





## On the cover

*The collage of technical plots/schematics/photos on the cover showcases research activities from across the Department of Chemistry. These individual images and others like them are regularly featured on both our website (<https://lsa.umich.edu/chem/research.html>) and our Instagram account (@michiganchem). Please follow both to learn more about our current and future research projects.*

*If anything in this newsletter intrigues you, please reach out to us to learn more.*

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## Follow us on social media!

Between newsletters, stay up-to-date with Michigan Chemistry through our social platforms. The Michigan Chemistry Social Media committee is sharing job opportunities on LinkedIn; creating videos for YouTube; posting news of awards, research, and seminars on Twitter; and showcasing our people, research, and events on Instagram.



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## Department of Chemistry Newsletter

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## Welcome from the Chair

I've taught several times and am particularly fond of. I'm thrilled that we've been able to welcome back high school students through the D-RISE program, alumni for both graduate student networking and our undergraduate research symposium. It's been great seeing so many new and familiar faces in our building.

In addition to teaching, we've had several faculty members receive awards for their outstanding contributions to research, teaching, and service in this past year. Sarah Keane won a Cottrell Scholar Award. Neil Marsh won a UM Distinguished Faculty Governance Award. Anne McNeil won the American Chemical Society Akron Section Award. Kerri Pratt won a UM Faculty Recognition Award and an American Geophysical Union Atmospheric Sciences Ascent Award. Melanie Sanford won the Mitsui Award and the UM Distinguished Faculty Achievement Award. Ginger Shultz won the LSA Class of 1923 Memorial Teaching Award. Lastly, I won the Imes and Moore Mentoring Award and was named an Arthur F. Thurnau Professor at UM.

Research teams in the chemistry department continue to make awesome advances in basic research with huge societal benefit. Stephen Maldonado's lab continues to make great progress in developing milder processes for generating silicon solar cells with support from the Graham Institute. And, students in the labs of professors McNeil, Ault, and Zimmerman are working diligently to study the role of microplastics in the atmosphere. You can read more about these projects in the pages to come.

In closing, the most important members of our community are you—our alumni. It is through your giving and continued support that we can provide many of the research and professional development opportunities for our current students. I thank you for that. And I'm inviting you to let us know how you're doing and what you're up to. Even better, come visit us when you're next in Ann Arbor. The faculty, staff, and current scholars are always excited to see you, hear from you, and welcome you back!

### Go Blue,

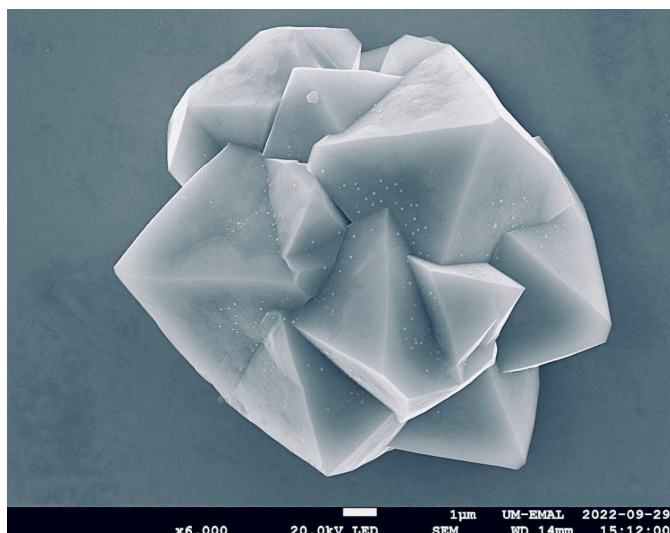
Bart M. Bartlett  
Chair, Department of Chemistry  
Arthur F. Thurnau Professor  
Professor of Chemistry

### **Dear University of Michigan Chemistry Community,**

Greetings, friends! I hope this message finds you well. In July, I began a four-year term as chair of the chemistry department. Since this is the first time many of you are hearing from me, I should tell you a bit about myself. This is my fifteenth year on the chemistry faculty at Michigan, where I've been my entire independent career. Over the years, the talented scholars in lab and I have taught each other and the scientific community a lot about materials that catalyze redox reactions and about the design principles for longer-lasting batteries.

I am grateful to my faculty colleagues, staff, and even some of my former students for their encouragement to take on the chair position. Many have asked why I agreed to take on the role, and my answer is the same as why I chose to start my career here at Michigan. Most important, our students and postdoctoral scholars are outstanding. I am amazed by the creativity and collaborative nature of research that is largely driven by trainees in our labs. Second, our faculty are deeply committed to pushing the boundaries of knowledge in chemistry while creating a supportive environment for scholars to thrive—both in the classroom and in research. And lastly, our dedicated staff work tirelessly to ensure that we have great resources to conduct this work. Together, our community is strong, which is why I am excited to lead us.

A key theme for our campus this fall is re-engagement in person. Although we learned that we can maintain community even when our ability to gather is compromised, I know of no greater joy than interacting face-to-face in the classroom, in the research labs, and in the broader community. My colleagues agree with me, and many of the stories we'll feature show that. For example, lecturers Carol Ann Castañeda and Amy Gottfried have been hard-at-work to better set up students for success in Chem 130, a class that



Maldonado lab crystal

## Overhauling the production of silicon for solar energy

Silicon would seem to be a natural choice for photovoltaics. Its properties are well-understood, it is practically indestructible, and it poses no hazards to human health. But paradoxically, silicon cannot scale up to meet global energy demands because the manufacturing process relies on centuries-old, resource-intensive chemistries that require major energy inputs and generate toxic byproducts.

Graham Sustainability Institute's Carbon Neutrality Acceleration Program (CNAP) at the University of Michigan has awarded a grant to Stephen Maldonado, associate professor of chemistry, to make it practical to use silicon in photovoltaics.

This research team aims to revolutionize the production of silicon with a low-temperature process that is radically simpler than any existing practice. Their technique, electrochemical liquid phase epitaxy (ec-LPE) invented by the Maldonado lab, makes the idea of forming a silicon photovoltaic device from a beaker on the benchtop possible. The funding from CNAP will enable the team to demonstrate that silicon ec-LPE is a viable method and seek follow-on grants to continue their work.

The team is motivated by the desire to eliminate the impediments that prevent silicon from being scaled rapidly to supplant fossil fuels. If successful, their ec-LPE process could unlock silicon photovoltaics' potential to put transformative solar resources into the energy portfolio of every nation on Earth.

"My hope is that folks in industry will also see this work and facilitate translation from the lab to a real process," says Maldonado. —*Credit: the Graham Sustainability Institute*

*This is just a small sample of research in the department. Follow the MichiganChem twitter to hear about research papers as they appear in the journals.*

## Agilent and UM Scientists Take the Measure of Measurement Science

The UM/Agilent 2022 Measurement Science Symposium brought over 100 researchers to UM's Ann Arbor campus, drawing scientific contributions from a wide range of regional universities, as well as participants across UM's Medical School, College of Engineering, and multiple LSA Units. The event featured four keynote presentations, eight student/junior researcher talks, and twenty-eight poster presentations. The event also included a dynamic career panel, where the audience engaged in a lively Q&A with Agilent panelists. Overall, the UM organizers for this event were thrilled by the outcome, and are looking forward to the 2023 iteration with great anticipation! Brandon Routolo, professor of chemistry, led the team organizing the event with funding from Agilent Technologies.

## Measuring, Modeling, and Mapping Microplastics in the Atmosphere of Michigan

A team of scientists that includes three chemistry faculty have been awarded \$2 million as part of the College of Literature, Science, and the Arts Meet the Moment Research Initiative, a new program focused addressing today's most pressing societal issues to create real, lasting change.

The harmful effects of microplastics in water and on land have been the topic of many scholars' research in recent years, but little is known about its impact in the air.

This team will research how microplastics pollution in the atmosphere has impacted residents in Michigan, and how racial, economic, and geographic disparities have played a role in exposure levels. The research will help inform how to better address this issue and promote environmental justice.

The project includes collaborating with high school students and teachers to collect air samples.

Andrew Ault, associate professor of chemistry, told the *Michigan Daily* in an article about the grant, that collecting this data will be crucial in expanding our understanding of the main sources of microplastics and the associated exposure risks.

"Microplastics are an emerging pollutant, and you're exposed to large numbers in the environment every day, but most of the research so far has focused on drinking or eating and how that might be a way that we are exposed to microplastics," Ault said. "What this project is going to try to understand is, how much is getting up into the air? This could be anything from tire bits getting kicked up, to microplastics coming out of the Great Lakes, all the way to things coming out of dryers."

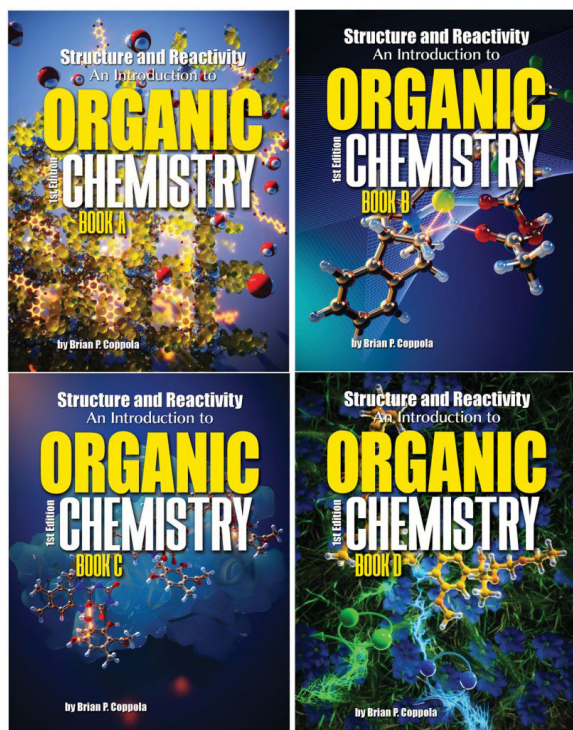
Project members in addition to chemistry professors Anne McNeil, Andrew Ault, and Paul Zimmerman are Ambuj Tewari, professor of statistics; Allison Steiner, professor of earth and environmental science; and alum Mary Starr, who is the director of the Michigan Mathematics and Science Leadership Network.



## Faculty-Student Baseball Game



This past August 19 marked the first ever (at least in recent memory) intra department softball game. During the annual Fall Chemistry Department picnic, two squads battled for supremacy on the diamond at Ann Arbor's Frisinger Park. The student/postdoc team handily defeated the faculty/staff squad but the game was packed with great fielding, home runs, and enthusiasm on both sides. Inset: Our chair shows off his pitching prowess.



### Coppola's Vision for Introduction to Organic Chemistry Now Available in Affordable Books

Thousands of students over forty years—many of our alumni among them—have helped Brian Coppola, professor of chemistry, shape his vision of what teaching materials should provide for an introduction to organic chemistry. This year, he published *Structure and Reactivity: An Introduction to Organic Chemistry*, 4-book series with a student-centered approach to the first-year undergraduate course in organic chemistry. The books offer detailed explanations, a guided analysis of important ideas, and scaffolded set of open response questions to be worked on and filled in as the learner progresses. As Coppola explains on his website: “These books are not produced to be preserved on a shelf, they are meant to be written in. The four volumes are designed as convenient, portable workbooks to be carried around, and record the ideas that their owners want to share, discuss, and debate with other students.”

He says the writing style favors a personal story-telling narrative that emphasizes explanation.

Books A/B cover the first semester, with C/D used in the second semester. For adoptions by institutions, the author licenses the text for printing and distribution through Hayden-McNeil Publishing, a division of Macmillan Learning (Curriculum Solutions). Contact him at [bcoppola@umich.edu](mailto:bcoppola@umich.edu) for more information.



**Andrew Ault** has been selected for the Top 40 under 40 power list, recognizing “rising stars” in analytical chemistry. by: <https://theanalyticalscientist.com/power-list/2022>

**Arthur J. Ashe** has been honored as a 60 year member of the ACS. He retired from teaching in 2008. He keeps busy editing sections of this newsletter.

**Julie Biteen** has received the Stanford Chemistry Department Sessler Distinguished Lectureship Award.

**Bart Bartlett** has received the 2022 Imes and Moore Mentorship Award and has been named as a Thurnau Professor. Thurnau Professorships [see right].

**Brian Coppola** is featured in Contemporary Pioneers in Teaching and Learning Volume 2 (Contemporary Pioneers in Educational Psychology: Theory, Research, and Applications)

**Sarah Keane** has been named as a 2022 Cottrell Scholar by the Research Corporation. Her award is for “RNA Matchmaker. The role of Loops and Mismatches.”

**Robert Kuczcowski**, Emeritus Professor, became associated with the National Science Foundation Chemistry Division in 2002, serving periodically as a program officer, and for last six years, he assisted with the instrumentation program working part-time off-site. Bob stepped down last year. He now lives in Rochester NY.

**Charles McCrory** has been named as a 2022 Scialog Fellow by the Research Corporation for his “Negative Emission Science Initiative.”

**Neil Marsh** is one of two faculty members to share this year’s Distinguished Faculty Governance Award given by the University Senate Advisory Committee on University Affairs (SACUA). The award honors his service as SACUA chair.

**Anne McNeil** received the 2021 American Chemical Society Akron Section Award. Her talk at the University of Akron on microplastics in the environment was featured on the local National Public Radio station. In 2022, her group has continued to organize Huron River clean-up days and her work on re-purposing plastics was featured on Michigan Radio.

**Alison Narayan** has received a 2022 Arthur C. Cope Scholar Award from the ACS. She is one of only ten awardees to be honored by this award for this year. She has also received a Mid-career Biosciences Faculty Achievement Recognition Award administered by the Presidential Biosciences Initiative.

**Kerri Pratt** received a 2022 University Faculty Recognition Award, which is given to mid-career faculty who brought distinction to themselves and to the University of Michigan. The American Geophysical Union awarded her the Atmospheric Sciences Ascent award for excellence in research and leadership within the atmospheric and climate sciences. She also has received a 2021 Elizabeth Caroline Crosby Faculty Grant, a UM program to help meet career-relevant needs of individual faculty in science and engineering.

**Melanie Sanford** has received a Distinguished Faculty Achievement Award. This award honors senior faculty who consistently demonstrated outstanding achievements in the areas of scholarly research, teaching and mentoring of students and junior colleagues and service.

**Alfred P. Sattelberger** (Chemistry faculty, 1977-84) has been awarded the 2022 ACS Award for Distinguished Service in the Advancement of Inorganic Chemistry. At Los Alamos National Laboratory he was a senior laboratory fellow and head of the chemistry division. More recently he worked at Argonne National Laboratory (ANL) where he was deputy laboratory director for programs, chief research officer, and senior intelligence official. He retired from ANL in 2017.

**Ginger Schultz** has received this year’s 1923 Memorial Teaching Award. Awardees are selected each year by the LSA Executive Committee from those recommended for promotion to associate professor with tenure.

**Roseanne Sension** was named as an AAA Science Fellow for her distinguished contributions to ultrafast chemistry,

**Emeritus Professor Charles Yocum** has been honored as a 50 year member of the ACS.

**Wenjing Wang** has received the NIH Director’s New Innovator Award. The award supports exceptionally creative early career investigators pursuing high-impact projects in the biomedical sciences within the NIH mission.

## Bartlett Lauded for Work with Undergraduates

Bart Bartlett, professor of chemistry and materials engineering, was named an Arthur F. Thurnau Professor in 2022.

Professor Bartlett is known for creating collaborative spaces for learning and treating students as peers as they undertake scientific discovery in solar energy conversion, alternative fuels and next-generation batteries.

Bartlett’s innovations to the introductory chemistry course taken by thousands of first-year students foster equitable engagement with course content. Converting lecture and discussion sections to small-group problem-solving sessions lets students thoroughly discuss and refine their understanding of concepts as they tackle new applications.

Nearly half of the undergraduate students mentored in his lab have been co-authors on peer-reviewed publications.

As the associate director of the U-M Energy Institute from 2014-19, he increased the proportion of women and minority participants in the 10-week summer research programs.

Bartlett also works to build community through service as a faculty facilitator of a first-year learning community and has hosted eight Detroit high school students through the D-RISE program.

Thurnau Professorships recognize and reward faculty for outstanding contributions to undergraduate education, with a demonstrable impact on the intellectual development and lives of their students. Thurnau professors hold this title for the remainder of their careers at U-M. They receive a \$20,000 grant to support activities that will enhance their teaching.—  
*from the University Record*



## PROMOTED TO PROFESSOR OF CHEMISTRY



### Pavel Nagorny

Professor Nagorny is an organic chemist whose research emphasizes synthesis of natural products and development of new chemical tools for synthesis. He teaches courses that span beginning to advanced levels and represent the core of the curriculum. For three years, he chaired the Chemistry Graduate Recruiting Committee with a focus on activities to promote a diverse graduate student applicant pool.

In the dean's recommendation for promotion, she wrote: "Professor Nagorny's research in synthesis and development of synthetic tools has high interest for chemists and application to fields such as drug development. His teaching is characterized by continued improvement and spans a broad portfolio of courses. He is a fine university citizen with attention to DEI."



### Paul Zimmerman

Professor Zimmerman is a computational chemist who has developed new approaches to predict chemical reactions and properties. He has developed an outstanding international reputation, especially for reaction discovery and prediction. He has consistently provided high quality instruction, including fresh approaches that relate chemistry to important societal issues, to both undergraduate and graduate students. He has worked well to engage students in his classes even during the transition to online courses. He is mentor to large number of students.

The dean's summary cited his "creative advanced computational methods for studying a wide array of significant chemistry problems, developed an appropriate teaching portfolio and mentored an exceptional number of advanced students with success, and contributed service to enhance industrial collaboration and computational education on campus."

## PROMOTED TO ASSOCIATE PROFESSOR WITH TENURE



### Charles McCrory

Professor McCrory is an inorganic and materials chemist with a specialty in electrochemistry. His research focuses on chemistry that is relevant to production of fuels in a carbon neutral manner and in solar energy systems.

In recommending him for promotion, the dean summarized his accomplishments: "Professor McCrory has developed a detailed understanding of the reduction of CO<sub>2</sub> based on catalysts within controlled chemical environments, paving the way for efficient use of this reaction in producing fuels from solar energy. He is teaching some of the largest and most important classes in the department in an effective and novel way. His service contributions, especially related to improving climate, are at the highest level."

McCrory is also associate professor of macromolecular science and engineering, without tenure, in the College of Engineering.



### Ginger Shultz

Professor Shultz is a chemical education specialist. Chemical education research (CER) is concerned with how chemistry is learned and taught. Her research program is aimed at understanding how chemistry instructors learn to teach, how writing contributes to conceptual learning and reasoning, and how disciplinary thinking in chemistry and science develops. She has also been an effective teacher of large organic chemistry classes. The dean's recommendation cited her "excellent program of research at the interface of chemistry and education. She has uncovered mechanisms of how college-level teachers gain and use pedagogical content knowledge and proposed methods for improved teaching as a result. She has identified how novice and expert students approach solving chemical problems, leading to insight into how to better teach new students. She has developed and implemented a novel approach to write-to-learn in STEM with potential for large scalability. Her teaching and service record indicate a committed and excellent professor with attention to DEI."

*These descriptions are condensed from May 2022 Regents Meeting agenda materials, when promotions were approved.*

# Structuring Introductory Chemistry for Success

*Textbook selection, study resources, training for teaching assistants, exam crafting, and technological supports are all helping students succeed in introductory chemistry and provide a more equitable experience despite differences in preparation for college work.*

“If everyone gets an A in Chem 130, great! We really do want students to feel like they can succeed,” says Carol Ann Castañeda. That is a key tenet of how the team of instructors who teach that introductory general chemistry course approach this mission.

Chem 130, “Macroscopic Investigations and Reaction Principles,” is an introduction to general chemistry course that does not require any previous experience with chemistry. It serves students who may have not had the advantage of AP classes or robust science education in their high schools or are new to it for other reasons.

Castañeda, a 2015 PhD graduate from Carol Fierke’s group, is now a Lecturer IV and coordinates the Chem 130 team, as well as teaches two lecture sections. The class includes lecture three times a week with 100 to 300 students in a lecture. Fall term enrollment is about 1500 students, with 5 different lecture sections.

Every student also has a one-hour discussion meeting in a class of about 30 other students. A corps of 16 Graduate Student Instructors (GSIs) handle the discussion sections. During discussion, GSIs guide students through a weekly quiz, answer student questions, and may form small groups within the class for problem solving.

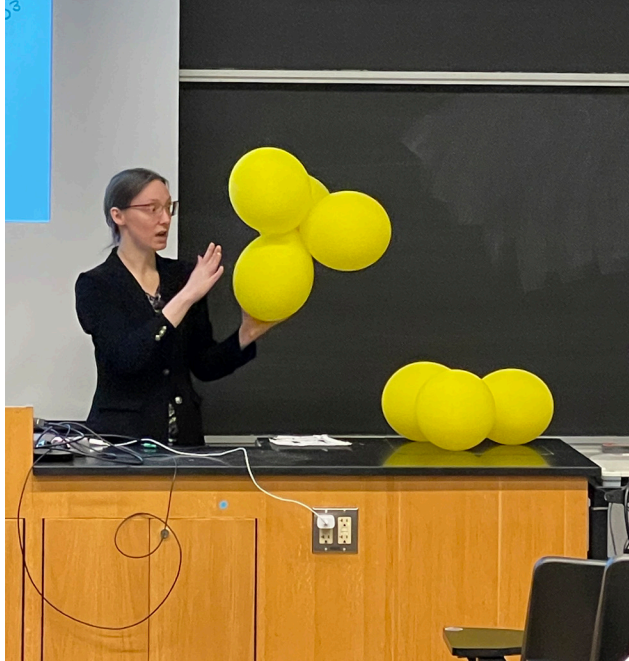
All sections use the same syllabus and instructional materials. It is an “atoms first” approach to the topic, explains Castañeda, starting with atoms, ions, and molecules and then progressing to chemical reactions and stoichiometry once a student understands the parts of a chemical equation.

Charles McCrory, a faculty member who has taught Chem130 explains the vision for Chem130 as emphasizing concepts—really understanding what is in the equation, not just being able to get the correct answer.

“We want each student to be able to identify each letter in a mathematical equation and how they are related to truly understand the chemistry not just ‘plug and chug’ to get an answer,” Castañeda says.

The instructional team also crafts exams that offer more chances for success. Some technological innovations have made it feasible to add short answer questions to the exam format even in such a large class. By having some written responses there is the possibility of partial credit for an answer. “It is not all-or-nothing,” says Amy Gottfried, another lecturer who teaches Chem 130. “You now can show what you know on paper.”

In the fall, the students in Chem 130 may not only be new



*Balloons help Carol Ann Castañeda demonstrate different bond configurations for her Chem 130 students.*

## Some Resources to Support Student Learning

- **Office hours**, of course—each instructor and GSI holds throughout the week. Someone is going to be there whether you come or not “So, go!” we tell the students.
- Available 24 hours a day is an online discussion board called **Piazza**—ideal for asking questions any time. Instructors and GSIs answer questions but often other students in the class answer even faster, says Amy Gottfried.
- **Problem Roulette** ([problemroulette.ai.umich.edu](http://problemroulette.ai.umich.edu)) Interactive practice questions from old exams are a resource to help prepare for Chem 130 exams
- The **Science Learning Center** (SLC) offers help, including SLC Peer Study Groups. Small groups of classmates led by an upper-class undergraduate student discuss course material. These have been highly effective for helping students master the material. The SLC also offers peer tutoring.
- **Textbook resources**, including videos, interactive in-text questions, and end-of chapter quizzes
- **Animations and videos**: potentially helpful videos and simulations from the Internet compiled into a list on the Canvas site. They may help students visualize and review course content.
- **ECoach** (<https://ecoach.ai.umich.edu/>): CHEM 130 is linked to ECoach, an optional resource offers free, personalized, web-based coaching. It was started by a physics professor inspired by a computerized tool for individual feedback on health issues such as quitting smoking. ECoach gives students strategies about the best ways succeed in the course tailored to their learning styles, such as setting aside blocks of time to study, making to-do lists, as well as feedback on their test scores.
- **Coming soon**: Lecturer Amy Gottfried has a small grant to create videos explaining the resources that students can use. She is recruiting chemistry students to work on the videos, tapping the power of their peers to create content that connects with students.





Amy Gottfried, a lecturer IV in LSA, teaches Chemistry 230 in the Central Campus Classroom Building to students who are broken into small groups, each with their own video screen and whiteboard. (Photo by Austin Thomason, Michigan Photography)

to chemistry, but also brand new to college level work, the University of Michigan, and living on their own. Castañeda and Gottfried point out that they are not only helping students learn chemistry but also “how to do college.”

Chem 130 is often a student’s first large science class, and the instructors are trying to make the course more accessible and inclusive for students, particularly those who are first-generation or from a less resourced background.

The team offers a host of resources to support a range of learning styles and needs. [See the resources sidebar.]

Gottfried has a small grant to create videos explaining course resources and why and how students should use them. The videos will feature chemistry students and show them using the Science Learning Center or another resource and explain how and when to use that particular resource.

“We tell the students they won’t have time to use all these resources so customize the ones that work for you,” Castañeda says.

### Helping GSIs Be Successful

Another group that may be new to the University of Michigan may be some of GSIs for the course, as some are first semester graduate students at UM. McCrory turned to the Future Faculty Graduate Student Instruction (FFGSI) program for developing programming to help these students in their teaching role. The FFGSI is a department-supported program that supports graduate students in work on education projects just as a graduate student with a research assistantship would work on a research project.

McCrory was the faculty lead for two projects. One aimed to develop a set of new peer-learning activities for Chem 130 discussion sections to better facilitate conceptual knowledge development among students aimed at offering new variety in the active learning activities used in the course. , drawing from published peer-learning exercises that have already been shown to increase conceptual knowledge among students.

A second project aimed to develop a training program specifically tailored for the Chem 130 GSIs. It is a one-day intensive training session focusing on the interconnection of content knowledge and pedagogical content knowledge for specific Chem 130 concepts.

GSIs now have a graduate student mentor and weekly meetings to work on quizzes, develop questions for their discussion groups, and other support for working with their undergraduate pupils.

### Chemistry an early user of new classroom building to enhance active learning

*A 1964 addition to the Ruthven Building, former home of the Museum of Natural History, has been replaced by the Central Campus Classroom Building (CCCB), a facility designed to support active learning in large courses.*

Instructors’ increasing desire for more flexible learning spaces coincided with a growing body of research showing the benefits of active learning on student outcomes, said physics and education professor Timothy McKay, who is also the associate dean for undergraduate education in LSA.

Active learning involves the use of structured opportunities, such as projects, discussions and collaborations, for students to process course material during class time. It is a teaching strategy that has been proven to support deeper learning and encourages students to develop critical thinking skills.

Amy Gottfried, a lecturer IV in the Department of Chemistry, was among the first instructors to teach in the CCCB. Her Chemistry 230 students sat in small groups, each with their own video screen and whiteboard, working on problem sets.

Gottfried said she loved the setup.

“I can see where people are at, and I get a much better sense of where students are at in problem-solving so I can adapt the feedback that I’m getting to an individual group or the class as a whole, and I can adapt the pace of my teaching,” she said.

Gottfried said active learning is “more effective, more engaging, and a better use of class time.”

—Abridged from “Central Campus Classroom Building fosters Engaged learning,” University Record, Sept. 12, 2022 by Ann Zaniewski, Public Affairs

## Meet A Few Award Winning Students

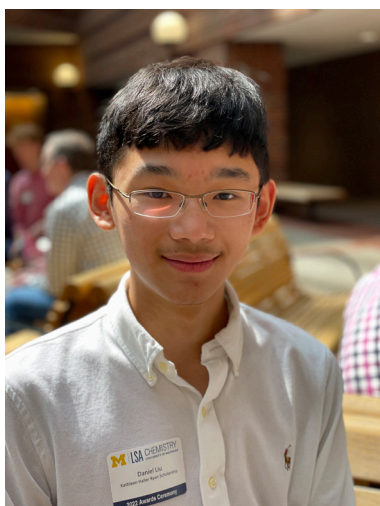
### Matthew R. Culberson Selected for Bouchet Society

Matthew R. Culberson, a PhD candidate with a concentration in organic and organometallic chemistry, is one of five students selected for the UM chapter of the Bouchet Society. Under the guidance of John P. Wolfe, Matthew's research focuses on the development of catalytic palladium methods for the synthesis of biologically relevant molecules. Since his first undergraduate year, Matthew has been teaching science as an undergraduate chemistry tutor, medical school instructor, K-8 teacher, and graduate student instructor (GSI). Across his entire academic career, he has been granted over 25 scholarships, awards, and honors. Of all his accomplishments, Matthew is most proud of giving back to underserved or historically marginalized communities through teaching and community service, participation on panels or in speaking opportunities, and mentoring Black students. Ultimately, his goal is to become a professor.

Named for the first African American doctoral recipient in the United States, the Edward Alexander Bouchet Graduate Honor Society recognizes outstanding scholarly achievement and promotes diversity and excellence in doctoral education and the professoriate. See the Rackham Graduate School website.



*“What I value about being a Bouchet Honor Society member is connecting with scholars with similar ambitious desires for great impacts on society and the world.”*



### Daniel Liu Awarded Goldwater Scholarship

Daniel Liu has received a Goldwater Scholarship, a national award for undergraduates who intend to pursue research careers in STEM. He started working with Melanie Sanford's group at age 14 and is now investigating C-H activation methodology development, experimentally and computationally. The Department of Chemistry gave him a Kathleen Haller Ryan award this year.

Liu told the *Michigan Daily* that he hopes to use his experiences to inspire others to pursue interdisciplinary research. He says he enjoyed reflecting on his research experiences while applying for the Goldwater Scholarship.

“Throughout writing my application, I was able to take the time and look back at my research journey,” Liu said. “One of the key parts about research is that eventually, you are bound to fail. It's how you recover from these failures and use the knowledge you gained from failing to succeed in the long run. Don't be afraid of failure, but understand how to recover from it.”

Liu plans to pursue a PhD in chemistry or computer science, using this combination to unite knowledge from various disciplines. He also said he hopes to eventually create his own startup based on interdisciplinary work.

See *Michigan Daily*, April 13, 2022. See also: [www.chemistryworld.com/news/14-year-old-chemist-is-newest-member-of-university-of-michigan-lab/4010669](http://www.chemistryworld.com/news/14-year-old-chemist-is-newest-member-of-university-of-michigan-lab/4010669).

### Taylor A. Bramlett Awarded for Promoting Equity in STEM

Taylor Bramlett has been recognized by the UM Women in Science and Engineering (WISE) program for her work to found *commUNITY*, a graduate student organization in the UM chemistry department dedicated to cultivating awareness and support Black, Indigenous, and People of Color (BIPOC) students. Then a fifth-year graduate student in the Matzger Lab, Bramlett received the Claudia Joan Alexander Trailblazer Award, which is given for developing a program that supports equity in STEM curricula or careers.

*commUNITY* achieves the award's aim by creating a collaborative and sustainable community among chemistry researchers. It sponsors the annual CHEM|UNITY symposium that highlights scientific contributions from the BIPOC community. Bramlett says the CHEM|UNITY symposium is a way for allies to hear about the experiences and work of BIPOC chemists.

See the Department of Chemistry website for more on Bramlett's award, *commUNITY* and the CHEM|UNITY symposium. Articles by Taylor Soucy, SciComm Fellow



*“Chemistry is the one concept that brings us together, and we can use it to springboard to open dialogue for things that are happening to people and how it impacts the way we do everything.”*





The Karle Symposium was held on August 12, 2022. The event is organized by graduate students and features research from across the department.

Nine student talks and two poster sessions covered the range of fields in the department. Guest speakers were Alan Aspuru-Guzik, University of Toronto, and Courtney Balliet, Ph.D., Senior Group Leader, Adhesives & Sealants Research, PPG Industries Inc.

Twenty-nine chemistry graduate students formed the organizing committee, led by co-chairs Gloria De La Garza & Nicole Woodall. Faculty advisor was Paul Zimmerman.

Sponsors were PPG, Dow, the Department of Chemistry, and Chemistry Graduate Student Council.

## Alum|NUM | URAN|UM

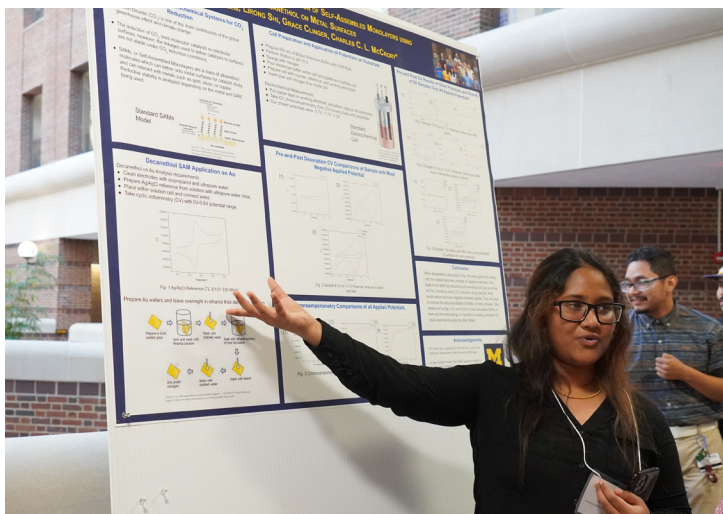


2022 Alum|NUM and URAN|UM organizing committee: Left to right: Brianna Jett, Bridget Murray, Katherine Torma, Michael Gatazka, Sabrina Carniero, Brady Anderson (co-president), Matthew Lasky, Emily Wearing (co-president), Scarlet Aguilar Martinez, Iliana Levesque

After two years of virtual events, Alum|NUM—Alumni Networking at the University of Michigan—welcomed alumni back to Ann Arbor where they provided career advice for current trainees. The Industrial Career Panel included Dr. Rebecca Watson (Pfizer Inc.), Dr. Tay Rosenthal (Corteva Agriscience), and Dr. Matt Remy (Dow Chemical). The Academic Career Panel comprised Prof. Sarah Fantin (Hanover College), Prof. Christian Malapit (Northwestern University), and Prof. Jennifer Furchak (Kalamazoo College). Dr. Rachel Kirpes (US EPA) and Brandon Chan, PhD, J.D. (Duane Morris LLP) were available during lunch to discuss other career paths including government and patent law. Sponsors were Corteva and the Chemistry Graduate Student Council.

In parallel with the alumni networking event, graduate students organized URAN|UM [undergraduate research and networking at UM] that connects students from primarily undergraduate institutions across the midwest with our students, postdoctoral fellows, faculty, and alumni. Their goal is to empower undergraduates to pursue graduate degrees.

## Summer Programs Return to In Person Events



Also presenting posters at URAN|UM were high school students from the D-RISE program, a collaboration with Cass Technical High School in Detroit, that brings students to campus to do research for the summer along side our students. Learn more about D-RISE on the Department of Chemistry website. Above: Asfi Tias explains the research she did in the McCrory Lab.

Follow plans for our annual summer events in 2023 at these websites:  
[sites.lsa.umich.edu/alum-num/](https://sites.lsa.umich.edu/alum-num/) • [sites.lsa.umich.edu/karle-symposium](https://sites.lsa.umich.edu/karle-symposium)





Kristin Koutmou and SURP student Abigail Bojanowski  
 Below: Abby is also pursuing a minor in music, and plays clarinet in the Michigan Marching Band.



*The complete list of awardees and donors for SURP and other 2022 Undergraduate Awards is available on the website: [lsa.umich.edu/chem](http://lsa.umich.edu/chem).*



*This year the Department of Chemistry awarded 25 summer research awards through the Summer Research Undergraduate Program, which is funded by several endowments. The May-Weiss Endowment is able to make.*

## Learning what it is like to “do chemistry” through success through the Summer Undergraduate

Abigail Bojanowski has experienced the highs and lows of research through her experience in Kristin Koumou’s lab. After one frustrating summer where their attempts to synthesize an enzyme met with failure, Abby had a much better summer this year, working closely with Koutmou and lab manager Dan Eyler on experiments that reveal novel modifications of RNA.

Abby is one of 25 students that were awarded stipends to spend the summer conducting research in labs across the department as part of the Summer Research Undergraduate Program, or “SURP”

“Undergraduate research is a critical part of undergraduate education in chemistry,” explains John Wolfe, professor of chemistry and associate chair for undergraduate studies. “It provides students with an authentic experience of what it is like to ‘do chemistry’, and is often the first time when students are confronted with having to solve problems that have no known solutions, and may appear quite impossible to solve at the outset.”

“Undergraduate research also gives students the chance to directly apply the knowledge they have gained in the classroom, and students typically walk away with a much deeper understanding of the chemistry when they practice it with their own hands, in a meaningful way, with an important and non-trivial goal.”

Wolfe says the experience also gives students a boost for their careers after they graduate. “The problem-solving skills that a student gains during the course of undergraduate research are broadly applicable to many scenarios, including those outside of the lab, and undergraduate research experience is something that every potential employer or graduate program wants to see on a candidate’s application.”





search fellowships through the Summer Undergraduate Research  
alt endowment has doubled the number of awards the department

## ry” and setting their course for future graduate Research Program

“The vast majority of scientists currently conducting research in industrial, academic, or government settings report that their own undergraduate research experience was a critical part of their training, which provided inspiration, skills, and the ability to work as part of a team towards the solution of a complex problem, and led them down the path towards their current career,” he adds.

Participants are grateful to the donors who made the SURP possible. Beyond the financial support, the students are also appreciate for the ways the program expanded their horizons and grounded them in chemistry.

Some excerpts from a few thank you letters to their donors make that clear.

**Dale Hendershot**, who would otherwise have work in his retail job to make ends meet, wrote:

“Your donation allowed me to participate, worry free, in meaningful research that has expanded my primary knowledge of the field and fostered increased personal ownership in my own education...

While pursuing my chemistry degree, I was excited to be learning different techniques in laboratory coursework but lacked the first-hand application of such knowledge to feel that I was doing anything with that information. I arrived late to undergraduate research, for a number of reasons, but was very excited to be welcomed in the Buss group during this past year.

The Buss group specializes in the advanced inorganic synthesis of multimetallic compounds; put differently, members of the Buss group make new molecules that contain two or more metal atoms in an air and moisture free environment. My work this past summer has built upon air and moisture



*Evan Romero (left), a graduate student in Alison Narayan’s group, has been mentoring Max Hrigo (right). Max’s project is the total chemoenzymatic synthesis of Phomketal B. Without SURP, Max says he would not have been able to spend fulltime in the lab. “I’m incredibly grateful. I love being here.”*

free synthesis skills introduced in a senior-level lab class, while also expanding my ability to make informed scientific decisions based on collected data and what has already been established in the field.”

**Grace Clinger**, a senior working on an honors thesis, writes: “Thanks to your generosity, I was able to spend my entire summer doing what I love. The chemistry department holds such a special place in my heart, and I am so lucky that they, along with your fellowship, allowed me to continue pursuing research the past few months.

“This summer, I worked with the McCrory group to continue research on a project I began in May 2021. I’ve developed copious technical and critical thinking skills through investigating the properties of self assembled monolayers on metal surfaces...Along with a team of amazing graduate student mentors, we have multiple papers on our findings in progress toward publication and hope to establish a starting point for more research aimed at mitigating carbon dioxide emissions.

Without the fellowship, I would have been forced to remain at home for the summer and lose these skills and goals.”

**Nicholas Finn** found the experience transforming. “My future plans have always been to go to medical school with the hopes of working with patients to improve their health and well-being. I decided to try out research because I saw value in learning what goes on behind the scenes in the development ...medical treatments. ...I find it fascinating how vastly different chemistry in class is compared to chemistry done in the real world. ...[I]n the lab, things will rarely go exactly how you expect it to go. ...This summer, I have learned the value of perseverance, even when things get tough and you become discouraged. ...At this point, I am heavily considering pursuing an MD/PhD program after my Bachelor’s degree because I really loved my time researching this summer and would really like to continue doing research in the future!”





## Our long-term members of the American Chemical Society

*Every year, Professor Emeritus Arthur Ashe contacts the members of the American Chemical Society among the University of Michigan community who have been recognized as 50 Year Members. This year, we heard updates from many of the alumni listed in C&En News.*

**Professor Ashe** is himself celebrating 60 years of membership in the ACS. He continues to be active in the life of the department, maintaining a small laboratory, contributing to chemistry journals, meeting regularly with other emeritus professors, and appearing frequently at department seminars and other events, as well as overseeing this newsletter.

### Clifford D. Bedford

(PhD 1976, Smith) retired in 2018 as Energetics Materials Research Program Director, Office of Naval Research. Cliff began his research career at the Naval Weapons Center (China Lake CA) and spent the following decade at Stanford Research Institute (Menlo Park CA). He rejoined the Naval community in 1987 moved to Washington DC with family and dogs and spent the next 30 years directing energetic materials research for the Department of the Navy. His contributions were recognized with two awards: Meritorious Civilian Service (2011) and Superior Civilian Service (2017). During his career, he traveled the globe to support energetic materials research and to sample new cuisines. Cliff currently devotes his days to maintaining his Maryland farmette, catching up on 40 years of missed foreign films, cooking, and caring for the family's rescued dogs.

### Bruce Begnoche

(BS 1972)

Sent a few bullet points summarizing his career:

- BS Chemistry, University of Michigan, 1972
- MS Analytical Chemistry from Penn State, 1974
- Joined E.I. DuPont in 1974
  - Analytical Chemist in CR&D Dept. 1974-87
  - Mylar/Cronar polyester film manufacturing, Florence, SC, 1987-95
  - Mylar polyester film product development and technical service, DuPont Teijin Films, Richmond, VA, 1995-2011
- Retired from DuPont in 2011



## David Floyd

(PhD 1976, Marino) writes: “Indeed, 50 years as a member of ACS is something to consider and also speaks to how long it has been since graduate school given, I joined the ACS shortly after arriving in Ann Arbor. As I assume as we all do, looking back over 50 years —graduate school, postdoc, a whole career, kids and grandkids—how did that all occur in what seems like such a short period?”

He left Bristol-Myers Squibb in 2003 as VP of Discovery Chemistry, and then assumed the position of Chief Strategy Officer/Executive Vice President at Pharmacoepia from 2005-2008. He worked for Medicines for Malaria (MMV) where he was on their scientific advisory board from 2004 to 2010. “This was perhaps one of the most rewarding experiences of my career.” After leaving Pharmacoepia, he mentored postdocs at Rutgers funded by an MMV sponsored NIH grant that resulted in a compound now in clinical trials for Vivax malaria and then consulted for a program that generated a second-generation compound currently in preclinical development. He continues to do some consulting.

## Michael D. Gordon

(BS 1972) retired in 2005 after 22 years in Texas as a Senior Scientist with Johnson & Johnson Medical, focused on aldehyde-based instrument disinfectants, and then as a healthcare industry consultant. After graduation, he did his Ph.D. work with Louis Quin, Duke University, before starting his career in organometallic chemistry R&D with M&T Chemicals in New Jersey, where he met his wife. He now enjoys golfing and volunteering at professional and college golf tournaments, as well as supporting the student-athletes in the women’s and men’s golf programs at Michigan and Duke. “I enjoyed returning to Ann Arbor in May to volunteer at the 2022 NCAA Women’s Golf Regional Championship held at the University of Michigan Golf Course and hosted by the Michigan Women’s Golf Team, the 2022 BIG Champions. It was exciting to witness the Michigan team successfully advance from Regionals to the NCAA National Championship. The last time I played golf at the Michigan course was 50 years ago, right before graduation!”

## David P. Hesson

(BS 1972) David P. Hesson was born in Ann Arbor, Michigan within hearing distance of the UM football stadium. He grew up in Ann Arbor to the sights sounds of the UM. He entered UM interested in science and fell in love with chemistry after taking organic chemistry from a young professor, Arthur Ashe III. He soon found Joe Marino, who taught organic chemistry with the magic and mystery of shapes and bonding, and moved from the classroom to his summertime lab. With encouragement and mentoring from the UM faculty, David graduated with a BS in Chemistry and moved on to graduate school at MIT and the laboratory of professor Jack Baldwin. After four years working on the synthesis of penicillin analogs, David moved up Massachusetts Avenue to the lab of R. B. Woodward as an NIH Fellow.

Hesson left Harvard to join the expanding effort pharmaceutical effort at DuPont where he started as a bench chemist started doing antiviral and cancer research where discovered Brequinar the first DHODH inhibitor to go into clinical trials. He then moved to positions as Director of Medicinal Chemistry, Director of Corporate R&D Planning, Director of Clinical Research, and Director of Oncology. David left DuPont after 15 years to join a previous boss at Symphony Pharmaceuticals for his first venture into small startup companies. He has worked for several additional small and medium size startups and was a visiting scholar at the University of Pennsylvania medical school for 7 years. He has been a Business Advisor at the University City Science Center Philadelphia for 10 years. He has to his credit 23 publications and 15 allowed patents.

David is now recently retired from Clear Creek Bio as VP of Drug Development where he still consults.

## Sumita Mitra

(PhD 1977, Lawton) She writes: “Thank you for contacting me regarding 50 year member of the American Chemical Society. It will be great honor to have this information in the chemistry dept newsletter.”

Since 2021 she has been a Professor, University of South Florida Institute of Advanced Discovery and Innovation.

She also received honors and awards in 2021.

- Elected to the National Academy of Engineering
- Received the European Inventor Award (non-EPO countries) [[www.epo.org/news-events/press/european-inventor-award/2021/mitra.html](http://www.epo.org/news-events/press/european-inventor-award/2021/mitra.html)]
- Elected to the National Academy of Inventors

*[Ed. note: An interview with Sumita Mitra appeared in the 2019 Newsletter and online on the UM Chemistry website. She was inducted into the National Inventors Hall of Fame in 2018 for nanocomposite dental materials. She explained her journey as a chemistry graduate and a scientist to help students to prepare for their dream careers in science.]*

## Harold Sanford

(PhD 1979, Ashe) retired since 2014 when Fresenius Medical Care discontinued the project he was working on, and shut down the small research facility. At Fresenius, from 2006 to 2014, he worked on a project to design a wearable belt system to do peritoneal dialysis to treat patients experiencing kidney failure. He also worked for nearly 25 years at Shipley Company (now part of Dow Chemical) doing materials research on photoresist components including both the polymer matrices and the photoactive components.

In retirement, he and his wife enjoyed vacation trips, including the Canadian Rockies, Alaska, Tanzania, and the Galapagos. He has taken up photography as a hobby.

## James Sommers

(PhD 1976, Westrum) of Medford, OR, has been honored as a 50-year member of the ACS.



## Welcome to the newest alums of Michigan Chemistry!

Above: **Caroline Chick Jarrold**, Chair, Department of Chemistry at Indiana University, was our featured speaker. She earned her B.S. degree in chemistry from UM in 1989 and PhD in Physical Chemistry from the University of California, Berkeley, in 1994. After a postdoctoral fellowship at UCLA, she joined the chemistry faculty at the University of Illinois, Chicago in 1997, and was there until her move to the Indiana University in 2002.

Professor Jarrold's research involves applying a combination of gas-phase reactivity, mass spectrometry, anion photodetachment spectroscopies, and computational chemistry toward issues of importance in energy and environment.

Above right: We were thrilled to welcome back friends and families to help our 2022 graduates celebrate at the Michigan Theater.

Right: **Drew Tarnopol** was the student speaker. He was an honors chemistry major who did research with Charles McCorry's group. His project focused on mitigating greenhouse gas emissions through the development of cobalt complexes for electrochemical CO<sub>2</sub> reduction. In 2021, he was awarded a Summer Undergraduate Research fellowship to continue his research. This year, he was the recipient of the Walter Yates Award, which recognizes a senior of exceptional scholarly achievement. He also received one of the very competitive National Science Foundation research grants that will help fund his graduate studies at CalTech where he is pursuing a PhD in Chemistry. He is interested in the intersections of organic/inorganic and electrochemistry for promoting sustainability.



You can watch the entire celebration on the University of Michigan YouTube Channel <https://myumi.ch/9PedW>

### Congratulations to our Master's Degree Graduates

Chemistry now offers a stand alone master's degree and a research-based master's degree as part of the Accelerated Degree Program, which includes an extra year after the bachelor's degree.

Erin Brown  
Majeda Matar  
Katherine Siller



# PhDs Awarded

## Fall 2021

Mueller, Emily Anne  
*Copolymers to Stabilize Morphology in Conjugated Polymer-Fullerene Blends and Understanding Alkene Spacing for Repurposing Polyethylene via Alkane Metathesis and Cyclodepolymerization*

McNeil

Patel, Ayesha Maleeha  
*Activation of Protein Ubiquitination by the Antiviral Enzyme, Viperin*

Marsh

Wang, Sibin  
*Development of Chiral Phosphoric Acids Catalyzed Site-selective Transformations and Synthesis and Applications of Immobilized CPAs towards Single-pot Functionalization of Monosaccharides*

Nagorny

Yan, Yichao  
*Physical Organic Approach Towards High-Performance Materials for Non-Aqueous Redox Flow Battery*

Sanford

## Winter 2022

Andre, John  
*Elucidating the Influence of Surface Treatments, Material Functionalization, and Additives on Adhesion at Buried Interfaces*

Chen

Brigham, Conor  
*Development of Nickel- and Palladium-Mediated Decarbonylative Coupling of Carboxylic Acid Derivatives: From Organometallic Reactivity to Catalysis*

Sanford

Davis, Ashlee  
*Overcoming Limitations in Carbonyl-Olefin Metathesis Using Novel Catalytic Approaches*

Schindler

Downes, Nathanael  
*Low Temperature Electrodeposition of Epitaxial Silicon Thin Films*

Maldonado

Hannigan, Matthew  
*The Reactivity of Ni Complexes in Conjugated Polymer Synthesis*

McNeil/Zimmerman

Jang, Eunju  
*Mechanistic Studies of Radical-Driven Peptide Tandem Mass Spectrometry: Implications for Tyrosine Sulfation Analysis and Higher Order Protein Structural Characterization*

Hakansson

Kallick, Jeremy David  
*Heterogenization of Molecular Electrocatalysts for Small Molecule Transformations*

McCrorry

Khanna, Kunal  
*Rapid Single Molecule FRET Biosensing Assay for Nucleic Acid Detection*

Walter

Lai, Yifan  
*Simulating Electronically Nonadiabatic Dynamics and Spectroscopy via Quantum Master Equations That Treats Off-Diagonal Electronic Coupling Perturbatively*

Geva

Laloo, Naish  
*Development of Group 10 Metal Catalyzed Decarbonylative Catalysis and Undergraduate Organic Chemistry 2 Lab Modules*

Sanford

Le, Nhat Hoang Van  
*Radical-Driven Tandem Mass Spectrometry: Improved Analytical Strategies and Mechanistic Studies for Characterization of Labile Biomolecules*

Hakansson

Liu, Jianxin  
*Rieske Non-heme Iron Oxygenases in Natural Product Biosynthesis*

Bridwell-Rabb

Michaud, Samuel Edward  
*Doped Cobalt Oxide Catalysts for Aqueous, Electrochemical Oxygen Evolution and Alcohol Oxidation*

McCrorry

Muthike, Angelar Kanini  
*Investigating the Time-Resolved Spectroscopy of Singlet and Triplet State Dynamics in Conjugated Rylene and Quinoline Derivatives for Efficient Optoelectronic Systems*

Goodson

Ricci, Federica  
*Investigation of Electronic Quantum Coherence in Semiconductor Materials using Time-resolved Non-Linear Optical Microscopy at Nanoscale Level*

Goodson

Roy, Pronay  
*Vlasov Simulation with FARSIGHT and Unlimited Photon Acceleration*

Sanford

Soucy, Taylor  
*Charge and Proton Transport in Electrocatalysis by Polymer Encapsulated Cobalt Phthalocyanine*

McCrorry

Terry, Bradley Dale  
*Mechanisms of Direct and Indirect (Photo)Electrochemical Alcohol Oxidation Reactions*

Bartlett

Vasquez, Robert  
*Wet Chemical Modification of Crystalline Silicon Interfaces for Heterogeneous Charge Transfer and Quantitative Analysis*

Maldonado

Vonesh, Hannah  
*Development and Mechanistic Elucidation of Carbonyl-Olefin Metathesis Transformations*

Schindler

Wilson, Jessica  
*Use of Secondary Sphere Hydrogen Bonds for Stabilization and Divergent Reactivity in Transition Metal Complexes*

Szymczak

Yazarians, Jessica  
*Biocatalytic P450 Oxidative Phenolic Coupling Reactions for Biaryl-bond Formation*

Narayan

## Summer 2022

Bellas, Michael  
*Energetic Materials and Oxygen Balance: Noncovalent Synthesis with Oxidizers*

Matzger

- Bonsall, Robert Edward      McCrory  
*Electrochemical Reductive Stability of Self-Assembled Monolayers on Transition Metal Electrodes*
- Bramlett, Taylor A      Matzger  
*Investigation of Non-Covalent Interactions in the Solid-State and in Solution Phase*
- Collins, James      Stephenson  
*Harnessing Imine Photochemistry for the Synthesis of Important Building Blocks*
- Crisci, Ralph      Chen  
*Molecular Understanding of Antifouling Surfaces and Surface Passivating Materials*
- Dean, William      McCrory  
*Spectroscopic and Microscopic Characterization of Heterogenized Molecular Catalyst Systems*
- Diaz, Nicolas      Nagorny  
*Total Synthesis of Diterpene (?) -Aspewentin A via a Michael/Aldol Cascade*
- Duan, Rong      Kubarych  
*Ultrafast Dynamics of Vibrational Polaritons Probed with 2D-IR Spectroscopy*
- Geng, Lequn      Wang  
*Designing Switchable Opioid Peptides for Interrogating the Effects of Cell Type-Specific Opioid Receptor Activation*
- Han, Yilin      Ruotolo  
*Investigation of Amyloidogenic Protein-ligand Complexes by Ion-Mobility Mass Spectrometry*
- Jiang, Hanjie      Zimmerman  
*Configuration Interaction Methods to Predictions on Photophysical Properties of Organic Materials*
- Lee, Jamy Yuen      Pratt  
*Chemical Characterization of Fresh and Aged Biomass Burning Aerosols from Wildfires and Prescribed Burns*
- Lu, Tieyi      Chen  
*Probing the Interfacial Peptides/Proteins by Using Sum Frequency Generation Spectroscopy with Hamiltonian Approach Data Analysis Method*
- Martin, Joshua      Montgomery  
*A Fluoride Migration Approach to the Rapid Synthesis of Small Oligosaccharides*
- Monroe, Jeremy G      Koutmou/Ragunathan  
*N1-methylpseudouridine and pseudouridine mRNA Modifications Modulate Translation Rate and Fidelity*
- Musselman, Bradley Wayne      Lehnert, Nicolai  
*Cobalt Porphyrinoid Complexes in Catalysis: Mechanistic Insights into Carbene Transfer and Biocatalysis Applications*
- Parson, Kristine      Ruotolo  
*Development of Ion Mobility-Mass Spectrometry Methods for Membrane Proteins Incorporated into Nanodiscs*
- Rask, Alan Etienne      Zimmerman  
*The Many-Body Expansion of Electron Interactions for Transition Metal Complexes*
- Richardson, Alistair      Schindler  
*Leveraging Lewis Acids and Visible Light for Method Development and Total Synthesis*
- Rojas Ramirez, Carolina      Ruotolo  
*Combining Native Ion Mobility-Mass Spectrometry and Radical-based Fragmentation for Top-down Structural Proteomics*
- Schneider, Bernadette L      Pecoraro  
*Solution Studies of Lanthanide-Centered Metallocrowns and Metallocrown Nanocapsules*
- Shao, Wenhao      Kim  
*Purely Organic Triplet Emitters: From Fundamental Molecular Design to Performance Amplification in Modern Applications*
- Skinner, Kevin Narayan/Zimmerman  
*Development and Application of Computational Tools to Study Single-Electron Transfer Initiated Reactions in Solution and Enzymes*
- Smith, Tyler Jackson      Koutmou  
*Modification and Sequence of tRNAs and mRNAs Impact Translational Speed and Accuracy: Insight into how Purines can Modulate Protein Synthesis*
- Wade Wolfe, Michael      Szymczak  
*Advancing Boron Mediated Fluoroalkylation Reactions*
- Wang, LeeAnne      Hakansson  
*Improved Mass Spectrometry-Based Approaches to Screening and Structural Analysis in Drug Development*
- Witt, Ciara      Frank  
*Toward RNA Design: Computational Exploration of ncRNA Sequence and Structure*
- Wu, Yujin      Brooks  
*Development and Application of CDOCKER Docking Methodology*
- Zegalia, Kelcie      Kennedy  
*Advances in Islet Metabolomics using Hydrophilic Interaction Chromatography-Mass Spectrometry*
- Zhou, Yanbing      Zgid  
*Quantum Chemistry in Solid-State Simulations: Gaussian Basis Sets Development and ab-initio Green's Function Based Realistic System Applications*
- Zotos, Eleni Katherine      Shultz  
*Chemistry Graduate Students' Knowledge for Teaching and Factors That Influence Their Development as Instructors*



**Jeffrey Brender** (postdoctoral 2006-2013, Ramamoorthy) has been promoted to become a Staff Scientist at the National Cancer Institute, Washington, DC.

**Kate Biberdorf** (BS, 2008) was featured in a New York Times, July 12, 2022 Profiles in Science, “Kate the Chemist’s Explosive Ambitions” about her outreach work aimed at breaking down the image of the stereotypical scientist, while reaching students who might otherwise be intimidated by science. Her work includes television appearances, children’s books, and nonfiction book for adults: *It’s Elemental; The Hidden Chemistry in Everything*.

**Conor Brigham** (PhD 2022, Sanford) has started work as a medicinal chemist with Roivant Sciences in Boston.

**Joel C. Colburn** (PhD 1978, Ashe) writes that he is retired and living the good life in San Diego. He would like to hear from some of his former Chem. Department buddies. His e-mail address is joel.colburn@sbcglobal.net.

**Sarah Cox-Vazquez** (PhD 2020, Ramamoorthy) is the co-founder of Acoerela and apostdoctoral fellow at the National University of Singapore.

**Joshua Damron** (PhD 2021, Ramamoorthy) has joined Oak Ridge National Laboratory as a scientist.

**Hai Dong** (PhD 2021, Lehnert) has just started as a Research Scientist at Intel, Santa Clara, CA.

**Giacomo DiMaurro** (PhD 2021, Ramamoorthy) has joined Kisbee Therapeutics as a scientist.

**Larry Hamann** (PhD 1991, Koreeda) has been selected as the recipient of the 2022 ACS Division of Medicinal Chemistry Award. He is currently the co-founder, president and CEO of a startup biochemistry technology in stealth mode. Previously, he was Global Head, Drug Discovery Sciences at Takeda Pharmaceuticals. Larry has also as corporate VP Global Head of Small Molecule Discovery and Cambridge Site Head at Celgene. He has overseen research teams for more than 18 clinical stage compounds. He is the co-inventor on more than 70 patents and coauthor of more than 80 scientific publications.

**Kunai Khanna** (PhD 2021, Walter) is now a research scientist at Agilent Technologies.

**Vojc Kocman** (postdoctoral 2018-19, Ramamoorthy) is a junior faculty member at the National Institute of Chemistry in Ljubljana, Slovenia.

**Naish Laloo** (PhD 2022, Sanford) has started teaching as an assistant professor at N.C. State University.

**Molly MacInnes** (PhD 2020, Lehnert) is now an Assistant Professor at Grinnell College.

**Shankar Mandal** (postdoctoral 2019-22, Walter) has started as an Associate Research Scientist at PPD as part of Thermo Fischer Scientific.



**Brad Musselman** (PhD 2022, Lehnert) is now a postdoctoral fellow with Professor Leslie Murray, University of Florida.

**Aaron Raphael** (BS 1996) recently an intellectual property law firm, Raphael Bellum PLLC.

**Thirupathi Ravula** (postdoctoral 2015-21, Ramamoorthy) has joined the National Magnetic Resonance Facility at Madison (NMRFAM) as a scientist.

**Theresa M. Reineke** (PhD 2000, Yaghi) was named a 2022 Arthur C. Cope Scholar by the ACS. She is one of ten recipients of this prestigious award. She is a Distinguished McKnight University Professor at the University of Minnesota.

**Andreas Schmidt** (postdoctoral 2019-22, Walter) has started as a Research Scientist at Illumina.

**Catherine Scull** (postdoctoral 2020-22, Walter) has joined Servier Pharmaceuticals as a Research Scientist.

**Robb Welty** (postdoctoral 2018-22, Walter) is now the Biophysics Core Manager at the University of Colorado Anschutz Medical Campus.

**Kazutoshi Yamamoto** (PhD 2011, Ramamoorthy) has been promoted to Staff Scientist at the National Cancer Institute, Washington, DC.

## We'd like to hear from you!

**Share a memory of your time at Chemistry!  
Which faculty made a lasting impression on you? What was your favorite spot on campus? Send us highlights of your days at the University of Michigan. What are doing now?**

Send a note to the Department of Chemistry,  
930 University Ave., Ann Arbor, MI 48109-1055  
Or email the information to [chem.alum@umich.edu](mailto:chem.alum@umich.edu).

# In Remembrance

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## Lyubica Dabich

(BS 1950) died in Ann Arbor on October 24, 2021 at the age of 92. She was born in Detroit on May 16, 1929. Dr. Dabich obtained her BS degree in Chemistry from the University of Michigan in 1950. She subsequently received an MS degree in biochemistry from the University of Wisconsin and worked at the Parke Davis Research Laboratory in Detroit until 1956. In 1960 she received her MD degree from McGill University. She returned to the UM for her internship and residency training 1960-64.

In 1966, she joined the faculty of the UM Medical School as an instructor and was promoted to assistant professor in 1968 and associate professor in 1973. The main thrust of Dr. Dabich's work was in the diagnosis and treatment of adult patients with leukemia or lymphoma. Obituary: *Ann Arbor News*, October 31, 2021

## John R. Dice

(BS 1941, MS 1942, PhD 1946 Bachmann) died on July 31, 2022 in Brunswick, Me. He was born in Ann Arbor on January 11, 1921. After finishing his education he worked as a Shift Foreman on the Manhattan Project at Tennessee Eastman Co, 1944-45. He was an assistant Professor of Chemistry 1946-51 at the University of Texas. He then joined Parke Davis, Ann Arbor, as a research chemist and was ultimately director of chemical research. He retired in 1985. He and his wife Peggy then moved to Maine.

Dr. Dice was predeceased by his wife, Margaret Little Dice in 2005 and survived by their children. Obituary: *Ann Arbor News*, August 25, 2022.

## Frank T. Hammer

(MS 1970, PhD 1972, Martin) died at Avila Retirement Community, Albany, New York on October 1, 2021. He was born in Gulfport, Mississippi on July 3, 1945. He received his BS in chemistry from Florida State University in 1967 and his PhD in chemistry from the University of Michigan in 1972. His dissertation was titled, "Studies on Cyclic Malonyl Peroxides."

Dr. Hammer lived most of his adult life in Chelsea, MI, working as an environmental toxicologist for the National Sanitation Foundation and Underwriters Laboratories. He was active in community affairs, serving three decades on the Chelsea City Council, retiring in 2015.

He is survived by his wife of 54 years, Elizabeth Hammer, and three children and four grandchildren. Obituary *Chelsea Update*, 2021

## Janice Bluestone Longone

(wife of Prof. Emeritus Daniel Longone) died in Ann Arbor on August 3, 2022 at the age of 89. A food history scholar, her renowned collection of cookbooks became the Janice Bluestein Longone Culinary Archive at the University of Michigan. It also powered the development of academic food studies programs, according to the New York Times. She is survived by Daniel and her brother Bernard Bluestone. Obituaries: *Ann Arbor News*, August 14, 2022 and *New York Times* August 15, 2022

## Norman G. Johnson

(Chief of the Chemistry Machine Shop) died on October 19, 2021 at Chelsea Retirement Community Towsley Village. He was born in Jackson, MI on September 23, 1929. He graduated from Ann Arbor High School in 1947 and earned an Agricultural Degree from Michigan State University. He served in the US Army from 1951-53.

Mr. Johnson was a master level machinist, spending 34 years assisting generations of students and faculty with important research. Upon retirement he continued to use his machinist skills as a hobby producing working model engines and other intricate projects.

He was preceded in death by his wife of 69 years Mary Ann Mannlein. He is survived by his children and other relatives. Obituary: *Ann Arbor News*, October 24, 2021

## Michael McCulloch Martin

(Faculty member 1959-1999) died on April 18, 2022 at his home in Ann Arbor at the age of 87. He was born in Junction City, Kansas in 1935 and spent his childhood on various military bases where his father served as an officer in the US Army.

He earned a BS degree from Cornell University in 1955 and a PhD from the University of Illinois in 1958. He joined the University of Michigan as an instructor of chemistry in 1959. He was promoted to assistant professor in 1961 and associate professor of chemistry in 1965. His interests lead him to the interface between chemistry and biology and in 1969 he was appointed in both departments. He served as chair of the Division of Biological Sciences from 1982-85, associate dean of the College of Literature, Science, and the Arts (LSA) from 1991-95 and director of the LSA Honors Program from 1997-98. He was recognized as an Arthur Thurnau Professor in 1996. He became a Professor Emeritus of Biology in 1999.

Through most of his career, Professor Martin focused on the biochemistry, physiology, and nutritional ecology of herbivorous insects.

He is survived by his wife of 56 years Joan Stadler Martin, Two children Jeff and Linda and four grandchildren. Obituary: *University Record*, May 2, 2022



## David George Mendenhall

(BS 1967) died on June 9, 2022 in New York City. He was born on February 12, 1945 in Iowa City, Iowa. In 1952 his family moved to Ann Arbor where he attended high school and college. After graduating from the University of Michigan in 1967, he received his PhD in chemistry from Harvard University in 1970. He subsequently held a post-doctoral fellowship at the National Research Council in Ottawa, Canada 1971-72 and he worked at the Stanford Research Institute, CA 1972-74 and the Batelle Laboratories in Columbus, OH 1974-80.

In 1980 he joined the Department of Chemistry at the Michigan Technical University in Houghton as a Professor of Chemistry. He retired in 2001 and founded a research company, Northern Sources based in Hancock, MI. On moving to New York the company was renamed Eastern Sources.

David was predeceased by his first wife Yvonne and survived by his second wife Ying Dong whom he married in 2006. Obituary: *Ann Arbor News* June 19, 2022

## Christer E. Nordman

(Faculty, 1955-1995) died at his home in Ann Arbor on July 6, 2022. He was born on January 23, 1925 in Helsinki, Finland. In 1943 he was drafted into the Finnish army where he served until the war's end. He was on the front line on the Karelian Isthmus where he received a wound which did not seem too important at the time. Interestingly a piece of shrapnel was removed from his neck 50 years later. Christer often remarked that this was his "metal" from the Finnish-Russian war.

He earned a chemical engineering degree from the Finnish Institute of Technology in Helsinki in 1949. He then received a scholarship to attend graduate school at the University of Minnesota, where he studied crystallography under future Nobel laureate William Lipscomb. After completing his PhD in 1953, he was a postdoctoral research associate at the Institute for Cancer Research in Philadelphia, PA. He then joined the UM Department of Chemistry as an instructor in 1955, being promoted to professor in 1964.

In 1971 he received a National Institutes of Health fellowship for sabbatical study at Oxford University with Nobel laureate Dorothy Hodgkin and at Uppsala University in Sweden.

Dr. Norman's research focused on X-ray crystallography and computational methods for solving the structures of large bioactive molecules. He served as editor of *Acta Crystallographica*. In 1997 he was honored with the Patterson Award of the American Crystallographic Association for lifetime achievement in his field. Christer retired in 1995. In post-retirement he spent many hours with his computer on research problems.

He is survived by his wife since 1994, Outi Marttila-Nordman. He is also survived by his former wife Barbara and their children. Obituaries: *Ann Arbor News*, July 17, 2022 and the *University Record* July 25, 2022.

## Frank F. Parker

(BS 1963 and Retired Manager of NMR Services) died on December 2, 2021 in Ann Arbor. He was born in Kalamazoo, MI on June 19, 1940. After graduation from the University of Michigan Frank joined the Department of Chemistry as the manager of our analytical instrumentation laboratories, where he worked for almost 35 years. He assisted generations of faculty and graduate students particularly with NMR spectra. He retired in 2001 then devoted his time to managing racing cars.

Frank is survived by his wife Ruth of 60 years and family. Obituary: [www.weremember.com/frank-f-parker/4c1r/memories](http://www.weremember.com/frank-f-parker/4c1r/memories)

## Robert W. Summitt

(BS 1955) died on January 9, 2022 in Portage, MI at the age of 86. Following graduation from UM, Robert received his PhD in physical chemistry from Purdue University in 1961. His initial employment was with the Corning Glass works. He left Corning to join Michigan State University in the Metallurgy, Mechanics and Material Science Department. He taught at MSU for 28 years, five of those years serving as Departmental Chairman.

He is survived by his wife Nancy and children Elizabeth and David. Obituary: *C&EN News*, April 25, 2022





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*The beautiful blue hue of liquid oxygen is a side benefit of the demonstration that Guenther Kellner—a perennial student favorite—provided in a Chemistry 130 lecture demonstrating the different responses of liquid oxygen and liquid nitrogen to a magnet. It was part of a lecture by Carol Ann Casteñada on models for predicting para- or diamagnetism and comparing and contrasting valence bond theory and molecular orbital theory.*

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