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Education

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|------|--------------------|--|
| 2011 | Ph.D. in Chemistry | California Institute of Technology, Pasadena, CA
Advisors: John E. Bercaw and Jay A. Labinger |
| 2005 | B.S. in Chemistry | University of Chicago, Chicago, IL
Advisor: Gregory L. Hillhouse |

Professional Experience

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| 7/2022–present | Professor, Department of Chemistry
University of North Carolina at Chapel Hill, Chapel Hill, NC |
| 1/2023–present | Director, Sustainable Energy Research Consortium
University of North Carolina at Chapel Hill, Chapel Hill, NC |
| 7/2021–present | Director of Graduate Studies, Department of Chemistry
University of North Carolina at Chapel Hill, Chapel Hill, NC |
| 7/2018–6/2022 | Associate Professor, Department of Chemistry
University of North Carolina at Chapel Hill, Chapel Hill, NC |
| 8/2018–7/2021 | Deputy Director, Department of Energy AMPED Energy Frontier Research Center
University of North Carolina at Chapel Hill, Chapel Hill, NC |
| 7/2012–6/2018 | Assistant Professor, Department of Chemistry
University of North Carolina at Chapel Hill, Chapel Hill, NC |
| 1/2011–6/2012 | Dreyfus Environmental Chemistry Postdoctoral Fellow
Advisors: Karen I. Goldberg and James M. Mayer
University of Washington, Seattle, WA |

Honors

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| 2022 | ACS Laboratory Safety Institute Graduate Research Faculty Safety Award |
| 2021 | Distinguished Speaker of the Year award, NC Section of the American Chemical Society |
| 2019 | J. Carlyle Sitterson Award for Teaching First-Year Students, UNC |
| 2018 | <i>Chemical Communications</i> Emerging Investigator Lectureship |
| 2017 | <i>Organometallics</i> Distinguished Author Award |
| 2016 | Sloan Research Fellowship |
| 2016 | National Science Foundation CAREER Award |
| 2016 | Early Excellence Profile in <i>Journal of Physical Organic Chemistry</i> |
| 2014 | University Research Council James Moeser Award for Distinguished Research, UNC |
| 2013 | Junior Faculty Development Award, UNC |
| 2013 | Named to Forbes “30 Under 30: Energy” list |
| 2011 | Camille and Henry Dreyfus Environmental Chemistry Postdoctoral Fellow |
| 2011 | Herbert Newby McCoy Award for Outstanding Graduate Research, Caltech |

Bibliography and Products of Scholarship

Book Chapters – University of North Carolina at Chapel Hill

2. Bruch, Q. J.; Butler, S. K.; Tonks, I. A.; **Miller, A. J. M.**
“Resources for Improving Safety Culture, Training, and Awareness in the Academic Laboratory”
Comprehensive Coordination Chemistry III, 3rd Edition, Elsevier, 2021, pages 1125–1143.
<https://doi.org/10.1016/B978-0-08-102688-5.00092-1>
1. Gonell, S.; **Miller, A. J. M.**
“Carbon Dioxide Electroreduction Catalyzed by Organometallic Complexes.”
Advances in Organometallic Chemistry **2018**, *70*, 1–69
<https://doi.org/10.1016/bs.adomc.2018.07.001>

Refereed Articles – University of North Carolina at Chapel Hill (* = corresponding author)

99. Fernández, S.; Assaf, E.A.; Ahmad, S.; Travis, B.D.; Curley, J.B.; Hazari, N.; Ertem, M.Z.; Miller, Alexander J.M.
“Room Temperature Formate Ester Transfer Hydrogenation Enables an Electrochemical-Thermal Organometallic Cascade for Methanol Synthesis from CO₂.”
Submitted, ChemRxiv Preprint.
<https://doi.org/10.26434/chemrxiv-2024-q01kl>
98. Mu, Y.; Chen, B.; Zhang, H.; Fei, M.; Liu, T.; Mehta, N.; Wang, D.; **Miller, A.J.M.**; Diaconescu, P.L.; Wang, D.*
“Highly Selective Electrochemical Baeyer-Villiger Oxidation through Oxygen Atom Transfer from Water”
J. Am. Chem. Soc. **2024**, *146*, 13438–13444
<https://doi.org/10.1021/jacs.4c02601>
97. Acosta-Calle, S.; Huebsch, E.Z.; Kolmar, S.S.; Whited, M.T.; Chen, C.-H.; **Miller, A.J.M.***
“Regulating Access to Active Sites via Hydrogen Bonding and Cation-Dipole Interactions: A Dual Cofactor Approach to Switchable Catalysis”
J. Am. Chem. Soc. **2024**, *146*, 11095–11104
<https://doi.org/10.1021/jacs.3c10877>
96. Bein, G.P.; Stewart, M.A.; Assaf, E.A.; Tereniak, S.J.; Sampaio, R.N.; **Miller, A.J.M.**; Dempsey, J.L.*
“Methyl Termination of p-Type Silicon Enables Selective Photoelectrochemical CO₂ Reduction by a Molecular Ruthenium Catalyst.”
ACS Energy Lett. **2024**, *9*, 1777–1785
<https://doi.org/10.1021/acsenerylett.4c00122>
95. Cloward, I.N.; Liu, T.; Rose, J.; Bonn, A.G.; Jurado, T.; Chambers, M.B.; Pitman, C.L.; ter Horst, M.A.; **Miller, A.J.M.***
“Catalyst Self-Assembly Accelerates Bimetallic Light-Driven Electrocatalytic H₂ Evolution in Water.”
Nature Chem. **2024**, *16*, 709–716
<https://rdcu.be/dCnA1>
• For a [highlight](#), see: Sonea, A., Warren, J.J. *Nature Chem.* **2024**, *16*, 678
94. Yoo, C.; See, X.; Bhattacharya, S.; Cunningham, D.; Perri, S.; West, N.; Mason, D.; Meade, C.; Cowden, J.; Turner, P.; Kilgore, R.; Osborne, C.; Grajeda, J.*; **Miller, A.J.M.***
“Nickel N-Heterocyclic Carbene Catalysts for Ester Carbonylation.”
Science **2023**, *382*, 815–820.
<https://www.science.org/doi/10.1126/science.ade3179>
• For a highlight, see: Casadevall, C. *Chem Catalysis* **2023**, *3*, 100863

93. McMillion, N.D.; Bruch, Q.J.; Chen, C.-H.; Hasanayn, F.; **Miller, A.J.M.***
 “Synthesis and Bonding Analysis of Pentagonal Bipyramidal Rhenium Carboxamide Oxo Complexes”
Dalton Trans. **2023**, 52, 15115–15123.
<https://doi.org/10.1039/D3DT02617E>
92. Elsby, M.R.; Espinosa, M.R.; Ertem, M.Z.; Deziel, A.P.; Hazari, N.; **Miller, A.J.M.**; Paulus, A.H.; Pecoraro, M.V.
 “Carbon Dioxide Insertion Reactions into Rhenium Hydrides as a Probe for the Impact of Solvent on Linear Free Energy Relationships Between Thermodynamic and Kinetic Hydricity”
Organometallics **2023**, 42, 3005–3012.
<https://doi.org/10.1021/acs.organomet.3c00333>
91. McMillion, N.D.*; Smith, A.M.*; **Miller, A.J.M.***
 “Responsibility as a Foundation of Safety Culture.”
ACS Chem. Health Saf. **2023**, 30, 105–107.
<https://doi.org/10.1021/acs.chas.3c00006>
 * These co-authors contributed equally
90. Acosta-Calle, S.; **Miller, A.J.M.***
 “Tunable and Switchable Catalysis Enabled by Cation-Controlled Gating with Crown Ether Ligands.”
Acc. Chem. Res. **2023**, 56, 971–981.
<https://doi.org/10.1021/acs.accounts.3c00056>
89. Dodge, H.M.*; Natinsky, B.S.*; Jolly, B.J.*; Zhang, H.; Mu, Y.; Chapp, S.M.; Tran, T.V.; Diaconescu, P.L.; Do, L.H.; Wang, D.*; Liu, C.*; **Miller, A.J.M.***
 “Polyketones from Carbon Dioxide and Ethylene by Integrating Electrochemical and Organometallic Catalysis.”
ACS Catal. **2023**, 13, 4053–4059.
<https://doi.org/10.1021/acscatal.3c00769>
 * These co-authors contributed equally
88. Deng, S.; Jolly, B.; Wilkes, J.; Mu, Y.; Byers, J.; Do, L.; Miller, A.J.M.; Wang, D.; Liu, C.; Diaconescu, P.L.
 “Spatiotemporal control for integrated catalysis”
Nat. Rev. Methods Primers **2023**, 3, 28.
<https://doi.org/10.1038/s43586-023-00207-0>
87. Hasanayn, F.*; Holland, P.L.; Goldman, A.S.; **Miller, A.J.M.***
 “Lewis Structures and the Bonding Classification of End-on Bridging Dinitrogen Transition Metal Complexes.”
J. Am. Chem. Soc. **2023**, 145, 4326–4342.
<https://doi.org/10.1021/jacs.2c12243>
86. Bruch, Q.J.*; McMillion, N.D.; Chen, C.-H.; **Miller, A.J.M.***
 “Oxidative Addition of a Phosphinite P–O Bond at Nickel.”
Inorg. Chem. **2023**, 62, 2389–2393.
<https://doi.org/10.1021/acs.inorgchem.2c04188>
85. Hegg, A.S.; Mercado, B.Q.; **Miller, A.J.M.**; Holland, P.L.* "Catalytic Reduction of Dinitrogen to Ammonia using Porphyrin-Molybdenum Catalysts." *Faraday Discuss.* **2023**, 243, 429–449.
<https://doi.org/10.1039/D2FD00166G>
84. Farquhar, A.*; Gardner, K.*; Acosta-Calle, S.*; Camp, A.; Chen, C.; **Miller, A.J.M.***
 “Cation-Controlled Olefin Isomerization Catalysis with Palladium Pincer Complexes.”
Organometallics **2022**, 41, 3366–3372.
<https://doi.org/10.1021/acs.organomet.2c00315>

- * These co-authors contributed equally
- Invited contribution to special issue in honor of Maurice Brookhart.

83. Assaf, E.A.; Gonell, S.; Chen, C.; **Miller, A.J.M.***
 “Accessing and Photo-Accelerating Low-Overpotential Pathways for CO₂ Reduction: A Bis-Carbene Ruthenium Terpyridine Catalyst.”
ACS Catal. **2022**, *12*, 12596–12606.
<http://doi.org/10.1021/acscatal.2c03651>
82. Espinosa, M.R.; Ertem, M.Z.*; Barakat, M.; Bruch, Q.J.; Deziel, A.P.; Elsby, M.R.; Hasanayn, F.; Hazari, N.*; **Miller, A.J.M.***; Pecoraro, M.V.; Smith, A.M.; Smith, N.E.
 “Correlating Thermodynamic and Kinetic Hydricities of Rhenium Hydrides.”
J. Am. Chem. Soc. **2022**, *144*, 17939–17954.
<http://doi.org/10.1021/jacs.2c07192>
81. Bruch, Q.J.; Malakar, S.; Goldman, A.S.; **Miller, A.J.M.***
 “Mechanisms of Electrochemical N₂ Splitting by a Molybdenum Pincer Complex.”
Inorg. Chem. **2022**, *61*, 2307–2318.
<http://doi.org/10.1021/acs.inorgchem.1c03698>
80. Gonell, S.*; Assaf, E.A.; Lloret-Fillol, J*.; **Miller, A.J.M.***
 “An Iron Bis(carbene) Catalyst for Low Overpotential CO₂ Electroreduction to CO: Mechanistic Insights from Kinetic Zone Diagrams, Spectroscopy, and Theory.”
ACS Catal. **2021**, *11*, 15212–15222.
<http://doi.org/10.1021/acscatal.1c04414>
79. Stratakes, B.M.; Wells, K.A.; Kurtz, D.A.; Castellano, F.N.; **Miller, A.J.M.***
 “Photochemical H₂ Evolution from Bis(diphosphine) Nickel Hydrides Enables Low-Overpotential Electrocatalysis.”
J. Am. Chem. Soc. **2021**, *143*, 50, 21388–21401.
<http://doi.org/10.1021/jacs.1c10628>
78. Stratakes, B. M.; Dempsey, J. L.*; **Miller, A.J.M.***
 “Determining the Overpotential of Electrochemical Fuel Synthesis Mediated by Molecular Catalysts: Recommended Practices, Standard Reduction Potentials, and Challenges.”
ChemElectroChem **2021**, *8*, 1–21.
<http://doi.org/10.1002/celec.202100576R2>
 • Invited contribution to special issue in honor of Jean-Michel Savéant.
77. Yoo, C.; **Miller, A.J.M.***
 “Stepwise Iodide-Free Methanol Carbonylation via Methyl Acetate Activation by Pincer Iridium Complexes.”
J. Am. Chem. Soc. **2021**, *143*, 12633–12643.
<https://doi.org/10.1021/jacs.1c05185>
76. Yamout, L.S.; Ataya, M.; Hasanayn, F.*; Holland, P.L.*; **Miller, A.J.M.***; Goldman, A.S.*
 “Understanding Terminal versus Bridging End-on N₂ Coordination in Transition Metal Complexes”
J. Am. Chem. Soc. **2021**, *143*, 9744–9757.
<http://doi.org/10.1021/jacs.1c01146>
75. Kaphan, D.M.*; Brereton, K.R.; Klet, R.C.; Witzke, R.J.; **Miller, A.J.M.***; Mulfort, K.L.*; Delferro, M.*; Tiede, D.M.*
 “Photocatalytic Transfer Hydrogenation in Water: Insight into Mechanism and Catalyst Speciation”
Organometallics **2021**, *40*, 1482–1491.
<https://doi.org/10.1021/acs.organomet.1c00133>
74. Shada, A.D.R.; **Miller, A.J.M.**; Emge, T.J.; Goldman, A.S.*
 “Catalytic Dehydrogenation of Alkanes by PCP–Pincer Iridium Complexes Using Proton and

- Electron Acceptors.”
ACS Catal. **2021**, *11*, 3009–3016.
<http://doi.org/10.1021/acscatal.0c05160>
73. Camp, A.M.; Kita, M.R.; Blackburn, P.T.; Dodge, H.M.; Chen, C.-H.; **Miller, A.J.M.***
 “Selecting Double Bond Positions with a Single Cation-Responsive Iridium Olefin Isomerization Catalyst.”
J. Am. Chem. Soc. **2021**, *143*, 2792–2800.
<https://doi.org/10.1021/jacs.0c11601>
72. Hu, J.*; Bruch, Q.J.*; **Miller, A.J.M.***
 “Temperature and Solvent Effects on H₂ Splitting and Hydricity: Ramifications on CO₂ Hydrogenation by a Rhenium Pincer Catalyst.”
J. Am. Chem. Soc. **2021**, *143*, 945–954.
<https://doi.org/10.1021/jacs.0c11110>
 * These co-authors contributed equally
71. Gonell, S.*; Lloret-Fillol, J.*; **Miller, A.J.M.***
 “An Iron Pyridyl-Carbene Electrocatalyst for Low Overpotential CO₂ Reduction to CO.”
ACS Catal. **2021**, *11*, 2, 615–626.
<https://doi.org/10.1021/acscatal.0c03798>
70. Dodge, H. M.; Kita, M. R.; Chen, C.-H.; **Miller, A.J.M.***
 “Identifying and Evading Olefin Isomerization Deactivation Pathways Resulting from Ion-Tunable Hemilability.”
ACS Catal. **2020**, *10*, 13019–13030.
<http://doi.org/10.1021/acscatal.0c03784>
69. Yoo, C.; Dodge, H. M.; Farquhar, A. H.; Gardner, K. E.; **Miller, A.J.M.***
 “Decarbonylative ether dissection by iridium pincer complexes.”
Chem. Sci. **2020**, *11*, 12130–12138.
<https://doi.org/10.1039/DoSC03736B>
 • For a highlight, see: Wilde, E. *Chemistry World*, 13 October 2020
68. Bruch, Q.J.*; Connor, G.P.*; McMillion, N.D.*; Goldman, A.S.; Hasanayn, F.*; Holland, P.*; **Miller, A.J.M.***
 “Considering Electrocatalytic Ammonia Synthesis via Bimetallic Dinitrogen Cleavage.”
ACS Catal. **2020**, *19*, 10826–10846.
<http://doi.org/10.1021/acscatal.0c02606>
 * These co-authors contributed equally
67. Brereton, K. R.; Smith, N. E.; Hazari, N.*; **Miller, A. J. M.***
 “Thermodynamic and Kinetic Hydricity of Transition Metal Hydrides”
Chem. Soc. Rev. **2020**, *49*, 7929–7948.
<https://doi.org/10.1039/DoCS00405G>
66. Stratakes, B.M.; **Miller, A.J.M.***
 “H₂ Evolution at an Electrochemical “Underpotential” with an Iridium-Based Molecular Photoelectrocatalyst”
ACS Catal. **2020**, *10*, 9006–9018.
<https://doi.org/10.1021/acscatal.0c02265>
65. Hochman, G.*; Goldman, A.*; Felder, F. A.; Mayer, J.; **Miller, A. J. M.**; Holland, P. L.; Goldman, L.; Manocha, P.; Song, Z.; Aleti, S.
 “The Potential Economic Feasibility of Direct Electrochemical Nitrogen Reduction as a Route to Ammonia.”
ACS Sustainable Chem. Eng. **2020**, *8*, 8938–8948.
<https://doi.org/10.1021/acssuschemeng.0c01206>

64. Gonell, S.; Assaf, E. A.; Duffee, K.; Schauer, C.K.; **Miller, A. J. M.***
“Kinetics of the Trans Effect in Ruthenium Complexes Provide Insight into the Factors that Control Activity and Stability in CO₂ Electroreduction.”
J. Am. Chem. Soc. **2020**, *142*, 8980–8999.
<https://doi.org/10.1021/jacs.0c02912>
63. Farquhar, A. H.; Brookhart, M.*; **Miller, A. J. M.***
“Oligomerization and Polymerization of 5-ethylidene-2-norbornene by Cationic Palladium and Nickel Catalysts.”
Polym. Chem. **2020**, *11*, 2576–2584.
<https://doi.org/10.1039/DoPY00216J>
62. Barrett, S. M.; Stratakes, B. M.; Chambers, M.; Kurtz, D. A.; Pitman, C. L.; Dempsey, J. L.; **Miller, A. J. M.***
“Mechanistic Basis for Tuning Iridium Hydride Photochemistry from H₂ Evolution to Hydride Transfer Hydrodechlorination.”
Chem. Sci. **2020**, *11*, 6442–6449.
<https://doi.org/10.1039/DoSC00422G>
61. Bruch, Q. J.; **Miller, A. J. M.***
“A Bis(arylphosphinito)amide Pincer Ligand that Binds Nickel Forming Six-Membered Metallacycles.”
Polyhedron **2020**, *179*, 114380.
<https://doi.org/10.1016/j.poly.2020.114380>
• Invited contribution to John Bercaw 75th Birthday Special Issue.
60. van Alten, R. S.; Wätjen, F.; Demeshko, S.; **Miller, A.J.M.**; Würtele, C.; Siewert, I.*; Schneider, S.*
“(Electro-)chemical Splitting of Dinitrogen with a Rhenium Pincer Complex.”
Eur. J. Inorg. Chem. **2020**, *2020*, 1402–1410.
<https://doi.org/10.1002/ejic.201901278>
59. Bruch, Q. J.; Connor G.P.; Chen, C.-H.; Holland, P. L.; Mayer, J. M.; Hasanayn, F.*; **Miller, A.J.M.***
“Dinitrogen Reduction to Ammonium at Rhenium Utilizing Light and Proton-Coupled Electron Transfer.”
J. Am. Chem. Soc. **2019**, *141*, 20198–20208.
<https://doi.org/10.1021/jacs.9b10031>
58. Smith, J. B.*; Camp, A. M.*; Farquhar, A. H.*; Kerr, S. H.; Chen, C.-H.; **Miller, A. J. M.***
“Organometallic Elaboration as a Strategy for Tuning the Supramolecular Characteristics of Aza-Crown Ethers.”
Organometallics **2019**, *38*, 4392–4398.
<https://doi.org/10.1021/acs.organomet.9b00462>
‡ These co-authors contributed equally
57. Lindley, B. M.*; Walden, A. G.*; Brasacchio, A. M.; Casuras, A.; Lease, N.; Chen, C.-H.; Goldman, A. S.; **Miller, A. J. M.***
“Electrochemical C–H Bond Activation via Cationic Iridium Hydride Pincer Complexes.”
Chem. Sci. **2019**, *10*, 9326–9330.
<https://doi.org/10.1039/C9SC03076J>
‡ These co-authors contributed equally
56. Brereton, K. R.; Jadrlich, C. N.; Stratakes, B. M.; **Miller, A. J. M.***
“Thermodynamic Hydricity across Solvents: Subtle Electronic Effects and Striking Ligation Effects in Iridium Hydrides.”

- Organometallics* **2019**, *38*, 3104–3110.
<https://doi.org/10.1021/acs.organomet.9b00278>
55. Gonell, S.; Massey, M.; Moseley, I.; Schauer, C.; Muckerman, J.; **Miller, A. J. M.***
“The *Trans* Effect in Electrocatalytic CO₂ Reduction: Mechanistic Studies of Asymmetric Ruthenium Pyridyl-Carbene Catalysts.”
J. Am. Chem. Soc. **2019**, *141*, 6658–6671
<https://pubs.acs.org/doi/10.1021/jacs.9b01735>
54. Yoo, C.; Dodge, H.; **Miller, A. J. M.***
“Cation-Controlled Catalysis with Crown Ether-Containing Transition Metal Complexes.”
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53. Wu, L. Brennaman, M. K.; Nayak, A.; Eberhart, M.; **Miller, A. J. M.**; Meyer, T. J.*
“Stabilization of Ruthenium(II) Polypyridyl Chromophores on Mesoporous TiO₂ Electrodes: Surface Reductive Electropolymerization and Silane Chemistry.”
ACS Cent. Sci. **2019**, *5*, 506–514
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52. Wu, L.; Eberhart, M.; Shan, B.; Nayak, A.; Brennaman, M. K.; **Miller, A. J. M.***; Shao, J.*; Meyer, T. J.*
“Stable Molecular Surface Modification of Nanostructured, Mesoporous Metal Oxide Photoanodes by Silane and Click chemistry.”
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51. Deaton, J.*; Taliaferro, C.; Pitman, C.L.; Czerwieniec, R.; Jakubikova, E.; **Miller, A. J. M.***; Castellano, F.*
“Excited-State Switching between Ligand-Centered and Charge Transfer Modulated by Metal–Carbon Bonds in Cyclopentadienyl Iridium Complexes.”
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50. Wang, Y.; Gonell, S.; Mathiyazhagan, U. R.; Liu, Y.; Wang, D.; **Miller, A. J. M.**; Meyer, T. J.*
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48. Gregor, L. G.; Grajeda, J.; White, P. S.; Vetter, A. J.; **Miller, A. J. M.***
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 “Synthesis and Characterization of Stable Gold(III) Pincer Complexes.”
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42. Smith, J. B.; Kerr, S. H.; White, P. S.; **Miller, A. J. M.***
 “Thermodynamic Studies of Cation-Macrocycle Interactions in Nickel Pincer-Crown Ether Complexes Enable Switchable Ligation.”
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41. **Miller, A. J. M.***
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Angew. Chem. Int. Ed. **2017**, *56*, 5498–5502.
<http://dx.doi.org/10.1002/anie.201701006>
37. Brereton, K. R.; Bellows, S. M.; Fallah, H.; Lopez, A. A.; Adams, R. M.; **Miller, A. J. M.***; Jones, W. D.*; Cundari, T. R.*
 “Aqueous Hydricity From Calculations of Reduction Potential and Acidity in Water.”
J. Phys. Chem. B **2016**, *120*, 12911–12919.
<http://dx.doi.org/10.1021/acs.jpcc.6b09864>
 • Invited contribution to “Mark S. Gordon Festschrift” special issue.

36. Brereton, K. R.; Pitman, C. L.; Cundari, T. R.; **Miller, A. J. M.***
“Solvent-Dependent Thermochemistry of an Iridium/Ruthenium H₂ Evolution Catalyst.”
Inorg. Chem. **2016**, *55*, 12042–12051.
<http://dx.doi.org/10.1021/acs.inorgchem.6b02223>
35. Chambers, M. B.; Kurtz, D. A.; Pitman, C. L.; Brennaman, M. K.; **Miller, A. J. M.***
“Efficient Photochemical Dihydrogen Generation Initiated by a Bimetallic Self-Quenching Mechanism.”
J. Am. Chem. Soc. **2016**, *138*, 13509–13512.
<http://dx.doi.org/10.1021/jacs.6b08701>
34. Lindley, B. M.; Appel, A. M.; Krogh-Jespersen, K.; Mayer, J. M.; **Miller, A. J. M.***
“Evaluating the Thermodynamics of Electrocatalytic N₂ Reduction in Acetonitrile.”
ACS Energy Letters, **2016**, *1*, 698–704.
<http://dx.doi.org/10.1021/acsenerylett.6b00319>
33. Gregor, L. C.; Grajeda, J.; Kita, M. R.; White, P. S.; Vetter, A. J.; **Miller, A. J. M.***
“Modulating the Elementary Steps of Methanol Carbonylation by Bridging the Primary and Secondary Coordination Spheres.”
Organometallics **2016**, *35*, 3074–3086.
<http://dx.doi.org/10.1021/acs.organomet.6b00607>
32. Wiedner, E. S.; Chambers, M. B.; Pitman, C. L.; Bullock, R. M.; **Miller, A. J. M.***; Appel, A. M.*
“Thermodynamic Hydricity of Transition Metal Hydrides.”
Chem. Rev. **2016**, *116*, 8655–8692.
<http://pubs.acs.org/doi/abs/10.1021/acs.chemrev.6b00168>
31. Walden, A. G.; Kumar, A.; Lease, N.; Goldman, A. S.; **Miller, A. J. M.***
“Electrochemical and Chemical Routes to Hydride Loss from an Iridium Dihydride.”
Dalton Trans. **2016**, *45*, 9766–9769.
<http://dx.doi.org/10.1039/C6DT00522E>
• Invited contribution to the *New Talent: Americas* special issue.
30. Pitman, C. L.; Finster, O. N. L.; **Miller, A. J. M.***
“Cyclopentadiene-Mediated Hydride Transfer from Rhodium Complexes.”
Chem. Commun. **2016**, *52*, 9105–9108.
<http://dx.doi.org/10.1039/C6CC00575F>
• For a highlight, see: Ritter, S. K. *Chemical & Engineering News*, **2016**, vol. 94, iss. 6.
• Invited contribution to the 2016 *Emerging Investigators* special issue.
29. Pitman, C. L.; Brereton, K. R.; **Miller, A. J. M.***
“Aqueous Hydricity of Late Metal Catalysts as a Continuum Tuned by Ligands and the Medium.”
J. Am. Chem. Soc. **2016**, *138*, 2252–2260.
<http://dx.doi.org/10.1021/jacs.5b12363>
28. Meek, S. J.; Pitman, C. L.; **Miller, A. J. M.***
“Deducing Reaction Mechanism: A Guide for Students, Researchers, and Instructors.”
J. Chem. Educ. **2016**, *93*, 275–286.
<http://pubs.acs.org/doi/10.1021/acs.jchemed.5b00160>
27. Grajeda, J.; Kita, M. R.; Gregor, L. C.; White, P. S.; **Miller, A. J. M.***
“Diverse Cation-Promoted Reactivity of Iridium Carbonyl Pincer-Crown Ether Complexes.”

Organometallics **2016**, *35*, 306–316.
<http://dx.doi.org/10.1021/acs.organomet.5b00786>

26. Barrett, S. M.; Slattery, S. A.; **Miller, A. J. M.***
 “Photochemical Formic Acid Dehydrogenation by Iridium Complexes: Understanding Mechanism and Overcoming Deactivation.”
ACS Catalysis **2015**, *5*, 6320–6327.
<http://dx.doi.org/10.1021/acscatal.5b01995>
25. Smith, J. B.; **Miller, A. J. M.***
 “Connecting Neutral and Cationic Pathways in Nickel-Catalyzed Insertion of Benzaldehyde into a C–H bond of Acetonitrile.”
Organometallics **2015**, *34*, 4669–4677.
<http://pubs.acs.org/doi/abs/10.1021/acs.organomet.5b00405>
 • Invited contribution to special issue in honor of the late Gregory L. Hillhouse.
24. Walden, A. G.; **Miller, A. J. M.***
 “Rapid Water Oxidation Electrocatalysis by a Ruthenium Complex of the Tripodal Ligand Tris(2-pyridyl)phosphine Oxide.”
Chem. Sci. **2015**, *6*, 2405–2410.
<http://dx.doi.org/10.1039/C5SC00032G>
23. Barrett, S. M.; Pitman, C. L.; Walden, A. G.; **Miller, A. J. M.***
 “Photoswitchable Hydride Transfer from Iridium to 1-Methylnicotinamide Rationalized by Thermochemical Cycles.”
J. Am. Chem. Soc. **2014**, *136*, 14718–14721.
<http://dx.doi.org/10.1021/ja508762g>
22. Kita, M. R.; **Miller, A. J. M.***
 “Cation-Modulated Reactivity of Iridium Hydride Pincer-Crown Ether Complexes.”
J. Am. Chem. Soc. **2014**, *136*, 14519–14529.
<http://dx.doi.org/10.1021/ja507324s>
21. Pitman, C. L.; **Miller, A. J. M.***
 “Molecular Photoelectrocatalysts for Visible Light-Driven Hydrogen Evolution from Neutral Water.”
ACS Catal. **2014**, *4*, 2727–2733.
<http://dx.doi.org/10.1021/cs500441f>

Refereed Articles – Undergraduate, Graduate, and Postdoctoral Research (* = corresponding author)

20. **Miller, A. J. M.***; Kaminsky, W.; Goldberg, K. I.*
 “Arene Activation at Iridium Facilitates C–O Bond Cleavage of Aryl Ethers.”
Organometallics **2014**, *33*, 1245–1252.
19. Brewster, T. P.; **Miller, A. J. M.***; Heinekey, D. M.; Goldberg, K. I.*
 “Hydrogenation of Carboxylic Acids Catalyzed by Half-Sandwich Complexes of Iridium and Rhodium.”
J. Am. Chem. Soc. **2013**, *135*, 16022–16025.
18. **Miller, A. J. M.***; Heinekey, D. M.; Mayer, J. M.; Goldberg, K. I.*
 “Catalytic Disproportionation of Formic Acid to Generate Methanol.”
Angew. Chem. Int. Ed. **2013**, *52*, 3981–3984.

17. Smieja, J. M.; Benson, E. E.; Kumar, B.; Grice, K. A.; Seu, C. S.; **Miller, A. J. M.**; Mayer, J. M.; Kubiak, C. P.*
“Kinetic and Structural Studies, Origins of Selectivity, and Interfacial Charge Transfer in the Artificial Photosynthesis of CO.”
Proc. Natl. Acad. Sci. USA **2012**, *109*, 15646–15650.
16. Waidmann, C. R.*; **Miller, A. J. M.***; Ng, C.-W. A.; Scheuermann, M. L.; Porter, T. R.; Tronic, T. A.; Mayer, J. M.*
“Using Combinations of Oxidants and Bases as PCET Reactants: Thermochemical and Practical Considerations.”
Energy Environ. Sci. **2012**, *5*, 7771–7780.
15. Iluc, V. M.; **Miller, A. J. M.**; Anderson, J. S.; Monreal, M. J.; Mehn, M. P.; Hillhouse, G. L.*
“Synthesis and Characterization of Three-Coordinate Ni(III)-Imide Complexes.”
J. Am. Chem. Soc. **2011**, *133*, 13055–13063.
14. **Miller, A. J. M.**; Labinger, J. A.*; Bercaw, J. E.*
“Trialkylborane-Assisted CO₂ Reduction by Late Transition Metal Hydrides.”
Organometallics **2011**, *30*, 4308–4314.
13. Laskowski, C. A.; **Miller, A. J. M.**; Hillhouse, G. L.*; Cundari, T. R.*
“A Two-Coordinate Ni Imido Complex that Effects C–H Amination.”
J. Am. Chem. Soc. **2011**, *133*, 771–773.
• For a highlight, see: Ritter, S. K. *Chemical & Engineering News*, **2011**, vol. 89, iss. 4.
12. West, N. M.; **Miller, A. J. M.**; Labinger, J. A.*; Bercaw, J. E.*
“Homogeneous Syngas Conversion.”
Coord. Chem. Rev. **2011**, *255*, 881–898.
11. **Miller, A. J. M.**; Labinger, J. A.*; Bercaw, J. E.*
“Homogeneous CO Hydrogenation: Ligand Effects on the Lewis Acid-Assisted Reductive Coupling of Carbon Monoxide.”
Organometallics **2010**, *29*, 4499–4516.
10. Deaton, J. C.*; Switalski, S. C.; Kondakov, D. Y.; Young, R. H.; Pawlik, T. D.; Giesen, D. J.; Harkins, S. B.; **Miller, A. J. M.**; Mickenberg, S. F.; Peters, J. C.*
“E-Type Delayed Fluorescence of a Phosphine-Supported Cu₂(μ-NAr₂)₂ Diamond Core: Harvesting Singlet and Triplet Excitons in OLEDs.”
J. Am. Chem. Soc. **2010**, *132*, 9499–9508.
9. Fulmer, G. R.*; **Miller, A. J. M.**; Sherden, N. H.; Gottlieb, H. E.; Nudelman, A.; Bercaw, J. E.; Stoltz, B. M.; Goldberg, K. I.
“NMR Chemical Shifts of Trace Impurities: Common Laboratory Solvents, Organics, and Gases in Deuterated Solvents Relevant to the Organometallic Chemist.”
Organometallics **2010**, *29*, 2176–2179.
8. Velian, A.; Lin, S.; **Miller, A. J. M.**; Day, M. W.; Agapie, T. A.*
“Synthesis and C–C Coupling Reactivity of a Dinuclear Ni^I–Ni^I Complex Supported by a Terphenyl Diphosphine.”
J. Am. Chem. Soc. **2010**, *132*, 6296–6297.
7. Wilson, A. D.; **Miller, A. J. M.**; DuBois, D. L.*; Labinger, J. A.*; Bercaw, J. E.*
“Thermodynamic Studies of [H₂Rh(diphosphine)₂]⁺ and [HRh(diphosphine)₂(CH₃CN)]²⁺ Complexes in Acetonitrile.”
Inorg. Chem. **2010**, *49*, 3918–3926.

6. **Miller, A. J. M.**; Labinger, J. A.*; Bercaw, J. E.*
“Homogeneous CO Hydrogenation: Dihydrogen Activation Involves a Frustrated Lewis Pair Instead of a Platinum Complex.”
J. Am. Chem. Soc. **2010**, *132*, 3301–3303.
5. **Miller, A. J. M.***; Bercaw, J. E.
“Dehydrogenation of Amine-boranes with a Frustrated Lewis Pair.”
Chem. Commun. **2010**, *46*, 1709–1711.
4. **Miller, A. J. M.**; Labinger, J. A.*; Bercaw, J. E.*
“Reductive Coupling of Carbon Monoxide in a Rhenium Carbonyl Complex with Pendant Lewis Acids.”
J. Am. Chem. Soc. **2008**, *130*, 11874–11875.
3. Harkins, S. B.; Mankad, N. P.; **Miller, A. J. M.**; Szilagy, R. K.*; Peters, J. C.*
“Probing the Electronic Structures of $[\text{Cu}_2(\mu\text{-XR}_2)]^{n+}$ Diamond Cores as a Function of the Bridging X atom (X = N or P) and Charge (n = 0, 1, 2).”
J. Am. Chem. Soc. **2008**, *130*, 3478–3485.
2. **Miller, A. J. M.**; Dempsey, J. L.; Peters, J. C.*
“Long-Lived and Efficient Emission from Mononuclear Amidophosphine Complexes of Copper.”
Inorg. Chem. **2007**, *46*, 7244–7246.
1. Iluc, V. M.; **Miller, A. J. M.**; Hillhouse, G. L.*
“Synthesis and Characterization of Side-bound Aryldiazo and End-bound Nitrosyl Complexes of Nickel.”
Chem. Commun. **2005**, 5091–5093.

Non-Peer-Reviewed Publications – University of North Carolina at Chapel Hill

1. **Miller, A. J. M.***; Tonks, I. A.*
“Let’s Talk About Safety: Open Communication for Safer Labs”
Organometallics **2018**, *37*, 3225–3227
<http://doi.org/10.1021/acs.organomet.8b00627>

Patents – University of North Carolina at Chapel Hill

2. **Miller, A.J.M.**; Grajeda, J.M.; Yoo, C.; Cunningham, D.; West, N.M.; See, X.Y.; Perri, S.T.; Mason, D.C.; Meade, C.D.
“Catalytic methods for carbonylation of esters.”
U.S. Patent Application PCT/US2022/044766, **2022**.
1. Pitman, C. L.; **Miller, A. J. M.**
“Electrocatalytic Hydrogen Production Promoted by Visible Light.”
U.S. Patent Application PCT/US14/520,930, **2014**.

Patents – Undergraduate, Graduate, and Postdoctoral Research

2. **Miller, A. J. M.**; Brewster, T. P.; Goldberg, K. I.; Heinekey, D. M.; Mayer, J. M.
“Hydrogenation and Disproportionation Catalysis.”
U.S. Patent Application PCT/US14/17465, **2014**.

1. Peters, J. C.; **Miller, A. J. M.**; Dempsey, J. L.
 “Emissive Monomeric Metal Complexes.”
U.S. Patent 7,683,183 B2, 2010.

Invited Seminars

52. University of Michigan, Ann Arbor, MI (April 2024)
51. University of Toronto, Toronto, Canada (March 2024)
50. Notre Dame University, South Bend, IN (January 2024)
49. University of Illinois, Chicago, Chicago, IL (September 2023)
48. Institut Català d'Investigació Química (ICIQ), Tarragona, Spain (June 2023)
47. University of Pennsylvania, Philadelphia, PA (February 2023)
46. Auburn University, Auburn, AL (September 2022)
45. Princeton University, Princeton, NJ (April 2022)
44. Göttingen University, Germany (Virtual, January 2022)
43. University of California, Berkeley, Berkeley, CA (Virtual, October 2021)
42. Mississippi State University, Mississippi State, MS (Virtual, September 2021)
41. California Institute of Technology Safety Day Presentation, Pasadena, CA (Virtual, November 2020)
40. Uppsala University, Uppsala, Sweden (Virtual, May 2020)
39. Indiana University, Bloomington, IN (February 2020)
38. University of Alabama, Tuscaloosa, AL (November 2019)
37. Tulane University, New Orleans, LA (October 2019)
36. University of Wisconsin, Madison, Madison, WI (September 2019)
35. University of Richmond, Richmond, VA (February 2019)
34. Columbia University, New York, NY (October 2018)
33. Rutgers University, New Brunswick, NJ (May 2018)
32. University of Memphis, Memphis, TN (March 2018)
31. Brown University, Providence, RI (December 2017)
30. Washington State University, Pullman, WA (November 2017)
29. University of California, Irvine, Irvine, CA (October 2017)
28. University of California, Los Angeles, Los Angeles, CA (October 2017)
27. University of North Carolina at Charlotte, Charlotte, NC (September 2017)
26. Northwestern University, Evanston, IL (September 2017)
25. Argonne National Laboratory, Argonne, IL (September 2017)
24. California Institute of Technology, Pasadena, CA (June 2017)
23. University of Chicago, Chicago, IL (May 2017)
22. Princeton University, Princeton, NJ (February 2017)
21. Virginia Polytechnic Institute and State University, Blacksburg, VA (February 2017)
20. University of Illinois at Urbana-Champaign, Urbana, IL (January 2017)
19. California Institute of Technology, Pasadena, CA (November 2016)
18. University of California, San Diego, San Diego, CA (November 2016)
17. University of California, Riverside, Riverside, CA (November 2016)
16. Carleton College, Northfield, MN (November 2016)
15. University of Minnesota – Twin Cities, Minneapolis, MN (November 2016)
14. Yale University, New Haven, CT (October 2016)
13. University of Cincinnati, Cincinnati OH (October 2016)
12. Michigan State University, East Lansing, MI (October 2016)
11. University of Michigan, Ann Arbor, MI (October 2016)
10. University of Pennsylvania, Philadelphia, PA (October 2016)
9. University of Delaware, Newark, DE (October 2016)
8. University of British Columbia, Vancouver, Canada (September 2016)
7. ExxonMobil Chemical Co., Baytown, TX (May 2016)
6. Weizmann Institute of Science, Rehovot, Israel (December 2015)
5. University of Southern California, Los Angeles, CA (November 2015)

4. Pacific Northwest National Laboratory, Richland, WA (October 2015)
3. North Carolina State University, Raleigh, NC (September 2015)
2. North Carolina Agricultural & Technical State University, Greensboro, NC (March 2015)
1. CNRS Laboratoire Hétérochimie Fondamentale et Appliquée, Toulouse, France (October 2011)

Invited Conference Presentations

41. ACS National Meeting, New Orleans, LA (March 2024)
40. UNC Renewable Energy Research Symposium, Chapel Hill, NC (October 2024)
39. 4th International Conference on Proton-Coupled Electron Transfer, Tarragona, Spain (June 2023)
38. Chemistry for a Sustainable Future, Haifa, Israel (May 2023)
37. ACS National Meeting, Chicago, IL (August 2022)
36. Electron Donor-Acceptor Interactions Gordon Research Conference, Newport, RI (August 2022)
35. NAM27 Conference of the North American Catalysis Society, New York, NY (May 2022)
34. NC-ACS Local Chapter Meeting (Virtual, Nov 2021)
33. NanoGe Conference on Recent Advances on Nitrogen Activation and Conversion (March 2021)
32. 257th ACS National Meeting, Organometallic Chemistry ACS Award Symposium in Honor of Alan Goldman, Orlando, FL (March 2019)
31. 256th ACS National Meeting, The Halpern Legacy: Mechanism, Catalysis, and Organotransition Metal Chemistry, Boston, MA (August 2018)
30. International Conference on Coordination Chemistry, Sendai, Japan (July 2018)
29. University of Göttingen Proton-Coupled Electron Transfer Workshop, Göttingen, Germany (May 2018)
28. 255th ACS National Meeting, Organometallic Chemistry ACS Award Symposium in Honor of Clifford Kubiak, New Orleans, LA (March 2018)
27. 255th ACS National Meeting, Inorganic Chemistry ACS Award Symposium in Honor of James Mayer, New Orleans, LA (March 2018)
26. 255th ACS National Meeting, PCET PhotoCatalysis with Inorganic Molecules and Materials, New Orleans, LA (March 2018)
25. 254th ACS National Meeting, *Organometallics* Distinguished Author Award Symposium Honoring Alexander Miller, Washington, D.C. (August 2017)
24. 254th ACS National Meeting, The Triplet Excited State in Inorganic Chemistry Symposium, Washington, D.C. (August 2017)
23. 254th ACS National Meeting, Center for Enabling New Technologies through Catalysis: Transforming Catalysis through Collaboration, Washington, D.C. (August 2017)
22. XXXVI Biennial of the Spanish Royal Society of Chemistry, Barcelona, Spain (June 2017)
21. Southeast Regional Meeting of the American Chemical Society (SERMACS), Electrocatalysis Symposium, Columbia, SC (October 2016)
20. COST Action PERSPECT-H₂O Final Meeting “Supramolecular Photocatalytic Water Splitting”, Milazzo, Italy (September 2016)
19. 252nd ACS National Meeting, Manipulation of Energy & Electron Transfer in Molecules & Devices Symposium, Philadelphia, PA (August 2016)
18. 252nd ACS National Meeting, Secondary Coordination Sphere Influences: Stability, Reactivity, and Everything in Between, Philadelphia, PA (August 2016)
17. Organometallic Chemistry Gordon Research Conference, Newport, RI (July 2016)
16. Inorganic Chemistry Gordon Research Conference, Biddeford, ME (June 2016)
15. 251st ACS National Meeting, Organometallic Chemistry Award Symposium Honoring Karen Goldberg, San Diego, CA (March 2016)
14. UNC Solar Energy Research Consortium Symposium, Chapel Hill, NC (October 2015)
13. North Carolina Photochemistry Symposium, Charlotte, NC (October 2015)
12. 250th ACS National Meeting, High-Energy Organometallic Complexes Symposium, Boston, MA (August 2015)
11. Center for Enabling New Technologies through Catalysis Summer School, Seattle, WA (July 2015)

10. 249th ACS National Meeting, Creative Research in Catalysis Award Symposium Honoring Maurice Brookhart, Denver, CO (March 2015)
9. 249th ACS National Meeting, Award in Industrial & Engineering Chemistry Symposium Honoring Joseph Zoeller, Denver, CO (March 2015)
8. 249th ACS National Meeting, New Catalysis Through Ligand Design Symposium, Denver, CO (March 2015)
7. Organometallic Chemistry Gordon Research Conference, Newport, RI (July 2014)
6. 2nd International Conference on Proton-Coupled Electron Transfer, Skokloster, Sweden (June 2014)
5. Eastman Chemical Company, Kingsport, TN (September 2013)
4. Center for Enabling New Technologies through Catalysis Summer School, Seattle, WA (July 2013)
3. 245th ACS National Meeting, Pure Chemistry Award Symposium Honoring Theodor Agapie, New Orleans, LA (April 2013)
2. 245th ACS National Meeting, Organometallic Chemistry Award Symposium Honoring Gregory Hillhouse, New Orleans, LA (April 2013)
1. VIPER Chemistry Collaborations, Workshops & Communities of Scholars Workshop, Chapel Hill, NC (July 2012)

Contributed Oral and Poster Presentations

10. Organometallic Chemistry Gordon Research Conference, Newport, RI (Poster, July 2019)
9. Inorganic Reaction Mechanisms Gordon Research Conference, Galveston, TX (Poster, March 2019)
8. Organometallic Chemistry Gordon Research Conference, Newport, RI (Poster, July 2018)
7. Solar Fuels Gordon Research Conference, Ventura, CA (Poster, February 2018)
6. International Chemical Congress of Pacific Basin Societies (Pacifichem), Honolulu, HI (Oral Presentation, December 2015)
5. Organometallic Chemistry Gordon Research Conference, Newport, RI (Poster, July 2015)
4. 24th Inter-American Photochemical Society Meeting, Sarasota, FL (Poster, January 2015)
3. 248th ACS National Meeting, San Francisco, CA (Oral Presentation, August 2014)
2. Renewable Energy: Solar Fuels Gordon Research Conference, Ventura, CA (Poster, January 2014)
1. Organometallic Chemistry Gordon Research Conference, Newport, RI (Poster, July 2013)

Teaching Activities

Courses Taught Fall 2018–present

Fall 2023

- CHEM 075 “First Year Seminar: Bread from Air? The Chemistry of Fertilizers” 22 students
- CHEM 692H “Senior Honors Thesis” 1 student
- CHEM 395 “Research for Chemistry Undergraduates” 1 student

Spring 2023

- CHEM 395 “Research for Chemistry Undergraduates” 1 student
- CHEM 692H “Senior Honors Thesis” 1 student

Fall 2022

- CHEM 089 “First Year Seminar: Bread from Air? The Chemistry of Fertilizers” 20 students
- CHEM 395 “Research for Chemistry Undergraduates” 1 student

CHEM 692H “Senior Honors Thesis” 1 student

Spring 2022

CHEM 395 “Research for Chemistry Undergraduates” 2 students

Fall 2021

CHEM 089 “First Year Seminar: Bread from Air? The Chemistry of Fertilizers” 20 students

CHEM 754 “Literature Seminar in Inorganic Chemistry” 17 students

CHEM 395 “Research for Chemistry Undergraduates” 2 students

Spring 2021

CHEM 453 “Organotransition Metal Chemistry” 37 students

Spring 2020

CHEM 453 “Organotransition Metal Chemistry” 37 students

CHEM 692H “Senior Honors Thesis” 2 students

Fall 2019

CHEM 251 “Introductory Inorganic Chemistry” 93 students

CHEM 291 “Academic Mentoring” 2 students

CHEM 395 “Research for Chemistry Undergraduates” 1 student

Spring 2019

CHEM 453 “Physical Methods in Inorganic Chemistry” 11 students

CHEM 692H “Senior Honors Thesis” 1 student

CHEM 395 “Research for Chemistry Undergraduates” 2 students

Fall 2018

CHEM 251 “Introductory Inorganic Chemistry” 127 students

CHEM 291 “Academic Mentoring” 3 students

CHEM 395 “Research for Chemistry Undergraduates” 3 students

Current Graduate Students

Jenna Halenda (1st year)

Grant Richter (1st year)

Zoe Stuart (1st year)

Mehrnaz Aliahmadi (2nd year)

Matthew Porowski (2nd year)

Benjamin Travis (2nd year)

Awards: DOD NDSEG Fellowship

Katie Fossum (4th year)

Eamon Reynolds (4th year)

Allison M. Smith (5th year)

Awards: DOD NDSEG Fellowship waitlist (2021), NSF Graduate Research Fellowship Program Honorable Mention (2020), Chemistry Teaching Assistant Award (2020)

Former Graduate Students

Noah D. McMillion, PhD 2023

Thesis Title: Ligand Design in Rhenium-Mediated Nitrogen Fixation

Sebastian Acosta-Calle, PhD 2023

Thesis Title: Leveraging Non-Covalent Interactions for Switchable Catalysis in Organometallic Chemistry

Henry M. Dodge, PhD 2023

Thesis Title: Tunable Catalysis with Iridium Pincer Crown Ether Complexes and Synthesis of Polyketones via Integrated Catalysis

Awards: UNC Dissertation Completion Fellowship (2021), UNC Morrison Summer Research Fellow (2017)

Eric A. Assaf, PhD 2022

Thesis Title: Designing Catalytic Motifs to Generate Solar Fuels from the Reduction of Carbon Dioxide

Current position: Pfizer Inc.

Isaac N. Cloward, MS 2022

Thesis Title: Supramolecular Self-Assembly of Iridium Complexes Accelerates Light-Driven Electrocatalytic H₂ Evolution in Water

Current position: Chemist I, Jacobs Solutions Inc.

Bethany M. Stratakes, PhD 2022

Thesis Title: Tuning Overpotential for Molecular Photoelectrocatalysts of Iridium And Nickel

Current position: OSHA

Kelsy Allard, MA 2022

Current position: KBI Biopharma

Quinton J. Bruch, PhD 2021

Thesis Title: Investigations of Dinitrogen Fixation via an N₂ Cleavage Pathway

Awards: NIH F32 Postdoctoral Fellowship (2021), NSF Graduate Research Fellow (2016), UNC Morrison Summer Research Fellow (2016)

Current position: Postdoctoral Scholar, MIT

Andrew M. Camp, PhD 2020

Thesis Title: Switchable Olefin Isomerization in Iridium Complexes

Awards: NSF Graduate Research Fellowship Honorable Mention (2016)

Current Position: Postdoctoral Scholar, UNC

Alexandra H. Sullivan Farquhar, PhD 2020

Thesis Title: Palladium and Nickel Catalyzed Olefin Isomerization and Polymerization

Awards: NSF Graduate Research Fellow (2015)

Current Position: UNC Law School

Jacob B. Smith, PhD 2018

Thesis Title: Roles of Cation-Macrocycle Interactions in Modulating the Reactivity of Transition Metal Pincer-Crown Ether Complexes

Awards: UNC Edminster Teaching Award (2014), UNC Morrison Summer Research Fellow (2013)

Current Position: Innovation Analyst, RTI International

Javier Grajeda, PhD 2018

Thesis Title: Pincer Complexes of Precious Metals

Awards: International Precious Metals Institute Johnson Matthey Student Award (2017), Dissertation Completion Fellowship (2017), NSF Graduate Research Opportunities Worldwide Fellow with Mats Tilset, University of Oslo (2016), NSF Graduate Research Fellow (2014)

Current Position: Scientist, Eastman Chemical Company

Kelsey R. Brereton, PhD 2018

Thesis Title: Interrogating the Influence of Electronics and Solvation on Thermodynamic Hydricity

Awards: Dissertation Completion Fellowship (2017)

Current Position: Visiting Assistant Professor of Chemistry, Pepperdine University

Ann Marie Brasacchio, MS 2018

Awards: NSF Graduate Research Fellowship Honorable Mention (2017)

Catherine L. Pitman, PhD 2017

Thesis Title: Molecular Photoelectrocatalysts for Solar Fuel Production: Discovery, Mechanism, and Exploration

Awards: Reaxys PhD Prize International Finalist (2017), International Precious Metals Institute Student Award (2014), NSF Graduate Research Fellow Honorable Mention (2014), UNC Venable Fellowship (2013), UNC Royster Fellow (2012)

Current position: Data Scientist, Booz Allen Hamilton

Matthew R. Kita, PhD 2017

Thesis Title: Cation Tunable Reactivity and Catalysis with Iridium Pincer-Crown Ether Complexes

Awards: Richard G. Hiskey Award (2014), Steelman Teaching Award (2013)

Current Position: Scientist, Eastman Chemical Company

Seth M. Barrett, PhD 2016

Thesis Title: Light-Driven Hydride Transfer from Iridium Hydride Complexes

Awards: UNC Future Faculty Fellow (2015-2016), UNC Graduate Research Consultant (2015-2016), NSF Graduate Research Fellow (2013), Steelman Teaching Award (2012)

Current position: Assistant Professor of Chemistry, Muskingum University

Andrew G. Walden, PhD 2016

Thesis Title: Oxidative Electrochemistry of Molecular Catalysts

Awards: UNC Center for Faculty Excellence Future Faculty Fellow (2015-2016), Steelman Teaching Award (2012)

Current position: Assistant Professor of Chemistry, Oglethorpe University

Current Postdoctoral Scholars

Dr. Paul Griffin, since 9/2023

Dr. Lukas Alig, since 3/2023

Dr. Sergio Fernandez Martin, since 9/2022

Dr. Tamara Jurado, since 5/2021

Former Postdoctoral Scholars

Dr. Samuel Shin, since 2022-2024

Current position: KRICT, Korea

Dr. Shrabanti Bhattacharya, 2021-2023

Current position: unknown

Dr. Scott M. Chapp, 2021-2022

Current position: Boulder Scientific

Dr. Drew W. Cunningham, since 2020

Current position: Cormetech, Inc.

Dr. Changho Yoo, 2018-2020

Current position: Assistant Professor, Ulsan National Institute of Science & Technology, S. Korea

Dr. Scott Kolmar, 2019-2020

Current position: Data Scientist, U.S. Environmental Protection Agency

Dr. Tianfei Liu, 2018-2020

Current position: Assistant Professor of Chemistry, Nankai University

Dr. Annabell Bonn, 2017-2018

Current position: Assistant Editor, Wiley-VCH

Dr. Sergio Gonell Gomez, 2017-2019

Current position: Professor, Institute of Advanced Materials, Universitat Jaume I, Spain

Dr. Brian M. Lindley, 2015-2019

Current position: Assistant Professor of Chemistry, Baylor University

Dr. Matthew B. Chambers, 2015-2017

Current position: Assistant Professor of Chemistry, Louisiana State University

Dr. Lauren Gregor, 2014-2017

Current position: Scientist, Proctor & Gamble

Current Undergraduate Students

J.R. Cobb (UNC '25)

Former Undergraduate Students

Evelyn Concepcion (UNC '25)

Afrah Faraz (UNC '25)

Awards: Chancellor's Science Scholar, Honors Carolina, UNC Summer Undergraduate Research Fellow (SURF)

Elsa Huebsch (UNC '24)

Awards: UNC Summer Undergraduate Research Fellow (SURF)

Elvis Perez Galarza (UNC NSF REU SUROC program, Western Carolina University '25)

Anna Eblen (UNC '23)

Honors Thesis: Catalysts for Conversion of Ethanol to *n*-Butanol

Awards: UNC Summer Undergraduate Research Fellow (SURF)

Maya Spencer (UNC '23)

Honors Thesis: Pursuing Electrochemical Dinitrogen Fixation with Rhenium and Molybdenum Complexes

Awards: ACS DIC Undergraduate Award in Inorganic Chemistry, UNC Venable Medal, UNC Summer Undergraduate Research Fellow (SURF)

Robert Edwards (UNC '23)

Austin Geer (NSF Center for Integrated Catalysis REU program, UNC '23)

Chris Cornejo (UNC NSF REU SUROC program, Elmhurst University '24)

Ciara Gillis (UNC '21)

Ashleigh Arrington (UNC NSF REU SUROC program, SUNY New Paltz, '21)

Dean Bass (UNC '20)

Honors Thesis: Mechanistic Effects of Immobilizing an Iridium Complex for Photoelectrochemical H₂ Generation

Awards: Chancellor's Science Scholar

Biyi Jenny Hu (UNC '20)

Honors Thesis: Insights into the Thermodynamics of Hydricity for a Rhenium Pincer Complex and their Implications on Catalytic Conditions

Awards: UNC Honors Program, J. Thurman Frieze Prize (2018), James H. Maguire Award (2018), ACS Division of Inorganic Chemistry Undergraduate Award (2019), David L. Stern Award (2020)

Joyanne Terry (UNC '20)

P. Thomas Blackburn (UNC '19)

- Kristin Gardner (UNC '19)
Honors Thesis: Exploring Cation-Modulated Olefin Isomerizations by Hemilabile Palladium Pincer Complexes
Awards: NSF Graduate Research Fellowship (2020), Venable Medal (2019), Jason D. Altom Award (2018), ACS Division of Inorganic Chemistry Undergraduate Award (2018), Broad Summer Research Program Fellow (2017), Chancellor's Science Scholar
- Ian Moseley (UNC '18)
- Teddy Wong (UNC '18)
Honors Thesis: Investigation of Photochemical Hydrogen Evolution from Ruthenium Hydrides
Awards: Jason D. Altom Award (2017), Taylor Summer Research Fellowship (2017)
- Jamie Rose (UNC '18)
Awards: UNC Goldwater Scholarship nominee (2017), Chapel Family Scholarship for Summer Research (2017), UNC SMART Fellow (2016)
- Jessica Bruggen (NSF CENTC Summer Undergraduate, University of Wisconsin-Platteville '17)
- Caleb Jadrich (UNC '17)
Honors Thesis: Solvent Dependence of Relative Hydricity of Pentamethylcyclopentadienyl Iridium Hydride Complexes
Awards: Jason D. Altom Memorial Award (2017)
- Victoria Cochran (NSF CENTC Summer Undergraduate, Harvard University '17)
Awards: National Science Foundation Graduate Research Fellowship (2017)
- Stewart Kerr (UNC '16)
Honors Thesis: Cation Binding in Pincer-Aza-Crown Ether Nickel Systems
Awards: UNC SMART Fellow (2015)
- Cat Wood (UNC '16)
Awards: Taylor Honors Mentored Research Fellowship (2015)
- Lucas Quintana (UNC NSF REU SUROC program, Regis University '16)
- Ellen Nichols (Exchange student, University of Nottingham '16)
- Frederick Moss (UNC NSF REU SUROC program, Morehouse College '16)
- Ariana Spentzos (NSF CENTC Summer Undergraduate, Brown University '15)
- Rebecca McCoy (UNC '15)
Honors Thesis: Catalysts for Molecular Photoelectrochemical Hydrogen Evolution
- Samuel Slattery (UNC '16)
Awards: J. Thurman Frieze Prize for Undergraduate Research (2014–2015)
- Christopher Sato (UNC '15)
- Olivia Finster (NSF CENTC Summer Undergraduate, Grinnell College '14)
- Joshua Altman (UNC '16)

Grants

Current Support

Project Title: Collaborative Research: CAS-SC: Electrochemical Approaches to Sustainable Dinitrogen Fixation

Source of Support: National Science Foundation

Total Award Amount: \$285,997

Total award period: 8/1/2023–7/30/2026

Role: Principal Investigator

Effort: 2.1%

Project Title: Synthesis of α -Diketones

Source of Support: Eastman Chemical Co.

Total Award Amount: \$307,210

Direct Award Amount: \$197,563

Total award period: 3/1/2023–2/28/2025

Role: Principal Investigator

Effort: 2.1%

Project Title: Collaborative Research: NSF-DFG: Electrochemical Hydrogenation of Esters and Amides (CHE- 2140205)

Source of Support: National Science Foundation

Total Award Amount: \$172,499

Direct Award Amount: \$54,679

Total award period: 1/1/2022–12/31/2024

Role: Principal Investigator

Effort: 0.8%

Project Title: Cation-Controlled Catalysis with Pincer-Crown Ether Complexes (CHE-2102244)

Source of Support: National Science Foundation

Total Award Amount: \$475,000

Direct Award Amount: \$320,238

Total award period: 8/1/2021–7/31/2025

Role: Co-Principal Investigator

Effort: 4.2%

Project Title: Center for Hybrid Approaches in Solar Energy to Liquid Fuels (CHASE) (DE SC0021173) (PI: Gerald Meyer, UNC)

Source of Support: Department of Energy

Total Award Amount: \$18,100,000

Direct Award Amount: \$32,256,866

Total Award to AJMM: \$979,398

Direct Award to AJMM: \$642,156

Total award period: 9/30/2020–9/29/2025

Role: Co-Principal Investigator

Effort: 8.3%

Project Title: CCI Phase I: NSF Center for Integrated Catalysis (CHE-2023955) (PI: Paula Diaconescu, University of California Los Angeles)

Source of Support: National Science Foundation via University of California Los Angeles

Total Award Amount: \$1,800,000

Total Award to AJMM: \$85,000

Direct Award to AJMM: \$57,121

Total award period: 9/1/2020–8/31/2024

Role: Co-Principal Investigator
Effort: 2.1%

Project Title: Studies of Alkene Hydroformylation
Source of Support: Eastman Chemical Co.
Total Award Amount: \$458,932
Direct Award Amount: \$304,177
Total award period: 8/1/2020–7/31/2025
Role: Principal Investigator
Effort: 1%

Project Title: Studies of Anhydride Synthesis
Source of Support: Eastman Chemical Co.
Total Award Amount: \$428,477
Direct Award Amount: \$283,622
Total award period: 8/1/2019–12/31/2024
Role: Principal Investigator
Effort: 1%

Project Title: Photohydrides: Mechanism-Guided Development of Molecular Photoelectrocatalysts for Water Reduction (DE-SC0014255)
Source of Support: Department of Energy
Total Award Amount: \$1,590,000
Direct Award Amount: \$1,069,582
Total award period: 9/1/2015–8/31/2024
Role: Principal Investigator
Effort: 8.3%

Past Support

Project Title: MRI: Acquisition of a Modern Single Crystal X-ray Diffractometer for Research and Education (CHE-2117287)
Source of Support: National Science Foundation
Total Award Amount: \$354,186
Direct Award Amount: \$354,186
Total award period: 8/1/2021–7/31/2024
Role: Co-Principal Investigator
Effort: 0%

Project Title: AI Accelerated Discovery of Solar Energy Materials
Source of Support: University of North Carolina
Total Award Amount: \$500,000
Direct Award Amount: \$500,000
Total award period: 9/1/2021–3/1/2024
Role: Co-Principal Investigator
Effort: 0.8%

Project Title: Collaborative Research: CAS: Electrochemical Approaches to Sustainable Dinitrogen Fixation (CHE-1954942)
Source of Support: National Science Foundation

Total Award Amount: \$310,774
Direct Award Amount: \$211,063
Total award period: 9/1/2020–8/31/2023
Role: Principal Investigator
Effort: 2%

Project Title: REU Site: Summer Undergraduate Research Opportunity in Chemistry (SUROC) at UNC Chapel Hill (CHE-1757413)
Source of Support: National Science Foundation
Total Award Amount: \$588,000
Direct Award Amount: \$576,807
Total award period: 5/1/2015–8/31/2024
Role: Senior Personnel
Effort: 0%

Project Title: CAREER: Dynamic Hemilability Controlled by Cation-Responsive Pincer-Crown Ether Catalysts (CHE-1553802)
Source of Support: National Science Foundation
Total Award Amount: \$675,000
Direct Award Amount: \$461,682
Total award period: 5/1/2016–4/30/2022
Role: Principal Investigator
Effort: 8.3%

Project Title: Alliance for Molecular PhotoElectrode Design for Solar Fuels (AMPED) (DE-SC0001011) (PI: Gerald Meyer, UNC)
Source of Support: Department of Energy
Total Award Amount: \$1,800,000
Direct Award Amount: \$1,304,233
Total Award to AJMM: \$103,656
Direct Award to AJMM: \$75,591
Total award period: 8/1/2018–7/31/2021
Role: Co-Principal Investigator
Effort: 8.3%

Project Title: MRI: Purchase of a 600 MHz Spectrometer for High-Sensitivity NMR
Source of Support: National Science Foundation
Total Award Amount: \$878,786
Direct Award Amount: \$878,786
Total award period: 8/1/2018–7/31/2020
Role: Co-Principal Investigator
Effort: 0%

Project Title: MRI: Acquisition of a Fusion Lumos Mass Spectrometer (CHE-1726291)
Source of Support: National Science Foundation
Total Award Amount: \$448,838
Direct Award Amount: \$448,838
Total award period: 9/1/2017–8/31/2021
Role: Co-Principal Investigator
Effort: 0%

Project Title: Collaborative Research: INFEWS: N/P/H₂O: Electrochemical Approaches to Sustainable Dinitrogen Fixation (CHE-1665135)
Source of Support: National Science Foundation
Total Award Amount: \$300,000
Direct Award Amount: \$192,927
Total award period: 9/1/2017–8/31/2020
Role: Principal Investigator
Effort: 4.2%

Project Title: Oligomerization of Hydrogenated Dicyclopentadiene
Source of Support: Eastman Chemical Co.
Total Award Amount: \$67,980
Direct Award Amount: \$45,541
Total award period: 9/1/2017–3/30/2018
Role: Principal Investigator
Effort: 1%

Project Title: Studies of Alkene Hydroformylation
Source of Support: Eastman Chemical Co.
Total Award Amount: \$551,579
Direct Award Amount: \$405,351
Total award period: 7/1/2017–6/30/2020
Role: Co-Principal Investigator
Effort: 1%

Project Title: Sloan Fellowship: Catalysis Controlled by External Stimuli
Source of Support: Alfred P. Sloan Foundation
Total Award Amount: \$55,000
Direct Award Amount: \$55,000
Total award period: 9/15/2016–9/14/2018
Role: Principal Investigator
Effort: 2.1%

Project Title: UNC EFRC: Center for Solar Fuels Phase II (DE-SC0001011; Center PI: Thomas J. Meyer)
Source of Support: Department of Energy
Total Award Amount: \$10,800,000
Direct Award Amount: \$7,809,937
Total Award to PI: \$295,736
Direct Award to PI: \$204,282
Role: Co-Principal Investigator
Award period: 8/1/2014–7/31/2018
Effort: 8.3%

Project Title: Enforcing Lewis Acid Proximity to Iridium Centers for Homogeneous Methanol Carbonylation Catalysis
Source of Support: Eastman Chemical Co.
Total Award Amount: \$769,568
Direct Award Amount: \$518,674
Total award period: 1/1/2014–12/31/2020
Role: Principal Investigator
Effort: 4.1%

Project Title: Center for Enabling New Technologies through Catalysis Phase II Renewal (CHE-1205189; Center PI: Karen I. Goldberg)

Source of Support: National Science Foundation subcontract via University of Washington

Total Award Amount: \$559,155

Direct Award Amount: \$341,870

Role: Co-Principal Investigator

Award Period: 9/15/2012–8/31/2017

Effort: 4.1%

Project Title: Cation-Crown Ether Interactions to Control Hemilability and Catalyst Function (52325-DNI3)

Source of Support: American Chemical Society Petroleum Research Fund

Total Award Amount: \$100,000

Direct Award Amount: \$100,000

Award Period: 9/1/2012–8/31/2016

Role: Principal Investigator

Effort: 6.1%

Project Title: UNC EFRC: Center for Solar Fuels (DE-SC0001011; Center PI: Thomas J. Meyer)

Source of Support: Department of Energy

Total Award Amount: \$17,500,000

Direct Award Amount: \$13,541,919

Total Award to PI: \$137,526

Direct Award to PI: \$99,058

Role: Co-Principal Investigator

Award period for PI: 8/1/2012–7/31/2014

Effort: 4.1%

Professional Service

Department of Chemistry

- Committee Chair
 - Director of Graduate Studies (2021–present)
 - Student and Postdoc Wellness (SWELL) Committee (2019–2021)
 - X-ray Core Laboratory Committee (2018–2021)
- Leadership Positions
 - Executive Committee, Center for Hybrid Approaches in Solar Energy to Liquid Fuels (2020–present)
 - Thrust Leader, Center for Hybrid Approaches in Solar Energy to Liquid Fuels (2020–present)
 - Deputy Director, Alliance for Molecular PhotoElectrode Design EFRC (2018–2021)
 - Faculty lead, High-Throughput Catalysis Center (2014–present)
 - Executive Committee of UNC Solar Fuels Energy Frontier Research Center (EFRC) (2014–2021)
 - Team Leader, Catalysis Team in the UNC Solar Fuels EFRC (2013–2021)
- Committee Member
 - Chair’s Advisory Committee (2021–present)
 - Safety Committee (2019–present)
 - Morehead Laboratory Planning Committee (2017–2021)
 - Facilities Committee (2017–2018)
 - Graduate Studies Committee (2013–2019)
 - Diversity Committee (2012–2021)

University of North Carolina at Chapel Hill

- Leadership positions
 - Director, Sustainable Energy Research Consortium (2023–present)
 - Director of Graduate Studies (2021–present)
- Committees
 - Member, Provost’s Committee on the Graduate Student Experience Initiative, STEM Research Assistant Team (2024)
 - Member, College of Arts & Sciences Collaborative to Address Structural Racism in Graduate Education (2021)
 - Subcommittee Vice Chair, University Teaching Awards Committee (2020)
 - Member, University Teaching Awards Committee (2019)
 - Member, College of Arts & Sciences Task Force for Improving Large Lecture Courses (2012)
- Center for Faculty Excellence
 - Mentor, Future Faculty Fellow Andrew Walden (2015-2016)
 - Mentor, Future Faculty Fellow Seth Barrett (2015-2016)
 - Mentor, Future Faculty Fellow Marsha Massey (2014-2015)
- Panelist Activities
 - Panelist, “Carolina and Beyond” undergraduate recruitment event (2015)
 - Panelist, UNC elevator pitch seminar (2013)
 - Panelist, UNC Center for Faculty Excellence Future Faculty Fellows (2013)
- Faculty Representative
 - Faculty Advisor, Science in the Stacks (2019–present)
 - Host, Laboratory Safety course (CHEM 701) “field trip” on safe practices (2016–present)
 - Poster judge, Women in Science Symposium (2016–present)
 - Keynote speaker, AXS Chemistry fraternity regional conclave (2016)
 - Participant, Diversity THINKposium: Intersectionality (2015)
 - Interviewer, Chancellor’s Science Scholar Program (2014-2015)
 - Participant, Department of Chemistry Commencement (2014–2017)
 - Faculty Advisor, Science Education and Policy Society (2014–2016)
 - Participant, Diversity Liaison Visioning Breakfast (2013)
 - Faculty Liaison, Morehead Planetarium & Science Center’s Morehead Ambassadors Program (2013–2015)

Inorganic and Organometallic Chemistry Community

- Advisory Boards
 - Editorial Advisory Board Member, *ACS Chemical Health & Safety* (2023–present)
 - Editorial Advisory Board Member, *Chemical Communications* (2020–present)
 - Editorial Advisory Board Member, *Organometallics* (2019–2025)
- Symposium Organization
 - Co-Organizer, “Shining Light on Liquid Fuel Production” Symposium, SERMACS, October 2023
 - Lead Organizer, 8th Annual North Carolina Photochemistry Symposium, Chapel Hill, NC, October 2021
 - Co-Organizer, 7th Annual North Carolina Photochemistry Symposium, Virtual Event, October 2020
 - Co-Organizer, Harry Gray Award for Creative Work in Inorganic Chemistry by a Young Investigator Symposium in Honor of Jillian L. Dempsey, Spring 2019 ACS National Meeting, Orlando, FL, March 2019
 - Co-Organizer, 6th Annual North Carolina Photochemistry Symposium, Boone, NC, October 2019
 - Co-Organizer, 3rd International Conference on Proton-Coupled Electron Transfer (2018)

- Co-Organizer, From Photons, Protons, and Electrons to Fuel: The Solar Energy Research Center Symposium at the Southeast Regional Meeting of the American Chemical Society (SERMACS) (2017)
- Scientific Meeting Session Chair
 - Session Chair, UNC Solar Energy Research Center Meeting (2017)
 - Session Chair, 251st ACS National Meeting “Organometallic Chemistry Award Symposium Honoring Karen Goldberg” (2016)
 - Session Chair, NC PhotoChem 2014, NC State University, Raleigh, NC (2014)
 - Session Chair, 248th ACS National Meeting Symposium “Organometallic Chemistry: The New Frontiers” (2014)
- Education and Outreach Activities
 - Presented to NC Energy Literacy Fellows through UNC Institute for Environment’s Center for Public Engagement with Science (May 2022)
 - North Carolina ACS Young Chemists Committee Digital Media Roundtable (June 2021)
 - Center for Integrated Catalysis Webinar on Surface Attachment (February 2021)
 - Led creation of remote high school outreach activity on batteries and electrochemistry, presented to Robeson Country American Indian STEM Summer Camp (June 2021)
 - Network of Academic Corporate Relations Officers (NACRO) Webinar (June 2020)
 - Created and maintained “The Safety Net” (<http://safetyweb.unc.edu>) as a web resource for safe practices in academic synthetic labs (2017–present)
 - Faculty advisor, North Carolina State University engineering senior project on CO₂ reduction (2016)
 - Published “Deducing Reaction Mechanism: A Guide for Students, Researchers, and Instructors” in *J. Chem. Ed.* (DOI: [10.1021/acs.jchemed.5b00160](https://doi.org/10.1021/acs.jchemed.5b00160)), providing a resource for researchers interested in learning about mechanistic analysis and teachers interested in building courses on mechanism (2016)
 - Hosted chemistry outreach booth at North Carolina Science Expo (2015–present)
 - Volunteer in Agriculture Today booth at North Carolina State Fair (2015)
 - Panelist, CENTC summer program videoconference jobs round table (2014)
 - Supported participation of nine graduate students in the Morehead Science Communication Ambassadors and Inspiring Meaningful Programs and Communication Through Science (IMPACTS) programs (2013–present)
 - Presenter, NSF Center for Enabling New Technologies through Catalysis Summer School “Enabling Sustainability and Innovation Through Catalysis” (2013)
 - Presenter, cCWCS Virtual Inorganic Pedagogical Electronic Resource (VIPeR) Workshop on bringing new research results into the classroom (2012)
- Workshop and Study Participation
 - Participant, Cottrell Scholars Collaborative New Faculty Workshop (2012)
 - Participant, US Academic Workshop of Energy, Sustainability, and Environmental Centers (2012)
 - Participant, pedagogical study (PI Marilyne Stains, University of Nebraska-Lincoln) assessing the effectiveness of the Cottrell Scholars Collaborative workshop on new faculty teaching at research universities (2012–2014)
- Reviewing Activities
 - Journals: *Nature*, *Proceedings of the National Academy of Sciences*, *Journal of the American Chemical Society*, *Angewandte Chemie International Edition*, *Chemical Science*, *Organometallics*, *Inorganic Chemistry*, *Chemical Communications*, *Dalton Transactions*, *ACS Catalysis*, *Chemistry — A European Journal*, *Journal of Physical Chemistry*, *Journal of Physical Chemistry Letters*, *Synthesis Letters*, *ChemSusChem*, *ChemPlusChem*, *ChemElectroChem*, *Organic Process Research & Development*, *RSC Advances*, *Chemical Society Reviews*, *Chemical Reviews*.

- Funding agencies: National Science Foundation, Army Research Office, ACS Petroleum Research Fund, Iowa Energy Center, Nazarbayev University (Kazakhstan), Department of Energy.
- Book publishers: Wiley.
- Professional Society Membership:
 - American Association for the Advancement of Science (2015–present)
 - Inter-American Photochemical Society (2014–present)
 - American Chemical Society (2006–present)