

Michael L. Aubrey

Email: michael.aubrey@austin.utexas.edu

Website: www.aubrey.group

University of Texas at Austin
Department of Chemistry
4.150 Welch Hall
Austin, TX 78712

Education

Ph.D., Chemistry

B.S., Chemistry

University of California, Berkeley, 2017
University of North Carolina, Chapel Hill, 2011

Work Experience

Assistant Professor of Chemistry

University of Texas at Austin
Austin, TX, July 2021–present

Postdoctoral Researcher

Advised by Prof. Hemamala Karunadasa

Stanford University
Stanford, CA, 2018–April 2021

Postdoctoral Researcher

Advised by Prof. Mercouri Kanatzidis

Northwestern University
Evanston, IL, 2017

Graduate Student Researcher, Ph.D. Candidate

Advised by Prof. Jeffrey R. Long

University of California, Berkeley
Berkeley, CA, 2011–2017

Fellowships

US Department of Energy's Solar Energy Technology Office Fellowship

Arkema Fellowship

Stanford, 2019–2021

UC Berkeley, 2014

Research Interests

Inorganic Solid-State Chemistry: exploratory discovery and synthesis of inorganic materials; electronic and magnetic properties of inorganic materials; electrochemical properties and applications of redox-active materials, fundamental electrochemistry of sustainable batteries; applications of low-dimensional materials.

Teaching

Materials Chemistry CH390K (graduate) / CH367C (undergraduate) (**Course Design**)

UT Austin, Fall 2021

Materials Chemistry CH390K (graduate) / CH367C (undergraduate)

UT Austin, Fall 2022

Foundations of Chemistry CH302C/H (honors & chemistry majors) (**Course Design**)

UT Austin, Spring 2023

FRI Luminators

UT Austin, Spring 2023

FRI Luminators (**Course Design**)

UT Austin, Summer 2023

Advanced Topics in Inorganic Chemistry CH368 (undergraduate) (**Course Design**)

UT Austin, Summer 2023

Materials Chemistry CH390K (graduate) / CH367C (undergraduate)

UT Austin, Fall 2023

Foundations of Chemistry CH302C (honors & chemistry majors)

UT Austin, Spring 2024

Materials Chemistry CH390K (graduate) / CH367C (undergraduate)

UT Austin, Fall 2024

Materials Chemistry CH390K (graduate) / CH367C (undergraduate)

UT Austin, Fall 2025

Foundations of Chemistry CH302C (chemistry majors)

UT Austin, Spring 2026

Materials Chemistry CH390K (graduate) / CH367C (undergraduate)

UT Austin, Fall 2026

Mentorship

Postdocs: Dr. Hashini Munasinghe

Graduate Students: Jacob Baker, Ovie Soman, Shain Mollick, Ryan Storteboom, Nilarun Koley, Emily Burhans, Anda Wang, Kate Murphy, Dillon Mosman, Cory Silguero, Corey Walkinshaw, Simeng Zhang

Undergraduates: Deyu Li, Vasant Balamraju, Max Rubinstein, Tejachandana Meka, Joseph Antonetti, Quý Lê, Cathy Wang, Ava Armstrong, Natasha Pennington, Daniel Echevarria, Diego Montenegro, Adar Ambar, Nathan Gannon, Daysi Mandujano

Awards

2024 Affordable Education Champion, *UT Austin Libraries*

UT Austin, Fall 2024

Service and Outreach

Department Safety Committee Chair

Austin, TX 2025–

Ad-hoc Seminar Review Committee

Austin, TX 2024–

Semiconductor Science and Engineering Graduate Studies Committee

Austin, TX 2024–

Inorganic Graduate Admissions Reviewer	Austin, TX 2021–
Inorganic Chemistry Seminar Coordinator	UT Austin, 2022–2026
Department Safety Committee Member	Austin, TX 2022–2024
Peer review for NSF SBIR	2025
Faculty Judge for the 2024 ECS Texas Symposium	Austin, TX 2024
Peer review for U. S. Department of Energy BES Program	2023
Faculty Judge for the Fall Undergraduate Research Symposium (FURS)	Austin, TX 2023
ExxonMobil PALS workshop	Austin, TX 2023
Faculty host for CREATE summer research program with Austin Community College	Austin, TX 2023, 2024
Judge at the Austin Energy Science Fair	Austin, TX 2023, 2025
Interview with Longhorn Network on scientific glassblowing	UT Austin, 2023
Junior Faculty Search Committee	UT Austin, 2021–2022
Faculty Judge: CNS Undergraduate Poster Session	UT Austin, Spring 2023
Faculty Host for Welch Summer Scholars Program	UT Austin, Summer 2022
Interview with Texas Scientist on battery research	UT Austin, Fall 2021
Interview with SLAC News Center on the synthesis of layered heterostructures	15 September 2021
Peer review for American Chemical Society Petroleum Research Fund	2021, 2022
Peer review for academic journals (<i>J. Am. Chem. Soc.</i> ; <i>Angew. Chem.</i> ; <i>Chem. Sci.</i> ; <i>ACS Appl. Mater. Interfaces</i> ; <i>RSC Advances</i> ; <i>ChemPhysChem</i> ; <i>Phil. Trans. A</i>)	Recurring

Publications

24. “Reversible Electrochemical Sodiation of $\text{Cu}_3\text{C}_6\text{S}_6$ ” Soman, O.; ***Aubrey, M. L.** *Chem. Mater.* **2026**, *In Preparation*.
23. “Electrochemical Insertion of Sodium into Iron Tetrahydroxyquinone” Storteboom, R. S.; ***Aubrey, M. L.** *ACS Electrochemistry* **2026**, *In Preparation*.
22. “Reductive insertion of a trivalent metal leading to the isolation of Prussian blue-type $\text{Eu}^{\text{III}}\text{Fe}_3[\text{Fe}(\text{CN})_6]_3$ ” Mollick, S. S.; Sur, S.; Fritsky, J. W.; Koley, N.; Storteboom, R. S.; Khoury, J. F.; Snyder, B. E. R.; **Aubrey, M. L.** *ChemRxiv* **2026**, <https://doi.org/10.26434/chemrxiv.15009709/v2>.
21. “Reductive insertion of divalent cations into low-defect Berlin Green” Mollick, S. S.; Sur, S.; Carsch, K. M.; Snyder, B. E.; **Aubrey, M. L.** *J. Am. Chem. Soc.* **2026**, *In Preparation*.
20. “Distinct Single-Crystal Structures of Prussian Blue by X-ray and Electron Diffraction” Ruiz, G. N.; Vasylevskiy, S.; ***Aubrey, M. L.**; ***Rose, M. J.** *Chem. Mater.* **2026**, *In Review*.
19. “Enhancing Electronic Conductivity and Solvent Accessible Porosity via Oxidative Deinsertion in a Vanadium Catecholate Framework” Koley, N.; Walden, M. E.; Storteboom, R. S.; Mollick, S. S.; Li, D.; Celio, H.; Carsch, K. M.; ***Aubrey, M. L.** *Chem. Sci.* **2026**, <https://doi.org/10.1039/D6SC06052H>.
18. “Calcium pyrenide: a room-temperature reagent for stoichiometric calciations and reductive Ca^{2+} intercalation reactions” Wang, A.*; Storteboom, R. S.*; Mollick, S. S.; Vasylevskiy, S.; **Aubrey, M. L.** *J. Mater. Chem. A* **2026**, *14*, 29849–29856.
17. “Interactions at heterointerfaces influence actuation in wet cast 1T-MoS₂ and V₂O₅·0.5H₂O thin films” Baker, J. M.*; Murphy, K. P.*; **Aubrey, M. L.** *J. Mater. Chem. A* **2025**, *13*, 23613–23622.
16. “Electrochemical Deposition of Aluminum from Binary Phenolate-Based Electrolytes” Mosman, D.; Ambar, A.; Silguero, C.; Antonetti, J. M.; Vasylevskiy, S.; **Aubrey, M. L.** *ACS Electrochemistry* **2025**, *1*, 819–825.
15. “Zwitterions in 3D Perovskites: Organosulfide-Halide Perovskites” Li, J.; Chen, Z.; Saha, S.; Utterback, J. K.; **Aubrey, M. L.**; Yuan, R.; Weaver, H. L.; Ginsberg, N. S.; Chapman, K. W.; Filip, M. R.; Karunadasa, H. I. *J. Am. Chem. Soc.* **2022**, *144*, 22403–22408.
14. “From an antiferromagnetic insulator to a strongly correlated metal in square-lattice $\text{MCl}_2(\text{pyrazine})_2$ coordination solids” Perlepe, P.; Oyarzabal, I.; Voigt, L.; Kubus, M.; Woodruff, D. N.; Reyes-Lillo, S. E.; **Aubrey, M. L.**; Négrier, P.; Rouzières, M.; Wilhelm, F.; Rogalev, A.; Neaton, J. B.; Long, J. R.; Mathonière, C.; Vignolle, B.; Pedersen, K. S.; Clérac, R. *Nat. Commun.* **2022**, *13*, 5766.
13. “Directed assembly of layered perovskite heterostructures as single crystals” **Aubrey, M. L.***; Saldivar Valdes, A.*; Filip, M. R.; Connor, B. A.; Lindquist, K. P.; Neaton, J. B.; Karunadasa, H. I. *Nature* **2021**, *597*, 355–359.
12. “Dependence of linker length and composition on ionic conductivity and lithium deposition in single-ion conducting network polymers” **Aubrey, M. L.***; Axelson, J. C.*; Engler, K. E.; Long, J. R. *Macromolecules* **2021**, *54*, 7582–7589.
11. “Magnetic ordering through itinerant ferromagnetism in a metal–organic framework” Park, J. G.; Collins, B. A.; Darago, L. E.; Runčevski, T.; Ziebel, M. E.; **Aubrey, M. L.**; Jiang, H. Z. H.; Velasquez, E.; Green, M. A.; Goodpaster, J. D.; Long, J. R. *Nat. Chem.* **2021**, *13*, 594–598.
10. “Chemiresistive detection of gaseous hydrocarbons and interrogation of charge transport in $\text{Cu}[\text{Ni}(2,3\text{-pyrazinedithiolate})_2]$ by gas adsorption” **Aubrey, M. L.**; Kapelewski, M. T.; Melville, J. F.; Oktawiec, J.; Presti, D.; Gagliardi, L.; Long, J. R. *J. Am. Chem. Soc.* **2019**, *141*, 5005–5013.

9. "Charge Delocalization and Bulk Electronic Conductivity in the Mixed-Valence Metal–Organic Framework Fe(1,2,3-triazolate)₂(BF₄)_x." Park, J. G.; **Aubrey, M. L.**; Oktawiec, J.; Chakarawet, K.; Darago, L. E.; Grandjean, F.; Long, G. J.; Long, J. R. *J. Am. Chem. Soc.* **2018**, *140*, 8526–8534.
 8. "Formation of the layered conductive magnet CrCl₂(pyrazine)₂ through redox-active coordination chemistry" Pedersen, K. S.; Perlepe, P.; **Aubrey, M. L.**; Woodruff, D. N.; Reyes-Lillo, S. E.; Reinholdt, A.; Voigt, L.; Li, Z.; Borup, K.; Rouzières, M.; Samohvalov, D.; Wilhelm, F.; Rogalev, A.; Neaton, J. B.; Long, J. R.; Clérac, R. *Nat. Chem.* **2018**, *10*, 1056–1061.
 7. "Electron Delocalization and Charge Mobility as a Function of Reduction in a Metal–Organic Framework" **Aubrey, M. L.***; Wiers, B. M.*; Andrews, S. C.*; Sakurai, T.; Reyes-Lillo, S. E.; Hamed, S. M.; Yu, C.-J.; Darago, L. E.; Mason, J. A.; Baeg, J.-O.; Grandjean, F.; Long, G. J.; Seki, S.; Neaton, J. B.; Yang, P.; Long, J. R. *Nat. Mater.* **2018**, *17*, 625–632.
 6. "Electronic Conductivity, Ferrimagnetic Ordering, and Reductive Insertion Mediated by Organic Mixed-Valence in a Ferric Semiquinoid Metal–Organic Framework" Darago, L. E.; **Aubrey, M. L.**; Yu, C.-J.; Gonzalez, M. I.; Long, J. R. *J. Am. Chem. Soc.* **2015**, *137*, 15703–15711.
 5. "A Dual–Ion Battery Cathode via Oxidative Insertion of Anions in a Metal–Organic Framework" **Aubrey, M. L.**; Long, J. R. *J. Am. Chem. Soc.* **2015**, *137*, 13594–13602.
 4. "Tetraarylborate Polymer Networks as Single-Ion Conducting Solid Electrolytes" Van Humbeck, J. F.; **Aubrey, M. L.**; Alsaiee, A.; Ameloot, R.; Coates, G. W.; Dichtel, W. R.; Long, J. R. *Chem. Sci.* **2015**, *6*, 5499–5505.
 3. "Metal–Organic Frameworks as Solid Magnesium Electrolytes" **Aubrey, M. L.**; Ameloot, R.; Wiers, B. M.; Long, J. R. *Energy Environ. Sci.* **2014**, *7*, 667–671.
 2. "Ionic Conductivity in the Metal–Organic Framework UiO-66 by Dehydration and Insertion of Lithium *tert*-Butoxide" Ameloot, R.; **Aubrey, M. L.**; Wiers, B. M.; Gomora-Figueroa, A. P.; Patel, S. N.; Balsara, N. P.; Long, J. R. *Chem. Eur. J.* **2013**, *19*, 5533–5536.
 1. "Tristability in a Light Actuated Single-Molecule Magnet" Feng, X.; Mathonière, C.; Jeon, I.-R.; Rouzières, M.; Ozarowski, A.; **Aubrey, M. L.**; Gonzalez, M. I.; Clérac, R.; Long, J. R. *J. Am. Chem. Soc.* **2013**, *135*, 15880–15884.
-

Patents

2. "Directed Assembly of Layered Heterostructures as Single Crystals" Karunadasa, H. I.; Saldivar, A.; Aubrey, M. L. US Patent 12,655,538 B2 (**2026**); WO 2022/266238A1 (**2022**).
 1. "Batteries with Polymer Electrolyte Composites Based on Tetrahedral Arylborate Nodes" Aubrey, M. L.; Hellstrom, S.; Abram, D.; Long, J. R.; Harry, K.; Christensen, J. F.; Eitouni, H.; Axelson, J. **2019**, WO2019027977A2.
-

Presentations

"Accessing Metastable Porous Coordination Solids via Post-Synthetic Redox Insertion of Uncommon Ions" Aubrey, M. L. *MOF2026*, **18 May 2026**, New Orleans, LA, *Oral Presentation*.

"Electrodeposition of Aluminum from Phenoxide-Based Binary Electrolyte Solutions" Aubrey, M. L. *Electrochemical Interfaces Relevant to Energy and Environment Session at the 2024 Southwest Regional ACS Meeting*. **21 October 2024**, Waco, TX, *Invited Speaker*.

"Electrodeposition of Aluminum from Phenoxide-Based Binary Electrolytes" Aubrey, M. L. *University of Texas at Austin Center for Electrochemistry Seminar Series*. **6 September 2024**, Austin, TX, *Invited Speaker*.

"Electrochemistry at the Interfaces of Organic-Inorganic Materials" Aubrey, M. L. *Austin Community College CREATE Seminar Series* **26 March 2024**, Austin, TX, *Invited Speaker*.

"Synthetic Design of Interfacial Interactions in Redox-Active Layered Heterostructures Using Organic Templates" Aubrey, M. L. *Inorganic Chemistry Lectureship Seminar at the 264th Meeting of the American Chemical Society* **22 August 2022**, Chicago, IL, *Invited Speaker*.

"A Molecular Approach to Layered and 2D Materials" *Faculty Summer Research Seminar* Aubrey, M. L. **August 2021**, University of Texas at Austin, Austin, TX.

"Conductive Organic Inorganic Hybrid Materials" Aubrey, M. L. *Texas A&M University* (**25 November 2019**); *University of Delaware* (**2 December 2019**); *University of Texas at Austin* (**12 December 2019**)

"Redox Doping and Electron Hopping in Conductive Metal–Organic Frameworks" Aubrey, M. L. *258th Meeting of the American Chemical Society* **25 August 2019**, San Diego, CA, *Oral Presentation* (Session Moderator).

"Controlled Redox Insertion as a Synthetic Avenue to Conductive Metal–Organic Frameworks" Aubrey, M. L. *North American Solid-State Chemistry Conference* **1 August 2019**, Golden, CO, *Featured Speaker*.

"Interrogation of Charge Transport by Gas Adsorption in Metal–Organic Frameworks" **Aubrey, M. L.**, Long, J. R. *253rd Meeting of the American Chemical Society*, **6 April 2017**, San Francisco, CA, *Oral Presentation*.

"Charge Transport in Metal–Organic Frameworks" **Aubrey, M. L.**, Long, J. R. *Open Research Group Meeting*, **25 October 2016**, Berkeley, CA, *Oral Presentation*.

“Ion Insertion in Metal-Organic Frameworks” **Aubrey, M. L.**, Long, J. R. *Invited Seminar at Northwestern University, 6 May 2016*, Evanston, IL, *Oral Presentation*.

“Oxidative Insertion of Weakly Coordinating Anions in a Metal-Organic Framework” **Aubrey, M. L.**, Long, J. R. *251st Meeting of the American Chemical Society, 13 March 2016*, San Diego, CA, *Oral Presentation*.

“Oxidative Insertion of Weakly Coordinating Anions in a Metal-Organic Framework” **Aubrey, M. L.**, Long, J. R. *Gordon Research Conference on Nanoporous Materials & Their Applications, 9 and 12 August 2015*, Holderness, NH, *Poster Presentation*.

“Oxidative Insertion of Weakly Coordinating Anions in a Metal-Organic Framework” **Aubrey, M. L.**, Long, J. R. *Gordon Research Seminar on Nanoporous Materials & Their Applications 8 August 2015*, Holderness, NH, *Oral Presentation*.

Research Support

US Department of Energy Office of Energy Efficiency and Renewable Energy – Solar Energy Technology Office Postdoctoral Fellowship “Discovery of Non-toxic Halide Perovskite for High Efficiency Photovoltaic Devices” Salary and research stipend (\$5k/year) 2019–2021.