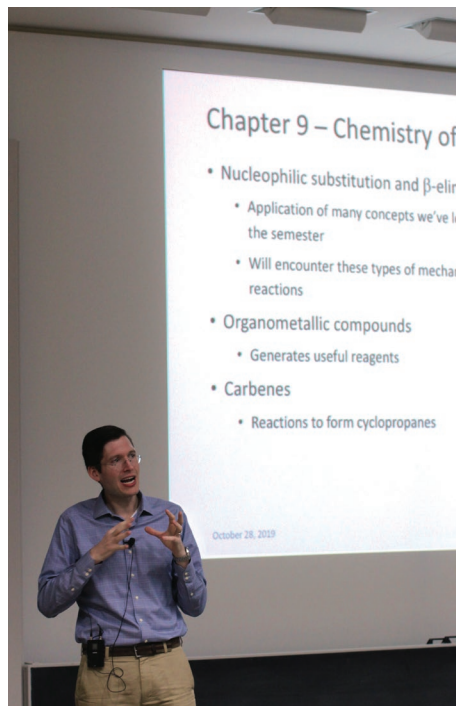
By Miranda Mecha  
Department Communication &  
Graduate Student (Cavagnero Group)

New faculty members Ryan Stowe and Sam Pazicni have grand plans when it comes to reinvigorating chemical education at UW-Madison and creating a new chemistry education research path.

"There's just this ginormous commitment to education at UW-Madison – it is at a level I never saw before and, honestly, couldn't really even conceive of," said Pazicni, an inorganic and chemical education professor who moved to UW from the University of New Hampshire.

Stowe and Pazicni study the transformation of UW-Madison's general chemistry courses, along with their individual projects, and are seeking new chemistry Ph.D. students to kickstart the chemistry education research path.

Due to REACH (Redesigning for Active Learning in High-Enrollment Courses), undergraduate students now have many active-learning opportunities built into the courses to reinforce core concepts.



Prof. Ryan Stowe teaches an organic chemistry class.



Sam Pazicni teaches a general chemistry class.

Stowe, an organic chemistry Ph.D. with a postdoc in chemistry education from Michigan State, notes that many colleges have made similar chemistry curriculum changes, due in part to a 2014 meta analysis by Dr. Scott Freeman. That transformative paper emphasized active learning over all other forms (i.e. traditional lecture) and found that students in an active environment earned significantly higher grades.

Stowe feels that the paper's message: "do active learning" is often interpreted as "do non-lecture things," which can represent a wide range of activities – some more useful than others. "What is meaningful active learning and how do we measure it?" he asked.

According to course data, the drop, fail, withdrawal (DFW) rates are roughly the same as before REACH, but Stowe is quick to add, "If the DFW rates remained the same, but course assessments now measure more meaningful things and students are learning more – then that's a win."

The Stowe group will study three different general chemistry learning environments including REACH UW-Madison, a traditionally structured course at the University of Iowa, and an active-learning emphasized course at Michigan State University. Using the exams, instructional emphasis, and student knowledge surveys, they hope to determine what, if any, impact the method of teaching has on student success.

"This should really be a rich and nuanced

way of looking at, not just active learning but meaningful knowledge construction work," he said.

Pazicni approaches the overhaul in a different way, "There are a host of disciplinary things about chemistry that make it inherently hard to learn." Previously, he has found that previous knowledge and language comprehension skills both correlated strongly with student success in chemistry.

"I think we are all aware that high school chemistry is not the same from school to school," he says, "I want to help students, who come in, at no fault of their own, at a disadvantage."

According to Pazicni, cognitive equity may be attained by changing the classroom to encourage and reward students who adopt the behaviors of high-achieving students, such as constant self-quizzing or resource regulatory behaviors. Therefore, one way to aid the low-achieving students is to "...incorporate constant quizzing into the course and key the questions back to certain learning objectives," Pazicni said. He hopes that resource-use surveys will provide insight on students' behaviors, which can then be integrated into a module or lecture in future semesters.

Stowe's focus on REACH impacts and Pazicni's continual improvement of UW-Madison's general chemistry courses offer unique research opportunities for interested chemistry education graduate students.

Photos on this page by Tatum Lyles Flick



# GSFLC Evaluates New Structure & Direction

By Rachel L. Tritt  
Department Communication &  
Graduate Student (Boydston Group)

Of the many emails that graduate students in the Chemistry department receive each week, at least one is bound to be a communication from the hard-working members of the Graduate Student Faculty Liaison Committee (GSFLC). Whether the subject is knitting, yoga, a student panel, or invited speaker, it's clear this student-run organization does more than your average student council. However, many may be unaware that the GSFLC has recently been undergoing a major restructuring.

Tesia Janicki, interim treasurer and part of the new wellness subcommittee, has been a member since the fall of 2017, when the organization was more path based and focused on only a few main events during the year. As a physical chemistry path representative, she experienced a system that, while made up of committed members, "had ideas that [they] couldn't execute," due to their limited size, which consisted of co-chairs, secretary, treasurer, and representatives for each section within the department.

Christian Wallen, a postdoc in the department, is beginning his third year as a member of the GSFLC and, while he spoke highly of the group in general, he too felt an evolution was necessary.

"There were a lot of limitations, without a clear view of GSFLC member roles, and what each person should focus on," Wallen said.

To address these problems, the group determined that restructuring was the answer. They kept the co-chairs and treasurer, but fall 2018 marked the debut of four subcommittees: community building, professional development, wellness, and outreach, each with a head as well as general members.

Janicki expressed that with this restructuring they hoped to, "provide a platform for student services that extend beyond the student as a researcher."

Matthew Styles, former member of the professional development subcommittee, highlighted the noticeable uptick in career



Graduate students Keywan Johnson and Vincent Rigoglioso work on stress-relieving knitting projects through the GSFLC Knit Night. This event, hosted by the GSFLC, helps provide opportunities to cope with the stress of experiments, paper submissions and deadlines.

Photo by Jordan Nutting

development options in the past year, particularly lunch 'n learns, where students heard career stories from people in the field. They also had a career day for "non-traditional" paths that featured professionals with experience in IP and start-ups, among others. They now have funding for the next three years from an outside source to plan additional events.

Styles is now a co-chair and when asked what made him want to take on a more significant role in the group, he said, "I just think we do a lot of important events and I thought that, going into the second year of this restructuring, it was important that everything kept going smoothly, that we kept improving."

Janicki agreed and expressed confidence in their work, saying that, "the framework is there," and what is left to do is refine the new system to ensure its sustainability.

While he and Janicki are in agreement that most of the new foundations are secure, Styles also notes that the outreach subcommittee is still evolving. Wallen concurred that it had more trouble getting off the ground than the others. "There are disagreeing philosophies about how to define [outreach]," and pointed to that as the reason for their slower start.

New outreach subcommittee head Paige Kinsley is set to rectify those issues, however. She feels that opportunities for department members to do outreach are limited and sees her group's main goal as "lowering that energy barrier" to participation. Additionally, she views the restructuring as an opportunity to help the department become a bigger player in the University's preexisting outreach community.

"I think the University of Wisconsin-Madison, partially because of the Wisconsin Idea and also because we're such a big institution, we're so, so good at imparting our knowledge to the public and making it open and giving people opportunities to learn about it," Kinsley said, adding that she thinks the Chemistry department has a lot to contribute to this goal. "The biggest thing is that this department has so much impressive expertise, in chemistry and in science, so why would we not tap into that? Why would we not share it?"

The restructuring has set Kinsley and her compatriots in the GSFLC on a path that not only hopes to bring growth, but also make their presence known campus-wide, a refreshing endeavor that surely all of us wish nothing but success.

# Undergraduate Research Strengthens Skills for Majors and Non-Majors

By Zach Armstrong  
Department Communication &  
Graduate Student (Zanni Group)

Undergraduate research is one of the most important experiences for a student preparing for graduate school. The research skills learned through this type of open ended, hands-on learning - collaboration, critical thinking, problem solving, communication, etc. - are universal and can be beneficial for any career path, STEM or otherwise.

Approximately 80 percent of graduating chemistry majors conduct research, and the department has more than 100 students from several departments doing research during any given academic term.

One challenge is to make students aware of the kinds of skills they can learn through doing research, even if they do not plan to pursue careers in chemistry.

Some advocate for a mandatory research requirement for all chemistry majors, but Cheri Barta, Director of Undergraduate Research for the Department of Chemistry at UW Madison has a different opinion.

"I think every student should be given the opportunity, but I don't think it should be required," she said, adding that she stresses the benefits of this experience to students who plan to pursue research, as well as those who do not.

Students not headed for careers in chemistry may pass over the often murky and ambiguous opportunity of 'undergraduate research' for more concrete titled courses with lists of specific skills they can learn. Sometimes they cannot pursue research because of time constraints, the need for a paid position, complicated course and life schedules and limited opportunities for research on campus.

However, research can provide valuable skills not easily acquired elsewhere. The unstructured and open-ended nature of undergraduate research can help students develop important professional skills but also can be daunting to get started.

Barta's work centers on helping students begin this process. She says that her office



Eowin Liu talks about her research poster at the Department of Chemistry's undergraduate research poster session held in the spring of 2019.

Photo submitted by Department of Chemistry Undergraduate Research Office

provides a framework for "structured struggling," or supporting students when they need help drafting professional emails or discovering their interests.

In addition, the department has a program to help. The Chemistry Undergraduate Research Board (CURB), recently completed its third year. It offers a sense of community and mentorship to students interested in the experience.

"It is composed of undergraduate researchers who provide guidance toward improving the undergraduate research experience," Barta said. "Items that the group has tackled over the past year include: developing the new undergraduate research website, holding peer research office hours, hosting mentor-mentee thank-you events, and organizing a community building event amongst undergraduate researchers."

Nichole Peterson, an undergraduate researcher in the Zanni Group, said she likes the independence of doing research, which has helped her develop better problem-solving and creative thinking skills.

She believes the skills she has picked up from undergraduate research will serve her well after graduation, even though her ca-

reer will not initially involve chemistry.

"You need to find a balance between working out problems on your own and knowing when to ask someone for help" said Peterson, illustrating an important professional skill for any career, not just chemistry.

Undergraduates potentially interested in doing research face many challenges such as not knowing how to begin, what they will learn along the way, or whether they are interested in research at all. These challenges highlight the importance of Barta's role, especially when it extends to giving career advice to students as they learn what aspects of chemistry they are drawn to.

"I spend a lot of time talking to students about what they want to do in the future and how undergraduate research could help them get those skills that they need" said Barta.

Though the projects that undergraduates pursue cover a broad array of topics, they all acquire many valuable skills, which often prove useful for students in any career path, whether they are headed on to graduate or medical school, or entering the workforce directly.



# Department Short Course Grounds Organic Chemists in Electrochemistry

By Jordan Nutting and Shannon Goes  
Department Communication &  
Graduate Students (Stahl Group)

Electroorganic synthesis – making molecules using electricity – has experienced a recent surge in interest among organic chemists. By electrifying organic reactions, chemists can access highly reactive intermediates or perform “green” redox reactions, among other unique advantages. Many organic chemists, however, are not trained in electrochemistry and are unfamiliar with the tools and theory needed to succeed in the field.

Wanting to help other chemists see the synthetic potential of organic electrochemistry, chemistry professors Shannon Stahl (UW-Madison) and Mohammad Rafiee (University of Missouri-Kansas City) hosted a short course on electroorganic synthesis. The course took place in August 2019 and consisted of a lecture series and lab sessions.

“At one level, electrochemistry provides a more sustainable approach to conduct chemical reactions,” Stahl said. “But, it also allows you to think differently about how to make and break chemical bonds, and this may be the more exciting opportunity.”

The goal of the short course was to demonstrate how electrochemistry can be used for



Jordan Nutting, Shannon Goes, Karina Targos and Medena Noikham work under the hood to collect the products of an electrochemical synthesis.

organic synthesis and to help attendees understand the theoretical and practical aspects of this tool. Few organic chemists encounter electrochemistry during their undergraduate and graduate education, and performing organic synthesis using electrochemistry requires familiarity with equipment and instruments that are rarely encountered in an organic lab.

Alyah Chmiel, an incoming first year chemistry graduate student interested in research that could benefit from electrochemical techniques, said, “I had no electrochemistry experience prior to this course and lab, but even after just two days, my confidence in setting up a reaction in an electrochemistry cell increased significantly.”

Rafiee, an electrochemistry ex-

pert, joined Stahl’s group in 2014 as a visiting scientist. He spent the next five years working with Stahl to develop a research program focused on electroorganic synthesis. During this period, the Stahl lab developed a number of new applications of electrochemical organic synthesis that show advantages over more traditional chemical synthesis methods.

During the lectures, Stahl and Rafiee surveyed many recent advances in the field of electroorganic chemistry, in addition to introducing many of the fundamental principles of electrochemistry and how such techniques can be used to develop and understand new chemical reactions.

In the lab, graduate students, post-docs, and representatives from AbbVie, a biopharmaceutical company near Chicago,

learned how to assemble, operate, and troubleshoot two different electrolysis reactions, including one developed in the Stahl group. They also learned how to use electrochemical tools to analyze reaction mechanisms and catalyst properties. Students from the Stahl group and representatives from Pine Research, a company that specializes in electrochemical research instrumentation, worked with the trainees to prepare their experiments and discuss the results.

“I enjoyed helping students make the connection between the chemistry they already knew and the electrochemistry we were able to teach them during the lecture and lab,” said Shannon Goes, a graduate student in Stahl’s lab who helped design the short course lab experiments. “It’s the same synthetic logic they use every day, but now there’s a special emphasis on every electron.”

Stahl and Rafiee hope to present the course again in the future, including finding opportunities to share the course with organic chemists outside the department.

“I was excited to share my experiences in the field of electrochemistry with the organic community,” Rafiee said, “and I would love to see this short course equip and inspire other chemists to explore electroorganic synthesis.”



Participants in the Electrochemistry Short Course learned techniques for using electricity to synthesize molecules.

Photos on this page by Tatum Lyles Flick

# BADGER CHEMISTS

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INNOVATION, TRAVEL & MORE

## Alumnus Featured

Alumnus Eric Breitung (Ph.D. 1999, McMahon), who works at the New York Metropolitan Museum of Art, was featured in the September 2019 issue of National Geographic for his work using the tools and techniques of chemistry to preserve priceless works of art.

## Cavagnero Group

Graduate student Hanming Yang has been granted a Travel Award to present his research on laser and LED-enhanced NMR at the Experimental Nuclear Magnetic Resonance Conference (ENC) in the spring 2019.

## Gellman Group Hosts Reunion

The Gellman group held a reunion on campus August 9-11, 2019. Forty-one former graduate students and nine former post-doctoral scholars participated. Group alumni traveled from overseas (Korea, Spain, Israel and Germany) and from across the US. The event was organized by former Ph.D. students Will Pomerantz, Jon Lai and Meg Schmitt, with extensive local support from Karen Stephenson (Organic Path Coordinator) and Julie Plotkin (Sam's wife).

The central event was a symposium on Saturday 10 August at which 23 group alumni presented lectures. The speakers included Paul Savage (Brigham Young University), Christian Hackenberger (Liebniz Institute and Free University, Berlin), Jon Lai (Einstein College of Medicine), Meg Schmitt (University of Colorado-Denver), Mike Giuliano (College of Charleston), Gui-Bai Liang (independent consultant), Matt Woll (PTC Therapeutics), Justin Murray (Amgen), Emily English (Gemstone Biotherapeutics), Zvi Hayouka (The Hebrew University), Ross Cheloha (Harvard Medical School), Seth Horne (University of Pittsburgh), James Checco (University of Nebraska), David Mortenson (Scripps-La Jolla), Soo Hyuk Choi (Yonsei University),



The Gellman Group hosted an Alumni Research Symposium, where they invited postdoctoral scholars and graduate students from past years to return to UW-Madison, revisit the lab and enjoy speakers and social events.

Photo by Sarah Maughan

Josh Price (Brigham Young University), Younghee Shin (Seoul National University), Nick Fisk (University of Colorado-Denver), Matt Windsor (American Chemical Society), Félix Freire (University of Santiago de Compostela), Tom Stein (Hagerstown Community College), Will Pomerantz (University of Minnesota), and Dan Appella (National Institutes of Health). Many returning group members enjoyed prowling their former laboratories (which in some cases are now assigned to other research groups). Social events were distributed across campus, including Grainger Hall (reception on Friday evening), the Fluno Center (dinner on Saturday evening) and the Memorial Union (breakfast on Sunday). The Saturday dinner was attended by more than 100 people, including alumni, family members and current group members.

## Lingjun Li Group

Jericha T. Mill is a volunteer with the Alzheimer's Association AIM (Alzheimer's Impact Movement), and was selected to serve as an Alzheimer's Ambassador to Senator Ron Johnson. The association assigns volunteers to each member of congress to educate them on research

and encourage them to support policies that benefit that research and the families who are affected. As ambassador, she attends periodic in-district meetings with Sen. Johnson, communicates with him and his team, participates in monthly calls and training sessions, reaches out to local media outlets, and has frequent interaction with local association staff. Mill acts as Sen. Johnson's direct point of contact for the Alzheimer's Association and plans to attend the national Alzheimer's Association Advocacy Forum in Washington, D.C. in spring 2020.

## Mentoring & Undergrad Research

Cheri Barta was invited to be a Master Consultant for the National Research Mentoring Network, where they provide Facilitator Training Workshops for Entering Research (2nd Edition) Curriculum. The Entering Research Curriculum is comprised of a variety of activities to introduce students to the culture of research, teach trainees skills to successfully navigate their research experience, and promote best-practices for effective mentoring relationships. Links to this information and to the presentations are available at [BadgerChemistNews@chem.wisc.edu](mailto:BadgerChemistNews@chem.wisc.edu).



Barta also was invited to submit content for Entering Research (2nd Edition) which has just been published! This book contains over 100 activities that can be used by facilitators to help undergraduate and graduate students become effective researchers. The content that I submitted was based off of assignments that I use in my research course, Chem 260, in our department. A link to the book for purchase is available at [BadgerChemistNews@chem.wisc.edu](mailto:BadgerChemistNews@chem.wisc.edu).

## McMahon Group

Bob's summer travels included speaking engagements at the RESOLV Summer School (Bochum, Germany), International Symposium on Reactive Intermediates (Ayers Rock, Australia), and the Physical-Organic Chemistry Gordon Research Conference, where he enjoyed the opportunity to see many friends, including Richard Johnson (Univ. New Hampshire; postdoc Zimmerman), Evgeni Nesterov (Northern Illinois Univ.; postdoc Zimmerman), Gary Weisman (Univ. New Hampshire; Ph.D. Nelsen). Bob organized the "Radicals in the Rockies" conference in Telluride, CO, which was also attended by Dan Singleton (Texas A&M Univ.; postdoc Trost).

## Schomaker Group

Jennifer M. Schomaker was elected as an alternate councilor for the ACS Division of Organic Chemistry (2019-2021) and a National Academy of Sciences 2019 Kavli Frontiers of Science, US Symposium, Chair and 'Diversifying Science' session organizer. She traveled to China to speak at the Chem-Reaxys China 2019 symposia and was a plenary speaker at the International Symposium on Synthesis and Catalysis in Evora, Portugal.

## Shakhashiri Group

Jerry Bell and Rodney Schreiner made major contributions to a wide variety of scientific and educational offerings including climate science workshops for college faculty and high school teachers; activities focused on creativity in science, the arts, and



**Once Upon a Christmas Cheery in the Lab of Shakhshiri**

**2019 50 YEARS**

**SUNDAY, DECEMBER 1  
1:00 & 4:00 P.M.**

**MIDDLETON PERFORMING ARTS CENTER  
2100 BRISTOL STREET  
Plenty of free parking!**

**A free community event**

**SCIFUN.ORG**

50 Sn Tin 50

Professor Shakhshiri celebrates 50 years of the Christmas program in December, 2019. Find details on where and when to catch the show on television at [BagerChemistNews.chem.wisc.edu](http://BagerChemistNews.chem.wisc.edu)

the humanities; and scholarly research and development work related to hearing and other senses. Group members Mike Boll, Levi Hogan, Jill Chipman, Ceci Vollbrecht, and Amanda Spiewak contributed to R&D work for Experiments You Can do at Home and Learn About entries, and along with Gery Essenmacher, Katherine Parrish, and Christina Marvin participated in dozens of SCIENCE IN MOTION presentations in Wisconsin and elsewhere. Elizabeth Reynolds contributed significantly in editing

and guiding thesis chapters explaining Ph.D. scientific research to non-science audiences. Cayce Osborne's outstanding supporting and artistic contributions greatly enhanced the success of all of our programming.

In October, Bassam received the first of a newly-established award from the Wisconsin Science Festival, named in his honor: the Bassam Shakhshiri Faculty Engagement Award. He currently celebrates 50 years of public outreach through Once Upon a Christmas Cheery in the Lab of Shakhshiri.



## Snout Out

The Graduate Student-Faculty Liaison Committee (GSFLC) celebrated its 36th annual Snout-Out departmental picnic and softball tournament this year, bringing together faculty, staff, graduate students, postdocs, friends and family. The ChemBio team won the softball tournament, with one year of bragging rights and a poster displayed in the department's main lobby. (See photo of winning team at top of page.)

## Theoretical Chemistry Institute (TCI)

The UW-Madison Theoretical Chemistry Institute awarded the 2019-20 Hirschfelder Prize in Theoretical Chemistry to Professor Shaul Mukamel, a Distinguished Professor of Chemistry at University of California, Irvine. Mukamel is a Fellow of the American Physical Society and the Optical Society of America, and a member of the National Academy of Sciences.

## Weix Group

The Weix Group has a new grant from the National Science Foundation (NSF) for an interesting collaboration with Pfizer looking for new catalysts in their pharmaceutical compound library. In addition, graduate student Kevin Garcia completed an internship this summer at Novartis.

Keywan Johnson, who graduated in 2019,



The ChemBio team won the annual SnoutOut Softball Tournament in 2019. Front row, from left: Rebecca Schultz, Meghan Campbell, Allwin McDonald, Prasanth Kumar, and Rachel Hutchinson; Back row, from left: Prof. Andrew Buller, Brian Weaver, John Mannone, Joshua Kreisel, Marshall Padilla, Lydia Perkins, Eric Cueny, and Victor Outlaw

spent three months in Japan working with another research group through the NSF Grow program.

Seoyoung Kim, Amanda Spiewak and Kevin Garcia gave talks at ACS meetings. Garcia spent three months at an internship with Novartis in Massachusetts as part of his CBI training grant and as part of a collaboration the Weix lab have with the organization.

Daniel Salguero received an NSF fellowship this past year, and Samantha Gavin received honorable mention.

Amanda Spiewak assisted with college-wide TA training workshops and has been working with Science is Fun to run workshops about climate change for teachers at the 2019 Chemical Education conference, and for UW-Madison grad students in STEM fields. Through Science is Fun, she has also worked at public engagement tables at good neighbor festivals and farmers' markets around Madison, as well as at the Wisconsin Science Festival. She also plans to assist with the Christmas show.



Photo submitted by Grace Lutovsky

Pedaling for Ph.D.s is a department bike ride taking place multiple times throughout the summer, organized by the GSFLC. Each bike ride ends at a different location, such as a brewery, park, or sandwich shop. For each event, we plan two routes, a long one and a short one, so cyclists of all abilities can come out and enjoy cycling the paths of Madison with their chemistry colleagues and friends. From left, front row: Yun (Bob) Hu, Jonas Widness, Emily Zerull, Camille Bishop, Aurora Janes, and Rachel Kidd; back row: Grace Lutovsky, Aristidis Vasilopoulos, Andrew Cavell, Matt Genzink, Jesse Kidd, Zach Wickens, Natalie Khuen. Also, the person on the right is a random photobomber.



Photo submitted by Tesia Janicki

Students and postdoctoral scientists participated in the degree dash.



# Larry Dahl Celebrates 90th Birthday

By Kristi Heming  
ChemBio & Inorganic Path Coordinator

On June 2, 2019 Emeritus Professor Larry Dahl turned 90 years old. We held a party at his home and so many of his friends and family came to wish him a happy 90th birthday.

He had a great time and so did everyone that attended. We had a special private concert by John Berry.

Thank you to Jim Maynard for taking great quality pictures of the event. Thank you to all who attended and helped with this party.



Top Left: Clark Landis talks with Marianna Weinhold, and Hyuk Yu. Bottom Left: Department Chair Judith Burstyn and executive director Matt Sanders talk with Don Gaines and Ralph Middlecamp. Above: Prof. John Berry plays the violin at the gathering. Also pictured are Sebb Maynard, June Dahl and Larry Dahl.

Photos for this story by Jim Maynard

# Weisshaar Looks Back on Career Full of Unique Experiences

Professor James C. Weisshaar will retire in summer of 2020. His career at UW-Madison spans almost four decades. He was trained as a gas phase physical chemist in Bradley Moore's lab at Cal Berkeley. His thesis work was a study of the rate of photochemical decay of single rotational states of gas phase formaldehyde from its S1 excited state. He spent two years as a postdoc in Boulder, CO working with Steve Leone, Veronica Bierbaum, and Barney Ellison on gas phase ion-molecule chemical kinetics. In 1981, he became Assistant Professor in the Department of Chemistry at UW-Madison.

In Madison he continued gas phase studies for 20 years. The kinetics of gas phase transition metal atoms with small hydrocarbons revealed striking differences in reactivity among different electron configurations and spin states. Spectroscopic work spanned substituted toluenes, transition-metal species, and organic radicals and their cations. Ultimately Weisshaar's students were measuring product velocity maps for reactions between state-selected metal cations and hydrocarbons in crossed-beam experiments.

"This was a golden era of gas phase physical chemistry", says Weisshaar. "You could study most anything that contributed to fundamental understanding."

In 1997-98, he took sabbatical in Chapel Hill with Ed Samulski, using NMR to determine the conformational preferences of a



Prof. Jim Weisshaar, who has worked for the department for almost 40 years plans to retire in 2020.

Photo by Patty McIntyre

small model dipeptide. Thus began his transformation from gas phase physical chemist to "physical bacteriologist." With Ed Chapman, he studied the SNARE-protein driven fusion of single lipid vesicles with supported lipid bilayers. With Tom Record, he learned how the diffusive properties of GFP in live *E. coli* cells depend on crowding within the cytoplasm. Single-cell microscopy has revealed new details of the mechanisms by which antimicrobial peptides attack bacterial cells. "Superresolution" single-molecule microscopy has measured spatial distributions and diffusive properties of key players in the *E. coli* transcription and translation machinery.

Weisshaar views his most important contributions to the Department as his co-founding with Gil Nathanson of the small, high-powered genchem sequence Chem 115-116 and his service as Department Chair from 2010 to 2013.

"My scientific journey has been quite an adventure," he said. "I am lucky to have so many smart and supportive faculty colleagues at UW-Madison. I especially thank all my current and former graduate students for their tremendous efforts over the years. I'd love to know what they're doing now."

They are invited to email Prof. Weisshaar at [weisshaar@chem.wisc.edu](mailto:weisshaar@chem.wisc.edu).

# AWARDS & HONORS

We want to celebrate your success! Let us know about your awards & honors at [badgerchemist@chem.wisc.edu](mailto:badgerchemist@chem.wisc.edu).

## ALUMNI

Abney, Carter W (Landis, 2007)..... ACS I&EC 2019 Early Career Fellow  
Bentley, Anne K. (Ellis, 2005)..... 2020 ACS Rising Star  
Lipscomb, Corinne (Mahanthappa, 2011)..... 2020 ACS Rising Star  
Wilson, Linda (West, 1962)..... Prof. Achievement Award, Tulane Univ.

## FACULTY & STAFF

Bain, Rachel..... L&S Academic Staff Mid-Career Award  
Blackwell, Helen..... WARF Named Professorship  
Bowman, Matt..... McBurney Center Forward in Access Award  
Buller, Andrew..... NIH Director's New Innovator Award  
Casperson, Kurtis..... 2019 University Staff Roll of Honor  
Coon, Josh..... Discovery in Proteomic Sciences Award  
Choi, Kyoung-Shin..... Vilas Faculty Mid-Career Investigator Award  
Drier, Tracy..... Distinguished Prefix Status  
Ediger, Mark..... 2019 APS Kavli Lecturer  
..... 2019 Chancellor's Distinguished Teaching Award  
..... 2019 Birnbaum Award from University of Illinois MSE  
Esselman, Brian..... GSFLC Mentor Award  
Fry, Charlie..... L&S Judith Craig Distinguished Service Award  
Gellman, Sam..... 2019 Meienhofer Award, Boulder Peptide Society  
Guzei, Ilia..... L&S Academic Staff Mid-Career Award  
Haveman, Matt..... 2017-18 Outstanding Chemistry TA Award  
Hermans, Ive..... 2019 Blavatnik National Awards Finalist  
..... ACS Ipatieff Prize  
Hooker, Paul..... James W. Taylor Excellence in Teaching Award  
Horsfall, Char..... 2019 University Staff Roll of Honor  
McGuire, Paul..... Chancellor's Award for Excellence in Research: Critical Support  
McMahon, Bob..... 2019 ACS Arthur C. Cope Scholar Award  
Middlecamp, Catherine..... ACS Pimentel Award in Chemical Education  
Moore, Elizabeth..... Departmental Academic Staff Excellence Award  
Nielsen, Jeff..... 2019 University Staff Recognition Award  
Schira, Hazel..... 2017-18 Outstanding Chemistry TA Award  
Schmidt, J.R..... H.I. Romnes Faculty Fellowship  
Schomaker, Jennifer..... Somorjai Visiting Miller Professorship Award, Berkeley  
Schwartz, Mike..... GSFLC Mentor Award  
Shakhashiri, Bassam..... Bassam Shakhashiri Faculty Engagement Award  
Stephens, Karen..... 2019 University Staff Roll of Honor  
..... 2019 University Staff Pringle Award  
Stodd, Cecilia..... 2019 University Staff Roll of Honor  
Tang, Weiping..... Vilas Mid-Career Investigator Award  
Yoon, Tehshik..... 2019 ACS Arthur C. Cope Scholar Award  
Weix, Daniel..... 2020 ACS Arthur C. Cope Scholar Award  
Willadsen, Marc..... 2019 University Staff Roll of Honor

## UNDERGRADUATE STUDENTS

Aranda, Alberto..... Wisconsin ACS Local Section, Excellence in Chemistry  
Beyer, Peyton..... Undergraduate Student Support in Chemistry Scholarship  
..... Hilldale-Holstrom Research Fellowship



Photo by Nate Moll, University Communications

Karen Stephens (center) received the 2019 University Staff Pringle Award, presented by UW-Madison Chancellor Rebecca Blank (on left). Also pictured is Vice Chancellor for Finance Laurent Heller. Other department nominees for this award were Mary Hanson, Kristi Heming and Erynn Zweifel.

..... Ieva L. Reich Undergraduate Scholarship  
Boettge, Walt..... John & Elizabeth Moore Award for Excellence (Chem 109)  
Brunn, John..... Ackerman Scholarship  
..... Edwin M. and Kathryn M. Larsen Scholarship  
Buboltz, Jacob..... Wisconsin ACS Local Section, Excellence in Chemistry  
Carlson, Grace..... George J. and Arleen D. Ziarnik Scholarship  
..... Andrew Dorsey Memorial Scholarship  
..... ACS-Hach Land Grant Undergraduate Scholarship  
Carlson, Tess (Cavagnero)..... WI ACS Local Section, Excellence in Chemistry  
..... ACS Division of Physical Chemistry, graduating senior  
Cunniff, Chase..... Undergraduate Student Support in Chemistry Scholarship  
Doughty, Sarah..... Boomer Student Support Fund in Chemistry  
..... Firminhac Chemistry Scholarship  
..... Martha Gunhild Week Scholarship  
..... Hilldale-Holstrom Research Fellowship  
Engel, Miriam..... Eugene and Patricia Kreger Herscher Scholarship  
England, Kevin (Cavagnero)..... Boomer Student Support Fund in Chemistry  
..... Ben & Ada Hake Scholarship, Fort Atkinson  
Evensen, Claire..... Saco Polymers Scholarship  
..... Eugene and Patricia Kreger Herscher Scholarship  
..... Hilldale-Holstrom Research Fellowship  
Fan, Yibo..... Francis Craig Krauskopf Memorial Award  
Feider, Natalie (Cavagnero)..... Dept. Chemistry Poster Session Poster Prize  
..... Eugene and Patricia Kreger Herscher Scholarship  
Fordyce, Benjamin..... Hilldale-Holstrom Research Fellowship  
Forman, Rebecca..... Francis Craig Krauskopf Memorial Award  
Geng, Han..... Eugene and Patricia Kreger Herscher Scholarship  
Geunes, Eric..... Ackerman Scholarship  
..... Wayland E. Noland Research Fellowship  
..... Hilldale-Holstrom Research Fellowship  
Guan, Weiyang..... Wisconsin ACS Local Section, Excellence in Chemistry  
Gugger, Morgan..... Henry and Eleanor Firminhac Chemistry Scholarship  
..... Margaret McClean Bender Scholarship



..... Eugene and Patricia Kreger Herscher Scholarship  
 Halada, Stephen ..... James J. Leddy Scholarship  
 ..... Richard Fischer Scholarship  
 Hunjadi, Rachel ..... ACS-Hach Land Grant Undergraduate Scholarship  
 Huth, Sean ..... Hilldale-Holstrom Research Fellowship  
 Kato, Tomoki ..... Wisconsin ACS Local Section, Excellence in Chemistry  
 Kim, Yeon Jung ..... Eugene and Patricia Kreger Herscher Scholarship  
 ..... Walter W. and Young-Ja C. Toy Scholarship  
 ..... Hilldale-Holstrom Research Fellowship  
 Landwehr, Eleanor (Schomaker) ..... Stephen Morton Research Award, Mentee  
 ..... ACS I&EC Division Poster Award  
 Lee, Scott (Fredrickson) ..... Stephen Morton Research Award, Mentee  
 Lin, Yueai ..... Martha Gunhild Week Scholarship  
 Ma, Stella ..... Eugene and Patricia Kreger Herscher Scholarship  
 ..... Hilldale-Holstrom Research Fellowship  
 McCann, Jack ..... Wisconsin ACS Local Section, Excellence in Chemistry  
 McIntosh, Jessica ..... John & Elizabeth Moore Award for Excellence (Chem 108)  
 Miller, Mackenzie ..... 2017-18 Outstanding Chemistry TA Award  
 Ni, Chi-Min ..... Dempsy Chemistry Scholarship  
 Ni, Pinzhi ..... Francis Craig Krauskopf Memorial Award  
 O'Sullivan, Charlotte ..... Henry and Eleanor Firminhac Chemistry Scholarship  
 ..... Lindsey Theresa Plank Memorial Scholarship  
 Onnuch, Polpum ..... Robert Franklin Taylor Scholarship  
 ..... Department of Chemistry Scholarship  
 ..... John & Elizabeth Moore Award for Excellence (Chem 109)  
 Palatnik, Benjamin ..... Robert Franklin Taylor Scholarship  
 Pinkerton, Tim ..... Wisconsin ACS Local Section, Excellence in Chemistry  
 Pliszka, Helena ..... James Y. and Harriet P. Tong Scholarship in Chemistry  
 ..... Henry and Eleanor Firminhac Chemistry Scholarship  
 ..... Mabel Duthey Reiner Scholarship  
 Raskopf, William ..... Department of Chemistry Scholarship  
 ..... Edward J. Panek Memorial Scholarship  
 ..... Robert and Diane Paulick Undergraduate Scholarship  
 Raymond-Schmidt, Lisa ..... Martha Gunhild Week Scholarship  
 Rozema, Soren ..... ACS Division of Organic Chemistry, graduating senior  
 Singh, Aditya ..... Department of Chemistry Scholarship  
 ..... Don Brouse Memorial Scholarship  
 Sous, Jinan Ehsan ..... Alpha Chi Sigma Alumni Endowed Scholarship  
 Sowin, Jennifer ..... ACS Division of Inorganic Chemistry, graduating senior  
 Spolar, Calvin ..... Undergraduate Student Support in Chemistry Scholarship  
 ..... Hilldale-Holstrom Research Fellowship  
 Talon, Lillie ..... Lindsey T. Plank and Richard H. Putze Memorial Scholarship  
 Thoreson, Nicholas ..... John & Elizabeth Moore Award for Excellence (Chem 109)  
 Tigges-Green, Isabelle ..... George J. and Arleen D. Ziarnik Scholarship  
 ..... Henry and Eleanor Firminhac Chemistry Scholarship  
 ..... Ieva L. Reich Undergraduate Scholarship  
 Tung, Anton ..... Francis Craig Krauskopf Memorial Award  
 Wilkie, Nicholas ..... Francis Craig Krauskopf Memorial Award  
 Wu, Mengcheng ..... Ackerman Scholarship  
 Yang, Nina ..... Francis Craig Krauskopf Memorial Award  
 Ying, Yuchen ..... Martha Gunhild Week Scholarship  
 Zhao, Keer ..... Margaret McClean Bender Scholarship  
 ..... Henry and Eleanor Firminhac Chemistry Scholarship  
 ..... Eugene and Patricia Kreger Herscher Scholarship  
 ..... Hilldale-Holstrom Research Fellowship

Bagchi, Kushal (Ediger) ..... K.V. and Sara Reddy Award in Physical Chemistry  
 Bohlmann Kunz, Miriam (Zanni) ..... NSF Graduate Fellowship  
 Brezny, Anna (Landis) ..... WISCL Communicating Research to Public  
 Buchberger, Amanda (Li) ..... WISCL Communicating Research to Public  
 Steven Chapman (Yoon) ..... 2017-18 Outstanding Chemistry TA Award  
 Cardiel, Allison C. (Choi) ..... WISCL Communicating Research to Public  
 Chen, Bifan (Ge) ..... Gary Parr Memorial Award  
 Cueny, Eric (Landis) ..... Casey Excellence in Research Award - Organic  
 Delaney, Kellen (Li) ..... Hartl Excellence in Research Award - Analytical  
 Dalphin, Matt (Cavagnero) ..... GSFLC Travel Award, Biophysics Society  
 ..... Biophysical Society SRAA Poster Award  
 Ehlerding, Emily (Cai) ..... WISCL Communicating Research to Public  
 Eshon, Josephine (Schomaker) ..... Robert C. Doban Mentorship Award  
 ..... Goering Organic Chemistry Fellowship  
 Farrell, Kieran (Zanni) ..... NSF Graduate Fellowship  
 Gavin, Samantha (Weix) ..... NSF Graduate Fellowship Honorable Mention  
 Girvin, Zeb (Gellman) ..... PPG Fellowship  
 Golden, Kristine (Stahl) ..... NSF Graduate Fellowship Honorable Mention  
 Janicki, Tesia (Schmidt) ..... Midwest Theoretical Chemistry Poster Award  
 Jiehao Guan (Biol Sys) ..... 2017-18 Outstanding Chemistry TA Award  
 Guillot, Sarah (Hamers) ..... Berk Award for Excellence in Chemistry  
 Hautzinger, Matthew (Jin) ..... PPG Fellowship  
 Hutchins, Paul (Coon) ..... Gary Parr Memorial Award  
 Janicki, Tesia (Schmidt) ..... Poster, Midwest Theoretical Chemistry Conference  
 Jernigan, Chris (Bertram) ..... NSF Graduate Fellowship Honorable Mention  
 Johnson, Keywan (Weix) ..... Goering Organic Chemistry Fellowship  
 Kim, Joseph (E. Wright) ..... NSF Graduate Fellowship Honorable Mention  
 Knapper, Kassandra (Goldsmith) ..... WISCL Communicating Research to Public  
 Kozack, Caitlin (Stahl) ..... Goering Organic Chemistry Fellowship  
 Krasecki, Veronica (Goldsmith) - NSF Graduate Fellowship Honorable Mention  
 Krerowicz, Samuel (Schwartz) ..... WISCL Communicating Research to Public  
 Kubota, Stephen (Choi) ..... WISCL Communicating Research to Public  
 Lafayette, David (Wright) ..... NSF Graduate Fellowship Honorable Mention  
 Laudadio, Liz (Hamers) ..... Michael W. McCoy Memorial Scholarship  
 ..... Schrag Analytical Outstanding Peer Award  
 Li, Wenjie Jerry (Jin) ..... Hartl Excellence in Research Award - Materials  
 Lies, Shane (Yoon) ..... 2017-18 Outstanding Chemistry TA Award  
 Lumley, Margaret (Choi) ..... Farrington Daniels Ethical Leadership Fellowship  
 Manger, Lydia H. (Goldsmith) ..... WISCL Communicating Research to Public  
 Manson, Daniel (Blackwell) ..... Goering Organic Chemistry Fellowship  
 McCarty, Bethany (Tang) ..... NSF Graduate Fellowship  
 Mecha, Miranda ..... 2019 Dept. Cookie Contest  
 Mohapatra, Sonisilpa (Weisshaar) ..... WISCL Communicating Research to Public  
 Nickson, Kathleen (Garand) ..... NSF Graduate Fellowship  
 Novak, Gordon (Bertram) ..... Robert C. Doban Mentorship Award  
 ..... GSFLC Mentor Award  
 Nutting, Jordan (Stahl) ..... Harold Hay Fellowship  
 Ostrander, Josh (Zanni) ..... Hartl Excellence in Research Award - Physical  
 ..... GSFLC Mentor Award  
 Padilla, Marshall (Mecozzi) ..... 2017-18 Outstanding Chemistry TA Award  
 Parrish, Katherine (Goldsmith) ..... NSF Graduate Fellowship  
 Petti, Megan (Zanni) ..... Roger J. Carlson Graduate Award  
 Pimentel, Edward (Martell) ..... NSF Graduate Fellowship Honorable Mention  
 Reeves, Ryan (Schomaker) ..... Stephen Morton Research Award, Mentor  
 Sagan, Cole (Garand) ..... NSF Graduate Fellowship Honorable Mention  
 Salazar, Chase (Stahl) ..... PPG Industries Mentoring Award  
 ..... Sam C. Slifkin Award in Chemistry  
 Salgueiro, Daniel (Weix) ..... NSF Graduate Fellowship  
 Schaffer, Leah (Smith) ..... Harold Hay Fellowship  
 Shearer, Melinda (Jin & Hamers) ..... WISCL Communicating Research to Public  
 Specht, Sarah (Hermans) ..... Berk Award for Excellence in Chemistry  
 ..... GSFLC Mentor Award

## GRADUATE STUDENTS

Agbi, Theo (Hermans) ..... NSF Graduate Fellowship  
 Agrawal, Anurag (Weisshaar) ..... WISCL Communicating Research to Public  
 Alperstein, Ariel (Zanni) ..... Schrag Analytical Outstanding Peer Award  
 Bachman, Ben (Hamers) ..... NSF Graduate Fellowship



Tesia Janicki (far right), a graduate student in the Schmidt Group, won best poster at the Midwest Theoretical Chemistry Conference. She is pictured here with other prize winners at the event.

Spiewak, Amanda (Weix).....L&S Teaching Fellowship  
 Styles, Matt (Blackwell).....Hirschmann-Rich Bio-Organic Fellowship  
 Trenerry, Michael (Berry).....NSF Graduate Fellowship Honorable Mention  
 Turton, Keren (Mosher).....WISCL Communicating Research to Public  
 Vasquez, Joseph (Blackwell).....PPG Industries Mentoring Award  
 .....Paul Bender Memorial Award  
 Vu, Nhu (Li).....NSF Graduate Fellowship Honorable Mention  
 Wang, Yu-Heng Larry (Stahl).....Casey Excellence in Research Award - Inorganic  
 Warden, Hillary (Fredrickson).....Stephen Morton Research Award, Mentor  
 Weaver, Brian (Burstyn).....NSF Graduate Fellowship  
 Wu, Zhijie Abe (Ge).....Robert C. Doban Mentorship Award  
 Xu, Meng (Li).....NSF Graduate Fellowship  
 Yang, Hanming.....Travel Award for Experimental NMR Conference  
 Yang, Zhilin (Weisshaar).....WISCL Communicating Research to Public  
 Zhang, Yongqian Kelly (Hamers).....Michael W. McCoy Memorial Scholarship  
 Zhao, Yuzhou (Jin Group).....2017-18 Outstanding Chemistry TA Award  
 Ziebarth, Katie (Landis Group).....2017-18 Outstanding Chemistry TA Award

### DID WE MISS AN AWARD?

Email us at [BadgerChemist@chem.wisc.edu](mailto:BadgerChemist@chem.wisc.edu) and we will share it at [BadgerChemistNews.chem.wisc.edu](http://BadgerChemistNews.chem.wisc.edu)

## ALUMNI LETTERS

My name is Linda Smith (Whatley) Wilson. I was a graduate student in chemistry, studying under Robert C. West from 1957-1962, and received the Ph.D. in February, 1962.

I am always grateful for the issues of Badger Chemist that I receive periodically. In the most recent issue, on page 16, is an article by Anthony Millevolte & Matthias Driess about Robert C. West, on his 90th birthday. The reference in the article is a wonderful tribute to Bob West.

I was extraordinarily lucky to be accepted as one of his Ph.D. group during my graduate work from 1957-1962. Having Bob as my major professor was a wonderful experience. While Bob sustained his office for teaching and research as an active faculty member at UW-Madison, he and his staff maintained connections with all of his graduate students and postdocs for many years.

I want to express again my deep appreciation for all that his support and confidence has enabled me to do professionally and personally.

Sincerely,  
 Linda S. Wilson, Ph.D.

In 1960, I transferred to UW as a junior planning to major in chemical engineering. Part way through my first semester I discovered chemical engineering was not my thing, though I still wanted to major in chemistry. It was also possible I would not earn a C average which meant I could not transfer between Colleges. This was a time when some professors told entering freshman, look at the person on each side of you because only one of you will graduate.

With a great amount of courage that semester I knocked on the door of professor C. Harvey Sorum, Chemistry Department head and world-renowned scientist. As one of about 20,000 students I was not too optimistic on the outcome. Upon hearing my humble plea (as I remember it) Professor Sorum said, "if you really want to major in chemistry, I will see that you will be able to transfer". I did get better than a C average so transferring was not an issue but Professor Sorem's encouragement reduced a lot of stress and ultimately I graduated with a degree in chemistry.

Many years later, I gave a copy of my prized chemistry book, authored by Sorum, to his grandson and also found out Sorum was my mother-in-law's quiz instructor and he gave my wife ice skating lessons. Small world.

Daniel Bloch, Ph.D.

## SHARE A MEMORY OR AN UPDATE: [BadgerChemist@chem.wisc.edu](mailto:BadgerChemist@chem.wisc.edu)

We want to help you connect with fellow Badger Chemists!

Email letters and photos to [BadgerChemist@chem.wisc.edu](mailto:BadgerChemist@chem.wisc.edu). We will post them online and select a few to share in the 2020 magazine. Employment updates, letters, and awards are always available at [BadgerChemistNews.chem.wisc.edu](http://BadgerChemistNews.chem.wisc.edu)





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# In Memoriam

We remember friends, faculty & alumni below

## 2018

1/16 Jeffrey Davis, BS 1967  
1/31 Robert Keller, BS 1951, MD 1958  
2/13 Shirley Bach, Ph.D. 1957  
2/13 William Maeck, BS 1953  
2/18 Kenneth Dempsky, BS 1961  
2/18 Kenneth Schulz, BS 1957  
2/24 Maurice Shamma, Ph.D. 1955  
2/28 Jean Thomas, BS 1949  
3/31 Robert Lichter, Ph.D. 1967  
4/1 James Barr, MS 1960  
4/8 Margherita Voelker, BA 1952  
4/17 Aubrey Messing, BS 1953  
5/2 Richard Fronko, Ph.D. 1984  
5/16 Albert Milun, BS 1946, MS 1947, Ph.D. 1951  
5/24 Robert Turner, MS 1949, Ph.D. 1950  
5/26 Robert Moore, BS 1955, Ph.D. 1962  
6/1 Terry Spennetta, BS 1966  
6/13 David Dion, MS 1973, Ph.D. 1974  
6/21 James Grow, MS 1972  
7/30 Maynard Olson, BS 1951  
7/31 Lester Zank, BPH 1952  
8/28 C. David Gutsche, Ph.D. 1947  
9/22 Bennett Willeford, MS 1949, Ph.D. 1951  
9/29 Kenneth Rieck, BS 1952  
10/11 Robert Strong, Ph.D. 1954  
10/15 Alexander Klein, BS 1975  
10/27 David Reinke, BS 1955  
10/29 Jean Shuler, BS 1948  
11/5 Maurice Loomans, MS 1959, Ph.D. 1962 Biochemistry  
11/12 Richard Hartl, BS 1960  
11/15 Eric Rice, BS 1967  
11/21 Karen Bartelt, BS 1971  
12/5 Claudia Aldrich, BS 2015 Chemistry & Biochemistry  
12/16 Harold Mason, Ph.D. 1955  
12/29 David Martin Ph.D. 1957  
12/31 Jerry Todd, Ph.D. 1960

## 2019

1/8 Allan Olson, Ph.D. 1969  
1/21 Roger Simkin, Ph.D. 1965  
1/22 Katharine Katharine Powell Daub, MA 1948  
1/24 Mary Bernard, BA 1949  
1/28 William Dickinson, Ph.D. 1950  
2/21 Shirley Herndon, BS 1957, MS 1958  
2/24 Paul Frohmader, BS 1950  
3/23 Conrad Marvin "Marv" Lang, MS 1964  
3/24 John Corcoran, Ph.D. 1967  
4/4 Leonard Jensen, BS 1950  
4/28 Stanley Mirviss, BS 1944, Ph.D. 1951  
5/1 Monte Blau, Ph.D. 1952 Chemistry & Biochemistry  
5/9 David Mehaffy, Ph.D. 1981  
5/18 Earl Montie, BS 1950  
6/2 Richard Crane, Ph.D. 1989  
6/3 John Schneider, BS 1953, MS 1955  
Oncology, Ph.D. 1958 Oncology  
6/5 Edward Cohen, Ph.D. 1966  
6/25 Kenneth Barnett, Ph.D. 1967  
7/4 Donald Donermeyer, BS 1956, Ph.D. 1961  
7/10 Guilford Jones, Ph.D. 1970  
7/13 Joseph Kraft, BS 2016 Chemistry & Biochemistry  
8/1 George Sausen, Ph.D. 1953  
8/17 Malcolm Mossman, BA 1952, MA 1955 Geology  
8/13 John Roberts, BS 1968, MD 1977  
8/23 Patricia Fricano, BS 1982  
8/26 Charles Muckenfuss, BS 1953, Ph.D. 1957  
8/30 Lee Rozelle, BS 1955, Ph.D. 1960  
9/12 Guy Meier, Ph.D. 1981  
9/24 James Tong, Ph.D. 1954  
9/30 Stephen Yamamoto, BS 1965

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