

David Potts

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EDUCATION

- University of Oklahoma, Norman, OK 2014 – 2018
- Bachelor of Science, Chemical Engineering
 - GPA: 4.0/4.0
 - GRE: Quantitative 168/170, Verbal 160/170, Analytical 5/6
- University of Illinois at Urbana-Champaign, IL 2019 – Present
- Pursuing a Ph.D. in Chemical Engineering
 - GPA: 3.8/4.0
 - National Science Foundation, Graduate Research Fellow 2021 – 2024

RESEARCH EXPERIENCE

- Graduate Student Researcher, Flaherty Lab (Heterogeneous Catalysis) Oct. 2019 – Present**
- Studying the effect of aqueous-organic solvent mixtures, reactant chain length, and active metal identity for green alkene epoxidation with hydrogen peroxide and epoxide ring-opening
 - Synthesize metal-incorporated porous zeolite catalysts of varying polarity
 - Examine the stability of reactive intermediates and transition states for epoxidation with batch kinetics and isothermal titration calorimetry experiments
 - Utilize infrared and ^1H NMR spectroscopy to observe the solvent structure within zeolite pores

PUBLICATIONS

1. Bregante, D.T.; **Potts, D.S.**; Kwon, O.; Ayla, E.Z.; Tan, J.Z.; Flaherty, D.W.; "Effects of Hydrofluoric Acid Concentration on the Density of Silanol Groups and Water Adsorption in Hydrothermally Synthesized Transition Metal Substituted Silicalite-1," *Chem Mater.* **2020**, *32* (17), 7425-7437.
2. Bregante, D.T.; Tan, J.Z.; Schultz, R.L.; Ayla, E.Z.; **Potts, D.S.**; Torres, C.; Flaherty, D.W.; "Catalytic Consequences of Oxidant, Alkene, and Pore Structure on Alkene Epoxidations within Titanium Silicates," *ACS Catal.* **2020**, *10* (17), 10169-10184.
3. Ayla, E.Z.; **Potts, D.S.**; Bregante, D.T.; Flaherty, D.W.; "Alkene Epoxidations with H_2O_2 over Groups 4-6 Metal-Substituted BEA Zeolites: Reactive Intermediates, Reaction Pathways, and Linear Free Energy Relationships," *ACS Catal.* **2021**, *11* (1), 139-154.
4. **Potts, D.S.**; Bregante, D.T.; Adams, J.S.; Torres, C.; Flaherty, D.W.; "Influence of Solvent Structure and Hydrogen Bonding on Catalysis at Solid-Liquid Interfaces," *Chem. Soc. Rev.* **2021**, *50*, 12308-12337.
5. **Potts, D.S.**; Jeyaraj, V.; Kwon, O.; Ghosh, R.; Mironenko, A.; Flaherty, D.W.; "Impact of Interactions Between Alkyl Chains and Water Networks on Lewis-Acid Catalyzed Epoxidations," *ACS Catal.* **2022**, *12* (21), 13372-13393.
6. **Potts, D.S.**; Torres, C.; Kwon, O.; Flaherty, D.W.; "Engineering the Solid-Liquid Interface: Effects of Aqueous-Organic Solvent Mixtures on Competition Between Zeolite-Catalyzed Epoxidation and H_2O_2 Decomposition Pathways," *Chem. Sci.* **2023**, *14*, 3160-3181.
7. Kwon, O.; Ayla, E.Z.; **Potts, D.S.**; Flaherty, D.W.; "Effects of Solvent-Pore Interaction on Rates and Barriers for Vapor-Phase Alkene Epoxidation with Gaseous H_2O_2 in Ti-BEA Catalysts," *Accepted*.

8. Torres, C.; **Potts, D.S.**; Flaherty, D.W.; “Solvent Mediated Interactions on Alkene Epoxidations in Ti-MFI: Effects of Solvent Identity and Silanol Densities,” *In revision*.
9. Torres, C.; Kwon, O.; **Potts, D.S.**; Flaherty, D.W.; “Impact of Methanol-Water-Silanol Interactions on Alkene Epoxidation Catalysis within Ti-MFI,” *To be submitted*.
10. He, W.; **Potts, D.S.**; Zhang, Z.; Liu, B.; Schuarca, R.L.; Bond, J.Q.; Flaherty, D.W.; Cybulskis, V.J.; “Influence of Lewis acidity and confinement on aldehyde enolization and C-C coupling in beta zeolites,” *To be submitted*.
11. **Potts, D.S.**; Komar, J.K.; Loch, H.Z.; Flaherty, D.W.; “Epoxide Methanolysis over Framework Substituted Zeolites: Strategies to Control Regioselectivity,” *In preparation*.
12. Kwon, O.; **Potts, D.S.**; Flaherty, D.W.; “Effects of Silanol Densities and Ti-Site Location within Ti-MWW on Alkene Epoxidation,” *In preparation*.

PRESENTATIONS (Presenter Underlined)

1. **Potts, D.S.**; Bregante, D.T.; Flaherty, D.W.; “Effects of Intramolecular Forces & Solvent Interactions on Epoxidation Reactions in Ti-BEA Zeolites,” ACS National Meeting, April 2021; Virtual – *Oral Presentation*
2. **Potts, D.S.**; Bregante, D.T.; Kwon, O.; Flaherty, D.W.; “Effects of Intramolecular Forces & Solvent Interactions on Epoxidation Reactions in Ti-BEA Zeolites,” Catalysis Club of Chicago Spring Symposium, May 2021; Virtual – *Poster Presentation, 1st Poster Prize Winner*
3. **Potts, D.S.**; Ghosh, R.; Flaherty, D.W.; “Impact of Interactions Between Alkyl Chains and Water Networks on Lewis-Acid Catalyzed Epoxidations,” ChBE Graduate Research Symposium, October 2021; Urbana, IL – *Poster Presentation*
4. **Potts, D.S.**; Ghosh, R.; Flaherty, D.W.; “Impact of Interactions Between Alkyl Chains and Water Networks on Lewis-Acid Catalyzed Epoxidations,” AIChE Annual Meeting, November 2021; Virtual – *Poster Presentation*
5. **Potts, D.S.**; Kwon, O.; Flaherty, D.W.; “Effects of Intramolecular Forces & Solvent Mixtures on Epoxidations in Ti-Zeolites,” AIChE Annual Meeting, November 2021; Virtual – *Oral Presentation*
6. **Potts, D.S.**; Kwon, O.; Flaherty, D.W.; “Effects of Aqueous-Organic Solvent Mixtures on Epoxidation & H₂O₂ Decomposition Pathways over Ti-BEA Zeolites,” The 27th North American Catalysis Society Meeting, May 2022; New York City, NY – *Poster Presentation*
7. **Potts, D.S.**; Jeyaraj, V.S.; Kwon, O.; Ghosh, R.; Mironenko, A.V.; Flaherty, D.W.; “Impact of Interactions Between Solvent Structures and Reactive Intermediates on Lewis-Acid Catalyzed Epoxidations,” The 27th North American Catalysis Society Meeting, May 2022; New York City, NY – *Oral Presentation*
8. **Potts, D.S.**; Torres, C.; Kwon, O.; Flaherty, D.W.; “Effect of Water Concentration on Rates and Selectivities of Alkene Epoxidations in Ti-BEA Zeolites,” AIChE Annual Meeting, November 2022; Phoenix, AZ – *Oral Presentation*
9. **Potts, D.S.**; Jeyaraj, V.S.; Kwon, O.; Ghosh, R.; Mironenko, A.V.; Flaherty, D.W.; “Influence of Interactions Between Solvent Structures and Reactant Alkyl Groups on Lewis-Acid Catalyzed Epoxidations,” AIChE Annual Meeting, November 2022; Phoenix, AZ – *Oral Presentation*

AWARDS AND HONORS

National Science Foundation (NSF) Graduate Fellow	2021 – 2024
1 st Poster Prize, 2021 CCC Spring Symposium	May 2021
UIUC ICES Teaching Assistants Ranked as Excellent (2x)	Fall 2020, Spring 2021
Engineer in Training (EIT) – passed FE Exam	August 2018
1 st Place Capstone Group, OU Chemical Engineering	Spring 2018
<ul style="list-style-type: none">Designed a plant that converted light cycle oil into diesel fuel. Focused on equipment design, catalyst selection, reaction chemistry, mass/heat transfer, and economics.Awarded 1st prize among 25 capstone groups in recognition of detailed design of catalytic reactor system and thorough economic analysis.	
OU CBME Program of Excellence	Aug. 2016 – May 2018
OU President's & Dean's Honor Rolls	Aug. 2014 – May 2018
Oklahoma State Regents Academic Scholars Program	Aug. 2014 – May 2018

PROFESSIONAL EXPERIENCE AND ACTIVITIES

Lab Manager	November 2021 – Present
<ul style="list-style-type: none">Handle lab orientation for incoming studentsDelegate cleaning assignments to lab members and track lab cleanlinessPoint of contact for lab equipment and facilities maintenance	
Lab Webmaster	October 2020 – November 2021
<ul style="list-style-type: none">Managed the lab's Twitter (@Flaherty_Lab) and website (https://publish.illinois.edu/flahertycatalysis/)Technology manager for group meetings – provided laser pointer and laptop to load weekly research and safety presentations	
ChBE Graduate Student Advisory Council – Internal Vice President	June 2020 – July 2021
<ul style="list-style-type: none">Organized welcome and networking events for first-year graduate studentsPlanned annual Graduate Research Symposium and graduate recruitment events	
Next Thought, Norman, OK	July 2018 – August 2019
<ul style="list-style-type: none">Full-time content developer and tutor for Chegg (contracted by Next Thought)Independently designed and created ~150 online video lectures for thermodynamics, kinetics, organic chemistry, and process controls<ul style="list-style-type: none">Pedagogical approach combined physical explanations, example problems, and quantitative analysis.Developed example problems for assigned topics.Tutored undergraduate engineers and chemists in one-on-one video sessions<ul style="list-style-type: none">Prepared tailored discussion and example problems for specific topics (based off topics students were covering in class).Created personalized reading assignments and practice problems as homework.	
American Institute of Chemical Engineers, OU Chapter Member	August 2015 – May 2018
<ul style="list-style-type: none">Attended chapter meetings and events	
National Society of Collegiate Scholars, OU Chapter Member	January 2015 – May 2018
<ul style="list-style-type: none">Attended chapter meetings and events	

TEACHING AND MENTORSHIP EXPERIENCE

Teaching Assistant

Fall 2020 – Spring 2021

- Chemical Kinetics and Catalysis, ChBE 551, Department of Chemical and Biomolecular Engineering, UIUC, Fall 2020 – *List of Teaching Assistants Ranked as Excellent*
- Mass Transfer Operations, ChBE 422, Department of Chemical and Biomolecular Engineering, UIUC, Spring 2021 – *List of Teaching Assistants Ranked as Excellent*

Undergraduate Mentor

August 2022 – Present

- Jess Komar (UIUC), current junior in ChBE Department
- Teaching a variety of experimental and data analysis techniques, also providing guidance in decision to pursue graduate school or an industry position

National Stuttering Association (NSA): Generations Mentor

October 2020 – March 2022

- Connected with teenagers who stutter via Zoom and e-mail
- Goal was to provide guidance and help instill confidence as communicators
- Met periodically to discuss experiences in school, future plans, hobbies, speech goals

Letters to a Pre-Scientist

September 2022 – Present

- Connected with a 7th grade “pre-scientist” in a low-income community to help broaden awareness of STEM careers and inspire students to pursue STEM
- Will exchange 4-6 letters throughout the academic year

SKILLS

- Catalyst synthesis
 - Hydrothermal synthesis
 - Post-synthetic modification
- Catalyst characterization
 - X-ray diffraction
 - Energy dispersive X-ray reflectance
 - Diffuse reflectance, *In situ* UV-visible spectroscopy
 - *In situ* attenuated total reflectance, transmission Fourier transform IR spectroscopy
- Liquid phase batch reactions
- Isothermal titration calorimetry
- ¹H NMR spectroscopy

VOLUNTEER WORK & EXTRACURRICULAR ACTIVITIES

National Stuttering Association (NSA)

May 2020 – Present

- NSA Generations Mentor
- National member: “NSA Connects” events

UIUC Stuttering Lab

October 2019 – Present

- Support group, meet weekly with student speech therapists and other people who stutter
- Discuss weekly fluency goals and interesting topics relating to stuttering

CURIE Summer Camp at Illinois

July 2021

- Guided high school students through basic introductory catalysis experiment
- Assisted with preparation of experimental design and experiment

Habitat for Humanity Volunteer

October 2010 – May 2018

- Habitat ReStore in Tulsa, OK: managed inventory and distribution of donations.
- House builds: material transport, build site preparation and cleanup, construction.