THE ACTION & *REACTION*

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

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2021 MMAIChE Awards Winners

BY MIKE MOLNAR, AWARDS COMMITTEE CHAIR

Chemical Engineer of the Year Award – Mike Telgenhoff

Michael Telgenhoff, Principal Research Scientist in Performance Silicones Process R&D, Dow Silicones Corporation, was awarded by the Mid-Michigan Local Section of the American Institute of Chemical Engineers (AIChE) as its Chemical Engineer of the Year for the 2020-2021 program year. This award recognizes exceptional career accomplishments and leadership in Chemical Engineering.

Michael Telgenhoff joined Dow Corning Corporation in 1997, with a B.S. in Chemical Engineering from Michigan State University, following completion of three previous internships within Dow Corning. Michael is recognized globally as a process technology expert across the silicones business. His expertise, innovative approach, and leadership capabilities have made him an invaluable member of our organization. Over his professional career, Michael has delivered capacity, quality, and safety improvements throughout organo-functional silanes and silicones. In addition, he has successfully commercialized many new silicone process technologies while mentoring and guiding others across the organization.

Throughout his career, Michael has proposed, developed, and commercialized new processes and materials across various silicone technologies including silane monomers and oligomers, organofunctional silanes, and silicone-organic hybrid materials. His contributions include new and innovative material synthesis and purification methods, step change improvements in quality and capacity, and improvements in process safety throughout the supply chain.

Michael also led an R&D team in the development of silicon deposition precursor technology for the solar and semiconductor markets. Through his direct innovation and leadership of other engineers, he developed new analytical and process technologies for a $150MM production facility manufacturing SiH_4 for solar and semiconductor markets. A couple of the key innovations included elemental analysis of silane at sub-part per trillion levels, along with development and implementation of purification schemes to reduce volatile impurities to these same levels on the production process through a series of specialized removal techniques.

Michael also developed a process and supply chain to produce hexachlorodisilane and led the commercialization efforts when the semiconductor industry faced a critical shortage of this material. He also ensured the team developed key health and safety methods to help protect the workers and industry from potentially catastrophic incidents due to the extremely hazardous nature of the critical semiconductor and solar materials. For example, Michael was a member of an industry team that studied the explosion and release scenarios of silane gas in storage or use. This team was a cooperation of corporate, academia, and industry associations. The team utilized the studies, industry data, and risk analysis to update the CGA G-13 standard which governs the process design and handling of silane gas in storage and use. Additionally, Michael sponsored and led studies to develop mitigation procedures to safety handle by-product shock sensitive gels formed upon accidental exposure of hexachlorodisilane to the atmosphere.

Earlier in Michael's career, he was instrumental in commercializing several new silicone and silane technologies. One key innovation in Michael's work enabled Dow Corning to commercialize a new product in the textile market to address multiple environmental and health concerns. He developed an innovative process chemistry for a new functional polymer that enabled customers to switch away from C8 Fluorochemicals in stain repellent textile coatings. In addition, the process technology was intensified to reduce a two-step process to a one step process and shorten the supply chain to one production site.

Michael is an author and contributor to over eighty-five (85) internal research reports as well as twenty (20) external publications and presentations. He is a recognized inventor with seven (7) issued patents. He has received numerous awards over his career including eight (8) internal technical and manufacturing achievement awards. Michael had been a member of AIChE since his university involvement, serving as the MSU AIChE student chapter treasurer, and most recently serving numerous roles within AIChE's Process Development Division. He was recognized with the 2020 AIChE Process Development Division Practice Award.

On behalf of the Mid-Michigan Local Section of AIChE and its awards committee, we would like congratulate Michael for this well-deserved accomplishment.

Young Chemical Engineer of the Year Award – Pranav Karanjkar

Pranav Karanjkar, Associate Research Scientist in Performance Silicones Process R&D, Dow Silicones Corporation, was awarded by the Mid-Michigan Local Section of the American Institute of Chemical Engineers (AIChE) as the Young Chemical Engineer of the Year for the 2020-2021 program year. This award recognizes technical and professional expertise, and leadership that is superior for an early-career engineer.

Pranav Karanjkar joined Dow Corning Corporation in 2016, with a PhD. in Chemical Engineering from University of Wisconsin-Madison. Pranav has led several projects related to silicone polymerization, such as developing fundamental understanding of reaction kinetics for some of Dow's key silicone reactions. He used very good scientific and laboratory methods to acquire the data, collaborating with others to develop a robust mathematical model to regress kinetic parameters for a multi-component reaction mechanism. He partners with manufacturing and technology center organizations to gather data from existing operating plants to test the validity of the reaction model and then transfer the knowledge gained from the model to improve performance of the polymerization process.

Pranav also has a passion for advanced analytical techniques and has worked hand in hand with our spectroscopy experts to develop in situ methods to track reaction process in his experimental laboratory equipment. He has also researched alternative catalysts and reactor designs that could provide a step change in process technology as well as provide competitive advantage for Dow.

Pranav's influence goes beyond technology into people development. He is very successfully mentoring new employees, teaching them all about reaction engineering and process development. Pranav has also taken on leadership positions in the Dow Consumer Solutions R&D Communities of Practice, where he leads the Mixing, Reaction Engineering, and Scaleup Community to teach and share information amongst new hires and others passionate in this area. He is also very active as the Programming Chair for the Mid-Michigan Local Section of AIChE to encourage continuous learning in the area of chemical engineering.

Within the Dow Consumer Solutions business, Pranav's work has been recognized with three (3) Donald R. Weyenberg Technical Achievement Awards for his contributions towards enhancing the fundamental understanding of siloxane ring opening and condensation polymerization as well as two (2) Technology Center Awards. He has authored over twenty-one (21) Dow research reports and four publications in peer-reviewed journals. In March 2021, Pranav was recognized by AIChE's Polymers Division (Materials Engineering and Sciences Area 8A) as a recipient of a Polymers in Industry Rising Star Award for 2021.

On behalf of the Mid-Michigan Local Section of AIChE and its awards committee, we would like congratulate Pranav for this well-deserved accomplishment.

Words from the Chair

BY VICTOR SUSSMAN, CHAIR

The Greek stoic philosopher Epictetus opens the *Enchiridion* with the statement, "Of things, some are in our power, and others are not," succinctly capturing the challenges of recent months and how we have met them. As I assume the role of section chair for 2021-2022, I am optimistic as our community prepares for post-pandemic life. Yet, I am mindful of the significant global challenges that remain. Nevertheless, to borrow from Sir Winston Churchill, it is my hope that as vaccines become more widespread and ease suffering everywhere, that, "The life of the world may move forward into broad, sunlit uplands."

The recent crisis has also led me to reflect on the positive role of science in society, but especially the role that chemical engineering plays in enabling that science. The arrival of revolutionary mRNA vaccines echoes the development of antibiotics in its significance. Amongst the public, most know of Alexander Fleming's discovery of penicillin, fewer know of Edward Abraham's role in introducing it for clinical use. Fewer still know Dr. Margaret Hutchinson Rousseau, the trailblazing chemical engineer and first female member of AIChE, whose development of deep tank fermentation enabled its commercial production. As engineers today have rapidly scaled up the manufacture of virus-thwarting vaccines, they follow in her footsteps and remind us that the societal role of chemical engineering is one of consequence.

Closer to home, I want to thank Deboleena Chakraborty for her leadership as section chair during a challenging time. Her enthusiasm, inclusiveness, recognition of others, and optimism were critical. I look forward to working together as she becomes past-chair and thank outgoing past-chair Stacie Santhany while welcoming

newly-elected Vice Chair Miao Wang. Thanks also to Mark Sullivan for his assiduous work as secretary, Eric Stangland as our longstanding treasurer, newsletter editor Jyo Lyn Hor, web master Bala Sreedhar, membership and publicity chairs Greg Theunick and Laura Basgall, and archivist/CEH administrator Rich Helling. Pranav Karanjkar showcased his versatility as

program chair when we moved online and going virtual allowed us to host speakers near and far, adding richness to the seminar program.

While our young professionals' activities were curtailed in 2020-2021, Pat Heider is developing a robust program for this year. I also thank Thu Vi for service as STEM outreach chair prior to her relocation to the East Coast. We are fortunate to have Kimberly Dinh continue as chair of our inclusion and diversity committee, as we strive to ensure that all with an interest in chemical engineering can participate and be heard. Finally, thanks to our directors Laura Dietsche, Shawn Feist, and Bruce Holden. Not least of all, thank you to all of our members for your ongoing support and participation – you are MMAIChE.

This June we presented our annual scholarship and section awards, and I want to recognize the efforts of scholarship chair Ted Calverley and awards chair Michael Molnar. I offer my sincere congratulations to Chemical Engineer of the Year Mike Telgenhoff, Young Chemical Engineer of the Year Pranav Karanjkar, and our scholarship recipients Pritesh Ravi and Faith Tabler on your well-deserved recognition. Read on to learn about our talented award recipients. It is inspiring to see both talented students at the start of the adventure and highly accomplished practicing professionals and to witness their enthusiasm for science and engineering.

Finally, I would like to welcome Carlos Escobar and Melissa Aplan to our team. I encourage anyone seeking to get involved to volunteer with the section – there are opportunities to suit a range of interests and time commitments, and it's fun too! Professional societies furnish a network, serve the community, and allow you to share your passion for your chosen field. Please contact me or any of the section officers for further information. I am excited for the year ahead, and I look forward to seeing all of you soon. Onward!

Very Respectfully,
Victor Sussman

Reflecting on a Successful Year

BY DEBOLEENA CHAKRABORTY, FORMER CHAIR

Oh, what a year this has been! I would like to sincerely express my gratitude to the Mid-Michigan AIChE leadership team, committee chairs, and new committee members for going beyond to execute, plan and shape up another great year. We could not have done this without YOU. We organized the seminar series; you showed your support by showing up and participating. This is first year ever when we had a virtual kick-off during September 2020. It was overwhelming to see so many of you join us online with your favorite beverage and have fun with the Trivia. It sparked so many discussions! A huge shout-out for the Midland Saxophone Quartet (Tim Lemke, Jon van Regenmorter, Larry Carbary, and John Anderson) for taking their time to pre-record a session especially for MMAIChE! The evening was special because of your commitment.

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." We actively worked towards continuing this journey even when being virtual was a reality. This year we have introduced the MMAIChE Equity, Diversity and Inclusion (EDI) Committee to embrace the diversity our members bring to the table and provide equal opportunity to all. Kimberly (Kim) Dinh, our newly appointed EDI chair, has a lot to offer. This year, the executive committee decided to add additional co-chair positions for K-12 STEM, Young professionals, and EDI committees to offer additional career and professional development opportunities for our members. If you are interested in sparking interest about Chemical Engineering in young minds, you have an opportunity to be more involved - reach out to anyone of us! Our chapter is looking forward to organizing interactive events at local schools, communities and colleges. Our seminar chair Pranav Karanjkar continued organizing seminar series on diversified topics virtually to keep our members and community engaged. We have a great year ahead planned. Please stay tuned for those seminar announcements on Facebook and social media.

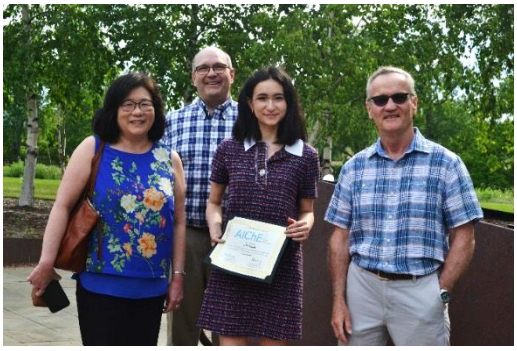
Our scholarship applicants were outstanding! Congratulations to Faith Tabler, a graduating senior from H.H. Dow High School in Midland for winning the 2021 MMAIChE Undergraduate Chemical Engineering Scholarship. Congratulations to Pritesh Ravi, a sophomore at Freeland High School, for winning the 2021 Engineering Exploration Scholarship. All the very best Faith and Pritesh! Thank you, Ted Calverley, for organizing an informal award ceremony at the Founder's Park. Congratulations Pranav Karanjkar for winning the 2021 Young Chemical of the Year and Congratulations Michael Telgenhoff for winning the 2021 Chemical Engineer of the Year award from Mid-Michigan sections. Thank you, Mike Molnar, for your efforts in identifying and honoring the talents in the section.

As my term as the section chair is ending, I am optimistic that our section will continue to embrace diversity as we learn from each other, bring in new ideas and make efforts to engage with the community. Our chapter is a hub of technologically minded members, you bring so much to the table. I would encourage you to continue the discussion and find opportunities to get more involved. With Victor Sussman assuming the role of Chair for 2021-22 and then Miao Wang taking up the responsibility in 2022-23, I assure you we are off to a great start! It surely has been an honor to be a part of this organization. Thank you for being a part of it.

Sincerely,
Deboleena Chakraborty.

2021 Chemical Engineering College Scholarship Awarded to Faith Tabler

BY TED CALVERLEY, SCHOLARSHIPS CHAIR



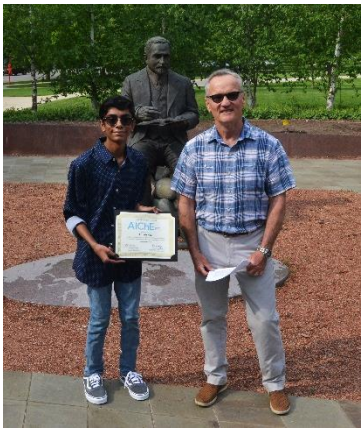
Faith Tabler, a graduating senior at H.H. Dow High School in Midland, has been awarded the 2021 Mid-Michigan AIChE Undergraduate Chemical Engineering Scholarship. The scholarship provides $2000 over 4 years to a graduating high school senior from the Great Lakes Bay region and neighboring counties who 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.

Faith plans to attend the University of Michigan in the fall to study chemical engineering. She has an impressive 4.0 GPA, was a member of the state champion Policy Debate Team for 2018-19, is a National Honor Society member and a National Merit Finalist and Scholarship winner. She runs for the Dow High cross country team and is a member of the Midland Area High School Figure Skating Team. In addition to her academic and athletic pursuits, Faith has been involved in numerous community organizations such as the Midland County Health and Human Services Council, the Michigan Youth Girls Advisory Board and is a Grace A Dow Library volunteer. She has taken significant leadership roles for the Midland County Youth Action Council where she was the Grants Chair for 2019-20 and the President for 2020-21.

Faith received her award on June 2nd during a small, socially-distanced outdoor ceremony at Founder's Park in Midland.

2021 Engineering Exploration Scholarship Awarded to Pritesh Ravi

BY TED CALVERLEY, SCHOLARSHIPS CHAIR



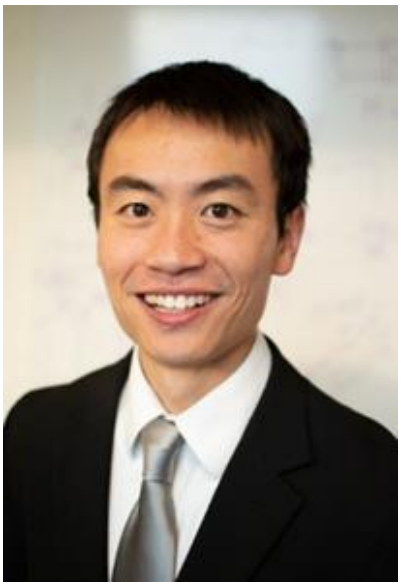
Pritesh Ravi, a sophomore at Freeland High School, has been awarded the 2021 Engineering Exploration Scholarship to attend the Summer Youth Program at Michigan Technological University (MTU). The MMAIChE Engineering Exploration Scholarship provides an opportunity for high school students to explore science and engineering careers through laboratory, classroom and field experiences at the MTU Engineering Exploration Summer Youth Program in Houghton, MI. The scholarship is open to students in grades 9 – 11 in the Great Lakes Bay region and neighboring counties.

Pritesh feeds his interests in STEM fields through his involvement with the Freeland High Robotics team, where he enjoys the practical application of STEM principles to create working robots. He is also a member of the STEM club which helps students explore potential career paths in the technical fields. While Pritesh maintains a 4.0 GPA, his teachers comment that they enjoy seeing his drive to understand the principles they are teaching and his willingness to put in extra research to expand his understanding of the course work. Pritesh also volunteers at the twice-monthly Freeland Lions Club food giveaway, which he says is satisfying but also helps him to broaden his perspectives and appreciate the things he has.

2021 Scholarship Award Mini Ceremony & Passing of the Gavel

New 2020-21 MMAIChE Officer in Profile

BY MIAO WANG, VICE CHAIR



Miao Wang joined the Process Development team in Engineering & Process Science, Core R&D, at Dow in Spring 2020. Miao was born in Sichuan China and obtained his B.S. in Chemistry and B.Eng. in Chemical Engineering at UMN-Twin Cities. As an undergraduate, Miao interned with Viracon to study mechanical properties of sealants in architectural windows. Miao also volunteered with UMN tutoring program for local high schools. Miao completed his Ph.D. with Prof. T. Alan Hatton at MIT, focusing on electrochemical engineering and separation processes. His Ph.D. work involves designing an electrochemically mediated amine regeneration process for flue gas CO_2 capture. At MIT, Miao worked with students participating in Chem-E-Car competition on evaluating battery and fuel cell powered mini-automobiles.

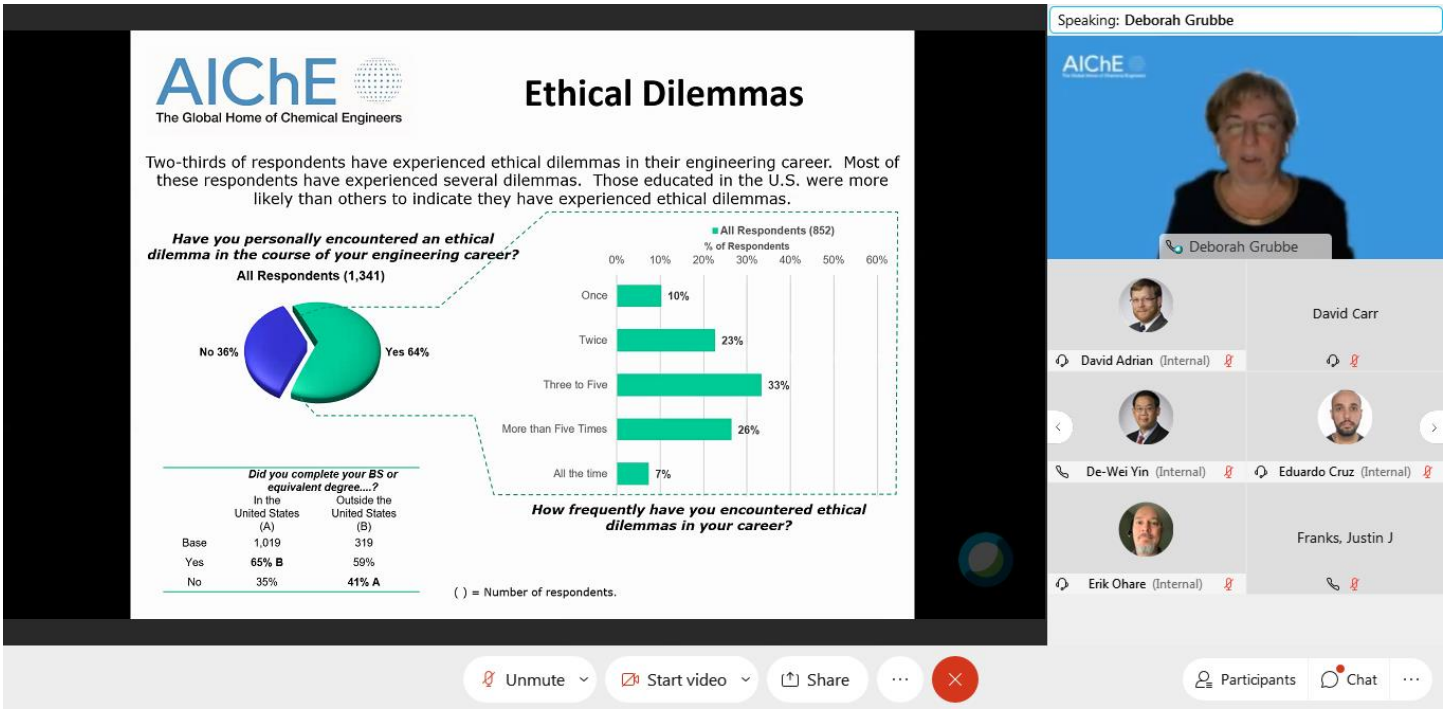
Since joining Dow, Miao has been supporting efforts in evaluating feedstock flexibility and in improving manufacturing reliability. Miao also collaborated with Hydrocarbons and Home & Personal Care on evaluation of novel separation units and in electrochemical upgrading of feedstocks. As the new vice-chair, Miao will strive to promote STEM outreach and provide opportunities to develop members professionally. In his free time, Miao enjoys playing the piano, running and spending time with his dogs.

BY CARLOS ESCOBAR, K-12 STEM EDUCATION OUTREACH CHAIR

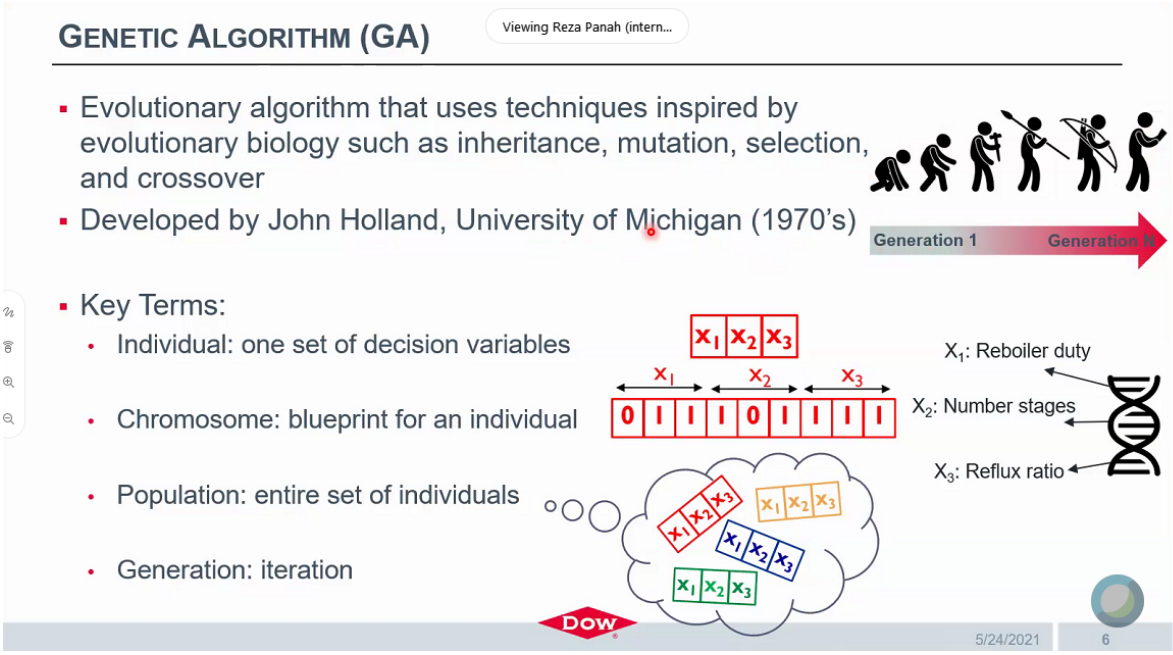
Carlos joined Dow in 2014. He is a Research Scientist in the Materials Science & Processing team within the Formulation, Automation, & Materials Science organization in Core R&D. His research focus is on extrusion-based technology. Carlos develops, optimizes, and scales up BLUEWAVE™ Technology, Reactive Extrusion, and Specialty Compounding processes. Fundamentally, his Process R&D activities de-risk the commercialization of Dow products by bridging the gap between lab and commercial scales. His research efforts have had a deep economic impact and global reach on the growth initiatives of several Dow businesses. Carlos is a certified Green Belt Project Leader and a Dow BEST Symposium alumnus (2013) and Chair (2018).

Carlos received his Ph.D. degree in Chemical Engineering from Vanderbilt University, a M.Sc. degree in Chemical Engineering from Universidad Nacional de Colombia, and a B.S. degree in Chemical Engineering from Universidad de San Buenaventura (Colombia). Carlos' Ph.D. research focused on: 1) the fabrication and characterization of novel materials and interfaces by employing surface-initiated ring-opening metathesis polymerization within nanoporous architectures to create composite membranes, 2) the amplification of the surface-initiated polymerization (SIP) of partially fluorinated polymer films to fabricate specialty coatings, and 3) developing a new SIP-based method to replicate the complex topographies of superhydrophobic natural surfaces onto solid supports. Prior to graduate school, Carlos worked in the production of bi-axially oriented polypropylene films and high-pressure laminates for packaging and decorative surface applications, respectively.

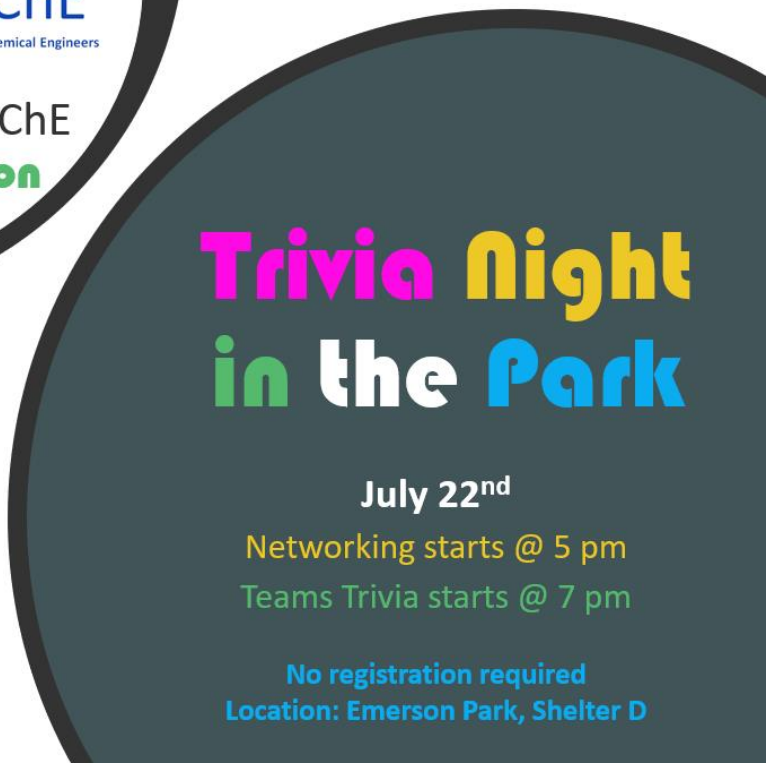
April & May 2021 Seminar Series



April seminar ‘Ethical Practice - A Perennial Business Challenge’ by President of AIChE, Deborah Grubbe



May seminar ‘High Throughput Modeling: A Novel Approach for Process Optimization’ by Reza Panah



Donating to Support a Future Engineer through Mid-Michigan AIChE is Easy!

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 sustain the scholarship fund that sends high school students to the Michigan Technological University Summer Youth Program or to an accredited university or college for a degree in chemical engineering.

You can choose to donate using a PayPal account or with a Debit or Credit card.
The PayPal link is:
https://www.paypal.com/donate/?cmd=_donations&business=eestangland%40charter.net&item_name=Scholarships+donations+to+Mid-Michigan+AIChE&currency_code=USD

OR scan the QR Code on your smartphone – it takes seconds!

Donations are tax-deductible and our secretary can provide you with a receipt.
We sincerely thank you for financially supporting aspiring chemical engineers.

The Mid-Michigan Section of AIChE gratefully acknowledges the support provided by the following sponsors.

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Stay tuned for the 2021–2022 event schedule!