THE MIDLAND CHEMIST

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Chair Column

Hunter Woodward, Chair, Midland Section ACS

"Twenty Trillion"

How many glasses of tap water would you need to drink before you ingested a single water molecule that was part of the iceberg that sunk the Titanic?[1]

Okay, I realize the title of this column gives away the answer, but let's go through the numbers: math is fun! For those of you who want to follow along (or don't believe me), I have put some numbers on the right.

First, let's estimate the number of water molecules in the iceberg. Estimates range from 50-100 feet high and 200-400 feet long. Ninety percent of an iceberg is below the water, so the total volume of the iceberg was about 1×10^{12} cubic centimeters.

$$50 \times 200 \times 200 \times 10 = 2.00 \times 10^{7} ft^3$$

$$100 \times 400 \times 400 \times 10 = 1.60 \times 10^{8} ft^3$$

$$\times 28316.8 \frac{cm^3}{ft^3} \approx \_\_\_\_\_ cm^3$$

The density of ice is about 0.9168 g per cc, giving us a mass of about a trillion grams.

$$\times 0.9168 \frac{g}{cm^3} \approx \_\_\_\_\_ g$$

A molecular mass of 18.0148 grams per mole gives us about a hundred billion moles. Now for a big jump: The Avogadro constant estimates the number of water molecules in the iceberg to be about 5×10^{34}! That's roughly fifty thousand million million million million million, or 50000000000000000000000000000000000.

$$\div 18.0148 \frac{g}{mol} \approx \_\_\_\_\_ mol$$

$$\times 6.02214 \times 10^{23} \frac{molecules}{mol} \approx \_\_\_\_\_ molecules$$

Still, this is virtually nothing compared to the molecules of water on Earth. This number is roughly estimated to be 1.386×10^{9} km^3, or 5×10^{46} molecules.

$$1.386 \times 10^{9} km^3 \times 10^{15} \frac{cm^3}{km^3} \times 1 \frac{g}{cm^3} \div 18.0148 \frac{g}{mol} = \_\_\_\_\_ mol$$

$$\times 6.02212 \times 10^{23} \frac{molecules}{mol} = \_\_\_\_\_ molecules$$

If we summarize thus far, we have 10^{34} molecules in the iceberg and 10^{46} molecules on Earth, so the iceberg made up approximately 0.0000000001 percent of all water on Earth.

$$\sim 5 \times 10^{34} \div 4.63 \times 10^{46} = \_\_\_\_\_ \%$$

Nearly there! We now calculate the number of water molecules in a 16 oz glass of water. Assuming the 100+ years of ocean currents, evaporation, and precipitation have created an equal distribution of iceberg molecules around the globe, we multiply the molecules in the glass by 10^{-10} to find the number of water molecules in that single glass that were part of the original iceberg. Indeed, every glass of water that you drink has *twenty trillion molecules of Titanic-sinking iceberg in it.*

$$16.0 oz \times 29.5735 \frac{cm^3}{oz} \times 1 \frac{g}{cm^3} \div 18.0148 \frac{g}{mol} = \_\_\_\_\_ mol$$

$$\times 6.02212 \times 10^{23} \frac{molecules}{mol} = \_\_\_\_\_ molecules$$

$$\times 1.08 \times 10^{-12} = 1.71 \times 10^{13} molecules$$

Molecules are small.[citation needed] Really small. You can't believe how negligibly singularly mind-bogglingly small they are.[2] How would one ever come up with the number $6.022\ 140\ 76 \times 10^{23}$? Avogadro himself certainly did not (1776-1856): he simply proposed that equal volumes of gas at a known temperature and pressure would have the same number of molecules. Loschmidt (1821-1895) proposed that the number of molecules in a liquid gas were the same as the gas evaporated, and you could therefore calculate the diameter of the molecules in a liquid via its density, estimate the mean free path of the gas via its volume upon evaporation, and thus determine the total number of molecules in one mole of gas. His estimate of 4×10^{23} molecules per mole is pretty close.[3] But a lot of guesswork went into this number: it was not until Jean Perrin's (1870-1942) experiments with mercury vapor that the Avogadro constant was empirically determined to be 6.025×10^{23}.[3] Perrin received the Nobel Prize for this work, and today exceedingly careful measurements and SI definitions have locked in the actual value. Even so, the number will always be an estimate. To actually count one mole of molecules is impossible. If we invented a detector that counted one million molecules per second it would take a bit longer than the current age of the universe to count one mole. So the next time you take a sip from a glass of water, imagine the millions upon billions upon billions of water molecules dancing around inside that single sip, and the history that each one must have witnessed.[4]

W. H. Hunter Woodward, Ph.D.

Calculating Chemist

P.S. If one asks "why not reserve this column for October, when the ACS celebrates Mole Day (October 23rd) and National Chemistry Week?," my answer is that I am unsuccessfully protesting the position of Mole Day on our calendars. If we want students to memorize the Avogadro number we should celebrate it on June 23rd, since the "ten-to-the" bit is easy to remember. This protest of course has nothing to do with the fact that Mole Day would then fall on my son's birthday…

[1]A quick footnote to state that the "unsinkable" RMS Titanic is often featured in stories and examples due to its being a household name, but this is only so because 1,500+ people tragically died on April 15, 1912. The ship as it remains today is a grave protected by the UNESCO Convention on the Protection of the Underwater Cultural Heritage.

[2]Modified from a famous Douglas Adams quote.

[3]Loschmidt's actual number and Maxwell's interpretations of his work used different units. The "mole" as a unit is a rough abbreviation of the German word "Molekül," first coined in 1897 by Ostwald.

[4]For further reading, I recommend "Caesar's Last Breath" by Sam Kean, by which this column was loosely inspired, and "Only a Trillion" by Isaac Asimov, which is outdated but still a great way of thinking about that specific number.

ACS Midland Section Celebrates Achievements in Chemistry and the Related Sciences

Diana K. Deese, Awards Committee Chair, Midland Section ACS

The American Chemical Society-Midland Section gathered on the evening of May 3rd for the 32nd Annual Awards Banquet to honor past, present, and future chemists and those who support them. Over 150 guests were treated to a delicious plated chicken dinner as part of the evening's festivities. The esteemed Dr. David Devore gave an engaging talk entitled "Catalyze Your Career in Science" through which we all learned, there are several paths to a successful career in the chemical sciences. Ultimately, though, our purpose was to recognize the efforts and achievements of the award recipients.

Amongst the banquet attendees, the section acknowledged the following people for awards and honors outside the scope of this program:

Chemistry Olympiad is a multi-tiered competition that brings together the world's most talented high school students to test their chemistry knowledge and skills. High-scoring Chemistry Olympiad participants were congratulated on their achievement.

Boaz Qui	*H. H. Dow High School*
Louis Huang	*H. H. Dow High School*
Joseph Crachiola	*Saginaw Arts & Sciences Academy*
Jonathan Colon	*Saginaw Arts & Sciences Academy*
Landon Wagner	*Heritage High School*
Anderson Li	*Heritage High School*
Isabel Walton	*Mt. Pleasant High School*
Cecelia Foote	*Mt. Pleasant High School*

Thirty-five local high school students were honored for being outstanding chemistry students as chosen by the chemistry department at each school. Students were introduced with answers they provided to the following questions: what chemistry experiment most intrigued them; where they planned on attending college and in what field; and, what science concept they would like to see come to fruition. The next generation of chemists and engineers would like to cure a multitude of diseases, discover new elements, and find clean energy solutions. They most enjoyed lessons on stoichiometry.

Hannah McIntosh	*All Saints High School*	*Jacob Rodammer*	*Frankenmuth High School*
Laila Heiss	*Alma High School*	*Brady Dixon*	*Freeland High School*
Remington Smith	*Alma High School*	*Joseph He*	*H. H. Dow High School*
Lauren Groulx	*Bay City Central High School*	*Rachel Mecca*	*Midland High School*
Madeline Fournier	*Bay City Western High School*	*Yuna Miyoshi*	*Mt. Pleasant High School*
Gabriella Dominguez	*Birch Run High School*	*Riley Mattheis*	*Nouvel Catholic Central High School*
Lyle Colthorp	*Breckenridge High School*	*Lucas Tilot*	*Saginaw Arts & Sciences Academy*
Aerial Johnson	*Bridgeport High School*	*Aidan Kelley*	*St. Charles High School*
Noelle Isaacson	*Bullock Creek High School*	*Rachel Yuncker*	*Shepherd High School*
Kapre Lynch	*Coleman High School*	*Ava Duprey*	*Swan Valley High School*

Nine Outstanding College Students received plaques recognizing their dedication to their studies. When asked who inspired them the most, they agreed; their parents, professors, and peers. They are eager make their mark on in the field of chemistry as they embark on furthering their education at various institutions of higher learning:

William Kidder	*Alma College - Chemistry*
Tyler Putnam	*CMU - Chemistry*
Lauren Wilson	*CMU - Chemistry*
Macy Knoblock	*CMU - Biochem*
Daniel Swanson	*CMU - Biochem*
Matthew Brennan Jackson	*CMU - Biochem*
Keaton Anderson	*Delta College - Chemistry*
Emily Jaremba	*SVSU - Biochemistry*
Devin Neumann	*SVSU - Biochemistry*

While we honor all of the students, we cannot overlook the importance of the people who have taught them. Our educators spend so much time cultivating the passion our students have for the sciences. They give countless hours of their own time, pay for expenses out of their own pocket, and believe in going the extra distance to create new opportunities for their students. The awards committee continues to be amazed at the innovative way teachers find to engage our young people. Nominations were comprised of accolades and achievements documented by peers, parents, supervisors, and students. Four local educators were honored for their Outstanding Achievement in Teaching:

Julee Dillon..... Auburn Elementary School
Brian Reinhardt ..... Midland High School

Denise Anaya, of The Dow Chemical Company, has earned the title of 2023 Outstanding Chemical Technician. Denise has consistently demonstrated influential leadership, a strong work ethic, and is always willing to acquire new skills. Denise has shown a high level of initiative and independence in overseeing the design, build, programming, validation, and commissioning of custom reactors for screening heterogeneous catalysts that have been critical to expanding Core's capabilities to support Dow's strategic priorities. Her work on new cracking technologies is aligned with Dow's Hydrocarbons business to make propylene and ethylene. These projects are part of Dow's sustainability goals to achieve a carbon-neutral Dow by 2050 through new, innovative processes.

The Science Education Volunteer award was received by me, Diana Deese. Diana has been part of the ACS Science Coaches program since 2010, teaming up with local teachers to do in-classroom, monthly demos. She also provides STEM presentation to local organizations such as the Girl Scouts Heart of Michigan where she plans day-long activities or troop presentations. In 2021, Diana took on the task of providing 365 Days of Science where she explained a personal science observation, every day, based on her question "I Wonder"… on the MMTG Fb page (and she admits, this was one of her favorite activities). Putting over 400 hours in each year, she loves instilling a passion for science into the minds of all the kids - young and old - that she works with.

The 2023 award for Promotion of Diversity in Chemistry, Related Sciences, and Engineering goes to Anne-Catherine Bedard. Anne-Catherine has been pivotal in highlighting her colleagues within the community through initiatives such as the Black History Month highlights of local scientists, National Women's Month highlights of women in STEM, and several outreach activities. She has also spent a significant amount of time creating connections between other local organizations with similar objectives such as MMAIChE, EDI, and NOBCChE. Through these connections, the annual Trivia Night in the Park and the newly announced Bettye Washington Greene Award were created. Leveraging her extensive network and passion for D&I, Anne-Catherine has consistently engaged and enhanced inclusion through her leadership of the ACS D&I committee in mid-Michigan.

As a *Midland Chemist* editor, Vickie Langer is customer focused, always supportive and encouraging of the Midland Section ACS leaders that she serves in bringing their stories and events to life after-the-fact, and promoting upcoming events in as polished a manner as possible ahead of time. She has established a high standard for herself in getting articles edited and each full issue of *The Chemist* published in a timely manner as close to the beginning of each month as possible. The spit and polish that shines forth from the monthly Midland Chemist publication helps showcase the Midland local section in a very favorable light, and Vickie is one of the behind-the-scenes individuals that makes that happen. Congratulations on being named the 2023 Outstanding Service to the American Chemical Society award recipient!

Dr. Tami Sivy continues to support chemistry and the related sciences in many ways. She has served as a department chair at SVSU, has been an integral member of curriculum teams, developing majors in both Neuroscience and Environmental Science, and has led the development of a faculty advising initiative within the Chemistry Department. Dr. Sivy has been a consummate professional, teacher, and mentor and her students (research and classroom) have gone on to many successful careers in academia, industry, medical professions, and more. She has won several awards for her teaching, including the Michigan Distinguished Professor of the Year in 2021. She provides opportunities for research work to be performed by *undergraduate* students, who often do not have any prior research experiences, highlighting Dr. Sivy's ability to educate students on how to perform cutting-edge research that is critical for all scientific careers. For her dedication to the chemistry community, she is the recipient of the award for Outstanding Achievement and Promotion of the Chemical Sciences.

This year, the ACS Midland Section D&I committee teamed up with NOBCChE to introduce the Bettye Washington Greene Award for Outstanding Science. This award recognizes a Black scientist who has demonstrated outstanding contributions in their technical field in the past three years. Dr. Siaka Yusuf is the recipient for 2023. Siaka is the facility director and reactor supervisor of Dow's Triga Research Reactor (DTRR) facility and is responsible for operating this inherently safe facility in compliance with Nuclear Regulatory Commission (NRC) guidelines. Through his efforts and history of demonstrated compliance in operating the DTRR, he has earned the trust of the NRC such that he is called upon by the NRC to provide best practices guidance to other reactor facilities around the country. Additionally, Siaka's technical expertise is externally recognized, evidenced by being asked to be a reviewer for multiple Department of Energy (DOE) grant submissions each year. For new Dow employees, especially those from underrepresented groups, who may find it challenging to start building their personal board of directors and expanding their networks, Dr. Yusuf has established a sustainable mentoring strategy: intrusive mentoring. This approach provides personal pointers on how to launch a safe and strong start to one's career at Dow, navigate a new career in the corporate world, and to connect new employees with other colleagues. Dr. Yusuf has established a community whose goal is to help in acquiring, growing, celebrating, and connecting talent. This is an effort that gives a sense of belonging and support to new employees and creates an avenue to share new and diverse perspectives that are useful for talent growth and development.

Every once in a while, the awards committee finds it necessary to recognize the outstanding efforts of a person that might not fit into a category or deserves a special recognition. So it is for this year as we give special appreciation to Wendell Dilling for his 25 years as our ACS Midland Section historian. Wendell had held many positions within the section and has volunteered with the ACS for decades. As he addressed the audience, he spoke of the virtues of volunteering for an organization that provides many opportunities and that our section, in particular, is one of the most awarded sections in the country due to the efforts of its members. Wendell's efforts in establishing a detailed and organized system to preserve our Midland Section history was recognized with the title, "Keeper of Time". Thank you, Wendell, for your dedication and service.

The awards committee was privileged to award "Salute to Excellence" commendations to our following colleagues:

Midland Area Farmer's Market -Emily Lyons and Becca Pleiman (representing)

In recognition of Collaborative Programming with the Midland Section and for their continuing support of the Midland Community through programs within the market that educate, excite, and enhance the public's knowledge on the intricacies and benefits of locally grown produce and the behind-the-scenes science that goes into the production of the variety of items available at the Midland Area Farmer's Market!

National Organization for the Professional Advancement of Black Chemists and Chemical Engineers (NOBCChE) - Edward Nyutu (representing)

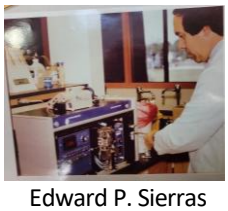
In recognition of Collaborative Programming with the Midland Section and for their continuing support of Midland ACS events and activities, from summer camp to the Earth Action Expo, where they have provided shelter, activities, and free lunches for volunteers. Even during the pandemic, NOBCChE was engaged and willing to help; we hereby recognize their valued partnership, and hope it continues!

Each year, the American Chemical Society reveals to the Midland Section the names of those who have shown time-honored service, dedication, and membership in the ACS. Three 50-year and two 60-year members received certificates for paving the way for the rest of us. A brief recap of where each studied, their career history, and what they have been involved in since retirement was recited as each honoree was presented:

Dr. Thomas H. Lane	*50 years*	*Dr. William X. Bajzer*	*60 years*
James A. Rabe	*50 years*	*Dr. Bob A. Howell*	*60 years*
Edward P. Sierras	*50 years*		

Dr. Bob A. Howell

Dr. Thomas H. Lane



Edward P. Sierras

As chair of the ACS Midland Section Awards Committee, I want to give special thanks to the awards team for all of their hard work in making this event what it is. I also want to thank Emily Deese for photographing the event on last minute notice.

If you were unable to attend this fun-filled evening, be assured that the 2024 Annual Awards Ceremony promises to be just as exciting. Watch for the date to be announced in the January issue of *The Midland Chemist* ….you know you will want to attend!

Regards,
Diana K. Deese

2023 U.S. National Chemistry Olympiad in mid-Michigan

Michael Tulchinsky, Chemistry Olympiad Chair, Midland Section of the ACS

Every year the Midland Section of the ACS organizes two rounds of the Chemistry Olympiad, the Local Section Exam and the National Exam. This year both rounds of the Chemistry Olympiad were in-person. The test materials have been provided by the American Chemical Society.

In the middle of March, 144 chemistry students from eight high schools located in four mid-Michigan counties took part in the Local Section Exam. In comparison, 71 students participated in 2022. The chemistry teachers at Bay City Western, Freeland, Heritage, H. H. Dow, Midland, Mt. Pleasant, Valley Lutheran, and Saginaw Arts and Science Academy (SASA) high schools administered this competition. The Local Exam required students to solve 60 problems with multiple choice answers with the allowed time of about 2 hours.

Based on the scores of the Local Exam, the Midland Section nominated ten students to the National Exam. Isla McCubbin-Green of Midland High School achieved the highest score among the mid-Michigan contestants receiving 34 points at the Local Exam. Eight students accepted the nominations and took part in the National Exam: Louis Huang and Boaz Qiu from H. H. Dow High School (chemistry teacher Ashley Burr), Landon Wagner and Alexander Li of Heritage High School (chemistry teacher Melanie Galonska), Isabel Walton and Cecelia Foote from Mt. Pleasant High School (chemistry teacher Jason Brown), Joseph Crachiola and Jonathan Colon from Saginaw Arts and Science Academy (chemistry teacher Dr. David Allan). The National Exam was held at Saginaw Valley State University on April 15th and included 60 questions with multiple choice answers in the first part, 8 questions requiring problem-solving and explanations in the second part, and 2 experimental problems in the laboratory setting in the third part.

Picture 1: Mid-Michigan students at the National Exam (from left to right): Isabel Walton, Cecelia Foote, Boaz Qiu, Joseph Crachiola, Jonathan Colon, Louis Huang, Landon Wagner, Alexander Li.

The students who participated in the National Exam were invited to the Awards Banquet in Midland on May 3rd where they were recognized with American Chemical Society certificates and awarded with honor cords. The chemistry teachers were also recognized with the ACS certificates for the guidance and encouragement given to their students.

Picture 2: Mid-Michigan students and their teachers at the Awards Banquet (from left to right): teacher Melanie Galonska, Jonathan Colon, Alexander Li, Joseph Crachiola, Landon Wagner, Isabel Walton, Cecelia Foote, Louis Huang, teacher Dr. David Allan.

Every year approximately 800-1,000 high school chemistry students overall participate in the National Exam. The top twenty students receive invitations to the Chemistry Olympiad Study Camp in June. The top four exceptionally strong students from this cohort represent the U.S. at the International Chemistry Olympiad (IChO) which will be held this year in-person in Zurich, Switzerland in July.

Several volunteers offered help at both local and national phases. The Midland section Chair Dr. Hunter Woodward supported and commended the Chemistry Olympiad activities. Dr. Jonathan Axtell and Dr. Sudipta Pal of Dow served as National Exam proctors. Dr. Anthony Revis of SVSU put together experimental sets for students and provided the laboratory for Part 3 of the National Exam. Ms. Diana Deese included the National Exam students and their teachers into the Awards Banquet schedule and ordered gifts. Dr. Michael Tulchinsky as previously served as the Chemistry Olympiad coordinator and recognized the students and their teachers at the Awards Banquet.

Picture 3: Volunteers at the 2023 Chemistry Olympiad (from left to right): Dr. Anthony Revis of SVSU, Drs. Sudipta Pal, Michael Tulchinsky, and Jon Axtell of Dow.

Midland Section ACS Receives Nine ChemLuminary Award Nominations for 2022 Programs

Joel McDonald, Past-Chair, Midland Section ACS

The Midland Section of the American Chemical Society is honored to be nominated for nine 2022 ChemLuminary awards. These nominations represent many volunteer hours, interactions with diverse community groups, and successful engagement on scientific topics at various levels. The dedication of Midland Section ACS volunteers is truly impressive!

The Midland local section has been selected as a finalist for the following ChemLuminary Awards:

Award Nominations

- Best Activity or Program Stimulating Member Involvement
- Best Continuing Senior Chemists Activity within a Local Section
- Most Creative NCW Celebration Using the Yearly Theme
- Outstanding Community Involvement in CCEW
- Outstanding Engagement with K-8 Students
- Outstanding High School Student Program Award
- Outstanding Ongoing CCEW Event
- Outstanding Project SEED Program Award - Small Site
- Outstanding Performance by a Local Section - Medium Small Size Category

Winners will be announced, and the awards will be presented at the ACS 2023 Fall National Meeting & Exposition in San Francisco, CA, on Tuesday, August 15, at the Moscone Center, located at 747 Howard Street, San Francisco, CA 94103.

Congratulations, Midland Section ACS team!

Meet a Designer of Catalysts for the Production of Industrial Chemicals

ACS Industry Matters Newsletter

Editor's note: This article is reprinted from the February 18, 2021, issue of *ACS Industry Matters Newsletter*, an online news publication of the American Chemical Society.

Souvagya Biswas of Dow explains how his passion for chemistry and a series of fortuitous introductions led him to a career in industry

Souvagya Biswas, Associate Research Scientist, Dow

It was scents that first attracted Souvagya Biswas to chemistry. "When I was a kid, it always fascinated me that vanillin and methyl salicylate had such unique smells," he says. His passion for chemistry was ignited when, in high school, he learned their odours were due to the molecules contained within them.

A bachelor's degree in chemistry, at Jadavpur University, was followed by a masters in chemistry at the Indian Institute of Technology, Bombay. It was there that Biswas fell for asymmetric catalysis, during a short course taught by T. V. RajanBabu, a visiting lecturer from Ohio State University.

After graduating with his masters, Biswas joined RajanBabu's research group for a PhD in asymmetric carbon–carbon bond formation. He then joined Dean Toste's group at the University of California, Berkeley, for a postdoc in asymmetric catalysts for carbon–heteroatom bond formation.

During his postdoc, Biswas got a glimpse of scientific life outside of academia through a collaboration with Dow's Core R&D synthesis and catalysis group. "I started interacting with a Dow scientist and was amazed to see some of the fundamental challenges that still exist in industry and to learn how solving them would have such a relevance in our daily life," he explains.

In January 2018, Biswas joined the same Dow team. He designs rhodium catalysts for the conversion of propylene feedstock into butanal. "Butanal, and other oxygenated solvents, are basic precursors for surface coatings, resins, dyes, paints, and plasticizers," Biswas says. "I am developing more efficient and robust catalysts for the hydroformylation reactions to meet the global demand for these chemicals."

Biswas is also the industrial lead in a Dow collaboration with Craig Hawker and Chris Bates at the University of Santa Barbara to study the phase behavior of silicone-organic hybrid materials.
In his spare time, Biswas volunteers with the Midland section of the American Chemical Society as a means to advocate for industrial chemistry careers. “Providing graduate students with a perspective from industry can help them shape their career and find a way to pursue their passion,” he explains.

What is in your lab coat pocket?
A Sharpie, a pen, a pencil, pipette bulbs, cut-resistant gloves, and a new pair of nitrile disposable gloves.

What tool can't you live without in the lab?
Nuclear magnetic resonance spectroscopy. I use NMR multiple times a day when I’m in the lab.

What is the best part of your job?
Talking with subject matter experts inside the company. People who have spent 30 years of their career solving a single problem have so much knowledge, and learning from them is the best part about being in industry.

Name a project you are particularly proud of
Last year, we developed a new catalyst for the hydroformylation reaction. We had many challenges, and it was really rewarding when we eventually provided a synthetic route to the catalyst. We are now working on the scale-up process.

What is your favorite catalyst and why?
I have so many of them! Catalysts close to my heart include the Wilkinson catalyst, the Ziegler–Natta catalyst, and the cobalt-based catalysts used for hydrovinylations.

If you could develop a catalyst that sped up any reaction at all, what would it be?
A catalyst for the chemical recycling of plastics. Sustainability is something that is central to everything Dow is doing right now.

Who is your scientific hero?
Henri Kagan, the father of asymmetric catalysis, and R. B. Woodward. Their innovation and unique approaches to organic chemistry were really impressive, especially when you consider how little technology they had compared to chemists today.

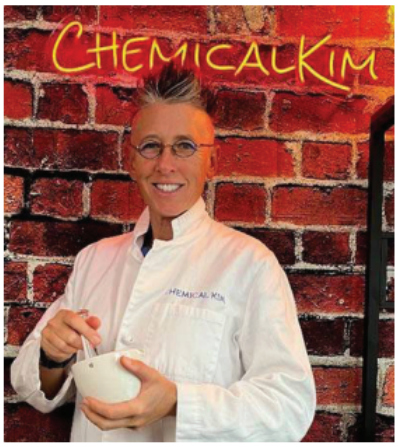
If you weren't a chemist, what job would you like to do?
A historian. When reading chemistry journals, I always look for details about the history of the field or mentions of serendipitous discoveries.

What is your morning routine?
I wake up between 5:30 and 6:00, have a cup of coffee, take shower and then try to hit lab by 7:00 to 7:30. I like to get a couple of hours in the lab before the meetings begin.

Professor Kimberly Hilton — "Chemical Kim" — Awarded 2022 Helen M. Free Award for Public Outreach

Centralight CMU Alumni Magazine

Editor's note: This article is reprinted from the Winter 2022 edition of the Central Michigan University Alumni Magazine, *Centralight*.



Chemistry professor awarded 2022 Helen M. Free Award for Public Outreach

Social media sensation Chemical Kim advocates for access to discovery

The American Chemical Society (ACS) honored Professor Kimberly Hilton, M.S. '96, with the 2022 Helen M. Free Award for Public Outreach. The award is presented annually to an ACS member whose outstanding achievements have improved public recognition and appreciation for the contributions of chemistry.

Hilton, a chemistry professor at Florida SouthWestern State College, is also known to millions of fans around the world through her in-person and digital public outreach as Chemical Kim.

Of particular importance to her is inspiring a young audience, especially those who may not have equal access to scientific discovery as a result of long-term hospitalization, foster care, language barriers or physical or mental disabilities. Her goal is to spark their interest to learn, understand and appreciate chemistry.

In the early 2000s, Chemical Kim took her enthusiasm to local airwaves by producing radio spots called "The Chemical Kim Science Minute" as well as an award-winning educational TV show called the "Chemical Kim Science Show." Over the years, and with the advent of new technology, she has branched out beyond in-person events to YouTube, Facebook, Instagram, Twitter, LinkedIn and TikTok, generating thousands of followers and millions of viewers who enjoy her engaging presentations.

"I am honored to receive this amazing recognition from ACS," Hilton said. "I make science inclusive and accessible for everyone. I believe the more diversity we bring to science, the faster and greater we will see improvements to our lives and our environment."

Hilton holds a B.S. in chemistry and a secondary education certification from Michigan Technological University, where she was a featured alumnus in the Department of Cognitive and Learning Sciences in 2018. She earned a master's degree in chemistry from CMU, where she was the recipient of the Outstanding Graduate Teaching Award. In 2011, she was the LGBTQ Pride co-chair in Kalamazoo, and she continues working to improve LGBTQ visibility in STEM education. She is featured on the website 500 Queer Scientists. •

Gardening Season is ON!

Gina Malczewski, Director and Outreach Committee, Midland Section ACS

Back in February, Creative 360 announced it was planning to buy the Chapel Lane Church (5501 Jefferson Ave, Midland) and put its Bayliss building and lot up for sale. Community Garden activities were therefore suspended for 2023. Later it was revealed that Chapel Lane also had a community garden space, though management and plans for 2023 were unclear.

In May, plots at Chapel Lane were opened for "soft reserve" after the sale went through, and the Director at Creative 360 asked for ACS assistance again. By mid-May a number of people had signed up to garden at the new spot. The Chapel Lane space has 12 double "boxes" (each single 4' x 8') where each pair share one wall; there are also two raised beds, some composting, a large corner lot, and another area suitable for the relocated "Teaching Garden". There is a shed and plenty of sun, the lack of which was getting to be an issue on Bayliss. The recycled bottle greenhouse we built at Creative 360 in 2015 will not be making the move.

There is work to do at the new place, but the fencing and the storage are definitely additional upgrades. Since not all plots were claimed, ACS will be planting any that are "open". The Chapel Lane garden donated produce through Hidden Harvest; ACS will again work with neighborhood food pantries to accomplish similar goals.

Creative 360/Chapel Lane Garden—photo by Barbara Junga

ACS Garden-related summer programming will be curtailed this season due to all the work associated with the move, so stay tuned for updates in the newsletter and on the website. Anyone wishing to help with the garden can contact Gina Malczewski at reginamalczewski@gmail.com.

In addition, a new summer garden effort is expected to launch at Bay City Western Middle School/High School in June. As part of a project for the new Green/Science Club, land around the school building that was previously planted with flowers to attract pollinators (in partnership with Pheasants Forever (PF) will be cleared and re-seeded with PF help. ACS will assist in planting raised beds with herbs that will be dried and sold next school year. Compost piles will also be established.

A busy gardening season—with more than the usual growing going on!

Letter to the Editor – Elections by Majority?

Wendell L. Dilling, Historian, Midland Section ACS

This letter continues a discussion started in January 2022, on voting procedures used in Midland Section and national ACS elections and possible changes to those procedures (see Midland Section Board of Directors Meeting Minutes for January 3, 2022, 7:50 PM). Some candidates in recent Midland Section elections have been elected even though they did not receive a majority of the votes cast.

The "Balloting and Preferential Voting Procedures for Elections of President-Elect, District Directors, and Directors-at-Large, American Chemical Society," as developed by the Committee on Nominations and Elections, July 1, 2015, approved by Council and confirmed by the Board of Directors, effective January 1, 2016, is given at https://www.acs.org/content/dam/acsorg/about/governance/charter/procedures-balloting-and-preferential-voting.pdf.

The second paragraph of this document states: "Wherever possible, elections should result in the winning candidate (or candidates for certain elections as described below) receiving a majority of the valid votes cast."

Recent Midland Section elections have been carried out using the above-referenced procedure. The figure accompanying this article (shown at the December 12, 2022, Midland Section Board of Directors Meeting) shows the results of the Director portion of the most recent (2022) Midland Section election.

Winning candidates for Director by *the preferential voting method**
(multiple positions are to be filled for the same office)

- 2nd-preference votes of eliminated candidates are redistributed
- Directors: Dan Dermody, Steve Keinath, Angelar Muthike



	WH	DD	KJ	WD	HA	SK	AM	YH	ES
Original tally (1st-pref votes)	5	14	3	16	4	18	20	5	13
Tally after KJ is eliminated	5	15		16	5	19	20	5	13
Tally after HA is eliminated	7	16		16		19	20	6	13
Tally after YH is eliminated	8	16		16		21	20		13
Tally after WH is eliminated		17		16		22	20		14
Tally after ES is eliminated		20		16		22	25		
WD is eliminated		**Win**				**Win**	**Win**		

** https://www.acs.org/content/dam/acsorg/about/governance/charter/procedures-balloting-and-preferential-voting.pdf*

In this election, where no candidate received a majority of first preference votes, candidate KJ who received the fewest first preference votes (3) was eliminated. The second preference votes on those three ballots where the first preference was the candidate first eliminated, were added to the other first preference votes (one each to

DD, HA, and SK). This process was repeated five times until only three candidates (DD, SK, AM), the number of candidates to be elected remained.

Using this procedure, none of the three candidates elected received a majority of the votes (42). Carrying out the analysis shown in the figure by one more step would have given one winner a majority unless a tie occurred. A simple solution for electing three candidates would be to run the analysis three times.

To elect three candidates one at a time would require analyzing the vote counts as three separate instant run-off elections, which could all be run at one time without any further voting. After one candidate was declared a winner the voters who voted for that candidate would have their next preferred candidate listed as their first preference in the next election. The candidate who won that election would be deleted from the candidate list.

Thus, a method exists for carrying out an instant run-off election with any number of voters and any number of candidates for any number of positions where each successful candidate is elected by a majority and no voters are denied having their vote counted at each stage of the election.

2023 Turner J. Alfrey Visiting Professor Lecture Series, June 6

Troy Terwillegar, MSU St. Andrews

We are pleased to announce that Prof. Karen L. Wooley from Texas A&M University will be the guest lecturer for the 2023 Turner J. Alfrey Visiting Professor Lecture Series.

Date: Tuesday, June 6, 2023 Time: 9:00 AM to 5:00 PM
Location: MSU St. Andrews, 1910 West St. Andrews Road, Midland
Guest Lecturer: Prof. Karen L. Wooley

Professor Karen L. Wooley

Join us at MSU St. Andrews for a full day of lectures with Dr. Karen Wooley of Texas A&M University. Dr. Wooley and her associate, Ashlee Jahnke, will discuss topics related to work being done in the Wooley Research Group.

Karen L. Wooley holds the W.T. Doherty-Welch Chair in Chemistry and is a University Distinguished Professor at Texas A&M University. She studied at Oregon State University (B.S., 1988) and Cornell University (Ph.D., 1993). The first sixteen years of her independent academic career were spent at Washington University, in St. Louis, Missouri, and she then relocated to Texas A&M University in July 2009. In addition to her academic positions, she is the co-founder and President of Sugar Plastics, LLC, and Chief Technology Officer of Teysha Technologies, LTD.

Her research interests include the synthesis and characterization of degradable polymers derived from natural products, unique macromolecular architectures, complex polymer assemblies, and well-defined nanostructured materials. She has designed synthetic strategies to harness the rich compositional, regiochemical, and stereochemical complexity of natural products for the construction of hydrolytically-degradable polymers, which have impact toward sustainability, reduction of reliance on petrochemicals, and production of biologically-beneficial and environmentally-benign natural products upon degradation. These materials are expected to impact the global issue of plastic pollution and address challenges resulting from climate change.

Recent awards include election as a Fellow of the American Academy of Arts and Sciences (2015), National Academy of Inventors (2019), American Association for the Advancement of Science (2020), American Institute for Medical and Biological Engineering (2020), and National Academy of Sciences (2020). She was also named as the 2021 Southeastern Conference (SEC) Professor of the Year.

- Lectures will take place in person at MSU St. Andrews, in Midland.
- Networking luncheon included from 12:30 – 1:30 PM in the MSU St. Andrews Rotunda sponsored by the Midland Section of the American Chemical Society.
- Dr. Wooley and her associate, Ashlee Jahnke, will deliver five, 45-minute talks throughout the day, discussing topics related to the Wooley Research Group.
- Time will be allowed for Q&A and discussion.

Agenda and Lecture Summaries:

9:15 AM – Lecture #1 – Karen L. Wooley

An Overview and Thirty-year History of Wooley's research program – A dimensional evolution from constructing well-defined polymer architectures to assembly of nanostructured polymer materials.

10:15 AM – Lecture #2 – Karen L. Wooley

Synthetic Strategies by Which to Afford Natural Product-derived Functional Polymer Materials that Address Health-Food-Energy-Water Challenges – An emphasis on nanomaterials for environmental and biomedical applications.

11:15 AM – Morning Break

11:30 AM – Lecture #3 – Ashlee A. Jahnke

Solving the Global Plastic Crisis Through Translation of Polymer Research to Real World Solutions – Sugar Plastics, LLC and Teysha Technologies, LTD.

12:30 PM – Lunch Break

2:00 PM – Lecture #4 – Karen L. Wooley

Design of Polypeptide Materials at the Intersections of Recyclable Batteries, Electronic Materials, and Biomedical Devices.

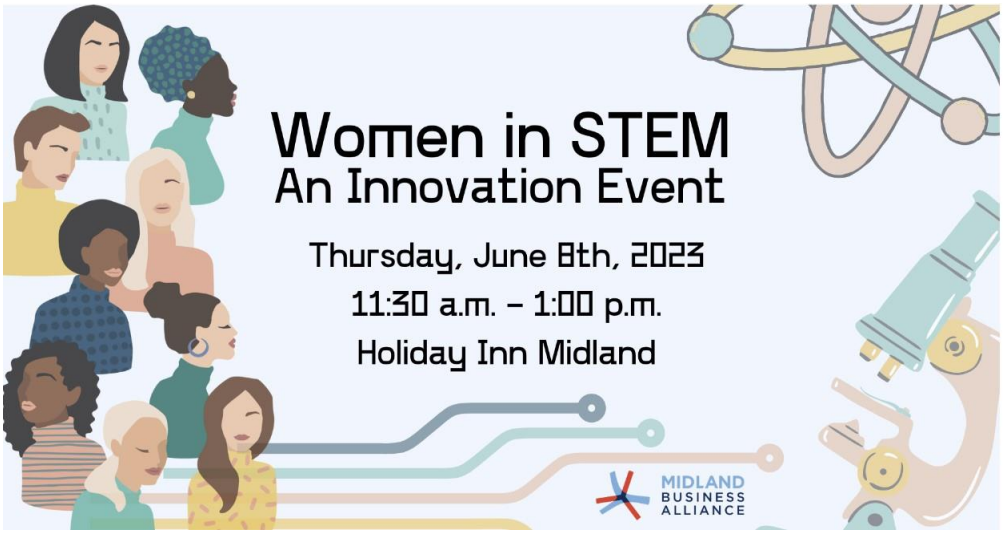
3:00 PM – Lecture #5 – Karen L. Wooley

The Future of Polymer Materials as the World Progresses Along the Energy Transition – Dynamically-reconfigurable Systems to Unconventional Sourcing of Feedstocks – A story of pivots to overcome adversities while pursuing ambitions.

This is a free event, but pre-registration is required to help plan for the networking luncheon. Please share information about this event with others that may be interested in attending. For more information, please contact Troy Terwillegar at terwil24@msu.edu.

Women in STEM: An Innovation Event, June 8

Emily Lyons, Director, Innovation & Small Business, Midland Business Alliance



Event Description:

Women in STEM: An Innovation Event will highlight a few of the local female leaders working in STEM in our community. Women make up 24% of the STEM workforce, but there is room to grow. Join us at the Holiday Inn of Midland to learn more from local female STEM workers on why a career in STEM is a growing opportunity.

Panelists:

Jessica Snyder – Michigan Operations Site Leader, DuPont
Linda Gruber – Site Leader, Hemlock Semiconductor
Sarah Eckersley – VP of R&D for II&I, Dow
Christal Taylor-Lawson – Information Technology Service Manager, Dow
Aundrea Trzaskos – Information Technology Analyst, Dow

Facilitator:

Sarah Gallo – Digital Capability Manager, Dow

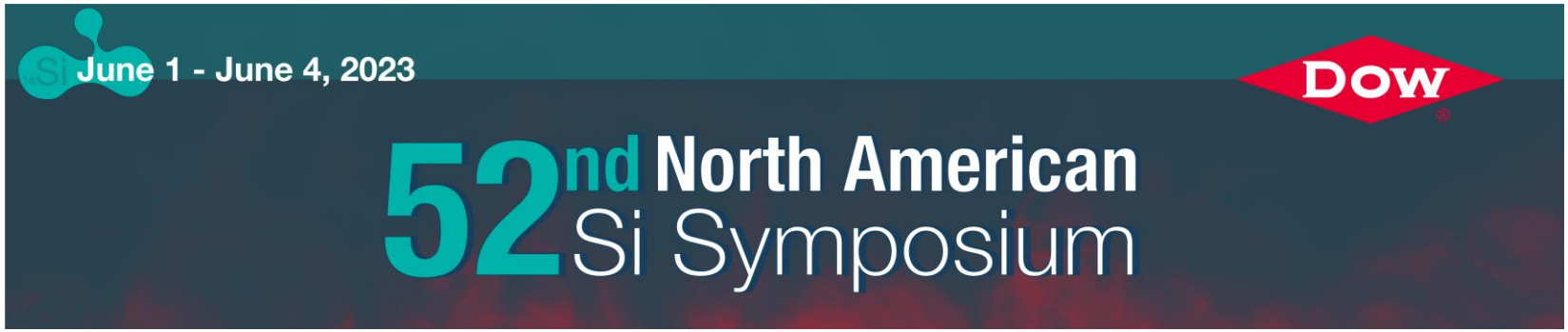
Date: Thursday, June 8, 2023
Time: 11:30 AM to 1:00 PM
Location: Holiday Inn of Midland, 810 Cinema Drive, Midland
Admission Fee: $15 per person (Lunch will be provided)

Contact Information:

Emily Lyons, Director, Innovation & Small Business, Midland Business Alliance, 300 Rodd Street, Suite 101, Midland, MI 48640. Please direct any questions to Emily at elyons@mbami.org or 989-839-9901.

52nd North American Si Symposium, June 1 – June 4

Michelle Cummings, Midland Section ACS



INVITED SPEAKERS

Take a look at our speakers scheduled for this event

Thibault Cantat
CEA, Université Paris - Saclay

Matthias Driess
Technische Universität Berlin

Annaliese Franz
University of California, Davis

Michel Gagne
University of North Carolina, Chapel Hill

Lutz Greb
Universität Heidelberg

Kenrick Lewis
Momentive Performance Materials, Inc.

Tom McCarthy
University of Massachusetts, Amherst

Yumiko Nakajima
National Institute of Advanced Industrial Science and Technology

Herbert Roesky
University of Goettingen

Lisa Rosenberg
University of Victoria

Michael Sailor
University of California, San Diego

Cheuk-Wai So
Nanyang Technological University

Christine Thomas
The Ohio State University

T. Don Tilley
University of California, Berkeley

Ryan Trovitch
Arizona State University

Hosted by Dow in Midland, Michigan

https://web.cvent.com/event/dcf0afdf-fa6f-433e-beba-c065f0d12735/summary

"Sound Science" Summer Camp, June 19 – 23

Gina Malczewski, Outreach Committee, Midland Section ACS

This year's ACS-MSU summer camp (the sixth in the "STEAM Stew" series) has a musical theme and will take place in-person at MSU St. Andrews (1910 West Saint Andrews Road, in Midland) on June 19-23. The camp targets students going into grades 6 to 8 in the fall and will be FREE. Monday through Thursday, June 19-22, activities will run from 9:00 AM to Noon, and the Friday, June 23 session will run from 9:00 AM to 4:00 PM.

We have many featured speakers, including Dr. Candice Colby-Scott on the topic of human hearing and speech; Angelo Cassar covering math and music; and Brenna Chapman, a practicing Music Therapist from Gladwin. Domingo Vasquez (Musico Lessons) will teach students to play color-coded keyboards, and micro-bit coding will be covered by Dr. Tracy Zhang (MSU) who will help participants to play and compose music on these devices. Josh Allen of INDe Drums (Kalamazoo) will show how materials and shapes affect drum sounds, and Elly Maxwell (Dow Gardens) will be speaking about insect communication (sound production and ears). Believe it or not, molecules can be represented by music and Dr. Bo Majhour (University of Michigan) will discuss how that is done, and how altering structures affect their sounds. Dr. Gina Malczewski will cover multiple topics, including art from sound, sound physics, music and food, and Beethoven and Kandinsky!

On the last day of the summer camp (Friday, June 23), we plan to have a concert with all those involved and display the artwork produced at a reception for parents, students, facilitators, and guests.

If you would like to help on any of these days, a quick background check and brief orientation are required. Please contact Gina Malczewski at reginamalczewski@gmail.com. Registration is open through June 7, or until a maximum of 25 students is reached. The registration link is at https://standrews.msu.edu/2023/02/12/acs-steam-stew-vi-middle-school-summer-camp-for-rising-6th-through-8th-graders/.

2023 ACS Central Regional Meeting

Steve Keinath, Co-Editor, The Midland Chemist

Editor's note: The material included within this article was provided in an email message, dated Friday, May 12, 2023, to members of the Central Region of the American Chemical Society.

The **2023 Central Regional Meeting (CERM)** will be hosted by the Detroit Local Section of the America Chemistry Society **June 20, 2023 - June 23, 2023**, and will focus on the chemistry being pursued within the region. The meeting theme is *Sustainability, the Great Lakes, and Chemistry for the Future.* In addition to symposia and poster sessions concerning organic chemistry, inorganic chemistry, analytical chemistry, physical chemistry, biochemistry, and chemical education, we hope to have sessions relating to advances in battery chemistry and electric automobiles, cannabis chemistry, hydrogen fuel cells, chemical safety, and a circular economy. A career fair and several social events will also be part of the programming.

Meet the CERM 2023 Plenary Speakers

BASF's sustainability journey – the challenges that they are turning into opportunities with their customers and how they are engaging employees to tell their stories

Jason McAlpine

Development of Advanced Olefin Polymerization Catalysts for the Production of Polyolefins with a Lower Energy Footprint

Jerzy Klosin

f-block Elements and the Environment: A Blessing and a Curse

Timothy Dittrich

Registration for CERM 2023 is available by clicking on Register Now.

CERM 2023 WCC Luncheon: Skills Beyond the Bench, June 21

Carmen Folk, 2023 CERM Communications Committee, Detroit Section ACS

2023 SKILLS BEYOND THE BENCH

OWNING YOUR SEAT AT THE BENCH:
A CONVERSATION ABOUT IMPOSTOR SYNDROME

CERM 2023 | June 21 @ 12-1:30 at the Henry Hotel

ACS Chemistry for Life®
AMERICAN CHEMICAL SOCIETY

Women CHEMISTS Committee

NOBCChE®

WITH INVITED SPEAKERS:

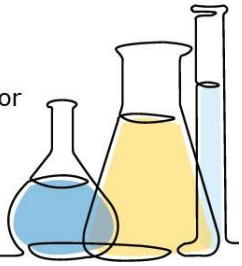
Alecia M. Gabriel, Ph.D.
Co-Founder, Director of Curriculum Development at The Lab Drawer®
Co-Executive Director at Motor City STEAM Foundation

Dr. Patricia Coleman Burns
Assistant Professor Emerita at the University of Michigan

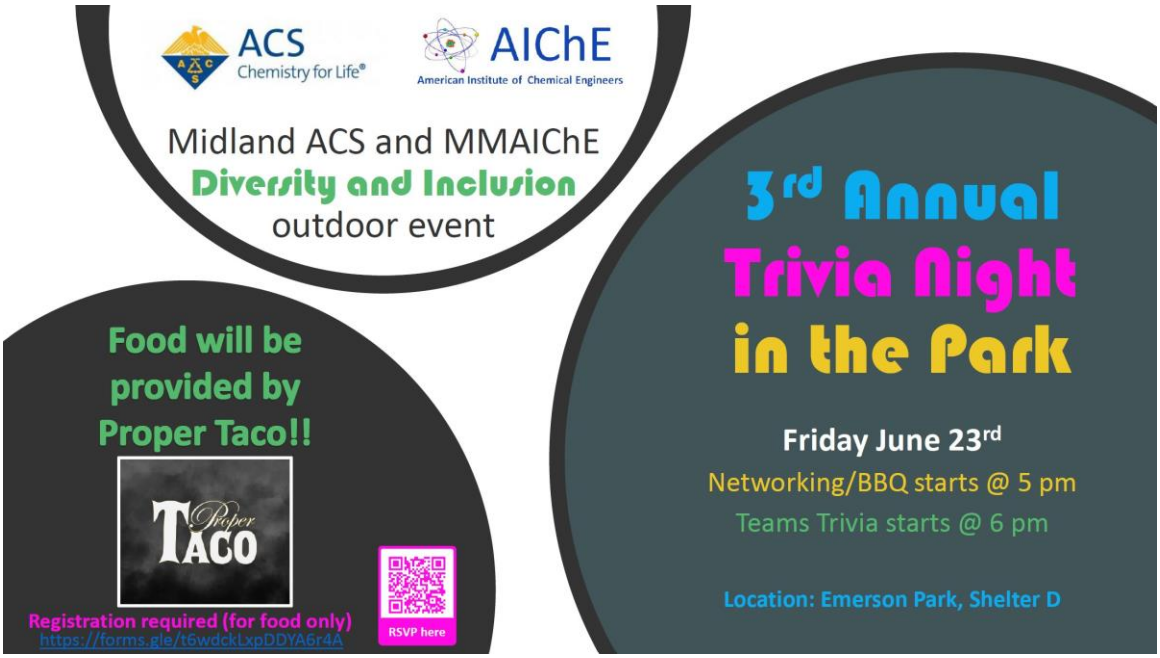
Registration for this luncheon is
$20 for students and $45 for professionals
and includes lunch, presentations, a panel, and networking.

Register for CERM and this workshop using the QR code or **tinyurl.com/cerm23**.

SPONSORS:
Detroit ACS | Midland ACS | Huron Valley ACS
Midland NOBCCHE | Regional NOBCChE



3rd Annual Trivia Night in the Park Event, June 23
Kim Dinh, Diversity & Inclusion Committee, Midland Section ACS



Please join us for an evening of networking, food, drinks, and trivia! Bring a team (5-6 people) or make one on the spot. BBQ and networking begin at 5:00 PM. Trivia begins at 6:00 PM. Location: Emerson Park, Shelter D, Midland.

Admission is free, but please RSVP so that we will know how much food to prepare. You can respond to this event at https://forms.gle/t6wdckLxpDDYA6r4A. For more information or any questions, please contact Kim Dinh at diversity@midlandacs.org.

National Graduate Research Polymer Conference 2023, June 29 – July 1
UofM Macromolecular Science and Engineering Program

The National Graduate Research Polymer Conference (NGRPC) is one of the largest student-run polymer research conferences in the country. This conference series was established in 1994 by the American Chemical Society's Division of Polymer Chemistry (ACS-POLY) to provide polymer science & engineering graduate students the opportunity to present their work, network, and interact with polymer scientists in industry, academia, and government.

National Graduate Research Polymer Conference 2023
June 29 through July 1, 2023
Michigan Union, University of Michigan, Ann Arbor

NGRPC 2023 will be hosted by the Macromolecular Science and Engineering Program at the University of Michigan. Click here to meet our organizing committee members.

Water Quality Weekend Adventure at Beaver Island, August 4 – 6

Dale LeCaptain, Councilor, Midland Section ACS

ACS Midland

Water Quality Weekend Adventure Beaver Island, Michigan

Water Chemistry in the Great Lakes Region

The ACS Midland Local Section H2O Q Outreach Committee invites YOU to explore freshwater chemistry testing and H2O Q volunteer training! Aug. 4-6, 2023

→Network with ACS colleagues

→Train to be a H2O Q classroom volunteer

→Learn about freshwater testing se.cmich.edu/H2OQ

Friday, Aug 4

- Travel to Charlevoix$$ Michigan for departure via car ferry$$ or flight$$
- Dinner, evening meet & greet at CMUBS lodge

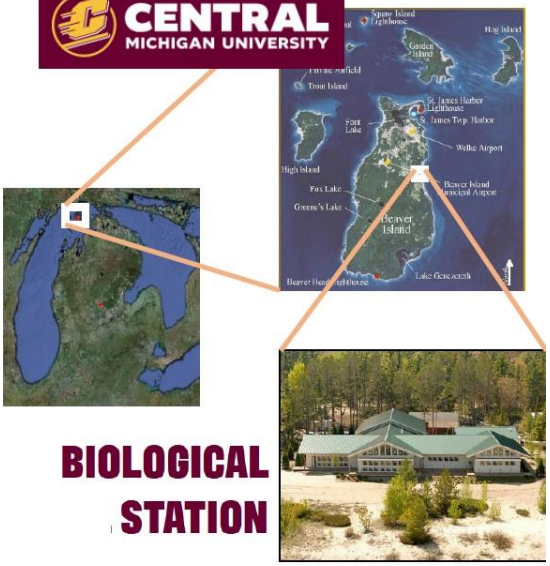
Saturday, Aug 5

- Morning South Beaver Island Excursion – 3 lakes, 1 marsh, 2 bays, a creek, AND the light house!
- Afternoon North Island Visit to St. James – Harbor, Stores, Whiskey Point Brewing, and an early dinner$$ in town
- Evening adventure - the stories, wildlife, and adventures of Barney's Lake, Protar's House, & a sunset view from Mount Pisgah

Sunday, Aug 6

- H2O Q the program, the experiments, and volunteering in the outdoor classroom
- Head back home OR stay for a round of golf$$

CENTRAL MICHIGAN UNIVERSITY



BIOLOGICAL STATION

- Lodging & Meals - $100/person campground cabin OR $150/person lakefront cottage
  $50/child ages 2-12 are welcome but may be limited for some activities
- Transportation to Charlevoix and onto Beaver Island – at own expense, check out www.bibco.com; www.freshairaviation.net; or islandairways.com
- Ground transportation on Beaver Island - included as scheduled

$$ indicates at "own expense"

Early registration ends May 22 and will continue until July 15 as space permits.
e-mail Dale.lecaptain@cmich.edu to sign-up and for details

This excursion is brought to you by the H2O Q team of volunteers, the ACS-Midland Local Section, and CMUBS which is a working research/classroom facility allowing this mission aligned volunteering in water quality chemistry outreach. This is not our day job and all scheduled events are subject to weather, time, ambition, and resources. Thank you in advance for understanding and considering to volunteer!

19th Annual MSU ChEMS Department Research Forum, August 25

MSU ChEMS Department, East Lansing

The Department of Chemical Engineering and Materials Science (ChEMS) at Michigan State University invites you to join us at the 19th annual ChEMS Department Research Forum on Friday, August 25, 2023. The forum is a full-day event, running from 8:30 AM to 5:30 PM, and will be held at the Spartan Stadium Tower, 325 West Shaw Lane, East Lansing, on the campus of MSU.

The 19th annual ChEMS Research Forum will showcase department research advances in the areas of:

- Energy and Sustainability
- Nanotechnology and Materials
- Biotechnology and Biomedical Engineering

The one-day program will feature invited plenary speakers, oral presentations from faculty and students, and an extended poster session describing the latest department research results. While the oral presentations of the program can be joined remotely via Zoom, all poster presentations are in-person only.

If you or your company shares an interest in chemical engineering and materials science, then this event offers a uniquely personal and informal view into the general research directions of the ChEMS department, its current research projects, and, most importantly, an opportunity to get to know the many talented graduate students that are at the heart of it all. Parking next to the Spartan Stadium is free and we hope to welcome you to MSU on August 25!

Keynote Speakers:

- **David Hickey** – Chemical Engineering & Materials Science, Michigan State University
- **Monica Olvera de la Cruz** – Materials Science & Engineering, Northwestern University
- **Daniel Woldring** – Chemical Engineering & Materials Science, Michigan State University

Keynote Topics:

- **There's still room at the bottom: Molecular engineering in battery design and lignin valorization**

  Despite more than 60 years since Richard Feynman's 1959 lecture, titled "There's Plenty of Room at the Bottom," and numerous advances in the fields of nanotechnology and molecular engineering,

there remain substantial opportunities to utilize a wholistic understanding of chemical systems for designing chemicals and materials on the molecular scale to influence a macroscale property. One such opportunity is related to the dramatic increase in applications and developments of electrochemical approaches to address global challenges, ranging from grid-scale energy storage and desalination to commercial production of commodity chemicals and environmentally friendly pharmaceutical synthesis. The success of many such promising technologies depends on an ability to control electron flow near the interface between a liquid solution and electrode surface. This is accomplished by utilizing small electrochemically active molecules that can act as either "electron shuttles" for electrocatalysis, or as "energy reservoirs" for energy storage applications depending on their reactivity in the electrochemically activated state. Despite their ubiquity in emerging green energy technologies, critical relationships between structure and properties of electrochemically active small molecules remain poorly understood. Consequently, discovery/implementation of new redox molecules has been slowed by a reliance on the top-down (or "guess and check") approach.

The Hickey Group utilizes molecular engineering principles to identify, synthesize, and tune electroactive small molecules and polymer materials for a variety of applications related to energy storage, catalysis, and biosensing. I will describe our recent efforts to design redox active molecules for two disparate areas of research: grid-scale energy storage and electrochemically recyclable biomimetic coenzymes. By studying electrochemical mechanisms and understanding molecular interactions at electrode interfaces, we aim to elucidate universal molecular design principles that can be applied across a wide range of cross-cutting research topics.

- **Structure and function of nanocontainers**

  Various heterogeneous molecules co-assemble into nanocontainers that mimic bacterial microcompartments, which sequester toxins in bacteria to be able to survive in harsh environments. We describe their assembly by modifying interactions among the different components to design and assemble specific mesoscale organizations that imitate biological nanostructures and functions. Regarding functions that mimic bacterial microcompartments, we describe chemotaxis in microcompartments of different sizes and compositions including hydrodynamic interactions.

- **Antibody engineering against carbohydrate antigens using virus-like particle conjugate immunization and high throughput selection**

  This talk will discuss a new method of evolving monoclonal antibody (mAb) binding affinity to solve the notorious challenge of developing therapeutic mAbs against tumor-associated carbohydrate antigens (TACAs). We apply our directed evolution method to develop lead candidate mAbs against TACAs selective to multiple cancers (e.g., pancreatic, ovarian, breast) with strong interactive forces (dissociation constant, KD < 10 nM), making these engineered mAbs ideal for biomarker discovery and molecular imaging.

Pre-registration for the forum is requested. Please register for the event at 2023 ChEMS Research Forum. For more information, call the MSU ChEMS Department at 517-355-5135, or send an inquiry by email to chems@egr.msu.edu.

2023 Joint Midwest–Great Lakes Regional Meeting

Steve Keinath, Co-Editor, The Midland Chemist

Editor's note: The material included within this article was provided, in part, in an email message, dated Wednesday, May 24, 2023, to members of the American Chemical Society.

Abstracts are now being accepted for the **2023 Joint Midwest–Great Lakes Regional Meeting of the American Chemical Society (MWGLRM)**. The MWGLRM will be held from Wednesday to Saturday, October 18-21, 2023, in St. Louis, Missouri. Co-hosts for this meeting are the St. Louis and East Central Illinois Sections of the ACS. The venue will be the St. Charles Convention Center in St. Louis.

The theme for the meeting is "**Scale Up Your STEM**," and will feature plenary speakers, exciting technical sessions and special symposia, poster sessions, regional awards, social events, and a large vendor expo. In addition, there will be special undergraduate programming, chemistry education workshops for high school teachers, and events sponsored by the local Younger Chemists Committees and the Minority Affairs Committees. It is a great opportunity for undergraduate and graduate students to present their research and get to know the Midwest and Great Lakes chemistry communities.

Please visit the MWGLRM website to find a list of the programming divisions and planned symposia open for abstract submissions. **The deadline to submit an abstract is Monday, July 17, 2023.**

Midland Section ACS Scholarship Fund Update and Encouragement to Give in 2023

Gina Malczewski, Director and Scholarship Committee, Midland Section ACS

In May of 2021, Dr. Wendell and Marcia Dilling issued a challenge relative to growing the Midland Section ACS Scholarship Fund. At that time, they committed $18,000 of matching money to grow the fund to $100,000 by matching dollar for dollar all contributions made to the fund until it reached the target goal.

Dr. Wendell and Marcia Dilling

To date, there have been six contributions amounting to $1,980.76, and recently Wendell and Marcia honored their matching donation commitment by submitting a check in the amount of $2,000 to the Midland Area Community Foundation, the entity that holds and manages the Midland Section ACS Scholarship Fund.

Wendell and Marcia have recommitted to their original pledge and will continue to provide matching money until their contribution reaches $18,000, or perhaps a little more upon future reflection. The long-rang goal remains the same, to increase the Midland Section ACS Scholarship Fund principal balance to $100,000 to enable offering additional and perhaps larger year-by-year scholarships to well-deserving students across the greater Midland Section ACS region.

Although the current balance in the scholarship fund is a little less than where it stood when Wendell and Marcia issued their matching gift challenge ($60,458.49 as of mid-September 2022), the investment strategies practiced by the Midland Area Community Foundation remain sound. Since May of 2021, the fund balance has decreased a mere 6.9%, pretty remarkable when considering what many of us have been seeing with the value of our own personal retirement accounts.

Continuing to invest now, when the stock market is in a bear market, means that proportionally lower cost shares of stock can be purchased now that will ultimately produce greater yields when the stock market turns around once again.

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The Midland Section ACS has been proud to offer scholarships to deserving undergraduate students majoring in a chemical science since 2002. Annually, two to four scholarships are awarded to candidates who have graduated from a high school in one of the Section's five counties (Bay, Midland, Saginaw, Isabella, and Gratiot), are studying at a Michigan university, and are ideally intending to pursue a career in some aspect of chemistry or chemical engineering. Selections are made by a committee and are based on academics, service and extracurricular contributions, and an essay on the student's sources of motivation as well as future plans. Past scholarship recipients are often highlighted in issues of the *Midland Chemist*.

Awards usually range from $1,000-2,000, depending on the financial performance of the Midland ACS Scholarship Fund (#399) administered through the Midland Area Community Foundation. A long-standing goal of the Midland Section ACS has been to raise the base amount to $100,000 to serve more students.

Wendell and Marcia Dilling, both chemists and long-time supporters of the Midland Section ACS, are prepared to continue to help us reach that goal by donating up to $18,000 as part of a challenge grant to the scholarship

fund. **They will match 1:1 any new contributions to the fund at the Midland Area Community Foundation over the next couple years**.

Please consider contributing to this worthwhile cause. **Your donations will help shape the future of chemistry!** If you have any questions about contributing to the Midland Section ACS Scholarship Fund, please call the Midland Area Community Foundation at 989-839-9661. Thank you.

An online donation form can be found through the following link:

Midland Section American Chemical Society Endowed Scholarship Fund #399

Upcoming Dates, Events, and Other Updates

- June 1-4, 2023 – 52nd North American Si Symposium, to be held at The H Hotel, in Midland. For symposium details and to register, see: PROGRAM - 52nd North American Silicon Symposium (cvent.com). For general questions, please email 52siliconsympos@dow.com.
- June 5 (7:00 – 8:00 PM) – Hybrid Midland Section ACS Board meeting, MSU St. Andrews, Midland (in person), and via a WebEx conference call connection at Webex Board Meeting - June 2022, Meeting number: 126 651 0648, or by phone at Phone number: 415-655-0001, Access code: 126 651 0648.
- June 6 (9:00 AM to 5:00 PM) – 2023 Turner J. Alfrey Visiting Professor Lecture Series program, featuring Prof. Karen Wooley from Texas A&M University, MSU St. Andrews, 1910 West St. Andrews Road, Midland. For more information, please see the accompanying article on pages 7 and 8. This event is free, but pre-registration is required to help plan for the networking luncheon. To pre-register, please click on 2023 Turner J. Alfrey Visiting Professor Lecture Series. For additional information or any questions, please contact Troy Terwillegar at terwil24@msu.edu.
- June 8 (11:30 AM – 1:00 PM) – Women in STEM: An Innovation Event, Holiday Inn of Midland, $15 per person (lunch will be provided). Contact Emily Lyons, Director, Innovation & Small Business, Midland Business Alliance, for any questions at elyons@mbami.org or 989-839-9901.
- June 19-23 (9:00 AM – Noon, Monday to Thursday, and 9:00 AM to 4:00 PM, Friday) – "Sound Science" Summer Camp for students going into grades 6 to 8 in the fall, MSU St. Andrews, in Midland. Free event, but registration is required by clicking on https://standrews.msu.edu/2023/02/12/acs-steam-stew-vi-middle-school-summer-camp-for-rising-6th-through-8th-graders/. For more information or any questions, please contact Gina Malczewski at reginamalczewski@gmail.com.
- June 20-23, 2023 – ACS 2023 Central Regional Meeting, Dearborn, MI, hosted by the Detroit Section ACS. Meeting theme: *Sustainability, the Great Lakes, and Chemistry for the Future*. For more information, please see Home | CERM 2023 (acscerm2023.org).
- June 21 (12:00 – 1:30 PM) – CERM 2023 WCC Luncheon event, Skills Beyond the Bench program, *Owning Your Seat at the Bench: A Conversation About Imposter Syndrome*, Henry Hotel, Dearborn, $20 for students and $45 for professionals, sponsored by Detroit ACS, Midland ACS, Huron Valley ACS, Midland NOBCChE, and Regional NOBCChE.
- June 23 (5:00 PM to ??) – 3rd Annual Trivia Night in the Park event, Emerson Park, Shelter D, in Midland. 5:00 PM – BBQ and networking begins, 6:00 PM – Teams Trivia event starts. Admission to this event is free, but an RSVP is required to help plan for how much food to prepare. Please click on https://forms.gle/t6wdckLxpDDYA6r4A. For more information or any questions, please contact Kim Dinh at diversity@midlandacs.org.

- June 29 – July 1, 2023 – National Graduate Research Polymer Conference 2023, hosted by the Macromolecular Science and Engineering Program at the University of Michigan. For more information, please see the accompanying article on page 14.

- July 17 – **Deadline to submit an abstract for the 2023 Joint Midwest–Great Lakes Regional Meeting**, October 18-21, in St. Louis, Missouri. Meeting theme: *Scale Up Your STEM*. Visit the MWGLRM website for more information.

- August 4-6, 2023 – Water Quality Weekend Adventure at Beaver Island. Early registration ends on May 22, but will continue until July 15 as space permits. For more information and the tentative day-to-day program schedule, please see the accompanying article on page 15. Send an email message Dale LeCaptain at dale.lecaptain@cmich.edu for more details and to sign up.
- August 7 (7:00 – 8:00 PM) – Hybrid Midland Section ACS Board meeting, MSU St. Andrews, Midland (in person), and via a WebEx conference call connection at Webex Board Meeting - August 2022, Meeting number: 126 651 0648, or by phone at Phone number: 415-655-0001, Access code: 126 651 0648.
- August 13-17, 2023 – ACS Fall 2023 National Meeting & Exposition, San Francisco, CA. This meeting is being planned as an in-person and virtual hybrid meeting. Meeting theme: *Harnessing the Power of Data*. For more information, please see ACS Meetings & Expositions - American Chemical Society.
- August 25 (8:30 AM – 5:30 PM) – 19th Annual MSU ChEMS Department Research Forum, Spartan Stadium Tower, 325 West Shaw Lane, East Lansing. Pre-registration for the forum is requested. Please register for the event at 2023 ChEMS Research Forum. For more information, call the MSU ChEMS Department at 517-355-5135, or send an inquiry by email to chems@egr.msu.edu.

- September 11 (7:00 – 8:00 PM) – Hybrid Midland Section ACS Board meeting, MSU St. Andrews, Midland (in person), and via a WebEx conference call connection at Webex Board Meeting - September 2022, Meeting number: 126 651 0648, or by phone at Phone number: 415-655-0001, Access code: 126 651 0648. **Please note: This Board meeting is being held on the second Monday of September, not the usual first Monday of most months due to the Labor Day holiday.**
- September 30 (10:00 AM – 3:00 PM) – *ACS Sustainability Event: How Can You Make a Difference?* Panel discussion at Delta College Midland Campus, 10:00 to 11:30 AM; pizza lunch, 11:30 AM to 12:30 PM; and volunteering opportunity at Midland Recycling Center, 1:00 to 3:00 PM. For more information, please contact Erin Vogel at EVogel@dow.com.

- October 2 (7:00 – 8:00 PM) – Hybrid Midland Section ACS Board meeting, MSU St. Andrews, Midland (in person), and via a WebEx conference call connection at Webex Board Meeting - October 2022, Meeting number: 126 651 0648, or by phone at Phone number: 415-655-0001, Access code: 126 651 0648.
- October 18-21 (Save the Date) – 2023 Joint Midwest–Great Lakes Regional Meeting, St. Louis, Missouri. Meeting theme: *Scale Up Your STEM*. Visit the MWGLRM website for more information. **The deadline to submit an abstract is July 17, 2023.**

- November 3 or 10 (Tentative – Save the Date) – 2023 Midland Section ACS Fall Scientific Meeting, all day, at Central Michigan University. For more information, please contact Dale LeCaptain, General Chair, at dale.lecaptain@cmich.edu.
- November 6 (7:00 – 8:00 PM) – Hybrid Midland Section ACS Board meeting, MSU St. Andrews, Midland (in person), and via a WebEx conference call connection at Webex Board Meeting - November 2022, Meeting number: 126 651 0648, or by phone at Phone number: 415-655-0001, Access code: 126 651 0648.

- December 4 (7:00 – 8:00 PM) – Hybrid Midland Section ACS Board meeting, MSU St. Andrews, Midland (in person), and via a WebEx conference call connection at Webex Board Meeting - December 2022, Meeting number: 126 651 0648, or by phone at Phone number: 415-655-0001, Access code: 126 651 0648.

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