

Rajamani Gounder

R. Norris and Eleanor Shreve Professor of Chemical Engineering
Charles D. Davidson School of Chemical Engineering, Purdue University
2160 Forney Hall, 480 Stadium Mall Drive, West Lafayette, IN 47907-2100
Office: (765) 496-7826, Fax: (765) 494-0805, E-mail: rgounder@purdue.edu
Website: <https://sites.google.com/site/rgounder/>

EDUCATION

Postdoctoral	California Institute of Technology , Chemical Engineering	2013
Ph. D.	University of California Berkeley , Chemical Engineering	2011
B. S.	University of Wisconsin Madison , Chemical Engineering (Double Major: Chemistry, Graduated with distinction)	2006

PROFESSIONAL EXPERIENCE

Director	Purdue Catalysis Center	2023-present
R. Norris and Eleanor Shreve Professor	Purdue University , Chemical Engineering	2023-present
Larry and Virginia Faith Professor	Purdue University , Chemical Engineering	2021-2023
Larry and Virginia Faith Associate Professor	Purdue University , Chemical Engineering	2018-2021
Larry and Virginia Faith Assistant Professor	Purdue University , Chemical Engineering	2016-2018
Assistant Professor	Purdue University , Chemical Engineering	2013-2016
Postdoctoral Fellow	California Institute of Technology , Chemical Engineering Postdoctoral advisor: Mark E. Davis	2011-2013
Graduate Researcher	University of California Berkeley , Chemical Engineering Dissertation advisor: Enrique Iglesia	2006-2011
Undergraduate Researcher	University of Wisconsin Madison , Chemical Engineering Research advisor: James A. Dumesic	2003-2006

HONORS AND AWARDS

• Fellow (Royal Society of Chemistry)	2023
• R. Norris and Eleanor Shreve Endowed Full Professorship (Purdue ChE)	2023
• ISCRE Rutherford Aris Award (ISCRE)	2023
• Eastman Lectureship (UC-Berkeley, College of Chemistry)	2022
• R. Norris Shreve Award for Outstanding Teaching in Chemical Engineering (Purdue ChE)	2022

- Outstanding Faculty Mentor Award (CISTAR) 2021
- Outstanding Mentor of Engineering Graduate Students (Purdue ChE) 2021
- ACS CATL Early Career in Catalysis Award (ACS CATL Division) 2021
- Faculty Excellence Award for Early Career Research (Purdue College of Engineering) 2019
- R. Norris Shreve Award for Outstanding Teaching in Chemical Engineering (Purdue ChE) 2019
- DOE Early Career Award (Department of Energy) 2018
- Alfred P. Sloan Research Fellowship in Chemistry (Sloan Foundation) 2018
- Phillip C. Wankat Graduate Teaching Award in Chemical Engineering (Purdue ChE, *inaugural*) 2017
- AIChE 35 Under 35 Award in Education (AIChE) 2017
- Teaching for Tomorrow Fellowship Award (Purdue Univ.) 2017
- Larry and Virginia Faith Endowed “Rising Star” Professorship (Purdue ChE) 2016
- Outstanding Mentor of Engineering Graduate Students (Purdue ChE, *inaugural*) 2016
- Young Scientist Prize, 16th ICC in Beijing (International Association of Catalysis Societies) 2016
- NSF CAREER Award (National Science Foundation) 2016
- R. Norris Shreve Award for Outstanding Teaching in Chemical Engineering (Purdue ChE) 2016
- Ralph M. and Grace W. Showalter Research Trust Award (Purdue Univ.) 2015
- 3M Non-Tenured Faculty Award (3M Corporation) 2015
- Ralph E. Powe Junior Faculty Enhancement Award (Oak Ridge Assoc. Univ.) 2014
- ACS PRF Doctoral New Investigator Award (ACS Petroleum Research Fund) 2014

RESEARCH PUBLICATIONS (SINCE 2020)

98. Ezenwa, S., Montalvo-Castro, H., Hoffman, A. J., Loch, H., Attebery, J., Jan, D.-Y., Schmidthorst, M., Chmelka, B., Hibbitts, D.*, **Gounder, R.***, “Synthetic Placement of Active Sites in Zeolites for Selective Toluene Methylation to Para-Xylene.” *Journal of the American Chemical Society* (2024), *in press*.
97. Wilcox, L. W.[†], Rebolledo-Oyarce, J.[†], Mikes, A. D., Wang, Y., Schneider, W. F.*, **Gounder, R.***, “Structure and Reactivity of Binuclear Cu Active Sites in Cu-CHA Zeolites for Stoichiometric Partial Methane Oxidation to Methanol.” *ACS Catalysis*, 14 (2024) 3647-3663.
96. Ezenwa, S., Hopping, G. M., Sauer, E. D., Scott, T., Mack, S., **Gounder, R.***, “Quantification of Extracrystalline Acid Sites in MFI Zeolites after Post-Synthetic Passivation Treatments using Mesitylene Benzoylation Kinetics.” *Reaction Chemistry & Engineering* (2024), DOI: 10.1039/D3RE00589E.
95. Santiago-Colón, Á. N., **Gounder, R.***, “Structural Changes to Molybdenum and Brønsted Acid Sites on MFI Zeolites During Methane Dehydroaromatization Reaction-Regeneration Cycles.” *Journal of Catalysis*, 430 (2024) 115335.
94. Waitt, C., Gao, X., **Gounder, R.**, DeBellis, A., Prasad, S., Moini, A., Schneider, W. F.*, “Analysis and Augmentation of Guest-Host Interaction Energy Models as CHA and AEI Zeolite Crystallization Phase Predictors.” *Journal of Physical Chemistry C*, 127 (2023) 22740-22751.
93. DeLuca, M.[†], Jones, C. B.[†], Krishna, S. H., Goswami, A., Saxena, R., Li, S., Prasad, S., Moini, A., Schneider, W. F., **Gounder, R.***, “Effects of Zeolite Framework Topology on Cu(I) Oxidation and Cu(II) Reduction Kinetics of NO_x Selective Catalytic Reduction with NH₃.” *Chem Catalysis*, 3 (2023) 100726.
92. Bickel, E. E., McGinness, H., Zamiechowski, N., **Gounder, R.***, “Synthetic Methods to Vary Crystallite Properties of TON Zeolites and Their Consequences for Brønsted-Acid Catalyzed Propene Oligomerization.” *Journal of Catalysis*, 426 (2023) 189-199.
91. Krishna, S. H., Goswami, A., Wang, Y., Jones, C. B., Dean, D. P., Miller, J. T., Schneider, W. F., **Gounder, R.***, “Influence of Framework Al Density in Chabazite Zeolites on Copper Ion Mobility and Reactivity During NO_x Selective Catalytic Reduction with NH₃.” *Nature Catalysis*, 6 (2023) 276-285.

90. Bickel, E. E., Lee, S., **Gounder, R.***, “Influence of Brønsted-Acid Site Density on Reaction-Diffusion Phenomena that Govern Propene Oligomerization Rate and Selectivity in MFI Zeolites.” *ACS Catalysis*, 13 (2023) 1257-1269.
89. Theis, J. R., Ura, J., Getsoian, A. B., Pridhodko, V. Y., Thomas, C. R., Pihl, J. A., Lardinois, T. M., **Gounder, R.**, Wei, X., Ji, Y., Pace, R. B., Crocker, M.*, “Effect of Framework Al Pairing on NO Storage Properties of Pd-CHA Passive NO_x Adsorbers.” *Applied Catalysis B* (2023) 122074.
88. Wang, X., Wang, Y., Moini, A., **Gounder, R.**, Maginn, E. J., Schneider, W. F.*, “Influence of N,N,N-trimethyl-1-adamantyl ammonium (TMAda⁺) Structure Directing Agent on Al Distributions and Pair Features in Chabazite Zeolite.” *Chemistry of Materials*, 34 (2022) 10811-10822.
87. Bickel, E. E., **Gounder, R.***, “Hydrocarbon Products Occluded within Zeolite Micropores Impose Transport Barriers that Regulate Brønsted Acid-Catalyzed Propene Oligomerization.” *JACS Au*, 2 (2022) 2585-2595.
86. Lee, S., Nimlos, C. T., Kipp, E. R., Wang, Y., Gao, X., Schneider, W. F., Lusardi, M., Vattipalli, V., Prasad, S., Moini, A., **Gounder, R.***, “Evolution of Framework Al Arrangements in CHA Zeolites During Crystallization in the Presence of Organic and Inorganic Structure-Directing Agents.” *Crystal Growth & Design*, 22 (2022) 6275-6295.
85. Bickel, E. E., Hoffman, A. J., Lee, S., Snider, H. E., Nimlos C. T., Zamiechowski, N. K., Hibbitts, D., **Gounder, R.***, “Altering the Arrangement of Framework Al Atoms in MEL Zeolites Using Mixtures of Tetrabutylammonium and Sodium Structure-Directing Agents.” *Chemistry of Materials*, 34 (2022) 6835-6852.
84. Lardinois, T. M.[†], Mandal, K.[†], Yadav, V., Wijerathne, A., Bolton, B. K., Lippie, H., Li, C., Paolucci, C.*, **Gounder, R.***, “Kinetic and Thermodynamic Factors Influencing Palladium Nanoparticle Redispersion into Mononuclear Pd(II) Cations in Zeolite Supports.” *Journal of Physical Chemistry C*, 126 (2022) 8337-8353.
83. Koninckx, E., **Gounder, R.**, Thybaut, J., Broadbelt, L. J.*, “Kinetic Modeling of Ethene Oligomerization on Bifunctional Nickel and Acid Beta Zeolite.” *Industrial & Engineering Chemistry Research*, 61 (2022) 3860-3876.
82. Kim, P., Van Der Mynsbrugge, J., Aljama, H., Lardinois, T. M., **Gounder, R.**, Head-Gordon, M., Bell, A. T.*, “Investigation of the Modes of NO Adsorption in Pd/H-CHA.” *Applied Catalysis B*, 304 (2022) 120992.
81. Marsden, G., Kostetsky, P., Sekiya R.-S., Hoffman, A. J., Lee, S., **Gounder, R.**, Hibbitts, D., Broadbelt, L. J.*, “Quantifying Effects of Active Site Proximity on Rates of Methanol Dehydration to Dimethyl Ether over CHA Zeolites through Microkinetic Modeling.” *ACS Materials Au*, 2 (2022) 163-175.
80. Caulkins R., Joshi, R., **Gounder, R.***, Ribeiro, F. H.*, “Effects of Ethene Pressure on Deactivation During Oligomerization on Ni Sites within Microporous and Mesoporous Supports.” *ChemCatChem*, 14 (2022) e202101478.
79. Saxena, A., Joshi, R., Seemakurthi, R. R., Koninckx, E., Broadbelt, L. J., Greeley, J., **Gounder, R.***, “Effect of Nickel Active Site Density on the Deactivation of Ni-Beta Zeolite Catalysts During Ethene Dimerization.” *ACS Engineering Au*, 2 (2022) 12-16.
78. Wilcox, L. N.[†], Krishna, S. H.[†], Jones, C. B., **Gounder, R.***, “Mechanistic Studies of NH₃-Assisted Reduction of Mononuclear Cu(II) Cation Sites in Cu-CHA Zeolites.” *Catalysis Science & Technology*, 11 (2021) 7932-7942.
77. Pace, R. B., Lardinois, T. M., Ji, Y., **Gounder, R.**, Heintz, O., Crocker, M.*, “Effects of Treatment Conditions on Pd Speciation in CHA and Beta Zeolites for Passive NO_x Adsorption.” *ACS Omega*, 6 (2021) 29471-29482.
76. Krishna, S. H., **Gounder, R.***, “Molecular Water Provides a Channel for Communication Between Bronsted Acid Sites in Solid Catalysts.” *Chem Catalysis*, 1 (2021) 968-970.
75. Bregante, D. T.[†], Wilcox, L. N.[†], Liu, C., Paolucci, C., **Gounder, R.**, Flaherty, D. W.*, “Dioxygen Activation Kinetics over Distinct Cu Site Types in Cu-CHA Zeolites.” *ACS Catalysis*, 11 (2021) 11873-11874.

74. Krishna, S. H., Jones, C. B., **Gounder, R.***, “Temperature Dependence of Cu(I) Oxidation and Cu(II) Reduction Kinetics in the Selective Catalytic Reduction of NO_x with NH₃ on Cu-Chabazite Zeolites.” *Journal of Catalysis*, 404 (2021) 873-882.
73. Cybulskis, V. J., Gawecki, P., Zvinevich, Y., **Gounder, R.***, Ribeiro F. H.*, “Demonstrating Concepts in Catalysis, Renewable Energy, and Chemical Safety with the Catalytic Oxidation of Hydrogen.” *Journal of Chemical Education*, 98 (2021) 2036-2041.
72. Bickel, E. E., Nimlos, C. T., **Gounder, R.***, “Developing Quantitative Synthesis-Structure-Function Relations for Framework Aluminum Arrangement Effects in Zeolite Acid Catalysis.” *Journal of Catalysis*, 399 (2021) 75-85.
71. Krishna, S. H., Jones, C. B., **Gounder, R.***, “Dynamic Interconversion of Metal Active Site Ensembles in Zeolite Catalysis.” *Annual Review of Chemical & Biomolecular Engineering*, 12 (2021) 115-136.
70. LiBretto, N. J., Xu, Y., Quigley, A., Edwards, E., Nargund, R., Vega-Vila, J. C., Caulkins, R., Saxena, A., **Gounder, R.**, Greeley, J., Zhang, G.*, Miller, J. T.* “Olefin Oligomerization by Main Group Ga³⁺ and Zn²⁺ Single Site Catalysts on SiO₂.” *Nature Communications*, 12 (2021) 2322.
69. Bates, J. S., **Gounder, R.***, “Kinetic Effects of Molecular Clustering and Solvation by Extended Networks in Zeolite Acid Catalysis.” *Chemical Science*, 12 (2021) 4699-4708.
68. Lardinois, T. M., Bates, J. S., Lippie, H., Russell, C. K., Miller, J. T., Meyer III, H. M., Unocic, K. A., Prikhodko, V., Wei, X., Lambert, C. K., Getsoian, A., **Gounder, R.***, “Structural Interconversion Between Agglomerated Palladium Domains and Mononuclear Pd(II) Cations in Chabazite Zeolites.” *Chemistry of Materials*, 33 (2021) 1698-1713.
67. Vernuccio, S.*, Bickel, E. E., **Gounder, R.** Broadbelt, L. J., “Propene Oligomerization on Beta Zeolites: Development of a Microkinetic Model and Experimental Validation.” *Journal of Catalysis*, 395 (2021) 302-314.
66. Kester, P. M.[†], Crum, J.[†], Li, S., Schneider, W. F.*, **Gounder, R.***, “Effects of Brønsted Acid Site Proximity in Chabazite Zeolites on OH Infrared Spectra and Protolytic Propane Cracking Kinetics.” *Journal of Catalysis*, 395 (2021) 210-226.
65. Nimlos, C. T.[†], Hoffman, A. J.[†], Hur, Y. G., Lee, B. J., Di Iorio, J. R., Hibbitts, D.*, **Gounder, R.***, “Experimental and Theoretical Assessments of Aluminum Proximity in MFI Zeolites and its Alteration by Organic and Inorganic Structure-Directing Agents.” *Chemistry of Materials*, 32 (2020) 9277-9298.
64. Vega-Vila, J. C., **Gounder, R.***, “Quantification of Intraporous Hydrophilic Binding Sites in Lewis Acid Zeolites and Consequences for Sugar Isomerization Catalysis.” *ACS Catalysis*, 10 (2020) 12197-12211.
63. Joshi, R., Saxena, A., **Gounder, R.***, “Mechanistic Insights into Alkene Chain Growth Reactions Catalyzed by Nickel Active Sites on Ordered Microporous and Mesoporous Supports.” *Catalysis Science & Technology*, 10 (2020) 7101-7123.
62. Bates, J. S., **Gounder, R.***, “Clustering of Alkanols Confined in Chabazite Zeolites: Kinetic Implications for Dehydration of Methanol-Ethanol Mixtures.” *Journal of Catalysis*, 390 (2020) 178-183.
61. Paolucci, C., Di Iorio, J. R., Schneider, W. F.*, **Gounder, R.***, “Solvation and Mobilization of Copper Active Sites in Zeolites by Ammonia: Consequences for the Catalytic Reduction of Nitrogen Oxides.” *Accounts of Chemical Research*, 53 (2020) 1881-1892.
60. Harris, J. W.*, Bates, J. S., Bukowski, B. C., Greeley, J., **Gounder, R.**, “Opportunities in Catalysis over Metal-Zeotypes Enabled by Descriptions of Active Centers Beyond their Binding Site.” *ACS Catalysis*, 10 (2020) 9476-9495.
59. Hoffman, A. J., Bates, J. S., Di Iorio, J. R., Nystrom, S. V., Nimlos, C. T., **Gounder, R.***, Hibbitts, D.*, “Rigid Arrangements of Ionic Charge in Zeolite Frameworks Conferred by Specific Al Distributions Preferentially Stabilize Alkanol Dehydration Transition States.”, *Angewandte Chemie International Edition*, 59 (2020) 18686-18694.

58. Cordon, M. J., Vega-Vila, J. C., Casper, A., Huang, Z., **Gounder, R.***, “Tighter Confinement Increases Selectivity of D-Glucose Isomerization Toward L-Sorbose in Titanium Zeolites.” *Angewandte Chemie International Edition*, 59 (2020) 19102-19107.
57. Bates, J. S.[†], Bukowski, B. C.[†], Greeley, J.*, **Gounder, R.***, “Structure and Solvation of Confined Water and Water-Alkanol Clusters within Microporous Brønsted Acids and their Effects on Alkanol Dehydration Catalysis.” *Chemical Science*, 11 (2020) 7102-7122.
56. Kester, P. M., Iglesia, E., **Gounder, R.***, “Alkane Dehydrogenation Catalyzed by Brønsted Acidic and Reaction-Derived Carbonaceous Active Sites in Zeolites.” *Journal of Physical Chemistry C*, 124 (2020) 15839-15855.
55. Krishna, S. H., Jones, C. B., Miller, J. T., Ribeiro, F. H., **Gounder, R.***, “Combined Kinetic and *Operando* Spectroscopic Interrogation of Cu-Zeolites: Insights into the Mechanism and Site Requirements of NO_x Selective Catalytic Reduction with NH₃.” *Journal of Physical Chemistry Letters*, 11 (2020) 5029-5036.
54. Jones, C. B.[†], Khurana, I.[†], Krishna, S. H., Shih, A. J., Delgass, W. N., Miller, J. T., Ribeiro, F. H., Schneider, W. F., **Gounder, R.***, “Effects of Dioxygen Pressure on Rates of NO_x Selective Catalytic Reduction with NH₃ on Cu-CHA Zeolites.” *Journal of Catalysis*, 389 (2020) 140-149.
53. Di Iorio, J. R.[†], Li, S.[†], Jones, C. B., Nimlos, C. T., Wang, Y., Kunkes, E., Vattipalli, V., Prasad, S., Moini, A., Schneider, W. F.*, **Gounder, R.***, “Cooperative and Competitive Occlusion of Organic and Inorganic Structure Directing Agents within Chabazite Zeolites Influences Their Aluminum Arrangement.” *Journal of the American Chemical Society*, 142 (2020) 4807-4819.
52. Cybulskis, V. J., **Gounder, R.**, Mojarad, S., Davis, M. E.*, “Initiating a Research-Focused Academic Career in Chemical Engineering: Perspectives from Faculty at Different Career Stages.” *AIChE Journal*, 66 (2020) e16927.

WORKSHOP REPORTS

1. Schweitzer, N. M., **Gounder, R.**, Rioux, R. M., eds., “Addressing Rigor and Reproducibility in Thermal, Heterogeneous Catalysis.” DOI: 10.5281/zenodo.8029158.

PROFESSIONAL LEADERSHIP AND SERVICE

- **Leadership and Major Conference Organization**
 - Director, Purdue Catalysis Center (2023-present)
 - Director, Catalysis Club of Chicago (2022-2025)
 - President, Catalysis Club of Chicago (2021-2022)
 - Vice President and Program Chair, Catalysis Club of Chicago (2020-2021)
 - Programming Chair, Area 20A: Catalysis (CRE), AIChE (2020-2021)
 - Posters Committee Co-Chair, 17th International Congress on Catalysis, San Diego, CA (2019-2020)
 - Technical Program Co-Chair, 26th North American Catalysis Society Meeting, Chicago, IL (2017-2019)
 - Thrust/Testbed Leader, NSF ERC CISTAR (2017-present)
 - Director, Area 20: Catalysis and Reaction Engineering Division, AIChE (2016-2019)
- **Journal Editorships**
 - *Reaction Chemistry & Engineering*, Associate Editor (2023-present)
 - *Science Advances*, Associate Editor (2021-present)
- **Journal Editorial and Advisory Boards**
 - *Journal of the American Chemical Society*, Editorial Advisory Board (2024-present)
 - *Catalysis Reviews*, Editorial Board (2022-present)
 - *ACS Catalysis*, Editorial Advisory Board (2022-present)
 - *Annual Review of Chemical and Biomolecular Engineering*, Committee Guest Member (2022-2023)
 - *Reaction Chemistry & Engineering*, Advisory Board (2016-2023)
 - *ACS Catalysis*, Early Career Advisory Board (2017-2019)