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# THE ACTION & REACTION

*Newsletter of the Mid-Michigan Section of the American Institute of Chemical Engineers*

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## 2019 MMAIChE Awards Winners

BY MIKE MOLNAR, AWARDS COMMITTEE CHAIR

### Chemical Engineer of the Year – Ted Calverley



Edward M. (Ted) Calverley joined The Dow Chemical Company in Vinyl Chloride Monomer R&D at the Fort Saskatchewan, Alberta site after completion of his PhD in Chemical Engineering at McMaster University (Hamilton, Ontario). Over his 29-year career at Dow, Ted has excelled in applying chemical reaction engineering principles to deliver innovative technologies. The magnitude of his contributions is reflected in his current position as a Dow Fellow, a role achieved by less than 3% of Dow's scientists as it requires demonstration of both scientific and commercial excellence.

Ted Calverley has contributed to commercial reaction engineering projects valued at more than \$100 million. Specifically, he increased production capacity of an agrochemical facility by 70% through kinetic model-derived optimization of several batch processes, generating \$60 million of delivered value. He has also played a role in the definition of best practices for laboratory reactor design and Dow's Global Process Engineering fixed bed tubular reactor systems best practices. These standards are used throughout the company to define current and future investments. Because of his

leadership and his commercial contributions, he has earned nine major Dow honors including the Doug Leng Award for Excellence in Engineering Research.

Ted is Dow's expert on polymer hydrogenation, contributing to both catalyst development and to process reactor design of Dow's patented commercial technology. These efforts have been described externally through patents and publications and through external presentations. To address issues with both the catalyst cost and performance, he developed kinetic and reactor models for the catalyst manufacturing process, resulting in catalysts with higher Pt dispersion. He trained Dow's partner and established operating and safety standards for the market development plant. These efforts led to the 2018 launch of the world's first cyclic block copolymer mass production line for USI Corporation's ViviOn™ Cyclic Block Copolymer family of products.

Ted's leadership in the development of a key intermediate for the production of a low global warming potential refrigerant is another example of his significant impact. While leading a global team, our awardee helped define the process and was responsible for pilot and market development plant operations, intellectual property, and competitiveness assessments. Ultimately, this technology was transferred to Olin for implementation.

Through his publications and presentations, Ted also shares his practical application of chemical reaction engineering principles towards both commercial and laboratory industrial challenges. Controlling exothermic reactions on a commercial scale can be difficult, and his work shows how axial variation in catalyst activity leads to reactor runaway conditions as well as how process stability can be improved by modifying catalyst loading procedures. He and his team also showed how reactor stability can be compromised by the presence of a reversible poison in a catalytic reactor for

chlorocarbon hydrolysis, solving a twenty-year-old question about the dynamics of this reactor and describing design options that would remove this sensitivity. Likewise, evaluation of commercial catalysts in a laboratory setting can be challenging. He led the development of a high throughput CSTR microreactor, which is the first reported system of its kind capable of testing commercial fixed bed catalyst pellets. The small footprint reactor can produce mass transfer rates equivalent to much larger Berty-type reactor systems and is employed internally to accelerate catalyst scale-up processes and kinetic studies.

Over the course of his career, Ted developed a strong Dow presence through his accomplishments and by authoring more than 150 internal reports. Likewise, he built a strong external presence through his lectures and publications and through his service to the technical community on various boards and committees. He has served in leadership in US and Canadian based chemical engineering communities, including chairing the Industrial Catalysis Committee of the Environmental Science and Technology Alliance and serving as President within the Michigan Catalysis Society and as Chair of the Mid-Michigan Local Section of AIChE. In addition to previously serving as Dow's Principal Investigator within the "Inorganometallic Catalyst Design Center," a U.S. Department of Energy sponsored Energy Frontier Research Center (EFRC), he supports university Dow partnerships, actively mentoring and advising the next generation of chemical engineers.

### Young Chemical Engineer of the Year – Reza Panah

This year's award winner has demonstrated extremely strong technical and professional expertise in the areas of adsorption, distillation optimization, and reaction model synthesis while demonstrating early

career leadership within the American Institute of Chemical Engineers, specifically Area 2E - Adsorption and Ion Exchange.

Reza Panah joined Dow Corning Corporation in 2014, with a PhD in Chemical Engineering from Nanyang Technological University in Singapore following a post-doctoral assignment at Stanford University. He also holds a Master's Degree in Polymer Engineering from Sapienza University in Rome, Italy and B.S. in Chemical Engineering from University of Isfahan in Iran.



During his career to date within Dow's Performance Silicones Process R&D organization, Reza has leveraged chemical engineering fundamentals to all his projects. For instance, he developed a novel approach to design and optimize adsorption processes that includes rigorous model-based design paired with fundamental properties as measured in the lab. This work demonstrated a low-cost methodology based on fundamental principles to design and optimize adsorption processes. Reza has also developed a robust predictive model in MATLAB® for a polymerization reaction and validated for the continuous reactors which produce 10,000's of tonnes/year leveraging more than \$1B in downstream sales. The model was coupled with a genetic algorithm optimizer routine to identify ideal reaction condition, showing opportunity to improve raw material conversion versus current baseline.

Another significant early career accomplishment has been the development of a framework for optimization of distillation processes by integrating MATLAB® optimization toolbox with Aspen Plus® using mixed integer nonlinear programming (MINLP) optimization for the first time in

The Dow Chemical Company. This approach saved significant amount of time to find the optimum solutions and can be used for optimization of any flowsheet in Aspen Plus®. Traditional methods of optimization involve performing parametric studies. It is difficult to arrive at the optimal condition of all process parameters that will minimize/maximize the desired objective(s) while fully meeting the design and operational constraints, which makes it a challenge to get to the most optimal set of conditions for the separation. Reza's work has been presented at both AIChE and ASPEN® Optimize conferences.

Reza has been very active in his profession and been recognized for his contributions both internal to Dow and externally. Within Dow Performance Silicones he has been recognized with several awards, including a 2016 Donald R. Weyenberg Technical Achievement Award in for "A Novel Approach to Adsorption Process Design", a 2016 Manufacturing Award for "Capacity improvements to Z3MS and Z4MS production in 2901", and most recently, a 2018 Donald R. Weyenberg Technical Achievement Award for a polymerization model development. Externally he has been active with AIChE and is now a technical reviewer for *Adsorption Journal* (*Journal of the International Adsorption Society*) and *The Canadian Journal of Chemical Engineering*.

#### Noland Poffenberger Award – Stacie Santhany



The Noland Poffenberger Award is designated for a manager who has shown great support of the Mid-Michigan Section by encouraging employees within the recipient's organization to participate in professional organizations such as AIChE.

This year's award winner exemplifies the requirements for this recognition. Six individuals gave testimonials supporting

the nomination, a sample of which are below.

*"She may have done more than anyone in recent years to populate the society with young engineers from her group. She also routinely enables our events by finding Dow funding mechanisms to make things happen."*

*"She is a tireless advocate for AIChE and the benefits of membership, including networking, technical resources and learning opportunities."*

Stacie Santhany joined Dow in 2001 after receiving a Chemical Engineering degree from Michigan State University. She began her career in the Agricultural Process Research group where she helped to develop and commercially launch various molecules for Dow AgroSciences. In 2007, she switched focus to amine chemistries, where she led the separations effort as part of an innovative Coatings program. She then expanded on her amines chemistry knowledge, taking over leadership of the ethyleneamines research and development efforts in the continuous pilot systems in Midland. In 2011, she transitioned to Dow Energy Materials R&D to lead the lithium manganese iron phosphate cathode materials project for lithium ion batteries. Over the course of her time in Core R&D and Business R&D functions, Stacie gained expertise in process development, separations, solids processing, and a number of other fundamental engineering areas.

In 2015, Stacie took on the position of Technical Leader for the Solids Processing discipline of Engineering and Process Sciences (E&PS) in Core R&D. In 2017, she expanded her role to lead the Process Development team in E&PS and Statistics teams. In 2018, she took on leadership roles within Dow Performance Silicones (Associate Director, Engineering Sciences and Engineered Materials).

Her service to the American Institute of Chemical Engineers and the Mid-Michigan Local Section include service as chair-elect/chair/past chair (2015-2017) and starting a second term as chair-elect as of May 2018. Stacie was co-chair for the 2017 *AIChE Process Development Symposium*, a specialized conference sponsored by AIChE's Process Development Division. She is a big advocate for STEM outreach in the local area, where she volunteers with the Dow STEM Ambassadors and MMAIChE Young Professional Outreach.

# Introduction and Plan for the Fiscal Year: Time Flies When You Are Having Fun!

BY STACIE SANTHANY, CHAIR

I have had the privilege of being part of the executive committee of MMAICHe for several years now, and I am honored to be starting my second term as chair elect. For those of you that I don't know yet, let me start with a quick introduction. I am a local mid-MI girl born and raised, and I am proud to call it home. I live in Auburn with my husband, Brian, and two awesome kids, Taylor and Carter. I am an 18 year employee of Dow Chemical, and am currently continuing my learning journey with a role in Dow Performance Silicones R&D. I enjoy people, sciences, and continuous learning, which makes being part of the mid-Michigan AICHe organization a great fit for me.

I think we all know that change is the new normal. MMAICHe is a constant in all the change. I consider it a 'home base' for our local engineers and scientists to come back to as many of our companies are changing. Through the change we have seen many of our colleagues, friends, and mentors move out of the local area, start careers in other companies/locations, or retire. It is nice that we have an organization like MMAICHe to 'call home.' For those of you leaving the local area, know that you always have MMAICHe to come back to when you are in the area.

Let's think ahead to 2019-2020. Some of the MMAICHe focus areas will be

around seminars, young professional and K-12 outreach, and scholarships. This year the committee is writing up a charter around expanding our scholarship giving. We want to do more. The scholarship review committee is always amazed to see the quality of the applicants in our local area. They are brilliant minded and are already influencing those around them with their volunteerism and leadership. If you have an interest in being inspired by the scholarship applicants by serving on the scholarship committee, please reach out to Sheila Gombar-Fetner. We also will continue to influence the younger minds in our area by visiting local middle schools with science demonstrations, participating in Delta STEM fest, and interacting with local university's AICHe student chapters. When a call for volunteering comes out from the MMAICHe mailing list, please consider donating your time to these great causes.

I want to thank the executive committee for an amazing 2018-2019, and I look forward to working with many of you into this fiscal year. Especially, I would like to thank Jay Rose for your influence on the chapter as you close your term as chair. It has been a great year, and we thank you for your leadership. I would also like to thank Bruce Holden, who is starting to transfer his secretary duties after so many years of service to the section. You have been a key



part of the section for many years, and we thank you for that service.

MMAICHe continues to evolve and grow throughout the change and I look forward to seeing what 2019-2020 has in store for all of us. During the time we spend together, let's make each other better and lift those around us up. I look forward to a year ahead making more relationships with all of you, continuously learning together, and helping those around us by our service to society. See you at the fall kickoff!

Sincerely,  
Stacie Santhany

## Reflecting and Measuring the Past Year

BY JAY ROSE, FORMER CHAIR

As Chemical Engineers measuring processes parameters is a critical part of what we do. Effectively measuring and analyzing historical process data allows us the best chance to get the desired process result.

The mission of MMAICHe is, "To provide opportunities to continuously develop our members professionally while working with the community to improve the understanding of science and engineering and their impact on society."

I hope you feel as I do that this past year was a fantastic program year for meeting this mission. Here's how I measure it. The

lecture series gave us the opportunity learn about a diverse list of topics from biomimicry to process safety. Working with Great Lakes Bay STEM Festival and local college AICHe chapters, MMAICHe teams worked to teach and inspire the youth in our community about how chemical engineers affect everyday products and things they use. The caliber of applicants for the MMAICHe scholarship were so outstanding that the committee challenged themselves to do more and is now working toward the possibility of expanding the

scholarship program. The feedback we received from one of the past scholarship recipients was awesome! She shared some of her experiences from her freshman year at college. There was a good turnout at the annual banquet, recognizing the two scholarship winners and the outstanding accomplishments of three of our members. I am looking forward to the new program year with excitement as there are leadership and growth opportunities for new committee chairs.

It was once said that "A persons life wasn't worth mentioned if they had not



shared it with others along the way.” Thank You to the MMAICHe leadership team, committee chairpersons, and members for sharing your passion and talents with me

and the community. By my measure, you have made this past year a success, fulfilling the MMAICHe mission.

Sincerely,  
Jay Rose

## Chemical Engineering College Scholarship Awarded to Maya Albright

BY SHEILA GOMBAR-FETNER, SCHOLARSHIPS CHAIR

Maya Albright, a graduating senior at Midland High School, received the 2019 AICHe College Scholarship. The Mid-Michigan AICHe Chemical Engineering Scholarship is a \$2000 scholarship awarded over 4 years to a graduating high school senior from the Great Lakes Bay region and neighboring counties who plans to study chemical engineering at an accredited university or college. The scholarship rewards academic performance, as well as school and community involvement. It is intended for a student who has a high probability of obtaining a chemical engineering degree and becoming a practicing engineer.

Maya plans to attend the University of Minnesota in the fall to study chemical engineering. During her high school years, Maya was an International Baccalaureate

Diploma Candidate, Class President of Student Council, and captain of the varsity volleyball and soccer teams. Maya also participated in Student Council at the state level with the Michigan Association of Student Councils Board of Delegates, promoting leadership opportunities for students throughout the state by facilitating Leadership Training Institutes and Regional conferences. She was a team leader on the Blessed Sacrament Youth Outreach Team and an intern at the Michigan State University STEM Research Center in Midland. She has received the Daughters of the American Revolution Good Citizen Award, won an essay competition on America’s future challenges to advance to the top 10 State Finalists, was selected as a finalist for the Michigan Scholar-Athlete Award and



was selected as the Midland High Saginaw Valley Scholar-Athlete female representative.

## MTU Summer Scholarship Awarded to Jaden Decuf

BY SHEILA GOMBAR-FETNER, SCHOLARSHIPS CHAIR

The Section awarded the 2019 Engineering Exploration Scholarship for the Michigan Tech Summer Youth Program to Jaden Decuf of Bay City Western High School. Jaden is an ascending sophomore who decided to attend the Chemical Engineering program. Jaden is one of three Chief Science Officers (CSO) at Western High School and her job as a CSO is to grow the student body’s knowledge of STEM and its opportunities. She received the school’s Principal Award for showing great academics and attitude. She received the Randall Koch Award for students who help their peers and their teachers, are always positive, and have excellent character. She was the captain of her school volleyball and basketball teams.

She was one of two freshmen on the Spirit Committee, a group of students who obtain ideas from the student body and communicate them to the administration. She also participates in STEM volunteering and acts with the Bay City Players Youth Theatre Program.

The MMAICHe Engineering Exploration Scholarship is open to students in grades 9-11. This scholarship provides an opportunity for a student from the Great Lakes Bay region and neighboring counties to explore science and engineering careers through hands-on laboratory, classroom, and field experiences at the Michigan Technological University Engineering Explorations Summer Youth Program at the MTU campus in Houghton, MI. The scholarship



includes tuition, room, and board, along with a travel allotment for a one-week Exploration during the summer. In providing this scholarship, the Section seeks to help young people learn about engineering careers.

# New 2019-20 MMAIChE Officers and Committee Chairs in Profile

MICHAEL DELISLE, SECRETARY



**Hometown:** Novi, Michigan, which is where I currently live as well.

**Education:** I studied Chemical engineering at Western Michigan University with a focus in “life sciences”, and 3 minors in Math, Biology, and Chemistry.

**Career info:** When I graduated, I took a little time off to really enjoy a bit of life. I was a bartender and traveled quite a bit, which was such a great experience. When I was ready to begin my career, I joined a small environmental regulations consulting firm. I wore many different hats, and

traveled something like 95% or so. Some typical job assignments:

- Client Program development – When a client is facing a new regulation or maybe they are a brand-new site and need to become compliant with regulations. Here I would detail all the regulations the client was affected by and then develop a program to comply with the regulations.
- Project and Site management – Come to site and kick start a program, oversee a program, or retool the procedures.

I switched jobs to slow down on the travel while pursuing new interests and an MBA.

Currently, as a project engineer at Sidock Group, I do all sorts of engineering services, consulting, and project management. From chemical to heavy industries, Sidock has allowed me to work with teams to deliver a variety of services. Currently I do quite a bit of project management work, which I really like and aligns nicely with some of my longer-term goals. Some of the project management includes setting up project budget, team, and guidance. I have

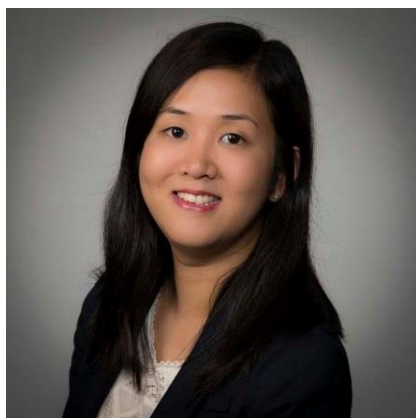
found a nice balance of dedicated engineering and management tasks.

I hope to attend an MBA program in the future, I would like to gain a bit more understanding of how business is conducted.

**Interests:** In terms of work I really like project management and the intersection of money and engineering. Additionally, I like improvement more than creation. Outside of work I enjoy weight lifting, snowboarding, and different car activities. I study for the PE quite a bit, which is fun in its own way.

**Why did you join MMAIChE?** Well I’ve been in AICHE since college, but I recently settled back into the Novi area and wanted to get a little more involved. I liked a lot of the group aspects in college and figured it could be a great way to integrate into some of the local Chemical Engineering groups. Anyway, while looking to renew my membership to the national board, I noticed that there was a local section for Detroit as well. However, before officially signing up I was distracted and ended up waiting about another week or two. I go back to complete my renewal but, there is no local section anymore. So I joined the next closest one, which is Mid-Michigan!

## THU VI, K-12 EDUCATION OUTREACH CHAIR



Thu Vi (goes by her last name, “Vi”) joined the Process Development team in Engineering & Process Science, Core R&D, at Dow in 2018. Her technical background is in polymer science, with experience in surface and solvent self-assembly of small molecules and polymeric materials. Vi received a B.E. in Chemical Engineering from Stony Brook University, where she was heavily involved in the student chapter of AICHE as the local chapter’s vice president and one of the original founders of Stony Brook Chem-E Car team. Vi worked as a Production Engineer at Sensitron Semiconductor Inc. for two years before pursuing and earning a Ph.D. in

Chemical Engineering from Columbia University. Prior to Dow, Vi was a post-doctoral researcher at the University at Delaware where she designed and developed shape-changing, biodegradable nanocarriers for efficient drug delivery and gene therapy. Since joining Dow, she has been working on the product and process development for several silicone hybrid projects in collaboration with Dow Performance Silicones and Home & Personal Care businesses. As the new education outreach chair, Vi hopes to continue the great work that MMAIChE chapter has done in promoting STEM education in the local area.

# Support the Mid-Michigan Section for AIChE Scholarships!

The Mid-Michigan Section of AIChE is involved in STEM educational outreach. We provide classroom demonstrations and support aspiring engineers through scholarships for summer camps and chemical engineering degrees. Your donation will be used to help Mid-Michigan AIChE establish a sustainable scholarship fund that sends high school students to the Michigan Technological University Summer Youth Program or to an accredited university or college with a degree in chemical engineering.

Would you like to help a future chemical engineer? You can donate to the Mid-Michigan Section of AIChE Scholarship Fund through the options below. Donations are tax-deductible.

Pay using PayPal by going to: <https://www.aiche.org/community/sites/local-sections/mid-michigan/scholarships>

OR by scanning the code on your smartphone:



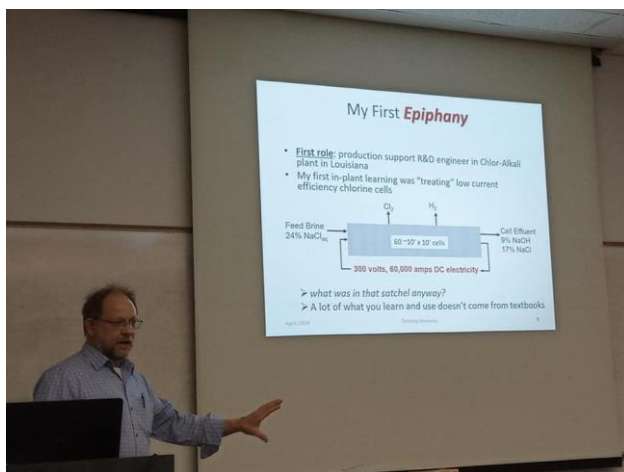
## 2019 MMAICChE Seminar Series



MMAICChE outing: "From Earth to The Universe" show at the Delta College Planetarium



Ron Leng, Defining moments – things I didn't learn in school that shaped my career.





# 2019 MMAIChE Spring Banquet



Bala Sreedhar and Eric Stangland manning the table.



Former chair Jay Rose gave an overview of 2018 – 2019 events.



Scholarship chair Sheila Gombar-Fetner presenting the 2019 MMAIChE scholarship awards to Jaden Decuff and Maya Albright.



Former and newly elected chairs Jay Rose (left) and Stacie Santhany speaking onstage in the Midland Country Club.



Hank Kohlbrand presenting keynote seminar “Food-Energy-Water Nexus”



(Left) Awards Committee Michael Molnar presenting the plaque for award winners. (Right) Past chair Jay Rose passing the gavel to Stacie Santhany.

## Volunteering Opportunities at the 2020 AIChE Midwest Regional Conference (MRC)

The 2020 AIChE Midwest Regional Conference (MRC) is planned for March 11 – 12, 2020 at the Illinois Institute of Technology, Chicago. The MRC planning is organized primarily by the Programming Committee and a General Arrangements Committee.

The Chicago Section of AIChE is seeking volunteers for the MRC Programming Committee who can serve as session chairs or co-chairs of your choice.

The MRC sessions available for volunteering opportunities are:

- Refining and petrochemical engineering
- Biomedical and pharmaceutical engineering
- Catalysis, reaction, and transport engineering
- Process engineering, modeling, and optimization
- Energy, environment, and sustainability
- Process safety
- Professional development (particularly for young professionals)

Each session typically consists of 1 hour 30 mins of technical presentations. The session chairs are responsible for identifying speakers, ensuring conference registration by the speakers, and introducing speakers at the session.

For more details, please visit the most recent conference website: <https://www.aiche.org/community/sites/local-sections/chicago/mrc11-2019>

OR contact Jarad Champion, the AIChE Chicago Chair Elect (pro tem) at 650-862-5494 or [jaradchampion@aichechicago.org](mailto:jaradchampion@aichechicago.org)



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## Stay Tuned for The 2019–2020 Event Schedule!