

Miriam A. Bowring

Margret Geselbracht Associate Professor
Department of Chemistry
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Education

- University of California, Berkeley, CA** 2008 – 2013
Ph.D. in chemistry: *Hydrocarbon Bond Activation with Platinum(II) Complexes*
Research advisors: Profs. Robert G. Bergman and T. Don Tilley
- Yale University, New Haven, CT** 2002 – 2006
B.S. in chemistry, magna cum laude with distinction in chemistry
Research advisor: Prof. Robert H. Crabtree

Research

- Reed College, Department of Chemistry** 2016 – present
Principal Investigator
Studying organometallic catalytic mechanisms, with areas of focus on isotope effects in organometallics, palladium reclamation from the environment, and analysis of laboratory techniques.
- University of Pennsylvania, Department of Chemistry** 2019 – 2020
Visiting faculty researcher with Professor Karen I. Goldberg
Investigation of organometallic systems for alternative fuels.
- Yale University, Department of Chemistry** 2015 – 2016
- University of Washington, Department of Chemistry** 2013 – 2015
NIH Postdoctoral Fellow with Prof. James M. Mayer
Developed a unimolecular phenol-base-oxidant system and used it to study fast multiple-site concerted electron and proton tunneling by variable temperature ultrafast laser spectroscopy.
- University of California, Berkeley, Department of Chemistry** 2008 – 2013
Lawrence Berkeley National Laboratory, Chemical Sciences Division
Graduate Student Researcher with Profs. Robert G. Bergman and T. Don Tilley
Developed and studied platinum catalysts for C–C and C–H activation.
- Yale University, Department of Chemistry** 2005 – 2006
Undergraduate Thesis Student with Prof. Robert H. Crabtree
- Massachusetts Institute of Technology, Department of Chemistry** 2005
NSF Undergraduate Research Fellow with Prof. Gregory C. Fu
- University of Pennsylvania, Department of Chemistry** 2004
NSF Undergraduate Research Fellow with Prof. Marisa C. Kozlowski

Teaching Experience

Reed College, Department of Chemistry

- Instructor, Chemistry 212, Introduction to Inorganic Chemistry 2017-2019, 2021-2022
lecture and laboratory, average ~20 students
- Instructor, Chemistry 101, Molecular Structure & Properties 2016-2018, 2020-2021
lecture, conference sections, and laboratory, average ~60 students
- Senior Thesis Advisor 2016-present
- Undergraduate Research Advisor 2017-present

University of Washington, Department of Chemistry

- Guest Lecturer, Honors General Chemistry 2014
- Guest Lecturer, Inorganic Chemistry 2013

Seattle University, Department of Chemistry

- Guest Lecturer, Organic Chemistry III 2014

University of California, Berkeley, Department of Chemistry

- Teaching Team Leader, Bay Area Scientists in Schools 2008 – 2013
- Research Mentor, RAU, SULI, and BLIPS programs 2009 – 2013
- Guest Lecturer, Introduction to Research and Study in the College of Chemistry 2012
- Graduate Student Instructor, Organometallics, with Prof. T. Don Tilley 2009, 2010
- Graduate Student Instructor, Organic Chemistry, with Prof. Steven Pedersen 2008
- Curriculum developer with Berkeley Center for Green Chemistry 2013

Chapel Hill-Chauncy Hall School, Waltham, MA

- High School Chemistry Teacher 2006 – 2008

Honors, Awards, and Grants

- National Science Foundation Major Research Instrumentation award, \$425,000 (2024-2027)
- National Science Foundation Research at Undergraduate Institutions award, \$300,000 (2023-2026)
- American Chemical Society Petroleum Research Fund Undergraduate New Investigator award, \$55,000 (2020-2022)
- National Science Foundation XSEDE Startup, estimated value \$1,157.50 (2020-2022)
- Paper selected by the Editorial Office of *Chemistry – A European Journal* for Showcase of Outstanding Review-type articles (2021)
- M.J. Murdock Charitable Trust College Research Program for Natural Sciences Grant, \$54,900 (2017-2020)
- Reed College Sabbatical Fellowship Award and Sabbatical Research Funds (2019-2020, 2022-2023)
- Reed College Summer Scholarship Funds, \$3,000 over two awards (2017, 2019)
- Reed College Stillman Drake Award, \$2,000 over two awards (2017, 2018)
- 3M Non-Tenured Faculty Awards Program Nominee (2016)
- NIH Ruth Kirschstein National Research Service Award Individual Postdoctoral Fellowship (2014-2016)
- Student Mentoring and Research Teams grant, University of California, Berkeley (2013)

- American Chemical Society Division of Inorganic Chemistry Travel Award (2013)
- Distinguished Education Partner, Community Resources for Science (2012)

Service

Reed College

- Chair, Search Committee for Visiting Professor of Chemistry (2) 2022
- Member, Committee on Diversity 2021-2022
- Member, Committee on Faculty Mentoring 2021-2022
- Member, Administration Committee 2016-2019
- Member, Search Committees (8): 2016-2021
 - Assistant Professor of Chemistry (3); Visiting Professor of Mathematics;
 - Instrumentation Chemist; Visiting Professor of Biochemistry;
 - Visiting Professor of Analytical Chemistry; Visiting Professor of Physics
- Member, Radiation Safety Committee 2020-2021
- Member, Outreach Committee 2020-2021
- Member, Trans Inclusion Working Group 2020-2021
- Session facilitator, Center for Teaching and Learning (2): 2020
 - “Lessons Learned: Lecture-based classes”; “Dealing with the Stress!”
- Co-leader, training sessions on LGBTQ students for faculty and staff 2018
- Co-leader, session on academic misconduct for international student orientation 2017
- Chemistry seminar chair 2020-2022
- Chemistry liaison to Office of Institutional Diversity 2020-2022
- Coordinator, author, and examiner, chemistry oral qualifying examinations 2016-2022
- Summer student work coordinator, chemistry 2018-2019
- Science Outreach host for children from minoritized groups 2019
- Faculty co-sponsor of Reed student chapter of American Chemical Society 2016-2019

External Service while at Reed College

- Faculty Mentor and Panelist, American Chemical Society Postdoc to Faculty Workshop 2023
- Reviewer of external promotion dossiers 2023
- Faculty Mentor, Chemistry Women Mentorship Network 2021-2022
- Session presider and Panelist, Organometallic Gordon Research Seminar 2022
- Faculty host and presenter, PUI Career Workshop 2021
- Member of Pauling Award Selection Committee 2020
- Session presider, American Chemical Society National Meeting 2019
- Session presider, American Chemical Society Northwest Regional Meeting 2019
- Peer reviewer for journals and for funding agencies, including: 2017-present
 - Chemical Communications, Journal of the American Chemical Society,*
 - Inorganic Chemistry, Dalton Transactions, RSC Advances,*
 - New Journal of Chemistry, ChemCatChem, Chemical Science,* Stanford
 - Synchrotron Radiation Light Source, ACS Petroleum Research Fund

Previous Service

- Volunteer women’s ultimate frisbee coach, Yale University 2015-2016

- Volunteer outreach teacher with NSF Center for Enabling New Technologies through Catalysis 2014
- Founding Student Chair, Chemical Sciences Division Catalysis Group, Lawrence Berkeley National Laboratory 2012-2013
- Member, Chancellor's Advisory Committee on LGBT Community, UC Berkeley 2011-2013
- Member, Community Resources for Science Advisory Board 2010-2013
- Member, Bay Area Scientists in Schools Steering Committee 2009-2013
- Team Leader and Classroom Volunteer, Bay Area Scientists in Schools 2008-2013
- Host for disadvantaged high school students, Experience Berkeley 2008-2013

Publications

*Reed undergraduate coauthors

Blythe, I. M.; Xu, J.;* Fernandez Odell, J. S.;* Kampf, J. W.; **Bowring, M. A.**; Sanford, M. S. Characterization and Reactivity of Copper(II) and Copper(III) σ -Aryl Intermediates in Aminoquinoline-Directed C–H Functionalization. *Journal of the American Chemical Society* **2023**, in press. DOI: 10.1021/jacs.3c00914.

Rettig, I. D.; Xu, J.;* Knight, E. A.;* Truong, P. T.; **Bowring, M. A.** Variable Kinetic Isotope Effect Reveals a Multistep Pathway for Protonolysis of a Pt–Me Bond. *Organometallics* **2022**, *41* (23), 3770–3780.

Truong, P. T.; Miller, S. G.;* McLaughlin Sta. Maria, E. J.;* **Bowring, M. A.** Large Isotope Effects in Organometallic Chemistry. *Chemistry: A European Journal*, **2021**, *27* (60), 14800–14815.

Carlson, A. W.;* Primka, D. A.;* Douma, E. D.;* **Bowring, M. A.** Evaluation of Air-Free Glassware Using the Ketyl Test. *Dalton Transactions*, **2020**, *49* (43), 15213–15218.

Bowring, M. A.; Bradshaw, L. R.; Parada, G. A.; Pollock, T. P.; Fernández-Terán, R. J.; Kolmar, S. S.; Mercado, B. Q.; Schlenker, C. W.; Gamelin, D. R.; Mayer, J. M. Activationless Multiple-Site Concerted Proton-Electron Tunneling. *Journal of the American Chemical Society*, **2018**, *140* (24), 7449-7452.

Bowring, M. A.; Bergman, R. G.; Tilley, T. D. Isolation of a Dicationic Platinum Complex with Two Accessible Coordination Sites. *Organometallics*, **2013**, *32* (19), 5266–5268.

Bowring, M. A.; Bergman, R. G.; Tilley, T. D. Pt-Catalyzed C–C Activation Induced by C–H Activation. *Journal of the American Chemical Society*, **2013**, *135* (35), 13121–13128.

Hill, A. D.; Zoerb, M. C.; Nguyen, S. C.; Lomont, J. P.; **Bowring, M. A.**; Harris, C. B. Determining Equilibrium Fluctuations Using Temperature-Dependent 2D-IR. *Journal of Physical Chemistry B*, **2013**, *117* (49), 15346-15355.

Bowring, M. A.; Bergman, R. G.; Tilley, T. D. Disambiguation of Metal and Brønsted Acid Catalyzed Pathways for Hydroarylation with Platinum(II) Catalysts. *Organometallics*, **2011**, *30*, 1295-1298.

Presentations

*Reed undergraduate coauthors

Rettig, I. D.; Xu, J.;* Tong, C. Y.;* Gregor, E. R. F.;* Truong, P. T.; **Bowring, M. A.** Large KIEs as Mechanistic Indicators in Organometallic Protonolysis Reactions. Inorganic Reaction Mechanisms Gordon Conference, Galveston, TX, March 2023. (poster)

Xu, J.;* Rettig, I. D.; Truong, P. T.; Tong, C. Y.;* Gregor, E. R. F.;* **Bowring, M. A.** Large Kinetic Isotope Effects as Mechanistic Indicators. Organometallic Chemistry Gordon Conference, Newport, RI, July 2022. (poster)

Bowring, M. A. Organometallic Reactions at Reed: Strangely Speedy Isotopes, Catalysts for Alternative Fuel, Putting in Dirt, and Keeping out Air. Reed College, October 2021. (invited talk)

Bowring, M. A. Reclaiming Palladium Pollution for Organometallic Catalysis. NSF Center for Sustainable Separation of Metals (by remote video), July 2021. (invited talk)

Bowring, M. A. Large Isotope Effects, Reclaimed Catalysts, and Air Exclusion in Organometallics. Chemistry Department Seminar (by remote video), Portland State University, Portland, OR, May 2021. (invited talk)

Bowring, M. A. Large Isotope Effects, Reclaimed Catalysts, and Air Exclusion in Organometallics. Chemistry Department Seminar (by remote video), Cleveland State University, Cleveland, OH, April 2021. (invited talk)

Bowring, M. A. Large Isotope Effects, Reclaimed Catalysts, and Air Exclusion in Organometallics. Chemistry Department Seminar, Temple University, Philadelphia, PA, January 2020. (invited talk)

Bowring, M. A. Large Isotope Effects, Reclaimed Catalysts, and Air Exclusion in Organometallics. Chemistry Department Seminar, University of Pennsylvania, Philadelphia, PA, November 2019. (invited talk)

Bowring, M. A. Professional development session. Graduate students Engaging with Mentor Scientists series, University of Pennsylvania, Philadelphia, PA, November 2019. (invited presentation)

Bowring, M. A.; Truong, P. T.; Douma, E.;* Ahmad, M. P.;* Mathe, Z. S.;* Tsang, J. B.* Large Isotope Effects in Organometallic Reactions. 258th American Chemical Society National Meeting, San Diego, CA, August 2019. (talk)

Truong, P. T.; Carlson, A. W.;* Douma, E.;* Keller, M.J.;* Lushchik, O.;* Mathe, Z. S.;* Tsang, J.;* Wise, H. N.;* Primka, D. A.;* **Bowring, M. A.** Large Isotope Effects for Hydrogen and Methane Evolution. Organometallic Chemistry Gordon Conference, Newport, RI, July 2019. (poster)

Bowring, M. A.; Truong, P. T.; Douma, E.;* Ahmad, M. P.;* Mathe, Z. S.;* Tsang, J. B.* Hydrogen Storage and Methane Activation: Investigation of Large Isotope Effects. 74th American Chemical Society Northwest Regional Meeting, Portland, OR, June 2019. (invited talk)

Bowring, M. A. Being Out in Chemistry. Keynote Address for the LGBTQ+ and allies event, 74th American Chemical Society Northwest Regional Meeting, Portland, OR, June 2019. (invited talk)

Bowring, M. A. Professional development session. United States Department of Agriculture (USDA) Plant Gene Expression Center and Department of Plant and Microbial Biology, University of California, Berkeley, Berkeley, CA, May 2019. (invited presentation)

Bowring, M. A. Overcoming Barriers in Organometallic Chemistry. Chemistry Association in the Interest of Minority Students (ChemAIMS) Seminar. Stanford University, Stanford, CA, May 2019. (invited talk)

Bowring, M. A. Organometallic Reactions: Atoms as Waves, Putting in Dirt, and Keeping out Air. Chemistry, Biochemistry, and Physics Department Seminar, Eastern Washington University, Spokane, WA, May 2019. (invited talk)

Ahmad, M. P.;* Carlson, A. W.;* Douma, E.;* Keller, M.J.;* Lushchik, O.;* Mathe, Z.S.;* Tsang, J.;* Wise, H. N.;* **Bowring, M.A.** Large Isotope Effects, Palladium Pollution, and "Air-Free" Glassware in Catalysis. Organometallic Chemistry Gordon Conference, Newport, RI, July 2018. (poster)

Bowring, M. A. Grow Your Own Scientists: Research with Undergraduates. SLAM: Science Leadership and Management Seminar, California Institute for Quantitative Biosciences (QB3), University of California, Berkeley, Berkeley, CA, October 2017. (invited talk)

Bowring, M. A. Being a Woman in Science. Food Frisbee Feminism: Feminist "TED" Talks, Portland, OR, March 2017. (invited talk)

Douma, E.;* Keller, M.J.;* Lushchik, O.;* Mathe, Z.S.;* Ortiz, C.V.;* **Bowring, M.A.** Highway Tunnels and Quantum Tunnels in Organometallics. Organometallic Chemistry Gordon Conference, Newport, RI, July 2017. (poster)

Bowring, M. A. Surprising Ways to Break Bonds, from Catalysis to Tunneling. Chemistry Department Seminar, Barnard College, New York, NY, November 2015.

Bowring, M. A. Surprising Ways to Break Bonds, from Catalysis to Tunneling. Chemistry Department Seminar, Reed College, Portland, OR, November 2015.

Bowring, M. A. Energy Efficient Ways to Break Bonds, from Catalysis to Tunneling. Chemistry Department Seminar, Swarthmore College, Swarthmore, PA, November 2015.

Bowring, M. A. Surprising Ways to Break Bonds, from Hours to Picoseconds. Chemistry Department Seminar, Mills College, Oakland, CA, November 2015.

Bowring, M. A. Surprising Ways to Break Bonds, from Catalysis to Tunneling. Chemistry & Biochemistry Department Seminar, Worcester Polytechnic Institute, Worcester, MA, October 2015.

Bowring, M. A.; Bradshaw, L. R.; Gamelin, D. R.; Mayer, J. M. Fast Unimolecular Multiple-site CPET over a Large Temperature Range. 250th American Chemical Society National Meeting, Boston, MA, August 2015. (talk)

Bowring, M. A.; Bradshaw, L. R.; Gamelin, D. R.; Mayer, J. M. Unimolecular Model to Probe Multiple-Site Concerted Proton Electron Transfer. Organometallic Chemistry Gordon Conference, Newport, RI, July 2015. (poster)

Bowring, M. A.; Bradshaw, L. R.; Gamelin, D. R.; Mayer, J. M. Unimolecular Model to Probe Multiple-Site Concerted Proton Electron Transfer. International Conference of Computational Methods in Sciences and Engineering 2015, Symposium on Photophysics of Electron and Proton Transfer; Proton Coupled Electron Transfer in Organic Dyes and Biological Systems, Athens, Greece, March 2015. (talk)

Bowring, M. A. Breaking C–C and C–H Bonds Using Platinum. Chemistry Department Seminar, Reed College, Portland, OR, February 2015.

Bowring, M. A. Breaking C–C and C–H Bonds Using Platinum. Natural Science Seminar Series, Seattle University, Seattle, WA, October 2014.

Bowring, M. A.; Bradshaw, L. R.; Gamelin, D. R.; Mayer, J. M. Unimolecular Model to Probe Multiple-Site Concerted Proton Electron Transfer. 248th American Chemical Society National Meeting, San Francisco, CA, August 2014. (poster)

Bowring, M. A.; Bradshaw, L. R.; Gamelin, D. R.; Mayer, J. M. Unimolecular Model to Probe Multiple-Site Concerted Proton Electron Transfer. Second International Conference on Proton-Coupled Electron Transfer, Skokloster, Sweden, June 2014. (talk)

Bowring, M. A. Catalytic C–H and C–C Bond Activation by Platinum(II) Complexes. Inorganic Division Seminar, University of Washington, Seattle, WA, January 2014.

Bowring, M. A.; Bergman, R. G.; Tilley, T. D. Pt-Catalyzed C–C Activation Induced by C–H Activation. 245th American Chemical Society National Meeting, New Orleans, LA, April 2013. (talk)

Bowring, M. A.; Bergman, R. G.; Tilley, T. D. A Catalytic Hydrocarbon Rearrangement via C–H and C–C Activation. Organometallic Chemistry Gordon Conference, Newport, RI, July 2012. (poster)

Bowring, M. A.; Bergman, R. G.; Tilley, T. D. Mechanism of Hydroarylation with Platinum Catalysts. Organometallic Chemistry Gordon Conference, Newport, RI, July 2010. (poster)

Undergraduate Research Students Advised

(AY = academic year)

student	research advising	thesis title
Zachary S. Mathe	thesis, 2016-2017 summer 2017	Synthesis of an Iridium Hydride Complex: Towards a Model System for Hydrogen Tunneling
Oleksandr Lushchyk	thesis, 2016-2017 summer 2017	A Dusty Road: Palladium Catalysis via the Mizoroki-Heck Reaction
Cordero V. Ortiz	summer 2017	
Joshua B. Tsang	thesis, 2017-2018	Synthesis of a Heterobimetallic Iridium-Ruthenium Organometallic Complex: Towards the Investigation of a Large Kinetic Isotope Effect
Hunter N. Wise	thesis, 2017-2018 summer 2018	What the Heck: Collection and Quantification of Anthropogenically Emitted Palladium in Portland, OR
Marie B. Faulkner	summer 2018	
Maryam P. Ahmad	thesis, 2018-2019 summer 2018	Quantifying H ₂ Generation by ¹ H NMR
Elle Douma	thesis, 2018-2019 summer 2017 AY 2017-2018	Investigation of an Unusually Large Kinetic Isotope Effect in the Dehydrogenation of Formic Acid by an Iridium-Ruthenium Catalyst
Alexandra W. Carlson	thesis, 2019-2020 summer 2018 summer 2019 AY 2018-2019	Hydrogen Gas Production from an Iridium-Ruthenium Hydride complex
M. Josephine Keller	thesis, 2019-2020 summer 2017 summer 2018 AY 2018-2019 AY 2017-2018	Hydrogen Production Reaction of an Iridium Half-Sandwich Complex
Leo H. Gartner	thesis 2020-2021 summer 2019 AY 2019-2020	Computational Investigation of Bimetallic Iridium-Ruthenium and Monometallic Iridium Formic Acid Dehydrogenation Catalysts
Danielle A. Primka	summer 2019 AY 2019-2020	

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student	research advising	thesis title
Sophia G. Miller	summer 2019 summer 2020 AY 2019-2020 AY 2020-2021 summer 2021 thesis 2021-2022	The Long Road to Reclamation: Toward the Quantification and Reuse of Environmental Palladium Pollution
Emily J. McLaughlin Sta Maria	summer 2020 AY 2020-2021	
Amelia F. Schaeffer	summer 2020 AY 2020-2021	
Elizabeth A. Knight	thesis 2020-2021 summer 2021	Quantifying the Effects of Hydrogen Bonding on the Protonolysis of Dimethyl(1,5-cyclooctadiene) Platinum (II) by Trifluoroacetic Acid with Density Functional Theory
Emma Cooney	thesis 2020-2021	Pipe for the Picking: Palladium Recovery and Quantification from Tailpipe Residue
Caitlyn Y. Tong	summer 2021 thesis 2021-2022	Generation of Hydrogen Gas by an Air-Sensitive Iridium- Ruthenium Catalyst
Jingtong Xu	summer 2021 AY 2021-2022 summer 2022 AY 2022-2023	
Ethan R. F. Gregor	summer 2021 AY 2021-2022 summer 2022 thesis 2022-2023	Investigation of Formic Acid Dehydrogenation with Alternatives to an Ir-Ru Catalyst
Natalie Y. Rogers	summer 2021	
Zonghan Yu	summer 2022	
Joaquin S. Fernandez Odell	summer 2022 AY 2022-2023	
Cameron P. DaSilva	summer 2022 AY 2022-2023 summer 2023	
Minh L. T. Nguyen	summer 2022 AY 2022-2023 summer 2023	
Joe K. Bush	summer 2023	
Nathaniel W. Michaels	summer 2023	
Abriana Ferguson	summer 2023	