Brandon R. Barnett

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Professional Appointments

Assistant Professor of Chemistry, *University of Rochester* — Jan. **2021**–Present
Postdoctoral Fellow, *University of California, Berkeley* — Nov. **2016**–Oct. **2020**

Education

Postdoctoral Research (Advisor: Jeffrey R. Long) — *University of California, Berkeley*
Ph.D. in Chemistry (Advisor: Joshua S. Figueroa) — *University of California, San Diego* (**2016**)
B.S. Chemistry, *Summa Cum Laude* (Advisor: Joseph M. Fritsch) — *Pepperdine University* (**2011**)

Awards and Honors

National Science Foundation CAREER Award, **2023**; ACS Petroleum Research Fund Doctoral New Investigator Award, **2022**; ACS Division of Inorganic Chemistry Young Investigator Award, **2017**; Teddy G. Traylor Award, UC San Diego, **2015**; National Science Foundation Graduate Research Fellowship, **2013**; GAANN Fellowship, Department of Education, **2013**; Travel Grant, UC San Diego Department of Chemistry and Biochemistry, **2013**; Travel Award, ACS Division of Inorganic Chemistry, **2013**; Most Outstanding Graduate in the Natural Sciences, Pepperdine University, **2011**; Undergraduate Research Fellowship, Tooma Foundation, **2010**; Faculty Scholarship Award, Pepperdine University Natural Sciences Division, **2010**; Dean's Scholarship, Seaver College Dean's Office, Pepperdine University, **2007**; Junior Giants Scholar, San Francisco Giants Community Fund, **2007**.

Scientific Publications (*Corresponding Author, Undergraduate coauthors underlined)

(27) Zapesochny, M.E.[†]; Hastings, C.D.[†]; Brennessel, W.W.; **Barnett, B.R.*** "Synthesis and Characterization of Trigonal Monopyramidal Complexes of Divalent Manganese." *Submitted*.

(26) Huffman, L.S.X.; Seshadri, A.; Hastings, C.D.; Brennessel, W.W.; Franco, I.; **Barnett, B.R.*** "Assessing Structure and Dynamics of Iron Complexes Supported by Tris(amidate)amine Ligands." *Submitted*. ChemRxiv Preprint: 10.26434/chemrxiv-2025-cs0r1

(25) Hastings, C.D.; Brennessel, W.W.; **Barnett, B.R.*** "Generation and Reactivity of a High-Spin Iron(IV)-Oxo Complex that is Stable at Ambient Temperatures." *Submitted.* ChemRxiv Preprint: 10.26434/chemrxiv-2025-4d00t

(24) Silva, H.A.; Whitehead, B.S.; Hastings, C.D.; Tiwari, C.K.; Brennessel, W.W.; **Barnett, B.R.*** "Installation of Copper(I) and Silver(I) Sites into a TREN-based Porous Organic Cage via Post-Synthetic Metallation." *Organometallics*, **2024**, *43*, 2599–2607.
Invited contribution to the special issue entitled "Applied Organometallic Chemistry"

(23) Whitehead, B.S.; Brennessel, W.W.; Michtavy, S.S.; Silva, H.A.; Kim, J.; Milner, P.J.; Porosoff, M.D.; **Barnett, B.R.*** "Selective Adsorption of the Super Greenhouse Gas Tetrafluoromethane within a Metal–Organic Framework with Dynamic Corrugated Ultramicropores." *Chem. Sci.*, **2024**, *15*, 5964–5972.

(22) Hastings, C.D.; Huffman, L.S.X.; Tiwari, C.K.; Galindo Betancourth, J.; Brennessel, W.W.; **Barnett, B.R.*** "Coordinatively Unsaturated Metalates of Cobalt(II), Nickel(II), and Zinc(II) Guarded by a Rigid and Narrow Void." *Inorg. Chem.*, **2023**, *62*, 11920-11931.

Work Prior to Independent Career

(21) Wang, H.; Su, G.M.; **Barnett, B.R.**; Drisdell, W.S.; Long, J.R.; Prendergast, D. "Understanding 2p Core-Level Excitons of Late Transition Metals by Analysis of Mixed-Valence Copper in a Metal–Organic Framework." *Phys. Chem. Chem. Phys.* **2024**, *26*, 11980–11987.

(20) Neville, M.L.; Chan, C.; **Barnett, B.R.**; Hernandez, R.E.; Moore, C.E.; Figueroa, J.S. "Three-Coordinate Monoanions of Rhodium (1–) and Iridium (1–): Isolable Examples of Coordinatively-Unsaturated Metalate Anions." *Polyhedron* **2023**, 116565. *Invited Contribution to Special Issue Honoring Prof. Arnold L. Rheingold*

(19) **Barnett, B.R.**; Evans, H.A.; Su, G.M.; Jiang, H.Z.H.; Chakraborty, R.; Banyeretse, D.; Hartman, T.J.; Martinez, M.; Trump, B.A.; Tarver, J.D.; Dods, M.; Funke, L.M.; Boergel, J.; Reimer, J.A.; Drisdell, W.S.; Hurst, K.A.; Gennett, T.; Brown, C.M.; Head-Gordon, M.; Long, J.R. "Observation of an Intermediate to H_2 Binding in a Metal–Organic Framework." *J. Am. Chem. Soc.* **2021**, *143*, 14884-14994.

(18) Anastasopoulou, A.; Furukawa, H; **Barnett, B.R.**; Jiang, H.Z.H.; Long, J.R.; Breunig, H.M. "Technoeconomic Analysis of Metal–Organic Frameworks for Bulk Hydrogen Transportation." *Energy Environ. Sci.* **2021**, *14*, 1083-1094.

(17) Su, G.M.; Wang, H.; **Barnett, B.R.**; Long, J.R.; Prendergast, D.; Drisdell, W.S. "Backbonding Contributions to Small Molecule Chemisorption in a Metal–Organic Framework with Open Copper(I) Centers." *Chem. Sci.* **2021**, *12*, 2156-2164.

(16) Fitzgerald, S.A.; Mukasa, D.; Rigdon, K.H.; Zhang, N.; **Barnett, B.R.** "Hydrogen Isotope Separation Within Cu-MFU-4*l*" *J. Phys. Chem. C* **2019**, *123*, 30427-30433.

(15) **Barnett, B.R.**; Parker, S.T.; Paley, M.V.; Biggins, N.; Gonzalez, M.I.; Oktawiec, J.; Long, J.R. "Thermodynamic Separation of 1-Butene from 2-Butene in Metal–Organic Frameworks with Open Metal Sites" *J. Am. Chem. Soc.* **2019**, *141*, 18325-18333.

(14) **Barnett, B.R.**; Gonzalez, M.I.; Long, J.R. "Recent Progress Towards Light Hydrocarbon Separations using Metal–Organic Frameworks" *Trends Chem.*, **2019**, *1*, 159-171.

(13) **Barnett, B.R.**; Mokhtarzadeh, C.C.; Figueroa, J.S.; Lummins, P.; Wang, S.; Queen, J.D.; Gavenonis, J.; Schüwer, N.; Tilley, T.D.; Boynton, J.N.; Power, P.P.; Ditri, T.B.; Weidemann, N.; Agnew, D.W.; Smith, P.W.; Carpenter, A.E.; Pratt, J.K.; Mandelson, N.D. "Terphenyl Ligands and Complexes" *Inorg. Synth.* **2018**, *37*, 85-122.

(12) **Barnett, B.R.**; Neville, M.L; Moore, C.E.; Rheingold, A.L.; Figueroa, J.S. "Oxidative-Insertion Reactivity Across a Geometrically Constrained Metal-Borane Interaction" *Angew. Chem. Int. Ed.* **2017**, *56*, 7195-7199.

(11) **Barnett, B.R.**[†]; Labios, L.A.[†]; Stauber, J.M.[†]; Moore, C.E.; Rheingold, A.L.; Figueroa, J.S. "Synthetic and Mechanistic Interrogation of Pd/Isocyanide-Catalyzed Cross-Coupling: π-Acidic Ligands Enable Self-Aggregating Monoligated Pd(0) Intermediates" *Organometallics* **2017**, *36*, 944-954.

(10) **Barnett, B.R.**; Figueroa, J.S. Zero-valent Isocyanides of Nickel, Palladium and Platinum as Transition Metal σ-type Lewis Bases" *Chem. Commun.* **2016**, *52*, 13829-13839. *Invited Feature Article*

(9) **Barnett, B.R.**; Rheingold, A.L.; Figueroa, J.S. "Monomeric Chini-Type Triplatinum Clusters Featuring Dianionic and Radical-Anionic π*-Systems" *Angew. Chem. Int. Ed.* **2016**, *55*, 9253-9258.

(8) Smith, S.J.; Radford, R.J.; Subramanian, R.H.; **Barnett, B.R.**; Figueroa, J.S.; Tezcan, F.A. "Tunable Helicity, Stability and DNA-Binding Properties of Short Peptides with Hybrid Metal Coordination Motifs" *Chem. Sci.* **2016**, *7*, 5453-5461.

(7) **Barnett, B.R.**; Moore, C.E.; Chandrasekaran, P.; Sproules, S.; Rheingold, A.L.; DeBeer, S.; Figueroa, J.S. "Metal-only Lewis Pairs Between Group 10 Metals and Tl(I) or Ag(I): Insights into the Electronic Consequences of Z-type Ligand Binding" *Chem. Sci*., **2015**, 6, 7169-7178.

(6) **Barnett, B.R.**; Labios, L.A.; Moore, C.E.; England, J.; Rheingold, A.L.; Wieghardt, K.; Figueroa, J.S. "Solution Dynamics of Redox Noninnocent Nitrosoarene Ligands: Mapping the Electronic Criteria for the Formation of Persistent Metal-Coordinated Nitroxide Radicals" *Inorg. Chem.*, **2015**, 54, 7110-7121.

(5) **Barnett, B.R.**; Moore, C.E.; Rhengold, A.L.; Figueroa, J.S. "Frustrated Lewis Pair Behavior of Monomeric (boryl)iminomethanes Accessed from Isocyanide 1,1-hydroboration" *Chem. Commun.* **2015**, 51, 541-544.

(4) Carpenter, A.E.; McNeece, A.J.; **Barnett, B.R.**; Estrada, A.L.; Mokhtarzadeh, C.C.; Moore, C.E.; Rheingold, A.L.; Perrin, C.L.; Figueroa, J.S. "Direct Observation of β-Chloride Elimination from an Isolable β-Chloroalkyl Complex of Square Planar Nickel" *J. Am. Chem. Soc.* **2014**, 136, 15481-15484.

(3) **Barnett, B.R.**; Moore, C.E.; Rheingold, A.L.; Figueroa, J.S. "Cooperative Transition Metal/Lewis Acid Bond-Activation Reactions by a Bidentate (Boryl)iminomethane Complex: A Significant Metal-Borane Interaction Promoted by a Small Bite-Angle LZ Chelate" *J. Am. Chem. Soc.* **2014**, 136, 10262-10265.

(2) Roberts, C.C.; **Barnett, B.R.**; Green, D.B.; Fritsch, J.M. "Synthesis and structures of tridentate ketoiminate zinc complexes that act as *L*-lactide ring opening polymerization catalysts" *Organometallics*, **2012**, 31, 4133-4141.

(1) **Barnett, B.R.**; Evans, A.L.; Roberts, C.C.; Fritsch, J.M. "Batch reactor kinetic studies on the reductive dechlorination of chlorinated ethylenes by *tetrakis*-(4-sulfonatophenyl)porphyrin cobalt" *Chemosphere*, **2011**, 82, 592-596.

Invited Lectures

(18) *North Carolina State University* – Raleigh, NC, March **2025**.

(17) *Vassar College* – Poughkeepsie, NY, February **2025**

(16) *Lattice Dynamics Symposium, American Chemical Society National Meeting* – Denver, CO, August **2024**

(15) *Organometallic Chemistry Gordon Research Conference (Selected Poster Talk)* – Newport, RI, July **2024**

(14) *Texas Pore Engineering Conference* – Denton, TX, October **2023**

(13) *Pepperdine University* – Malibu, CA, January **2023**

(12) *Emerging Areas in Inorganic Chemistry Symposium, American Chemical Society National Meeting* – Chicago, IL, August **2022**

(11) *Texas A&M University* – College Station, TX, January **2020**

(10) *University of Maryland, College Park* – College Park, MD, January **2020**

(9) *University of Rochester* – Rochester, NY, January **2020**

(8) *University of Texas at Austin* – Austin, TX, December **2019**

(7) *University at Albany, SUNY* – Albany, NY, December **2019**

(6) *University of Michigan, Ann Arbor* – Ann Arbor, MI, November **2019**

(5) *Center for Gas Separations, Nanoporous Materials Seminar Series* – Berkeley, CA, June **2019**

(4) *Organometallic Chemistry Gordon Research Conference (Selected Poster Talk)* – Newport, RI, July **2018**

(3) *American Chemical Society Division of Inorganic Chemistry Young Investigator Award Symposium* – Washington, DC, August **2017**

(2) *University of California, Berkeley* – Berkeley, CA, January **2016**
(1) *University of California, San Diego* – La Jolla, CA, December **2015**

Contributed Lectures and Presentations

(12) *Organometallic Chemistry Gordon Research Conference (poster)* – Newport, RI, July **2024**
(11) *Inorganic Chemistry Gordon Research Conference (poster)* – Newport, RI, June **2024**
(10) *American Chemical Society National Meeting* – San Francisco, CA, August **2023**
(9) *Organometallic Chemistry Gordon Research Conference (poster)* – Newport, RI, July **2022**
(8) *American Chemical Society National Meeting* – San Diego, CA, August **2019**
(7) *Organometallic Chemistry Gordon Research Conference (poster)* – Newport, RI, July **2018**
(6) *American Chemical Society National Meeting* – San Diego, CA, March **2016**
(5) *Organometallic Chemistry Gordon Research Conference (poster)* – Newport, RI, July **2015**
(4) *American Chemical Society National Meeting* – San Francisco, CA, August **2014**
(3) *American Chemical Society National Meeting* – New Orleans, LA, April **2013**
(2) *American Chemical Society National Meeting (poster)* – Anaheim, CA, March **2011**
(1) *Southern California Conference for Undergraduate Research* – Malibu, CA, November **2010**

Awarded Funding

University of Rochester Pump Primer II Award (01/2025 – 12/2025)
Controlling Entropy Through Local Phase Changes within Porous Sorbents
Role: Principal Investigator Amount: $40,000

Semiconductor Research Corporation (01/2025 – 12/2027)
Abating PFC, HFC, and PFAS Emissions with Regenerable Metal–Organic Frameworks
Role: Principal Investigator Amount: $315,000

National Science Foundation CAREER Award (07/2024 – 06/2029)
CAREER: Cavity-Enforced Structure and Reactivity of High-Valent Iron Oxo, Nitrosyl, and Superoxo Complexes
Role: Principal Investigator Amount: $770,000

ACS Petroleum Research Fund – Doctoral New Investigator Award (01/2023 – 08/2025)
Shape-Selective Hydrocarbon Oxidations Using Transition Metal Complexes with Zeolite-Inspired Cavities
Role: Principal Investigator Amount: $110,000

Mentored Researchers

Current Graduate Students Irin Elizabeth Aby (G2), Christopher Hastings (G5), Morgan Hern (G1), Lucy Huffman (G3), Bevan Whitehead (G5), Paul Yoon (MS)

Current Postdoctoral Fellows Dr. Bittu Chandra (August 2024 – Present)

Current Undergraduates Justin Hao (’27), Miranda Stewart (’25), Marina Zapesochny (’25)

Group Alumni Jolaine Galindo Betancourth (*i*Scholar 2022), Negede Alemayehu (MS ’22), Chandan Tiwari (Postdoc 2021-2022), Hope Silva (BS ’24), Jiwon Woo (BA ’23), Sheeza Fatima (*i*Scholar 2024)

Teaching Activities

CHEM 211 **Inorganic Chemistry** (Fall 2022, Fall 2023, Fall 2024)

This course covers topics including bonding in inorganic molecules, molecular symmetry, coordination chemistry, the properties and reactions of transition metal complexes, organometallic chemistry and bioinorganic chemistry. Two 75-minute lectures per week, 9 workshops, 9 problem sets, three midterm examinations and a final examination. Four units.

Typical Enrollment: 30-45 Students *TA/WSLs Supervised: 4-5*

CHEM 421 **Organometallics I** (Fall 2021)

This course examines basic concepts, systems, reactions and applications of organometallic chemistry. Specific areas of focus include the structure and bonding of complexes having carbonyl, alkyl, carbene, olefin, and related π ligands. The latter part of the course examines fundamental organometallic reactions, including oxidative addition, reductive elimination, insertion, elimination reactions. Two units.

Enrollment: 26 Students *TA/WSLs Supervised: 1*

CHEM 422 **Organometallics II** (Spring 2021, Spring 2023, Spring 2024, Spring 2025)

The primary focus of this course is fundamental reactivity and mechanisms in organometallic reactions, with a particular focus on important catalytic cycles. Specific processes of interest include olefin functionalizations (hydroformylation; polymerization; Wacker oxidation; metathesis), palladium-catalyzed cross-coupling, asymmetric hydrogenations, and C-H activation/functionalization. Two units.

Typical Enrollment: 5-10 Students

CHEM 446 **Nanoporous Materials Chemistry**

(Spring 2021, Fall 2021, Spring 2023, Spring 2024, Spring 2025)

This course surveys the various classes of materials that can support permanent porosity as well as their established and emerging applications. Topics covered include industrial zeolite catalysis, adsorptive gas storage and separations, and membrane science. An emphasis is placed on applications of current industrial importance. Two units.

Typical Enrollment: 5-10 Students

Note: Course Material Developed from Scratch

Departmental and University Service

Departmental Committees	Graduate Recruiting (2021–2024) Graduate Studies (2022–2023) Space & Services (2022–Present) Seminars & Colloquia (2023–Present) Faculty Search (2024–Present) *Ad Hoc* Department Chair Search (2024)
Synergistic Activities	Summer Undergraduate Workshop Series Organizer (2022–Present) Virtual Prospective Graduate Student Visitation Co-Organizer (2021) Virtual Prospective Graduate Student Open House Co-Host (2023) Western NY Inorganic Symposium Presentation Judge (2023, 2024)
University Service	AS&E Graduate Research Symposium Presentation Judge (2023) Chair, Provost Fellowship Natural Sciences Panel (2024) Schwartz Discover Grant Reviewer (2024) AS&E NSF CAREER Bootcamp Mentor (2024)

Professional Service

Journal Reviewer	*Journal of the American Chemical Society; Chemical Science; ACS Catalysis; Inorganic Chemistry; Dalton Transactions; Chemical Communications; ACS Nanoscience Au; Journal of Physical Chemistry Letters; Crystal Growth & Design; ACS Sustainable Chemistry & Engineering*
Funding Reviewer	ACS Petroleum Research Fund (2022, 2023, 2024) Department of Energy (2025)
Miscellaneous	ACS National Meeting Session Moderator (2019, 2023)