

Daniel T. Bregante

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Education

Massachusetts Institute of Technology; Cambridge, MA 2020 – 2022 (expected)
Postdoctoral Research Associate
Postdoc Advisor: Yogesh Surendranath, Ph.D.

University of Illinois at Urbana-Champaign; Urbana, IL 2015 – 2020 (expected)
Ph.D. in Chemical and Biomolecular Engineering GPA: 4.0
Ph.D. Advisor: David W. Flaherty, Ph.D.
National Defense Science and Engineering Graduate (NDSEG) Fellow

University of California, Berkeley; Berkeley, CA 2011 – 2015
B.S. in Chemical and Biomolecular Engineering *with honors* GPA: 3.7
Concentration in Applied Physical Sciences; Minor in Chemistry

Professional Experience

Graduate Researcher Sept. 2015 – Present
University of Illinois at Urbana-Champaign; Urbana, IL
Advisor: Professor *David W. Flaherty*, Department of Chemical Engineering

Analytical Operations Intern June 2015 – Aug. 2015
Genentech; San Francisco, CA
Manager: *Wayman Chan*, Analytical Operations Division

Undergraduate Researcher Jan. 2014 – May 2015
University of California, Berkeley; Berkeley, CA
Advisor: Professor *Clayton J. Radke*, Department of Chemical Engineering

Undergraduate Researcher Jan. 2013 – Dec. 2013
University of California, Berkeley; Berkeley, CA
Advisor: Professor *Thomas J. Maimone*, Department of Chemistry

Chemistry Demonstrations Laboratory Jan. 2012 – May 2015
University of California, Berkeley; Berkeley, CA
Manager: *Karen Chan*, Department of Chemistry

Awards & Honors (Awarding Institution)

2019 – 2020 University of Illinois Dissertation Completion Fellowship (UIUC)
2019 – 2020 ARCS Foundation Scholar (ARCS Foundation)
2016 – 2019 National Defense Science and Engineering Graduate Fellowship (NDSEG; Army Research Office)
2019 Gordon Research Conference Travel Award (GRC)
2019 Graduate College Travel Award (UIUC)
2018 ACS Graduate Student Award in Environmental Chemistry (ACS)
2018 AIChE Catalysis and Reaction Engineering Travel Award (AIChE)
2017 – 2018 Frederic and Edith Mavis Future Faculty Fellowship (UIUC)
2017 – 2018 School of Chemical Sciences Graduate Teaching Award (UIUC)
2017 – 2018 Twice on List of Teachers Ranked as Outstanding/Excellent (UIUC)
2017 Richard J. Kokes Graduate Fellowship (North American Catalysis Society)

2017	Thomas J. Hanratty Travel Award (UIUC)
2016	1 st Place Award for Oral Presentations at 15 th Annual ChBE Symposium (UIUC)
2015 – 2016	Samuel W. Parr Graduate Fellowship (UIUC)
2014	College of Chemistry Summer Research Fellowship (UC Berkeley)
2013 – 2014	Melvin J. Heger-Horst Undergraduate Fellowship (UC Berkeley)
2013 – 2014	Engineering Undergraduate Scholarship (UC Berkeley)
2013	Frank Delfino Chemical Engineering Summer Research Fellowship (UC Berkeley)

Publications

‡Denotes co-first authorship; §Denotes undergraduate mentee

15. Ardagh, M.A.; **Bregante, D.T.**; Flaherty, D.W.; Notestein, J.M.; “Controlled deposition of silica on titania-silica to impart transport limitation-free confinement effects on epoxidation catalysts” *In review*.
14. **Bregante, D.T.**; Tan, J.Z.;[§] Sustrino, A.; Flaherty, D.W.; “[Heteroatom Substituted Zeolite FAU with Ultralow Al Contents for Liquid-Phase Oxidation Catalysis](#)” *Catalysis Science & Technology, Advance Article*.
*Featured on the cover of *Catalysis Science & Technology**
13. Hong, Y.T.; **Bregante, D.T.**; Lee, C.W.; Seo, Y.; Flaherty, D.W.; Rogers, S.A.; Schook L.G.; Kong, H.; “[Catalytic Microgelators for Decoupled Control of Gelation Rate and Rigidity of the Biological Gels](#)” *Journal of Controlled Release*, **2020**, *317*, 166-180.
12. **Bregante, D.T.**; Flaherty, D.W.; “[Impact of Specific Interactions Among Reactive Surface Intermediates and Confined Water on Epoxidation Catalysis and Adsorption in Lewis Acid Zeolites](#)” *ACS Catalysis*, **2019**, *9*, 10951-10962.
11. **Bregante, D.T.**; Johnson, A.M.;[§] Patel, A.Y.;[§] Ayla, E.Z.; Cordon, M.J.; Bukowski, B.C.; Greeley, J.; Gounder, R.; Flaherty, D.W.; “[Cooperative Effects between Hydrophilic Pores and Solvents: Catalytic Consequences of Hydrogen Bonding on Alkene Epoxidation in Zeolites](#)” *Journal of the American Chemical Society* **2019**, *141*, 7302-7319.
10. **Bregante, D.T.**; Thornburg, N.E.; Notestein, J.M.; Flaherty, D.W.; “[Consequences of Confinement on Highly Dispersed Group IV and V Metal Oxide Catalysts for Olefin Epoxidation with Hydrogen Peroxide](#)” *ACS Catalysis* **2018**, *8*, 2995-3010.
*Featured on the cover of *ACS Catalysis* and *Mass Transfer Newsletter**
9. **Bregante, D.T.**; Patel, A.Y.;[§] Johnson, A.M.;[§] Flaherty, D.W.; “[Catalytic Thiophene Oxidation by Groups 4 and 5 Framework-Substituted Zeolites with Hydrogen Peroxide: Mechanistic and Spectroscopic Evidence for the Effects of Metal Lewis Acidity and Solvent Lewis Basicity](#)” *Journal of Catalysis* **2018**, *364*, 415-425.
8. Wilson, N.M.; Schröder, J.; Priyadarshini, P.; **Bregante, D.T.**; Kunz, S.; Flaherty, D.W.; “[Direct Synthesis of H₂O₂ on PdZn Nanoparticles: The Impact of Electronic Modifications and Heterogeneity of Active Sites](#)” *Journal of Catalysis* **2018**, *368*, 261-274.
7. Dion, M.Z.; Wang, Y.J.; **Bregante, D.T.**; Chan, W.; Andersen, N.; Hilderbrand, A.; Leiske, D.; Salisbury, C.M.; “[The use of a 2,2'-azobis \(2-amidinopropane\) dihydrochloride \(AAPH\) stress model as an indicator of oxidation susceptibility for monoclonal antibodies](#)” *Journal of Pharmaceutical Science* **2018**, *107*, 550-558.
6. **Bregante, D.T.**; Flaherty, D.W.; “[Periodic Trends in Olefin Epoxidation over Group IV and V Framework-Substituted Zeolite Catalysts: A Kinetic and Spectroscopic Study](#)” *Journal of the American Chemical Society* **2017**, *139*, 6888-6898.
*Highlighted in *Illinois News Bureau*, *Science Daily*, *Science Newslines*, *Phys.org*, etc.*
5. **Bregante, D.T.**; Priyadarshini, P.; Flaherty, D.W.; “[Kinetic and Spectroscopic Evidence for Reaction Pathways and Intermediates for Olefin Epoxidation on Nb in *BEA](#)” *Journal of Catalysis*, **2017**, *348*, 75-89.

4. Wilson, N.M.;[‡] **Bregante, D.T.**;[‡] Priyadarshini, P.; Flaherty, D.W.; “[Production and use of H₂O₂ for atom-efficient functionalization of hydrocarbons and small molecules](#)” *Catalysis*, **2017**, *29*, 122-212.
3. Moteki, T.; Rowley, A.T.; **Bregante, D.T.**; Flaherty, D.W.; “[Formation Pathways toward 2- and 4-Methylbenzaldehyde via Sequential Reactions from Acetaldehyde over Hydroxyapatite Catalysts](#)” *ChemCatChem*, **2017**, *9*, 1921-1929.
2. Dursch, T.J.; Liu, D.E.; Taylor, N.O.; Chan, S.Y.; **Bregante, D.T.**; Radke, C.J.; “[Diffusion of Water-Soluble Sorptive Drugs in HEMA/MAA Hydrogels](#)” *Journal of Controlled Release* **2016**, *239*, 242-248.
1. Dursch, T.J.; Liu, D.E.; Oh, Y.; **Bregante, D.T.**; Chan, S.Y.; Radke, C.J.; “[Equilibrium water and solute uptake in silicone hydrogels](#)” *Acta Biomaterialia* **2015**, *18*, 112-117.

Patent Applications

1. Flaherty, D.W.; **Bregante, D.T.**; “Heteroatom Substituted Zeolites” U.S. Patent Application No. 62/944,412 (2019)

Oral Presentations

13. **Bregante, D.T.**; Schultz, R.L.;[§] Ayla, E.Z.; Tan, J.Z.;[§] Torres, C.; Flaherty, D.W. “Influence of Oxidant Chemical Functionality on Alkene Epoxidation over Lewis Acid Zeolites: Intermediate Stabilization through Inner- and Outer-Sphere Interactions” 2019 AIChE National Meeting; November 13th, 2019; Orlando, FL
12. **Bregante, D.T.**; Tan, J.Z.;[§] Patel, A.Y.;[§] Flaherty, D.W. “Catalysis in Tight Spaces: Confined Solvent Structures Influence Stability of Surface Intermediates during Alkene Epoxidation within Lewis Acid Zeolites” 2019 AIChE National Meeting; November 11th, 2019; Orlando, FL
11. **Bregante, D.T.**; Tan, J.Z.;[§] Schultz, R.L.;[§] Patel, A.Y.;[§] Torres, C.; Ayla, E.Z.; Flaherty, D.W. “Interactions between Surface Species and Confined Solvent Structures within Lewis Acid Zeolites: The (De)Stabilization of Catalytically-Relevant Intermediates” ACS Fall 2019 National Meeting; Aug. 25th, 2019; San Diego, CA
10. **Bregante, D.T.**; Tan, J.Z.;[§] Patel, A.Y.;[§] Ayla, E.Z.; Flaherty, D.W. “Confined Solvent Structures within Lewis Acid Zeolites Influence the Stability of Surface Species at the Liquid-Solid Interface” 2019 Gordon Research Conference: Nanoporous Materials and Their Applications; August 5th, 2019; New London, NH (*Invited from GRS speakers*)
9. **Bregante, D.T.**; Tan, J.Z.;[§] Patel, A.Y.;[§] Ayla, E.Z.; Flaherty, D.W. “Confined Solvent Structures within Lewis Acid Zeolites Influence the Stability of Surface Species at the Liquid-Solid Interface” 2019 Gordon Research Seminar: Nanoporous Materials and Their Applications; August 4th, 2019; New London, NH (*Invited*)
8. **Bregante, D.T.**; Flaherty, D.W. “Solvent Effects in Confined Spaces: Catalytic Consequences of Hydrophilicity on Alkene Epoxidation in Titanium Zeolites” Army Research Office Chemical Sciences Program Review; June 27th, 2019; Durham, NC – *PI Invitation; Presented in place*
7. **Bregante, D.T.**; Cordon, M.J.; Gounder, R.; Flaherty, D.W. “Solvent Effects in Confined Spaces: Catalytic Consequences of Hydrophilicity on Alkene Epoxidation in Titanium Zeolites” 26th North American Meeting of the Catalysis Society (NAM 26); June 24th, 2019; Chicago, IL
6. **Bregante, D.T.**; Johnson, A.M.;[§] Patel, A.Y.;[§] Ayla, Z.; Flaherty, D.W. “The Catalytic Consequences of Silanol Densities within Titanium BEA on Alkene Epoxidation with Hydrogen Peroxide” 2018 AIChE National Meeting; November 1st, 2018; Pittsburgh, PA

5. **Bregante, D.T.;** Flaherty, D.W. “Structure-Function Relationships for Dispersed Early Transition Metals on Porous Oxides” Army Research Office Chemical Sciences Program Review; August 2nd, 2018; Durham, NC – *PI Invitation; Presented in place*
4. **Bregante, D.T.;** Johnson, A.M.;[§] Patel, A.Y.;[§] Ayla, Z.; Thornburg, N.E.; Cordon, M.J.; Gounder, R.; Notestein, J.M.; Flaherty, D.W. “The Catalytic Consequences of Active Intermediate Polarization, Transition State Confinement, and Silanol Density on Alkene Epoxidation with Hydrogen Peroxide over Highly Disperse Group 4 and 5 Metal Oxides” Catalysis Club of Chicago Symposium; May 11th, 2018; Naperville, IL
3. **Bregante, D.T.;** Thornburg, N.E.; Notestein, J.M.; Flaherty, D.W. “Group IV and V Periodic Trends in Olefin Epoxidation: Effects of Local Environment and Electronic Structure” 2017 AIChE National Meeting; November 1st, 2017; Minneapolis, MN
2. **Bregante, D.T.;** Flaherty, D.W.; “Kinetic and Spectroscopic Evidence for Periodic Trends in Olefin Epoxidation over Group IV and V *BEA” 25th North American Meeting of the Catalysis Society (NAM 25); June 6th, 2017; Denver, CO
1. **Bregante, D.T.;** Flaherty, D.W.; “Periodic Trends in Olefin Epoxidation over Group IV and V Zeolite Catalysts” 253rd ACS National Meeting; Apr. 6th, 2017; San Francisco, CA

Poster Presentations

14. **Bregante, D.T.;** Wilcox, L.N.; Paolucci, C.; Gounder, R.; Flaherty, D.W. “Kinetics of O₂ Activation over Cu-exchanged Zeolites: Implications for Partial Methane Oxidation” 2019 AIChE National Meeting; November 13th, 2018; Orlando, FL
13. **Bregante, D.T.;** Wilcox, L.N.; Paolucci, C.; Gounder, R.; Flaherty, D.W. “Kinetics of O₂ Activation over Cu-exchanged Zeolites: Implications for Partial Methane Oxidation” 2019 AIChE National Meeting; November 12th, 2018; Orlando, FL – *Exxon Mobil Poster Presentation (Invited)*
12. **Bregante, D.T.;** “Engineering the Catalytic Environment: Synthetic, Mechanistic, Spectroscopic Approaches for Developing Design Principles” 2019 AIChE National Meeting; November 10th, 2018; Orlando, FL – *Meet the Faculty Candidate Poster Session*
11. **Bregante, D.T.;** “Molecular Interactions at Solid-Liquid Interfaces for Oxidation Catalysis” ARCS Annual Reception; Oct. 16th, 2019; Chicago, IL (*Invited*)
10. **Bregante, D.T.;** Tan, J.Z.;[§] Schultz, R.L.;[§] Patel, A.Y.;[§] Torres, C.; Ayla, E.Z.; Flaherty, D.W. “Interactions between Surface Species and Confined Solvent Structures within Lewis Acid Zeolites: The (De)Stabilization of Catalytically-Relevant Intermediates” ACS Fall 2019 National Meeting; Aug. 25th, 2019; San Diego, CA – *Sci-Mix (Invited)*
9. **Bregante, D.T.;** Tan, J.Z.;[§] Patel, A.Y.;[§] Ayla, E.Z.; Flaherty, D.W. “Confined Solvent Structures within Lewis Acid Zeolites Influence the Stability of Surface Species at the Liquid-Solid Interface” 2019 Gordon Research Conference: Nanoporous Materials and Their Applications; August 5th, 2019; New London, NH
8. **Bregante, D.T.;** Flaherty, D.W. “Confined Chaos: Disruption of Hydrogen-Bonded Water by Hydrophobic Surface Intermediates within Lewis Acid Zeolites” Catalysis Club of Chicago Symposium; April 16th, 2019; Naperville, IL
7. **Bregante, D.T.;** Patel, A.Y.;[§] Johnson, A.M.;[§] Flaherty, D.W. “Catalytic Thiophene Oxidation by Groups 4 and 5 Zeolite BEA with H₂O₂: Mechanistic and Spectroscopic Evidence for the Effects of Metal Lewis Acidity and Solvent Lewis Basicity” 2018 AIChE National Meeting; October 31st, 2018; Pittsburgh, PA

6. **Bregante, D.T.;** Thornburg, N.E.; Notestein, J.M.; Flaherty, D.W.; “Group IV and V Periodic Trends in Olefin Epoxidation: Effects of Electronic Structure and Local Environment” 2017 AIChE National Meeting; November 1st, 2017; Minneapolis, MN
5. **Bregante, D.T.;** Flaherty, D.W.; “Periodic Trends in Olefin Epoxidation over Group IV and V Zeolite Catalysts” Catalysis Club of Chicago Symposium; May 16th, 2017; Naperville, IL
4. **Bregante, D.T.;** Flaherty, D.W.; “Reaction Pathways and Intermediates for Epoxidation on Nb-*BEA” Catalysis Club of Chicago Symposium; May 17th, 2016; Naperville, IL
3. **Bregante, D.T.;** Chan, W.; Xu, A.; “Automation of a high-throughput assay to quantify peptide modification in mAbs by UHPLC-HRMS” Genentech Internship Poster Presentation; Aug. 15th, 2015; South San Francisco, CA
2. **Bregante, D.T.;** Dursch, T.J.; Peng, C.C.; Radke, C.J.; “Sliding Friction Coefficient of Soft Surface-Gel Coatings for Soft Contact Lenses” Saegebarth Undergraduate Research Fair; Apr. 24, 2015; Berkeley, CA
1. **Bregante, D.T.;** Dursch, T.J.; Peng, C.C.; Radke, C.J.; “Surface Gel Coatings for Soft Contact Lenses” Saegebarth Undergraduate Research Fair; Apr. 25, 2014; Berkeley, CA

Teaching Experience

- *Ad hoc* Instructor, *Kinetics and Reactor Design*, ENGR 462. Department of Engineering, Olivet Nazarene University, Spring 2019
- Teaching Assistant and Guest Lecturer, *Chemical Kinetics and Catalysis*, ChBE 551. Department of Chemical and Biomolecular Engineering, UIUC, Fall 2018
 - List of Teachers Ranked as Excellent (Top 20% of all TAs)
- Teaching Assistant and Guest Lecturer, *Mass Transfer and Operations*, ChBE 422. Department of Chemical and Biomolecular Engineering, UIUC, Fall 2017
 - School of Chemical Sciences Graduate Teaching Award
 - List of Teachers Ranked as Outstanding (Top 10% of all TAs)
- Teaching Assistant, *Chemical Structure and Reactivity*, Chem 3A. Department of Chemistry, UC Berkeley, Summer 2014
- Teaching Assistant, *Organic Chemistry I*, Chem 112A. Department of Chemistry, UC Berkeley, Fall 2013

Undergraduate Mentees

At the *University of Illinois at Urbana-Champaign*, with awards won while mentored [last known location]

- Ami Y. Patel [Exxon Mobil] Jan. 2017 – Present
 - R.J. Van Mynen Chemical Engineering Scholarship
- Jun Zhi Tan [UIUC] Sept. 2018 – Present
 - Finalist for Outstanding Poster Award at Undergraduate ChBE Research Symposium 2019
- Rebecca L. Schultz [UIUC] Feb. 2018 – May 2019
- Alayna M. Johnson [UIUC] Jan. 2017 – May 2018
 - Barry M. Goldwater Scholarship
 - Outstanding Researcher award at the Summer Research Symposium at UIUC 2017
 - Best Oral Presentation at the 2017 Eastern Central Illinois ACS Conference
- Katherine E. Nagode [Corning Inc.] May – Nov. 2016

Professional Service and Leadership

- **Conference Abstract Peer Reviewer:** AIChE National Meeting (2019, 2020); Catalysis Club of Chicago (2019)
- **Conference Session Chair:** AIChE National Meeting (2019, 2020); Catalysis Club of Chicago (2019)

- **Manuscript Reviewer:** Applied Catalysis B: Environmental; Catalysis Science & Technology; Catalysis Communications
- **Membership:** American Chemical Society (ACS); American Institute of Chemical Engineers (AIChE); Catalysis Club of Chicago (CCC); International Zeolite Association (IZA); North American Catalysis Society (NACS); Tau Beta Pi (TBP)
- **Outreach and Service Activities (University):** Undergraduate Research Symposium Judge (2018 – Present); Summer Pre-doctoral Institute Mentor (2018 – Present); Eastern Central Illinois ACS Undergraduate Conference Judge (2017 – Present); Mentees and Mentors Relationships in Research (NSF-REU, 2016 – 2019); Summer Research Opportunities Program Mentor (2017 – 2018); Omega Chi Epsilon Chemical Engineering Student Panel (2016 – Present); Engineering Prospective Graduate School Panel (2016 – Present); Cal Alumni Association Scholarship Reviewer (2016 – Present); Vice President of Graduate Student Advisory Committee (2016 – 2017)
- **Outreach Activities (K-12):** Catalyzing your Interest in Engineering at Illinois (CURIE, 2019); Girls Adventures in Mathematics, Engineering, and Science (GAMES, 2016 – 2018); Berkeley Engineers and Mentors (BEAM, 2014 – 2015)

Collaborations

2016 – Present	Prof. Justin Notestein (Northwestern University)
2017 – Present	Prof. Rajamani Gounder (Purdue University)
2018 – Present	Prof. Christophe Copéret (ETH Zürich)
2019 – Present	Prof. Diwakar Shukla (UIUC)
2019 – Present	Prof. Christopher Paolucci (University of Virginia)
2018 – 2019	Prof. Jeffrey Greeley (Purdue University)
2018 – 2019	Prof. Hyunjoon Kong (UIUC)