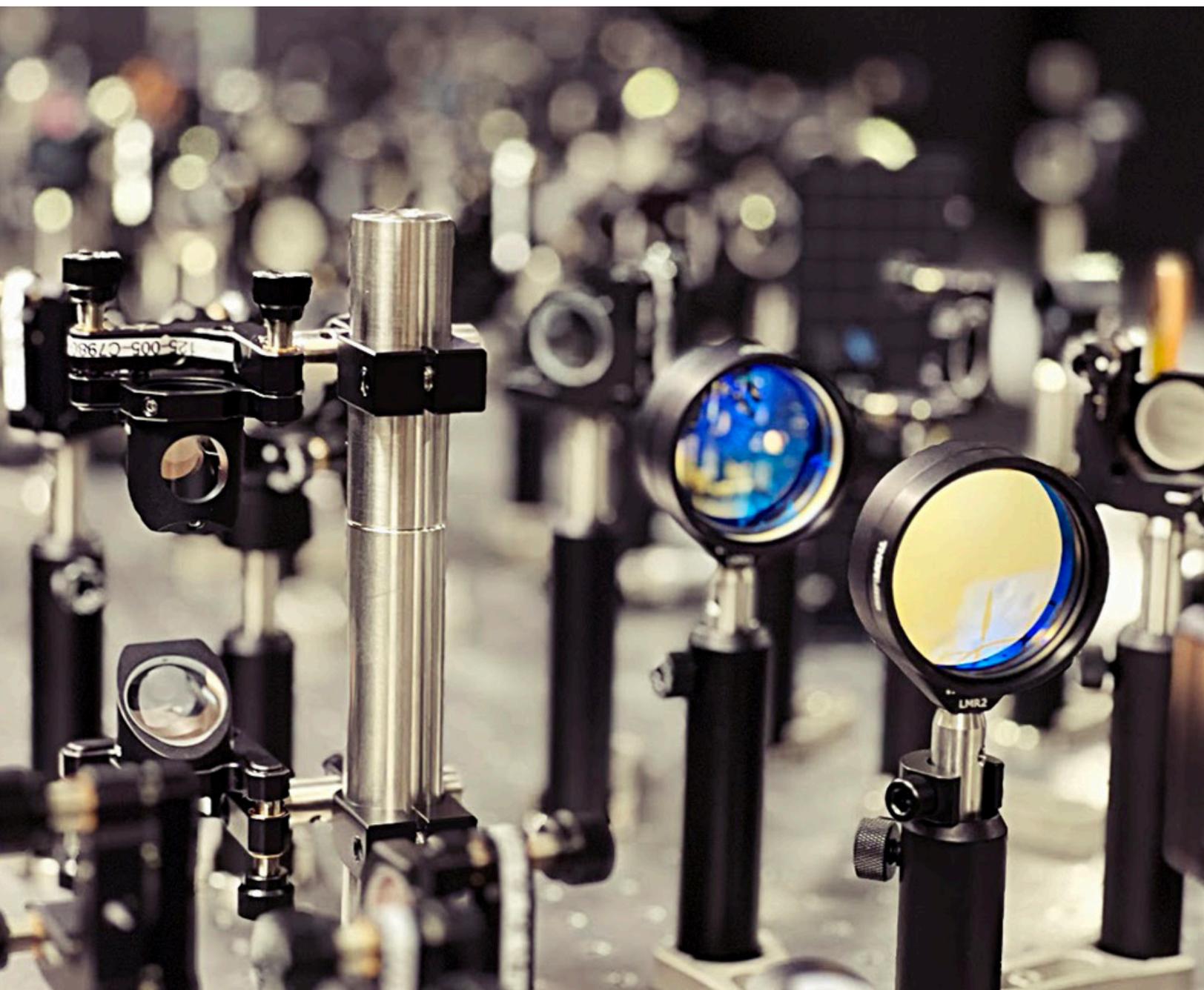




CHEMISTRY NEWS

2025 – 2026



Kobayashi Group aims to see electrons on the move



M lsa.umich.edu/chem

On the cover

Beamline of the femtosecond laser in the Kobayashi lab
Courtesy of Yuki Kobayashi

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Department of Chemistry Newsletter

Chair: Bart M. Bartlett

Editors: Stephen Maldonado

Email: chem.alum@umich.edu

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Jordan B. Acker, Michael J. Behm, Mark J. Bernstein, Paul W. Brown, Sarah Hubbard, Denise Ilitch, Carl J. Meyers, Katherine E. White, Domenico Grasso (ex officio).

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Welcome from the Chair

Dear University of Michigan Chemistry Community,
I hope this letter finds you well. We've begun another great year, and I'm excited to share a bit of what we're up to here at Michigan Chemistry.

We've welcomed two new faculty members this year. Assistant Professor Lexi Deal is developing analytical and physical chemistry methods for studying change in properties at air/water interfaces. Dr. Thu Nguyen is a Lecturer III who will have an immediate impact on the organic lab course instruction. I also want to recognize Dr. David Bartley, Lecturer III, who joined the U-M faculty last year; he is doing great work with the general chemistry lecture program.

We've celebrated six successful promotions among the tenure-track faculty (Sarah Keane, Markos Koutmos, and Matthew Soellner to Associate Professor with tenure; Andrew Ault, Charles McCrory, and Ginger Shultz to Professor with tenure). And Dr. Alex Poniatowski has recently been named a Teaching Professor.

Faculty members in Chemistry continue to win major awards: Prof. Charles McCrory (John Dewey Teaching Award and Bold Challenges Initiative); Prof. Matthew Soellner (Class of 1923 Memorial Teaching Award; 2024 Individual Award for Outstanding Contributions to Undergraduate Education in LSA); Prof. Julie Biteen (Janine Maddock Collegiate Professor of Chemistry & Biophysics); Prof. Brandon Ruotolo (2024 Ken Standing Award in Mass Spectrometry); Prof. Nicolai Lehnert (2024 Stanley C. Israel Regional Award for Advancing Diversity in the Chemical Sciences); Prof. Markos Koutmos (Robert Kuczkowski Faculty Research Award); Prof. Kristin Koutmou (2025 Elisa Izaurralde Award in Innovation from the RNA Society); Prof. Ginger Shultz (Arthur F. Thurnau Professorship); Prof. Anne McNeil (Energy Reduction Champion Award); Prof. Neil Marsh (2025 Michigan Road Scholar); Prof. Wenjing Wang (Isabella Karle Collegiate Professor in the Life Sciences); Prof. Theodore Goodson III (2025 Chemical Pioneer Award by the American Institute of Chemists; I won the 2025 Percy L. Julian Award by the National Organization for the Professional Advancement of Black Chemists and Chemical Engineers.

Our students are flourishing. We have seen large increases in the demand for undergraduate students enrolling in the general chemistry lab and lecture courses. We have revamped the courses and schedules to meet this demand. We have also seen a 15% growth in the number of chemistry majors from last year, with 190 undergraduates completing B.S. degrees in our department. Within the graduate program, we created a professional development writing course in 2023, and we are learning that students have an increased sense of community and increased self-confidence in writing within the discipline as a result.

In this edition of the newsletter, you'll read about Prof. Yuki Kobayashi's research in quantum materials. You'll learn from our SciComm student fellows the efforts the department has undertaken in sustainability, opportunities for external internships to enhance the student experience, and advances in our safety culture. And you'll see some of the fun we've had this past year in strengthening our community through scientific discussions and social events.

In preparing the most recent newsletter, I deeply regret that I forgot to recognize the success of our 11th annual Alum|NUM and 7th annual URAN|UM events held on July 24. I am grateful to the organizing committee members and the co-presidents, Ayush Chitrakar & Sabrina Reich. This event is very special in bringing together the past, present, and future of Michigan Chemistry: 14 alumni, 57 undergraduates from U-M and 7 other schools, 8 D-RISE high school students, and 85 current graduate students and postdoc volunteers who graciously dedicated their time to review CVs and serve as poster judges.

I also want to thank commUNITY for their work in welcoming Prof. Robert Gilliard as this year's June-teenth speaker to share his research in main-group chemistry as well as sharing his career journey with students and postdocs.



I am grateful for the myriad of ways that we gather to learn from each other, support each other, and get to know each other.

Please know that your contributions and engagement are crucial for our department. I deeply encourage you to share your stories and accomplishments, to visit us whenever you have a chance, and to continue supporting our teaching and research missions.

Thank you for being a part of our Chemistry community. Here's to a productive and inspiring year ahead!

Go Blue!

Bart M. Bartlett

Chair, Department of Chemistry

Arthur F. Thurnau Professor

Professor of Chemistry

Carbon Capture Method Mines Cement Ingredients From the Air

by Morgan Sherburne, U-M News

University of Michigan researchers have helped develop a method to take carbon dioxide, an industrial waste product that pollutes the atmosphere, and turn it into something useful: precursors to make cement.

U-M chemist Charles McCrory and his research group, along with Jesús Velázquez's lab at the University of California, Davis, and Anastassia Alexandrova's lab at the University of California, Los Angeles, have developed a method to capture carbon dioxide and turn it into metal oxalates, which then can be used as precursors for cement production.

"This research shows how we can take carbon dioxide, which everyone knows is a waste product that is of little-to-zero value, and upcycle it into something that's valuable," said McCrory, professor of chemistry and macromolecular science and engineering. "We're not just taking carbon dioxide and burying it; we're taking it from different point sources and repurposing it for something useful."

The research was spurred by McCrory's participation in the Center for Closing the Carbon Cycle. 4C is an Energy Frontier Research Center funded by the U.S. Department of Energy, Office of Science, Basic Energy Sciences, and is led by Jenny Yang at the University of California, Irvine. One of the goals of 4C is to explore methods for capturing and converting carbon dioxide into valuable fuels and products.

The most common type of cement is Portland cement, which is typically made from limestone and minerals such as calcium silicates. Producing this Portland cement has a relatively large energy cost and carbon footprint, McCrory said. McCrory and

colleagues were looking into ways to take carbon dioxide and convert it into materials that can be used for production of alternative cement.

One type of material that can be used as an alternative cement precursor is metal oxalates, simple salts. Researchers know that lead can be used as a catalyst—a substance that helps facilitate a chemical reaction—converting carbon dioxide into metal oxalates. But the process requires large amounts of lead catalysts, which are an environmental and human health hazard.

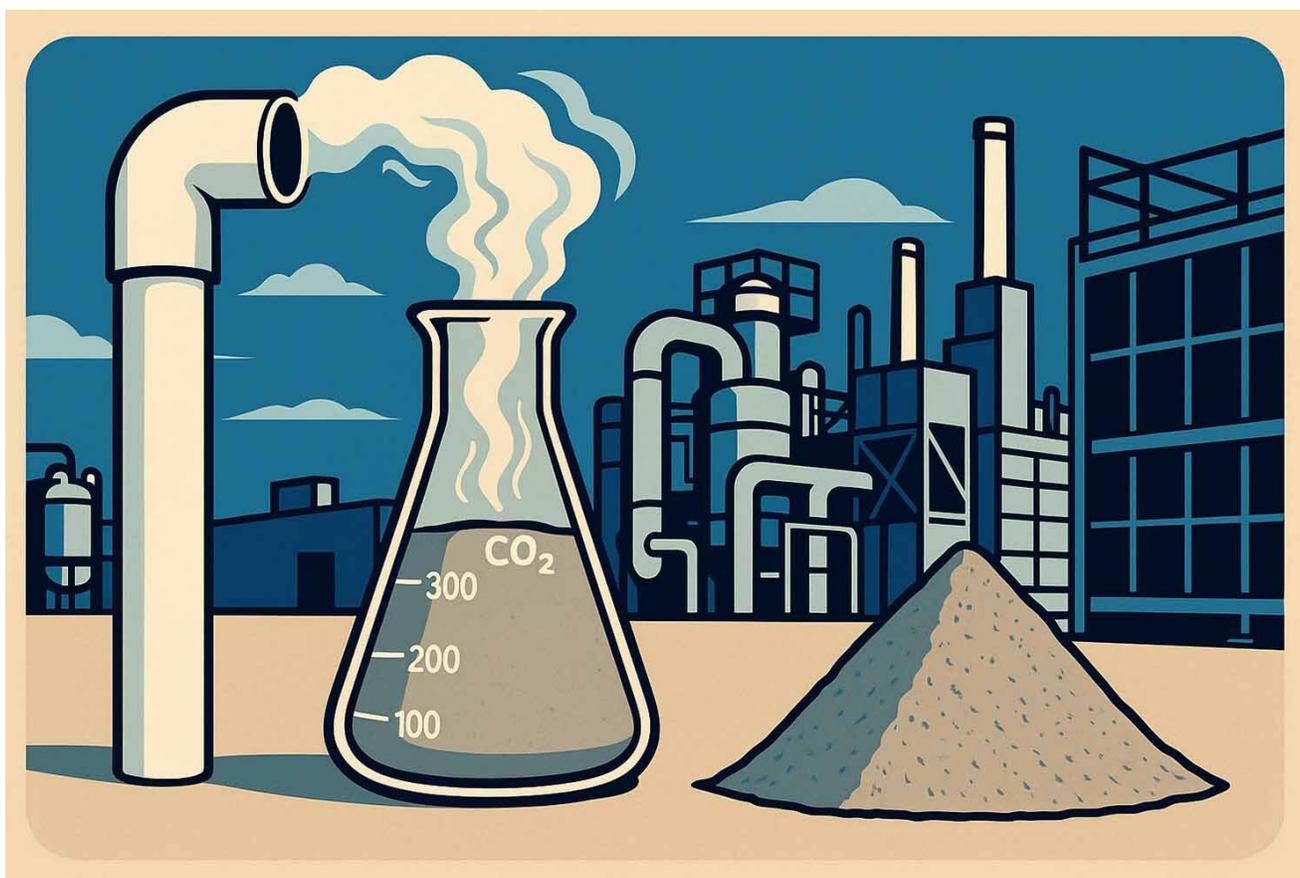
The 4C team was able to use polymers to control the environment immediately surrounding the lead catalysts, shaving the amount of lead needed in this process down to parts per billion—a trace impurity level of lead found in many commercial porous graphite and carbon materials.

McCrory specializes in controlling the microenvironment—the chemical environment and coordination environment—around catalyst sites. By controlling the microenvironment, McCrory can tune the activity of the catalyst. The researchers showed that by controlling the microenvironment surrounding the lead catalyst in the chemical reaction that converts carbon dioxide to oxalate, they can vastly reduce the amount of lead needed for the process.

To produce oxalate from carbon dioxide, researchers use a set of electrodes. At one electrode, carbon dioxide is converted to oxalate, which is an ion dissolved in the solution. The other electrode is a metal electrode that's being oxidized and releasing metal ions that bind with the oxalate ion and precipitate it out of solution as a metal oxalate solid.

"Those metal ions are combining with the oxalate to make a solid, and that solid crashes out of the solution," McCrory said. "That's the product that we collect and that can be mixed in as part of the cement making process."

Study: Selective Electrochemical Reduction of CO₂ to Metal Oxalates in Nonaqueous Solutions Using Trace Metal Pb on Carbon Supports Enhanced by a Tailored Microenvironment (DOI: 10.1002/aenm.202501286)



Concept illustration of capturing particulates from the air to use in concrete production. Image credit: Nicole Smith, made with ChatGPT

Velázquez is a co-lead author of the study and associate professor of chemistry at UCD. His group originated the idea of using trace amounts of lead to drive oxalate-synthesis reactions and examined the mechanisms behind the chemical reaction of carbon dioxide into oxalate.

Metal oxalates represent an underexplored frontier—serving as alternative cementitious materials, synthesis precursors and even carbon dioxide storage solutions,” he said.

Alexandrova is also a co-lead author of the study and professor of chemistry and materials science at UCLA. Her team performed calculations to confirm the hypothesis that this mechanism would work.

“Catalysts are often discovered by accident, and successful industrial formulations are often very complicated. These cocktail catalysts are discovered empirically through trial and error,” Alexandrova said. “In this work, we have an example of a trace lead impurity actually being a catalyst. I believe there are many more such examples in practice catalysis, and

also that this is an underexplored opportunity for catalyst discovery.

McCrorry says once the carbon dioxide is converted into the metal oxalate solid, it won’t be re-released into the atmosphere as carbon dioxide again under normal conditions.

“It’s a true capture process because you’re making a solid from it,” he said. “But it’s also a useful capture process because you’re making a useful and valuable material that has downstream applications.”

McCrorry says researchers should be able to scale up one part of the process: researchers are working on electrolysis for carbon dioxide on a large scale. Next steps will be to further study how to scale up the portion of the process that produces the solid product.

“We are a ways away, but I think it’s a scalable process,” McCrorry said. “Part of the reason we wanted to reduce the lead catalyst to parts per billion is the challenges of scaling up a catalyst with massive amounts of lead. It wouldn’t be environmentally reasonable, otherwise.”

U-M, Multinational Team of Scientists Reveal Structural Link for Initiation of Protein Synthesis in Bacteria

A visual mystery solved—scientists previously did not know how the ribosome attaches to and reads mRNA

by Paul Avedisian, Center for RNA Biomedicine

Within a cell, DNA carries the genetic code for building proteins.

To build proteins, the cell makes a copy of DNA, called mRNA. Then, another molecule called a ribosome reads the mRNA, translating it into protein. But this step has been a visual mystery: scientists previously did not know how the ribosome attaches to and reads mRNA.

Now, a team of international scientists, including University of Michigan researchers, have used advanced microscopy to image how ribosomes recruit to mRNA while it's being transcribed by an enzyme called RNA polymerase, or RNAP. Their results, which examine the process in bacteria, are published in the journal *Science*.

“Understanding how the ribosome captures or ‘recruits’ the mRNA is a prerequisite for everything that comes after, such as understanding how it can even begin to interpret the information encoded in the mRNA,” said Albert Weixlbaumer, a researcher from the Institute of Genetics and Molecular and Cellular Biology at the University of Strasbourg who co-led the study. “It’s like a book. Your task is to read and interpret a book, but you don’t know where to get the book from. How is the book delivered to the reader?”

The researchers discovered that the RNAP transcribing the mRNA deploys two different anchors to rope in the ribosome and ensure a solid footing and start of protein synthesis. This is similar to a foreperson at a construction site overseeing workers installing a complex section of the superstructure, confirming in two redundant ways that all the pieces are fastened securely at critical junctures for maximum stability and functionality.

Understanding these fundamental processes holds great potential for developing new antibiotics that

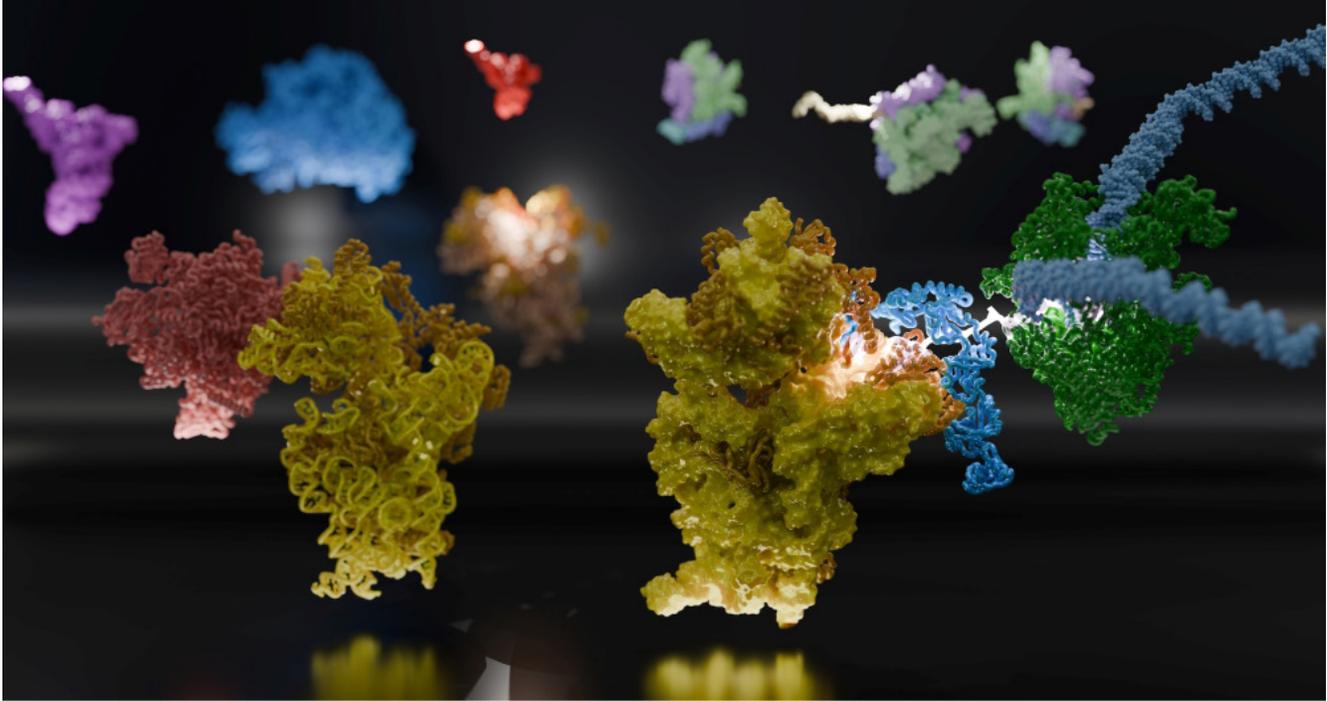
target these specific pathways in bacterial protein synthesis, according to the researchers. Traditionally, antibiotics have targeted the ribosome or RNAP, but bacteria often find a way to evolve and mutate to create some resistance to those antibiotics. Armed with their new knowledge, the team hopes to outwit bacteria by cutting off multiple pathways.

“We know there is an interaction between the RNAP, the ribosome, transcription factors, proteins, and mRNA,” said U-M senior scientist Adrien Chauvier, one of four co-leaders of the study. “We could target this interface, specifically between the RNAP, ribosome, and mRNA, with a compound that interferes with the recruitment or the stability of the complex.”

The team developed a mechanistic framework to show how the various components of the complex work together to bring freshly transcribed mRNAs to the ribosome and act as bridges between transcription and translation.

“We wanted to find out how the coupling of RNAP and the ribosome is established in the first place,” Weixlbaumer said. “Using purified components, we reassembled the complex—10-billionth of a meter in diameter. We saw them in action using cryoelectron microscopy (cryo-EM) and interpreted what they were doing. We then needed to see if the behavior of our purified components could be recapitulated in different experimental systems.”

In more complex human cells, DNA resides in the walled-off nucleus, where RNAP serves as the “interpreter,” breaking down genetic instructions into smaller bites. This dynamo of an enzyme transcribes, or writes, the DNA into mRNA, representing a specifically selected copy of a small fraction of the genetic code that is moved to the ribosome in the much “roomier” cytoplasm, where it is translated into proteins, the basic building blocks of life.



This image highlights two alternatives for the ribosome to be recruited to an mRNA that is still being synthesized by RNA polymerase (RNAP). RNAP (left, red) can directly deliver the mRNA to the entry channel of the small ribosomal subunit (left, yellow). Alternatively, and likely dominant in bacteria, RNAP (green) can interact with ribosomal protein bS1 (right, cyan). bS1 binds and guides the mRNA (right, white and glowing) from RNAP into the small ribosomal subunit (right, yellow). Image courtesy: Mohammad Afsar and Huma Rahil

In prokaryotes, which lack a distinct nucleus and internal membrane “wall,” transcription and translation happen simultaneously and in close proximity to each other, allowing the RNAP and the ribosome to directly coordinate their functions and cooperate with each other.

Bacteria are the best-understood prokaryotes, and because of their simple genetic structure, provided the team with the ideal host to analyze the mechanisms and machinery involved in the ribosome-RNAP coupling during gene expression.

With expertise in biophysics, Chauvier and Nils Walter, U-M professor of chemistry, biophysics and biological chemistry, utilized their advanced single molecule fluorescence microscopes to analyze the kinetics of the structure.

“In order to track the speed of this machinery at work, we tagged each of the two components with a different color,” Chauvier said. “We used one fluorescent color for the nascent RNA and another one for the ribosome. This allowed us to view their kinetics separately under the high-powered microscope.”

They observed that the mRNA emerging from RNAP was bound to the small ribosomal subunit (30S) particularly efficiently when ribosomal protein bS1 was

present, which helps the mRNA unfold in preparation for translation inside the ribosome.

The cryo-EM structures of Webster and Weixlbaumer pinpointed an alternative pathway of mRNA delivery to the ribosome, via the tethering of RNA polymerase by the coupling transcription factor NusG, or its paralog or version, RfaH, which thread the mRNA into the mRNA entry channel of the ribosome from the other side of bS1.

Having successfully visualized the very first stage in establishing the coupling between RNAP and the ribosome, the team looks forward to further collaboration to find out how the complex needs to rearrange to become fully functional.

Huma Rahil, a doctoral student in the Weixlbaumer lab, and Michael Webster, then a postdoctoral fellow in the lab and now of The John Innes Centre in the United Kingdom, co-led the study, as well.

Study: Molecular basis of mRNA delivery to the bacterial ribosome (DOI: 10.1126/science.ado8476)



Safety Refresher Day

Advancing the Department's Commitment to Safety Culture

By Colin Tichvon, SciComm Fellow

"Can you find the mistakes here?" Assistant Professor Yuki Kobayashi asked a crowded classroom gesturing to the picture in his slideshow: a photo of him, but leaning over a laser table, checking the alignment of the beam. "Unfortunately, wearing the same shirt. That is a huge mistake," he joked before pointing out the real mistakes, a slew of unsafe practices. He was wearing his laser goggles improperly, using his bare hand to check the beam path, and wearing a shiny bracelet on the same wrist.

His presentation on proper laser safety procedures was one of the many breakout sessions that comprised Michigan Chemistry's first Safety Refresher Day, a building-wide event in August 2024. Attendees began the day with an introduction by Professor Nathaniel Szymczak where he outlined the schedule, goals, and safety statistics from the past year.

"I think it's important to kind of normalize safety and best practices across the entire department," Szymczak said. "The idea is that we have this as a reoccurring session or reoccurring yearly event effectively and build a new skill set, build familiarity with different subtopics every year."

Topics were collected by members of the Department's Safety Committee, which Szymczak chairs. Faculty were asked to speak with their lab members

and research clusters to identify where refresher training would be beneficial. This guided committee members as they prepared their presentations and scheduled guest presenters, including the keynote lecture delivered by Professor Imke Schroeder, Research Project Director of the UC Center for Laboratory Safety. Her research focuses on evaluating laboratory practices to improve safety procedures, both through case study and developing principles for safe research. She also serves as an Editor for ACS Chemical Health and Safety, a primary reason she was selected, according to Szymczak.

Szymczak expressed the importance of the Safety Day refresher to the department's safety culture in addition to the chance to establish standards across the department. He said the general attitude towards safety has changed since he was a graduate student. "Standards have just completely changed," he said. "The culture is just trending in the right direction."

He noted that this is a national trend, driven by keeping safety as a consistent subject of conversation. Events such as the Safety Refresher Day, something other universities have instituted, contribute to this by inviting students to engage in discussions about best practices with their advisors and



Attendees began the day with an introduction by Professor Nathaniel Szymczak where he outlined the schedule, goals, and safety statistics from the past year.

colleagues. Chris Peters, the Environmental Health and Safety Officer for the department as well as one of the event's presenters, agrees that this consistent engagement is crucial.

"That's something we've been really trying to do is trying to keep safety at the forefront...to get that mindset out there." This has included presenting safety minutes at faculty meetings, discussing safety incidents in-depth at Safety Committee meetings, and holding monthly meetings with laboratory safety officers to talk through best practices.

Constant conversation helps to combat complacency with respect to safety protocols, something Peters sees as a challenge when researchers cut corners in familiar procedures.

"Inevitably, it's like 'I could do it this way much easier, quicker' but that's not necessarily the safest way. So, you kind of lose that thought process of how I do this without possibly causing issues?" Peters, who has worked in the Chemistry department since 2004, gave his presentation on general chemical hygiene and waste management, two topics that lie at the heart of all wet chemistry research.

Enforcing these principles in the laboratory is the responsibility of each group's safety officer. Graduate student Nicholas Tomalia fills that role in the Matzger research group. Daily, his responsibilities include ensuring chemicals are stored correctly and used safely, and that waste is managed according to the department's standard operating procedures (SOPs). Specific guidelines are necessary for each lab's unique research. For the Matzger lab, Tomalia

says that "safe work and disposal of energetic materials is important." He strives to ensure that "the people who work with and handle energetics are doing so safely, and according to our SOPs, and the SOPs outlined by the

department." This includes working with department staff, Peters and Kacey Vaughn, the chemical waste specialist, whose efforts have created a streamlined disposal process for all research waste.

For Tomalia, the refresher day was a chance to reflect on his own safety experiences, both in academia and industry, and apply that in the breakout sessions. His biggest takeaway from the event was "reinforcing the double-checking of SDS's (safety data sheets) of materials and knowing compatibilities and incompatibilities," he says. That way, "you know what you're using, you know what could go wrong."

Beyond addressing strategies for mitigating risk, the symposium also emphasized the importance of reporting incidents that do occur. "Tell us when there's an accident, it doesn't matter if we look bad, we just want to know so we can try to figure out how to prevent this in the future," says Peters. Fear of blame can keep researchers from disclosing incidents, a crucial step in responding effectively to safety issues, he explains. Reflecting on these incidents and treating them as learning opportunities plays an important role in the continual conversation that perpetuates a productive safety culture.

Recordings of the 2024 presentations have also been uploaded to a Canvas page to serve as a constant resource for the department. Szymczak hopes that hosting the event yearly will continue to build a strong safety culture, inviting suggestions from all department members for relevant topics to be covered in future breakout sessions.



Reusing space to swap supplies and create a circular economy

Sam Kocurek, an Office of Campus Sustainability intern and Master's student in SEAS (School for Environment and Sustainability) is responsible for recording all exchanges.

Lab Swap Shop

By Zahra Gandhi, SciComm Fellow

In early 2024, North University Building Room 5004 wasn't much more than a former rock-cutting lab turned storage facility for chairs. But when the Office of Campus Sustainability (OCS) rediscovered the room, they saw it as more than a "chair graveyard."

With a little work, it could perfectly exemplify one of their missions: optimizing current spaces before building new spaces.

"It was a space that had been sitting, just collecting chairs and dust for eight years, and we stumbled upon it," explained shop coordinator Alex Galens.

Recently, the "chair graveyard" has been operating as the Lab Swap Shop. Every Thursday afternoon, researchers can stop by to pick up or donate all kinds of laboratory materials.

While anyone can visit the shop, it was specifically developed to reduce waste and purchasing costs for research laboratories by encouraging a more efficient distribution of inventory.

Galens often jokes that no one will ever need to buy an Erlenmeyer flask again!

"I think there's something in the Swap Shop that could help out every single lab on campus."

The Swap Shop was years in the making. Since 2011, OCS has run Lab Reuse, a program where one could request supplies online and have them delivered.

There were also several one-off swap events—the annual Swapapalooza in Chemistry is one—where researchers could trade materials in one location.

From these events, OCS found that researchers enjoyed the convenient delivery option, but also being able to see the products they wanted in person.

The next step seemed clear: to create a permanent place that offered both of these advantages.

However, OCS needed people to organize it. "There was just a need to have somebody dedicated so that the programs could grow," says Galens, who started her role over a year ago, with a focus on getting the Swap Shop running.

For a long time, finding space seemed to be the biggest deterrent. Newly available spaces are quickly designated as classrooms and laboratories, and any potential spaces must also satisfy safety requirements for the storage and monitoring of certain materials.

After LSA appointed Caitlin Jacobs as their Carbon Neutrality Program Manager, she talked to researchers who were really involved in sustainability, particularly in Chemistry and Earth and Environmental Sciences, who would be eager to have a central storeroom.

“It was a combination of knowing that we had some empty space in that building, knowing we had a really responsive community who would accept it and be excited about it, and then it fitting in nicely to this existing operational chain where we already have trucks going on a regular basis,” explains Jacobs.

After three months of getting approvals, cleaning up, moving supplies, and starting communications, the shop opened in June 2024.

“No one will ever need to buy an Erlenmeyer flask again,” Galens jokes.

Upon entering the shop, you’ll first notice the last-call table of items that will be thrown out in a few weeks to make way for new inventory. From there, the shop is organized into sections: plastics and consumables, glassware, large equipment, electronics, chairs, and some smaller, scattered groups, like fridges and hand sanitizer stations.

At the end of your visit, you’ll meet Sam Kocurek, an OCS intern and Master’s student in SEAS, who is responsible for recording all exchanges.

Kocurek estimates that in 2024, users of the Lab Swap Shop have saved over 4,700 lbs. of waste from landfills and over \$346,000 in purchasing new supplies.

Since opening day, one of their biggest special events was the Spooky Swap Shop, held on Halloween. The event included candy, pizza, a costume contest, and a glassware decorating station.

In particular, the event was a great success in attracting a new set of customers: undergraduates. “They’re a community we’re looking to engage more in lab sustainability,” Kocurek shares.

A Kocurek goal for the future is to integrate the Lab Swap Shop into the fabric of every lab’s onboarding process, so researchers are introduced as soon as they join a lab.

“It’s a space for items to move and circulate, but it’s also what we love to call a hub for sustainability,” Kocurek says. “I almost think of it as office hours, an opportunity for that in-person connection.”

Jacobs points out that the Lab Swap Shop has fulfilled one of the large goals of LSA’s Year of Sustainability: strengthening partnerships between campus groups.

Articles from our SciComm Fellows

Everybody wants to know: how can their specific department and area of expertise contribute to this? Jacobs notes. “We hope the Swap Shop is building a bit of that culture.”

Jacobs points out that the Chemistry department, particularly Professor Anne McNeil, has been an advocate for many objectives of the Year of Sustainability, such as carbon neutrality, lower purchasing, and circular economy. Jacobs highlights the Chemistry Sustainability Committee —overseen by McNeil, as an initiative not seen in many departments, yet important for tailoring resources specific to that department.

“The fact that LSA is focusing on this has allowed us to actually focus on it,” McNeil says. “I think it’s empowering a lot of the students to come up with their own ideas.”

Seven months into the shop’s existence, expectations for participation, donations, community building, and education had been met and surpassed. But according to the sustainability leaders, it’s clear that this is just a start.

For McNeil, the ultimate goal is a centrally-located stockroom for commonly ordered lab supplies, which would reduce procurement and shipping costs and save energy and time.

“I feel like the Swap Shop, because it’s free, has the potential to be a halfway point,” says McNeil. “And I think getting people to realize that this shop is only as useful as the donations it gets will be even more useful. If everything you ever wanted to order was already in the Swap Shop, that’s essentially the stockroom, right?”

Check out the *Chemistry Sustainability* <<https://lsa.umich.edu/chem/sustainability.html>> website for all their initiatives, including the *Freezer challenge, Findenser installation and energy-saving goals.*



Pushing a Laser to Reveal the Inner Workings of the Chemistry of Materials

“My dream is to see the fastest phenomena that nobody has ever seen—electrons moving from one atom to another in molecules and nanomaterials.

In my lab, I hope to directly capture that moment experimentally,” says Yuki Kobayashi, an assistant professor of chemistry.

He plans to make his dream come true through the use of ultrafast lasers. With a research interest in laser spectroscopy of quantum materials, Kobayashi, who joined the department in the summer of 2023, is adding to Michigan’s long history in ultrafast, high-power laser research.

Electrons are so fast-moving that it requires a very short burst to see an electron clearly, rather than as just a blur. To see an electron moving about a material, it takes an attosecond laser—one with ultrashort “attosecond” pulses that last 10-18 or a billionth of a billionth second. Such short pulses can be achieved at extremely high photon energies, which have traditionally been available only at large facilities such as synchrotrons—miles in length.

“We are trying to obtain attosecond X-ray capabilities on a lab bench,” Kobayashi says.

To shrink the space needed to generate the ultrafast X-ray pulses, he based his laboratory set-up on

insights awarded the Nobel Prize in 2023, a process called “high-harmonic generation.”

“We focus a high-power femtosecond laser on a gas jet in a vacuum chamber, which creates a plasma—an ocean of ions and electrons—and the collisions generate light.” The photons emitted are of higher frequencies than the driving oscillation of the laser—the “harmonics” in harmonic generation. They generate bursts of X-rays, which have such a short wavelength that they can reveal the electrons in a material clearly rather than as a blur as occurs with visible light.

“X-rays,” he explained, “can do things that regular visible light cannot. It has element specificity—the high energy goes deep into the orbitals of the molecules, selectively accessing the atoms you want to see. In metal-ligand materials, for example, the metal atom will be seen but not all the signal noise of the other molecules.



Above: The Kobayashi Laboratory in the Chemistry building is set up for a high-power femtosecond laser. The tables are isolated from vibration, and the space is temperature and humidity-controlled. Grad student Kanchan Shaikh adjusts some components in the laser enclosure.

Left: Attosecond laser set-up using vacuum chambers

The Kobayashi lab is working to develop new tools for spectroscopy but also to look directly at the electron dynamics in new functional materials such as two-dimensional materials.

“Capturing such fleeting motion of electrons is fundamental to advance our knowledge of reaction mechanisms, from light-to-energy conversion to chemical-bond rearrangement.”

“Our overarching goal is to unlock the potential of quantum effects in the development of sustainable energy and information technologies.”

Kobayashi’s work complements the existing strengths of materials and spectroscopy research from Chemistry, Physics, and Engineering. He also uses other University of Michigan resources, such as the Lurie Nanofabrication Facility on North Campus. In addition, he is a fellow of the U-M’s Quantum Research Institute.

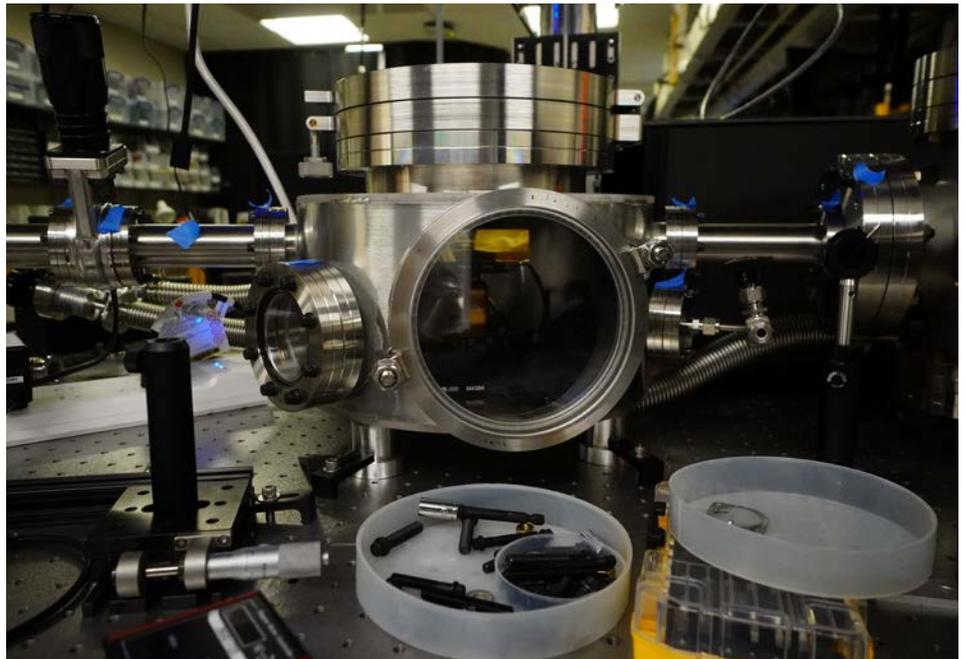


Yuki Kobayashi, William Roush Assistant Professor of Chemistry and Fellow of U-M’s Quantum Research Institute. “Our group employs the state-of-the-art tools of spectroscopy to address some of the most challenging issues in chemistry.”

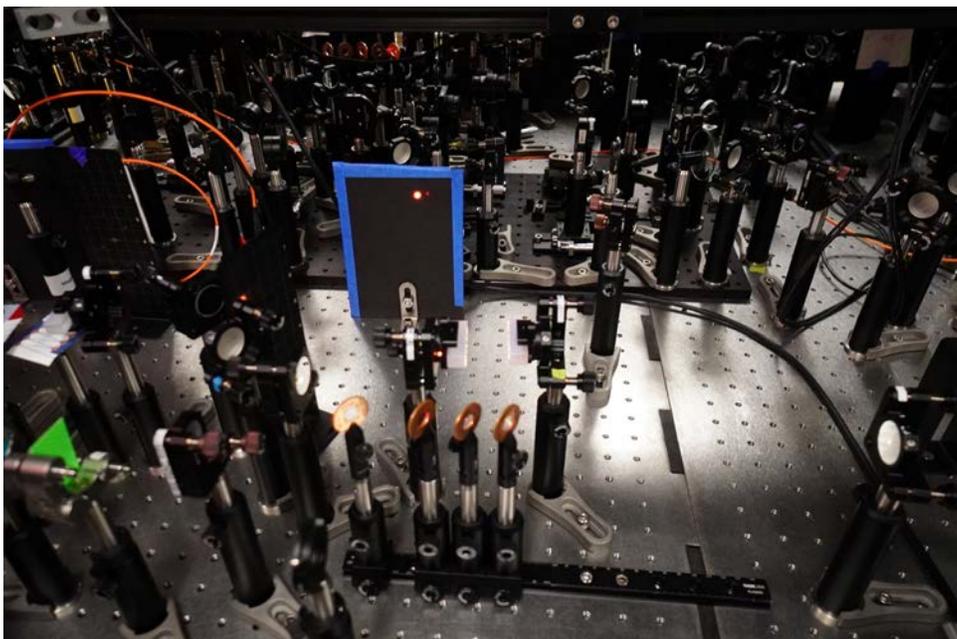


Left: The lab also includes space for preparing and characterizing the materials samples.

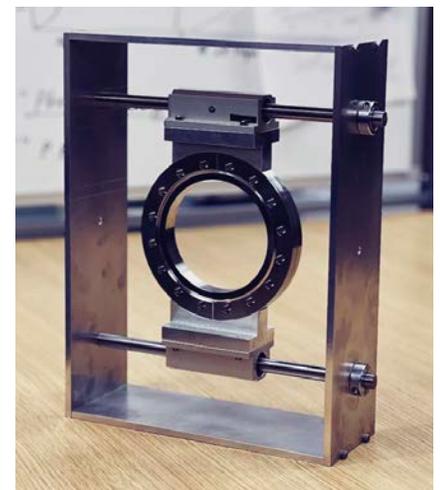
Right: The Kobayashi group custom-builds their high-vacuum chambers that are uniquely designed for the attosecond beamline.



Bottom Left: The optics used in the lab are specifically designed for the ultrafast light sources.



Below: This cam holder was fabricated in the LSA machine shop.





The Kobayashi group takes safety seriously but not themselves too seriously—as evidenced by their 2024 group photo where they are sporting their protective eyewear.

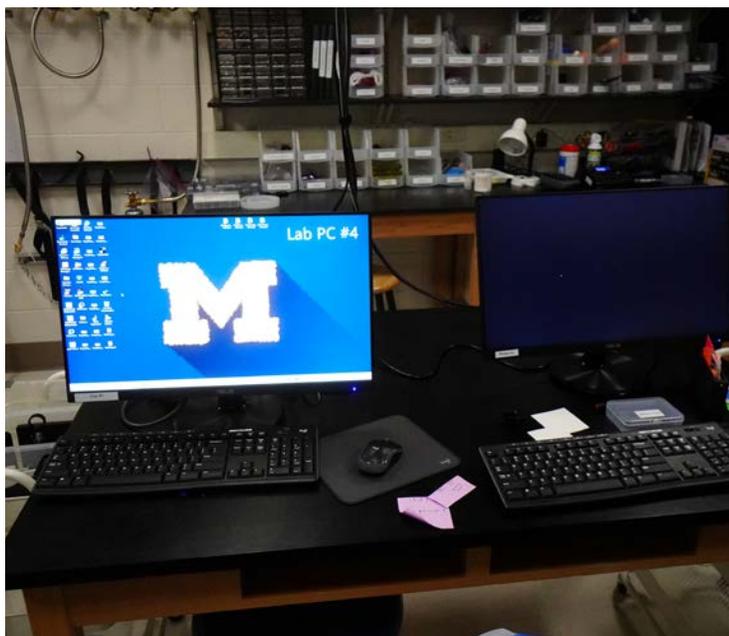


Left: The Kobayashi Lab takes safety very seriously with protective eyewear for workers and visitors, a curtain enclosure, and reminder posters of best practices.

The researchers control the system via computer.

As Kobayashi explains on the research website, “Computing and simulations are critical part of our research. The data acquisition and motion control are done by custom-written programming codes to carry out our measurements in a fast and efficient way.

We also perform quantum-mechanical calculations for materials properties as well as simulations on electronic dynamics, which provide the basis for the design of our experiments.” (Right)





Summer Undergraduate Research Program awardees with Professor John Wolfe (far-right)

Undergraduate Accomplishments Recognized

The Department of Chemistry celebrated the accomplishments of our undergraduate students at the annual awards lunch this spring, including 28 students selected for Summer Undergraduate Research Program. Professor John Wolfe, associate chair for undergraduate studies calls the presentation of the awards one of his favorite duties.

Alum Megan Kwiatkowski, who received her BS-Biochemistry degree in 2015, joined us virtually to share her journey after U-M Chemistry. She earned a PhD at the University of North Carolina at Chapel Hill in 2020 and is now a process chemist with Corteva Agriscience.

A list of all the awards and award recipients is available on the Chemistry website.

2025 Karle Symposium

The 2025 Karle Symposium was held in July. Entirely designed and run by graduate students, this annual event provides an invaluable venue for sharing the innovative and impactful work of chemists at the University of Michigan.



Funding is provided by PPG, DuPont, Dow, and the Department of Chemistry.





Alum and speaker Jessica Frick (front row, 2nd from left) with faculty in full academic regalia for the celebration at the Michigan Theatre.

Celebrating Our 2025 Graduates

In May, the Department of Chemistry celebrated our graduating students with a commencement ceremony. Some 200 graduating students had an opportunity to walk across the stage at the Michigan Theater.

The commencement speaker was U-M Chemistry alum Jessica Frick, the co-founder and CEO of Astral Materials, a company focused on using the microgravity environment of low Earth orbit to manufacture semiconductors that are larger and higher quality than can be made on Earth.

In her commencement address, she recounted her evolution as a chemist and electrified the audience with her call to continue to advocate for inclusion in the field.

From Tecumseh, Michigan, she commuted to campus for her first two years at U-M and was wooed to chemistry by her experience in Brian Coppola's organic class despite it being held at 8:00 AM.

She gained research experience in Adam Matzger's lab, on crystal polymorphism of pharmaceuticals, as well as completing several other summer research experiences. She earned her B.S. in Chemistry in 2014. With a prestigious NSF Graduate Research Fellowship, she went to Princeton University, earning a Ph.D. (2019). Subsequently, she did postdoctoral research with Debbie G. Senesky at Stanford University in the Extreme Environment Microsystems Laboratory. As a postdoc, she specialized in microgravity materials science.

Dr. Frick also conducted a seminar for the department where she recounted how she and Senesky went on to found Astral Materials, advantages of making semiconductors in low earth orbit, and the company's work with NASA to test their technology in parabolic flights which simulate microgravity for short periods before it is used on commercial spacecraft.



Meet Allison Kaatz, U-M Chemistry Class of 2027

Her experience as a Beckman Scholar gives her confidence to consider graduate work in chemistry

“Ok, I can do it. I want to do it. I love being in lab,” says Allison Kaatz, an undergraduate in Bart Bartlett’s lab, who had been discussing her future and what it takes to do graduate work with the experienced graduate students in the lab.

Originally from Ludington, Michigan, Kaatz began her college career at Aquinas College in Grand Rapids. After a summer research experience at Argonne National Laboratory, which gave her many insights about what it means to be a full-time scientist, she transferred to U-M.

In CHEM 216, she learned about the Beckman Scholars program and was encouraged to apply by professors Nicole Tuttle and John Wolfe.

Established by the Beckman Foundation, this 15-month mentored research program supports students who intend to pursue graduate studies in Chemistry, Biology, or Biomedical Sciences.

Beckman Scholars are matched with top faculty researchers and receive support for their research over two summers plus one academic year. At U-M, the program selects scholars who are transfer students because they have a harder time getting research experience than students with more exposure to faculty through early classes.

With her interest in green chemistry, the Bartlett lab’s focus on alternative energy options was a good fit. The Bartlett group uses inorganic synthesis to prepare compositionally complex materials with useful functions for converting solar energy to chemical fuels and in energy storage devices.

Kaatz research project makes use of urea glass synthesis method to create titanium-cobalt-niobium compounds that may prove to have desirable qualities for use in devices that convert sunlight to energy.



Above: Allison Kaatz's independent research project in the Bartlett Lab makes use of the high heat attainable in the furnace. She removes the glass tube from the furnace that holds her sample compound.



Left: Her compound sample

In her first summer as a Beckman Scholar, she attended the annual conference held for all the scholars across the U.S. Attendees learn about a broad range of research topics from their peers, and discuss career tips with invited experts from academia, industry, and medicine. She got to network with other scholars and attend presentations from the 2nd-year scholars. This summer, she was excited to present her own research at the symposium. She expects to graduate in spring 2027, and then she would like to earn a Ph.D.

"I'd like to get a Ph.D., but I didn't think I was smart enough," she says. Conversations with 4th and 5th-year graduate students gave her a new perspective on what it takes to do graduate work.

"They told me that everyone has impostor syndrome and success in graduate school is really about hard work and dedication."

She expects to pursue her dream. "I've always been a hard worker. If I want it, I will put in the work for it."

"Allison is a fantastic student, who instantly embraced the goals of the Beckman Scholars Program," says Bart Bartlett. "She immersed herself in my lab right away, and she has taken every opportunity to teach us about materials synthesis while learning how to navigate her own scientific career. Her enthusiasm, maturity, and positive outlook in doing research are truly remarkable."

Faculty News

Bart Bartlett is the 2025 awardee of the Percy Julian Prize from the National Organization for the Professional Advancement of Black Chemists and Chemical Engineers (NOBCCHE). The organization's most prestigious honor recognizes significant contributions in pure or applied research in science or engineering.

Charles McCrory was named the 2025 John Dewey Award winner for his ongoing commitment to the education of undergraduate students within the Department of Chemistry and beyond. He was noted for his deep and sustained commitment to the instruction and improvement of CHEM 130, an early STEM course taken by many students and one that is of exceptional importance to the college.

Ted Goodson was named a Chemical Pioneer Award winner by the American Institute of Chemists. This award honors chemists, chemical engineers, or associates with outstanding contributions impacting chemical science, industry, and/or the chemical profession.

Nicolai Lenhert was awarded the Stanley C. Israel Award for Advancing Diversity in the Chemical Sciences from the regional section of the American Chemical Society. It includes a medal and \$1,000 grant.

Neil Marsh was selected to be part of the University of Michigan 2025 Roads Scholar program in June. This program takes faculty on a five-day traveling seminar of the State of Michigan. This educational tour exposes participants to the state's economy, government and politics, culture, educational systems, health and social issues, history, and geography. The tour introduces participants to locations where the majority of U-M students call home.

Ginger Shultz was named an Arthur F. Thurnau Professor. These professorships "honor those tenured faculty whose commitment to and investment in undergraduate teaching has had a demonstrable impact on the intellectual development and lives of their students." It includes a \$20,000 grant to support activities that will enhance her teaching.

Matt Soellner was named the 2025 winner of the Class of 1923 Memorial Teaching Award for outstanding teaching of undergraduates. Noted was Prof. Soellner's willingness to take on the challenge of working to improve student success in CHEM 210 and for developing a new drug discovery course, with a focus on topics at the frontier of practice that lead students directly into careers in the discipline.



As the first woman to receive the Janssen Prize in Organic Synthesis, **Melanie Sanford** was featured in the February 24 issue of *Chemistry World*, from the Royal Society of Chemistry.



Nicole Tuttle has received a 2025 Individual Award for Outstanding Contributions to Undergraduate Education from the U-M College of Literature, Science, and the Arts. This award is given to faculty members who are exceptionally dedicated to undergraduate education. She has made outstanding contributions to CHEM 215 by implementing inclusive teaching practices and enriching the Comprehensive Studies Program sections. She has also contributed significantly to GSI mentoring and professional development. Former students note her respectful and supportive nature as an instructor.

“One-time gymnast Melanie Sanford has made a name for herself in catalysis and organometallic chemistry.”

The article charts her path to success, from her mentors to her mentoring. You can read it at: <https://www.chemistryworld.com/features/melanie-sanfords-route-from-college-gymnast-to-ground-breaking-researcher/4020992>. article



Wenjing Wang is a 2025 recipient of the Michigan Biosciences Faculty Award Recognition. She will receive \$500,000 in discretionary funding to support high-impact, innovative research in projects that may not fit traditional funding models. It is a U-M investment in current faculty. She is the Isabella Karle Life Sciences Collegiate Professor and associate professor of chemistry. Her laboratory applies protein engineering and synthetic biology to develop genetically encoded sensors and tools for probing neuromodulatory systems in the brain. Her team has generated novel sensors for detecting diverse brain signaling molecules. They are now advancing protein- and cell-based therapeutic strategies for targeting neurodegenerative diseases and cancer.



In May, Professors **Zhan Chen** and **Anne McNeil** gave their Inaugural College Lectures. Collegiate professorships are the highest academic award from the College of Literature, Science, and the Arts (LSA). Both have named their professorships after emeriti faculty who served as mentors and inspirations to them. Chen is the Michael D. Morris Collegiate Professor of Chemistry, Macromolecular Science and Engineering, Biophysics, and Applied Physics. McNeil is the Carol A. Fierke Collegiate Professor of Chemistry, and a professor of Macromolecular Science and Engineering, and Arthur F. Thurnau Professor. Video of their lectures will be available on the LSA events website.

Staff Awards

Angie Cox and **Nathalie Vandecan** were selected for the 2024 William H. McMullen Staff Award for Exceptional Service and Support. Angie serves as our Undergraduate Coordinator and is recognized for her exceptional support for our undergraduate student population and for going above and beyond to ensure our courses and labs are full by expertly managing our many waitlists. Nathalie is the Soellner lab manager and is recognized for her exceptional service in the Soellner lab, including her work to coach, teach, and mentor lab members, as well as her efforts to make the lab more sustainable.



Adrien Chauvier received a 2025 Research Staff Leadership Recognition Award from the U-M Office of the Vice President for Research. He is a research lab specialist in the Walter Lab.

Promoted to the Rank of Professor



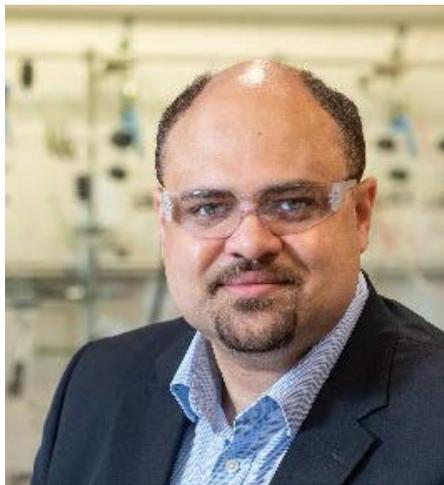
Andrew Ault

Professor Ault is an internationally recognized researcher in analytical and environmental chemistry

A dedicated teacher of undergraduate and graduate students, he has chaired 16 Ph.D. committees and mentored 15 undergraduate students. He has taught eight different courses to students in chemistry and environmental health sciences. He has served as a co-director of the Detroit Research Internship Summer Experience program and has developed a program to present research demonstrations at the U-M Museum of Natural History.

His research is focused on developing analytical methods in the lab and utilizing them in regional field campaigns to study the chemistry of aerosol particles of interest in the environment. Peers note the impact of his measurement innovations in the field.

He has advocated for the relevance of aerosol science to the public since the COVID-19 pandemic.



Charles McCrory

With international recognition in his research areas of inorganic, analytical, and physical chemistry, Professor McCrory is attacking important fundamental problems that underpin key challenges in energy and sustainability.

He has taught four different chemistry courses to over 3,500 students and helped students develop conceptual knowledge to apply to practical problem solving. In addition to excellence in the classroom, he has mentored six high school students through the Detroit Research Internship Summer Experience program. He has also created a permanent exhibit on Renewable Energy Storage at the U-M Museum of Natural History.

As an expert in the field of electrocatalysis, his research is designing and creating electrocatalysts with well-defined microenvironments for transforming CO₂ and nitrate into useful chemical products.



Ginger Shultz

Professor Shultz is an expert in chemical education research, using qualitative and quantitative methods to assess problems in teaching and learning chemistry.

A dedicated teacher of undergraduates and graduate students, she has piloted adding more frequent, lower-stakes assessments in the first-year undergraduate structure and reactivity of organic molecules lecture class, implemented writing-to-learn as a pedagogical tool in the organic lab class, and created a course in humanizing science that explores identity in science culture. She has developed courses in chemical education research and in chemistry instruction for graduate students.

A reviewer commented, "...Dr. Shultz is an investigator who is doing innovative, deep, and important work on both student learning and questions of how it should be taught. It will take the community some time to absorb these lessons...."

Promoted to the Rank of Associate Professor with Tenure



Sarah Keane

Professor Keane has established a vigorous and productive program at the interfaces of biophysics, chemistry, and biology using NMR and related biophysical methods to understand the biogenesis of microRNAs (miRNAs), which are important in the control of genetic expression. Professor Keane's work is at the forefront for the understanding of miRNAs biogenesis in affecting cellular function and paths to novel therapeutics.

Her service and teaching records are strong. Also, as a part of the Biophysics Program, Professor Keane was actively involved in the curricular design of a new Structural Biophysics Track for undergraduates. She introduced a novel research experience, which resulted in a peer-reviewed publication that included 16 undergraduate students and the deposition of new NMR chemical shift assignments.



Markos Koutmos

Professor Koutmos is a chemical biologist who studies structure using X-ray crystallography to observe how biomolecules are arranged and organized in three-dimensional space, providing insight into how enzyme reactions occur. He also integrates biophysics, biochemical, chemical biology, and cell biology approaches to investigate structural dynamics of complicated biomolecules.

An excellent educator with strong evaluations of his classroom teaching, he helped to revamp an advanced biochemistry course by replacing textbook-based lecture content with cutting-edge biomedical research examples, incorporating primary literature, and introducing a video project. In a structural biology course, he creatively incorporated science communication in a Molecules of Life exhibit in collaboration with the U-M Natural History Museum. He has mentored 15 undergraduate students, with five as co-authors on publications.



Matthew Soellner

Professor Soellner studies protein kinases, enzymes that regulate cell activity by adding phosphate to proteins, which changes their shape and activates them. Protein kinases are essential in cell signaling and other biological processes but can become dysregulated in cancer cells; their uncontrolled proliferation is detrimental. Professor Soellner designs molecules called protein kinase inhibitors that turn off the signaling in cancer cells, which form the basis for certain therapeutics.

A dedicated educator, he has developed extensive resources shared among the teaching team and is active in the STEM Equity Learning Community (SEISMIC), addressing issues of access and retention within the broader STEM community. He has also developed a new upper-division class on organic chemistry of drug design. In his research laboratory, he has mentored 17 undergraduate students and 18 graduate students from diverse backgrounds.

Chemistry Welcomes Three New Faculty Members



**Dr. David Bartley,
Lecturer III**

Dr. David Bartley joined the Chemistry teaching faculty as a Lecturer III on September 1, 2024. He earned his Ph.D. in Medicinal Chemistry from the University of Michigan. He completed post-doctoral work at Johns Hopkins University before taking a tenure-track faculty position at the University of Detroit Mercy in 2007. In 2011, Dr. Bartley moved to Adrian College as a Professor of Chemistry & Biochemistry to establish their biochemistry program. While at Adrian College, he served as the department chairman, the

Honors Program director, and the faculty president. In addition to mentoring many undergraduate research students, he has taught courses including General Chemistry lecture, Introductory Chemistry lab, Organic Chemistry I and II lecture and lab, Biochemistry I and II lecture and lab, Thermodynamics, Instrumental Analysis lab, and Medicinal Chemistry, as well as several seminars and research courses. Since joining the teaching faculty, Dr. Bartley has made a significant contribution to the Chemistry teaching mission.



**Assistant Professor
Alexandra (Lexi) Deal**

Alexandra (Lexi) Deal joined the Chemistry faculty as an assistant professor starting August 25, 2025. Professor Deal is an analytical and physical chemist who develops and applies methods to study the chemistry and morphology of molecules at air-water interfaces. Her work involves combining surface-specific spectroscopy with sensitive mass spectroscopic techniques to develop the first-ever correlated surface structure and kinetics experiments. This new technique, alongside existing surface-specific spectroscopic techniques like Infrared and UV-Vis reflection absorption spectroscopies (IR-RAS and UV-Vis-RAS), will be used to investigate several fundamental questions that will be key to understanding the unique physicochemical properties of air-water interfaces. Deal group research primarily focuses on model sys-

tems related to atmospheric and environmental chemistry but can also be applied to broad fields including materials synthesis, drug delivery, and energy. Prior to joining the chemistry faculty, Professor Deal completed postdoctoral research at Lawrence Berkeley National Laboratory and earned her Ph.D. in physical chemistry from the University of Colorado, Boulder. Before graduate school, she worked as an engineer for the Boeing company after earning a B.S. in chemical engineering from Rensselaer Polytechnic Institute (RPI) in 2014. Professor Deal has made significant discoveries in studying air-water interfaces, particularly how important bio-organic molecules like lactic acid and atmospherically relevant molecules like ozone react at these interfaces. The Department of Chemistry welcomes Professor Deal to our faculty.



**Dr. Thu Nguyen,
Lecturer III**

Dr. Thu Nguyen joined the Department of Chemistry on August 25, 2025, as a Lecturer III. Dr. Nguyen has taught a wide range of lecture and laboratory courses, including General and Organic Chemistry, Applied Organic and Biochemistry, Introductory Biochemistry, seminars for first-year through senior students, a Survey of Organic Chemistry, Chemistry in Society for non-majors, and a forensic chemistry lab. In 2011, Dr. Nguyen earned her Ph.D. from Michigan State University and completed a year as a Research Specialist at the University of Pittsburgh Medical Center

before taking a position as a Visiting Assistant Professor at Lake Superior State University in 2012. She was appointed as a tenure-track Assistant Professor in 2016, promoted to Associate Professor with tenure in 2022, and became Chair of the School of Science and Medicine in 2023. Her skills as an advisor have been recognized through two awards: (a) the 2023 Excellence in Advising Award from LSSU; and (b) the 2021 Advisor of the Year Award from the LSSU Student Government. We are excited to have a person with Dr. Nguyen's accomplishments join our teaching faculty.

We'd like to hear from you!



Use our online form.

Scan the QR code or go to:

<https://myumi.ch/236G4>
or email the information to
chem.alum@umich.edu

or send a note to:

Attn: News

Department of Chemistry,
930 University Ave.
Ann Arbor, MI 48109-1055



The Reality of Graduate Internships: The Pros, Cons, and Everything In-Between

by Rebecca A. Dawley, SciComm Fellow

Graduate students are increasingly pursuing valuable external internship opportunities during their degrees, but careful planning and communication between the student and their advisor are key to making this possible.

“When I joined graduate school, I didn’t really understand that this was an option. It is more common than I expected,” explained Jess Hatt (Wolfe Lab), who interned at AbbVie after her third year in 2023. Hatt, like many students, previously assumed that internships were for undergraduates and was pleased to discover otherwise.

Since 2021, at least 18 Michigan Chemistry graduate students have participated in internships, according to Emma Houle, Chemistry Career and MS Program Coordinator.

These varied in length, location, and are nearly as diverse in discipline as the department itself. As are many aspects of a graduate school career, the ability to intern elsewhere can be research, individual, and PI dependent, but that shouldn’t necessarily dissuade those curious or interested. What is the potential value of internship opportunities? What are some considerations, both attractive and realistic, for those considering internships in the near or distant future of their graduate degree?

The value of internships

Why consider being an intern if graduate school already has so many learning and professional development opportunities? For starters, it’s a great way to experience firsthand the reality of industry or government labs and how that aligns with a student’s professional goals. “How do you know what you want to do without seeing it?” says Chris Woodley (Bartlett Lab) after reflecting on his summer 2024 internship at The Naval Air Warfare Center. Not only are interns exposed to the daily environment of these places, but also the scientific colleagues within them.

Anna Anders (Ruotolo Lab), who did a joint internship between IonDX and Agilent Technologies,

recognized the value of her network only about two years afterward. “If I didn’t do my internship, I don’t think I would have a job right now”, she says. On a similar note, Hatt found the internship application process, where she did a research talk, particularly valuable when preparing for her job search years later.

Professor Kennedy finds internships “especially useful when a student will pick up a skill or get access to something that can relate back to their [Ph.D.] project.”

A great example of this is Hatt’s internship with AbbVie. While there, she was exposed to technology that encouraged her to think about her research differently and ultimately inspired her next research project upon returning to Michigan.

Professor Kennedy explained that in some cases, companies are willing to work with graduate students and maybe their PI to design something aligned with the student’s thesis research. In ideal scenarios, this sort of collaboration can result in publications or a dissertation chapter, thus satisfying the goals of all involved.

Many students who interned felt refreshed and more motivated upon returning from the change in scenery from their internship. “I think it was good to get a break [...] and since I’ve been back, I’ve been pretty productive on my work, so it has been a nice reset to focus in [on my dissertation],” said Woodley.

Considerations for Interns

There can be great value for students who may choose to pursue an external internship opportunity; however, it doesn’t fit for everyone. “Some people don’t want to do it because they have their life here and then you have to get a new place to live and you’re away from everybody, maybe missing out on things,” explained Professor Kennedy. Many factors pertaining to one’s personal and academic situation should also be considered.

Often, an internship requires temporary relocation from Ann Arbor for up to 6 months. One concern could be to secure housing, both in Michigan and wherever the position is located. “There is a monetary component that comes into play [when planning], one downside of my internship was paying



*Faculty advisors for CHEMCAREERS:
Robert Kennedy and Ginger Shultz*

Articles from our SciComm Fellows

double rent,” said Woodley. Interns are faced with the dilemma of breaking or subletting an apartment lease or ensuring they have a place to return to by paying double rent during their time away.

Additionally, short-term leases can be challenging to find and are often higher priced than standard leases. “There was no way I could have afforded double rent if I didn’t break my lease,” said Anders. Handling complicated housing situations can be stressful for students who may already be tight on budgets and time.

On the other hand, most doctoral internships pay generously in comparison to a standard stipend in graduate school. “A lot of people think internship and they think unpaid. That’s not the case; I made so much money, and I didn’t even know that was an option,” said Hatt. This extra income can aid with costs associated with relocation, general quality of life, and experiencing the new area.

Another consideration beyond work is the change in personal and social routine and the impact on overall well-being. It is likely that as an intern there will be more free time due to a defined work schedule, and being in a new place, likely alone, could be difficult.

Another suite of considerations relates to Ph.D. student responsibilities and the funding structures that support them. The individual details of these arrangements make it hard to establish general guidelines for pursuing graduate internships. Coming to an agreement can be difficult, but the most important factor is open and honest communication between a graduate student and their advisor. Professor Kennedy encourages any student who may be interested in even the possibility of internships to tell their advisors as soon as possible and open the conversation. “Once you start thinking about it, let them know,” he says.

Timing, both related to doctoral progress and funding, is another essential yet complicated aspect of internships. Although there may be no perfect time to go on an internship, both graduate students and PIs favored scenarios when a student is in-between projects, not well funded, or is at a point which minimizes disruption to Ph.D. research. Regarding funding, a hiatus in results from a student if they go on an internship could be disruptive and thus going one year over another may make more sense. “A lot of these internships occur annually, and applications are cyclical. If you find one you’re interested in, maybe keep that in the back of your head,” said Woodley. In other scenarios, like Anders’, a student’s funding may mandate an internship. “Ideally, you could do that [intern] in your later years where things aren’t so busy getting your project up and rolling, but I didn’t have much of a choice given my funding would be taken back if I didn’t do it that year [her second].”

Internships during a Ph.D. are not only feasible but also offer great value. With any big decision, there comes both personal and professional planning. Although interning is a possible supplement, it’s by no means a necessary aspect of the Michigan Chemistry experience or being successful afterwards. Some students may choose to pursue them, and others not allowed the opportunity.

Regardless, our department has many other opportunities to discover oneself and prepare for the future.

Recently, CHEMCAREERS, a student-focused organization advised by Professor Kennedy and Professor Ginger Schultz, has relaunched, allowing students opportunities to explore professional development resources and skills.

Additionally, we have many industry symposia and recruiting events throughout the year where all are welcome. Professional development is a valuable, and arguably critical, supplement to graduate research and coursework, and thankfully, there are many opportunities to do so, within the department and beyond.

Advanced Degrees Awarded ♦ Fall 2024-Summer 2025

Ph.D.s

Anders, Anna Grace Development of Ion Mobility-Mass Spectrometry and Collision-Induced Unfolding for the Structural Characterization of Noncoding Ribonucleic Acids	Ruotolo	Fyodorova, Yekaterina Understanding the Heterogeneous Dynamics of Epigenetic Modifiers in Live Eukaryotic Cells by Using Single-Molecule Imaging	Biteen
Bennett, Andrew Ionic Cocrystals as Chlorine-Free Oxidizers	Matzger	Gu, Frances Advancements in Modern Palladium-Catalyzed C-H Functionalization Reactions	Sanford
Blackmun, Dominique Development of Visible-Light Mediated and Transition Metal Catalyzed Methods to Access Azetidines and Azetidines	Nagorny, Schindler	Hall, Jonathan Regan Synthesis of Organofluorine Compounds via Non-Traditional Bond Activations	Sanford
Boggs, David Garrett Enzymes Involved in Chlorophyll Metabolism	Bridwell-Rabb	Hatch, Jeffrey Paul Improving the Scalability and Efficiency of High Accuracy Electronic Structure Methods: Expanding the Reach of Configuration Interaction	Zimmerman
Bunnell, Alexander Wesley Mechanism Guided Development of Group 10 Mediated Reactions for the Synthesis of Bioactive Scaffolds	Sanford	Hatt, Jessica Elizabeth Palladium-Catalyzed Alkene Difunctionalization to Form Methylene Cyclobutanes, Methylene Cyclopentanes, and Tetrahydroberberines	Wolfe
Chiang, Chang-Hwa Bioinformatics and Machine Learning Guided Biocatalyst Development	Brooks III, Narayan	Havens, Steven Markley Engineering Generalizable Genetically Encoded Fluorescence Integration Sensors for Neuromodulators through Chimeric G-protein Coupled Receptors	Wang
Cruz, Andrew Outcompeting and Suppressing the Heck Arylation in Bimolecular Palladium-Catalyzed Alkene Difunctionalization Reactions	Wolfe	Hazelnis, Joshua Philip Understanding Liquid Metal Electrode Interfaces for Intermetallic, Metallic, and Semiconductor Growth	Maldonado
Culberson, Matthew Ray Cascade Palladium-Catalyzed Stereoselective Synthesis of Polycyclic Nitrogen Heterocycles via Reactions of Allylanilines	Wolfe	Herderschee, Hayley Renee Liquid Chromatography-Mass Spectrometry Method Development for Improved Separation and Detection Performance of Pneumococcal Polysaccharides and Multi-omics Analyses	Kennedy
Defiglia, Steven Alexander Novel Implementations and Insights for Improved Gas Phase Ion-Electron Reactions in Biomolecular Tandem Mass Spectrometry	Hakansson	Jaekle, Elizabeth Claire Synthetic and Mechanistic Studies of Nickel Catalyzed Cross Coupling Reactions	McNeil, Montgomery
Dirocco, Daniel James Structure and Mechanism of PhdC, a Prenylated Flavin Oxidative Maturase	Marsh	Knapp, Madison Understanding the Reactivity and Regulation of Enzymes in Chlorophyll Metabolism	Bridwell-Rabb

Lamb, Ryan M	Sension	Saucedo, Anthony Tomas	Narayan
Expanding the Ultrafast Toolkit: Employing Polarized Spectroscopy and Multiple Atomic Perspectives to Better Understand Femtosecond Dynamics of 3d Transition Metal Complexes		Iron Metalloenzymes for the Chemoenzymatic Synthesis of Complex Natural Products	
Levesque, Iliana	Ruotolo	Snyder, Laura Ruth	Koutmou
Development of Native Ion Mobility – Mass Spectrometry Methods for the Analysis of Membrane Proteins from Various Membrane Mimetics		Nucleoside Modifications in Novel Coronavirus SARS-CoV-2	
Lillo, Hayley Lynne	Buss	Tharp, Annika Elyse	Soellner, Stephenson
Multinuclear Nickel Complexes Featuring Unusual Oxygenic Ligands: Hydrogen Peroxide Activation, Catalase Reactivity, and Efforts Toward C-H Activation		“Advancing Pharmaceutical Chemistry: Innovative Approaches in Photoredox Catalysis and Latestage Functionalization”	
Maiola, Michela Lynn	Buss	Vogel, Trenton Riley	Schindler, Szymczak
Synthesis, Characterization, and Reactivity of Molecular Metal Hydride Clusters		Total Synthesis of Complex Polycyclic Natural Products and the Development of Cyclization Methods	
Majhi, Srijoni	Marsh	Wright, Keenan Rashad	Matzger
Viperin Regulates Mitochondrial Transcription via Chain Termination		Synthesis and Activation of Metal-Organic Frameworks (MOFs)	
Makey, Devin Michael	Ruotolo, Kennedy	Wu, Judy	Pratt
Improved Chromatography and Cyclic Ion Mobility-Mass Spectrometry to Accelerate Discovery, Development, and Manufacturing of Modern Pharmaceuticals		Quantification of Chemical Species within Individual Aerosol Particles and their Sources in the Arctic Troposphere	
Mendoza, Johnny	Koutmos	Xiao, Yao	Ault
Making Methionine		Novel Approaches to Size-Dependent Aerosol Sampling and Chemical Characterization of Atmospheric Particles to Determine Sources and Aging	
Munsayac, Benson Mark Aldrex Reyes	Keane	Yang, Di	Narayan
Shining Light (and Neutrons) on RNA Structure: Small-Angle Scattering Studies of Non-Coding RNAs and RNA Complexes		Integrating Bioinformatics Tools in Development of Biocatalytic Platforms	
Nicolau, Shelby Taylor Noel	Matzger	<hr/>	
Controlling Properties of Energetic Materials Using Tailored Additives		Accelerated Degree (B.S. & M.S.)	
Perez, Alma Rosa	Wolfe	Chaekyung Park	
Palladium-Catalyzed Alkene Difunctionalization Reactions: Synthesis of Indane Derivatives and Bridged Azabicycles		Garret Hanks	
Pitts, Winston Cole	Pecoraro	Ji Hyun Park	
Designing Metalloenzymes by Controlling the First and Second Coordination Spheres Using Non-Traditional Design Strategies		Master’s	
		Jay German	
		Benjamin Healy	

Alumni Notes

Beck, Michael W. (PhD Chemistry 2015, Mi Hee Lim) I was promoted with tenure to Associate Professor of Chemistry and Biochemistry at Eastern Illinois University effective this Fall (August 2025).

Bissett, Justina D. (BS Biomolecular Science 2024, Carmen Gherasim (pathology)). In the Fall of 2024, I started at Wayne State University's Organic Chemistry PhD program. I joined the Bour Lab (Dr. James Bour is a U-M alum, too), researching iridium aromatic borylation catalysis, MOF (metal organic framework) catalysis, and PAF (porous aromatic framework) synthesis. I took two classes in my last year at U-M that really cemented my love for chemistry and inspired me to get my PhD. The first was Organic Chemistry III with Prof. Narayan, who encouraged me to get my PhD and continue pursuing chemistry. The second class was Organic Synthesis with Prof. Szymczak, which gave me very valuable experience in organic laboratory techniques and piqued my interest in working with MOFs.

Boothe, Jordan (PhD Chemistry, Organic Emphasis 2017, Wolfe; Masters in Post-Secondary Science Education 2017) I am pleased to let you know that the Provost of the University of Pittsburgh has officially approved my promotion and tenure documentation, so I will officially begin as an Associate Professor of Biochemistry at the University of Pittsburgh at Greensburg Campus. I have also been elected as the Chair-Elect of the Spectroscopy Society of Pittsburgh for the 2025-2026 year.

Boyce, Paul (BS Honors 1994, Billy Joe Evans) Originally from Trinidad & Tobago, after Michigan he earned his medical degree from Emory University and his MPH from Harvard. Specializing in pulmonary & critical care medicine, Dr. Boyce has served as the Pulmonary Section Chief and Respiratory Care Director at Northside Hospital in Atlanta and founded Georgia's only certified Pulmonary Hypertension Program in 2012. Most recently, in 2023, Dr. Boyce was commissioned as a Lieutenant Commander in the US Navy Reserves Medical Corps, helping ensure the health of our nation's military personnel.

Chien, Tun-Cheng (PhD 2004, Townsend) Now Professor, Department of Chemistry, National Taiwan Normal University, Taipei, Taiwan.

Culberson, Matthew (MS 2021, PhD 2024, Wolfe) Career: Lecturer of Chemistry transitioning to Spelman College full time from adjunct work at Emory University, Agnes Scott College, and Kennesaw State University. Memories of CheMich: Visiting 1500 for awesome convos with staff, Dr. Wolfe's amazing Pd pre-cat. collection bench, and the pleasurable walks through the Diag (and in the snow)

Delgado, Cesar (MS Chemistry 2008, PhD Educational Studies (Science Education) 2009; MA Ed. Studies (Learning Technologies) 2008) I am an associate professor of STEM Education at North Carolina State University

DePorre, Yvonne Camille (PhD, 2018, Schindler) Yvonne started as an Analytical R&D Chemist at AJNA Biosciences, a Schedule I licensed botanical drug development company based in Littleton, Colorado, in July 2024. She has been working on the identification of unknown molecules in botanical and mushroom extracts so that full spectrum natural product extracts can be submitted to the FDA and undergo clinical trials. She has been isolating and characterizing new minor cannabinoids and other bioactive molecules in hemp and psilocybin-containing mushrooms. She recently presented her work at the Psychedelic Science Conference 2025 in Denver titled "Natural Products Extracted from Cannabis and Psilocybin-containing Fungi in Development as FDA-Approved Botanical Drugs".

Dickerson, Russell (PhD, 1980, Stedman) (and Dunn for fun) Still a Prof at U Maryland, but at Max Planck Inst for Chem in Mainz for the Summer.

Engle, Keary (BS Chem 2007, Matzger) I received the ACS Cope Scholar Award (2025), to be presented at the Fall ACS National Meeting in Washington, DC: <https://magazine.scripps.edu/awards-and-honors/2024/online-exclusive/professor-keary-engle-receives-2025-arthur-c-cope-scholar-award/>

Farina, James (MS 1974; PhD 1977, Marino) After a 33-year career at Pfizer Pharmaceuticals in Chemical Process Research & Development, I retired in 2017 as a Director and moved to New Hampshire. While in NH I became a PSIA certified alpine ski instructor and a USSF certified soccer referee. Additionally I served on the Board of Trustees for the NH Boat Museum and chaired their sailing program.

Upon moving to RI in 2022 I have maintained my ski instructor and soccer referee certifications. Hence I am busy in the winter as a ski instructor, in addition

to recreational skiing in CO. During the spring, summer, and fall I referee youth and high school soccer, in addition to sailing Narragansett Bay and boating Point Judith Pond with family and friends.

Fields, Ryan (BS, 1998) Here's an update on my recent career path/change: <https://www.urmc.rochester.edu/news/story/surgeon-scientist-ryan-fields-to-chair-urmc-department-of-surgery>. I now live in Rochester, NY with my wife, Laura; son, Gabe; and daughter, Sarah.

Ganatra, Rahul (BS Biochemistry 2008), Meyerhoff, Nicholas Reder, an alumnus of the chemistry department (BS in biochemistry, 2008), has become CEO of Alpenglow Biosciences, a successful biotech startup aiming to revolutionize digital pathology using AI and an innovative new type of microscope (<https://www.alpenglowbiosciences.com/aboutus>). He was recently awarded a \$24M grant from ARPA-H to further develop his technologies, which speaks volumes about the importance of his work, especially in the current funding climate. I think a feature on him,

perhaps with an interview, would be an outstanding contribution to the alumni magazine or newsletter.

Garza, Nicholas, F. (MS Chemistry, 2021, Shultz) In September 2024, I began working at the American Chemical Society in Washington, DC. I am a Program Manager overseeing the ACS Approval Program, which approves of baccalaureate chemistry programs.

Ghali, Amer (BS Biomolecular Science, 2020 Veneti). I started medical school at the University of Toledo College of Medicine and Life Sciences in 2022 and just wrapped up a research year at the University of Michigan Department of Neurosurgery. I also worked with the Syrian American Medical Society and BluePrints for Pangea at the University of Michigan to send excess medical supplies from the University of Michigan Health System to hospitals across Syria, hoping to visit my family there at the end of the month after 14 long years away. Thank you from the bottom of my heart to U-M for getting me here, and in particular Dr. Coppola, Dr. Sweha,



Holm, Meredith (BS Biochemistry Honors 2024, David Sherman) I'm working at Arena BioWorks in Cambridge, MA for two years and will be applying to PhD programs this upcoming cycle! Hopefully given the current academic *situation* that goes over okay lol. It seems I miss Michigan more and more every day :(but I hold my memories in the chemistry department very close to my heart. Apparently I can't let go of Umich chemistry because I still tutor Chem 210 and Chem 215 virtually, and

it makes me feel so connected to the university and puts me right back in the classroom!! Other hobbies include paddleboarding in the Charles River, finding bodies of water around Boston to swim in, and trying out new restaurants around Cambridge and Boston. I'll be back in Ann Arbor this August because my college friend and I are swimming around Mackinac Island which should be very long but very fun!!! Super excited to pop my head into the chem building for the mems.



*Meredith (left) was on the U-M Water Polo Team while completing her honors in biochemistry --quite an accomplishment right there!
Clare Wieland (right) Medical Scientist Training Program (MSTP) student at UM.*

Dr. Venneti, and Dr. Wolfe for their support and mentorship during my time in undergrad.

Gowani, Amran (BS Chemistry, 2003) My first novel LEVERAGE, a satirical Wall Street thriller, was published by Simon & Schuster on August 19, 2025.

Hadley, Richard (BS With distinction and honors in chemistry) went to medical school at University of Pennsylvania. Practiced orthopedic surgery in Minnesota. Currently retired, living in Prior Lake, Minnesota.

Heard, Kyle (BS Biochemistry, 2025) First year Biochemistry PhD student at University of Illinois, Urbana Champaign in Fall 2025.

Hendrickson, Heidi (PhD 2015, Geva; MSc in Educational Studies 2015). Heidi (Phillips) Hendrickson was promoted to Associate Professor of Chemistry at Lafayette College on July 1, 2025. Lafayette College is a small liberal arts college located in Easton, PA.

Hersberger, Katie (PhD 2012, Hakansson) Went to PA school after completing post doc in Michigan Medicine. Now practicing in ER in southeast Virginia.

Kalvin, Douglas (MS organic chemistry 1978, Marino; MS pharmacology, 1983 Baylor College of Medicine, Crooke; PhD 1985, U-M Medicinal Chemistry, Woodard; Postdoctoral 1985-1986 University of Wisconsin Madison, Rich) research chemist Nova Pharmaceutical Corp. Baltimore, MD 1987-1989; research chemist Abbott Laboratories North Chicago, IL 1990-2007; taught as an adjunct chemistry professor at a variety of Chicago area colleges and universities 2008-2015; compounding pharmacy technician full-time and part-time 2015 to present Hobbies; travel; collector of US plate block stamps; and avid reader of World War 2 history books research emphasis: synthesis of unusual amino acids; peptides; manual and automated organic synthesis of compounds for medicinal chemistry project support; Family: wife and two adult children; I am currently living in Buffalo Grove, IL Semi-retired working part-time in a compounding pharmacy in Libertyville, IL preparing human and veterinary prescriptions.

Kessel, David (MS and PhD, Elderfield) While I did switch to Biochemistry after learning enough chemistry to get an MS degree, that early training in synthetic organic chemistry was very helpful. It meant that I could follow directions for preparation of agents not available commercially without any immediate hazards. I did, however, miss out on a major milestone in organic synthesis at MIT.

John Sheehan, who ultimately succeeded in a total synthesis of penicillin, put me on a BS thesis project designed to study some spontaneous rearrangement reactions. His group discovered the use of carbodiimides for penicillin synthesis, but this was a few years after I left.

Kokko, Kent (PhD 1984, Wiseman) Sorry to hear of John Wiseman's death. I graduated in 1984 and have lived in Minnesota since. Retired in 2019

Lutter, Jacob (PhD 2018, Pecoraro) I have been an Assistant Professor of Chemistry at the University of Southern Indiana [a primarily undergraduate institution (PUI)] since July, 2022. I teach general chemistry, inorganic chemistry and have an undergraduate research program that investigates coordination compounds containing rare earth elements.

Malladi, Deviprasad (PhD) Currently, I am working at Micron Technology and has been in the Bay Area since I left Ann Arbor in 1981. Did a year at half of Post-doctoral Fellowship at UC Berkeley. Started working in the high tech world till now except 7 and 1/2 years at JPL in Pasadena, CA. I managed a team that worked on both electronic board and Hybrid assembly of all the current missions including Europa clipper that will take flight on 10/10/2024.

Micallef, Jessie, L. (BS 2016) I'm a postdoc in particle physics, I've worked as a postdoc at MIT and Tufts and I work on projects at Fermilab. I love mentoring the next generation in STEM and have co-Chaired one of the conferences for undergraduate women in physics. I have a cat, Ahsoka, and she travels with me sometime for work as an emotional support pet. I do martial arts, cosplay, pick-up soccer, and write fiction.

Motta, Laura (PhD, Zimmerman) I love my time at Michigan. I tell most of the undergrads they should consider Michigan for graduate school. Happy to share about career, pets, and time Michigan.

Murtuza, Shahid (BS 1994) Shahid is a partner in the strategy practice at EY-Parthenon, where he serves executive clients in chemicals, materials, and other industrial sectors. He is also the executive sponsor of the Greater Washington chapter of the EY Muslim Community affinity group. Shahid recently vacationed with his family in both peninsulas of Michigan, including a stop in Ann Arbor to revisit old stomping grounds, such as the venerable Chemistry building. He is based in northern Virginia, where he lives with his three children, Russian Blue cat, and

freshwater snail. Shout-outs to chemistry buddies Doug Whittington, Seble Wagaw, Paul Lindenfeld, Todd Hachigian, Dan Weisenberger, and Brian Schefke

Musselman, Brad (PhD 2022, Lehnert) In 2024 I moved to Los Angeles, CA after completing a postdoc at the University of Florida. In March 2025, I started a new job as a R&D Innovation Chemist at Heraeus Precious Metals North America (HPMN) in Santa Fe Springs, CA.

Neitz, Jeff (PhD 2003, Roush) Jeff is now an Adjunct Professor of Chemistry at UCSF and Associate Director of the Small Molecule Discovery Center. Prof. Neitz recently co-founded Tiller Therapeutics to develop small molecule drug conjugate for precision oncology treatment.

O'Hernandez, Nathalie, J. (BS 2024, Biomolecular Science). Starting veterinary school at the University of Pennsylvania this summer! Spent the summer in a veterinary surgical practice observing surgeries and learning as much as I could. I think of Professor Nolta often and still remember "Boron the Moron" and how Organic Chemistry taught me how to study differently and more efficiently. I am sure I will be using these skills in my professional program. But also Nolta's phenomenal teaching is why I will always remember that lone pairs are like "fur" and why I see chemistry everywhere. She made me feel like I will always be an organic chemist at heart!

Pettersen, Michael (BS Chem. 2021, MS 2022 (Chemistry), Shultz) I went on to medical school at the University of Cincinnati College of Medicine and will graduate in 2027. I am super grateful for all the research I was able to produce with the generous support and guidance of the Shultz Group. I even continued education-focused research in medical school!

Patchen, Nicole B. (BS Biochemistry, 2016, Olszewski) went on to earn a PhD from University of Washington in Pathobiology <https://orcid.org/0000-0003-0699-8863>

Quist, David, A (BS Chemistry, 2013, Szymczak) In 2018, I earned my Ph.D. in Inorganic Chemistry from Johns Hopkins University. In 2019, I started my position as an Assistant Professor of Chemistry at Trine University. In 2023, I was promoted to Associate Professor of Chemistry. In June 2025, I became the Chair of the Department of Chemical and Foren-

sic Sciences at Trine University. My wife and I just had our first baby in July 2025.

Raphael, Aaron, M. (BS Chemistry, 1996) I earned a BS Chemistry from UM in 1996, and a JD from Emory University in 1999. I am the co-owner of Raphael Bellum PLLC, an intellectual property law firm based in Falls Church, VA, and Washington, DC. I have over 25 years of experience in patent law, both in prosecution and litigation.

Rosen, David, A. (BS 2002, Coward) David Rosen, MD, PhD was recently promoted to Associate Professor with Tenure in the Departments of Pediatrics and Molecular Microbiology at Washington University School of Medicine in St. Louis. His laboratory studies molecular mechanisms of *Klebsiella pneumoniae* pathogenesis.

Shapiro, Alec, J. (BS 2018) Since graduating undergrad, I became a registered patent attorney in Michigan by attending law school, passing the bar exam, and passing the USPTO's registration exam. I regularly get to use the vital knowledge I obtained during my time at Michigan. I currently work remotely for a patent prosecution firm based in DC called Bookoff McAndrews.

Sharkey, Leo (1986 BS Chemistry, Bartell) After a long corporate career and several other degrees, Leo bought an HVAC business in Central Massachusetts that he runs with some of his family. Life as a small business owner and 2nd time husband keeps him quite busy along with his hobby farm and animals.

Shin, Jeff (BS Biomolecular Science, 2022), I pursued further education at the University of Michigan School of Dentistry as a DDS student.

Shubart, Richard, W. (BS Chem 1962), Retired from Pharmaceutical Industry for 20 years but still go to AA for Homecoming every year to play Alto Horn with the Alumni Marching Band.

Stringham-Turner (née Stringham), **Emily** (BS Biochemistry, 2020) I am now a lab manager in the Plant Research Laboratory at Michigan State University! I never set out to study plants, but I've learned that they are absolutely fascinating! And, just as importantly (if not even more so), I love the people I work with. The PRL community is amazing! I definitely get some interesting reactions wearing my U-M alumni gear around campus, but I wouldn't have it any other way.

Stroble, Sean (Biomolecular Science 2024, Koutmou) I am starting medical school at Emory University.

Wearing, Emily (PhD 2024, Schindler) received a ProQuest Distinguished Dissertation Award. This award is given in recognition of the most exceptional scholarly work produced by doctoral students at the University of Michigan who completed their dissertations in 2024. Her dissertation: Development of New Visible-Light-Mediated Methods to Access Azetidines and Azetines

Wiedner, Susan (PhD 2009, Vedejs) Susan earned her PhD in 2009 and then moved to Richland, WA with her husband, Eric. She worked as a postdoc in proteomics at the Pacific Northwest National Laboratory and earned the distinguished Linus Pauling Fellowship. Susan now owns a small business, SciTech Proofreading (www.scitechproofreading.com), which offers editing and proofreading services for science researchers who wish to publish their work

Wu, Hongdi (BS 2022, MS 2023, Nagorny) I have a lot I want to share! Because most of time I am a shy person, although I really appreciate everything. I learnt and everyone I met. The chemistry depart-

ment is a warm place. All the professors I met and my classmates are all nice and helpful. It's often hard for me to keep in touch because I'm not very good at writing updates about myself. This feels like a nice chance to share something here, and I hope that if any of my former professors or classmates see this, they'll feel happy to hear from me—just as I feel happy whenever I read their updates. Recently, I'm in the stage of preparing for my comprehensive exam. Earlier this year, however, I became seriously ill. The pain was overwhelming, and for a while it even made me question whether I still wanted to continue in chemistry. I couldn't work efficiently for a couple of months, and my original plan to pass the exam before June was completely derailed. Thankfully, I'm slowly recovering now. I feel deeply grateful for the training and support I received from the University of Michigan, which has given me the foundation to get back on my feet. As I start to feel like myself again, I realize once more why I chose this path, and I'm committed to continuing my work in chemistry. Wish me luck as I aim to pass the exam this year and officially become a PhD candidate!

Zhang, Jessica (BS Biochemistry, 2019) Missing fall football out from the west coast!

Former U-M Professor Omar M Yaghi shares Nobel Prize for his work developing metal organic frameworks, a new form of molecular architecture

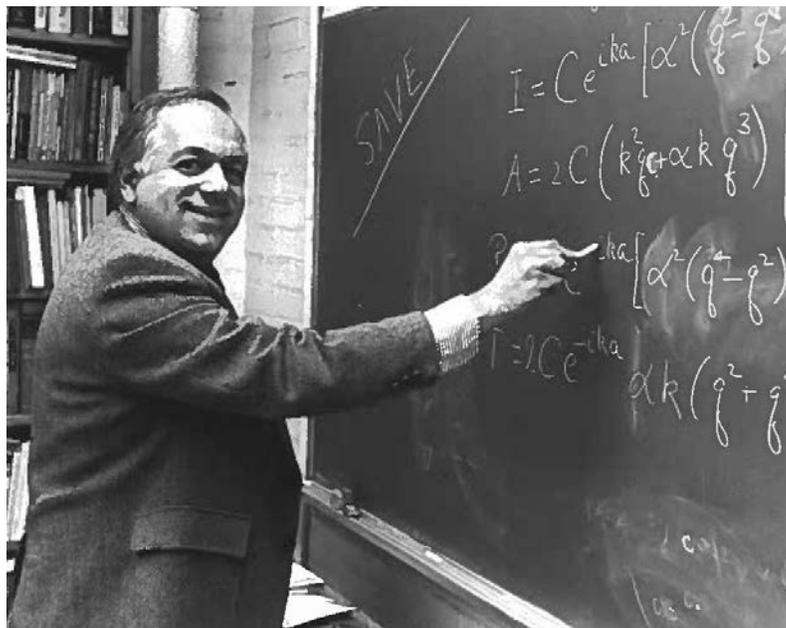
Former U-M Chemistry Professor Omar M. Yaghi was awarded a share of the 2025 Nobel Prize in Chemistry for his work developing a new class of materials called metal-organic frameworks (MOFs). MOFs are composed of metal ions linked by organic ligands, creating crystals that contain voluminous porosity and unprecedented surface areas. MOFs are contributing to solving some of the greatest challenges in sustainability, with applications that include capturing carbon dioxide, harvesting water from desert air, and storing hydrogen for vehicles. Yaghi was a faculty member of the U-M Department of Chemistry from 1999 to 2006, a period during which he conducted much of the work cited by the Nobel

committee. Professor Yaghi often taught the freshman introductory chemistry course, and a lab synthesizing MOFs is still an integral part of the advanced synthetic chemistry sequence for majors. Professor Yaghi is currently at the University of California, Berkeley.



In Remembrance

S. M. Blinder 1932- 2024



In fact, having fun was a hallmark of Sy's long and productive scientific career - from his first research position at Johns Hopkins Applied Physics Labs (1958-1961), to his faculty position at the UM Department of Chemistry (1963-1995), to his second career at Wolfram Research (2007-2024). He was always current, not just in his field, but in many fields of scientific research. He enjoyed his "somewhat surprising" academic writing career. He remained in touch with numerous colleagues and former students. He was amused when a colleague showed him he had an Erdos Number of 4 and an Einstein Number of 5. But, always moving forward, he wanted to know "what comes next." And to that end, he was earnestly engaged in his personal research until days before illness overtook him.

Seymour (Sy) Michael Blinder (born March 11, 1932, in New York City) was Professor Emeritus of chemistry and physics at the University of Michigan and a remote working senior scientist with Wolfram Research in Champaign, Illinois. Sy's intellectual capacity, his curious mind and his work ethic, together with his sense of humor, his joy in his family, and his zest for living, were ever-present and a testament to who he was. Blinder attended Cornell University and received an A.B. in physics and chemistry in 1953. He received an A.M. in physics in 1955 and a Ph.D. in chemical physics in 1958 from Harvard University under Professors W. E. Moffitt and J. H. van Vleck (Nobel Laureate in Physics 1977).

He was fit and intellectually productive until late August 2024. His 12th book, *A Primer on Quantum Chemistry*, was published by Wiley in early February 2024. He retired later that same month from his 17-year, second career, as a full-time Senior Research Scientist at Wolfram Research. Looking forward to working exclusively on his personal research "in retirement", Sy had some "wild ideas" he wanted to pursue. Thinking that his body of work would "probably withstand whatever I put out there now," he started to work on these "ideas" on his 92nd birthday, March 11, 2024 - a birthday present to himself, he said. And he was having fun.

Seymour Blinder passed away on September 4, 2024.



Paul G. Rasmussen 1939 - 2023



Paul G. Rasmussen, Arthur F. Thurnau Professor Emeritus of Chemistry and Macromolecular Science & Engineering at the University of Michigan, died December 14, 2023. He was 84.

Professor Rasmussen received his B.A. degree from St. Olaf College in 1960 and his Ph.D. degree from Michigan State University in 1964. He then joined the University of Michigan faculty as assistant professor of chemistry, and was promoted to associate professor in 1970, and professor in 1979. He was appointed professor of macromolecular science and engineering in 1992 and was named Arthur F. Thurnau professor in 2002.

At retirement in 2006, he had authored over 100 papers and patents, as well as a number of abstracts and meeting preprints. He had mentored 28 Ph.D.

students. His 42 years at the University of Michigan also included service as associate dean for research and facilities from 1975-82, and associate dean for research and graduate studies from 2001-04. He was deeply involved in the design and construction of the 1988 expansion of the chemistry building on campus.

Professor Rasmussen's early research focused on the coordination chemistry of transition metals and the use of imidazoles as ligands to these metals. His most recent research dealt with the synthesis and characterization of pyrazine cyanocarbons as electron acceptors and n-carrier materials.

He also developed innovative instructional methods, including "Seeing Through Chemistry," an interactive computer/video tool, and "The Business of Chemistry," curricular modules that related chemistry to everyday life. His dedication as a teacher was recognized by the LSA Excellence in Education award in 1994, by his appointment as an Arthur F. Thurnau Professor, and by

election as an honorary member of Phi Eta Sigma for excellence in the teaching of general chemistry.

He held a Sloan Foundation grant for the support of minority students in materials research and received the University's Harold R. Johnson Diversity Service Award in 2004.

Eager to continue his research after retirement, Professor Rasmussen founded and operated a company that studied cutting-edge battery chemistry.

Professor Rasmussen is survived by his wife, Val, their three daughters, and their spouses: Lorin and Robert Bryce, Erin and Matt Warhol, Marit Rasmussen and Mark Woodham of Ann Arbor, and grandchildren: Mary Bryce, Michael (Bethany) Bryce, Jacob Bryce, Jack Zdechlik, Claire Zdechlik, and Tommy Woodham.

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GIVING BLUEDAY

SAVE the DATE

March 18, 2026

ENDOWMENTS—A Legacy

Endowments have been established by former students to recognize beloved professors and by alumni whose lives were transformed by their college experiences. Some aim to “pay it forward” to the next generation of scholars. Others are just grateful for their association with the department. Whatever the motivation, endowments create a legacy. They keep giving year after year as the interest earned provides current support for our missions while the principal maintains a solid foundation for the future.

Among these are:

Richard J. Cook and Teresa M. Lahti Undergraduate Research Endowment

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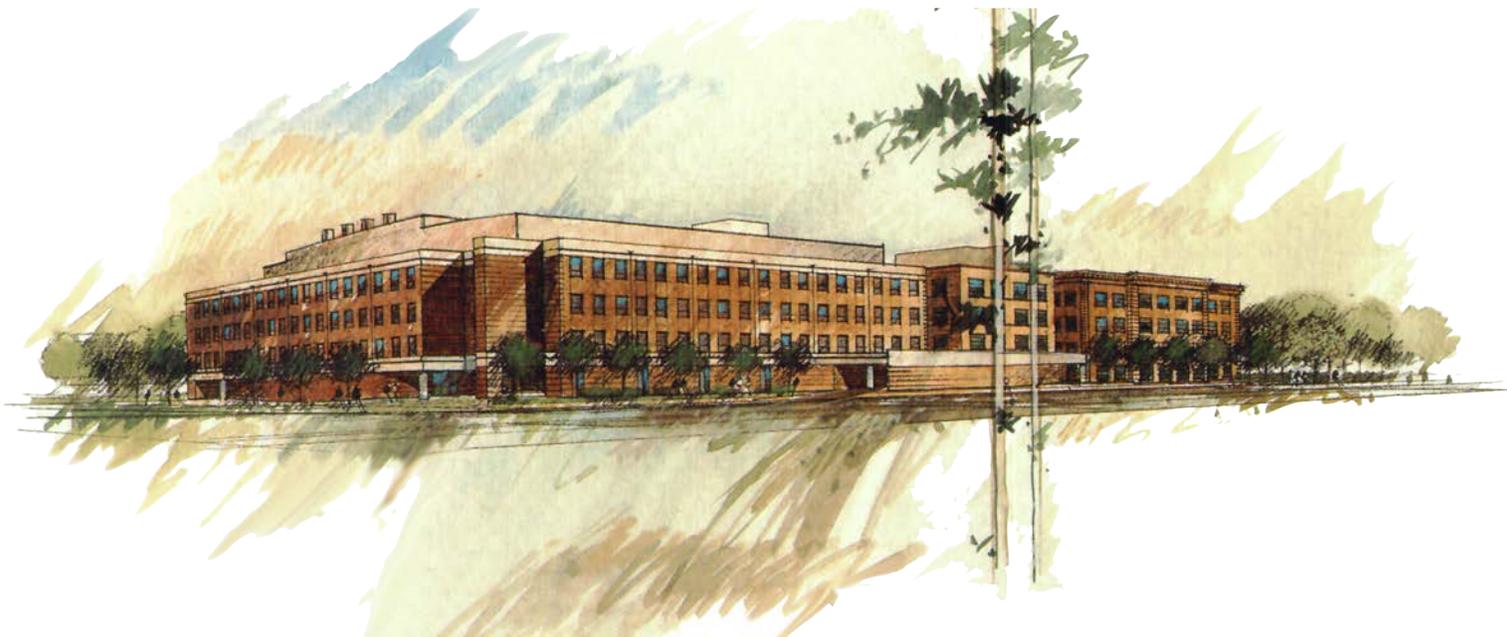
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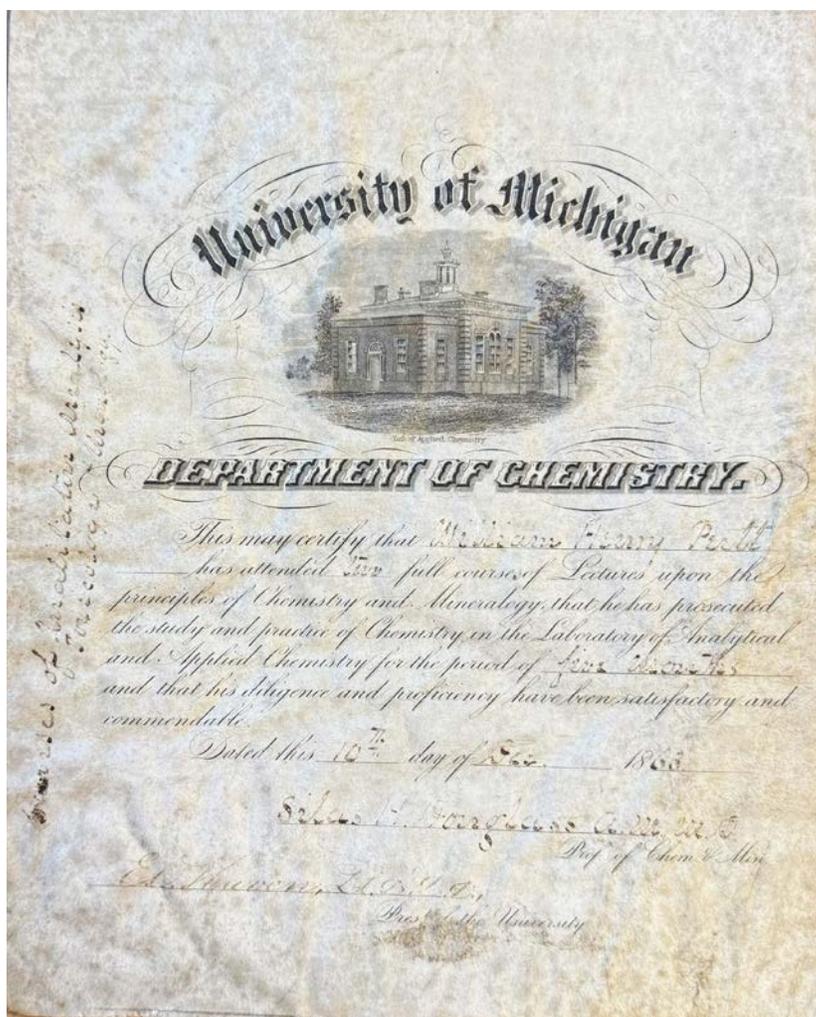
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A diploma from 1863 awarded to William Henry Putt was found in a box of old pharmacy bottles at an auction in Ohio and gifted to the Department of Chemistry.



This may certify that William Henry Putt has attended two full courses of Lectures upon the principles of Chemistry and Mineralogy that he has prosecuted the study and practice of Chemistry in the Laboratory of Analytical and Applied Chemistry for the period of five months and that his diligence and proficiency have been satisfactory and commendable.

Dated this 10th day of Dec. 1863.

It is signed by Silas H. Douglass, Professor of Chemistry and Mineralogy and Erastus Otis Haven, President of the University of Michigan.

In the early years, chemistry instruction consisted mainly of “chemical analyses and their applications to toxicology and to other subjects, chiefly medical,” according to an early history of the chemical laboratory.

The writing in the margin says: [unreadable ink] courses in qualitative analysis, toxicology and urology” as was medical school curriculum of the time. The ink blot is likely as 2 since students were required to attend the same lectures for two years.

William H. Putt is listed in the *Triennial Catalog of the University of Michigan* (1871) as a 1864 graduate as a medical doctor with a title of “Prof. of Organic and Applied Chemistry and Pharm.”