

DIANNE J. XIAO

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Department of Chemistry
University of Washington
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PROFESSIONAL EXPERIENCE

University of Washington Assistant Professor, Department of Chemistry Klaus and Mary Ann Saegebarth Endowed Faculty Fellow Affiliate Faculty, Clean Energy Institute Member, Molecular Engineering & Science Institute	2019–present
Stanford University Postdoctoral Scholar (Advisor: Matthew W. Kanan) Research focus: <i>CO₂ Insertion into C–H Bonds for Carboxylic Acid Synthesis</i>	2016–2019

EDUCATION

University of California, Berkeley Ph.D. in Chemistry (Advisor: Jeffrey R. Long) Thesis: <i>Metal–Oxo and Dioxygen Chemistry in Metal–Organic Frameworks: Applications in Catalysis and Gas Separations</i>	2016
Harvard University A.B. <i>summa cum laude</i> in Chemistry (Advisor: Theodore Betley) Thesis: <i>Taming Manganese: Synthesis and Characterization of Trinuclear and Hexanuclear Manganese Clusters</i>	2011

AWARDS AND HONORS

Packard Fellow	2022
Beckman Young Investigator Award	2022
NSF CAREER Award	2022
DOE Early Career Award	2021
ACS PRF Doctoral New Investigator Award	2021
GCEP and Precourt Student Energy Lecture Series, Distinguished Student Lecturer	2018
Arnold O. Beckman Postdoctoral Fellowship	2017–2019
Camille and Henry Dreyfus Postdoctoral Fellowship	2016–2017
National Science Foundation Graduate Research Fellowship	2012–2015
UC Berkeley Outstanding Graduate Student Instructor Award	2012
Thomas T. Hoopes Thesis Prize	2011
Phi Beta Kappa	2010

SCIENTIFIC PUBLICATIONS

At the University of Washington († = co-first author, = undergraduate author, * = corresponding author):

- (28) Shafranek, R. T.; Snook, K. M.; Geary, J.; Gannon, P. M.; Kaminsky, W.; **Xiao, D. J.*** “Controlling the self-assembly and nanoscale ordering of anisotropic metal–organic cages.” *Manuscript in preparation*.

- (27) Kamin, A. A.; Moseley, I. P.; Oh, J.; [Brannan, E.J.](#); Gannon, P. M.; Kaminsky, W.; Zadrozny, J. M.; **Xiao, D. J.*** “Geometry-dependent valence tautomerism, magnetism, and electrical conductivity in 1D iron-tetraoxolene chains.” *Manuscript submitted*.
- (26) Rollins, D. S.;[†] Geary, J.;[†] [Wong, A. H.](#); **Xiao, D. J.*** “Stabilizing large pores in a flexible metal–organic framework via chemical cross-linking.” *Chem Commun.* **2022**, *58*, 12361–12364.
Part of the “2022 Emerging investigators” themed collection.
- (25) Snook, K. M.; Zasada, L. B.; Chehada, D.; **Xiao, D. J.*** “Oxidative control over the morphology of Cu₃(HHTP)₂, a 2D conductive metal–organic framework.” *Chem. Sci.* **2022**, *13*, 10472–10478.
- (24) Zasada, L. B.; Guio, L.; Kamin, A. A.; Dhakal, D.; Monahan, M.; Seidler, G. T.; Luscombe, C. K.; **Xiao, D. J.*** “Conjugated metal–organic macrocycles: Synthesis, characterization, and electrical conductivity.” *J. Am. Chem. Soc.* **2022**, *144*, 4515–4521.
Highlighted on Twitter as an editor’s pick of the week by @NatureSynthesis
Research highlight in Nature Reviews Materials
- (23) Geary, J.; [Wong, A. H.](#); **Xiao, D. J.*** “Thermolabile cross-linkers for templating precise multicomponent metal–organic framework pores.” *J. Am. Chem. Soc.* **2021**, *143*, 10317–10323.
- (22) [Do, M.](#); Rogers, D.; Kaminsky, W.; **Xiao, D. J.*** “A robust synthetic route towards anisotropic metal–organic cages with tunable surface chemistry.” *Inorg. Chem.* **2021**, *60*, 7602–7606.

Prior to the University of Washington:

- (21) Reed, D. A.; **Xiao, D. J.**; Jiang, H. Z. H.; Chakarawet, K.; Oktawiec, J.; Long, J. R. “Biomimetic O₂ Adsorption in an Iron Metal–Organic Framework for Air Separation.” *Chem. Sci.* **2020**, *11*, 1698–1702.
- (20) **Xiao, D. J.**; Chant, E. D.; Frankhouser, A. D.; Chen, Y.; Yau, A.; Washton, N. M.; Kanan, M. W. “A Closed Cycle for Esterifying Aromatic Hydrocarbons with CO₂ and Alcohol.” *Nat. Chem.* **2019**, *11*, 940–947.
- (19) Reed, D. A.; Keitz, B. K.; Oktawiec, J.; Mason, J. A.; Runčevski, T.; **Xiao, D. J.**; Darago, L. E.; Crocellà, V.; Bordiga, S.; Long, J. R. “A Spin Transition Mechanism for Cooperative Adsorption in Metal–Organic Frameworks.” *Nature* **2017**, *550*, 96–100.
- (18) Grosso-Giordano, N. A.; Yeh, A. J.; Okrut, A.; **Xiao, D. J.**; Grandjean, F.; Long, G. J.; Zones, S. I.; Katz, A. “Effect of Defect Site Preorganization on Fe(III) Grafting and Stability: A Comparative Study of Delaminated Zeolite vs Amorphous Silica Supports.” *Chem. Mater.* **2017**, *29*, 6480–6492.
- (17) **Xiao, D. J.**; Oktawiec, J.; Milner, P. J.; Long, J. R. “Pore Environment Effects on Catalytic Cyclohexane Oxidation in Expanded Fe₂(dobdc) Analogues.” *J. Am. Chem. Soc.* **2016**, *138*, 14371–14379.
- (16) Zhang, W.; Kauer, M.; Halbherr, O.; Epp, K.; Guo, P.; Gonzalez, M. I.; **Xiao, D. J.**; Wiktor, C.; Xamena, L.; Francesc, X.; Woll, C.; Wang, Y.; Muhler, M.; Fischer, R. A. “Ruthenium Metal–Organic Frameworks with Different Defect Types: Influence on Porosity, Sorption, and Catalytic Properties.” *Chem. Eur. J.* **2016**, *22*, 14297–14307.
- (15) Vogiatzis, K. D.; Haldoupis, E.; **Xiao, D. J.**; Long, J. R.; Siepmann, J. I.; Gagliardi, L. “Accelerated Computational Analysis of Metal–Organic Frameworks for Oxidation Catalysis.” *J. Phys. Chem. C.* **2016**, *120*, 18707–18712.
- (14) Bloch, E. D.; Queen, W. L.; Hudson, M. R.; Mason, J. A.; **Xiao, D. J.**; Murray, L. J.; Flacau, R.; Brown, C. M.; Long, J. R. “Hydrogen Storage and Selective, Reversible O₂ Adsorption in a Metal–Organic Framework with Open Chromium(II) Sites.” *Angew. Chem. Int. Ed.* **2016**, *55*, 8605–8609.
- (13) Mercado, R.; Vlaisavljevich, B.; Lin, L. –C.; Lee, K.; Lee, Y.; Mason, J. A.; **Xiao, D. J.**; Gonzalez, M.; Kapelewski, M. T.; Neaton, J. B.; Smit, B. “Force Field Development from Periodic Density Functional Theory Calculations for Gas Separation Applications Using Metal–Organic Frameworks.” *J. Phys. Chem. C.* **2016**, *120*, 12590–12604.
- (12) Borycz, J.; Paier, J.; Verma, P.; Darago, L. E.; **Xiao, D. J.**; Truhlar, D. G.; Long, J. R.; Gagliardi, L. “Structural and Electronic Effects on the Properties of Fe₂(dobdc) upon Oxidation with N₂O.” *Inorg. Chem.* **2016**, *55*, 4924–4934.
- (11) **Xiao, D. J.**; Gonzalez, M. I.; Darago, L. E.; Vogiatzis, K.; Gagliardi, L.; Long, J. R. “Selective, Tunable O₂ Binding in Cobalt(II)–Triazolate/Pyrazolate Metal–Organic Frameworks.” *J. Am. Chem. Soc.* **2016**, *138*, 7161–7170.
- (10) Reed, D. A.; **Xiao, D. J.**; Gonzalez, M. I.; Darago, L. E.; Long, J. R. “Reversible CO Scavenging via Adsorbate-Dependent Spin State Transitions in an Iron(II)–Triazolate Metal–Organic Framework.” *J. Am. Chem. Soc.* **2016**, *138*, 5594–5602.

- (9) Verma, P.; Vogiatzis, K.; Planas, N.; Borycz, J.; **Xiao, D. J.**; Long, J. R.; Gagliardi, L.; Truhlar, D. "Mechanism of Oxidation of Ethane to Ethanol at Iron(IV)–Oxo Sites in Magnesium-Diluted Fe₂(dobdc)." *J. Am. Chem. Soc.* **2015**, *137*, 5770-5781.
- (8) Saeed, A.; Maya, F.; **Xiao, D. J.**; Najam-ul-Haqq, M.; Svec, F.; Britt, D. K. "Growth of a Highly Porous Coordination Polymer on a Macroporous Polymer Monolith Support for Enhanced Immobilized Metal Ion Affinity Chromatographic Enrichment of Phosphopeptides." *Adv. Funct. Mater.* **2014**, *24*, 5790–5797.
- (7) Kapelewski, M. T.; Geier, S. J.; Hudson, M. R.; Stück, D.; Mason, J. A.; Nelson, J. N.; **Xiao, D. J.**; Hulvey, Z.; Gilmour, E.; FitzGerald, S. A.; Head-Gordon, M.; Brown, C. M.; Long, J. R. "M₂(*m*-dobdc) (M = Mg, Mn, Fe, Co, Ni) Metal–Organic Frameworks Exhibiting Increased Charge Density and Enhanced H₂ Binding at the Open Metal Site." *J. Am. Chem. Soc.* **2014**, *136*, 12119-12129.
- (6) **Xiao, D. J.**; Bloch, E. D.; Mason, J. A.; Queen, W. L.; Hudson, M.; Planas, N.; Borycz, J.; Dzubak, A. L.; Verma, P.; Lee, K.; Bonino, F.; Crocellà, V.; Yano, J.; Bordiga, S.; Truhlar, D. G.; Gagliardi, L.; Brown, C. M.; Long, J. R. "Oxidation of Ethane to Ethanol by N₂O in a Metal–Organic Framework with Coordinatively Unsaturated Iron(II) Sites." *Nat. Chem.* **2014**, *6*, 590-595.
- (5) Zadrozny, J. M.; **Xiao, D. J.**; Long, J. R.; Atanasov, M.; Neese, F.; Grandjean, F.; Long, G. J. "Mössbauer Spectroscopy as a Probe of Magnetization Dynamics in the Linear Iron(I) and Iron(II) Complexes [Fe(C(SiMe₃)₃)₂]^{1–0}." *Inorg. Chem.* **2013**, *52*, 13123-13131.
- (4) Jeon, I. –R.; Park, J. G.; **Xiao, D. J.**; Harris, T. D. "An Azophenine Radical-Bridged Fe₂ Single-Molecule Magnet with Record Magnetic Exchange Coupling." *J. Am. Chem. Soc.* **2013**, *135*, 16845-16848.
- (3) Zadrozny, J. M.; **Xiao, D. J.**; Atanasov, M.; Long, G. J.; Grandjean, F.; Neese, F.; Long, J. R. "Magnetic blocking in a linear iron(I) complex." *Nat. Chem.* **2013**, *5*, 577-581.
- (2) Fout, A. R.; **Xiao, D. J.**; Zhao, Q.; Harris, D. T.; King, E. R.; Eames, E. V.; Zheng, S. –L.; Betley, T. A. "Trigonal Mn₃ and Co₃ Clusters Supported by Weak-Field Ligands: A Structural, Spectroscopic, Magnetic, and Computational Investigation into the Correlation of Molecular and Electronic Structure." *Inorg. Chem.* **2012**, *51*, 10290-10299.
- (1) Fout, A. R.; Zhao, Q.; **Xiao, D. J.**; Betley, T. A. "Oxidative Atom-Transfer to a Trimanganese Complex To Form Mn₆(μ⁶-E) (E = O, N) Clusters Featuring Interstitial Oxide and Nitride Functionalities." *J. Am. Chem. Soc.* **2011**, *133*, 16750-16753.

PATENTS

Long, J. R.; Xiao, D. J. "Redox-Active Metal-Organic Frameworks for the Catalytic Oxidation of Hydrocarbons." US10058855B2, 2018.

SELECTED INVITED PRESENTATIONS

At the University of Washington:

8th International Conference on Metal-Organic Frameworks and Open Framework Compounds (MOF 2022), Dresden, Germany	2022
Electrochemical Society Pacific Northwest Section, virtual seminar	2022
Department of Chemistry, Rice University, TX	2022
Department of Chemistry, University of North Carolina at Chapel Hill, NC	2022
Department of Chemistry, Indiana University Bloomington, IN	2021
School of Molecular Sciences, Arizona State University, AZ	2021
Molecular Engineering Materials Center, University of Washington, WA	2020

Prior to the University of Washington:

Department of Chemistry, University of Washington, Seattle, WA	2019
Department of Chemistry, University of California, Riverside, CA	2019
Department of Chemistry, University of Florida, FL	2018
Institute of Molecular Engineering, University of Chicago, IL	2018
Department of Chemistry, Duke University, NC	2018
Department of Chemistry and Biochemistry, University of California, San Diego, CA	2018

Department of Chemistry, University of Colorado Boulder, CO	2018
Department of Chemistry and Biochemistry, University of Notre Dame, IN	2018
Department of Chemistry, University of Michigan, MI	2018
Future Faculty in Chemistry Symposium, Department of Chemistry and Chemical Biology, Harvard University, Cambridge, MA	2018
ACS Spring National Meeting, Denver, CO	2015

SELECTED CONTRIBUTED PRESENTATIONS

At the University of Washington:

ACS Spring National Meeting, San Diego, CA	2022
Pacificchem 2021 (<i>anceled due to COVID-19</i>)	2021
ACS Spring National Meeting, Virtual Meeting	2021

Prior to the University of Washington:

ACS Spring National Meeting, Orlando, FL	2019
Inorganic Chemistry Gordon Research Conference, Biddeford, ME	2018
ACS Spring National Meeting, New Orleans, LA	2018
Inorganic Chemistry Gordon Research Conference, Biddeford, ME	2016
ACS Fall National Meeting, Boston, MA	2015
ACS Fall National Meeting, San Francisco, CA	2014

PROFESSIONAL ACTIVITIES

Conference Organization

- Organizing Committee of the Young Investigator Symposium, 8th International Conference on Metal–Organic Frameworks and Open Framework Compounds (2022)
- CEI Orcas Conference (2022)

Editorial Roles

- Editorial Advisory Board, *Nano Letters* (2023–)

Journal Reviews

Journal of the American Chemical Society, ACS Central Science, ACS Catalysis, ACS Sustainable Chemistry & Engineering, Inorganic Chemistry, Nature Catalysis, Nature Chemistry, Nature Communications, Chemical Science, Chemical Communications, CrystEngComm, Catalysis Letters, Australian Journal of Chemistry, Journal of Photochemistry and Photobiology

Grant Review

- Ad hoc reviewer for the National Science Foundation (CHE CAT)
- Ad hoc reviewer for the ACS Petroleum Research Fund (DNI, ND, UR)
- Ad hoc reviewer for the Department of Energy (DOE BES)
- Review panel for NSF GRFP (2020, 2021)
- Review panel for Arnold O. Beckman Postdoctoral fellowship (2021, 2022)

Department Service

- Molecular Engineering Graduate School Interdisciplinary Committee, Rotating member (2023)
 - Graduate Admissions and Recruiting Committee (2019–present)
 - Chemistry Web Committee (2020–present)
 - Inorganic Seminars (2020)
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TEACHING EXPERIENCE

At the University of Washington:

Chem 165: Honors General Chemistry	2020–present
Adjusted median course evaluations: Spring 2022, 4.6/5.0; Spring 2021, 5.0/5.0; Spring 2020, 4.6/5.0	
Chem 312: Inorganic Chemistry	2019–present
Adjusted median course evaluations: Winter 2022, 4.7/5.0; Autumn 2020, 4.4/5.0; Autumn 2019, 3.8/5.0	

OUTREACH

Guest speaker, UW Math Science Upward Bound	2022
Panelist, “From There to Here: My Asian American Journey,” ACS Webinar	2022
Workshop leader, Inclusive Future Faculty Symposium, Arizona State University	2022
Panelist, UW Women in Science Society Q&A Panel	2021
Guest speaker, Shorewood High School AP Environmental Science	2021
Clean Energy Institute (CEI) Clean Energy Ambassador	2019–present
Mentor, the Chemistry Women Mentorship Network (Chem WMN)	2019–present