



MISSISSIPPI STATE UNIVERSITY
JAMES WORTH BAGLEY
COLLEGE OF ENGINEERING

DAVE C. SWALM
SCHOOL OF CHEMICAL
ENGINEERING

VOLUME 3, ISSUE 1

carbon	helium
6	2
C	He
12.011	4.0026

neon	tungsten	sulfur
10	74	16
Ne	W	S
20.180	183.84	32.065

MAY 2022

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Faculty Spotlight

By: Maggie Britton

Dr. Yizhi Xiang is an Assistant Professor in the Dave C. Swalm School of Chemical Engineering. Since coming to Mississippi State, Dr. Xiang has taught Reactor Design and Thermodynamics I. His research focus is on catalysis.

Dr. Xiang ventured into his undergrad at Zhejiang University of Technology as a chemical engineering major. He decided on chemical engineering because the chemical engineer job market is promising. He began his research journey during his sophomore year of undergrad. He fell in love with the opportunities in research and was heavily influenced by the professor he worked under to continue at the same university for his PhD.

After earning his PhD, Dr. Xiang worked as a Post-Doc in Brussels, Belgium at Université Libre de Bruxelles for over 2 years. Then he moved to Washington State University with his supervisor and worked as a Post-Doc for nearly another three years. After this, he was appointed as a scientist at NICE America Research, Inc (an R&D company located in Silicon Valley).

He realized that he enjoyed the freedom that academic research provides because one is not limited by the market for the work that is done. He started at Mississippi State in Fall of 2017.

As mentioned, Dr. Xiang's research work is about catalysis. As defined by Merriam Webster Dictionary, catalysis is defined as "a modification and especially increase in the rate of a chemical reaction induced by material unchanged chemically at the end of the reaction." Research in catalysis involves tuning the catalytically active sites structure and properties at the atomic level. The active sites are frequently being anchored on a porous support, which typically has a surface area up to several hundred or even thousands of square meters per gram! Research in catalysis involves all aspects (>90%) of the chemical engineering industry, which includes energy and chemicals transformation, environmental remediation, and materials manufacture.

Dr. Xiang expressed an interest in developing catalysts for sustainable energy and chemical transformation. Given the natural abundance of light alkanes, his current research focuses on the natural gas conversion through ammonia-assisted reforming/dehydrogenation, direct aromatization, dehydrogenation, etc. His work on aromatization and ammonia-assisted reforming/dehydrogenation for clean H₂ and chemicals has been published in high-impact journals, such as ACS Catalysis.

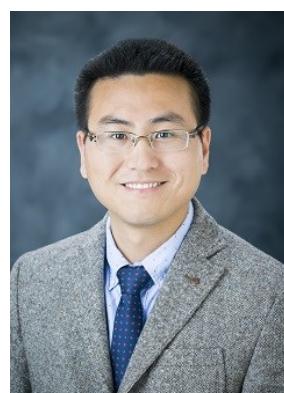
As a professor, Dr. Xiang enjoys seeing his students improve throughout the semester. In addition, he enjoys working with undergraduate researchers since he had superb experience as an undergraduate researcher. When possible, Dr. Xiang enjoys spending time in the lab as well.

Dr. Xiang's passion in research is to see new ideas be realized. In academic research, new ideas can be developed, tried, and good outcomes can be enjoyed. He hopes that one day his work will be scaled up and industrialized. Outside of being a professor, Dr. Xiang enjoys spending time with his family.

Thank you Dr. Xiang for all that you do for the students at Mississippi State!

TO STAY
INFORMED:

Keep up with news in the Swalm School of Chemical Engineering by following us at che.msstate.edu



Alumni Spotlight

By: Ashley Wynne

I came to Mississippi State in 2009 after completing my bachelor's degree at the University of Rhode Island. I decided to come to State for my graduate degree because of the caliber of education and research efforts that were ongoing in the department. While in graduate school at State, I worked with Dr. Keisha Walters, who is a brilliant engineer. She challenged me to think on my own and develop innovative ideas into valuable research findings. The Poly-SEL lab group prepared me for rigorous jobs, challenging projects, and other difficult undertakings.

After graduation, I worked for a company called Milliken & Company in Spartanburg, SC, where I spent time in a variety of roles including traditional R&D, product development, and process engineering. Milliken was a challenging, yet worthwhile experience, especially the process

engineering role. The hands-on skill development of that role was a great way to learn a lot in a short amount of time.

After a couple years with Milliken, I moved to Sealed Air Corporation, where I have worked now for 8 years. It is always difficult to make a professional move, but Sealed Air has been such a wonderful place to work and has presented me with many opportunities to be challenged and develop professionally. I have been able to travel to different countries and different plants within the United States, work with global teams from every region in the world, have training opportunities, and work with some of the most innovative people in



the packaging industry. My current role is a Principal Process and Product Development engineer and I work to develop new products in shrinkable packaging. I develop the products step by step, from pilot scale testing and conceptualization to commercial scale up. I also believe it is valuable to invest in your professional development outside of work as well. There are many opportunities in the industry to find something that interests you and become involved in that organization. I have enjoyed being a part of Society of Women Engineers, Society of Plastics Engineers, AIChE, and, of course, my MSU Alumni Club!

My biggest piece of advice to Bulldog Engineers: remember that the people who know the most about your job, regardless of what engineering avenues it is, are the operators, technicians, mechanics, electricians, etc. Those people have been making your product or running your process for, in some cases, longer than you've been alive. Learn from them and, most importantly, respect them and their knowledge. They will teach you more than any book or P&ID ever will.

Undergraduate Research Highlight

By: Quyen "Peter" Tran

Problem solving and critical thinking are the most important skills that any good engineer should develop during their time in the classroom. One opportunity to gain this skill outside of the classroom is through an undergraduate research program. Beside the chance to get paid when working on research, a student can also make new connections when presenting their research at conferences and symposiums. Especially if someone plans to go to graduate school, this experience will help their application stand out.

I began my research journey under Dr. Neeraj Rai with a project called "Effects of cyclohexane, methanol, and water solvent effects on the binding modes of furfural

on $\alpha/\beta\text{-Mo}_2\text{C}$ (101) surface." This project focuses on the conversion of furfural, a biomass derived chemical, to furfuryl alcohol, which is a rocket fuel additive. I am focused on studying how the catalytic behaviors of two catalysts change under the effects of solvents upon the adsorption of furfural. The results show how catalyst surfaces change the solvent structure around furfural resulting in different furfural adsorption modes.

By participating in this research, I got a chance to run a quantum mechanics simulation software on supercomputers in our MSU Research Park and visualize the atoms dancing on the computer screen! From my time in Dr. Rai's lab, I have learned how to be an independent researcher and carry experiments out by

myself, and also how to work in teams with other researchers. Working with others in the research setting has sharpened my communication skills on how to deliver the idea across more effectively.

After graduating from MSU this May, I will be attending Georgia Tech to pursue a Ph.D. degree in Chemical Engineering to work on the intersection of computational catalysis and machine learning.



AIChE's Year in Review

By: Caitlin Wesson

A warm congratulations goes to **Dr. Jessop** and our AIChE officers and volunteers who have helped our student chapter to be one of a very select group to receive **Outstanding Student Chapter for the 2020-2021 school year**. Several AIChE members were also award recipients, including:

- 2020-2021 Freshman Recognition Award: **Catherine Boltz**
- 2020-2021 Donald F. Othmer Sophomore Academic Excellence Award: **Ashley Riser**

- 2020-2021 Donald F. & Mildred Topp Othmer Scholarship Award: **Emma Rich**
- Materials Engineering & Sciences IV category at the AIChE SAC, First Place Poster: **Katelyn Woodard**
- Diaper Doozy video selected to compete in the AIChE K-12 STEM Module Competition at the AIChE SAC: **Natalie King, Lauren Brown, and Nathan Mitchell**

During the 2021-2022 academic year, AIChE hosts a variety of events, some returning and some new, that allowed the ChE students to engage with



the community and with each other. Some of the fun events held during the spring semester include:

- The Annual Crawfish Boil
- Girl Scouts Day (pictured above)
- Swalm Cleanup Day
- Brickfire Outreach Event

Co-op Highlight

By: Maggie Britton

My sophomore year, I was excited to apply and interview for co-ops; however, I was unsuccessful in getting any offers during the fall semester. I later worked with the MSU Co-Op office to improve my resume and professional skills, and received co-op offers during the spring semester. In 2021, I co-opted or interned for three companies: Southern Ionics, BASF, and Citgo.

During summer 2020, I worked at Southern Ionics' headquarters in West Point MS, where I was a member of the corporate engineering group. In spring 2021, I worked at their Baton Rouge, LA plant. I acted as a liaison between the corporate engineering team and site operations. Because this plant is small, I made close connections with operators and learned how they solve problems based on their experience.

In summer 2021, I interned at BASF in Freeport, TX at a batch plant that makes latex. My main projects included pushing through a project that

decreased batch time by modifying piping and changing automation sequences and managing an alarm management team. Through both projects, I was involved with tuning control loops in the unit. I was exposed to this freshman year in our Intro to ChE class by experiment using a Lego Mindstorm Robot to maintain a tank level using a control loop. Using concepts learned freshman year in industry demonstrated the importance of taking the time to fully understand course content.

During fall 2021, I co-opted at Citgo in Lake Charles, LA, where I was a part of the Reforming group in the Operations Engineering Department. One assignment I worked on was calculating the heat transfer coefficient of two heat exchangers to justify if they should or should not be cleaned during an upcoming unit outage. Another project was to collect data to diagnose the causes of low performance in a distillation tower. Both projects involved course material that I had not learned yet in school, but the engineers were very helpful. Through co-opting, I learned how Heat Transfer and Separations concepts are applicable before taking the classes!

The most exciting part of all my co-op experiences was being able to go into a reactor and two distillation towers at Citgo while units were on turn around. Being able to see the inside of these vessels have given me a very strong appreciation for what I have learned, what I will learn, and how significant the work of a chemical engineer is.

I have gained so much technical knowledge from co-opting at a variety of companies. From my experience in industry, I have a better understanding of what I could do with my chemical engineering degree. I am so thankful for MSU facilitating co-op opportunities and building important relationships with employers that benefit us as students.



Congratulations to our Spring 2022 ChE Graduates!

Cheyenne Allred Ω

Jacob Anaya Ω

Hayden Anderson $\star\Omega$

Brian Auger

Megan Barnum $\star\Omega$

Michael Baxter

Nicholas Bolan

Lauren Brown $\star\Omega$

Trevor Brown Ω

Sarah Chipley $\star\Omega$

Isaac Clapp $\star\Omega$

Connor Clark Ω

Daelyn Cook $\star\Omega$

Katelyn Crawford Ω



Theresa Crowe

Mayukh Datta Ω

Joseph Davide

Andrea DeLeon

Andre DeNicola Ω

Ignacio Diaz

Garrett Dobson \star

Samantha Dove

Christopher Edoff

Chelsea Francois Ω

Abigail Grantham Ω

Malone Harrison

Conor Hogan

William Hunt Ω

Keegan Jones

Tyla Jones

Natalie King $\star\Omega$

John Lane Ω

Drake Larson

Cameron Lea

Kaitlin Lee Ω

Nicole Lejeune

Morgan Leonard Ω

Braden Lewis Ω

Brandon Lightsey Ω

Andrew Lund $\star\Omega$

Morgan McDonald

Samuel Mills

Nathan Mitchell $\star\Omega$

William Moak $\star\Omega$

Zavion Moffett Ω

Jacob Newsome Ω

Meghan Nguyen $\star\Omega$

Madelyn Padich

Brandon Palfreyman Ω

Shivani Patel Ω

Lisa Phan

Hunter Rush Ω

Elizabeth Sanford $\star\Omega$

Peyton Sexton

John Skelton

Abbey Stogner $\star\Omega$

Aleria Story

Keri Sullivan $\star\Omega$

David Thaggard Ω

William Thompson

Zachary Toth

Quyen Tran $\star\Omega$

Kelly Truong $\star\Omega$

Charles Walker Ω

Auberon Warren

Caitlin Wesson $\star\Omega$

\star = AY2021-2022 AIChE member

Ω = Omega Chi Epsilon member



A Step Back into Swalm Hall History

By: Caitlin Wesson

This year, on April 2, 2022, marked the 25th Anniversary of Swalm Hall's Groundbreaking Ceremony, which took place on April 2, 1997. In attendance for the 1997 ceremony (pictured right) was Mississippi Gov. Kirk Fordice, university officials, and special guests. Dave C. Swalm Chemical Engineering Building was made possible by the alumnus, who received his degree from

Mississippi State in 1955. The building, which cost \$18.6 million to build, was eventually completed in 1999, making it the most recent addition to the Drill Field



to date. Over his time as a generous alumnus, Dave Swalm donated over \$24 million to Mississippi State, including the building bearing his name.

The exterior of Swalm Hall was modeled as an exact replica of the historic Lee Hall, built in 1909. Dave Swalm's donation also helped to restore Lee Hall exterior to its original appearance, a project that occurred at the same time as Swalm Hall's construction.

Thank you to everyone who took the time to contribute to making our newsletter a success!
— Caitlin Wesson, AIChE Newsletter Editor