

THE ACTION & REACTION

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

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2016 MMAIChE Awards Winners

BY MICHAEL MOLNAR

Young Chemical Engineer of the Year

This year's recipient of the MMAIChE Young Chemical Engineer of the Year Award is Megan Donaldson, a Research Scientist in the Core R&D Engineering & Process Science Laboratory at The Dow Chemical Company. She holds a Ph.D. in chemical engineering from Georgia Institute of Technology and bachelor's degree from Michigan Technological University. Megan is a highly regarded subject matter expert at Dow for advancements in process separations technology. Examples of her impact on commercial practice include: development of key crystallization processes, development of new adsorption technology, and development of new extraction processes.

Megan served as Chair and Vice Chair of Area 2C Extraction in the Separations Division and is currently a Director of the Separations Division. In addition, she is the Past Chair of the Women's Initiatives Committee, and the Vice Chair of the Societal Impact Operating Council.

Chemical Engineer of the Year

Scott Tipler joined The Dow Chemical Company in 1985 after completing a B.S. degree in Chemical Engineering from Michigan Technological University. Over his 30+ year career, he has served in many manufacturing and engineering roles, in



cluding Run Plant Engineer, Process Control Engineer, Process Engineer, and Manufacturing Global Process Engineering Technology Leader for the engineering polymers, films, and SARAN™ Technology Center.

He is a recognized within the Dow Chemical Company for his in-depth knowledge in process engineering design, in particular, the areas of process safety and pressure relief design. Since 2007, he has served as Overpressure Protection Expertise Area Leader, where he leads a team of pressure relief design subject matter experts. Scott has made significant contributions to this field having served as a member of the AICHE Design Institute for Emergency Relief Systems (DIERS) consortium. He has published several articles in the area of over pressure protection in AICHE's Chemical Engineering Progress and AICHE's Process Safety Progress.

Noland Poffenberger Award

Shawn Feist joined Dow Chemical in 2002 after completing a BS degree in chemical engineering from the University of Minnesota. Starting at Dow in Core R&D, Shawn has also served as a special project leader for R&D synergy during the acquisition of Rohm and Haas. He then led new business development initiatives in Dow Water & Process Solutions before returning to Core R&D as a Senior Leader in Engineering & Process Sciences. Shawn is now the R&D Director of Dow Corporate Venturing, External Technology, and R&D Statistics.

He served as chair of MMAIChE and is a former winner of the section's Young Chemical Engineer of the Year award. Shawn has been active in AICHE at the national level, most recently as a chair for the Process Development Symposium.

Proposed MMAIChE Section Bylaw Revisions

BY TOM GREGORY, PAST CHAIR

The Executive Committee of MMAIChE has been reviewing our section bylaws with a goal of updating and harmonizing them with current recommendations from AICHE. The revised section bylaws as approved by the section officers is now available on the section's website.

For the most part, the proposed revisions involve language and terminology clarifications as well as the limitations of these bylaws with respect to federal, state, and local ordinances and the relationship

between the section and AICHE. The most significant revision with respect to section operation involves Article XII. While our current bylaws require approval of proposed bylaws amendments by a 2/3 majority of at least 25% of the current regular members of the section, the proposed revision of this article streamlines this process by allowing for approval by the section officers following a comment period when input would be requested from section members. The motivation for this change

is a recommendation from AICHE for consistency with the bylaws of other local sections.

The ballot for this vote has been sent by email to all regular members of the Section and is due by 8 am on October 3. The section officers recommend a "Yes" vote on these revisions. Questions or comments may be directed to Tom Gregory (tdgregory@sbcglobal.net). To request a replacement ballot email please contact Bruce Holden (bsholden@dow.com).

Introduction and Plan for the Fiscal Year

BY STACIE SANTHANY

A 30 second bio about me... I am a local girl from Bay City, where I grew up living on the Saginaw Bay. I really started to love science when I began working at Dow Chemical at the age of 16 years, as a junior in high school. I ventured to Michigan State University, where I earned my BS in Chemical Engineering in 2001. During the years at MSU, I was heavily involved in the student chapter of AIChE and was the 2000–2001 chapter president. After graduation, I came back to Midland to start my career at Dow Chemical in Agricultural Chemical Process Research.

Over the last 15 years, my passion has lied in process development for various Dow businesses, such as AgroSciences, Amines, and Energy Materials. I have recently taken the role as technical resource leader of the Solids Processing Discipline of Engineering & Process Sci-

ences, which I am really enjoying. I have a husband Brian (who many of you know) and two kids Taylor (8) and Carter (6). In addition to work and home, I now have the honor of sitting as the chair of MMAICHE alongside many of you amazing engineers and scientists.

This year I hope to keep up the momentum of the past MMAICHE chair and continue to grow. The seminar series from this past year was fantastic, so we will aim to get a great group of speakers to keep us all continuously learning (one of my favorite things to do). You will hear lots more about the speaker lineup in September during the kickoff event. We will definitely keep up the momentum in the STEM outreach category too (another passion of mine). Let's grow MMAICHE!! If you know of colleagues that are not involved that would benefit from joining,



please pass the word. See you all around Mid-Mich doing great science and engineering!

Looking Back on the 2015–2016 Program Year

BY TOM GREGORY

MMAICHE's 2015/2016 program year (and my term as Section Chair) ended with our annual banquet on May 24. We concluded another successful year by awarding scholarships and awards. We also recognized our 50+ year members and our Section members who have attained the rank of Fellow in AIChE.

I provided a "State of the Section" address to update banquet attendees on our activities over the course of the past year and on-going activities. We have a very active Executive Committee that meets monthly to plan Section activities and conduct its business affairs.

Our monthly seminar program this past year was very well received and covered such diverse topics as chemophobia, energy issues, inherently safe chemical plant design, food supply, silicones, evolution of a green chemistry startup, and additive manufacturing (3-D printing). In addition, we provided 55 continuing education certificates to licensed professional engineers to help them meet the requirements for maintaining their licenses.

Our educational outreach efforts began the year by presenting demonstrations on

the effects of friction on packed solids and density effects in mixtures of immiscible liquids to thousands of attendees at the 3rd Annual Great Lakes Bay STEM Festival in September at Delta College. In March we conducted lessons on surface tension and histogram analysis for 600 science students at Jefferson and Northeast middle schools. These demonstrations were conducted by nearly 30 volunteers which helps keep our costs low for these activities and allows us to reach more students.

Our Section finances are in great shape, with receipts over the past year of \$5295, mostly from member dues, and expenses of \$5031, mostly for scholarships and meeting expenses. We also have a healthy endowment of \$50,591 which we are working on growing to provide more income to support our scholarship program.

The Executive Committee also conducted a comprehensive review and update of our Section bylaws over the past year. The proposed revisions have been reviewed by AIChE's Local Sections Committee and their feedback has been incorporated into the revision. The pro-

posed bylaw revision is now before our members for final approval.

The feature event of the evening was the keynote address by Victor Atiemo-Obeng who is a Director of the Safe Water Team (among his many other endeavors). Victor spoke on the topic of Retirement Living: Opportunities to Live out Passions and Address Pressing Needs. Victor told us of the many rewarding activities he has engaged in following his retirement from Dow Chemical, particularly his work to provide water purification systems to areas of Africa that previously had no access to safe drinking water. Victor encouraged all of us to continue to use our talents to help make this a better world.

I'd like to thank the members of the MMAICHE Executive Committee, who have done a terrific job over the past year (as they always do!), and I'm confident that our incoming Section Chair, Stacie Santhany, and Chair-Elect, Ted Calverley, will continue the Section's fine tradition of serving our members and the community at large with interesting and innovative programs.

Scenes from the 2016 MMAIChE Spring Banquet



MMAIChE members and guests enjoying dinner.



Victor Atiemo-Obeng delivering the keynote lecture.



Norm Lake is recognized for his service to MMAIChE.



Chemical Engineer of the Year Scott Tipler.



Tom Gregory passing on the gavel to Stacie Santhany.



Young Chemical Engineer of the Year Megan Donaldson.

2016 MMAIChE Scholarship Winners

BY NANCY TSENG, SCHOLARSHIPS CHAIR

The Engineering Exploration Scholarship awards full tuition, room and board, and a \$100 travel allotment for a high school student to attend the Michigan Technological University's Summer Youth Program. The objective of this scholarship is to foster passion and interest in STEM in the future generation of scientists and engineers. The winner of the 2016 scholarship is Megan Brooks. She is currently a sophomore at Swan Valley High School in Saginaw. She is a member of several student organizations, including Students Against Destructive Decisions, Student Government, and Model United Nations. She is also an accomplished athlete and is on her school's varsity cross country team, varsity soccer team, and junior varsity basketball team and is also a member of the Saginaw Storm soccer team. The

scholarship evaluation committee was very impressed with her essay where she described her passion for solving puzzles and her interest in the intersection between medical science and engineering. Thus, we have awarded this scholarship to her so that she can further explore this interest in the Genetic Modification and Biotechnology program at MTU.

The Undergraduate Chemical Engineering Education Scholarship awards \$2000 over 4 years to an exceptional high school senior who plans to major in chemical engineering at an ABET-accredited school. The winner of the 2016 scholarship is Austen Zhu. He is graduating from H. H. Dow High School and plans to attend the University of California Berkley. He is an avid community volunteer, piano player, and soccer player. He plays on his

school's varsity soccer team as well as in the Midland and Alliance Soccer Clubs. Of special note to the scholarship committee was his work as co-captain of the A.H. Nickless Innovation Project Team. His team won the \$25,000 grand prize for their school 3 years in a row. In 2014, they designed a microbial fuel cell to clean their school's waste water system. In 2015, they designed a wearable piezoelectric device that would convert energy from jogging athletes to charge mobile devices. This year, they designed a reverse electro dialysis device that would produce fresh water in arid, coastal regions. Thus, we have awarded this scholarship to someone who not only shows interest in chemical engineering, but has already applied engineering concepts to solve real world problems.



Megan Brooks (left) receives the Engineering Exploration Scholarship from Scholarships Chair Nancy Tseng.



Austen Zhu wins the Undergraduate Chemical Engineering Education Scholarship.

K-12 STEM Education Outreach Report

BY ALAN STOTTLEMYER, K-12 STEM EDUCATION OUTREACH CHAIR

The Mid-Michigan AIChE K-12 STEM Outreach Committee was invited to return to the grade 7 science classrooms at Jefferson Middle School and Northeast Middle School in Midland in March 2016. Volunteers taught a one-hour lesson on surface tension and histogram analysis. They worked with approximately 600 students in total.

Nearly 30 MMAIChE volunteers helped with K-12 outreach activities this

year; these included: Victor Atiemo-Obeng, Evelyn Auyeung, Sara Bailey, Dave Camp, Yu Chen, Hsu Chiang, David Couling, Roja Ergun, Maureen Ferries, Ben Freireich, Tom Gilbert, Tom Gregory, Pat Heider, John Herman, Jon Host, Paul Larsen, Jing Liu, Cody Marnach, Bob McAfee, Jim Mitrano, Jim Ringer, Stacie Santhany, Alan Stottlemyer, Rebecca Swanson, Cliff Todd, Kathryn Whitaker, Kathleen Wu, and De-Wei Yin.

MMAIChE does not have an explicit outreach fund to support these activities, therefore outreach cost has been kept low, for example at 25 cents per student for the classroom visit program. We welcome both volunteers and donations to support these efforts.

If you are interested in volunteering or making a donation, please contact Alan Stottlemyer.

Interview with Micromidas' John Bissell

BY MIKA YAMAMOTO

John Bissell, co-founder and CEO at Micromidas Inc. and one of Forbes "30 Under 30" in 2014, has raised more than \$30 million in financing for his company. On Tuesday, March 15 he talked about the challenges and joys of founding a start-up as part of Mid-Michigan AIChE's seminar series. We caught up with him after to ask a few more questions.

MMAICHe: In your seminar talk, you mentioned that you cannot trace back the connection to your first big investor. This investor ended up writing you a check for three million dollars.

Bissell: Yes, he found me, and to this day, we can't figure out who told him about our venture (laugh).

MMAICHe: You were having hundreds and hundreds of meetings and constantly pitching your business at this point, yet, it was not any of these interactions that directly led to your first big break?

Bissell: That's right. It wasn't a clear linear path at all. This is something I like to stress. People—especially intelligent people—love to smooth over the details of a process that are haphazard by nature. For example, science is a messy process. You seldom go from Point A to Point B to Point C. It goes from Point A to Point D back to Point A.1 then A.2...It goes everywhere, backs up, skips in a different direction. But nobody talks about this. Instead, after a desired result is obtained, the story is told as if everything happened in a smooth curve. They go back and choose to talk about only the points that connect, even though this is not how it happened. I call this the Retrospective Narrative Creation. The same is true for creating a business, creating a market, or even hiring people. When people enforce

this on a process that doesn't inherently have these characteristics, you typically get mediocre results. Or even terrible results. So it's important for people to realize that the non-linear process is important.

MMAICHe: Obviously, this messy process means you heard a lot of "no's." I imagine that would be very hard. What was driving you?

Bissell: People have done large studies of start-ups. What they have found that people are driven by the desire not to fail the other people they are working with. It is very, very hard to put yourself out there and be denied over and over again. If you only had to be accountable for yourself, it would be very easy to find reasons for why you didn't want it enough.

MMAICHe: This all started eight years ago. Is this how you imagined the road to be?

Bissell: The last few years is not too dissimilar to what I imagined, but the process of getting here is not what I imagined. The path of the growth of a start-up can be mapped by the path of the growth of its credibility. In order to do anything in the beginning, you need credibility. You need it to hire people, get investors, get customers, etc. The technical aspect is important, but a huge proportion of the work is being able to acquire the credibility to use the technical work. That is something I didn't anticipate. Now we have the credibility, so when I call someone, they will usually pick-up. For a long time, however, that was not the case at all.

MMAICHe: What kind of person is a good fit for working at a start-up?

Bissell: We look for a certain kind of person. We look for people who are willing to look risk in the eyes. There are other



kinds of people who would rather hide risk and not have to see it. At start-ups, what we need are people who aren't willing to go through that denial process. They have to be people who, if the risk is there, they want to face it. They don't necessarily have to take on more risk, just be willing to acknowledge it. At start ups, there is more transparency of what is actually going on.

MMAICHe: What can be gained by working at a start-up company?

Bissell: I like to say that at start-ups, you develop survival skills. There are tertiary skills that must be developed when you work at a start-up that may not be required in a larger company. Obviously, you have to be competent in the major thing that you do. However, other things like: creating personal branding, gaining accounting knowledge, developing networking skills—make you more resilient in an ever changing workforce. This is important because at the end of the day, no singular company can guarantee job security.

2016 AIChE Board Election & Constitutional Referendum

FROM AIChE OFFICE OF THE SECRETARY AND BOARD OF DIRECTORS

Polls are open for the AIChE's 2016 Board Election. Candidate biographies and statements, the debate featuring the candidates for president-elect, and the link to cast an electronic vote on-line are at <http://www.aiche.org/news/institute/09-06-2016/vote-now-2016-board-directors-election>. Candidates will answer questions posed by AIChE young professional members each week during the election process. Voting ends October 10 at 11:59 pm. Election results will be announced at the Annual Meeting.

A Constitution Election is also being held from October 12 to December 12. The proposed changes (see <http://www.aiche.org/about/governance/constitution/proposed-amendments>) (1) implement best practices by specifying term limits for Directors and Officers and move several provisions to the Bylaws; (2) modernizes governance so that the Constitution conforms to New York law; (3) reflects current practices by broadening Board creation of entities and specifying the Past President as an Officer.

The Flint Water Crisis: A Review

BY MIKA YAMAMOTO

What is important to understand about the Flint water crisis is that although it may appear to be a technical problem, in reality, it was a result of ethical breakdown because governmental institutions, politicians, and scientists who were entrusted with the commonwealth of the people did not hold paramount the safety, health, and welfare of the public.

The Flint Water Advisory Task Force Final Report—that was issued in March of 2016—explicitly begins, “The Flint water crisis is a story of government failure, intransigence, unpreparedness, delay, inaction, and environmental injustice.” The deterioration of Flint’s water quality started with the decision to change Flint’s water source from Detroit water to Flint River water in April of 2014. Immediately Flint residents began to complain that something was wrong. These residents, however, were not seeing their concerns being addressed to their satisfaction by officials. Time and time again, officials said on public record that Flint water was “safe to drink.” Even when scientific data was presented, the data was ignored.

It ultimately took a call from Lee Anne Walters, a concerned mother, to Marc Edwards, an environmental engineering professor at Virginia Tech who

has studied the corrosion of old water systems for decades—to effect change.

Edwards and four of his graduate students loaded up his van with water testing kits two days after being contacted by Walters and drove to Flint. This was August 2015, sixteen months after the switch to Flint River water. Thanks to the hard work of the Virginia Tech team and the commitment of the community, over 800 samples were processed. The results came back uncontestable. Flint water was unsafe to drink due to high levels of lead.

Yet, Michigan officials suggested that the Virginia Tech scientists had questionable motives, with one official saying that the group specialized in looking for high lead problems, comparing their work to pulling rabbits out of hats everywhere they go so nobody should be surprised by their findings.

The concerns raised by Dr. Mona Hanna-Attisha, Director of Pediatric Residency at Hurley Children’s Hospital was also initially discredited by officials. When she called for a public health advisory regarding the Flint water situation because her own studies showed increased lead levels in the children of Flint, officials countered by stating that Flint’s drinking water was safe in that it was

meeting state and federal findings.

Only, it wasn’t. Dr. Hanna-Attisha made her announcement on September 24, 2015. By September 26, Public Health Emergency was declared for Genessee County. On October 16, City of Flint switched back to Detroit water. On January 5, 2016 Governor Snyder declared emergency in Flint. On January 16, President Obama signs an emergency declaration—and federal aid is granted for Flint.

The damage, however, had already been done. The House Oversight and Governmental Reform Committee hearing in February 2016 noted that 100,000 residents had been affected for eighteen months and continue to be. Of these, 9,000 were children—a population susceptible to lead poisoning. Two hundred of these children have been confirmed to indeed have lead poisoning—which is known to cause developmental harm. This damage cannot be undone.

Virginia Tech PhD student Siddhartha Roy, one of the researchers involved in analyzing the quality of Flint water, presented an informative webinar to the AIChE community in April 2016 on the whole crisis. AIChE members can view the recording by using one of their member webinar credits.

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University of Michigan AIChE Student Section

BY HANNAH FETNER, 2013 MMAICHe UNDERGRADUATE CHEMICAL ENGINEERING EDUCATION SCHOLARSHIP RECIPIENT

Welcome to the new student membership column! This first column will introduce you to the University of Michigan chapter and some of the things we do, but first let me introduce myself.

My name is Hannah Fetner. I grew up in Midland, MI and graduated from H.H. Dow High School in 2013. I am now a senior at the University of Michigan studying Chemical Engineering and minoring in German. In my time at U of M I've been able to study abroad in Berlin, work in several research labs, be a peer advisor for the College of Engineering, teach elementary-aged students German and engineering, and work as an instructional aide for two different engineering classes. The only thing I have left to do now is win an intramural sports league. In other words, I should probably stop playing on our AIChE team to see that one happen.

I have been involved in the U of M chapter of AIChE for the past three years. I served as the representative for the sophomore class, continued as treasurer my junior year, and will be the chapter president this upcoming year.

The U of M chemical engineering de-

partment currently has 539 declared undergraduate chemical engineering students. Students here start their chemical engineering curriculum in their sophomore year with Material and Energy Balances.

Almost 26% of U of M chemical engineering students participate in AIChE, which totals 139 members. Our AIChE student chapter advisor is H. Scott Fogler, who served as the 2009 National AIChE President. He also wrote the "Elements of Chemical Reaction Engineering" textbook; if you've taken Reaction Engineering Design anytime since 1986, it's probably the book you used. Our program advisor, Susan Montgomery, also plays a large role in helping our student organization succeed by providing unyielding support for our members.

This past year our AIChE chapter held 25 company sponsored luncheons where representatives spoke about their company, its culture, where chemical engineers fit in, and a little about what products they make or help support. In addition to the luncheons we also hosted seven different company information sessions, four plant tours, and two case studies.

A big part of the U of M AIChE chapter is our mentorship program. The program matches underclassmen students with upperclassmen mentors who act as a resource for both questions about the department and possible career paths of interest. It also helps connect students with companies. For example, the "Night with Industry" is an annual event we host where mentees have the opportunity to talk to job recruiters in a small group setting before the big career fair.

Last but not least, our chapter hosts a number of social and service events to foster a sense of camaraderie within the department and help give back to our community. Past events include study nights, potlucks, volunteer work at elementary schools, cider mill trips, ice-skating, working at the creature conservancy, and a trivia night.

I greatly look forward to continue updating all of you over the upcoming year. Hopefully this column will be able to provide you with insight into the life of a Chemical Engineering student at the University of Michigan. I hope you are all enjoying your summer!

Preview of the 2016–2017 Seminar Schedule

Event	Date, Time, and Venue	Speaker and Topic
October	October 11, 2016, 6–8 pm Grand Traverse Pie Co., Midland	Brian Walther TS&D Technology Leader, The Dow Chemical Company <i>"Keeping Our Food Supply Tasty Through Technology"</i>
December	December 13, 2016, 6–8 pm Grand Traverse Pie Co., Midland	Tracy Young Core R&D Program Director, The Dow Chemical Company <i>"Advancing a Water Circular Economy: Key to Sustainable Process Development"</i>
January	January 17, 2017, 11:30 am–1 pm Dow Chemical Michigan Operations 1790 Bldg Rm 272, Midland	Scott Tipler Overpressure Protection Expertise Area Leader, The Dow Chemical Company <i>"Recognizing and Mitigating Overpressure Scenarios"</i>
February	February 15, 2017, 6–8 pm Grand Traverse Pie Co., Midland	Kim Zimmer, P.E. Bay Region Traffic Safety & Operations Engineer, Michigan Dept. of Transportation <i>"Toward Zero Deaths™ safety campaign"</i>
March	March 21, 2017, 6–8 pm Grand Traverse Pie Co., Midland	Mark Bassett Chairman and Chief Executive Officer, Hemlock Semiconductor <i>"Polycrystalline Silicon Technology and Markets"</i>
April Joint seminar with Midland ACS	April 18, 2017, 6–8 pm Venue to be determined	Mary Logan Remedial Project Manager, U.S. Environmental Protection Agency <i>"Tittabawassee River Clean-up"</i>
April	April 25, 2017, 6–8 pm Grand Traverse Pie Co., Midland	Mark Worden Professor, Dept. of Chemical Engineering & Materials Science, Michigan State Univ. Topic to be announced
May Spring Banquet	May 23, 2017, 5:30–9 pm Great Hall Banquet & Convention Center, Midland	Gene Anderson <i>"Life Is Too Important To Be Taken Seriously"</i>