Adrian Huang, Ph.D.
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Education and Research Experience

Stanford University, Stanford, CA — Sep 2026 – Present
Postdoctoral Researcher
Research Advisor: Prof. Yan Xia
Research: Membrane Separations for Hydrocarbon and Ion Recovery

University of California, Berkeley, Berkeley, CA — Aug 2020 – May 2026
National Science Foundation Graduate Research Fellow, Ph.D. in Chemistry

Research Advisor: Prof. Jeffrey R. Long
Research: CO_2 Capture from Air and Flue Gas with Molecular Polyamines
Research: Structural Analysis of Sorbents with in-situ Gas Dosing Techniques

California Institute of Technology (Caltech), Pasadena, CA — Sep 2016 – Mar 2020
GPA: 3.8/4.0, B.S. in Chemistry

Research Advisor: Prof. Theodor Agapie — Sep 2019 – Mar 2020
Research: Ambient N_2 Reduction with a fused FeS double-cubane

Summer Undergraduate Research Fellow at University of California, Berkeley — Jun 2019 – Aug 2019
Research Advisor: Prof. Jeffrey R. Long
Research: Cooperative CO_2 Capture in Metal–Organic Frameworks

Research Advisor: Prof. Wei Gao — Nov 2017 – Oct 2019
Research: Remote Sensing of Ammonium, Urea, Glucose, and Sodium in Sweat

Research Advisor: Prof. Erik Winfree — Feb 2017 – Aug 2017
Research: Sorting Algorithms with Stochastic Chemical Reaction Networks

Publications

(20) Huang, A. J.; Dods, M. N.; Conde, O. A.; Brannan, E.; Patel, P. G.; Jiang, H. Z.; Hall, F.; Graf, K. I.; Klein, R. A.; Giovine, R.; Teat, S.; Furukawa, H.; Long, J. R. Isothermal Carbon Dioxide Separation from Air with A Porous Triptycene Dodecaamine. *Manuscript in preparation.*

(19) Huang, A. J.; Dods, M. N.; Patel, P. G.; Brannan, E.; Conde, O. A.; Jiang, H. Z.; Hall, F.; Graf, K. I.; Klein, R. A.; Giovine, R.; Teat, S.; Furukawa, H.; Long, J. R. Low-Temperature Isothermal Carbon Dioxide Separation with an Oxidatively Robust Expanded Triptycene Hexaamine. *Manuscript in preparation.*

(18) Huang, A. J.; Graf, K. I.; Reyes, R.-D.; Krotz, A.; Jiang, H. Z.; Kinniburgh, T.; Klein, R. A.; Furukawa, H.; Head-Gordon, M.; Long, J. R. Impacts of Amine Density and Molecular Packing on Hydrogen Bonding and Carbon Dioxide Capture in Molecular Polyamines. *Manuscript in preparation.*

(17) Huang, A. J.; Dods, M. N.; Klein, R. A.; Jiang, H. Z.; Furukawa, H.; Giovine, R. A.; Patel, P. G.; Lubner, S.; Long, J. R. Isothermal Capture and Release of Carbon Dioxide with a Porous Molecular Hexaamine. *J. Am. Chem. Soc.* 2026, *148*, 37446–37457.

(16) Zeng, J.[†]; Tsai, H.[†]; Lim, T. H.; Dods, M. N.; Zhu, Z.; Albers, H.; **Huang, A. J.;** Ye, M.; Xiong, S.; Furukawa, H.; Breunig, H.; Long, J. R.; Prasher, R. S.; Lubner, S. L. Passive Direct Air Capture of Carbon Dioxide Using Cooperative Metal–Organic Framework Adsorbents and Only Solar Energy. *Accepted in Nature Energy.*

(15) Fan, Q.; Paley, D. W.; Nyiera, H. N.; Mittan-Moreau, D. W.; Willson, M. C.; Kotei, P. A.; Schriber, E. A.; Liyanage, C. D.; Tchoń, D. M.; Rosenberg, D. J.; Zeller, M.; Melendrez, C.; Kang, J.; Inoue, I.; Dehe, S.; DePonte, D. P.; Aquila, A. L.; Banta, K.; Sierra, R. G.; Su, A. C.; **Huang, A. J.;** Eddy, N. A.; Zhao, J.; Brewster, A. S.; Hohman, J. N. Solid–Liquid Transitions in 1D Metal–Organic Chalcogenolates. *J. Am. Chem. Soc. ASAP. doi:* 10.1021/jacs.5c22588.
(14) Fan, Q.; Ladera, A. J.; Paley, D. W.; Tchoń, D. M.; Rasamsetty, A.; Nyiera, H. N.; Willson, M. C.; Mittan-Moreau, D. W.; Liyanage, C. D.; Aleksich, M.; Kotei, P. A.; Schriber, E. A.; Rosenberg, D. J.; Zeller, M.; DePonte, D. P.; Sierra, R. G.; Dehe, S.; Aquila, A. L.; Banta, K.; Simon, P. S.; Makita, H.; Kern, J. F.; Su, A. C.; **Huang, A. J.;** Kang, J.; Inoue, I.; Owada, S.; Tono, K.; Sugahara, M.; Sauter, N. K.; Ung, G.; Zhao, J.; Brewster, A. S.; Smidt, T.; Hohman, J. N. Sugar-Based 1-Dimensional Metal−Organic Chalcogenolates with Hydration-Tunable Chiroptical Emission. *J. Am. Chem. Soc. ASAP. doi:* 10.1021/jacs.6c06311.
(13) Ngo, D. X.; McClain, K. R.; Rajabi, A.; Held, L. I.; Nguyen, D. K.; **Huang, A. J.;** Kwon, H.; Patel, P. G.; Furche, F.; Long, J. R. Planar Benzene Trianion-Bridged Dilanthanide Complexes Exhibiting Strong Ferromagnetic Exchange via Metal–Radical Covalency *J. Am. Chem. Soc. ASAP. doi:* 10.1021/jacs.6c16624.
(12) Rohde, R. C.[†]; Carsch, K. M.[†]; Dods, M. N.; Klein, R, A.; Yabuuchi, Y.; **Huang, A. J.;** Zakariz, N. I.; Heyer, A. J.; Pourghaderi, A.; Martins, P. G.; Taylor, J. W.; Madden, D. G.; Teat, S. J.; Reimer, J. A.; Neaton J. B.; Brown, C. M.; Long, J. R. "High-Temperature π-Acid Separations via a Metal–Organic Framework with Coordinatively Unsaturated Copper(I) Sites" *Manuscript submitted.*
(11) Ngo, D. X.; Franzke, Y. J.; Hruby, J.; Held, L. I.; Russo, D. R.; Smith, P. W.; Murphy, R. A.; Kwon, H.; **Huang, A. J.;** Patel, P. G.; Zakaria, N. I.; Carsch, K. M.; Minasian, S. G.; Hill, S.; Long, J. R. A Molecular Atom Trap Encapculating Bismuth(0). *Manuscript submitted.*
(10) Xiong, S.; Taini, G.; Shaidu, Y.; Meng, J.; Martins, P. G.; **Huang, A. J.;** Yabuuchi, Y.; Jiang, H. Z. H.; Klein, R. A.; Chen, Y.; Wang, Y.; Giovine, R.; Tsai, H.; Zhu, Z.; Dods, M. N.; Falkowski, J. M.; Furukawa, H.; Neaton, J. B.; Colombo, V.; Long, J. R. An Oxidatively Robust Tetraamine-Appended Metal–Organic Framework for Cooperative CO_2 Capture from Air. *Manuscript submitted.*
(9) Graf, K. I.; **Huang, A. J.;** Zakaria, N. I.; Heyer, A. J.; Santoso, M. S.; Klein, R. A.; Furukawa, H.; Long, J. R. Electronic and Steric Control of Phase Changes Caused by Methylamine Insertion into Copper Paddlewheel Metal–Organic Frameworks. *Chem. Sci.* **2026,** *17*, 16376–16387.
(8) Carsch, K. M.; Jiang, H. Z. H.; Klein, R. A.; Rosen, A. S.; Summerhill, P. S.; Peltier, J. L.; **Huang, A. J.;** Murphy, R. A.; Dods, M. N.; Silva, H, A.; Hasanbasri, A.; Kwon, H.; Karstens, S. L.; Yabuuchi, Y.; Börgel, J.; Taylor, J. W.; Meihaus, K. R.; Bustillo, K. C.; Minor, A. M.; Persson, K. A.; Brown, C. M.; Britt, D. R.; Stadie, N. P.; Long, J. R. Multi-gas adsorption with Single-Site Cooperativity in a Metal–Organic Framework. *Science* **2025,** 390, 808–812.
(7) Huang, A. J.; Gupta, A. K.; Jiang, H. Z. H.; Zhuang, H.; Wenny, M. B.; Klein, R. A.; Meihaus, K. R.; Kwon, H.; Furukawa, H.; Brown, C. M., Reimer, J. A.; de Jong, W. A.; Long, J. R. Phase Change-Mediated Capture of Carbon Dioxide from Air with a Molecular Triamine Network Solid. *J. Am. Chem. Soc.* **2025**, 147, 12, 10519–10529.
(6) Rohde, R. C.[†]; Carsch, K. M.[†]; Dods, M. N.; Jiang, H. Z. H.; McIsaac, A. R.; Klein, R. A.; Kwon, H.; Karstens, S. L.; Wang, Y.; Engler, K.; **Huang, A. J.;** Taylor, J. W.; Yabuuchi, Y.; Engler, K. E.; Meihaus, K. R.; Bustillo, K. C.; Minor, A. M.; Reimer, J. A.; Head-Gordon, M.; Brown, C. M.; Long. J. R. High-Temperature Carbon Dioxide Capture in a Porous Material with Terminal Zinc–Hydride Sites. *Science* **2024,** 386, 814–819.
(5) Graf, K. I.; **Huang, A. J.;** Meihaus, K. R.; Long, J. R. Methylamine Separations Enabled by Cooperative Ligand Insertion in Copper–Carboxylate Metal–Organic Frameworks. *J. Am. Chem. Soc.* **2024**, 146, 34, 23943–23954.
(4) Yabuuchi, Y.; Furukawa, H.; Carsch, K. M.; Klein, R. A.; Tkachenko, N.V., **Huang, A. J.;** Cheng, Y.; Taddei, K. M.; Novak, E.; Brown, C. M.; Head-Gordon, M.; Long, J. R. Geometric Tuning of Coordinatively Unsaturated Copper(I) Sites in Metal–Organic Frameworks for Ambient-Temperature Hydrogen Storage. *J. Am. Chem. Soc.* **2024**, 146, 32, 22759–22776.

(3) Zhu, Z.; Tsai, H.; Parker, S. T.; Lee, J.; Yabuuchi, Y.; Jiang, H. Z. H.; Wang, Y.; Xiong, S.; Forse, A. C.; Dinakar, B.; **Huang, A. J.;** Dun, C.; Milner, P. J.; Smith, A.; Martins, P. G.; Meihaus, K. R.; Urban, J. J.; Reimer, J. A.; Neaton, J. B., Long, J. R. High-Capacity, Cooperative CO_2 Capture in a Diamine-Appended Metal–Organic Framework through a Combined Chemisorptive and Physisorptive Mechanism. *J. Am. Chem. Soc.* **2024**, 146, 9, 6072–6083
(2) Carsch, K. M.; **Huang, A. J.;** Dods, M. N.; Parker, S. T.; Rohde, R. C.; Jiang, H. Z. H.; Yabuuchi, Y.; Kwon, H.; Karstens, S. L.; Chakraborty, R.; Bustillo, K. C. Meihaus, K. R.; Furukawa, H.; Minor, A. M.; Head-Gordon, M.; Long. J. R. Selective Adsorption of Oxygen from Humid Air in a Metal–Organic Framework with Trigonal Pyramidal Copper(I) Sites. *J. Am. Chem. Soc.* **2024**, 146, 3160–3170.
(1) You, Y.; Nassar, J.; Xu, C.; Min, J.; Yang, Y.; Dai, A.; Doshi, R.; **Huang, A. J.;** Song, Y.; Gehlhar, R.; Ames, A. D.; Gao, W. Biofuel-powered Soft Electronic Skin with Multiplexed and Wireless Sensing for Human-Machine Interfaces, *Science Robotics* **2020**, 5, 41.

Patents

(2) Huang, A. J.; Long, J. R. Isothermal Capture and Release Carbon Dioxide with Molecular Polyamines. *US Provisional Patent 63/781,277 filed on March 31, 2025.*
(1) Huang, A. J.; Long, J. R. Direct Air Capture of Carbon Dioxide with Molecular Polyamines. *US Provisional Patent 63/587,467 filed on October 3, 2023.*

Grants

(4) Long, J. R. (Lead PI); Reimer, J. (Co-PI); Neaton, J. (Co-PI); Jiang, H. (Co-PI); **Huang, A. J.;** *"New Solid Sorbents for Direct Air Capture of Carbon Dioxide" Baker Hughes* **(2025–2026, $3,877,167)**
(3) Long, J. R. (Lead PI); Reimer, J. (Co-PI); Neaton, J. (Co-PI); Head-Gordon, H. (Co-PI); **Huang, A. J.;** Kharod, R. A. *"Molecular Phase-Change Adsorbents for Capturing Carbon Dioxide from Air" Baker Hughes* **(2024–2025, $3,877,167)**
(2) Long, J. R. (Lead PI); Lubner, S. (Co-PI); de Jong, W. A. (Co-PI); Breunig, H. (Co-PI); Furukawa, H.; **Huang, A. J.;** Gupta, A. K.; Lim, T. H.; Tsai, H.; Xiong, S. *"Molecular Polyamines for the Efficient Capture of Carbon Dioxide from Air: Understanding and Limiting Sorbent Degradation" DOE Office of Basic Energy Science* **(2023–2024, $1,191,000)**
(1) Long, J. R. (Lead PI); Lubner, S. (Co-PI); de Jong, W. A. (Co-PI); Breunig, H. (Co-PI); Furukawa, H.; **Huang, A. J.;** Kim, E. J.; Dods, M. N. *"New Cooperative Adsorbents and Regeneration Methods for the Efficient Removal of Carbon Dioxide from Air" DOE Office of Basic Energy Science* **(2021–2023, $3,600,000)**

Awarded Research Proposals and Research Programs

(8) Long, J. R. (Lead PI); **Huang, A. J.;** Kwon, H.; Ye, M.; Patel, P. G.; Removski, N. *"Structural Characterization of Phase-Change Behavior and Site-Isolated Reactive Intermediates in Framework Materials" Advanced Light Source, Lawrence Berkeley Research Laboratory* **(2025–2027, 384 hours awarded)**
(7) Long, J. R. (Lead PI); Graf, K. I.; **Huang, A. J.;** Pekar, K.; Vuong, M. *"Structural Effects Governing CO2 Binding in Metal–Organic Frameworks Featuring Terminal Zinc Hydride Sites" Advanced Photon Source, Argonne National Laboratory* **(2025, 72 hours awarded)**
(6) Long, J. R. (Lead PI); Graf, K. I.; **Huang, A. J.;** Yabuuchi, Y.; Pekar, K. *"In Situ Generation of Terminal Metal–Nitride Species Within a Metal–Organic Framework and Study of Gas Reactivity" Advanced Photon Source, Argonne National Laboratory* **(2025, 72 hours awarded)**
(5) Long, J. R. (Lead PI); **Huang, A. J.;** Graf, K. I.; Yabuuchi, Y. *"In Situ Gas Dosing Study of Phase Transitions with Polyamine Molecules for the Direct Air Capture of CO2" Advanced Photon Source, Argonne National Laboratory* **(2024, 72 hours awarded)**

(4) Long, J. R. (Lead PI); Vincent, A. H.; **Huang, A. J.;** Kwon, H.; Ye, M. *"Structural Characterization of Small Molecules and Novel Porous Frameworks by X-ray Diffraction for Host-Guest Interactions and Quantum Sensing" Advanced Light Source, Lawrence Berkeley Research Laboratory* **(2023–2025, 384 hours awarded)**
(3) Long, J. R. (Lead PI); Graf, K. I.; Yabuuchi, Y.; **Huang, A. J.** *"In Situ CO_2-dosed Powder X-ray Diffraction Measurements of ZnH-MFU-4l under humid streams for high-temperature CO_2 capture" National Synchrotron Light Source II, Brookhaven National Laboratory* **(2023, 72 hours awarded)**
(2) Long, J. R. (Lead PI); Graf, K. I.; Yabuuchi, Y.; **Huang, A. J.** *"In Situ Gas Dosing Structural Study of CuM-MFU-4l Frameworks for High Temperature Separations of π-Acidic Gases" National Synchrotron Light Source II, Brookhaven National Laboratory* **(2023, 72 hours awarded)**
(1) Long, J. R. (Lead PI); Jiang, H. Z. H.; Paley, M.; Graf, K. I.; Yabuuchi, Y., **Huang, A. J.** *"In Situ Gas Dosing for Structural Study of M_2(m-dobdc-X) Frameworks for Olefin Separations" Advanced Photon Source, Argonne National Laboratory* **(2022, 72 hours awarded)**

Teaching Experience

CHEM201, Fundamental Concepts in Inorganic Chemistry — Fall 2022
Graduate Student Instructor, UC Berkeley (Prof. Jeffrey R. Long)

CHEM250a, Introduction to Bonding Theory — Fall 2022
Graduate Student Instructor, UC Berkeley (Prof. Jeffrey R. Long)

CHEM104b, Advanced Inorganic Chemistry — Spring 2022
Graduate Student Instructor, UC Berkeley (Dr. David Harris)

CHEM1a, General Chemistry — Fall 2020
Graduate Student Instructor, UC Berkeley (Prof. Teresa Head Gordon)

Ch3a, Introduction to Chemistry Lab — F, W, Sp 2019
Teaching Assistant, UC Berkeley (Dr. Jeffrey Mendez) — F, W 2020
Teaching Assistant, UC Berkeley (Dr. Jeffrey Mendez)

CS11, Computer Language Lab — Winter 2018
Teaching Assistant, UC Berkeley (Prof. Michael Vanier)

Honors, Awards, and Fellowships

MOF2026 Top Young Investigator Award	May 2026
UCCS Materials Division Outstanding Presentation Award	September 2025
Outstanding Graduate Student Instructor Award	March 2022
Outstanding Graduate Student Instructor Award	March 2021
Undergraduate Leadership Award	June 2020
National Science Foundation (NSF) Graduate Research Fellowship	March 2020
Warren and Katharine Schlinger Summer Research Fellow	July 2019
The Aerospace Corporation Summer Research Fellow	July 2018
Perpall Speaking Competition Semi-Finalist	August 2017
The Aerospace Corporation Summer Research Fellow	July 2017

Mentorship (G = Graduate, UG = Undergraduate)

Ruby Kharod (G), Vincent Allen (G), Orlando Conte Del Moral (G), Katherine Hightower (G), Jonathan Novak (G), Rhea Donna-Reyes (G), Nicole Removski (G), Priya Patel (G), Fisher Hall (G), Verner Sääsk (G), Kyle Pekar (G), My Vuong (G), Xinru Wang (G) Kushaan Bahl (UG), Daniel Wehbeh (UG), Madeline Thiara (UG)

Mentoring Experience – graduate students (13), undergraduate students (3)

Service, Extracurricular Activities, & Diversity, Equity, Inclusion, Belonging Actions

NorCal Science Olympiad State Tournament, Event Coordinator	Spring 2026
Alameda County Regional Science Olympiad Tournament, Event Coordinator	Spring 2026
SoCal Science Olympiad State Tournament, Event Coordinator	Spring 2025
Science Olympiad National Event Supervisor, Astronomy C	Spring 2022
Golden Gate Science Olympiad Tournament Director	Winter 2022
NorCal Science Olympiad Regional Tournament Event Supervisor, Forensics C	Winter 2022
Science Olympiad National Invitational Event Supervisor, Forensics B	Winter 2022
MY SO STEM Showdown Test Writer, Forensics C	Winter 2022
NorCal Science Olympiad State Tournament Test Reviewer, Forensics C	Spring 2021
SoCal Science Olympiad State Tournament Event Supervisor, Density Lab B	Spring 2021
Golden Gate Science Olympiad Test Reviewer, Chemistry & Environmental Science	Spring 2021
Caltech Chemistry Department, Undergraduate Option Representative	2019 – 2020
Avery Executive Committee, Chancellor	2019 – 2020
Caltech Science Olympiad Club, President	2018 – 2019
Avery Executive Committee, Vice Chancellor	2018 – 2019
Caltech Science Olympiad Summer Workshop, Organizer	2018 – 2019
Avery Executive Committee, Secretary	2017 – 2018
Caltech Core Curriculum Steering Committee, Undergraduate Representative	2017 – 2018
Caltech Science Olympiad Club, Treasurer	2017 – 2018
Caltech Academic and Research Committee	2016 – 2018
Outreach (chemistry demonstrations, recruitment, local DEIB initiatives)	*Ongoing*
UC Berkeley Graduate Student Recruitment	*Ongoing*

Seminars, Public Presentations, and Colloquia

Isothermal Capture and Release of CO_2 with Porous Molecular Polyamines

Gordon Research Conference (Membranes: Materials and Processes) – Poster Presentation, New London, NH	Summer 2026
Gordon Research Seminar (Membranes: Materials and Processes) – Poster Presentation, New London, NH	Summer 2026
MOF2026 – Poster Presentation, New Orleans, LA	Spring 2026
MOF2026 – Oral Presentation, New Orleans, LA	Spring 2026
MOF2026 Young Investigator Symposium – Oral Presentation, New Orleans, LA	Spring 2026
COPSXII – Oral Presentation, Germany	Spring 2026

Phase-Transition Mediated CO_2 Capture from Air with Molecular Polyamines

2025 UC Chemical Symposium – Flash Oral Presentation, Los Angeles, CA	Fall 2025
MOFschool2025 – Flash Oral Presentation, Como, Italy	Summer 2025
Gordon Research Conference (Carbon Capture, Utilization, and Storage) – Poster Presentation, Ventura, CA	Spring 2025
Gordon Research Seminar (Carbon Capture, Utilization, and Storage) – Poster Presentation, Ventura, CA	Spring 2025
Harvard University – Oral Presentation, Cambridge, MA	Summer 2024
Massachusetts Institute of Technology – Oral Presentation, Cambridge, MA	Summer 2024
MOF 2024 – Poster Presentation, Singapore	Summer 2024
MOF 2024 – Oral Presentation, Singapore	Summer 2024

UC Berkeley Chemistry Symposium – Oral Presentation, Berkeley, CA — Spring 2024

College, Chemistry, and the World Beyond High School
Leigh High School (alma mater) – Oral Presentation, San Jose, CA — Summer 2025

Investigating Cooperative CO_2 Capture in Diamine-Appended MOFs
Caltech – Invited Research Seminar, Pasadena, CA — Fall 2019

Sweat Science: Tracking Protein and Sugar Dieting with Wearable Devices
The Aerospace Corporation, El Segundo, CA — Fall 2018
Caltech – Invited Research Seminar, Pasadena, CA — Fall 2018

Sorting Algorithms Using Stochastic Chemical Reaction Networks
The Aerospace Corporation, El Segundo, CA — Fall 2017
Caltech – Invited Research Seminar, Pasadena, CA — Fall 2017