

# BADGER CHEMIST

University of Wisconsin–Madison Department of Chemistry  
Established 1953, No. 63 2020

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CHEMISTS  
*take on*  
SARS-CoV-2

RESEARCH &  
INSTRUCTION  
*go virtual*

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*find ways to*  
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FEATURE



Department of Chemistry  
UNIVERSITY OF WISCONSIN-MADISON

# LETTER FROM THE CHAIR

JUDITH N. BURSTYN

This year has been filled with challenges, yet the Department of Chemistry students, faculty, staff and alumni are keeping the Badger Chemist spirit alive at the forefront of research and education. The department continues to deliver its mission to conduct world-class, groundbreaking research in the chemical sciences, while offering the highest quality education and training to undergraduate students, graduate students, and postdoctoral associates.

In this issue of Badger Chemist magazine, you will get to meet researchers who are working to find solutions to the SARS-CoV-2 crisis and graduate students who continue to make a difference in the lives and education of others. You will learn about outreach efforts that are educating the public, to better connect scientific research to the goal of improving life in our community and our world.

Throughout 2020 we have risen to meet the challenges and continued to push our department forward as a leader in the chemical sciences. Our new building construction continues. Next year, the site that once housed outdated lecture halls will hold a newly revitalized chemistry education facility, with state-of-the-art instructional laboratories, classrooms, an interactive learning studio and flexible spaces for large classes. The teaching and learning opportunities enabled by these new spaces will allow future generations of students, across numerous majors, to understand the relevance of chemistry in everyday life. The new facility will support our chemistry majors as they embark on their careers as confident, well-trained Badger Chemists.

In closing, I want to thank the donors and friends who support our drive to conduct high-quality research and to educate students. Your gifts make a difference in the work that we do and in the futures of numerous Badger Chemists.



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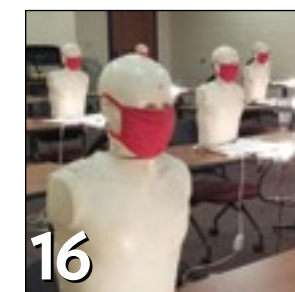
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**ON THE COVER:** Using a classroom simulation set-up in Mechanical Engineering, the Bertram Group assessed the spatial variability in respiratory aerosol emitted from mannequins equipped to disperse aerosol particles into the room. Photo by Prof. Tim Bertram

# CONGRATULATIONS NEW BADGER CHEMISTS!

This year we celebrated graduating students online with memories, messages of congratulation and photos.  
View Celebrating Student Success 2020 at [BadgerChemistNews.chem.wisc.edu/celebrating-student-success/](http://BadgerChemistNews.chem.wisc.edu/celebrating-student-success/)

## Bachelor's Degrees

### SUMMER 2019

Alberto Aranda  
Phoenix Higgins  
Danny Lee  
Riley Luetzgen  
Cody Retzlaff  
Jamie Schuberth  
Justin Twardowski  
Lauren Van Hoof

### FALL 2019

Aziz A Hamid  
Michael Aguilar  
Mitchell Coston  
Kaylin Flesch\*  
Danielle Grubb  
Sarah Gruber\*\*  
Yeon Jung Kim\*\*  
Miranda Koby  
Scott Lee\*  
Eowyn Yangyang Liu  
Phillip Michael Nowak  
Jocelyn Ruiz

Ryan Saari  
Lucas Schult  
Ching To So  
Matthew Szymanski\*\*  
Isabelle Tigges-Green\*  
David John Wesolowski  
Aikaterini Zampetaki

### SPRING 2020

Kushagra Beniwal  
Noah Berg  
Peyton Beyer  
John Brunn\*  
Chavin Buasakdi\*  
Jorge Calderin  
Yinting Chiu  
Loran Cipala  
Carley Delong  
Corbin DeSautell\*  
Anna Doebele  
Megan Doty  
Christopher Ebert\*\*  
Nicholas Ebert\*\*

Natalie Feider  
Isaac Fine  
Hadley Fischer  
Juan Israel Flores  
Kirsten Elizabeth Gasser  
Eric Paul Geunes\*\*  
Shaybriana Ruth Groth  
Elizabeth Alice Haberland-Ervin  
Olivia Grace Hassinger  
Rachel Hoel  
Emily Elizabeth Holzmans\*\*

Rachel Lauren Hunjadi  
Kaylee Marie Hustad  
Sean William Huth\*\*  
Ethan Emanuel Hyland\*  
Talaith Lake Stone Isaacs  
Dylan Cole Keane  
Ziyuan Li\*\*  
Franco Alfonso Llamas III  
Joshua Allen Logsdon  
Kaining Mao\*\*  
Buruj Wali Mohammed  
Jacob Donald O'Hearn\*\*

Charlotte Michelle O'Sullivan\*\*  
Nichole Sabin Peterson  
Helena Pliszka\*\*  
Christopher Six  
Calvin Nicholas Spolar\*\*  
Nathaniel Balink Tankel  
Janell Elizabeth Voves  
Christopher John Walter  
Josef Daniel Wilkinson  
Mengcheng Windy Wu\*\*  
Tianlei Yan\*\*  
Xinyu Ye\*  
Yuchen Ying\*

### SUMMER 2020

Carmen Ibrahim Daoud\*\*  
Benjamin Ivan Fordyce\*  
Jacqueline Danelle Hammond  
Diego Lamela Hernandez  
Aditya Narayan Singh\*  
Emily G Tomashek\*\*  
Cassandra "Cassie" Zimdars



**Andrew Fuchs** (Cavagnero)  
*Degree in Biophysics*  
Interaction of nascent proteins with the bacterial ribosome

**Yasmin Alvarez Garcia** (Beebe)  
Device Fabrication for Micro-scale Study of Human Cells and Microbes

**Daniel Glazier** (Tang)  
Site- and Stereo-selective Functionalization of Carbohydrate Hydroxyl Groups Using Chiral Catalysts

**Erik Horak** (Goldsmith)  
Optical Microresonators as Single-Particle Photothermal Absorption

**Minxue Huang** (Schomaker)  
Tunalbe, Selective C(sp<sup>3</sup>)-H Aminations via Silver-Catalyzed Nitrene Transfer Reactions: Mechanism Study and Method Development

**Kyeong-Jun Jeong** (Yethiraj)  
Multiscale Modeling of Self-Assembly and Phase Behavior of Complex Fluids

**Minsoo Ju** (Schomaker)  
Development of silver-catalyzed chemo-, enantio- and site-selective nitrene transfer reactions through rational catalyst design

**Hyuntae Jung** (Yethiraj)  
Simulation Methods for the Phase Behavior of Complex Fluids

**Elizabeth Dina Laudadio** (Hamers)  
Chemical transformations of lithium cobalt oxide nanoparticles in model environmental systems

**Wenjie Li** (Jin)

Design Principles and Developments of Integrated Solar Flow Batteries

**Vanessa Linke** (Coon)  
Improved Mass Spectrometry Methods for Studying the Various Biological Roles of Lipids

**Lu Liu** (Schomaker)  
Visible-Light-Assisted Intramolecular Amidation of Allenes

**Shi Liu** (Gellman)  
Modulating Signaling Selectivity and Dynamics of Parathyroid Hormone Receptor with Unnatural Peptidic Ligands

**Yang Liu** (Li)  
Mass Spectrometry-based Neuropeptidomic Study and Functional Discovery of Signaling Peptide

**Margaret Lumley** (Choi)  
Development of Electrode Materials for Electrochemical Water Desalination and Solar Water Splitting

**Daniel Evan Manson** (Blackwell)  
Non-native small molecules that modulate quorum sensing in gram negative bacteria

**Hillary Mitchell Warden** (Fredrickson)  
Maps to Structural Chemistry: Phase Transitions, Superstructures, and Incommensurability Explained Through the FAST Principle

**Darien James Morrow** (Wright)  
Development of multidimensional spectroscopies to investigate transition metal dichalcogenide and lead halide perovskite semiconductors

**Mainak Mustafi** (Weisshaar)  
Dynamics of EF-Tu/ternary complex in live *E. coli* using superresolution imaging

**Gordon Anderson Novak** (Bertram)  
Water Interfaces as a Source and Sink of Reactive Trace Gases in the Atmosphere

**Gordon Peterson** (Fredrickson)  
The Design of Complex Intermetallic Structure or: How I Learned to Stop Worrying and Love Chemical Frustration

**Megan Kathryn Petti** (Zanni)  
Development of Novel Surface Sensitive and Surface Specific Two-Dimensional Spectroscopies

**Morgan Rea** (Goldsmith)  
Absorption Spectroscopy of Single Polymers and Nanoparticles Using Whispering Gallery Mode Microresonators

**Nicholas Lawrence Reed** (Yoon)  
Copper(II) Salts as Terminal Oxidants in Photoredox Catalysis

**Ryan D. Reeves** (Schomaker)  
Part I. Transition Metal Catalyzed Cycloisomerizations of Allenes. Part II. Synthetic Small Molecule Ionophores.

**Joshua Viggo Ricci** (Ediger)  
Comparing Linear Stress Relaxation and Fluorescence Recovery: Measuring Segmental Dynamics during the Aging of Polymer Glasses

**Leah V. Schaffer** (Smith)  
Development of Integrated Proteomic Strategies to Identify, Quantify, and Visualize Proteoform Families

**Evan Michael Sherbrook** (Yoon)  
The Development of Stereoselective Photocycloadditions via Lewis and Bronsted Acid Catalysts

**Tom Sobyra** (Nathanson)  
The Uptake and Reactivity of Organic and Atmospheric Gases in Salty and Surface-Coated Water Microjets

**Sarah Specht** (Hermans)  
Fundamental Studies of Selective Oxidations by Green Oxidants over Heterogeneous Catalysts

**Amanda Marie Spiewak** (Weix)  
In Amide Solvents: A True Account of Multiple Metals for Catalysis and Their Consequences

**Sean Staudt** (Bertram)  
Heterogeneous Reactions of Nocturnal Nitrogen Oxides at Atmospherically Relevant Aqueous Interfaces

**Trisha M. Tucholski** (Ge)  
Defining the Human Heart Proteoform Landscape with Top-down Proteomics

**Pingli Wei** (Li)  
Method Development and Application of Mass Spectrometry-based Omics Analyses

**Gary M. Wilson** (Coon)  
Application and development of mass spectrometry technologies to enable biological investigations

**Zhijie "Abe" Wu** (Ge)  
Investigations on Protein Phosphorylation and Its Regulators by Top-down Mass Spectrometry

**Yongqian "Kelly" Zhang** (Hamers)  
Functionalization and Characterization of Carbon Nanomaterials: Understanding Mechanistic Molecular Interactions in Biological Systems

## Master's Degrees

Alina K Dao  
Maggie McEwan  
Keyu Zeng  
Matthew James Griffin  
Zichuan Tian  
Ruochen Lin  
Angela Ablaberdieva  
Clayton Thompson  
Dan Yin

**Trevor Bennin** (Ediger)

Segmental dynamics of polymer glasses during deformation: poly(lactic acid) and cyclic loading/unloading

**Naomi Biok** (Gellman)

Assessing the Effect of Ammonium and Guanidinium Groups on the Stability of Helical Peptides

**Camille Elizabeth Bishop** (Ediger)

Vapor deposition rate modifies order in highly structured glasses

**Stephanie Ann Blaszczyk** (Tang)

Discovery of S-Adamantyl Group Directed Site-Selective Acylation and Its Applications in the Synthesis of Oligosaccharides

**Dain Brademan** (Coon)

The Development of Computational Strategies for the Improved Interpretation and Dissemination of Multi-Omic Mass Spectrometry Data

**Kyle Alexander Brown** (Ge)

Novel Proteomic Approaches to Characterize Membrane Proteins

**Emily Caudill** (Pedersen)

Interactions of Nanoparticles and Polymers with Bacterial and Eukaryotic Cell Surface Structures

**Joshua Robert Corbin** (Schomaker)

Development of Metal-Catalyzed Nitrene Transfer for Streamlining Amine Synthesis

**Eric Steven Cueny** (Landis)

Mechanistic Studies of the Hafnium-Pyridyl Amido-Catalyzed Allene Polymerization

**Matthew Dalphin** (Cavagnero)

*Degree in Biophysics*  
The Earliest Stages of a Protein's Life Influence Its Long-Term Solubility and Structural Accuracy

**Josephine Eshon** (Schomaker)

Adventures in Rh catalysis: hydroformylation and aziridinium ylide reactivity

**Taylor Ashton Evans** (Choi)

Development of antimony-containing catalysts and semiconductors for (photo) electrochemical fuel production

**Kaitlyn C. Fischer** (Garand)

Using Cryogenic Ion Vibrational Spectroscopy to Investigate the Microsolvation of Amino Acids and Small Peptides

**Jessi Flach** (Zanni)

Ultrafast 2D White-Light Spectroscopy of Semiconducting Materials for Photovoltaics

## Doctoral Degrees

**Ariel Martelle Alperstein** (Zanni)

Identifying Amyloid in Cataract Lens Tissue using Two-dimensional Infrared Spectroscopy

**Kushal Bagchi** (Ediger)

X-ray Scattering Characterization of Vapor-Deposited Glasses of Organic Semiconductors

**Madeleine Sara Beasley** (Ediger)

In Situ Characterization of Vapor-Deposited Organic Glasses

# Department welcomes new faculty & staff

## Prof. Susanna Widicus Weaver brings a love of chemistry and expertise in astronomy

By Caroline Cole  
Department Communications

Vozza Professor of Chemistry Susanna Widicus Weaver arrived at UW–Madison in May to conduct research in pre-biotic astrochemistry and on how life may form with the evolution of stars and planets. Weaver received a bachelor's degree in chemistry at Illinois Wesleyan University (2000) and her Ph.D. in chemistry at California Institute of Technology (2005). She most recently was a professor of chemistry at Emory University.



Susanna L. Widicus Weaver

Photo by Jessica Horwitz



From left: Katarina Yocum, Connor Wright, Hayley Bunn and Chase Schultz stand on the platform of the Green Bank Telescope, with the Green Bank Observatory 140 Foot Telescope in the background.

### Who else will be working in your lab?

- **Hayley Bunn** (4th-year graduate student) studies oxygen insertion reactions into small organic molecules to make molecules of astrochemical interest.
- **Connor Wright** (4th-year graduate student) studies small organic ions and radicals of astrochemical interest.
- **Katarina Yocum** (4th-year graduate student) has developed a new experimental technique to study the gas above an interstellar or cometary ice analog.
- **Chase Schultz** (3rd-year graduate student) studies biological precursor molecules of astrochemical interest.

## Welcome New Staff

- |   |   |
|---|---|
| • <b>Emily Bennin</b><br>Financial Specialist       | • <b>Mike Malone</b><br>Financial Specialist                      |
| • <b>Alisa Gradney</b><br>Administrative Assistant  | • <b>Pubali Mandal</b> (Zanni)<br>Coordinating Editor/Lab Manager |
| • <b>Christopher Holland</b> (Stahl)<br>Researcher  | • <b>Taylor Mathewson</b><br>Graduate Student Coordinator         |
| • <b>Arianna Imperl</b><br>Administrative Assistant | • <b>Jeremy Weaver</b><br>Faculty Associate                       |

# Climate Survey helps department address concerns

By Mason Braasch and Caroline Cole  
Department Communications

The Department of Chemistry at UW–Madison is a leader in the country for undergraduate education, graduate research, and teaching programs. However, with success comes hard work, and hard work can have mental health impacts.

“Nationwide statistics indicate that graduate students are at a higher risk for exhibiting symptoms of mental health disorders than the general population,” said Tesia Janicki, a co-leader of the 2019 climate survey. “This is certainly true for UW–Madison, as well as chemistry - one of the largest chemistry Ph.D. programs.”

To combat this cycle, the Graduate Student Faculty Liaison Committee's (GS-FLC) Climate Survey Team (CST) implemented the third iteration of its biennial climate survey. Through the survey, they probe graduate students' and postdocs' attitudes regarding stress, mental health and the department's work environment.

“We chose questions that we thought would encompass the graduate student experience,” Rebeca Fernandez, a co-leader of the 2019

climate survey, said. The four main themes that arose from the responses were clarity of advisor/PI expectations, mentorship, diversity and bias, and teaching.

In 2017, the survey was revised by an eight-person team to ask about both the negative and positive aspects of the department in contrast to the prior survey to ensure more accurate results. The 2019 survey was revised to encompass feedback received for the 2017 survey.

“We paid special attention to the

“Nationwide statistics indicate that graduate students are at a higher risk for exhibiting symptoms of mental health disorders than the general population.”

Tesia Janicki  
Co-leader 2019 Climate Survey

dynamic between PIs and postdocs, PIs and students, and the demographics,” Janicki said. “The demographics are important for us so we can understand how different groups, especially minoritized populations in the STEM field including women, BIPOC, LGBTQ, may feel in our department in comparison to the majority population.”

The survey conclusions support requests to implement solutions to common graduate program prob-

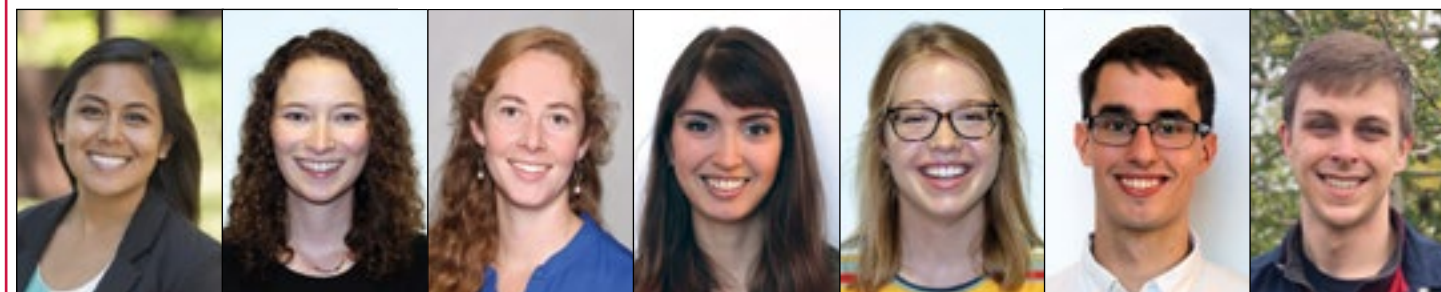
lems seen in the UW–Madison Department of Chemistry. For example, the conclusions demonstrated a variability in graduate student experience dependent on one's identity, which can be addressed by providing documents with detailed expectations for each PI's research environment and group dynamics. Although this is not a department requirement, the survey hopes to encourage PIs to create such a document for their groups. The findings also brought increased awareness to the importance

of diversity, equity and inclusion, as those who identify with historically marginalized groups may find some mentorship styles and support structures less effective.

The CST's survey has gone beyond the Department of Chemistry and inspired other departments on and off campus to initiate their own surveys.

“Our graduate students are amazing,” said Judith Burstyn, department chair. “They talked to other departments and to graduate school leaders. They published their work and they also shared their survey with people around the country who want to emulate what they have done - I think that level of hard work and influence is impressive.”

## CLIMATE SURVEY TEAM



Michelle Akana

Laura Elmendorf

Rebeca Fernandez

Tesia Janicki

Grace Lutovsky

Marshall Padilla

Brett Schneider

# Graduate students recreate NOBCChE chapter

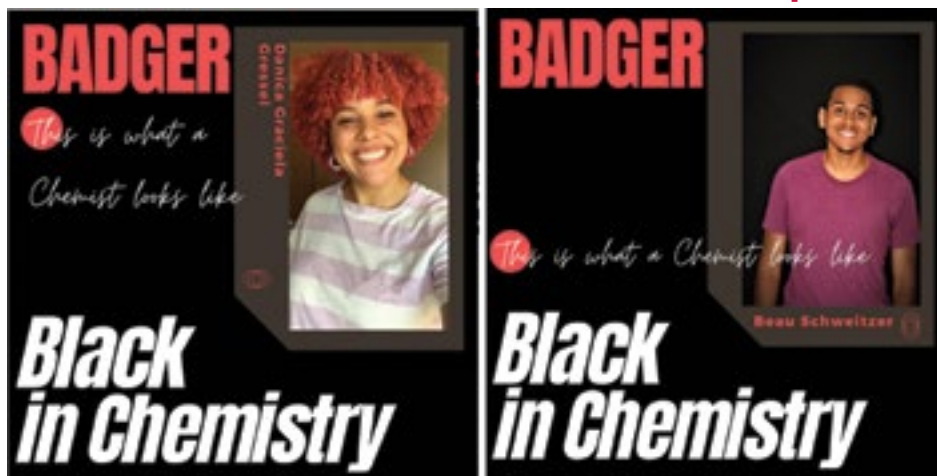
By Gina C. Roesch (Garand) & Coty Weathersby (T. McMahon)

Tough times call for tough people. One of them is Olga Riusech (Garand). Balancing her first year of graduate school, the pandemic and racial unrest throughout the country, she still took action to make change happen.

After the death of George Floyd and resulting protests, Riusech saw an opportunity to facilitate change in her immediate community: the chemistry department. As a member of the Latinx Cultural Center on campus, she noticed the lack of such a community for Black scientists. With a few volunteers, she organized a Juneteenth event to acknowledge the holiday and celebrate the impact of Black chemists. The event featured a history of Juneteenth, a Black Chemist Spotlight, and a reading of a poem by Maya Angelou.

The event also served to promote the establishment of a new community center for Black chemists and engineers. The second half of the event featured the who, what, where, when and why of that community -- a space where members and allies support racial justice in STEM disciplines. With more than Badger Chemists in attendance, this was the first successful event from the newly-reformed National Organization for the Professional Advancement of Black Chemists and Chemical Engineers (NOBCChE) chapter at UW-Madison.

The NOBCChE mission is, "to build an eminent cadre of successful diverse global leaders in STEM and advance their professional endeavors by adding value to their academic, development, leadership, and philanthropic endeavors throughout the



Chemistry graduate students Danica Gressel (Fredrickson) and Beau Schweitzer (Goldsmith) were featured in an ACS Twitter campaign for #BlackInChem week to showcase diversity within the department as well as participation in the ACS Bridge Program.

life-cycle of their careers." The UW chapter aims to embody every element of this mission through professional, social, and outreach-oriented programming - in part as a response to the events of the summer and in part because a NOBCChE chapter existed five years ago on campus but did not survive a lack of membership. With increasing awareness and activism around the country and world, NOBCChE is a step toward acknowledging the department's need to recruit and support a more diverse student body.

Fortunately for Riusech, Coty Weathersby (T. McMahon), a member of the original UW-Madison chapter, studies on campus as an Engineering masters student. During her undergraduate career, Weathersby found a strong source of community with the former NOBCChE chapter.

"My NOBCChE family helped me to feel comfortable owning my space on this campus," she said. "The community I built through NOBCChE has given me the confidence and support to earn my engineering degree."

Moreover, Weathersby believes the

reemergence of NOBCChE on campus is needed now more than ever.

"With the recent violence by law enforcement on unarmed Black people, many Black and Indigenous people of color (BIPOC) are seeking a strong source of academic support and affirmation here at UW-Madison, a predominantly white institution," she said.

Weathersby believes NOBCChE has the potential to advocate for and uplift the voices of BIPOC scientists and engineers. With more traction and student town halls, the chapter has more members than ever - 25 and counting - and is planning for the future. The Executive Board, led by chemistry graduate student Jamorous Smith (Buller), will lead informational and social events that promote racial justice and equality in academia and the community.

Most importantly, the events will create a community. Want to learn more or support the UW-Madison NOBCChE Chapter? Email Jamorous Smith or Danica Gressel at [jsmith96@wisc.edu](mailto:jsmith96@wisc.edu) and [gressel@wisc.edu](mailto:gressel@wisc.edu), respectively.

# Book club fosters important conversations

By Mason Braasch  
Department Communications

When Desiree Bates, a computational chemistry leader, AJ Boydston, a professor in the department, and Cathy Clewett, a senior instrument technologist, came up with the idea of a Chemistry Book Club that would tackle hard, but relevant topics, they had no idea of the interest that it would gauge. More than 100 people have joined.

"It was an exciting and overwhelming amount of interest," Boydston exclaimed.

Faculty members, staff, and students were dispersed into nine small groups to foster meaningful discussions and experiences. While basic ground rules were put into place to ensure safe spaces for all participants, members are free of any preexisting academic structure.

"It's definitely not a course," Boydston said. "We want people to feel like they're discussing as peers, and that they all have the same sense of agency within their book club group."

The book club groups will all be reading three books; *How to be an Anti-Racist* by Ibram X. Kendi, *White Fragility* by Robin DiAngelo, and *Feminism is For Everybody* by bell hooks. Bates, Boydston, and Clewett were inspired to choose these books based on the events they saw happening in society, and the impacts that these books seemed to have in creating conversations.

"We wanted to take



Artwork by Danica Gressel (Fredrickson)

an active role in educating our community," Bates said. "I think that educating ourselves about how systemic issues are built into society is important. Learning about these issues is key to creating a better environment."

Along with providing the book recommendations and discussion questions, Bates and Boydston are making sure that everyone has access to the book, regardless of any issues or circumstances that may cause an individual difficulty in acquiring it.

Bates said "if they need a book, we provide it."



Desiree Bates



AJ Boydston



Cathy Clewett

Although the individual groups are all reading the same books, they are free to explore other activities and grow as a group as well. Bates explained that the group she belongs to also incorporates personality questions within their discussions, in order to understand and connect with each other on a deeper level.

"I like how the personality of each group is coming out" Bates said.

As the groups dived into the first chapters of the books, Bates, Boydston, and Clewett shared that their hope for the club is that it continues to foster conversation and change throughout the department.

"My hope is that people learn something," Boydston said. "I hope that they learn something about themselves, something about their own perspectives, and something about the perspectives of others. I also hope that this conversation becomes normalized and doesn't become an isolated topic. I hope it becomes an integrated part of everything that we are trying to do to improve."

As the book club continues, Bates emphasizes the importance of the conversations that are happening within each group, and the impact that they could have on the Department of Chemistry's community.

"This book club is a direct way of giving everyone the control of changing our system and being educated on how to do that," she said, "we want to acknowledge and say to our students of color; it's not just your issue to fight, it's all of ours."

# Institute for Chemical Education takes chemistry camps online

By Mason Braasch & Caroline Cole  
Department Communications

The Department of Chemistry's Institute for Chemical Education offered free summer chemistry camps online, continuing a four-decade-long tradition of education, despite disruptions caused by the pandemic.

The virtual camps are available to children and families with computer, tablet or smartphone access to the Institute's website. Two groups of virtual activities are online: one for children entering grades K–4 in the fall and another for children entering grades 5–8.

Activities cover a range of scientific topics including chemical reactions, engineering, physics and learning how to do and troubleshoot experiments. The Institute worked to make the experiments safe, inexpensive and easy to do at home, says Iszie Tigges-Green, the Institute outreach specialist.

"We've eliminated all activities that need to be done in a lab or require supervision by trained staff, and we focused only on the activities

for which you could find the materials around the house, and do them with either some or minimal parental guidance," Tigges-Green said.

Most experiments require common items such as plastic bottles, aluminum cans or popsicle sticks. But the lessons and the experiences provided are close to what the traditional camps offer.

"These virtual camps provide an experience similar to what we would have given them at the in-person camps, but for free. It's not the same as in-person, but for quite a few of the things that we do in the camps, students could do almost the same thing at home," said John Moore, Institute director.

Each activity offers a science background that encourages campers to observe, think and draw scientific conclusions they may not reach on their own.

At in-person camps, there is one group leader for every three or four children, which allows campers to interact with scientists — something that is hard to replicate online,

Moore points out. To provide a similar experience, students can find a series of troubleshooting questions in case they come across challenges carrying out their experiments.

"At the camps, the campers are usually able to talk with the group leaders about the activity," Tigges-Green said. "We've added learning objectives so that they can learn more from the activity."

The virtual format allows children to think independently within their experiments or collaborate with family members at home.

"Families can try it out — and their siblings or their cousins or their grandparents can try it out as well," Tigges-Green said. "It can become more a family activity or more a group activity with people in the home."

Activities are available online at <https://go.wisc.edu/90lab>

The Institute for Chemical Education encourages families to provide feedback about the experiments and send photos of the activities to [chemcamps@chem.wisc.edu](mailto:chemcamps@chem.wisc.edu).



Photos by Andrew Greenberg

Faculty associate Andrew Greenberg's daughter Maddyn Hilt-Greenberg creates the Gliding Car from Recycled Materials, a virtual camp activity.

# Connecting Science and Society: Science is Fun

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

Our public engagement programs reach large audiences in person, on the radio, in print, via television, social media and the internet. The Science is Fun truck traveled to schools, libraries, farmers markets, public parks and other community centers.

The 50th Annual Once Upon a Christmas Cheery in the Lab of Shakhshiri was held at the Middleton Performing Arts Center and is available to watch online. We saluted the Wisconsin Academy of Sciences, Arts, and Letters on its 150th anniversary with bubbly cheers and colorful experiments. Our last in-person event was on March 10, 2020 at Huegel School.

Our emphasis is on connecting science and society as we feature hands-on/minds-on activities and a variety of topics such as: *Creativity Links Art and Science* and *Science and Music: Creative Cousins*. Climate science workshops for faculty and teachers continue to be offered virtually across the country.

I am especially pleased with the increasing number of Wisconsin Ph.D. candidates who are including in their theses a chapter in which they explain their scholarly research to non-science audiences.

Since March 10, my group has expanded our research and development work with new Experiments You Can Do at Home, new Learn Abouts, videos of home experiments and entries on our YouTube channel. Everyone is working virtually. Our weekly group meetings feature a guest who shares perspectives and




provides inspiration as we adjust and adapt to the rapid changes and uncertainty that society faces. Bibi Campos-Seijo, Nadia Drake, Thomas Friedrich, Roald Hoffmann, Thomas Holme, Neal Lane, Alan Leshner,

Cora Marrett, Harold McGee, Chad Mirkin, William Moomaw, Elliott Sober, Amanda Turek and Richard Zare were among the guests.

Our mission is to promote literacy in science, mathematics and technology among the general public and to attract future generations to careers in research, teaching and public service.

Science literacy enlightens and enables people to make informed choices, to be skeptical, and to reject shams, quackery, unproven conjecture, and to avoid being bamboozled into making foolish decisions where matters of science and technology are concerned. Science literacy is for everyone—scientists, artists, humanists, all professionals, the general public, youth and adults alike.

Long live the Wisconsin Idea!



Bucky Badger joins in marking my 51st year as a UW–Madison chemistry faculty member by mixing two clear and colorless solutions to form a bright yellow solid. Note Bucky's goggles—safety is paramount in everything that I and my group do.

### What ingredients did Bucky use?

The first five people to correctly identify both components and the name of the solid will receive autographed copies of Volume 5 in the Chemical Demonstrations Book Series. Send responses to [scifun@chem.wisc.edu](mailto:scifun@chem.wisc.edu)






Photo by Prof. John Moore

## Chemistry instructional tower takes shape

By Prof. John Moore  
Chemistry Facilities Committee

The long-awaited, much-needed new chemistry tower, which will serve a growing population of undergraduate chemistry students, is rapidly nearing completion.

Scheduled to open in the middle of 2021, the facility is poised to support advanced learning techniques with state-of-the-art lecture rooms, modern laboratories (each with adjacent write-up rooms), a multi-purpose learning studio for interactive small-group work, an information commons (library), an advanced synthesis lab, an undergraduate research project lab, informal instruction areas, and offices and support spaces.

When renovation of the basement, first, and second floors of the Daniels building is complete in summer 2022, the department's facilities supporting chemistry learning will be second to none—commensurate with our traditional strong commitment to chemistry education.

Each year the Department of Chemistry teaches more than 13,000 undergraduate students from a wide array of majors. The Chemistry Building Project promises en-



Photo by Gerald David

TOP PHOTO: The north side of the new building is seen from the UW-Madison Botanical Garden on University Avenue. BOTTOM PHOTO: The new 360-seat lecture hall is being prepared with desks and seating.

hanced education and reduced time-to-degree for chemistry majors and students in many other degree programs such as engineering, biological sciences, and physical sciences.

Look for a more extensive feature and photo gallery in the 2021 Badger Chemist or follow our progress online.

**MORE >>**

VIEW PHOTO GALLERY & UPDATES ONLINE AT:  
[www.BadgerChemistNews.chem.wisc.edu](http://www.BadgerChemistNews.chem.wisc.edu)

## Stuck at home under COVID-19 restrictions, undergraduate researchers find silver lining

By Aadhishre Kasat  
Department Communications &  
Student Researcher (Buller)

In early March, I was sitting in the Union eating stir-fry, browsing through the multitude of COVID-19 articles. I spent the next hour concerned by something strange in my bowl when I really should have been concerned by the rising number of cases.

The next day, I went to the Buller lab to review spring break plans with my mentor, still unalarmed by the increasing numbers. Instead of going to Florida and spending hours at the ocean, I decided to stay back and dive into the waters of protein engineering. I was thrilled to spend a whole week in my lab-coat and goggles! But alas, the excitement was fleeting.

The atmosphere on campus changed drastically from one of distant possibilities to extreme caution. Later, while cleaning LC-MS vials, acetone made me sneeze. It felt like every head turned toward me, but before I could explain what caused the sneeze, the department's closing was announced. Suddenly, I was bleaching cultures and quenching reactions, preparing to shut down the lab. The day originally reserved for research was instead spent on a flight back to India.

Coming back home mid-semester, especially to the opposite time zone, meant a lot of changes. It meant being unable to attend lab meetings because they were too early in the morning. It meant having to reorient my entire life while keeping up with classes, being quarantined in my bedroom, and coming up with a feasible



Aadishre Kasat works on her winning poster for the virtual Chemistry Undergraduate Research Symposium from home.

remote research plan. Although it was difficult, it also led to rewarding experiences, not just for me, but for almost every undergraduate researcher.

Natalie Feider, a class of 2020 graduate and former member of the Cavagnero lab, worked on a group literature review by finding relevant papers and writing detailed summaries. She said, "Before when I read papers, I read them to find something, I read them briskly, and often didn't finish reading them at all. Now I have developed the practice of reading papers properly. I have been able to find the gap in knowledge and connect the dots much more easily."

Kevin England and Anna Allen, rising seniors at the Cavagnero lab, worked on a manuscript. Kevin said, "During this time, I have been able to plan my future experiments and think of contingency plans, as well as learn kinetic and structural modeling using software such as Pymol and Copasi!" Samantha Ausman, a rising senior, as part of her REU program, learned computational chemistry and coding.

Although summer has ended, and to some extent, our motivation to stare at computer screens too, we

must be persistent. Dr. Cheri Barta, undergraduate research director, encourages undergraduates to learn poster-making and refine their presentation skills by participating in virtual symposiums or lab meetings. She also encourages them to ask their mentors to set up some experiments for them or give them access to previously collected data. This way, they can analyze the data remotely and continue being involved in experimentation.

"Students can cultivate their communication skills by practicing grant and proposal writing or prepare for the GRE, for students will definitely be asked during graduate school interviews how they used this time," Barta said. "How did they make progress in research? What skills did they challenge themselves to learn? Students should be prepared to answer such questions."

Now more than ever, it's important to celebrate the small accomplishments and stay connected. These are challenging times, but just like diamonds, we too need a little pressure before we can shine.

# Postdoc starts world-wide literature discussions

By Aadishre Kasat  
Department Communications & Student Researcher (Buller)

Morgan Howe, a new addition to Sam Pazicni's group at the UW-Madison chemistry department, began her post-doctoral fellowship with a bang! She initiated a popular on-line literature discussion group, filling a need for chemists across the world to connect and learn virtually.

As a Ph.D. student pursuing organic chemistry at the University of California-Los Angeles, Howe participated in a local ACS meeting which led to the beginning of something quite extraordinary. During the session, she attended a presentation on chemistry education research and was fascinated by the depth of the field. The prospect of exploring teaching methods and understanding how students learn intrigued her to such an extent that she switched her path to chemistry education.

"Applications of a chemistry degree have changed significantly over the past couple of decades," she explained. "However, the way we teach the subject hasn't evolved. In

order to recommend changes to the current structure, several large questions need to be answered. Such as, how do experts versus amateurs understand certain chemistry concepts, or, how well are tests designed." Since her switch to this domain is recent, Howe has been in a constant practice of educating herself. She has been doing so by indulging in years of published peer-reviewed literature.

Before the department closed in March to prevent COVID-19, Howe enjoyed meeting with members from other groups to discuss literature. These meetings provided a platform for sharing unique perspectives and a chance to learn from other's experiences. However, the doors to such collaborative opportunities seemed to snap shut with the doors to the chemistry building. After being cooped up at home, Howe longed for a community more than anything else. She reestablished the biweekly forum for discussing chemistry education literature with fellow department members by adapting it to a virtual form. All invited members were thrilled by this opportunity and eager to reconnect, once again highlighting how research of every form, on every level, can be a collaborative process.

Something that started as a local effort grew rapidly. During one of the Pazicni group meetings, students and faculty from the University of Michigan, University of

Ottawa, and the University of New Hampshire were invited to join, expanding the meeting of five to 25. Gazing at her computer screen, somehow trying to fathom the appearance of 20 new faces, Howe thought that perhaps there were others yearning for a community. After seeing researchers from Canada join, she thought that there may be others around the world who would be interested in being part of the chemistry literature discussion initiative. She could already envision the platform becoming global.

She tweeted about her initiative and was taken aback by the overwhelming response. Scholars from Germany and Australia started joining the meetings.

"This is truly a unique opportunity where geographical boundaries don't matter," Howe said. "This experience has allowed me to look outside my bubble. Getting the chance to speak to such amazing

people, coming from diverse backgrounds, led to some brilliant discussions. Although this started as a forum for discussing literature, it is also now a place of networking."

Originally the plan was to have single time slots twice a week, but since international researchers also wanted to be part of the discussion, multiple time slots were organized with rotations. Slowly, independent scholars from research institutions also became a part of the forum. The scope of discussions broadened to education research in other disciplines. Initially, Howe picked the papers, devised discussion questions, and led the meetings, then other members stepped up and led discussions too. The forum became an overflowing cup of leadership opportunities.

In the future, Howe hopes to strengthen the discussion by inviting authors of each paper being discussed. She believes that their addition to the group could lead to insightful conversations about the standards and the direction of the field. Presently, the literature discussion club is taking a break while members manage fall term responsibilities, but Howe hopes to resume sessions next summer and invites all interested readers to reach her via email at mhowe4@wisc.edu to be added to the mailing list.



Howe

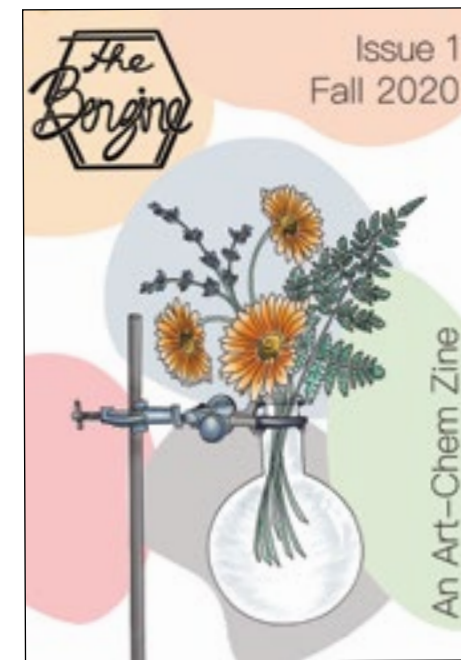
# Chemists get creative in The Benzine

By Tatum Lyles Flick  
Department Communications

The Benzine is a newly developed art and literary magazine published each fall and spring by a group of chemistry graduate students. The editorial team includes Philip Lampkin (Gellman), Danica Gressel (Fredrickson), Robin Morgenstern (Pazicni), Rachel Czerwinski (Goldsmith), Jairo Villalona (Buller), and Sophya Alamudun (advisor TBD, first year).

Lampkin came up with the idea to help his fellow chemists share their artistic abilities, but the editorial team also honed their skills in project management, collaboration, organization, graphic design and technology along the way.

"When Philip approached me with the idea of The Benzine I was immediately



Cover art by Danica Gressel and Robin Morgenstern

on board. I have always been passionate about Chemistry and Art but have never truly combined the two," Gressel said, adding that The Benzine, which helped meld her artist

and chemist identities together, was well worth the time and effort.

The Benzine took shape over a year of planning, as the team met with department leadership and created a solid foundation and project plan. The first issue, which received more submissions than the team could print and which has been read more than 1250 times as of November 8, offers a wide array of original art pieces.

In the future, the editorial team hopes to expand the zine to include audio and video submissions, and to build collaborations with libraries and professional organizations to expand readership.

**MORE >>**

FIND A LINK TO THE BENZINE AT  
[www.BadgerChemistNews.chem.wisc.edu](http://www.BadgerChemistNews.chem.wisc.edu)

# Art & science exhibit goes virtual

By Caroline Cole  
Department Communications

COVID-19 has universally disrupted the way humans interact with other humans and the environment. With stricter enforcement of face coverings, handwashing and physical distancing, individuals and microbes are interacting differently.

Nearly three years ago, Artist Sonja Bäuml and UW-Madison Prof. Helen Blackwell teamed up to research microbial communication. Now, their exhibit, "What would a microbe say?"



Photo by Maurizio Montali

has become ever more important with the onset of the novel coronavirus.

Originally developed as a performative showcase in Germany at Frankfurter Kunstverein that debuted in October 2019, dancers symbolized the movement of bacterial communication.

"The performance seeks to point out that a living being cannot be reduced to its DNA and that its exploration of social relationships requires, among other things, an artistic and philosophical extension of scientific tools," the exhibit's description states.

With the onset of COVID-19 and regulations for in-person events, the exhibit moved

to an online format in April.

"We are all well aware of viruses these days," Blackwell said. "Giving the viewer an appreciation of bacteria was our initial motivation, but now we are starting to explore a broader swath of microbes you cannot see but have dramatic impacts on us and how we interact."

Their book of the exhibit is set to release in early 2021 and it will explore Blackwell and Bäuml's three-year-long collaboration and their online exhibit.

The "What would a microbe say?" online exhibit will be available until December 31, 2020.

**MORE >>**

FIND A LINK TO THE EXHIBIT AT  
[www.BadgerChemistNews.chem.wisc.edu](http://www.BadgerChemistNews.chem.wisc.edu)

# Atmospheric chemists join battle against COVID-19

By Aadishre Kasat  
Department Communications &  
Student Researcher (Buller)

When COVID-19 first hit, many people hastily adopted work-from-home protocols. Trips outside were limited to grocery runs; suddenly, fruits and vegetables became synonymous with ramen and ready-to-eat food choices. Social lives compressed to the six inches of mobile phone screens. Facetime Fridays with steaming cups of coffee, arguably with three too many shots of espresso, became routine. Today, even with the pandemic running rampant, things are very different. Slowly people are participating in more in-person activities; however, often without a complete understanding of the risks.

According to the National Academies of Science, there is growing evidence that SARS-CoV-2 can also spread through airborne transmission; viral particles evaporate, instead of depositing to a surface, and enter the room's circulation to spread beyond the six-foot radius.

To prevent airborne transmission, Tim Bertram, professor of chemistry and affiliate professor of Atmospheric and Oceanic Sciences, explained the importance of understanding how air moves inside and outside closed spaces and how airborne particulates can carry the virus. Bertram, along with assistant scientist Joe Gord and graduate student Stephanie Richards, has been trying to determine transmission pathways and vectors in a typical indoor environment and engineering controls that can be utilized to mitigate associated risks.

Bertram explained that there is greater evidence for airborne transmission in indoor environments than the outdoors or between rooms. This



Using a classroom simulation set-up in Mechanical Engineering, the Bertram Group assessed the spatial variability in respiratory aerosol emitted from mannequins equipped to disperse aerosol particles into the room.

is because indoor environments, in comparison, are not as thoroughly ventilated. To understand the risks associated with sitting in such spaces, the relationship between actions such as laughing, singing, and the diameter and the number of the aerosol particles ejected needs to be resolved, as well as what percentages of those particles contain active forms of the virus. Answering this question will help evaluate how effective physical distancing strategies are and at what rate particles are lost from circulation through physical processes.

In collaboration with Prof. David Rothamer and Prof. Scott Sanders, from the mechanical engineering department, and Johnson Controls, Bertram's team found that viral particles ejected in rooms with four times higher ventilation rates have a 10-15 percent lower initial concentration, reach a steady-state faster, and decay faster. Bertram's team also found that wearing a mask reduces the ejected particle concentration by at least 20-30 percent in the near-field region.

"These experiments help us understand what is occurring in a room after it has been vacated, which is valuable information because it will help

us assess the amount of buffer time required between consecutive classes," Bertram said.

"From a research perspective, I want to track particulates and the viruses they may carry as they are being exhausted out into the room," Bertram said. "This is challenging because there are pieces of the puzzle that we simply do not know. We do not know how many viruses are in an individual aerosol particle as a function of size. We do not know the dose-response curve for SARS-CoV-2. But we have not had this information for calculating risk for other types of airborne diseases, so the best we can do is set policies in place to control variables we understand."

Bertram explained that the key principles are clear: physical distancing while wearing masks, even though they are not 100 percent efficient, makes a difference. Limiting the time spent indoors, increasing ventilation, and clean air delivery rates also make a difference.

**MORE >>**

FIND THE FULL STORY AND VIDEO AT:  
[www.BadgerChemistNews.chem.wisc.edu](http://www.BadgerChemistNews.chem.wisc.edu)

Photo by Prof. Tim Bertram

# Gellman lab works on ways to block SARS-CoV-2 from entering cells

By Tatum Lyles Flick  
Department Communications

Prof. Samuel Gellman and his group have been working on strategies to prevent infection by pathogenic viruses for several years. They are now using that work as a launching pad for research on SARS-CoV-2, the virus that causes COVID-19.

This work, led by post-doctoral scientist Victor Outlaw, includes collaborations with virologists from Columbia University Medical Center (Anne Matteo and Matteo Porotto) and a group in Galveston, TX. The Columbia-Wisconsin team has previously designed peptides intended to block the fusion of HPIV3 and RSV, enveloped viruses that target the respiratory system and are particularly dangerous to young children and the elderly.

SARS-CoV-2 is also an enveloped virus, which means that its viral particles are surrounded by a membrane that must fuse with a human cell membrane to cause infection. In the 1980s, scientists learned that blocking envelope-membrane fusion could prevent infection by HIV. A decade ago, the Gellman lab began developing a new approach to fusion inhibitors by working on anti-HIV compounds.

Their experience with other viruses enabled the Gellman lab and their collaborators to pivot to SARS-CoV-2 as the pandemic was looming. Since March, this trans-national team has been developing long, synthetic peptides and asking if those peptides can stop the virus from infecting human cells.

"Because we had the right collaborators and because we had a strategy that can map onto this problem, we had to try this," Gellman said. "However, we understand that it is very difficult to develop new therapeutic agents, even for very large companies."

Due to their previous work on RSV

**“We synthesize a peptide derived from a specific domain on the spike protein of SARS-CoV-2, which binds once the fusion protein activates, preventing entry into the cell.”**

**Victor Outlaw  
Postdoctoral Scientist**

and HPIV3, the Gellman lab and their collaborators were able to make significant progress over the past six months. The first paper from this collaboration recently appeared in the journal mBio. The research efforts continue.

The long-term goal is to develop molecules that can be inhaled to block fusion and protect frontline care providers and susceptible populations from infection. Later they plan to see if the same compounds could be used to treat those who are already infected.

"We learned a lot from my initial project that we could apply directly to Coronavirus," Outlaw said. "It allowed us to identify a fusion inhibitory

peptide much faster. We synthesize a peptide derived from a specific domain on the spike protein of SARS-CoV-2, which binds once the fusion protein activates, preventing entry into the cell."

Long peptides are rapidly degraded in biological environments, so the Gellman lab modifies the peptide backbone to slow that degradation. Creating such peptides requires a lot of work; however, the Gellman lab has a head start because of their experience creating inhibitors for other viruses.

"Working on something that has a potential direct application in the clinic has been one of the hallmarks of my time here," Outlaw said. "It definitely makes you feel like you might actually make a difference in somebody's health – in human health."



Postdoctoral researcher Victor Outlaw synthesizes amino acids for incorporation into peptides.

Photo by Lei Liu (Gellman)

# Collaboration goes viral tackling COVID-19

By Rachel M. Miller  
Graduate Student (Smith)  
& Rachel A. Knoener  
Postdoctoral Scientist  
(Smith, Sherer)

The onset of the COVID-19 pandemic has been a call to action for many within the scientific community. Long-time collaborators, Lloyd Smith, professor of chemistry, and Nathan Sherer, associate professor of molecular virology and oncology with the McArdle Laboratory for Cancer Research and Institute for Molecular Virology, set out, along with their students, to contribute to the global understanding of SARS-CoV-2 by adapting the Smith group's Hybridization Purification of RNA-protein complexes followed by Mass Spectrometry (HyPR-MS) technology to the study of SARS-CoV-2.

Rachel Knoener, a joint postdoc between the labs, developed HyPR-MS as a graduate student with Smith. HyPR-MS enables the identification of host proteins that interact with specific RNAs. These protein interactors are likely to have important roles in viral replication, making them potential drug targets. The Smith and Sherer groups will emulate the strategy devised by Nevan Krogan, professor of cellular and molecular pharmacology at the University of California San Francisco (<https://www.nytimes.com/2020/03/17/science/corona-virus-treatment.html>) to identify FDA approved drugs which may disrupt viral RNA and host protein interactions, providing promising candidates for a safe and readily available SARS-CoV-2 treatment.

This work required the participation

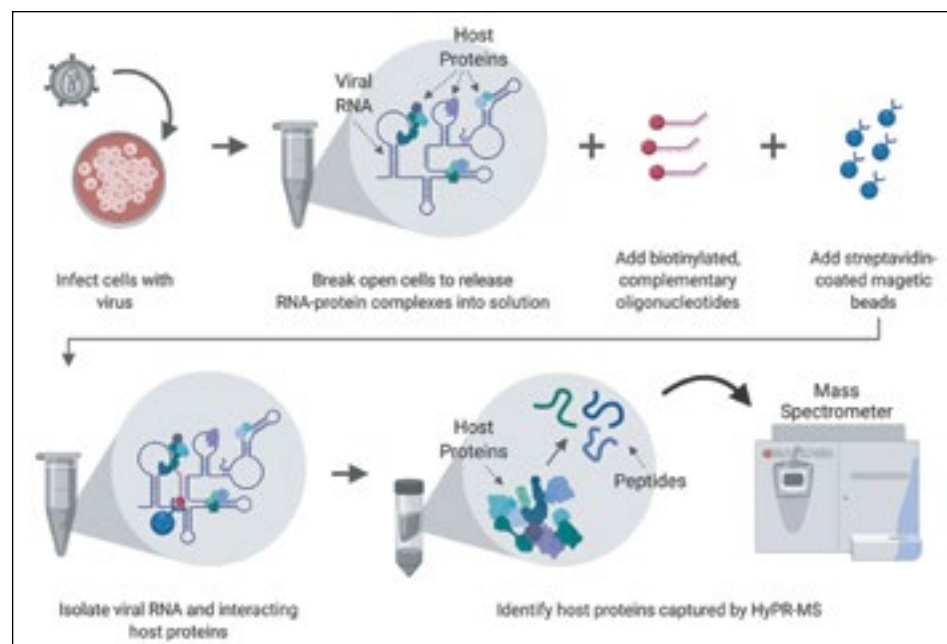
of a collaborator capable of safely growing SARS-CoV-2, and infecting human cells. Yoshihiro Kawaoka, professor of pathobiological sciences, and virologist Peter Halfmann began researching SARS-CoV-2 early in the pandemic and were willing to generate and provide infected cell cultures to the Smith and Sherer groups.

Initial HyPR-MS experiments used Vero cells (African green monkey) infected with SARS-CoV-2, while the groups investigated which human lung cell lines were susceptible to infection. The pilot experiments demonstrated efficient capture of the SARS-CoV-2 RNAs and provided preliminary candidates for protein interactors. Particularly promising is an RNA-activated antiviral enzyme called OAS3 that interacts with the viral genomic RNA and a protein called SNX27 which interacts with the RNA that encodes the viral spike protein and has been implicated in regu-

lation of receptor molecules for other viruses.

The team has identified a human lung cell line, Calu-32B4, which can be reliably infected with SARS-CoV-2. HyPR-MS. Analysis using these human cells is just beginning, but the team is excited about what they will find. Once a list of human proteins that interact with the SARS-CoV-2 viral RNAs is finalized, it will be made available to other research groups, and the team will begin biological studies investigating the importance of the RNA-binding host proteins in the viral replication process.

Members of the Smith Lab are pleased to have the opportunity to contribute to the growing body of knowledge on SARS-CoV-2, and for the opportunity to work with such wonderful collaborators. They are thankful to the Sherer and Kawaoka laboratories for making this exciting work possible.



Graphic depicting the experimental process of HyPR-MS that is being utilized to study SARS-CoV-2

# ACS Organic Division launches new data site

Abridged version of a news release from the ACS Division of Organic Chemistry

The American Chemical Society Organic Division released a new resource for organic chemists:

## OrganicChemistryData.org

The idea and majority of the current content (~1500 html pages + 650 PDF files) is from the late emeritus Prof. Hans J. Reich (see feature on page 34), a pioneer in distribution of educational content via the world wide web, who served his entire professional academic career at UW-Madison.

Upon his untimely death in 2020, the division offered to assist in maintaining Reich's extensive online resources, which impact the organic chemistry community worldwide. This new website contains a list of about 300 web-based resources on organic chemistry for quick access to high-quality information.

The linked pages have been selected for ease of use, broad applicability, and quality of coverage. Topics include:

- Reaction Info
- Chemical Data
- Spectroscopy Resources
- Organic Compound Info
- Safety
- Chemical Societies & Portals
- Literature Sources
- Laboratory Techniques
- Useful Software
- Resources for Educators & Students
- Organic Chemistry Videos

Website set-up and content conversion for use on a wide range of electronic devices was completed by the following volunteers: Khoi Van,



The home page of the new Organic Chemistry Data website offers content and resources to help students and researchers.

Organic Division assistant webmaster, with initial oversight, support and direction from Brian Myers, Organic Division webmaster, and Joseph Ward, Organic Division head webmaster.

We are grateful to the University of Wisconsin-Madison (especially the Department of Chemistry) for their support in this project. We also graciously thank Dr. Ieva L. Reich,

Hans Reich's wife, and her family for supporting this project, where we are able to honor his 25+ years of website efforts in support of the broader organic chemistry community.

**MORE >>**

READ THE FULL NEWS RELEASE AT:  
[www.BadgerChemistNews.chem.wisc.edu](http://www.BadgerChemistNews.chem.wisc.edu)

## Reich Collection Highlights

- Comprehensive topics in NMR database
- NMR Spectral Database with approximately 650 high quality NMR spectra, which are searchable and grouped by functional group, molecular formula, NMR spin systems, techniques, multinuclear, and spectral level
- Information on some of the fundamentals of organic chemistry. e.g. pKa tables, electron pushing, A-values, nomenclature, organometallic chemistry (esp. organolithium reagents), pericyclic reactions, reduction and oxidation
- Approximately 700 total syntheses, searchable and categorized by compound name, named reactions used, chemoselectivity, rings formed, reaction types, reagents used and year of publication.

# Instructors, students find benefits in virtual learning

By Tatum Lyles Flick  
Department Communications

This year's pandemic-induced on-line instruction did not stop students from enrolling in chemistry courses, but it did give instructors and teaching assistants (TAs) experience using a different instructional medium.

"Teaching CHEM 344 online was definitely a unique experience," said TA Maggie McEwan. "Teaching online requires a different set of skills compared to teaching in a classroom or lab, so I think I learned a lot this summer right along with the students."

McEwan added that she missed face-to-face interactions, but appreciated how students were engaged with the material and discussions.

Two chemistry courses made the top ten list, based on number of enrolled students over the summer. Introductory Organic Chemistry Lab had the highest enrollment of any class and Intermediate Organic Chemistry had the second highest. General chemistry courses also maintained pre-pandemic enrollment numbers.

The general chemistry instruction team, which used videos, pre-class readings and quizzes to increase student engagement, focused on synchronous instruction.

"Most of these elements were already created during the REACH curriculum revision," explained Dr. Theresa Pesavento, director of teaching and learning. The REACH initiative, which started in 2016, focused on interactive and inclusive learning with increased student engagement.

Though online instruction presents challenges, many students responded positively.

"Instructors reported that one ben-



Photo by Alyson Herreid, DoIT Academic Technology

Cameras are set up to record laboratory components of general chemistry for instructional videos.

efit to the online environment is more direct and meaningful exchanges with students in large problem-solving/Q&A sessions (whole-class/lecture) where it is easier to interact individually with students via BBCollaborate video and chat, respond to their questions, and identify where they might be struggling with concepts," Pesavento said, adding that students agreed, citing positive interactions and a sense of community.

The organic chemistry instructional team, comprised of organic lab director Dr. Nick Hill and assistant lab directors Dr. Aubrey Ellison and Dr. Brian Esselman, decided that their program should focus on videoed experiments and opportunities for students and TAs to connect.

"Transforming the CHEM 344 organic laboratory course to remote instruction was an immense logistical and pedagogical challenge," Hill said. "How do you convert a practical course that relies on students recording observations, performing lab techniques, and generating and analyzing their own data into an entirely online experience yet maintain authenticity and a sense of discovery?"

Hill performed and narrated each experiment, as if leading a group of students through the procedure.

Starting with the addition of reagents to a flask, students observed all steps in the experimental and chemical disposal procedure. They also focused on finding authentic and meaningful ways to assess student learning of hands-on material taught by video.

"The instructors heavily emphasized the development of skills which enable students to make coherent arguments about a chemical reaction based on experimental data," Hill said. "Maintaining these learning outcomes in an online course entailed significant changes in the type of questions included in the lab report for each experiment and the course exams."

"I saw TAs and instructors go above and beyond to do much more than what was required," said one of the students. "The organic lab was one of the best run courses I have taken at this university!"

Most large organic chemistry courses were mainly asynchronous with some synchronous elements, enabling each student to work through material at their own pace, while staying connected through virtual office hours and group review sessions.

Both programs plan to use the videos in future semesters as preparation material for students and TAs.

# Department Updates on Collaboration, Research, Travel & Other Activities

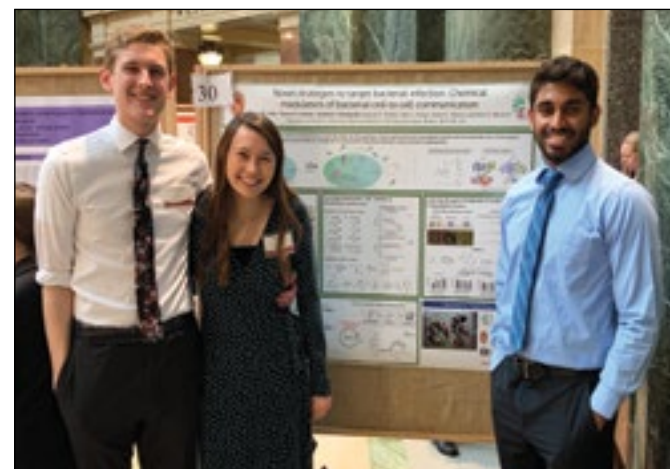


Photo by Dr. Cheri Barta

## Blackwell Group

Three undergraduate students in the Blackwell group (pictured above), Michael Kuehne, Rebecca Gillis, and Akshith Mandepally, participated in the 17th annual Research in the Rotunda, hosted by the University of Wisconsin System. Claire Evensen (not pictured) from the Record group also participated. During the event they presented posters and their research to visitors and members of the state legislature.

## Cavagnero Group

Graduate student news: Hanming Yang gave an oral presentation at the Chicago Area NMR Discussion Group Conference in November 2019. Miranda Mecha received a Robert C. Doban Mentorship Award for mentoring Natalie Feider on molecular chaperone research. Meranda Masse received the 2020 Straka Award, which is given annually to one graduate student at UW-Madison, a travel award by the Biophysical Society to present her research at the annual meeting in February 2020 in San Diego, CA and a research poster presentation award by the Biophysical Society. Rachel Hutchinson received a Graduate Research Fellowship from the UW-Madison TEAM Science Training Program. Justin Dang joined the Cavagnero group as a graduate student in November 2019. In other news, visiting scientist Valeria Guzman Luna gave an oral presentation at the 25th Annual Stress Response and Molecular Chaperone Meeting at Northwestern University in January 2020. Find our other award winners in the awards listing on page 29.



Photo by Steph Adams, University of Illinois UC

## Ediger Group

In November, Mark Ediger presented the Birnbaum Award Lecture at the University of Illinois (pictured above). The graphic on the award plaque illustrates vapor deposition.

## Ge & Jin Group Collaboration

Researchers in the Ge and Jin labs developed a method, called nanoproteomics, to capture and measure different forms of cardiac troponin I, a biomarker of heart damage currently used to help diagnose heart attacks and other heart diseases. The scientists hope it will lead to more accurate diagnostic tests. The research was published in Nature Communications. Read the full story here: <https://go.wisc.edu/n3028z>

## Gilbert Group

The Gilbert group was recently featured at news.wisc.edu for research on coral reef formation. The researchers observed reef-forming corals to identify how they create their skeletons. The results suggest that corals can resist ocean acidification caused by rising carbon dioxide levels, and that controlling water temperature, not acidity, is crucial to mitigating loss and restoring reefs. Read the full article at: <https://go.wisc.edu/i7288r>

## Graduate Student

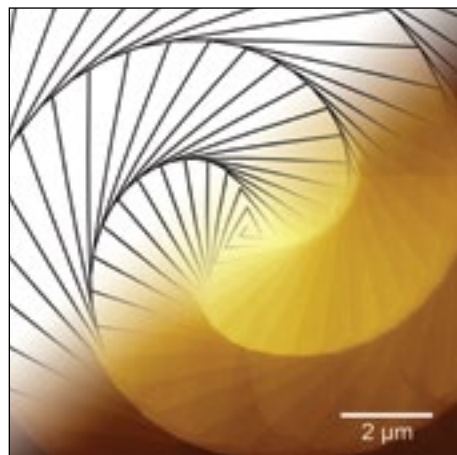
### Faculty Liaison Committee

The GSFLC Community Building Subcommittee held a Halloween costume contest through which participants submitted photos from home. The winners, chosen by a department vote, are John Wright, Katie Kruszynski and Alicia Tripp, and AJ Boydston.

The GSFLC Climate Survey Team (CST) implemented the third iteration of its biennial climate survey December 2019 to January 2020 for graduate students and postdocs. The CST presented results of the survey in a department-wide virtual seminar in July. 96 graduate students, postdocs, faculty, and staff attended to listen to the results and recommendations reported during the event. Four major themes emerged from survey responses: Clarity of PI/Advisor Expectations; Mentorship and Other Training; Diversity and Bias; Teaching. Learn more in the story on page 7.

### Jin & Wright Group Collaboration

The Jin group published an article on twisting two-dimensional (2D) materials research in the journal *Science*. They discovered a way to directly grow twisting, microscopic spirals of 2D materials on curved surfaces. The ability to rationally control the interlayer twists in 2D layers can allow scientists to study quantum physics on the



Graphic submitted by Song Jin

# COSTUME CONTEST



Winners of the GSFLC Community Building Subcommittee's socially distant Halloween costume contest are: John Wright (1st Place), Katie Kruszynski and Alicia Tripp (2nd Place) and AJ Boydston (3rd Place)

Photos submitted by contestants

nanoscale. Read the full story here: <https://go.wisc.edu/715ijc>

### Stahl Group

Shannon Stahl and Mohammad Rafiee will teach an Organic Electrochemistry Short Course, from January 13-15, 2021. With the pandemic continuing to limit in-person contact, the course will be offered in a virtual format. The presentations will take place from 9 a.m. – 12 p.m. CST each day, and will be followed by a one hour question-and-answer/discussion session each day of lectures. There will be short lab tutorial videos included in some of the lectures. More information about the topics to be covered in the course and a link to the registration website may be accessed on the course website: <https://stahl.chem.wisc.edu/or->

ganic-electrochemistry-virtual-course We hope you will be able to join us.

Graduate student Chase Salazar led a team of researchers to develop palladium catalysts for “C–H oxidation reactions” that can streamline the synthesis of pharmaceuticals and agrochemicals. This work, recently reported in *Science* (<https://science.sciencemag.org/content/early/recent>), significantly reduces the amount of palladium catalyst needed and allows oxygen gas to be used as the oxidant.

### Theoretical Chemistry Institute

TCI awarded Prof. Sharon Hammes-Schiffer the 2020-21 Joseph O. Hirschfelder Prize in Theoretical Chemistry. Hammes-Schiffer is a physical chemist who contributed to theoretical and computational chem-

istry. She is currently the John Gamble Kirkwood Professor of Chemistry at Yale University. TCI at UW–Madison established the award in 1991 in response to a generous bequest from Prof. Joseph O. Hirschfelder (1911–90) and his widow, Dr. Elizabeth S. Hirschfelder. Over the course of his 40-year career, Prof. Hirschfelder established himself as a leader in teaching, research, and public service at the university and in the broader research community. The award commemorates his role as a pioneering member of the theoretical chemistry field, beginning in the late 1930s.

### Weix Group

The Weix and Yoon groups have each secured \$50,000 in funding from ACS Green Chemistry Institute Pharmaceutical Roundtable awards. UW–Madison was the only institution with two projects funded. The Weix group received the award for “Metal-Mediated Electrochemistry: A New Frontier for Surfactants,” which aims to decrease the environmental impact of synthetic electrochemistry by running the reactions in water/surfactant mixtures instead of pure organic solvents. While great advancements have been made in electrochemistry recently, there is usually a need for dipolar aprotic solvents that are less desirable to use on a larger scale. This grant leverages the expertise of UW–Madison in electrochemistry with the Weix group's expertise in transition-metal catalysis.

### Wickens Group

The Wickens group collaborated with artists Ingrid Kallick and Peter Krsko as part of the Science to Street Art project through the Wisconsin Institutes of Discovery - and the result of



The Wickens group worked with local artists as part of the Science to Street Art project. The mural is being installed near a bike path and school on a wall at the Nine Springs Wastewater Treatment Plant.

Photo submitted by Ginger Ann Contreras

that collaboration is being installed at Nine Springs Wastewater Treatment Plant, near a bike path and school. Wickens and his students worked with local artists on the project theme - a Molecular Structure Mural, which includes how water interacts with nature.

### Wright Group

After 48 years at Wisconsin, John Wright became an emeritus professor in May, but John is not retiring. He will become a full-time researcher. He expects that his research program will expand, not contract. John's research program was motivated by attending a symposium on lasers in 1972 that included all of the most famous laser scientists. There was great excitement over all the things that a laser could do because of its coherence. It was seen as the key to an optical analogue of NMR. The panel discussion that followed concluded with the presenters answering the final question, “What is the most important application of lasers?” The answer from each of them was, “Chemistry.” The follow-up question was, “Why aren't chemists using lasers?” The answer was, “They don't know how to use lasers.” That answer

made it clear that John would seek a position in chemistry. Seeking an optical analogue of NMR formed the basis for his research program. He has worked on that goal throughout his career and just now, it is becoming a reality. John intends to push this technology as far as it will go into all the areas of science where spectroscopy is used so it can attain the original promise of a true optical analogue of NMR that is useful to all chemists.

### Yoon Group

The Yoon and Weix groups have each secured \$50,000 in funding from ACS Green Chemistry Institute Pharmaceutical Roundtable awards. UW–Madison was the only institution with two projects funded. The Yoon group received the award for “Oxidative C–N Cross-Coupling Enabled by Iron Photochemistry”. The central goal of this project is to develop an innovative and sustainable new paradigm for oxidative C–N, C–C, and C–O cross-coupling reactions. This conceptually novel strategy uses non-toxic, earth-abundant iron salts as both photocatalysts and terminal oxidants.

# Alumni Updates: Catch up with fellow Badger Chemists

Here we share some of the Alumni Profile updates submitted online. See them all at [BadgerChemistNews.chem.wisc.edu](http://BadgerChemistNews.chem.wisc.edu)

## Jonathan Bohmann (Ph.D. 1996, Weinhold/Farrar)

Bohmann, who works for the Southwest Research Institute in San Antonio, TX, is a staff scientist for a COVID-19 drug discovery project in partnership with the Department of Defense. The project is using DoD supercomputers to quickly screen drug compounds that may treat COVID-19. The work is funded by a one-year \$1.9 million contract from the Henry M. Jackson Foundation for the Advancement of Military Medicine, and makes use of a 3D drug screening software tool that Bohmann authored, Rhodium™, which predicts how protein structures in infectious diseases bind with drug compounds.

## Kristin Briney (Ph.D. 2010, Crim)

Briney is the Biology Librarian at Caltech. She and husband Andy Schmitt (Ph.D. 2009, Jin) moved from Wisconsin to Los Angeles in 2019. She authored the book "Data Management for Researchers: Organize, Maintain and Share Your Data for Research Success."

## Bruce Bursten (Ph.D. 1978, Fenske)

Bursten received the 2020 ACS Award for Distinguished Service in the Advancement of Inorganic Chemistry. See the story on page 26.

## Tess Carlson (BS 2019, Cavagnero; MA Stanford 2020)

Carlson, who teaches chemistry at Raoul Wallenberg Traditional High School in San Francisco, California, was selected as a 2020 teaching fellow by the Knowles Teacher Initiative, a program which supports early career high school mathematics and science teachers.

## Peter K. Dorhout (Ph.D. 1989, Ellis)

Peter K. Dorhout from Kansas State University has been named vice president for research (VPR) at Iowa State University. Dorhout, a fellow of the American Association for the Advancement of Science and former president of the American Chemical Society, currently serves as VPR and professor of chemistry at Kansas State. He will begin his tenure in Ames by Jan. 25, 2021.

## Adam Dunkelberger (Ph.D. 2013, Crim)

Dunkelberger, who works as a Research Chemist for the U.S. Naval Research Laboratory, was awarded the Presidential Early Career Award for Scientists and Engineers.

## Adam Garske (Ph.D. 2008, Denu)

Garske works in the Nutrition and Biosciences division of DuPont, and has been there for the last nine years. At DuPont, Garske engineers enzymes for industrial applications such as use in laundry detergents (highlighted in the TED talk). This involves altering the amino acid sequence of the enzyme from what is found in nature to maximize performance in the given application. For the last several years, Garske has been working on proteases—enzymes that catalyze the degradation of other proteins. The goal is to create proteases that are highly active in laundry, stable and manufacturable. Ultimately, these enzymes enable laundry to be done without heating, which results in significant energy savings. View the TED talk called How designing brand-new enzymes could change the world here: [www.ted.com/talks/adam\\_garske\\_how\\_designing\\_brand\\_new\\_enzymes\\_could\\_change\\_the\\_world](http://www.ted.com/talks/adam_garske_how_designing_brand_new_enzymes_could_change_the_world)

## Kenneth T. Gillen (Ph.D. 1970, Noggle)

Gillen was honored for technical competency and contributions to rubber technology as winner of the 2020 Melvin Mooney Distinguished Technology Award. Gillen worked for the Sandia National Laboratories as a polymer chemist until retirement in 2004, and now serves as a consultant.

## Kathy Gisser (Ph.D. 1992, Ellis)

Gisser, a staff scientist at Sherwin-Williams Co., Cleveland, Ohio, was featured in the book Find Your Path: Unconventional Lessons from 36 Leading Scientists and Engineers (The MIT Press). In the book scientists offer personal accounts of the challenges, struggles, successes, U-turns, and satisfactions encountered in their careers in industry, academia, and government. ([mitpress.mit.edu/books/find-your-path](http://mitpress.mit.edu/books/find-your-path))

## Leslie M. Klevay (B.S. 1956, Meloche; MD 1960)

Klevay has been married for 53 years and has three children and six grandchildren. One son and daughter-in-law are graduates of the UW Medical School. He climbed Mt. Fuji and traveled the upper 85 miles of the Mississippi River by canoe. Last year he achieved the equivalent of three equatorial trips around the world on his bicycle. His 1973 MGB-GT has the license KUPFER in honor of his theory that most heart disease is caused by copper deficiency (Nutr Res Rev 29:172, 2016). He received valuable experience as a teaching assistant in quantitative analysis (with Leussing and Blaedal) during his senior year. He has published more than 250 publications in 95 different journals and in 30+ books. He was awarded the Klaus Schwarz Commemorative Medal of the International Association of Bioinorganic Scientists and Medical Alumni Citation from the UW Medical Alumni Association. He is a Fellow of the American Society for Nutrition in honor of a distinguished career in the science of nutrition and of the American Association for the Advancement of Science for distinguished contributions to the field of copper nutrition in humans.

## Brian Parker (MS 2010, Gellman)

Parker is an assistant professor of Emergency Medicine at UT Health San Antonio, an assistant program director of residency and researches how to optimize the delivery of critical and emergency care to morbidly obese patients. He and his wife celebrated their 11th anniversary, and look back fondly on their first year of marriage, when they were

at UW. Their two year old son and four year old daughter can't wait to visit the campus and see the Badgers play at Camp Randall.

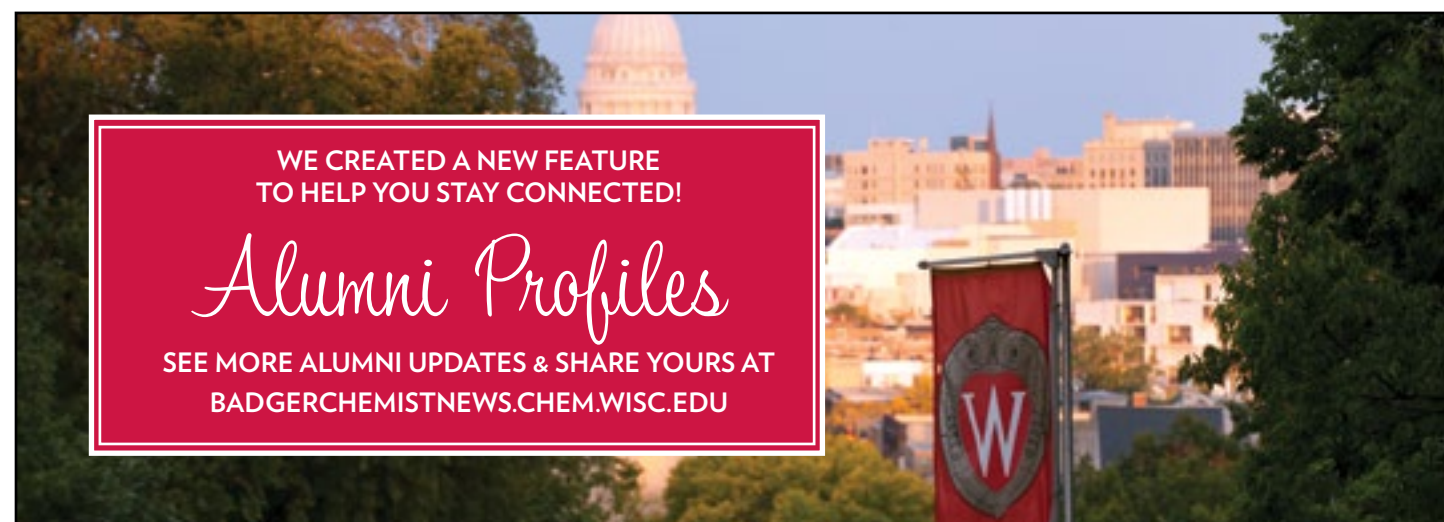


## Treichel Group

Alumni of Paul Treichel's Inorganic Chemistry group (pictured above), David Shaw (Ph.D. 1975) and Rick Wong (Ph.D. 1977) had a reunion in Hong Kong in January. David and his wife Marsha completed a Singapore to Hong Kong cruise in early January, and had dinner with Rick and his wife Annie at a restaurant on Hong Kong island. David is retired from many years of teaching at Madison Area Technical College, in addition to collaborating on several Chemical Education projects with the department. Rick was vice-president of research and now continues as professor of chemistry at Hong Kong Baptist University. He sent several of his students to Madison for their graduate degrees over the years. The meal and the conversations were wonderful. The Shaws left Hong Kong a few days after the dinner, just as the authorities were starting to realize that the virus coming out of Wuhan did have human-to-human transmission.

## Thomas Welter (Ph.D. 1977, Zimmerman)

Welter retired after 35 years with Eastman Kodak Company and two years with Novomer Inc.



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[www.BadgerChemistNews.chem.wisc.edu](http://www.BadgerChemistNews.chem.wisc.edu)

# FEATURED BADGER CHEMIST

## Bruce Bursten, Ph.D. 1978 (Fenske)

By Aadishre Kasat  
Department Communications &  
Student Researcher (Buller)

Prof. Bruce Bursten received his Ph.D. in chemistry from UW–Madison in 1978. He was recently honored with the 2020 ACS Award for Distinguished Service in the Advancement of Inorganic Chemistry.

Bursten's journey toward the ACS award has been profoundly guided by his experiences. His story begins in high school, as a curious student in a math summer program.

With hands covered in chalk, gazing at complex equations, within the sunlit, tall white walls of Berkeley, the professor within Bruce Bursten was kindled for the very first time. It was something about being on a college campus, surrounded by passion and intellect, that as a junior in high school Bursten already knew his future.

He carried his love for numbers to the University of Chicago and started as a math major. "I took first-year chemistry because my mom wanted me to consider premed and because I enjoyed the problem-solving aspect of it," Bursten said. "I eventually de-



Photo submitted by Prof. Bruce Bursten

Prof. Bruce Bursten (center) stands with Emeritus Professors Paul Treichel (left) and Larry Dahl (right), who he considers important mentors during his time as a graduate student at UW.

cided to take both organic and physical chemistry as a sophomore and figured if I survived that, I was going to be a chemist. Needless to say, I loved it and pursued the opportunity of becoming a professor."

Bursten's quest in inorganic research began with Prof. Virgil Goeden, with whom he worked during college. "I quickly learned that I have the hands of a mathematician, not an experimental chemist, and so I began exploring chemistry using computers," Bursten said. These interests continued when he attended UW for graduate school and worked under the direction of the late Prof. Richard Fenske.

"He was a phenomenal mentor!" Bursten said. "It was almost like having a parent figure who was also a friend. At the time he was department chair; watching him be such an integral part of running the university significantly affected my choice of accepting positions as a department chair, dean and

provost later in my career."

For his postdoctoral fellowship, Bursten worked with Prof. F. Albert Cotton at Texas A&M University. "He was a very demanding guy who became a very good friend; working with him showed me different ways of thinking."

Bursten went on to serve as secretary of the inorganic chemistry division and eventually president of the American Chemical Society, where he started the ACS Fellows program to celebrate service, professional excellence, and increased efforts to enhance diversity.

As he considered the path that led to his ACS award, he shared what drives him to make a difference in the lives of other scientists, "The path I have taken has been tremendously shaped by the people I interacted with, and I have taken that lesson to heart in trying to help shape the careers of my students as well as being committed to giving back to my field."

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Email us at [connect@chem.wisc.edu](mailto:connect@chem.wisc.edu) to  
share your story or suggest someone to feature.



## Department wins Regents' Diversity Award

By Tatum Lyles Flick  
Department Communications

The University of Wisconsin–Madison Department of Chemistry received a 2020 Diversity Award from the University of Wisconsin System Board of Regents. The award recognizes the department's efforts to enhance underrepresented students' access to and success in the chemistry graduate program.

"This award celebrates a key point in our progress toward fostering greater diversity in our discipline and is just the beginning of our efforts" said Judith Burstyn, department chair. "These achievements are the result of everyone in the department who works tirelessly to build diversity through the creation of key programs and mentorship of students."

The field of chemistry has long lacked diversity. According to the American Chemical Society (ACS), the number of females receiving bachelor's degrees in the discipline is increasing, but the number of doctoral recipients, postdoctoral scientists, and professional chemists who stem from other traditionally underrepresented populations is still low.

"Everyone benefits from diverse perspectives," Burstyn said. "We recognized that need in our department, and have worked to find effective solutions."

The Department of Chemistry has created several programs aimed at increasing diversity in the field and at supporting students who pursue a graduate degree. Chemistry Op-



Bryce Richter / UW–Madison

Members of the UW–Madison chemistry department receive a Diversity Award at the Board of Regents meeting held at the University of Wisconsin–Madison on Feb. 7, 2020.

portunities (CHOPs), which brings in students from minority-serving institutions, and Research Experiences for Undergraduates both facilitate undergraduate exploration of the department's doctoral program. For graduate students, the department offers Catalyst, a supportive mentoring program for underrepresented

by completing a research-based master's degree, with the benefit of well-coordinated mentorship.

"Consistent with UW–Madison's commitment to recruit, retain and graduate a diverse student body, the Department of Chemistry embraced their role in supporting diversity by creating highly effective initiatives to increase representation within their large graduate program," said Gloria Mari Beffa, associate dean in the Colleges of Letters & Science, in her nomination letter.

Judith N. Burstyn  
Department Chair

**"This award celebrates a key point in our progress toward fostering greater diversity in our discipline and is just the beginning of our efforts."**

The Board of Regents awards the winners \$7,500, which the chemistry department will use to support its programs. The Diversity Awards are administered by the UW System Office of Academic and Student Affairs. The other recipients are Associate Prof. Arijit Sen, from the UW–Milwaukee School of Architecture and Urban Planning, and UW–Stout's Fostering Success program. The three winners were recognized at the February meeting of the Board of Regents in Madison.

The strength and effectiveness of the first three programs led the ACS to select the department as its first partner for a Chemistry Bridge to the Doctorate program, which aims to increase the number of doctoral degrees completed by underrepresented minorities. A select group of students bolster their experience and applications to top Ph.D. programs

# Chemistry students win numerous awards

By Caroline Cole  
Department Communications

It was a busy year for awards, despite the constraints of a pandemic. In May, the Department of Chemistry celebrated students, faculty and staff with an online awards and graduation event called Celebrating Student Success.

Because of generous donors, the department was able to give almost \$500,000 in student support. See the winners of department and other awards starting on the next page.

The College of Letters and Science also announced scholarship winners in 2020 and honor society Phi Beta Kappa announced new members.

The Wisconsin Scholarship Hub (WiSH) provides information about awards and funding for high-achieving students. The review teams look for creativity, community service, leadership, strength of character, and more, WiSH stated.

Lydia Hoffman, the recipient of the 2020 Jane Goddard Scholarship award from L&S, is a rising senior studying chemistry and French. The scholarship supports exceptional juniors or seniors studying in the humanities field.

“I am truly humbled and honored to have been selected as a recipient of the Jane Goddard Scholarship,” Hoffman said. “I am moved by the donor’s and UW–Madison’s support and commitment to my education reflected by this award. Knowing that I have the support and encouragement of the University behind me, I can persevere through this unprecedented time and finish strongly in my

final year here at UW–Madison.”

Hoffman plans to apply to graduate programs this fall, in hopes of teaching on the collegiate level.

Matthew McGill is a junior majoring in chemistry, and he was awarded the Ralph B. Abrams Scholarship from L&S. This award is given to exceptional students in the College of Letters and Sciences (L&S).

“Aside from the generous financial aid, the award carries more meaning to me,” McGill said. “It shows that the UW–Madison chemistry department believes in me as a student and fledgling scientist. In my time in the chemistry building, I have seen firsthand the care and dedication that the lecturers, advisors, graduate students, and support staff have for student success. The Herculean efforts that were put forth this past spring to finish the semester online are one of many examples of this dedication.”

McGill was involved in research for a semester with the Buller lab with his mentor, Meghan Campbell. McGill’s lab work is centered around engineering enzymatic catalysts to make new amino acids. After college, he plans to go to graduate school so he can work in the field of medicinal chemistry, specifically in drug design and synthesis.

Other winners include Chance Wilkinson-Johnson, who won the Leo and Jean Besozzi Scholarship Award, and Ira Manthey, who won the Wirth Scholars Award. The Leo and Jean Besozzi Scholarship is gifted to high-achieving seniors in L&S, and Wirth Scholars are high achieving first-generation college students with an intended major in L&S or



Lydia Hoffman

women students in the biological or physical sciences field that are research-oriented.

Nine chemistry students were inducted into Phi Beta Kappa, one of the oldest and most prestigious honors societies in the country. Some of those students include Brendan Anderson, Sean Huth, Calvin Spolar, Morgan Gugger, Lydia Hoffman, Jacob O’Hearn and Kaining Mao.

Approximately 150 of the top undergraduates at UW–Madison are selected to join Phi Beta Kappa each year. To be selected for participation, students must be among the top in their class, take a range of courses to demonstrate a diverse liberal arts course load, and take a college-level math, statistics or logic course.

**MORE >>**

READ ABOUT DEPT. SCHOLARSHIPS AT:  
[www.BadgerChemistNews.chem.wisc.edu](http://www.BadgerChemistNews.chem.wisc.edu)

# Department of Chemistry Awardees

Did we miss an award? Let us know about all of your accomplishments at [connect@chem.wisc.edu](mailto:connect@chem.wisc.edu)!

## FACULTY AND STAFF

Bates, Desiree	Outstanding Women of Color Award
Blackwell, Helen	STAR Award for Cottrell Scholars
Brunold, Thomas	2019-20 WARF Kellett Mid-Career Award
Buller, Andrew	GSFLC Mentorship Award NIH New Innovators Award
Casperson, Kurtis	University Staff Excellence Award University Staff Recognition Award
Choi, Kyoung-Shin	Vilas Faculty Mid-Career Investigator Award Baldwin Wisconsin Idea Award
Coon, Josh	2020 Kellett Mid-Career Award
Doolittle, Pam	Dept. Academic Staff Excellence Award
Ediger, Mark	2019 Kavli Lecturer (APS March Meeting) 2019 Chancellor’s Distinguished Teaching Award 2019 Birnbaum Award (University of Illinois)
Fredrickson, Danny	James W. Taylor Teaching Award 2020-2021 Vilas Associate Elected to Physical Sciences Divisional Committee
Garand, Etienne	2020-2021 Vilas Associate
Ge, Ying	American Society for Mass Spectrometry Biemann Medal
Gellman, Sam	Vilas Research Professorship Honorary Member, Hungarian Academy of Sciences Meienhofer Award, Boulder Peptide Society
Gockel, Sam	GSFLC Mentorship Award
Mattei, Michael	GSFLC Mentorship Award
Schueneman, Susan	Outstanding Chemistry Teaching Assistant
Stahl, Shannon	2019 WARF Innovation Award, finalist 2020 ACS Catalysis Lectureship
Stephens, Karen	Pringle Award
Swords, Wesley	GSFLC Mentorship Award
Weix, Dan	ACS Cope Scholar Award ACS Green Chemistry Institute Pharm Roundtable Grant
Wickens, Zachary	GSFLC Mentorship Award
Yethiraj, Arun	GSFLC Mentorship Award
Yoon, Tehshik	ACS Green Chemistry Institute Pharm Roundtable Grant
Zanni, Martin	Elected to AAAS 2019 UPenn Chemistry Distinguished Alumni Award APS 2021 Plyler Prize for Molecular Spectroscopy & Dynamics
Zweifel, Erynn	University Staff Recognition Award

## GRADUATE STUDENTS

Acosta, Milton (Berry)	Pei Wang Fellowship
Alektiar, Sara (Wickens)	NSF Graduate Fellowship, Honorable Mention
Alperstein, Ariel	Reddy Award in Physical Chemistry
Benware, Sarah (Pedersen)	Pei Wang Fellowship
Bishop, Camille	McCoy Memorial Scholarship National Research Council Postdoc Fellowship
Brown, Kyle (Ge)	Hartl Excellence in Research Award - Analytical Three Minute Thesis Competition, 1st Runner Up
Bruns, David (Stahl)	Goering Organic Chemistry Fellowship

Flores, Brandon (Fredrickson)	Pei Wang Fellowship
Campbell, Meghan (Buller)	2019-20 TA Award
Candelaria, Froylan Omar Fernandez (Burstyn)	Pei Wang Fellowship
Cendejas, Melissa (Hermans)	Hay Fellowship
Cary, Brian (Gellman)	Hartl Excellence in Research Award- Chemical Biology Morton Research Award, Graduate Mentor
Chen, Si-Jie (Stahl)	Dickinson Fellowship in Organic Chemistry
Chmiel, Alyah (Wickens)	Pei Wang Fellowship
Corbin, Joshua (Schomaker)	PPG Summer Fellowship
Cribari, Mario (Martell)	Three Minute Thesis Competition, 3rd
Czerwinski, Rachel (Goldsmith)	NSF Graduate Fellowship 2019-20 Teaching Assistant Award
Deglopper, Kimberly (Stowe)	2019-20 Teaching Assistant Award
Delaney, Kellen (Li)	Schrag Analytical Chemistry Outstanding Peer Award Berk Award for Excellence in Chemistry Research
Dorman, Matisha (McMahon)	Chosen for Graduate School Student Advisory Board
Elmendorf, Laura (Brunold)	NSF Graduate Fellowship, Honorable Mention
Evensen, Claire	2020 Rhodes Scholar
Fellows, Madison (McMahon)	2019-20 Teaching Assistant Award
Foote, Alex (Goldsmith)	Carlson Graduate Award
Garcia, Kevin (Weix)	Goering Organic Chemistry Fellowship Selected to attend AbbVie Scholar Symposium
Genzink, Matt (Yoon)	NSF Graduate Fellowship 2019-20 Teaching Assistant Award
Girvin, Zeb (Gellman)	Casey Excellence in Research Award-Organic Reaxys Ph.D. Prize, Finalist
Goes, Shannon (Stahl)	PPG Summer Fellowship
Good, Gillian (Martell)	Pei Wang Fellowship
Greenhalgh, Elizabeth (Brunold)	NSF Graduate Fellowship Honorable Mention Best Poster, Midwest Enzymes Chemistry Conf.
Hassan, Mostafa (Sibert)	2020 Goldwater Scholar
Hautzinger, Matt (Jin)	2019-20 Teaching Assistant Award
Higgins, Peyton (Buller)	NSF Graduate Fellowship
Hutchinson, Rachel (Cavagnero)	TEAM Science Training Grad Research Award
Ju, Minsoo (Schomaker)	Dickinson Fellowship in Organic Chemistry
Kidd, Jesse (Yoon)	Slifkin Award in Chemistry
Kim, Min Ji (Wickens)	Pei Wang Fellowship
Kohn, Eric (Martell)	Pei Wang Fellowship NSF Graduate Fellowship
Kreisel, Joshua (Martell)	Pei Wang Fellowship
Kurgan, Kathleen (Gellman)	Hirschmann-Rich Fellowship in Bio-Organic Chemistry
Kuborn, Thomas	Outstanding Chemistry Teaching Assistant Award
Lampkin, Philip (Gellman)	NSF Graduate Fellowship, Honorable Mention
Lee, Byung Joo (Wang)	Goering Organic Chemistry Fellowship
Li, Miyang (Li)	Hay Fellowship
Lim, Amber (Fredrickson)	2019-20 Teaching Assistant Award
Linke, Vanessa (Coon)	Hay Fellowship
Lipinski, Karli (Hoskins)	NSF Graduate Fellowship, Honorable Mention

Liu, Lei (Gellman)	Mirviss Mentorship Award in Chemistry
Longley, Victoria (Weix)	PPG Summer Fellowship
Lumley, Margaret (Choi)	Schrag Analytical Chemistry Outstanding Peer Award Hay Fellowship
Lutovsky, Grace (Yoon)	.3M Science & Technology Fellowship NSF Graduate Fellowship, Honorable Mention
Machhi, Jasmin (Cavagnero)	Taylor Scholarship NSF REU Fellowship (Summer 2020)
Manson, Daniel (Blackwell)	Dickinson Fellowship in Organic Chemistry
Masse, Meranda (Cavagnero)	2020 Straka Award Biophysical Society Travel Award Biophysical Society Research Poster Presentation Award
Mattock, Dominic (Wang)	Pei Wang Fellowship
McCarty, Bethany (Tang)	NSF Graduate Fellowship
Mecha, Miranda (Cavagnero)	Doban Mentorship Award
Merenini, Princess (Choi)	Pei Wang Fellowship
Melby, Jake (Ge)	NSF Graduate Fellowship, Honorable Mention
Mihalyi-Koch, Willa (Jin)	Pei Wang Fellowship
Mill, Jericha (Li)	NSF Graduate Fellowship, Honorable Mention 2019-20 TA Award
Moreno, David (Ge)	Pei Wang Fellowship
Morris, Rylie (Gellman)	Pei Wang Fellowship NSF Graduate Fellowship
Morrow, Darien	Hartl Excellence in Research Award-Physical
Mustafi, Mainak	WISL Award for Communicating Ph.D. Research to the Public
Nicastri, Kate (Schomaker)	Goering Organic Chemistry Fellowship Slifkin Award in Chemistry Outstanding Chemistry Teaching Assistant Award
Nieszala, Megan (Landis)	NSF Graduate Fellowship
Nutting, Jordan (Stahl)	2020 AAAS Mass Media Fellowship
Orr, Vanessa (McMahon)	Outstanding Chemistry Teaching Assistant Award
Owen, Andrew (McMahon)	Outstanding Chemistry Teaching Assistant Award
Pimentel, Edward (Martell)	Slifkin Award in Chemistry
Pattaburaman, Dinesh	WISL Award for Communicating Ph.D. Research to the Public
Podorova, Yulia (Zanni)	Pei Wang Fellowship
Reed, Nicholas (Yoon)	Goering Organic Chemistry Fellowship PPG Mentoring Award
Ross, Dominic (Jin)	NSF Graduate Fellowship, Honorable Mention
Roy, Michael (Berry)	Daniels Ethical Leadership Award Outstanding Chemistry Teaching Assistant Award
Salazar, Chase (Stahl)	Goering Organic Chemistry Fellowship
Santalucia, Daniel J. (Berry)	Outstanding Chemistry Teaching Assistant Award
Schaffer, Leah (Smith)	Parr Memorial Award
Smith, Houston (McMahon)	2019-20 Teaching Assistant Award
Smith, Jamorous (Buller)	Pei Wang Fellowship
Smith, Mackinsey (Goldsmith)	Pei Wang Fellowship NSF Graduate Fellowship
Spitha, Natalia (Wright)	2019-20 Teaching Assistant Award
Tabang, Dylan (Li)	NSF Graduate Fellowship Honorable Mention
Targos, Karina (Wickens)	Pei Wang Fellowship
Thomas, AnnaBeth	Pei Wang Fellowship
Trenerry, Michael J. (Berry)	Outstanding Chemistry Teaching Assistant Award
Tritt, Rachel (Boydston)	NSF Graduate Fellowship, Honorable Mention

Trujillo, Anji (Coon)	Hirschmann-Rich Fellowship in Bio-Organic Chemistry
Tucholski, Trisha	Parr Memorial Award
Vasilopoulos, Aris (Stahl)	Dickinson Fellowship in Organic Chemistry
Vine, Logan (Schomaker)	Goering Organic Chemistry Fellowship
Vollbrecht, Cecilia (Goldsmith)	QISE-Net award
Warden, Hillary Mitchell (Fredrickson)	Casey Excellence in Research Award-Inorganic
Walsh, Shannon	WISL Award for Communicating Ph.D. Research to the Public
Weaver, Brian (Burstyn)	Best Poster, Midwest Enzymes Chemistry Conf.
Wegner, Kyle	WISL Award for Communicating Ph.D. Research to the Public
West, Korbin (Blackwell)	Hirschmann-Rich Fellowship in Bio-Organic Chemistry Mirviss Mentorship Award in Chemistry
Wheaton, Amelia (Berry)	NSF Graduate Fellowship, Honorable Mention
Yang, Hanming (Cavagnero)	Bender Memorial Award Presented at the CANMRDG NMR Conference
Xing, Enran (Ediger)	PPG Summer Fellowship
Zhang, Yongqian "Kelly"	Hartl Excellence in Research Award-Materials

### UNDERGRADUATE STUDENTS

Akhetova, Sofya (Boydston)	Herscher Scholarship
Allen, Anna (Cavagnero)	Herscher Scholarship Hilldale Research Award
Anderson, Brendan	Student Support in Chemistry
Allen, Anna (Cavagnero)	Herscher Scholarship Hilldale Research Award
Ausman, Samantha (Dumesic)	Dept. Undergrad Research Poster Award
Bartels, Brenna	Firminhac Chemistry Scholarship
Beyer, Peyton	WI ACS Undergrad. Award for Excellence in Chemistry
Bieser, Michael (Ediger)	WI ACS DUCK Exam Award
Carlson, Grace (Buller)	Student Support in Chemistry Tong Scholarship in Chemistry Dept. Undergrad. Research Poster Award
Chen, Chelsea (Cavagnero)	UW-Madison Biochemistry Summer Research Awards
Coulthurst, Josette	Saco Polymer Scholarship
England, Kevin (Cavagnero)	Chemistry Department Scholarship Larsen Scholarship Hilldale Research Award Dept. Undergrad. Research Poster Award ASBMB Undergraduate Research Conference, Poster Award
Erpelding, Peter (Sheibani)	Don Brouse Memorial Scholarship Hilldale Research Award
Flesch, Kaylin (Stahl)	WI ACS Undergrad. Award for Excellence in Chemistry
Geng, Han (Berry)	Week Scholarship
Gugger, Morgan (Ge)	Maeck Scholarship in Chemistry Telander Undergrad Research Award Ackerman Scholarship Hilldale Research Award
Gut, Mary	Alpha Chi Sigma Scholarship
Harker, Cade	Student Support in Chemistry Ziarnik Scholarship
Harrison, Brandon	Krauskopf Memorial Scholarship
Hoffman, Lydia	Jane Goddard Scholarship
Hunjadi, Rachel	ACS-Hach Land Grant Undergrad Scholarship

Ishikuri, Takahiro (Record)	Ackerman Scholarship Hilldale Research Award
Juntunen, Nicholas (Brunold)	Ackerman Scholarship Noland Research Fellowship Tong Scholarship in Chemistry Morton Research Award, Undergrad Mentee Dept. Undergrad Research Poster, Honorable Mention
Kaiser, Bridget (Rayment)	Hilldale Research Award
Kasat, Aadhishre (Buller)	Fischer Scholarship Dept. Undergrad. Research Poster Award
Kleman, Adam (Gellman)	PPG Mentoring Award
Kressuk, Rebecca	Dorsey Memorial Scholarship Tong Scholarship in Chemistry
Kyrvasilis, Andreas (Ge)	Hilldale Research Award
Leisten, Eric (Tang)	Hilldale Research Award
Lin, Yueai (Fredrickson)	McLean Bender Scholarship Week Scholarship Hilldale Research Award
Ma, Stella (Blackwell)	Kreger Herscher Scholarship Duthey Reiner Scholarship 2020 Goldwater Scholar
Machhi, Jasmine (Cavagnero)	Taylor Scholarship NSF REU Fellowship
Mandepally, Akshith (Blackwell)	Taylor Scholarship
Manthey, Ira	Wirth Scholars Award
McCann, Erin (Yu)	Dept. Undergrad Research Poster Award
McGill, Matthew	Student Support in Chemistry Ralph B. Abrams Scholarship
Mehta, Moulik	Moore Award for Excellence-109
Minic, Marina (Bertram)	Maeck Scholarship in Chemistry
Nguyen Kevin (Gellman)	Hilldale Research Award
Ni, Chi-Min (Nathanson)	Dempsky Chemistry Scholarship
Nguyen, Kevin Dinh (Gellman)	Morton Research Award, Undergrad. Mentee

Onnuch, Paul	Ackerman Scholarship Toy Scholarship
Palatnik, Benjamin	Ackerman Scholarship
Palof, George	Krauskopf Memorial Award
Pederson, Corey	Student Support in Chemistry
Ragan, Abbey (Instructional Staff)	Kreger Herscher Scholarship
Rattanakornphan, Dan	Moore Award for Excellence-109
Raskopf, William (Schomaker)	Ackerman Scholarship Firminhac Chemistry Scholarship
Rivard, Matthew	Dempsky Chemistry Scholarship
Rupanya, Anuchit	Chemistry Department Scholarship Panek Memorial Scholarship
Sill, Alex (Demonstration Lab)	Plank & Putze Memorial Scholarship
Singh, Aditya (Yethiraj)	WI ACS Undergrad. Award for Excellence in Chemistry ACS P. Chem Undergrad. Award for Graduating Senior
Snider, Dylan (Nathanson)	Dempsky Chemistry Scholarship Hilldale Research Award
Sun, Yuqian	Moore Award for Excellence-109
Susilo, Nicholas	Krauskopf Memorial Award
Tankel, Nataniel	WI ACS DUCK Exam Award
Tigges-Green, Isabelle (Zanni)	WI ACS Ugrad Award for Excellence in Chemistry NSF Graduate Fellowship
Unger, Maxwell	Boomer Student Support Fund
Voigt, William	Krauskopf Memorial Award
Wei, Wanting (Cavagnero)	UW-Madison Biochemistry Summer Research Awards
Weidemann, Amelia	Krauskopf Memorial Award
Wilkinson-Johnson, Chance	Paulick Undergrad Scholarship Saco Polymers Scholarship Besozzi Scholarship
Winter, Casey (Wickens)	Student Support in Chemistry
Witzig, Daniel	Moore Award for Excellence-108
Xistris, Lily	Krauskopf Memorial Award
Ye, Xinyu (Gellman)	Dept. Undergrad Research Poster Award, Honorable Mention



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# In Memoriam

We remember friends, faculty & alumni below.  
If a name is missing from the list, you may find it in our 2019 issue or on our website.

## 2019

03/18 Clark, Bruce, Ph.D. 1974 (Evans)	03/30 Connors, William, BS 1960, JD 1982
04/28 Mirviss, Stanley B., BS 1944, Ph.D. 1951 (McElvain)	04/01 Caufield, Craig, Ph.D. 1984 (Zimmerman)
08/07 Heydinger Galante, Jenifer, Ph.D. 1990 (Zimmerman)	04/10 Wiggert, Elizabeth, BA 1956, MS 1961 (West)
09/19 Stull, G. Alan, Donor	04/16 Mirviss, Ina, MS 1949 Biochem, supporter
09/22 Johns, William, Ph.D. 1955 (Johnson)	04/29 Berge, Lila, supporter
09/30 Yamamoto, Y. Stephen, BS 1965	05/01 Reich, Hans, Emeritus Faculty
10/06 Hansen, Maryjane, supporter	05/13 Barg, Evelyn, BS 1949 (Ihde)
10/11 Licke, George, Ph.D. 1967 (Zimmerman)	07/01 Somsen, Roger, BS 1953
10/13 Kons, Hugo, BS 1972 (Woods)	07/01 Schooler, James, MS 1959, Ph.D. 1964 (Wilds)
10/17 Adams, James, BS 1943 (Klein)	07/05 Kropp, Paul, Ph.D. 1962 (Johnson)
10/26 Saunders, Winifred, BS 1949 (Schuette)	07/07 Allen, Edward, supporter
10/28 Berman, David, BS 1948 (Ihde)	07/20 Yin, Fay, BA 1954, Ph.D. Biochem 1960 (Ferry)
11/01 Herreid, Richard, MS 1976 (O' Leary)	07/25 Morman, Joyce, BS Ecology 1957
11/09 Van Holde, Kensal, BS 1948, Ph.D. 1952 (Williams)	07/26 Mazurak, Peter, MS 1966 (Willard)
12/09 Hindermann, David, Ph.D. 1967 (Cornwell)	08/11 Certain, Phillip, Ph.D. 1969 (Hirschfelder)
12/10 Currier, Vernon, BS 1950 (Johnson)	08/23 Immke, Joshua, Ph.D. student
12/30 Fuhlbrigge, Armin, BA 1951, BS 1952, MD 1955 (Woyski)	08/28 Krahnke, Robert, BS 1955 (Daniels)
12/31 Ruka, Roswell, BS 1944; MS 1948 (McElvain)	08/31 Daines, Gary, BS 1966
	09/10 Schellhas, Gordon, BS 1949 (Woyski)
	09/19 Clemens, David, Ph.D. 1957 (McElvain)
	09/30 Olmstead, Marilyn, Ph.D. 1969 (Fenske)
	10/07 Bray, John, MAJ 1990

## 2020

01/03 Roth, Marie, Ph.D. 1952 (Johnson)
01/20 Zimmer, Joseph, MS 1970 (Evans)
03/26 Ver Ploeg, Dan, Ph.D. 1968 (Alberty)
03/30 Linzmeier, Karen, BS 1985 (Harriman)

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[www.BadgerChemistNews.chem.wisc.edu](http://www.BadgerChemistNews.chem.wisc.edu)

# Phil Certain (Ph.D. 1969, Hirschfelder)

Former department chair and L&S dean known for thoughtful leadership & innovation



Phillip R. Certain

By Mary Ellen Gabriel  
L&S Director of Communications

Phillip R. Certain, former chair of the Department of Chemistry and former dean of the College of Letters & Sci-

ence died in August at age 76.

Trained as a theoretical chemist who worked with quantum mechanics and the structure of molecules, Certain earned his Ph.D. at UW-Madison and joined the faculty in 1970, receiving a Guggenheim Fellowship in 1978. He was a fellow of the American Association for the Advancement of Science.

Certain had a reputation as a careful listener, visionary problem-solver and people-focused leader who cultivated leadership in others.

"Phil was a wonderful leader and colleague. He cared passionately about UW-Madison and lived our highest values," said UW-Madison Provost Karl Scholz.

As L&S dean, Certain oversaw major building and capital improvement

projects, including the 90,000-square-foot Chemistry Building (dedicated in 2000) as well as state-of-the-art facilities improvements for the Physics, Psychology and Astronomy departments and lecture hall renovations for improved instructional technology.

Upon his retirement, a fund was created in his honor. The Phillip R. Certain and Gary D. Sandefur Distinguished Faculty Award is an annual award to newly tenured faculty, outstanding in research, teaching and service to the college and to the campus.

**MORE >>**

READ THE FULL STORY ONLINE AT:  
[www.BadgerChemistNews.chem.wisc.edu](http://www.BadgerChemistNews.chem.wisc.edu)

# Marilyn Olmstead (Ph.D. 1969, Fenske)

Alumna teacher and leader in X-ray crystallography pioneered key techniques in the field

Becky Oskin, research communications  
UC Davis College of Letters and Science

Marilyn Olmstead, a leader in X-ray crystallography and teacher died in September. She was 76.

Olmstead had a broad range of research interests, drawing from her focus on small molecule X-ray crystallography. She gained wide recognition for her skill in crystal structure determination and was an expert in the crystallographic study of fullerenes — a spherical form of carbon discovered in 1985. With Alan Balch, UC Davis distinguished professor of chemistry, Olmstead pioneered a technique to "co-crystallize" fullerenes. This allowed them to retrieve better structural data than standard crystallization methods. The work was central to the doctoral

theses of dozens of students co-advised by Balch and Olmstead.

Olmstead said that "X-ray crystallography is like listening to an orchestra play." From a young age, she was fascinated with symmetry, chirality and repetitive motifs. She would stop and peer at snowflakes, pinecones, insects, flowers and mosaics to search for hidden symmetries. She devoted her life to trying to understand Nature's rules for the assembly of molecules and atoms.

Olmstead earned a bachelor's degree in chemistry at Reed College, and was awarded a Woodrow Wilson Fellowship to support her graduate studies at the University of Wisconsin-Madison. She received her Ph.D. in chemistry in 1969.



Marilyn Olmstead

**MORE >>**

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# Remembering Hans Reich (Ph.D. 1968, Cram)

## Committed to students, colleagues and science, Reich leaves lasting legacy

By Aadishre Kasat  
Department Communications &  
Student Researcher (Buller)

Everyone who knew Hans Reich knew of his love for the chemistry department. For 43 years of his life, Reich distinguished himself as an exceptional professor, a passionate scientist, and above all, an inspiring colleague. He died May 1, 2020, at age 76, from an injury sustained in a bicycle accident.

"Hans was very committed to science, his students, and education," said Prof. Sam Gellman. "His selflessness is what distinguished him from many others of his caliber and ambition."

Reich joined the chemistry department as an assistant professor in 1970. Soon after his arrival, he established what became a globally renowned research program in physical organic chemistry. The students he interacted with considered him a remarkable mentor.

Reich met his wife, Ieva, while they were both working on their doctoral degrees in organic chemistry at UCLA. Ieva was very active in departmental life, serving as a senior lecturer for twenty years. "Of course, Hans was very proud of his research, but he took most pride in the accomplishments of his graduate and undergraduate students," she said. "He maintained

connections with them even after their graduation and continued to be a pillar of support and encouragement in their lives."

Reich's research efforts were directed toward the study of organometallic and organometalloid compounds. Through his extensive study, he deepened the understanding of these materials and broadened and improved their chemistry. For his work, the American Chemical Society honored him with the James Flack Norris Award in Physical-Organic Chemistry in 2012.

"There are many moments when I drew inspiration from Hans and his work; he was such a deep thinker and always dealt with situations so calmly," Gellman explained. "Every Wednesday, we would have joint group meetings. Sitting there, listening to him ask the most perceptive and critical questions, I would think to myself that I am so lucky to have one of the greatest minds in chemistry look so closely at all



Photo submitted by Ieva Reich

Ieva and Hans Reich

the research being conducted in my lab."

Across the department, Reich was respected for his acumen and guidance. Ieva said, "Hans loved everyone in the department, and everyone loved him, which is why his roles as the associate chair of the chemistry department and chair of the organic chemistry division were very fitting."

According to Ieva, his most significant accomplishment is his website. She said, "Hans was an international superstar for his webpages. He worked on them till his very last day.

All the resources he has compiled over the years have helped organic chemistry students and scientists all across the world. After

his passing, I received several emails from people who used his webpages; people he had never known or met."

"My first interaction with Hans took place much earlier," Gellman said. "On my first day of graduate school at Columbia, I was assigned a desk, and right above it was a table of pKa values. I stared at that table for all four years of graduate school, but it wasn't until I came to UW that I realized it was Hans's table of pKa values. He diligently worked on updating these numbers on his website, and scientists and students all across the world have used them and will continue to use them."

Reich lived a full life. He was an invaluable member of the chemistry department and will be remembered for his friendly smile and contagious passion.

“There are many moments when I drew inspiration from Hans and his work; he was such a deep thinker and always dealt with situations so calmly.”

Sam Gellman  
Professor of Chemistry

# Remembering Steve Yamamoto (B.S. 1965, Ph.D. PSU)

## Family ties to Wisconsin and UW–Madison create enduring legacy

By Mason Braasch  
Department Communications

At his 45th high school reunion, Steve Yamamoto said that he had "gone on to try just about everything," and looking at his life, this was not an exaggeration.

Steve grew up in Madison. His father, Shinji Yamamoto, was a Wisconsin state architect who managed construction of many familiar and important state and university buildings. Robert J. McMahon, professor of chemistry at the University of Wisconsin-Madison, explained that Madison was an important place for the family, especially for Steve.

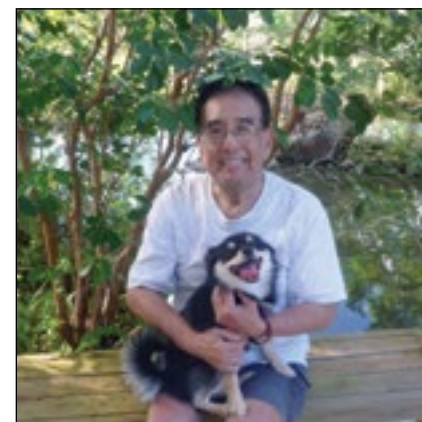
"He was very proud of Wisconsin because it was the place that offered his father a job after he was freed from a Japanese internment camp in Utah during World War II," McMahon said.

Steve's mother, Hifumi Yamamoto, was a familiar face on campus. Working for UW housing, she became a beloved figure, especially in her athletic activities such as volleyball, tennis, line dancing, yoga, cross country skiing, and Senior Olympics.

Steve and both of his siblings, Diane and JoAnn, received their bachelor's degrees in chemistry from the University of Wisconsin-Madison before going on to get doctoral degrees in the field. Steve went to Penn State to earn his Ph.D.

Steve had a successful career in the chemical and chemical information science industries, working as a research chemist for Eastman Kodak Company, an associate professor of chemistry and administrator of the cooperative education program at Rochester Institute of Technology and senior editor of Ullmann's Encyclopedia of Industrial Chemistry. He also helped develop chemical databases for DuPont Company and served as an internet consultant.

After retiring in 2003, Steve purchased an acre of fruit trees and coconuts in West Palm Beach, Florida, where he also worked as an adjunct professor of chemistry at community colleges in Broward and Palm Beach counties. After he was diagnosed with cancer in 2006, he constructed and maintained a Japanese restorative garden to help with his own battle with cancer and to assist others.



Steve Yamamoto

Photo submitted by Prof. Robert McMahon

Steve unfortunately passed away in 2019 at the age of 76; however, his legacy, and the legacy of his family lives on at The University of Wisconsin-Madison. The Yamamoto Family Professorship recognizes the significance of both the State of Wisconsin and the University of Wisconsin to the Yamamoto family.

"The Yamamoto Family Professorship provides an enduring legacy of Steve and his family," McMahon said. "This endowed professorship enables the department to recruit and retain outstanding faculty members."

Today, AJ Boydston, who joined the department in 2018, holds the role of the Yamamoto Family Professor of Chemistry.

"The Yamamoto Family Professorship is a generous show of support and faith in our department's mission," Boydston said. "It's a way to carry on a legacy of excellence in science as well as humanity. As I learn more about the history of the Yamamoto Family and their motivations for creating the professorship, it encourages me to take note of my roles on campus, as a mentor, educator, and researcher, and how I might be able to serve in the spirit of their name."



Prof. AJ Boydston and Steve Yamamoto

Photo by Nick Jaeger



## Department of Chemistry

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