

# The University of Iowa

EDITOR: Margaret Praska

AIChE Spring 2022

## Advisor's Corner

By: Prof. David Murhammer, Professor and AIChE Student Chapter Advisor

Greetings to Hawkeye Chemical Engineers!! First, this Spring 2022 issue of our AIChE Student Chapter Newsletter contains articles about our students' attendance at the 2022 AIChE Mid-America Regional Student Conference in Ames, Iowa. Second, there are three articles about our student chapter activities, specifically about the Spring 2022 Kids Day Camp, AIChE volunteering activities, and our student-run Mentor/Mentee program. Third, there is an article about the 2020 and 2021 student winners of the Tinker Process Safety Prize attending the 2022 Spring AIChE Meeting and another article about the 2022 Tinker Process Safety Prize competition. Fourth, there is an article about the Dare to Discover Campaign that features the research of one of our undergraduate students and another article about the Society of Women Engineers (SWE) high school conference.

A few comments about 2022 Spring AIChE meeting. The first-place winner of the 2020 Tinker Process Safety Prize (Katelyn Murhammer) and the first-place (Anthony Shirazi) and second-place (Nina Laszkowiecki and Jared Parr) winners of the 2021 Tinker Process Safety Prize attended the 2022 Spring AIChE meeting in San Antonio, Texas. These students presented posters about a safety incident that was investigated by the Chemical Safety Board (CSB). These students were surprised and excited to meet many of the CSB investigators, including the lead investigator for one of incidents presented in a student poster. The CSB investigators were also excited to interact with the students and pleased that their investigations were featured in these posters. I would like to emphasize that this student opportunity would not be possible except for the tremendous generosity of Sharon Tinker.

A few comments about the 2022 AIChE Mid-America Regional Student Conference that was held in Ames, Iowa. Our department had three teams competing in the ChemE Jeopardy Competition among the nine teams in the competition. Two of our teams won their semi-final round and competed in the finals. These teams finished first and third in the finals. The first-place University of Iowa (UI) team, along with a team from the University of Oklahoma, will represent the Mid-America region at the national competition being held in November in Phoenix, Arizona. The UI team will attempt to win the third consecutive national championship for the University of Iowa.

Any comments about the newsletter contact can be sent to me at [david-murhammer@uiowa.edu](mailto:david-murhammer@uiowa.edu).



## University of Iowa American Institute of Chemical Engineers

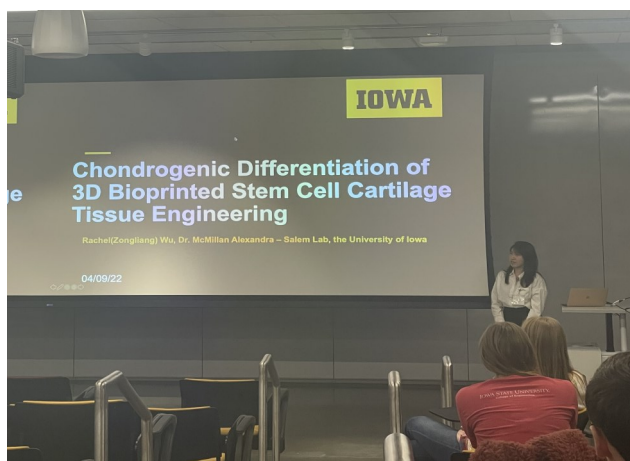
### INSIDE THIS ISSUE:

AIChE Regional Conference Overview	2
Kids Day Camp	3
AIChE Spring Safety Conference	3-4
Tinker Process Safety Competition	4-5
AIChE Volunteering	5-6
Dare to Discover Campaign	6
Mentor/Mentee Program	7
SWE High School Conference	8
Acknowledgments	9



## AICHE Regional Conference Overview — Margaret Praska

The second weekend in April from the 8th-9th current students had the amazing opportunity to attend the American Institute of Chemical Engineers Mid-America Regional Conference. This year it was hosted at our fellow Iowan campus at Iowa State. On the first day, students gathered into university vans and made the journey from Hawkeye territory to Cyclone country. Once the students made it to Ames, it was time to explore Iowa State and all it has to offer. The conference had plant tours scheduled during the afternoon and a fun bowling social event later in the evening for the students to show off their skills. The second day was when a majority of the main events took place: the ChemE car competition, student technical paper competition, student poster competition, workshops, and ChemE jeopardy.



*Rachel Wu during Student Technical Competition*

Rachel Wu represented the University of Iowa at the student technical paper competition with her presentation of her research on "Chondrogenic Differentiation of 3D Bioprinted Stem Cell Cartilage Tissue Engineering". She had an amazing presentation on the research project she has had the incredible opportunity of being on for the past couple semesters. Rachel went into detail on all the great work that the Salem Lab group is doing. Rachel's wonderful presentation helped her secure the third place award!



*AICHE Student Members Attending Regional Conference*

Shortly after the student technical paper competition, it was time for ChemE jeopardy. The University of Iowa was represented by three teams, with two teams making it to the final round. The first team was the "Dimadones" which consisted of Nolan Burson, Kevin Dial, Marie Ohlinger, and Anthony Shirazi and the second team was the "Nusselt and the Numbers"

which consisted of Quintin Blad, Nick Brunn, Kiana Resch, and Darrell Smith. Both teams brought their A game to the final round, but it was the "Dimadones" who came out on top! They will be representing the University of Iowa at the National conference in Phoenix this fall. Overall, students returned home with new connections and a greater understanding of all the chemical engineering field has to offer. We are all looking forward to attending the national conference in the fall!



*The "Dimadones," the 2022 Mid-America Regional Champions. (l-r) Marie Ohlinger, Nolan Burson, Kevin Dial and Anthony Shirazi.*

## Kids Day Camp — Alexa Barnes

The University of Iowa's chapter of the American Institute of Chemical Engineers hosts an outreach event once a semester for kids in grades K-5. The event this semester was an Earth Day themed science day camp following a successful Halloween theme camp last semester. The camp includes a variety of science and engineering themed activities for kids to do.

The most recent camp was hosted on April 23rd in the Herky Room at the IMU. The room was decorated with Earth Day themed decorations and streamers. As the kids arrived, they colored an Earth Day themed coloring page while waiting for everyone who signed up for the event. The first two activities that were planned were building a structure out of toothpicks and dots candy and building a aluminum foil boat to hold pennies. The goal of these activities was to build a structure that could hold the weight of a tennis ball and a boat that held the most pennies using the least amount of toothpicks and tinfoil possible. These activities led to a natural discussion about sustainability, limiting waste, and the importance of using renewable resources in protecting our Earth. After the first two experiments the kids, and some K-12 coordinators, made slime while the other coordinators prepared to make a seed bomb. The seed bombs were made of construction paper that was ripped up and wetted with water. Seeds were mixed up with the construction paper and the children used their hands to hold the construction paper into a ball. After the construction paper dried it could be planted into the ground with the hope that the seeds in the bomb begin to grow. The final ex-

periment of the day was a density experiment. The kids placed water, honey, dish soap, and oil into a cup and watched the layers form. They then mixed the mixture with a spoon and saw how the layers would return. Throughout the experiment, the K-12 coordinators explained what density is and how it works.

Overall, the camp was very successful and everyone who attended had a lot of fun while learning some new things. Next semester, AIChE's goal is to go to elementary and middle schools in the Iowa City area and lead experiments covering and expanding on what the students are learning in the classroom. This will be a great way for us to reach students where they are and hopefully help them grow an interest and love for science.



*Kids Day Camp Board Members*

## AIChE Spring Safety Conference Experience — Katelyn Murhammer

The 2022 AIChE Spring Meeting and 18th Global Congress on Process Safety (GCPS) was held April 10th through April 14th in San Antonio, Texas and was attended by some CBE students and faculty. The students who won awards in the Tinker Process Safety Prize Competition in 2020 and 2021 had the opportunity to travel to this conference to present their posters. The students who attended the conference were Anthony Shirazi, Nina Laskowiecki, Jared Parr, and myself.

Additionally, two faculty members, Professors Guymon and Murhammer, attended the conference. On Monday, April 11th, the conference held the GCPS Process Safety Poster Session in the Henry B. Gonzalez Convention Center where the students presented their posters. Each of our student's posters focused on a process safety incident and investigation report issued by the Chemical Safety Board (CSB). At the poster session, the students were able to meet current members of the CSB and share their posters with them.

## AICHE Spring Safety Conference Experience (continued) — Katelyn Murhammer

Furthermore, the CSB Lead Investigator of the Formosa Plastics Vinyl Chloride Explosion, Lisa Long, attended the poster session and was able to share many details with me about the incident as this was the topic of my poster. It was very interesting to learn more about the incident beyond what was included in the report and to talk with Lisa. In addition to the poster session, there were many breakout sessions and keynote speakers that were attended by all. Amy Theis, known by students in the CBE department for her work with the Advanced Reactive System Screening Tool (ARSST) used in our Chemical

Process Safety laboratory, was also at the conference and the students were able to meet her and attend her presentation. Other than attending the conference, the students and faculty were also able to visit the Alamo and enjoy the San Antonio River Walk with dinner and a boat tour. Next year, this conference will be held in Houston, Texas, and the winners of the 2022 Tinker Process Safety Prize Competition will have the opportunity to attend.



*University of Iowa Students Who Presented Posters. (l-r) Jared Parr, Anthony Shirazi, Katelyn Murhammer, and Nina Laskowiecki.*



*University of Iowa Students with Chemical Safety Board Investigators and Professor Murhammer.*

## Tinker Process Safety Competition — Marie Ohlinger

This spring, students in Professor Murhammer's Chemical Process Safety class were given the opportunity to carry on the tradition of participating in the Tinker Process Safety Competition. Sharon Tinker, a University of Iowa alum who spent her career working for ExxonMobil, developed the competition to emphasize the importance of process safety in the chemical industry. The competition calls for students to research a process safety incident that has occurred in the chemical industry, apply their knowledge from the process safety course to analyze the incident, and provide suggestions that would have prevented the incident from occurring.

The competition consisted of a written report summarizing the Chemical Safety Board's investigation and the presentation of a poster about the incident. Half of the competition's score was based on the paper, and half was based on the poster presentation. The papers were submitted by January 25, and the poster competition occurred on February 18th. The judges consisted of Sharon Tinker, other industry professionals, and past student winners. Awards were given to all participants, with the first place student receiving \$1000, the two runner-ups receiving \$500, and the rest of the participants receiving \$100 and recognition.

## Tinker Process Safety Competition (Continued) – Marie Ohlinger

Additionally, the winner and the two runner ups receive the opportunity to attend the 2023 AIChE national spring conference in Houston to present their posters.

Tinker and the other judges awarded Marie Ohlinger with first place for completing an investigation on the Tesoro Refinery Fire and Explosion. The two runner-up awards were given to Nick Brunn and Sam Mittal.

The incident at the Tesoro refinery occurred outside Anacortes Washington in 2010 when a heat exchanger in the hydrotreating unit experienced catastrophic failure, killing seven workers nearby. The heat exchanger succumbed to what is known as high temperature hydrogen attack, or HTHA. HTHA occurs when hot hydrogen is able to diffuse into carbon steel, where it then reacts to create methane. The methane gas is then trapped inside the steel, and causes microfractures that weaken the structure and may eventually lead to failure. Process safety culture deficiencies had allowed the heat exchanger to run for years with repeated leaks. Additionally, faulty guidelines from the American Petroleum Institute about operating regimes where HTHA was not expected to occur gave engineers a false sense of security. After the incident, it was discovered that eight similar incidents had occurred.

Based on these issues, the CSB recommended requiring the use of inherently safer materials such as higher quality steel when processing hydrogen at high temperatures, as this is the only way to completely prevent high temperature hydrogen attack. Additionally, in her report, Ohlinger recommended the implementation of an automatic review system that would be triggered each time an industrial accident in the same sector occurred. This review would work similarly to Management of Change, where the incident would be analyzed and compared to the current operation of each plant. Ohlinger said that she “was not surprised to see that process safety culture issues were a common thread in every incident reviewed for the competition.”

Overall, the competition expanded students’ knowledge about how chemical processing can go wrong and emphasized the importance of a good process safety culture. The competition will be offered again next fall, and all the students taking the Chemical Process Safety course are encouraged to participate.

## AIChE Volunteering – Hadley Mosby

This semester I had the privilege to serve as the volunteer chair for the American Institute of Chemical Engineers (AIChE) chapter at the University of Iowa! My main responsibility as volunteer chair was to plan events to encourage members to give back to the community. This semester, our AIChE chapter volunteered at two events. The first event was held at Houses into Homes on April 2nd, 2022. Houses into Homes is a non-profit in Coralville, Iowa that provides furniture and other household items to individuals exiting homelessness and crisis situations.



*Houses into Homes Facility in Coralville, Iowa.*

## AICHE Volunteering (Continued) — Hadley Mosby

At Houses into Homes, our chapter built 10 dressers, refurbished 3 tables, folded laundry, and sorted through mattresses and bed frames. The second event was an Earth Day themed trash pick-up. The trash pick-up was hosted with the Alpha Epsilon chapter of Omega Chi Epsilon (OXE) on April 24th, 2022. Members of AICHE and OXE picked up trash around the westside of campus for 2 hours. Nearly 20 bags of trash were collected over the course of the event! In total, around 45 members of the University of Iowa AICHE chapter participated in the Houses into Homes and trash pick-up events! In addition to these two events, members also volunteered at the kid's day camp.

## Dare to Discover Campaign — Grave Williamson

This past January, I, along with 81 other researchers, had the honor of being featured in the 2022 Dare to Discover banner campaign. The campaign highlights the work done by undergrads, graduate students, and post-doctoral researchers in their field of study. I knew going into college that I wanted to work in a lab setting post-college. I have always been interested in research and chose to attend the University of Iowa because of the many opportunities to do research as an undergraduate and work collaboratively with other colleges. During tours of the chemical engineering labs freshman year, I learned that the Fiegel lab was working on a collaborative project with the college of pharmacy. I thought it sounded like a perfect fit. That summer, I joined the lab as a volunteer researcher working with Riannon Smith.

Together we are working to develop a temperature-sensitive sprayable hydrogel to be used as an alternative treatment for burn wound infections. The gel is liquid at room temperatures and can be sprayed onto the wound, where it transitions into a gel consistency with the heat of the wound bed. This method will prolong drug delivery and provide an easier, more sanitary, and less painful treatment option for those hospitalized due to severe burn wounds. I have investigated hydrophilic drug release profiles at different drug and gel concentrations in addition to tests on spray properties of the different formulations. This past summer, I received an ICRU fellowship to work on my own experiments to determine how different drug loading techniques of a hydrophobic drug impact gel properties like gel transition temperature. Participating in hands-on research throughout my college career has helped me figure out my interests, work towards my goals, and even helped me understand concepts better in the classroom.

Because of this experience, I have decided to continue my education at UNC, pursuing a Ph.D. in pharmaceutical sciences. This program is incredibly unique, with faculty from several disciplines, including many who received de-

grees in chemical engineering. The Ph.D. program has five divisions starting with drug discovery and following drug development to a division for patient outcomes. I will be joining DPMP (the division of pharmacoengineering and molecular pharmaceuticals), where students from various backgrounds, including engineering, chemistry, and physics, work collaboratively on drug delivery techniques to improve therapeutic efficacy. I am very excited to move to Chapel Hill and could not have made this decision without the help and support of my pharmacology professors and the CBE faculty, especially my advisor, Dr. Fiegel. I can't wait to see how the fields of pharmaceutical and chemical engineering research continue to grow together and hope to see more Chem E's find their passions in pharmaceuticals.



*Grace Williamson's Dare to Discover Banner in Downtown Iowa City*

## Mentor/Mentee Program — Nicholas Brunn

The University of Iowa's chapter of the American Institute of Chemical Engineers (AIChE) has a mentorship program that allows our underclassmen to receive guidance and advice from their more experienced upperclassmen in the chemical engineering department. Juniors and Seniors are paired with one or more Freshman and Sophomores based on criteria such as research, career interests, and focus area. The mentors meet with their mentees several times a semester to provide support and help out with any areas where their mentees are struggling. It is common for mentors to help with schedule planning, preparing for interviews or job searches, or just adjusting to life at the university.

The beauty of the Mentor Mentee Program is that it allows the participants to expand their networks and abilities. The mentees are able to meet regularly with older chemical engineering students who often have invaluable connections and experience. Mentees can learn the secret tips and tricks to thrive in this major from people who have surpassed all of the challenges they are currently facing. The mentors also benefit greatly from this partnership. Meeting with and assisting a mentee allows the mentor to experience a leadership role, where they are able to guide others in their decision-making process, something they will undoubtedly use in their careers as chemical engineers. Furthermore, interacting with a mentee allows the mentor to learn about someone who likely has a different perspective, background, or mindset, and doing so can enrich their student experience and teach valuable lessons about teamwork and leadership. Control over the frequency, duration, and topic of these meetings is left up to the mentees, so they can get as much out of the program as they desire. Some mentees love to meet up with their mentors as often as possible, while others prefer to meet only one or two times a semester, so the flexibility of the program allows every mentee to cater it to their own specific needs.

To help support our mentors and mentees, AIChE organizes social events to allow students to meet and interact not just with their mentors/mentees, but also with other chemical engineers in and out of their

grade level in a fun and engaging setting.

Early in the semester, AIChE hosted a game night, where students were invited to set aside some time from their busy schedules to join each other and play games of intense strategy and teamwork. A favorite of the night was Secret Hitler. In this game, students were divided into secret parties and tasked with determining, through logic and deduction, who is on their side and who is the 'enemy'.

AIChE also hosted a Laser Tag event, where students were able to once again meet up with their peers in an environment quite unlike the classroom. The fast paced, intense action of laser tag forces students to cooperate and strategize on the fly to outmaneuver the other team, thus practicing skills they will use as engineers while also unwinding from the stress of their coursework.

The Mentor Mentee program is all about getting students together to support each other, provide guidance, and expand personal and professional networks. For that reason, I am proud to be part of such an organization that is able to do so much to support chemical engineering students. As the semester comes to an end, so does the program. But come Fall, there will be an entire new class of first-year students eager to learn about chemical engineering, and the former Sophomore class will become upperclassmen now in a position to provide guidance and support to their peers. AIChE will, of course, be there along the way to bring these students together so they can learn and grow as peers on their path to become professional chemical engineers.

## SWE High School Conference — Sam Mittal

The Society of Women Engineers hosted their first in-person high school conference after 3 years. The event was hosted by Celesta Cox. On April 8th, students from the local area along with other areas of the state and Illinois came to Iowa to join the fun. The event kicked off with a few icebreakers and a welcoming message from our very own Dean Nembhard. Attendees participated in several activities ranging from making boats of aluminum foil to hold pennies and guessing who among a panel of male students was an engineer. In addition to these games and challenges, the students also had the opportunity to learn about all of the disciplines of engineering at Iowa with short lab tours. Several members of our local Professional SWE chapter were also in attendance to meet and share with our attendees what it means to be a professional in engineering and those next steps.

Following these panels a dinner was also provided with the attendance of several professors across all departments, including our very own Professor Jennifer Fiegel. Overall, the event ran very smoothly and I was very proud of Celesta Cox.

Having been the past High School Conference chair for the organization it was amazing to be able to volunteer at the in-person event after the last one was virtual. The joy that the students had made attending the event and being a volunteer that much more worthwhile. Our SWE chapter has made consistent efforts to share the love of STEM with children of all ages and having this event be successful really showed that our efforts have made a difference. We hope to continue this event and involve more of our local community in the future and I look forward to see what our next chair accomplishes.



*University of Iowa SWE Members Volunteering at in the High School Conference.*



*Celesta Cox (left) and Calla Swanson, the High School Conference Chair and Assistant Chair, respectively. Celesta and Calla are both Chemical Engineering majors.*



## Follow us on Linked in

### Attention Alumni

There is now an IOWA Chemical Engineering Alumni LinkedIn page for you to join!

Its called *AIChE at the University of Iowa.*

Check it out for more frequent IOWA ChemE news, we would love to see you there!



## Acknowledgements

Thank you to the AIChE Officers for their hard work and contributing efforts to make our AIChE Student Chapter a successful organization.

**President:** Anthony Wagner

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**Kid's Day Camp Coordinators:** Jide Babawale, Alexa Barnes, Drew Hall, Madison Meek, and Anthony Scarpelli

**Volunteer Chair:** Hadley Mosby

**Advisor:** Professor David Murhammer

Editor-In-Chief Margaret Praska would also like to thank the following people for their support and contributions to the Spring 2022 AIChE Student Chapter Newsletter:

**Faculty Advisor:** Professor David Murhammer

**Contributors:** Margaret Praska, Alexa Barnes, Katelyn Murhammer, Marie Ohlinger, Hadley Mosby, Grace Williamson, Nicholas Brunn, and Sam Mittal.

### *Your help is much appreciated!*

Interested in speaking at professional seminar? If so, then contact our Fall 2022 AIChE Student Chapter Vice President Nicholas Brunn at [nicholas-brunn@uiowa.edu](mailto:nicholas-brunn@uiowa.edu) or Student Chapter Advisor Prof. David Murhammer at [david-murhammer@uiowa.edu](mailto:david-murhammer@uiowa.edu) for details and availability!

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