

### March Section Meeting: Renewable Ammonia for Sustainable Agriculture and Energy: Process, Supply Chain, and Energy System Optimization

Making ammonia with hydrogen sourced from renewable energy for use as fertilizer can improve agricultural sustainability. More broadly, renewable ammonia has potential to improve energy sustainability in its use as energy storage to balance intermittent renewable generation with demand. However, a number of challenges remain to its economically competitive deployment. In the presented work, mathematical optimization is used to address these challenges across multiple spatial and temporal scales. First, I'll introduce a novel adsorbent process for low pressure ammonia production and discuss its modeling and optimal design toward lowering capital intensity. Then, for sustainable agriculture, I'll discuss a vision for modular deployment of this new process in the context of the existing ammonia fertilizer supply chain. Finally, from a sustainable energy perspective, I'll introduce an approach for lowest-cost selection and sizing of hydrogen and/or ammonia energy storage technologies in the face of intermittent renewables. These hybrid storage systems are optimized for two use cases: (i) electrical energy storage

### March Section Meeting

- Topic:** Renewable Ammonia for Sustainable Agriculture and Energy: Process, Supply Chain, and Energy System Optimization
- Speaker:** Dr. Matthew Palys, Dept. of Chemical Engineering and Materials Science, University of Minnesota
- Date:** Tuesday, March 15<sup>th</sup>
- Time:** 6:00 – Introduction  
6:05 - Career Discussion  
6:15 - Technical Presentation  
7:15 – Q & A
- Cost:** Free, Registration Required
- Location:** Online Zoom meeting
- REGISTRATION REQUIRED.** More information can be found on our [website](#).

[Register](#)

After you register, you will receive instructions via email for joining the meeting.

throughout the continental U.S. and (ii) combined heat and power in remote U.S. locations.



Matt Palys is a postdoctoral associate in the Department of Chemical Engineering and Materials Science at the University of Minnesota. He received his B.E.Sc in Chemical Engineering from the University of Western Ontario (Canada) in 2015 and his Ph.D. in Chemical Engineering from the University of Minnesota in 2021. His research focuses on mathematical modeling and optimization to address design and operational aspects of chemical production from variable renewable energy as well as utilization of these chemicals to enable renewable electrification across multiple sectors. His paper "Using hydrogen and ammonia for renewable energy storage: A geographically comprehensive study" was the recipient of the Computers and Chemical Engineering best paper award in 2020.

## Future City Winners

Thank you to our AIChE members who served as judges to select this year's Future City competition winners. Congratulations to these three teams:

- New Mexico's winner was team Meridia from Annunciation Catholic school in Albuquerque, New Mexico. \$250 AIChE award. View their [presentation](#).
- Colorado's winner was team Thunder Bay from Colorado Academy. View their [presentation](#). \$500 AIChE award.



- AIChE Rocky Mountain Section special award winner for Energy & Mass Balances of Zero Waste Cities was team Risaikuru from Liberty Classical Academy of New Castle, Colorado. View their [presentation](#).

## WE NEED VOLUNTEERS!

We are looking for officers for our next program year including Program Chair, Treasurer, and Secretary. If you would like more information about the positions, please contact the current officer for a description of their duties.

We are also need liaisons for every state we serve. Won't you consider being a part of the team?

We need your ideas and help to make next year's program another outstanding year! Please contact Marc Paffhausen by March 31 if you are interested.

## AIChE Meetings

2022

- Apr 10-14     [2022 Spring Meeting and 18<sup>th</sup> Global Conference on Process Safety](#)  
San Antonio, TX
- May 2-5        [2022 Synthetic Biology; Evolution, Engineer and Design \(SEED\)](#)  
Arlington, VA
- June 1-3        [Advanced Manufacturing and Processing Conference](#)  
Bethesda, MD
- June 7-9        [Process Development Symposium](#)  
Philadelphia, PA
- June 26-28     [NDEW-ChE: National Diversity Equity Workshop for Chemical Engineering Academic Leaders](#)  
Baltimore, MD

### National AIChE Contact Info

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**Awards & Honors:** 646.495.1317  
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The objectives of AIChE are to advance chemical engineering in theory and practice, to maintain a high professional standard among its members, and to serve society, particularly where chemical, engineering can contribute to the public interest.

## VOLUNTEER AS A YOUNG PROFESSIONAL LIAISON (YPL)

We are looking for Young Professional Liaisons for each state – CO, NM, WY, SD & MT. Please send nominations to any section officer listed above.

## MEETING SCHEDULE

*The Rocky Mountain Local Section (RMLS) of AIChE generally meets the second or third Tuesday of every month, September through May.*