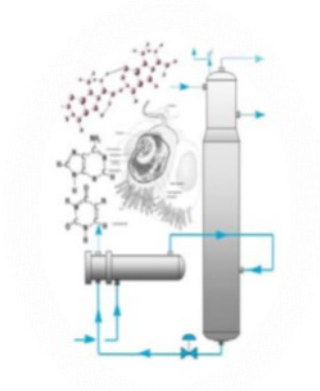
www.aiche.org/Chicago

AIChE Chicago Section

March 2021 Newsletter



Inside this issue:

Virtual Links:

Midwest Regional Conference (MRC)

March 17-18, 2021

Organized by Chicago Local Section of AIChE, with support from AIChE Global

Virtually On "Pathable"

AIChE Midwest Regional Conference

KEYNOTE SPEAKERS

Sohail Murad
Professor and Chair
Department of Chemical and Biological Engineering
Illinois Institute of Technology

Ray Mentzer
Professor of Engineering Practice and Executive Director
Process Safety & Assurance Center
Purdue University

Cathy Tway
Technology and Applications Director
Catalyst Technologies
Johnson Matthey

William Schneider
Professor and Chair
Department of Chemical and Biomolecular Engineering
University of Notre Dame

Marius Stan
Senior Scientist and Leader of Intelligent Materials Design
Applied Materials Division
Argonne National Laboratory

Chair's Corner

It is an exciting time of year...the thirteenth annual AIChE Midwest Regional Conference (MRC) is just days away! This MRC will be the first one conducted virtually and I would like to recognize the following people who have invested so much time and effort to ensure that the event will be a success:

Robert Tsai	*Conference Chair*	Linh Quach	*Outreach Chair*
Matthew Walters	*Conference Co-Chair*	Donald Chmielewski	*Outreach Co-Chair*
Hakim Iddir	*Program Chair*	Maithreyi Thukaraman	*AIChE Support*

The list of speakers and topics is very impressive, so please consider registering if you have not yet done so!

Last month, I wrote that our section had contacted over twenty academic departments throughout the Midwest in order to increase visibility of our local section and the events hosted by it. I was very pleased to see that effort translate into a few new faces at our February monthly meeting! In order to further promote awareness, we recently launched a cost-effective advertising campaign on LinkedIn. In just the past few days, our LinkedIn Group has gained several new members. If you are not already a member, please join us at

https://www.linkedin.com/groups/4538581/

This month, we also need to identify volunteers for several positions for the 2021-2022 operating year: Chair-Elect, Secretary, Vice Chair - Programming, and Director-at-Large. The nomination deadline is March 19th. If you, or someone you know, may be interested in one of these positions, please contact me. I have found it very rewarding working with the Chicago Section for the past several years because of the passion, helpfulness, and talent of the volunteers. Any new candidate should be aware that plenty of help will be available should he/she be voted into a role, so do not let inexperience be an obstacle. Volunteering is a great way to build connections and make an impact by helping to advance the chemical engineering community.

Jeffrey M. Zalc

jeffrey.zalc@bp.com
zalc@iit.edu

AIChE Chicago Section Chair
AIChE Senior Member

2021 Meeting Schedule and Speakers

Month	Date	Speaker	Affiliation	Topic
March	Wednesday 17th	Prof. Sohail Murad	IIT	Process Synthesis; joint with MRC
April	Tuesday 13th	Dr. Ted Krause	Argonne	H_2 generation and utilization
May	Tuesday 18th	Prof. Liane Rossi	Universidade de São Paolo	Catalyst design for sustainable transformations

2021 MIDWEST REGIONAL CONFERENCE
KEYNOTE SPEAKERS

Process Safety Update – Training, Research, … Where Are We Headed?

Ray A. Mentzer, Ph.D.

Professor of Engineering Practice and Executive Director

Process Safety & Assurance Center

Purdue University

Speaker's Bio:

Ray is a Professor of Engineering Practice in the Charles Davidson School of Chemical Engineering at Purdue since 2016, where he teaches the required senior level 'Chemical Process Safety' course and is Executive Director of the Purdue Process Safety & Assurance Center. The Center oversees a wide variety of process safety research at PhD, MS and UG levels, with a dozen faculty and about three dozen students engaged. Previously, he taught at Texas A&M and was part of the Mary Kay O'Connor Process Safety Center for seven years. Earlier he had a 28-year career with ExxonMobil, with over a dozen assignments, with experience in research, facility design, operations, finance, public affairs, and safety & environment. He has a BS from the University of Illinois, and MS & PhD from Purdue - all in Chemical Engineering.

Abstract:

Following the T2 Laboratory incident in FL in 2007, all ABET accredited Chemical Engineering curricula have been required to address process safety. Numerous approaches, with only a few schools choosing to require a rigorous technical course, but number seems to be growing – albeit, slowly. What does such training generally consist of and what are the challenges academics have in offering such training? The Davidson School of Chemical Engineering at Purdue University is deeply committed to process safety and requires such rigorous training for all seniors. In addition, the Purdue Process Safety & Assurance Center (P2SAC) was formed in 2014 focused on process safety research at the PhD, MS and undergraduate levels. Projects are suggested by industry sponsors who represent a broad spectrum of industries – oil & gas, chemicals, pharmaceuticals, manufacturing, etc – many of whom serve as mentors during the work. Several recent projects will be highlighted, including a snapshot of the future direction & challenges in this technical multifaceted discipline.

Science and Society

Marius Stan

Senior Scientist and Leader of Intelligent Materials Design

Applied Materials Division

Argonne National Laboratory

Speaker's Bio:

Dr. Marius Stan is a Senior Scientist and Leader of Intelligent Materials Design in the Applied Materials Division at Argonne National Laboratory. He is also a Senior Fellow at University of Chicago and Northwestern University. Marius and his team use artificial intelligence (AI) and high-performance, multi-scale computer simulations to understand and predict physical and chemical properties of multi-component metals and ceramics. The applications include energy production (nuclear fuels and reactor materials), energy storage (batteries) and electronics. The team also uses AI to optimize complex processes for manufacturing applications such as 3-D printing and flame spray pyrolysis. Marius has extensively published in the scientific literature,

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holds several patents, and is currently writing a book on modeling and simulation. He is also an author of short-stories and poetry. Some will recognize him as an actor, portraying Bogdan in the award-winning TV series *Breaking Bad*.

Abstract:

Elements of science, engineering, and technology have positively impacted human society throughout history. Among the most spectacular developments are the discovery and design of new materials and chemical compounds. With the volume, variety and rate of data generation continuously increasing, human analysis becomes extremely difficult, if not impossible. In this talk, the concept of "intelligent software" is introduced and discussed. The software includes elements of Artificial Intelligence such as machine learning and computer vision, coupled with reduced-order modeling and Bayesian statistics for uncertainty evaluation. The value of the approach is illustrated using examples of material design and real-time optimization of synthesis processes. The presentation also includes a discussion of the impact of AI and computational science on society, with a focus on lifestyle, cinema, and visual arts.

The Future Ain't What It Used To Be

Cathy Tway

Technology & Applications Director

Catalyst Technologies

Johnson Matthey

Speaker's Bio:

Cathy Tway is the Technology and Applications Director for Catalyst Technologies in Johnson Matthey. In her role, Cathy is responsible for a global team of scientists and engineers specializing in catalysis, process technologies, and engineering design. She ensures customer driven R&D and engineering is delivered efficiently and provides technical input, oversight, and direction.

Johnson Matthey (JM) is an international specialty chemicals company and a leader in sustainable technologies. Established in 1817, the company has a long history of innovation in advanced materials and technologies. JM's vision is for a world that is cleaner and healthier; today and for future generations. The company uses its expertise in advanced materials and technology to innovate and improve solutions that are valued by customers, optimize the use of natural resources and enhance the quality of life for millions of people around the world. Within JM, the Catalyst Technologies Business Unit supplies catalysts, absorbents and licensed processes to enable its customers to achieve chemical transformations with greater efficiency and reduced environmental impact.

Prior to joining Johnson Matthey, Cathy held positions at Dow, Celanese, Solutia, and Akzo Nobel, holding both R&D leadership and individual contributor roles. Her more than 25 years of industrial experience covers the entire catalyst project life cycle including front-end opportunity identification and creation of new technologies, process scale-up, commercialization and plant support. Over her career, Cathy has commercialized two new inorganic materials and four catalyst technologies, with two of these processes still in use today. She has served on numerous review panels, boards and committees including the committee for the National Academies of Sciences, Engineering, and Medicine consensus study report on "Gaseous Carbon Waste Streams Utilization." Cathy earned her BS degree in chemistry from Wichita State University and her Ph.D. in physical inorganic chemistry from the University of Nebraska-Lincoln.

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Models and Opportunities in Plasma Catalysis

William Schneider

Professor and Department Chair

Department of Chemical and Biomolecular Engineering

University of Notre Dame

e-mail: wschneider@nd.edu

Speaker's Bio:

Bill Schneider's expertise is in chemical applications of density functional theory (DFT) simulations. After receiving his Ph.D. in Inorganic Chemistry from the Ohio State University, he began his professional career in the Ford Motor Company Research Laboratory working on a variety of problems related to the environmental impacts of automobile emissions. At Ford he developed an interest in the catalytic chemistry of NOx for diesel emissions control, and he has published extensively on the chemistry and mechanisms of NOx decomposition, selective catalytic reduction, trapping, and oxidation catalysis. In 2004 he joined the Chemical and Biomolecular Engineering faculty at the University of Notre Dame as an Associate Professor. At Notre Dame he has continued his research into the theory and molecular simulation of heterogeneous catalysis, with particular emphasis on reaction environment effects on catalytic materials and their implications for mechanism and reactivity. He was named the H. Clifford and Evelyn A. Brosey Chair in 2016 and Dorini Family Chair and Chair of the Department of Chemical and Biomolecular Engineering in 2020. He has co-authored 200 articles and book chapters, is a Fellow of the American Association for the Advancement of Science, is an Executive Editor of The Journal of Physical Chemistry, and was the 2018 recipient of the Giuseppe Parravano Award of the Michigan Catalysis Society.

Abstract:

Heterogeneous catalysis is essential to industrial chemical processes, from those that transform petroleum into fuels and chemicals to those, like the Haber Bosch process, that create fertilizers to feed the planet. The first heterogeneous catalysts were discovered empirically and improved through Edisonian experimentation. Within the last twenty years or so, however, the field has been transformed through the advent of catalysis science, which, using high fidelity synthesis and characterization coupled with molecular-level models, is able to understand and predict catalytic function. Catalysis science has revealed that the most common heterogeneous catalysts present a tableau of reactivity limited by intrinsic correlations between the various reaction steps that make up a surface catalytic reaction. Coupling of heterogeneous catalysts with non-thermal plasmas offers the potential to break these constraints. While empirical evidence suggests that such combinations can enhance apparent catalytic function relative to plasmas or catalysts alone, the absence of basic models to rationalize this behavior and guide material and plasma selection has limited progress. In this talk I will describe recent work to bridge this gap through the development of models that highlight the potential origins and consequences of combining non-thermal plasmas and catalysts, all in the context of nitrogen fixation.

https://www.aiche.org/conferences/midwest-regional-conference/2021

Attention Students and Parents!

If you are an undergraduate chemical engineering student or have a son or daughter that plans to study chemical engineering you may be interested in the Chicago Section's scholarship program.

Applications are due **March 1st** .

Please click here to read rules and eligibility.

For a Link to the Electronic Version of the AIChE Chicago Scholarship Application Form, Click on the Link Below:

http://form.jotform.us/form/42814483647159

Why Renew Your AIChE Membership?

Renew your membership now to keep learning and growing.

Stay Connected to 40,000+ international members who take advantage of:

- Subscription to AIChE's flagship publication: CEP*
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- Access to the AIChE eLibrary—a wealth of information from Knovel Life Sciences and the McGraw-Hill AccessEngineering Library collections

View COMPLETE benefits

Renew Membership

Submitting Articles to AIChE Columns

We welcome email submissions for our monthly newsletter. Commercial announcements are subject to the fee schedule below. News stories, editorials, technical or career related non-commercial contributions are always welcome with no charge. We consider job postings, announcements of for-fee training courses, expositions, conferences as commercial. Categorization of announcements is at the sole discretion of the Chicago AIChE Board of Directors. Chicago AIChE may publicize activities of interest to our members by cooperating professional societies and other non-profits without charge.

Please submit your material to **aichechicago@gmail.com** with "newsletter article" as a subject line.

NOMINATIONS FOR 2021-22 AIChE Chicago SECTION OFFICERS

Members may nominate only one candidate for each office (Chair-Elect, Vice-Chair Program, Treasurer, Secretary) and one Director-at-Large for 2021-22 Fiscal year.

Please submit nominations either online:
https://form.jotform.com/50354560774154
or send an email to:
Jeffrey M. Zalc at:
(jeffrey.zalc@bp.com or zalc@iit.edu)
The nomination deadline is **March 31**.

Act Now

AIChE Chicago March Dinner Meeting

Registration (SEPARATE FROM MRC): https://www.cvent.com/d/9jq2fj/1Q

Using Molecular Modeling for Screening and Optimizing Membrane Based Separation Processes

Sohail Murad

Professor and Department Chair

Department of Chemical and Biological Engineering

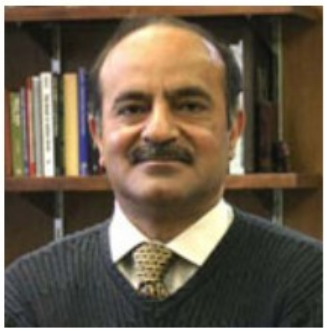
Illinois Institute of Technology

Abstract:

Separations consume almost 15% of the total global energy consumption. These separations ae currently almost exclusively thermal. Membrane based separations offer a energy efficient alternative, but the development of these methods has been challenging. One possibility to address these challenges is to use computational tools for screening design alternatives rather than using traditional engineering techniques for lab scale to commercial designs. We will describe how molecular simulations using a method based on molecular dynamics can be used to study and design a wide variety of separation processes. These include reverse osmosis separation of brine, separation of air and N_2-CO_2 mixtures using zeolite membranes, pervaporation separation of alcohols, and selective permeation of heavy ions and protons in ion exchange membranes used in the new generation of redox batteries. Finally molecular simulations have been used to understand anomalous behavior observed in experimental studies

Speaker's Bio:

Dr. Sohail Murad is Professor and Department Chair of Chemical and Biological Engineering at the Illinois Institute of Technology. Prior to this he was Head of Chemical Engineering at University of Illinois at Chicago, where he joined the faculty in 1979 after receiving a PhD from Cornell University, Ithaca, NY. He spent 1981-82 at Exxon Research and Engineering Company at Florham Park, New Jersey, while on a leave of absence from the university. He was an ARO Research Fellow at the Ballistics Research Laboratory in 1985. He is the author of over 150 archival research publications and book chapters. He is/has been a member of the Editorial Advisory Board of *Computer Applications in Engineering Education, Scientific Journals International* and *Research Letters in Chemical Engineering*. His research is focused on alternate energy and its efficient utilization, computational molecular modeling of fluids on membrane surfaces and pores and on heat and mass flows in nanosystems. It has been funded by the US National Science Foundation, US Department of Energy, US Army Research Office, American Chemical Society, IBM, Dow Chemical Company, Sun Microsystems, Microsoft, and other private and public funding agencies. He is an elected fellow of the American Institute of Chemical Engineers, and member of several other professional societies. He holds honorary faculty positions at Nanjing University (China), Petra University (Jordan), and University of Karachi (Pakistan). He has given many keynote talks at national and international symposia, and has served on panels of the National Science Foundation, Department of Energy, Department of Defense, Environmental Protection Agency, etc.



Contact Information:
http://engineering.iit.edu/faculty/sohail-murad
Email: murad@iit.edu

We want you for AIChE Chicago!

We need your help!

How many opportunities can you find to learn project management, delegation and leadership skills for free? Volunteering with the Chicago Section of AIChE is such an opportunity. While you're learning new skills, your professional network grows. Just about all of us are either undergoing a career change, contemplating a career change, or are wondering if our career will be changed for us. Volunteering with AIChE is a way to add skills and accomplishments to your resume.

Volunteers are needed to help with:

* Programming – arrange speakers for monthly meetings, and arrange catering and venues
* Logistics – arrange catering and venues
* Newsletter Editor – prepare and publish ten monthly newsletters
* Newsletter Contributions – write meeting summaries, contribute photos, and more
* Engineering Outreach – coordinate three annual K-12 outreach events with high schools and colleges
* Professional Development and Sponsorship – arrange companies to sponsor pre-meeting talks to help fund student dinners
* Awards and Scholarship Committees – Review applications for local Section award and scholarships
* Midwest Regional Conference – many opportunities including programming, logistics, website, advertising, sponsorship, high school outreach, poster session and more!
* Young Professionals – plan socials and programming for young professionals (under 35)

If you are interested in any of these positions, please contact us *aichechicago@gmail.com*.

http://www.aiche.org/community/sites/local-sections/chicago/announcements/volunteerism

Women History Month

Paula Hammond
MIT chemical engineering head creates drug-delivery systems

Laura M. K. Dassama
Using structural biology to search for sickle cell disease therapies

Maria Telkes
Biophysicist and inventor
1900 – 1995

Wendy Lee Queen
Combining MOFs with polymers to clean up air and water

Edith Flanigen
Synthesis of emeralds and zeolites for molecular sieves

Ilham Kadri
Solvay CEO is reshaping the chemical giant

Read More:
https://www.thoughtco.com/famous-women-in-chemistry-609453
https://cen.acs.org/sections/amazing-women-chemistry.html
https://www.thoughtco.com/womens-history-month-3530805

AICHE CHICAGO SECTION INFORMATION

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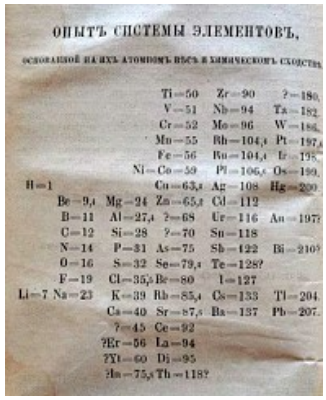
Did you know?

1st periodic table is presented, March 6, 1869


ОПЫТЪ СИСТЕМЫ ЭЛЕМЕНТОВЪ,

In March of 1869, Mendeleev made a formal presentation to the Russian Chemical Society, entitled "The Dependence between the Properties of the Atomic Weights of the Elements," which described elements according to both atomic weight and valence. Mendeleev then published his periodic table of all known elements in a Russian journal and predicted several new elements to complete the table. Only a few months later, German chemist Julius Lothar Meyer published a virtually identical table. Some people dismissed Mendeleev for predicting that there would be more elements, but he was proven to be correct when Ga (gallium) and Ge (germanium) were found in 1875 and 1886 respectively, fitting perfectly into his table and predictions.

https://www.sciencehistory.org/distillations/mendeleevs-legacy-the-periodic-system
https://physicstoday.scitation.org/do/10.1063/PT.6.4.20190327a/full/

Officers Information

Chair	Jeff Zalc
Chair Elect	Ha Dinh
Chair Programming	Christopher Nicholas
Secretary	Ignasi Palou-Rivera
Social Media	Sanaz Taghvaii
Treasurer	McKay Rytting
Directors at Large	Robert Tsai
	Pat Shannon
	Olha Zvarych
House Committee	Paolo Palmas
	Lance Baird
Newsletter Editors	Reza Mostofi
	Azita Ahmadzadeh

NOMINATIONS REQUESTED FOR THE ERNEST W. THIELE AWARD

The Ernest W. Thiele award is sponsored by bp and recognizes the outstanding contributions to our profession by a Midwest region chemical engineer. This award was established by the AIChE Chicago Section and is presented annually to a Midwest region AIChE member. This internationally recognized award consists of an engraved plaque and $1,000 honorarium presented at a monthly section meeting.

Last Month

To nominate, please contact:
Jeffrey Zalc
bp Solutions, P&O
phone: 630.881.5478
email: jeffrey.zalc@bp.com

Nomination forms and additional information can be obtained from the Thiele Committee Chair.

Completed nominations are due to the committee chair no later than ***April 01, 2021***.

One of the highest honors a distinguished chemical engineer can receive is our AIChE Chicago Section Thiele award. Please consider nominating a deserving engineer for this prestigious award.

More information about this award and the past winners:
https://www.aiche.org/community/sites/chicago-local-section/ernest-w-thiele-award
https://www.aiche.org/community/sites/local-sections/chicago/thiele-award-past-winners

THANK YOU!

The following organizations generously contributed to the AIChE Chicago's student outreach programs in 2020.

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The Climate Solutions Community
An AIChE Initiative

REACT

REACTOR RESOURCES

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WANGER INSTITUTE FOR SUSTAINABLE ENERGY RESEARCH
AT ILLINOIS INSTITUTE OF TECHNOLOGY

2021 MIDWEST REGIONAL CONFERENCE
TECHNICAL PROGRAM

AIChE MIDWEST REGIONAL CONFERENCE

Wednesday, March 17th, Track 1, AM		
8:30	8:40	AIChE Chicago Chair Introduction: Jeffrey Zalc
8:40	9:30	Keynote Introduction: Hakim Iddir **Morning Keynote: William Schneider** *Professor and Chair, Department of Chemical and Biomolecular Engineering, University of Notre Dame*
9:30	9:45	Networking Break
9:45	10:10	**Session I: Catalysis and Reaction Engineering** Session Chair: Aditya Prajapati, University of Illinois at Chicago Session Co-Chair: Iman Nezam, Georgia Institute of Technology **Enhancing the Selectivity for Electrocatalytic CO2 Reduction By Oscillating Applied Potential** Aditya Prajapati, University of Illinois at Chicago
10:10	10:35	**Improving the Selectivity of Epoxide Ring-Opening Using Diol Co-Catalysts for Polyurethane Applications** Mihir Bhagat, Northwestern University
10:35	11:00	**Controlled Oxygen-Peroxide Chemistry in LI-Oxygen Batteries By Molecular Redox Mediators** Erik Askins, University of Illinois at Chicago
11:00	11:25	**Controlled Grafting Synthesis of Silica-Supported Boron** Melissa Cendejas, University of Wisconsin-Madison
11:25	11:45	Technical Session Open Q&A
11:45	12:45	Networking / Lunch Break

Wednesday dinner meeting Registration (SEPARATE FROM MRC): https://www.cvent.com/d/9jq2fj/1Q

Wednesday, March 17th, Track 1, PM		
12:45	1:45	Keynote Introduction: Robert Tsai **Afternoon Keynote: Cathy Tway** *Technology and Applications Director, Catalyst Technologies, Johnson Matthey*
1:45	2:00	Networking Break
2:00	2:25	**Session II: Climate Solutions** Session Chair: Dennis O'Brien, Jacobs Engineering **Nuclear Power, Natural Gas, and the Impacts of Carbon Pricing** Tom Rausch, CWE
2:25	2:50	**Dispassionate Deliberate Collaboration Can Resolve Global Warming and Its Climate Change Effects** Tom Rehm, TERehm Consulting
2:50	3:15	**Clues to Climate Mitigation Priorities from Global Greenhouse Gas Budgets** Gavin McNicol, University of Illinois at Chicago
3:15	3:30	Technical Session Open Q&A
3:30	3:45	Networking Break
3:45	4:10	**Session III: Biorefining Technology** Session Chair: Belma Demirel, BP **The Pursuit of a Cleaner Healthier World through Bio Renewables** Grace Rhoades, Johnson Matthey
4:10	4:35	**Techno-Economic Analysis of the Modified Mixalco Process** Chloe Simchick, Milwaukee School of Engineering
4:35	5:00	OPEN
5:00	5:15	Technical Session Open Q&A
5:15	5:30	Networking Break
5:30	7:30	**Chicago Section Monthly Technical Dinner: Sohail Murad** Professor and Chair, Department of Chemical and Biological Engineering, Illinois Institute of Technology

2021 MIDWEST REGIONAL CONFERENCE
TECHNICAL PROGRAM

AIChE MIDWEST REGIONAL CONFERENCE

Wednesday, March 17th, Track 2, AM		
8:30	8:40	AIChE Chicago Chair Introduction: Jeffrey Zalc
8:40	9:30	Keynote Introduction: Hakim Iddir **Morning Keynote: William Schneider** *Professor and Chair, Department of Chemical and Biomolecular Engineering, University of Notre Dame*
9:30	9:45	Networking Break
9:45	10:10	**Session I: Fluid Properties, Fluid Dynamics and Transport Phenomena** Session Chair: Joel Paustian, Honeywell UOP Session Co-Chair: Shri Dawande, Illinois Institute of Technology **CFD Modeling of a Bioreactor** Reza Mostofi, Honeywell UOP
10:10	10:35	**Modeling and Simulation of Magnetophoresis of Nanoparticles for Magnetic Targeting Applications** Ayankola Ayansiji, University of Illinois at Chicago
10:35	11:00	**Maxwell Viscoelasticity of Complex Fluids Mixtures** Guler Bengusu Tezel, Bolu Abant Izzet Baysal University
11:00	11:25	**Modeling and Numerical Simulation of Concentrated Solar Energy Storage in a Packed Bed of Silicon Carbide Particles** Zeyuan Gao, Illinois Institute of Technology
11:25	11:45	Technical Session Open Q&A
11:45	12:45	Networking / Lunch Break

MRC Registration and Information:

https://www.aiche.org/conferences/midwest-regional-conference/2021

Wednesday, March 17th, Track 2, PM		
12:45	1:45	Keynote Introduction: Robert Tsai
		Afternoon Keynote: Cathy Tway *Technology and Applications Director, Catalyst Technologies, Johnson Matthey*
1:45	2:00	Networking Break
2:00	2:25	**Session II: Energy Storage I** Session Chair: Hakim Iddir, Argonne National Laboratory Session Co-Chair: Juan Garcia, Argonne National Laboratory **Strain-Driven Surface Reconstruction and Cation Segregation in Layered Li(Ni1-x-yMnxCoy)O2 (NMC) Cathode Materials** Juan Garcia, Argonne National Laboratory
2:25	2:50	**Structure-Activity Relationships in Lithium Ion Batteries: Solid State NMR Characterization of Lithium-Ion Cathodes and Anodes** Fulya Dogan, Argonne National Laboratory
2:50	3:15	**Understanding the (de)Lithiation Mechanism of Pb-Based Nanocomposite Anode for High Performance Lithium-Ion Batteries** Jinhyup Han, Argonne National Laboratory
3:15	3:30	Technical Session Open Q&A
3:30	3:45	Networking Break
3:45	4:10	**Session III: Energy Storage II** Session Chair: Mohammad Asadi, Illinois Institute of Technology Session Co-Chair: Juan Garcia, Argonne National Laboratory **A Lithium Accounting Model with Unstable Electrolytes: Protocol Dependence, Invisible Processes, and the Consequences of Reactivity** Adam Tornheim, Argonne National Laboratory
4:10	4:35	**NiMn5050-Based Cathodes As Next Generation Cathodes for Lithium-Ion Battery** Anh Vu, Argonne National Laboratory
4:35	5:00	Lead-Based Nanocomposites As Anode Material for Sodium-Ion Batteries
5:00	5:15	Technical Session Open Q&A
5:15	5:30	Networking Break
5:30	7:30	**Chicago Section Monthly Technical Dinner: Sohail Murad** Professor and Chair, Department of Chemical and Biological Engineering, Illinois Institute of Technology

2021 MIDWEST REGIONAL CONFERENCE
TECHNICAL PROGRAM

AIChE MIDWEST REGIONAL CONFERENCE

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8:30	8:40	Conference Chair Introduction: Robert Tsai
8:40	9:30	Keynote Introduction: Hakim Iddir **Morning Keynote: Marius Stan** *Senior Scientist and Leader of Intelligent Materials Design, Applied Materials Division, Argonne National Laboratory*
9:30	9:45	Networking Break
9:45	10:10	**Session I: Machine Learning and Optimization** Session Chair: Joshua Gabriel, Argonne National Laboratory Session Co-Chair: Aditya Prajapati, University of Illinois at Chicago **Machine Learning Force Fields for Li-Ion Cathodes** Joshua Gabriel, Argonne National Laboratory
10:10	10:35	**Cost Productivity Approach to Industry 4.0 Cybersecurity** Pranav Patel, ResiliAnt
10:35	11:00	**Artificial Intelligence (AI) – Machine Learning (ML) Based Framework for Optimal Design of Interfacially Polymerized Thin Film Nanocomposite Membranes for Desalination** Jasneet Kaur Pala, BITS Pilani K K Birla Goa Campus
11:00	11:15	Technical Session Open Q&A
11:15	12:45	Networking / Lunch Break (Lunch from Professionals @ 11:30 AM)

Wednesday dinner meeting Registration (SEPARATE FROM MRC): https://www.cvent.com/d/9jq2fj/1Q

Thursday, March 18th, Track 1, PM		
12:45	1:45	Keynote Introduction: Matthew Walters **Afternoon Keynote: Ray Mentzer** *Professor of Engineering Practice and Executive Director of Purdue Process Safety & Assurance Center, Purdue University*
1:45	2:00	Networking Break
2:00	2:25	**Session II: Biomedical, Pharmaceutical, and Nano-Engineering** Session Chair: Abhinav Bhushan, Illinois Institute of Technology Session Co-Chair: Seok Hoon Hong, Illinois Institute of Technology **Polymersome Encapsulation of a High Logp Protein-Protein Interaction Inhibitor to Achieve Increased Solubility and Therapeutic Index** Yu Tian, University of Delaware
2:25	2:50	**Engineering Shewanella Oneidensis for Bisphenol a Degradation and Biofilm Formation** Jiacheng Zhou, Illinois Institute of Technology
2:50	3:15	**Mechanical and Structural Characterization of Thin Films** Mark Haase, Anton Paar
3:15	3:30	Technical Session Open Q&A
3:30	3:45	Networking Break
3:45	4:10	**Session III: Environmental Compliance and Remediation** Session Chair: Jarad Champion, Geosyntec **Destructive Technologies for per- and Polyfluoroalkyl Substances (PFAS)** Mary Ensch, Geosyntec
4:10	4:35	**Improving Membrane Fouling Resistance in Water Filtration with Polyelectrolyte Complex Sacrificial Layers** Yechan Wong, Geosyntec
4:35	5:00	**Are Catastrophes Affecting Compliance?** Katherine Culbert, K and K Process
5:00	5:15	Technical Session Open Q&A
5:15	6:30	**Poster Reception**
6:30	8:30	**YP Social**

2021 MIDWEST REGIONAL CONFERENCE
TECHNICAL PROGRAM

AIChE MIDWEST REGIONAL CONFERENCE

Thursday, March 18th, Track 2, AM		
8:30	8:40	Conference Chair Introduction: Robert Tsai
8:40	9:30	Keynote Introduction: Hakim Iddir **Morning Keynote: Marius Stan** *Senior Scientist and Leader of Intelligent Materials Design, Applied Materials Division, Argonne National Laboratory*
9:30	9:45	Networking Break
9:45	10:10	**Session I: Process Safety and Occupational Health I** Session Chair: David Hietala, Exponent Session Co-Chair: Jessica Morris, Exponent **Why Storage Tanks Leak and How to Stay Safe** Jessica Morris, Exponent
10:10	10:35	**Mechanical Integrity for Aging Process Facilities - Ensuring Safe Operations over Time** Robert Weber, PSRG Inc.
10:35	11:00	**Combustible Dust Hazards and Spray Drying Systems – Understanding NFPA 61's New Requirements in a Dust Hazard Analysis** Sean Dee, Exponent
11:00	11:15	Technical Session Open Q&A
11:15	12:45	Networking / Lunch Break (Lunch from Professionals @ 11:30 AM)

MRC Registration and Information:

https://www.aiche.org/conferences/midwest-regional-conference/2021

Thursday, March 18th, Track 2, PM		
12:45	1:45	Keynote Introduction: Matthew Walters
		Afternoon Keynote: Ray Mentzer *Professor of Engineering Practice and Executive Director of Purdue Process Safety & Assurance Center, Purdue University*
1:45	2:00	Networking Break
		Session II: Process Safety and Occupational Health II Session Chair: Jessica Morris, Exponent Session Co-Chair: David Hietala, Exponent
2:00	2:25	**Understanding Fire Hazards in Inert Cryogenic Systems** Ehson Fawad Nasir, Exponent
2:25	2:50	**Common Cause Failure – What Are They and How to Mitigate Them?** Tekin Kunt, PSRG Inc.
2:50	3:15	**Means to Achieve Backflow Prevention of Hazardous Chemicals from Process Vessels to Utility Pipelines** Deepak Sharma, Bayer US
3:15	3:30	Technical Session Open Q&A
3:30	3:45	Networking Break
		Session III: Advances in Refining Session Chair: Belma Demirel, BP Session Co-Chair: Shahineze Saada, Honeywell UOP
3:45	4:10	**Reducing Octane Loss – Solutions for FCC Gasoline Post-Treatment Services** Claus Brostrom Nielsen, Haldor Topsoe A/S
4:10	4:35	**Ultra-High Temperature Resistant Preformed Particle Gels for Enhanced Oil Recovery** Buddhabhushan Salunkhe, Missouri University of Science and Technology
4:35	5:00	**OPEN**
5:00	5:15	Technical Session Open Q&A
5:15	6:30	**Poster Reception**
6:30	8:30	**YP Social**