

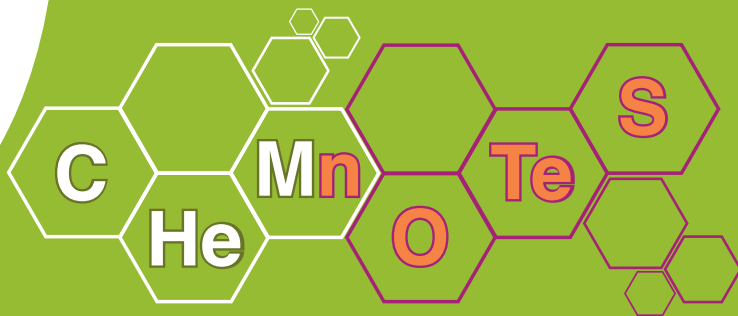


Michigan Tech

DEPARTMENT OF CHEMISTRY

2018 NEWSLETTER

mtu.edu/chemistry



From the Chair



John Jaszczak, Chair

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This past summer has been quite a season of change in the Copper Country. Some significant changes took place in the physical landscape due to flash flooding in June, presenting not only dangers, but an opportunity for

the community to come together in amazing ways to help each other and to rebuild. There have also been many changes in leadership at Michigan Tech this summer. On July 1, the University welcomed its new president, Dr. Richard J. Koubek, as well as four new deans, including Dr. David Hemmer, dean of the College of Sciences and Arts. And within our college, there are new department chairs serving in interim roles in the Department of Computer Science, Department of Kinesiology and Integrative Physiology, and the Department of Chemistry.

I very much appreciate the warm welcome by the chemistry department to serve as interim chair this year. I also thank the department's former chair, Dr. Cary Chabalowski, for his work the last five years, and for helping me transition to the chemistry department from physics, where I have served on the faculty since 1991. Although I'm formally trained as a physicist, I have a love of chemistry going back to my childhood, during which my love of minerals and mineral collecting inspired me to want to be a scientist. I majored in chemistry during my first two years in college before switching to physics. My research interests include the study of electron transport in nanometer devices, mineralogy and crystallography (especially related to graphite), and nanotechnology education.

It has been a great experience meeting the students, staff, and faculty in the department over the summer. It is inspiring to hear everyone speak

with excitement about their laboratories, research programs, teaching ideas and opportunities, and departmental support. I hope that many of you reading this newsletter may be able visit campus and see for yourselves, for example, the newly renovated first-year teaching laboratories. Through the hard work of our staff, including Lorri Reilly, Aparna Pandey, and Dean Seppala, the vision of Dr. Chabalowski, and the support of the University administration and the Board of Trustees, these state-of-the-art laboratories are simply magnificent. We are also grateful to the efforts of Jacob Guter and Jim Rathbun with Michigan Tech's Facilities Management team, and to the design firm, Harley Ellis Devereaux, based in Chicago. The job is only half done, however, as there are several more teaching laboratories that also need major renovations.

We also celebrate the promotion of Dr. Loredana Valenzano-Slough from assistant professor without tenure to associate professor with tenure. Dr. Valenzano-Slough specializes in quantum-chemical computational studies of structures and properties of a wide variety of molecules and materials. Congratulations!

As part of my introduction to the department, I have also come to learn how critically important the financial support of our alumni and friends are to the vitality and progress of the department. In addition to laboratory renovations, we have a variety of opportunities that could be supported, such as our outstanding chemistry Summer Youth Program (SYP) for middle- and high-school students, Summer Undergraduate Research Fellowships, graduate student research and conference travel, and minor and major instrumentation support.

Thank you for your support and gifts, and for being agents of positive change!

—John Jaszczak

Returning to Tech, This Time as Chemistry Learning Center (CLC) Director and Academic Advisor



Jeremy Brown
Chemistry Learning Center (CLC)
and Academic Advisor

My love for both chemistry and Michigan Tech extend back into my pre-college years. I had a wonderful high school chemistry teacher in Lansing who really brought chemistry to life; I anticipated class every day with great delight! Because of the teacher's passion (and my general love for math and science), I excelled.

I never believed in having an idle summer, so when I learned of Michigan Tech's Sumer Youth Program, I jumped at the opportunity and attended SYP's Honors

Orchestra Program. I immediately fell in love with the glorious Keweenaw and campus. I chose Tech for my studies, majoring in mathematical sciences. Somehow, though, I continued to find opportunities in the chemistry department. Some of my most treasured memories of Michigan Tech involve these educational opportunities. Indeed, this is where I had an epiphany, "Maybe working in education is what I really want to do?" Not wanting to change course drastically, however, I pressed on and finished my BS in mathematical sciences.

After graduation, I took a somewhat random detour and went into restaurant management. Serendipitously, the Noyce Scholarship was created during this season of uncertainty in my

life; the grant gave working college grads a chance to become secondary teachers. I jumped at the chance and returned to Michigan Tech to start my teacher certification coursework. Two years later, I was certified to teach chemistry and mathematics in Michigan.

I relocated to the Marquette area and enjoyed some wonderful temporary STEM education opportunities with Northern Michigan University and several secondary schools in Marquette County, before I landed a teaching position at Baraga High School—a position I held for two years. It was an absolutely wonderful experience. However, when I learned that my mentor (Lois Blau) had retired, I mused at the prospect of returning to Michigan Tech. It didn't take long for me to decide to apply for the position. The rest is history.

Working in education ignites a passion within me. Being blessed with such great STEM teachers and mentors growing up, I understand what it feels like to be believed in and for someone to take great delight in seeing you grow and succeed. Serving in this role allows me to play just a small role in impacting the next generation of scholars treading the same path I once trod. I am delighted to be able to serve in this role.

As far as management of the CLC, there's such a great foundation here that has been laid during the past 30-something years; there are no epic changes on the horizon. The CLC will remain focused on creating an environment where Tech's diverse learners can get the support and assistance they need to succeed in their chemistry courses. We do hope to diversify access to our services and examine ways that we can integrate technology into our operations. The possibilities are endless!

New Faculty—For Christo Christov, Chemistry is a Lifelong Pursuit



Christo Christov's interest in chemistry began at age 11 when he received his first chemistry set called "Young Chemist" as a Christmas gift. Christo set up a small chemistry lab in the attic of his home in Sevlievo, in northern Bulgaria. Since then, Christo has been interested in chemistry and its applications in life sciences.

Christov earned both a Bachelor of Science and Master's of Science in

Biochemistry at the University of Sofia, followed by a PhD in theoretical chemistry at the Bulgarian Academy of Sciences and RWTH-Aachen in Germany. His doctoral studies focused on protein circular dichroism theory.

During postdoctoral studies in the United Kingdom (UK) and Spain, Christo focused on enzyme reaction mechanisms and protein dynamics using quantum mechanics (QM), combined

quantum mechanics and molecular mechanics methods (QM/MM), and molecular dynamics (MD).

Christov was awarded a Marie Curie International Outgoing Fellowship for Career Development and a Fulbright grant to investigate iron-containing enzymes combining state-of-the-art theoretical methods (QM, QM/MM, and MD) with advanced spectroscopic methods (LT-MCD, VTVH-MCD) at Stanford University.

Christov then worked as an associate professor at Northumbria University in Newcastle, UK, where he developed an independent research program on computational studies of enzyme reaction mechanisms and dynamics.

Since his arrival at Michigan Tech in August 2017, Christo's research has focused on understanding the reactivity and mechanisms of non-heme iron and 2-oxoglutarate-dependent histone demethylases, which play a vital role in epigenetic regulation and are validated targets for drug design using QM/MM, QM, and MD methods. Furthermore, his research aims to implement this knowledge in the design of both transition state analogs (as potential drug candidates) and mechanism-based silico design of enzymes with desired properties.

Purnima Bandyopadhyay

Purnima Bandyopadhyay has studied disease-causing microbes since she was a graduate student at the University of Calcutta in India. During her doctoral research, she worked on the protozoan parasite *Leishmania*. This parasite causes Leishmaniasis, a disease that affects people in more than 90 countries in the tropics, subtropics, and southern Europe (according to the Centers for Disease Control). There are two forms of the

disease: one causes skin sores and the other damages internal organs, usually spleen, liver, and bone marrow. Bandyopadhyay discovered important cellular markers that indicate when these parasites are most prone to infect humans.

Bandyopadhyay received her postdoctoral training at Albert Einstein College of Medicine, New York, where she subsequently served as a faculty member. There, her research was focused on pneumonia-causing, water-dwelling bacteria *Legionella*. Her paradigm-shifting work showed that the bacteria used a free-living amoeba to sharpen their ability to infect humans. Two of her research articles were selected as papers of significance: One was selected by the American Society for Microbiology (ASM) as "one of the six best papers of the month" out of 12 ASM journals, and the other was selected as "an article of significant interest" by the editors of *Infection and Immunity*, one of the top journals published by ASM. Such acknowledgements by her peers highlight the importance of her findings.

In the Department of Chemistry at Michigan Tech, she works in the Laboratory of Mechanistic Glycobiology as a research assistant professor. Her expertise in microbiology, molecular biology, and cell biology has been instrumental for the success of several research projects in the lab. She has cloned and expressed a cancer-associated protein that, in turn, helped secure funding from the National Science Foundation (NSF). Currently, she has been expressing different mutants of that protein in order to fulfill the goals proposed in the funded NSF grant. Besides working as a researcher, she also taught a perspective course at Michigan Tech. Bandyopadhyay mentored several undergraduate researchers from Barnard College of Columbia University in New York and an undergraduate from Michigan Tech. She also trains graduate students in her current lab.

Tatyana Karabancheva-Christova

Tatyana Karabancheva-Christova joined the Department of Chemistry as a research associate professor in October 2017. Her research expertise is in computational chemistry, which focuses on understanding the reaction mechanisms of metal-containing enzymes involved in DNA damage repair, neurodegenerative diseases, and cancer.

According to Karabancheva-Christova, "The goal of my research is to contribute to the

integration of theoretical and computational chemistry along with collaborative experimental efforts for improving human health and quality of life."

Her research involves the application of multi-scale molecular modeling methods such as quantum mechanics, molecular dynamics, and combined quantum mechanics and molecular mechanics methods to explore reaction mechanisms, conformational dynamics, and ligand binding in enzymes.

Dr. Karabancheva-Christova earned her BS in Biology and Chemistry from the University of Sofia, Bulgaria in 2005, and her PhD in Computational Chemistry from Bristol University in the UK in 2011. She was a research fellow at the Autonomous University of Barcelona in the Institute of Neurosciences and Biostatistics, and held a Marie Curie International Career Development Fellowship from 2010 to 2013 at Stanford University. Before coming to Michigan Tech, she attained associate professor rank at Northumbria University in Newcastle, UK. While at Northumbria University, she taught classes in computational chemistry, biochemistry, cheminformatics, molecular structure and reactivity, and medicinal chemistry.

Since coming to Michigan Tech, she has already authored or collaborated in the publication of seven peer-reviewed journal articles including *Scientific Reports*, *Journal of Physical Chemistry B*, *ChemComm*, *AminoAcids*, and *Advances in Protein Chemistry and Structural Biology*—and six research grant applications. She has acted as co-editor of several books, such as *Advances in Protein Chemistry and Structural Biology*, and as co-editor of topical collections in the *International Journal of Molecular Sciences*.



Momoko Tajiri

Momoko Tajiri's research focus include gene sequencing to understand protein functions in malaria parasites. Tajiri graduated with a Bachelor of Science in Natural Sciences (with a radiation physics focus) from the University of Tsukuba in Japan. She earned her Master's in Health Physics from Georgia Institute of Technology and a PhD in Chemical Biology from Pennsylvania State University. Since 2011, Tajiri's

focus at Michigan Tech has been coaching graduate students on their research projects, investigating how specific mutations found in pediatric brain cancer patients lead to oncogenesis, and preparing molecules for cancer drug delivery using peptide conjugated gold nanoparticles. She is now shifting gears into a heavier research agenda.

Tajiri's current research aims to find the protozoan-specific drug targets by investigating roles of Alba super-family proteins in gene regulation for the human malaria parasite *P. falciparum*.

Alba super-family proteins are known to interact with DNA/RNA and to play critical roles in archaeal gene regulation, thus highly likely to have important functions in *P. falciparum*.

A 2016 World Health Organization study estimated more than three billion people are currently at risk of contracting malaria. Although a wide variety of medications are available to treat malaria, a parasite that transmits the disease has started to exhibit resistance to many commonly used therapeutics, necessitating a push for new investigations to identify novel drug targets.

One limitation of traditional DNA sequencing is that it only has a capacity to achieve an assessment of a small fraction of the candidate pool considering available time and cost for the assay. To overcome the limitations of traditional DNA sequencing, Tajiri is using high-throughput sequencing technologies (HTS), Sequence by Synthesis and Nano-pore sequencing, to acquire millions of biomolecule sequences to represent a selected population. All the procedures used in her project can be conducted on Michigan Tech's campus, including protein preparation, in vitro selection techniques, two types of HTS, and bioinformatics data analysis.

Tajiri says that future research will provide a comprehensive picture of gene regulation mechanisms and will also lead to the identification of potential malaria treatment and diagnostic targets.

Research News

Green Connects Climate Change from Local to Global, Gives Distinguished Lecture



Sarah Green

Sarah Green, a professor in both the Department of Chemistry and the Great Lakes Research Center at Michigan Tech, presented the distinguished lecture, "Expanding Spheres: Atoms to Earth, Local to Global, Science to Society," during a February 15, 2018, Michigan Tech Research Forum event. Mike Abbott, director of the Great Lakes Research Center operations, nominated Green for the distinguished lecturer role.

Green joined Michigan Tech's Department of Chemistry in 1994, serving as department chair from 2004 to 2013. She spent the next year at the US State Department as a Jefferson Science Fellow in the Bureau of East Asia-Pacific Affairs. She currently serves as co-chair for the Scientific Advisory Panel on the Sixth Global Environmental Outlook (GEO-6), United Nations Environment Programme.

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New University Chemical Stores



The new University Chemical Stores began operation on July 1, 2018, and now reports to the Office of Compliance, Integrity, and Safety. With the commissioning of the new facility, all chemicals and reagents for research and teaching are now purchased by and delivered to the University Chemical Stores.

Expanding the existing Chemical Stores, previously maintained by the Department of Chemistry, into the larger University Chemical



Stores, will increase safety, reduce the cost of managing chemicals and reagents, reduce disposal costs, and provide a high level of customer service, including in-laboratory delivery. Chem Stores remains housed in the Chemical Science and Engineering Building and maintains operating hours—Monday–Friday 8 AM–5 PM—during the academic year.

Green is an environmental chemist focused on global climate—including climate communication, science-policy interface, and the response of aquatic systems to climate change. The work she conducted with the State Department and the United Nations has provided her with direct experience in science-policy interface, and this work contributes to her teaching.

Green describes her role of teacher-scholar-advocate as “a translator between different branches of science: between science and engineering, between science and policy, between academics and other community members.” Due to her ability to synthesize and collaborate, she has stewarded initiatives that are making important progress on climate action.

In her February lecture, Green discussed how “chemical flows can help researchers visualize the big picture of climate change and the human impacts. The ultimate challenge in understanding how things work is to consider the whole Earth as a system of physical, biological, and human processes.”

Research Awards

Shiyue Fang, Professor of Chemistry

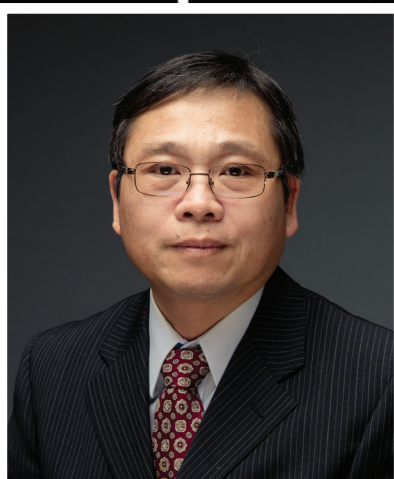
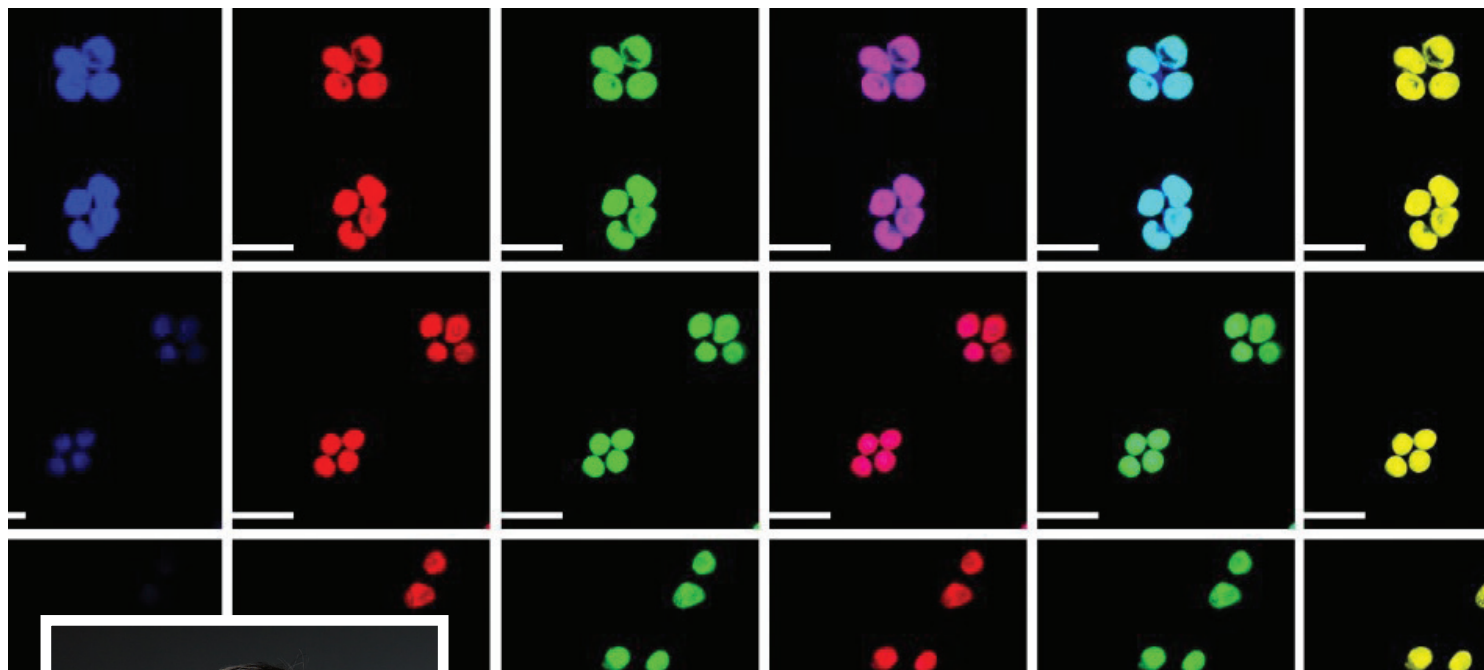
Fang received T3N funding for 12/08/2017–3/15/2018 in the amount of \$5,801.46. He received additional T3N funding for 5/12/2018–12/15/2018 in the amount of \$17,934.

Patricia Heiden, Professor of Chemistry

Heiden received \$56,034 from Petoskey Plastics for her work to improve the efficiency of recycling post-consumer polyethylene batches by designing an improved analysis method to screen out polyethylene batches that will not meet their mechanical and processing specifications before processing them.

Marina Tanasova, Assistant Professor of Chemistry

Tanasova received T3N funding for 10/12/2017–3/15/2018 for the amount of \$50,000 for her proposal “Advancing Probe Design for Cancer Detection.” She received additional T3N funding for 3/16/2018–9/30/2018 in the amount of \$30,152.



Investigating the Biochemistry of Disease with Cyanine Dyes

Chemist Haiying Liu joined the Department of Chemistry in 2002 and became a full professor in 2013. His current research uses cyanine dye for sensitive detection of pH changes in live cells. Liu and his co-researchers recently published a paper on their research in the journal *Chemical Communications*. The paper documents the process of building a new cyanine dye that works in water and has other beneficial properties.

Liu and his team began their work by attaching the chemical tetraphenylethene (TPE) to a conventional cyanine dye that measures pH. The team's new dye does what the conventional dye does not: It fluoresces when it aggregates in water, glowing brightly when conditions are acidic, and fading in alkaline conditions. The new dye has an advantage since it fluoresces under both near-infrared light and visible light. Liu explains that the team's innovation helps to "determine the pH change in two different colors, which

lets us double check the imaging results"—useful for investigating the biochemistry of disease, including cancer. Their use of "near-infrared is useful in biomedical research because it penetrates deep tissue," Liu says.

The new fluorescent dye is relatively simple to make in the lab and it could definitely help researchers who need to detect cellular pH in solutions with a high percentage of water. In addition, he believes the technique could be adapted to different types of cyanine dyes.

Wild World of Chemistry



Tayler Hansen-Bates of Alpena, Michigan, prepares two chemical compounds.

The department's 2018 Summer Youth Program, "Wild World of Chemistry," was a great success. This year's program consisted of 11 participants from Michigan (upper and lower peninsulas),

Illinois, and Maryland. The photo is an example of one of the many hands-on activities students experienced during the week. Instructors showed students how to prepare an acid-base indicator using a blender and red cabbage. Students then used the indicator to test the pH of laundry detergent, lemon juice, and other common household materials. I challenged the students to prepare as many different pHs/colors as possible.

Tayler Hansen-Bates from Alpena, Michigan, is pictured intently trying to obtain a different shade of pink by mixing two of the compounds. However, it doesn't seem to be working out too well! Meanwhile, Jens Krause came up with an impressive array of colors. Although his picture isn't shown, I can assure you he is grinning from ear-to-ear. (I believe an instructor may have assisted with a few drops of sodium hydroxide and/or hydrochloric acid solutions.)

This experiment proved to be a great way to introduce and/or expand students' knowledge of acid and base chemistry using common household materials. Jens is from Chillicothe, Illinois, and is interested in studying architecture. Tayler is interested in studying biology, biochemistry, or microbiology.

—Kelley Smith, laboratory supervisor

Director of Chemistry Learning Center Retires

Lois Blau retired from her role as director of the Chemistry Learning Center in January 2018 after serving for nearly 30 years at Michigan Tech. Blau was beloved by the University community. In 2007, she was awarded an "Unsung Hero" award at the Making a Difference Staff awards ceremony.

Kevin Toadvine '04 says Blau made a difference in his life: "If it were not for Lois Blau, I am not confident I would have been successful at Michigan Tech. Lois became an outlet for support and encouragement, and the learning center became my home away from home. At the end of my third year, I obtained one of my highest GPAs in my college career, but more importantly, I gained the confidence I needed to finish the chemical engineering program; I could not have done it without the support and encouragement from Lois."

Blau says her position changed over the years.

"Initially, it was primarily assisting with the administration of the large chemistry courses, along with coordinating the activities of the Chemistry Learning Center, where about 12 or so coaches were employed and 100 or so students were using the resource," she says. "When I retired, the center transformed to 25-plus coaches, the supplemental instruction program, thousands of student visits, academic advising of majors, and overseeing departmental visits by prospective students and families, along with

continuing duties related to first-year chemistry. Some of the additional duties I came up with on my own, and others I was asked to do, but all I found enjoyable and rewarding."

In her retirement, Blau has participated in the Great Bear Chase ski race for the first time, made a trip to Florida with her sister, and is planning a grand trip to Scandinavia this fall.

"Having thoroughly enjoyed my working years, I am now thoroughly enjoying my retirement!" she says.



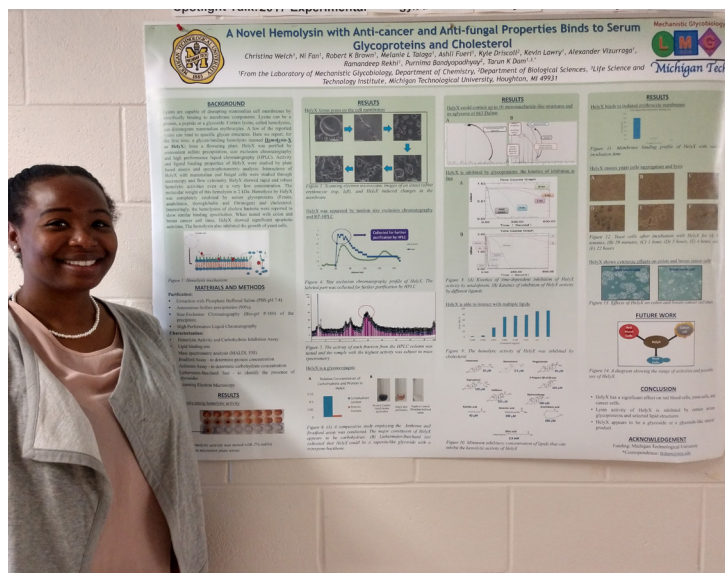
Lois Blau retired after 30 years at Michigan Tech.

Christina Welch Receives Best Poster Award

Attending the 2018 National Association for the Professional Advancement of Black Chemists and Chemical Engineers annual meeting in Minneapolis was truly an honor. At the conference, I was able to network with other African-American graduate and postdoctoral students. I was able to attend research discussions with other biochemists that provided ideas for future research projects. I gained insight about key professional development skills, and I was able to attend a panel discussion held by doctoral graduates in industry and academia.

The conference hosted a poster session during which different scientific societies were giving awards to students who were able to present their research effectively and proficiently. I was honored to win the Biophysical Society Poster Award and receive accolades from Michigan Tech alumni and others. I look forward to attending and representing Michigan Tech at this conference again in the future.

—Christina Welch



Notes from ACS

A group of students presented a research poster at the American Chemical Society (ACS) National Meeting and Expo in New Orleans, Louisiana, March 18-22. Graduate student Vagarshak Begoyan, and undergraduate students Shelby McGuire and Alexis Ferrier's research with fructose transporters, is a development in the field of cancer treatment. The title of their research and poster is "Unveiling the Conformational Preferences of Fructose Transporters." Their faculty advisor is Marina Tanasova. In their own words, each student briefly shares highlights from their ACS experience.

Vagarshak Begoyan

This was my fourth ACS meeting. Being able to meet professors whose work I've been following or using in my own research was a real treat. While I've presented posters on my work in the past, this time I had the opportunity to watch undergraduates present as well. It is something special to see students who worked under you present their own research.

Shelby McGuire

This was my first time attending an ACS national conference, but it for sure won't be the last! Even though my friends warned me how big the event is, until you see it for yourself, you can't really picture it. There were presentations, talks, and posters from nearly every facet of chemistry, from food science to hardcore synthetic chemistry. Walking around the conference hall, especially during poster sessions, you could feel the excitement in the air from researchers eager to show off their research.

Alexis Ferrier

Attending the ACS National Meeting in New Orleans was a wonderful experience. It was my first ACS meeting, so I wasn't sure what to expect, especially the size. Due to the size of the symposium, I was unable to attend all the lectures and view all the posters, but those I saw were great. Additionally, the expo was something I've never seen before, with dozens of companies coming and demoing their products to the attendees. Now that I am working in the industrial side of chemistry, I hope one day to present our technology at a national meeting.



Students at ACS in New Orleans in March.

Spring Awards Speaker Alumni Ali Carpenter



Ali Carpenter

Cheminformatics alumna Ali Carpenter '16, was the featured speaker for the spring 2018 Department of Chemistry Student Awards Program April 25. Carpenter's talk "From Chemistry to Computers—My Journey to IBM Watson Health," chronicled the serendipitous path of her early career as a software developer—a position she has held since graduation.

As an undergraduate in cheminformatics, Carpenter also minored in pharmaceutical chemistry. She spoke about being pleasantly surprised to be professionally positioned at the intersections of chemistry and medicine as she completes work on an innovative IBM product that provides treatment recommendations for cancer patients.

2017-18 Graduates

Undergraduate Degrees Awarded

Bachelor of Science in Biochemistry and Molecular Biology-Chemistry
Erinn M. Smith

Bachelor of Science in Cheminformatics
Adam D. Pap

Bachelor of Science in Chemistry
Nicole V. Bliven
Terri R. Cavender
Alexis L. Ferrier
Tyler A. Leverton
Alexis L. Martin
Shelby B. McGuire
Cathleen A. Saraza
Diane L. McNease

Bachelor of Science in Pharmaceutical Chemistry
Ash Chhabra
Zack M. Nelson
Alex O. Vansumeren

Graduate Degrees Awarded
Masters of Science in Chemistry
Marian T. Ampadu

Doctorate of Philosophy in Chemistry
Gemechis Dereje Degaga
Sarah E. Hopson
Ashok Khanal
Chelsea J. Nikula

Congratulations to all of our graduates!

Departmental Student Awards

Undergraduate

Outstanding Student in First-Year Chemistry: Abby Schwartz

Doc Berry Award: Alyssa Cinder

Undergraduate Award in Inorganic Chemistry sponsored by the American Chemistry Society, Division of Inorganic Chemistry: Shelby McGuire

Biochemistry Research Award: Erinn M. Smith

Outstanding Senior Research Award: Alexis Ferrier

Outstanding Senior: Tyler Leverton

Leslie Leifer Award in Physical Chemistry: Sarah Montgomery

Departmental Scholar: Jacob Mohar

Rebecca Sandretto and Susan Stackhouse Summer Fellowship: Samuel Willard

Graduate

Outstanding Lower-Division Chemistry Teaching Assistant Award: Shanshan Hou and Wafa Mazi

Outstanding Upper-Division Chemistry Teaching Assistant Award: Rashmi Adhikari

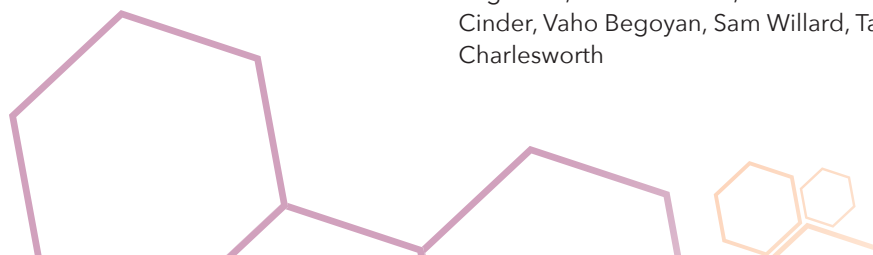
Ray E. and Eleanor K. Cross Endowed Graduate Fellowship in Chemistry: Rashmi Adhikari

Robert and Kathleen Lane Outstanding Graduate Student Research Award: Mingxi Fang

Outstanding Graduate Student Leadership Award: Shahien Shahsavari

Other

Ambassador: Grace Billman-Bevenise, Tyler Leverton, Ema Bagnasco, Hanna Pickard, Brian Burtka, Conner Hensley, Alyssa Cinder, Vaho Begoyan, Sam Willard, Taylor Johnson, and Dr. Paul Charlesworth



Meet New CSA Dean David Hemmer



"My area of research is very pure mathematics. I study problems that I find beautiful and interesting, not motivated by applications. In this way, while I am a mathematician and scientist, I find common ground with my colleagues in the humanities."

David Hemmer began as dean of Michigan Tech's College of Sciences and Arts (CSA) on July 1, 2018.

Hemmer comes to Michigan Tech from the University at Buffalo, The State University of New York (UB), where he was chair and professor of mathematics. Hemmer replaces retiring dean Bruce Seely, who led the College for the last decade.

Experienced STEAM Advocate

As a mathematician studying abstract algebra, Hemmer's expertise in representation theory of symmetric groups has resulted in dozens of publications and invited talks across the nation and globe. Hemmer's research has been supported by National Science Foundation (NSF) grants for the past 20 years.

Though Hemmer has made a career advocating for STEM education, he is no stranger to the arts. During his tenure at UB, Hemmer provided service to the university's honors college and the department of music—experiences that will aid him in promoting STEAM education (science, technology, engineering, arts, and math) at Michigan Tech.

Hemmer holds a PhD and MS in Mathematics from the University of Chicago and a BA in Mathematics from Dartmouth College. He began his career as an NSF postdoctoral fellow at the University of Georgia; he transitioned to the University of Toledo in 2003, where he became associate professor before moving to UB in 2007.

Honoring CSA History to Collaboratively Create the Future

Hemmer's plans for leading CSA is inspired by a combination of the College's historical excellence and the University's changing leadership. Hemmer says, "With a relatively young faculty and potential growth planned from 'Portrait 2045,' this is a great time to be leading CSA. I want to build on the incredible momentum the College has had under Bruce Seely's leadership. Bruce has been very gracious sharing his time and wisdom during this transition. With so many new leaders arriving this summer, this will be a crucial time in Michigan Tech's history and I am excited to be a part of that. I look forward to working with Provost Huntoon and the incoming president."

Hemmer also plans to advance Michigan Tech's objective to wed the sciences with the arts, stating, "The evidence is clear that the best scientists and engineers have a broad-based training in the humanities and social sciences. I was delighted to hear how the humanists and social scientists in CSA embrace their role at a technological university. I will have a lot to learn from my new colleagues in these disciplines."

Alumna Ge Wang Inducted in to the College of Sciences and Arts Academy



Alumna Ge Wang (PhD Chemistry) '02 was inducted into the College of Sciences and Arts Academy for her outstanding achievements in scientific research April 5, 2018.

Wang is a professor in the department of materials, physics, and chemistry at the University of Science and Technology in Beijing, China. In 2016, Wang won the Natural Science Award first prize for outstanding achievements in scientific research at the university.

Wang's research interests include the composition and architectural design of a series of functional composites, with the goal of improving the efficiency of energy utilization and resource consumption. She has received

51 national invention patents and numerous international and national (China) awards. On April 6, 2018, Wang presented research on "Nanoarchitected MOFs-based Catalyst" to an audience at Michigan Tech. Her talk showcased her research with catalysts for carbon dioxide reduction and energy storage materials. She discussed the work conducted in her lab, which brings together expertise in materials science, catalysis, electrochemistry, and physics to address the many challenges that emerge in the field of energy.

Remembering Professor Emerita Gladys Dawson

Professor Emerita Gladys Dawson passed away January 3, 2018 at the age of 93. She taught in the Department of Chemistry from 1963 to 1985. The New Jersey native received her Bachelor's (1946) and PhD (1951) in Chemistry from the University of Illinois in Champaign-Urbana.

In 1963, she and her husband, the late Donald Dawson, a mathematics professor and researcher, accepted positions at Tech. Dawson's son, Tim, says his mother was a pioneer. "My mom was very unique as a woman in a hard science at a time when it was pretty rare."

Carrie Richards, Michigan Tech's manager of partner engagement, was a student of Dawson's first-year chemistry. "She was very smart; a good role model and mentor. I really admired her. Later she became a friend and neighbor," Richards says. "Through her actions, she taught me about community involvement and the rewards of volunteering."

Tim Dawson says his mother "was fair" and memorable to her students for other reasons: "She showed up to give an exam in a witch's costume," Tim said. "I think *The Lode* ran a commentary along the lines of, 'We suspected it all along.'"

Dawson was a member of the American Chemical



Society and the Alpha Gamma Delta Sorority. She was also very active in the Pine Mountain Music Festival for many years.

In 2011, the Dawsons established the Dr. Gladys Q. Dawson and Dr. Donald E. Dawson Endowed Scholarship. The purpose of the scholarship is to provide financial assistance to Michigan Tech students who have achieved at least second-year status and are majoring in science, technology, engineering, or math (STEM).



**Michigan
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University**

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Giving

Periodic Table of the Elements																	
H	He																
Li	Be	B	C	N	O	F	Ne										
Na	Mg	Al	Si	P	S	Cl	Ar										
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe
Cs	Ba	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
Ge GERMANIUM 72.63 YOUR NAME HERE		Sg	Bh	Hs	Mt												
		Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu			
		Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr			

Elements of Success–2942

Our Elements of Success Periodic Table, located on the first floor of the Chemical Sciences and Engineering Building, honors donors who give \$1,000 or more to chemistry programs. Your name (or a name of your choice) will be engraved on your sponsored element and you will also receive your own personal tile. Our goal is a sponsor for each of the 118 elements on the periodic table.

This year's featured element is Germanium. The element falls in the same group as carbon and silicon, but also as tin and lead. Germanium is classified as a metalloid. It's hard at room temperature and looks metallic with a shiny silvery gray finish, but it's actually a semiconductor with electrical properties that differ in important ways from a metal. Discovered in 1886 by Clemens Winkler, the name is derived from the Latin name for Germany, "Germania."

You can see the lists of sponsored and available elements at mtu.edu/elements.

Other Giving Opportunities

All gifts to the Department of Chemistry are used to enhance the education of our students. Our giving page—mtu.edu/chemistry/giving ensures your gift goes to the right place. Donations of any amount are welcome. In addition to the "elements of success," below are a few other areas to which you can direct a gift. You may use the enclosed envelope to make a gift.

Excellence in Undergraduate Education–3093

Support undergraduate student research and the development of valuable professional skills.

Excellence in Graduate Education–2969

Support graduate student research, travel, and professional development activities.

Chemistry Learning Center (CLC)–3181

The CLC is an important part of our department. Funding helps to provide quality coaching in a comfortable, supportive learning environment. This service continues to have a substantial impact on student success and retention.