

# V. Sara Thoi, Ph.D.

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## Education

- **Ph.D. Chemistry**, Prof. Christopher J. Chang, *University of California, Berkeley, 2008-2013*  
“Earth-abundant Transition Metal Complexes for Catalytic Proton and Carbon Dioxide Reduction”
- **B.S. Chemistry**, *University of California, San Diego, 2004-2008*  
Cum Laude Honors, High Distinction Honors (Chemistry), Economics Minor

## Research Appointments

- **Assistant Professor**, *Dept. of Chemistry, Dept. Materials Science Engineering (secondary), Johns Hopkins University, 2015-present*  
Development of novel materials for charge transport and energy conversion and storage.
- **Co-Founder**, *Lithinity, LLC., Baltimore, Maryland, 2021-present*  
Commercialization of designer porous materials for energy storage and chemical separations
- **Postdoctoral Fellow**, *Depts. of Materials Science and Chemical Engineering, Prof. Sossina M. Haile, California Institute of Technology, 2013-2015*  
Intermediate temperature fuel cell technology mediated by microstructured catalysts and solid acid electrolyte (Dow-Bridge Program, ARPA-E REBELS).

## Awards/Honors

- **2022 WCC Rising Star**, Women Chemists Committee of the American Chemical Society, September 2022
- **Camille Dreyfus Teacher-Scholar Award**, Dreyfus Foundation, May 2022
- **Catalyst Award**, Johns Hopkins University, September 2022
- **Early Career Award**, Department of Energy, August 2021
- **CAREER Award**, National Science Foundation, January 2020
- **Scialog Fellow, Advanced Energy Storage**, Research Corporation for Science Advancement, 2017
- **Woman In Engineering Award**, University of New South Wales, Sydney, Australia, 2019
- **Young Investigator Award**, ACS Division of Inorganic Chemistry, 2014
- **National Science Foundation Graduate Research Fellowship**, 2009-2012
- **Mayer Award for Excellence in Undergraduate Research**, Dept. of Chemistry, UC San Diego, 2008
- **Amgen Scholar**, UCLA, 2007
- **Regent's Scholar**, UC San Diego, 2004-2008
- **Provost's Honors**, UC San Diego, 2004-2008
- **Robert C. Byrd Honors Scholar**, 2004-2008

## Current and Past Research Support

- **Department of Energy**, “Designing Molecular Interactions at the Electrode-Electrolyte Interface in Nitrogen Reduction,” sole PI, \$750,000, Aug 2020-Aug 2025
- **National Science Foundation**, “CAREER: Probing Polysulfide Redox Chemistry in Tunable Metal-Organic Frameworks for Energy Storage,” sole PI, \$748,596, Jan 2020-Dec 2024
- **National Science Foundation**, “New Nonheme Iron Complexes for NO<sub>x</sub> Reduction, Mechanism, and Catalysis,” co-PI, \$309,999.50 (Thoi), Sept 2020-Aug 2023
- **Ralph S. O'Connor Sustainable Energy Institute**, Johns Hopkins University, “Light-Integrated Technology and Energy Storage (LITES),” co-PI, \$1,047,297, Jan 2022-Dec 2024

- **Camille Dreyfus Teacher-Scholar Award**, Dreyfus Foundation, “Molecular Approaches to Materials Design in Energy Conversion and Storage,” sole PI, \$100,000, Sept 2022- Sept 2027.
- **Maryland Energy Innovation Institute Seed Grant**, Maryland Energy Innovation Institute, “SulAnchor Cathodes for Solid-State Lithium Sulfur Batteries,” PI, \$100,000, March 2023-March 2024
- **Discovery Award**, Johns Hopkins University, “Photoelectrochemical Carbon Capture: Using Sunlight to Clean the Air,” co-PI, \$150,000, Sept 2023- Mar 2025
- **Catalyst Award**, Johns Hopkins University, “Creating an Artificial Protection Barrier for Safe Lithium Metal Batteries,” sole PI, \$125,000, Jan 2023- Jun 2023
- **Discovery Award**, Johns Hopkins University, “Developing Adsorptive Coatings and Regenerative Technologies for Simultaneous Atmospheric CO<sub>2</sub> And Wind Power Harvesting” PI, \$150,000, Sept 2022- Mar 2024
- **MEI<sup>2</sup> Seed Funding**, Maryland Energy Innovation Initiative, “SulAnchor Cathodes for Solid-State Lithium Sulfur Batteries”, sole PI, \$100,000, May 2023-May 2024
- **Discovery Award**, Johns Hopkins University, “Photoelectrochemical Carbon Capture: Using Sunlight to Clean the Air,” co-PI, \$50,000 (Thoi), July 2023-December 2024
- **National Science Foundation**, “Acquisition of a 500 MHz Nuclear Magnetic Resonance (NMR) Spectrometer and Equipped with Solid-State Probes,” co-PI, \$560,000, Aug 2020
- **Maryland Technology Development Corporation**, “SulfurAnchor Cathodes for Enhancing Cyclability of Li-S Batteries,” sole PI, \$115,000, Jun 2019-Jun 2020
- **Cohen Translational Engineering Fund**, Whiting School of Engineering, Johns Hopkins University, “SulfurAnchor Cathodes for High Charge/Discharge Li-S Batteries,” sole PI, \$100,000, Mar 2019 - Dec 2020
- **Space@Hopkins Seed Grant**, Johns Hopkins University, “Developing Metal-Organic Porous Materials Towards Lithium Sulfur Batteries for Space Applications,” sole PI, \$25,000, Aug 2020 - Aug 2021
- **Discovery Award**, Johns Hopkins University, “Atomic Precision of Porous/Non-Porous Interfaces for Energy Conversion and Storage,” co-PI, \$25,416 (Thoi), Sept 2019-Sept 2020

## Publications (‡joint first-author, undergraduate authors, \*corresponding)

### Independent Career

- 41) Singh, K. K., ‡ Gerke, C. S., ‡ Saund, S. S., Zito, A. M., Siegler, M. A., **Thoi, V. S.**\* CO<sub>2</sub> Activation with Manganese Tricarbonyl Complexes via an H-Atom Responsive Benzimidazole Ligand, *Chem. Eur. J.*, **2023**, *in press*. Invited to a special issue on “Manganese Homogeneous Catalysis.” DOI: [10.1002/chem.202300796](https://doi.org/10.1002/chem.202300796)
- 40) Davis, J., Banerjee, S., Beccar-Varela, P., Thoi, V. S., Drichko, N.\* Raman Scattering Spectra of Boron Imidazolate Frameworks Containing Paramagnetic Ions, *J. Chem. Phys.*, **2023**, *158*, 214707. DOI: [10.1063/5.0152070](https://doi.org/10.1063/5.0152070)
- 39) Liu, B., Baumann, A. E., Butala, M. M., **Thoi, V. S.**\* Phosphate-Functionalized Zirconium Metal-Organic Frameworks for High Performance Lithium-Sulfur Batteries, *Chem. Eur. J.*, **2023**, *in press*. DOI: [10.1002/chem.202300821](https://doi.org/10.1002/chem.202300821)
- 38) Banerjee, S., Han, X., Siegler, M. A., Miller, E. M., Bedford, N. M., Bukowski, B. C., **Thoi, V. S.**\* A Flexible 2D Boron Imidazolate Framework for Polysulfide Adsorption in Lithium-Sulfur Batteries, *Chem. Mater.*, **2022**, *34*, 10451–10458. DOI: [10.1021/acs.chemmater.2c02324](https://doi.org/10.1021/acs.chemmater.2c02324)
- 37) Baumann, A. E., ‡ Anayah, R. I., ‡ **Thoi, V. S.**\* Phosphorus-Functionalized Organic Linkers Promote Polysulfide Retention in MOF-Based Li-S Batteries, *ACS Appl. Energy Mater.*, **2022**, *5*, 15302–15309. DOI: [10.1021/acsaem.2c02925](https://doi.org/10.1021/acsaem.2c02925)
- 36) Banerjee, S., Gorham, J., Beccar-Varela, P., Hackbarth, H. G., Siegler, M. A., Drichko, N., Wright, J., Bedford, N. M.,\* **Thoi, V. S.**\* Atomically Dispersed CuN<sub>x</sub> Sites from Thermal Activation of Boron Imidazolate Frameworks for Electrocatalytic Methane Generation, *ACS Appl. Energy*

- Mater*, **2022**, in press. Invited Article to the special issue “Metal-organic Frameworks for Energy Storage Applications.” DOI: [10.1021/acsaem.2c01174](https://doi.org/10.1021/acsaem.2c01174)
- 35) Liu, B., **Thoi, V. S.**\* Tailored Porous Framework Materials for Elucidating Lithium-Sulfur Battery Chemistry, *Chem. Comm.*, **2022**, 58, 4005-4025. Invited Feature Article. DOI: [10.1039/D1CC07087H](https://doi.org/10.1039/D1CC07087H)
  - 34) Banerjee, S.,<sup>‡</sup> Gerke, C. S.,<sup>‡</sup> **Thoi, V. S.**\* Guiding CO<sub>2</sub>RR Selectivity by Compositional Tuning in the Electrochemical Double Layer, *Acc. Chem. Res.*, **2022**, 55, 504-515. **Invited contribution.** DOI: [10.1021/acs.accounts.1c00680](https://doi.org/10.1021/acs.accounts.1c00680)
  - 33) Burns, D. A.,<sup>‡</sup> Baumann, A. E.,<sup>‡</sup> Diaz, J. C., **Thoi, V. S.**\* Chemical Sulfide Tethering Improves Low-Temperature Li-S Battery Cycling, *ACS Appl. Mater. Interfaces*, **2021**, 13, 50862-50868. DOI: [10.1021/acsaami.1c12129](https://doi.org/10.1021/acsaami.1c12129)
  - 32) Saund, S. S., Siegler, M. A., **Thoi, V. S.**\* Electrochemical degradation of dicationic Re complex via Hoffman-type Elimination, *Inorg. Chem.*, **2021**, 60, 13011-13020. DOI: [10.1021/acs.inorgchem.1c01427](https://doi.org/10.1021/acs.inorgchem.1c01427)
  - 31) **Thoi, V. S.**,\* Yang, J. Y.\* Heterogeneous Interfaces through the Lens of Inorganic Chemistry *Inorg. Chem.*, **2021**, 60, 6853-6854. Guest Editor. DOI: [10.1021/acs.inorgchem.1c01272](https://doi.org/10.1021/acs.inorgchem.1c01272)
  - 30) Burns, D. A., Benavidez, A., Buckner, J., **Thoi, V. S.**\* Maleimide-Functionalized Metal-Organic Framework for Polysulfide Tethering in Lithium-Sulfur Batteries, *Mater. Adv.*, **2021**, 2, 2966-2970. DOI: [10.1039/D1MA00084E](https://doi.org/10.1039/D1MA00084E)
  - 29) Banerjee, S.,<sup>‡</sup> Anayah, R. I.,<sup>‡</sup> Gerke, C. S., **Thoi, V. S.**\* From Molecules to Porous Materials: Integrating Discrete Electrocatalytic Active Sites into Extended Frameworks, *ACS Cent. Sci.*, **2020**, 6, 1671-1684. **Invited contribution.** DOI: [10.1021/acscentsci.0c01088](https://doi.org/10.1021/acscentsci.0c01088)
  - 28) Han, X., **Thoi, V. S.**\* Non-Innocent Role of Porous Carbon Towards Enhancing C<sub>2-3</sub> Products in Electroreduction of Carbon Dioxide, *ACS Appl. Mater. Interfaces*, **2020**, 12, 45929-45935. DOI: [10.1021/acsaami.0c10591](https://doi.org/10.1021/acsaami.0c10591)
  - 27) Han, X.,<sup>‡</sup> Gerke, C. S.,<sup>‡</sup> Banerjee, S., Zubair, M., Jiang, J., Bedford, N. M., Miller, E. M., **Thoi, V. S.**\* Strategic design of MoO<sub>2</sub> nanoparticles supported by carbon nanowires for enhanced electrocatalytic nitrogen reduction, *ACS Energy Lett.*, **2020**, 5, 3237-3243. DOI: [10.1021/acscenergylett.0c01857](https://doi.org/10.1021/acscenergylett.0c01857)
  - 26) Liu, B., **Thoi, V. S.**\* Improving Charge Transfer in Metal-Organic Frameworks through Open Site Functionalization and Porosity Selection for Li-S Batteries, *Chem. Mater.*, **2020**, 32, 8450-8459. DOI: [10.1021/acs.chemmater.0c02438](https://doi.org/10.1021/acs.chemmater.0c02438)
  - 25) Banerjee, S., Zhang, Z-Q., Hall, A. S., **Thoi, V. S.**\* Surfactant Perturbation of Cation Interactions at the Electrode-Electrolyte Interface in Carbon Dioxide Reduction, *ACS Catal.*, **2020**, 10, 9907-9914. DOI: [10.1021/acscatal.0c02387](https://doi.org/10.1021/acscatal.0c02387)
  - 24) Baumann, A. E.,<sup>‡</sup> Downing, J. R.,<sup>‡</sup> Burns, D. A., Hersam, M. C.,\* **Thoi, V. S.**\* Graphene-MOF Composite Sulfur Electrodes for Li-S Batteries with High Volumetric Capacity, *ACS Appl. Mater. Interfaces*, **2020**, 12, 37173-37181. DOI: [10.1021/acsaami.0c09622](https://doi.org/10.1021/acsaami.0c09622)
  - 23) Zhang, Z-Q, Banerjee, S., **Thoi, V. S.**, Hall, A. S.\* Cationic Surfactant Adsorption Enhances CO<sub>2</sub> Reduction Electrocatalysis by Disrupting the Hydrogen Bonding Structure of Water, *J. Phys. Chem. Lett.*, **2020**, 11, 5457-5463. DOI: [10.1021/acs.jpcclett.0c01334](https://doi.org/10.1021/acs.jpcclett.0c01334)
  - 22) Sarkar, S., Maitra, A., Banerjee, S., **Thoi, V. S.**, Dawlaty, J. M.\* Electric Fields at Metal-Surfactant Interfaces: A Combined Vibrational Spectroscopy and Capacitance Study, *J. Phys. Chem. B*, **2020**, 124, 1311-1321. DOI: [10.1021/acs.jpccb.0c00560](https://doi.org/10.1021/acs.jpccb.0c00560)
  - 21) Sagar, K. S., Siegler, M. A., **Thoi, V. S.**\* Unusual Reactivity of Thiazole-based Mn Tricarbonyl Complex towards Electrocatalytic CO<sub>2</sub> Reduction, *Organometallics*, **2020**, 39, 988-994. **Invited Special Issue on “Organometallic Chemistry at Various Length Scales.”** DOI: [10.1021/acs.organomet.9b00727](https://doi.org/10.1021/acs.organomet.9b00727)

- 20) Burns, D. A., Press, E. M., Siegler, M. A., Klausen, R. E., **Thoi, V. S.\*** 2D Copper-based Oligosilyl Metal-Organic Frameworks as Multi-State Switchable Materials. *Angew. Chem. Int. Ed.*, **2020**, *59*, 763-768. **Editor's pick for "Hot Paper."** DOI: [10.1002/anie.201912911](https://doi.org/10.1002/anie.201912911)
- 19) Baumann, A. E., Han, X., Butala, M. M., **Thoi, V. S.\*** Lithium Thiophosphate Functionalized Zirconium MOFs for Li-S Batteries with Enhanced Rate Capabilities, *J. Am. Chem. Soc.* **2019**, *141*, 17891-17899. DOI: [10.1021/jacs.9b09538](https://doi.org/10.1021/jacs.9b09538)
- 18) **Thoi, V. S.\***, Yang, J. Y. Y.\* Molecular Insights into Heterogeneous Processes in Energy Storage and Conversion, *ACS Energy Letter*, 2019, *4*, 2201-2204. **Invited Energy Focus Article.** DOI: [10.1021/acsenergylett.9b01701](https://doi.org/10.1021/acsenergylett.9b01701)
- 17) Liu, B., Baumann, A. E., **Thoi, V. S.\*** Modulating Charge Transport in MOFs with Zirconium Oxide Nodes and Redox-Active Linkers for Lithium Sulfur Batteries. *Polyhedron*, **2019**, *170*, 788-795. **Invited Special Issue on "Women with MOxy: Metal Oxide Chemistry from Female Investigators."** DOI: [10.1016/j.poly.2019.06.044](https://doi.org/10.1016/j.poly.2019.06.044)
- 16) Baumann, A. E.,<sup>‡</sup> Burns, D. A.,<sup>‡</sup> Liu, B., **Thoi, V. S.\*** Metal-organic framework functionalization and design strategies for advanced electrochemical energy storage devices. *Commun. Chem.*, **2019**, *2*, 86. **Invited contribution**, also included as a most downloaded review article in a special collection commemorating the 5<sup>th</sup> anniversary of *Communications Chemistry*. DOI: [10.1038/s42004-019-0184-6](https://doi.org/10.1038/s42004-019-0184-6)
- 15) Banerjee, S., Han, X., **Thoi, V.S.\*** Modulating the Electrode-Electrolyte Interface with Cationic Surfactants in Carbon Dioxide Reduction. *ACS Catal.*, **2019**, *9*, 5631-5637. DOI: [10.1021/acscatal.9b00449](https://doi.org/10.1021/acscatal.9b00449)
- 14) Saund, S. S., Goldschmid, S. L., Ng, K., Stewart, V. J., Siegler, M. A., **Thoi, V. S.\*** Exploring Ligand Non-Innocence of Coordinatively-Versatile Diamidodipyrinato Cobalt Complexes. *Chem. Commun.*, **2019**, *55*, 1825-1828. DOI: [10.1039/C8CC08674E](https://doi.org/10.1039/C8CC08674E)
- 13) Baumann, A. E., Burns, D. A., Diaz, J. C., **Thoi, V. S.\*** Lithiated Defect Sites in Zr Metal-Organic Framework for Enhanced Sulfur Utilization in Li-S Batteries. *ACS Appl. Mater. Interfaces*, **2019**, *1*, 2159-2167. DOI: [10.1021/acsaami.8b19034](https://doi.org/10.1021/acsaami.8b19034)
- 12) Han, X., Wang, M., Le, M. L., Bedford, N., Woehl, T., **Thoi, V. S.\*** Effects of Substrate Porosity in Carbon Aerogel Supported Copper for Electrocatalytic Carbon Dioxide Reduction. *Electrochim. Acta*, **2019**, *297*, 545-552. DOI: [10.1016/j.electacta.2018.11.203](https://doi.org/10.1016/j.electacta.2018.11.203)
- 11) Baumann, A. E., Aversa, G. E., Roy, A., Bedford, N., Falk, M., **Thoi, V. S.\*** Promoting Sulfur Adsorption using Surface Cu Sites in Metal Organic Frameworks for Lithium Sulfur Batteries. *J. Mat. Chem. A*, **2018**, *6*, 4811-4821. DOI: [10.1039/C8TA01057A](https://doi.org/10.1039/C8TA01057A)

#### Prior to Independent Career

- 10) **Thoi, V. S.**, Usiskin, R. E., Haile, S. M. Platinum-decorated Carbon Nanotubes for Hydrogen Oxidation and Proton Reduction in Solid Acid Electrochemical Cells. *Chem. Sci.*, **2015**, *6*, 1570-1577. DOI: [10.1039/C4SC03003F](https://doi.org/10.1039/C4SC03003F)
- 9) Khnayzer, R. S.,<sup>‡</sup> **Thoi, V. S.**,<sup>‡</sup> Nippe, M., King, A. E., Jurss, J. W., El Roz, K. A., Long, J. R., Chang, C. J., Castellano, F. N. Towards a Comprehensive Understanding of Visible-Light Photogeneration of Hydrogen from Water Using Cobalt(II) Polypyridyl Catalysts. *Energy Environ. Sci.*, **2014**, *7*, 1477-1488. DOI: [10.1039/C3EE43982H](https://doi.org/10.1039/C3EE43982H)
- 8) **Thoi, V. S.**,<sup>‡</sup> Kornienko, N.,<sup>‡</sup> Margarit, C. G., Yang, P., Chang, C. J. Visible-Light Photoredox Catalysis: Selective Reduction of Carbon Dioxide to Carbon Monoxide by a Nickel N-Heterocyclic Carbene-Isoquinoline Complex. *J. Am. Chem. Soc.*, **2013**, *135*, 14413-14424. DOI: [10.1021/ja4074003](https://doi.org/10.1021/ja4074003)
- 7) **Thoi, V. S.**, Sun, Y., Long, J. R., Chang, C. J. Complexes of Earth-abundant Metals for Catalytic Electrochemical Hydrogen Generation under Aqueous Conditions. *Chem. Soc. Rev.*, **2013**, *42*, 2388-2400. DOI: [10.1039/C2CS35272A](https://doi.org/10.1039/C2CS35272A)

- 6) **Thoi, V. S.**, Karunadasa, H. I., Surendranath, Y., Long, J. R. , Chang, C. J. Electrochemical Generation of Hydrogen from Acetic Acid using a Molecular Molybdenum-oxo Catalyst. *Energy Environ. Sci.*, **2012**, *5*, 7762-7770. DOI: [10.1039/C2EE21519E](https://doi.org/10.1039/C2EE21519E)
- 5) Sundstrom, E. J., Yang, X, **Thoi, V. S.**, Karunadasa, H. I., Chang, C. J., Long, J. R., Head-Gordon, M. Computational and Experimental Study of the Mechanism of Hydrogen Generation from Water by a Molecular Molybdenum-oxo Electrocatalyst. *J. Am. Chem. Soc.*, **2012**, *134*, 5233–5242. DOI: [10.1021/ja210949r](https://doi.org/10.1021/ja210949r)
- 4) **Thoi, V. S.**, Chang, C. J. Nickel *N*-heterocyclic Carbene-pyridine Complexes that Exhibit Selectivity for Electrocatalytic Reduction of Carbon Dioxide over Water. *Chem. Comm.*, **2011**, *47*, 6578-6580. DOI: [10.1039/C1CC10449G](https://doi.org/10.1039/C1CC10449G)
- 3) **Thoi, V. S.**, Stork, J. R., Niles, E. T., Depperman, E. C., Tierney, D. L, Cohen, S. M. Diamidodipyrins: Versatile Bipyrrolic Ligands with Multiple Binding Modes. *Inorg. Chem.*, **2008**, *47*, 10533-10541. DOI: [10.1021/ic8011876](https://doi.org/10.1021/ic8011876)
- 2) Stork, J. R, **Thoi, V. S.**, Cohen, S. M. Rare Examples of Transition Metal–main Group Metal Heterometallic Metal-organic Frameworks from Gallium and Indium Dipyrinato Complexes and Silver Salts: Synthesis and Framework Variability. *Inorg. Chem.*, **2007**, *46*, 11213-11223. DOI: [10.1021/ic7016159](https://doi.org/10.1021/ic7016159)
- 1) **Thoi, V. S.**, Stork, J. R., Magde, D., Cohen, S. M. Luminescent Dipyrinato Complexes of Trivalent Group 13 Metal Ions. *Inorg. Chem.* **2006**, *45*, 10688-10697. DOI: [10.1021/ic061581h](https://doi.org/10.1021/ic061581h)

## Patent Applications

- 1) Baumann, A. E., **Thoi, V. S.** Lithium-sulfur and sodium-sulfur battery cathodes. PCT Application filed April, 30, 2019. (*Office action*)
- 2) Baumann, A. E., Burns, D. A., **Thoi, V. S.** Organic Linker Functionalization for Improved Performance in Lithium Sulfur Batteries. PCT Application filed June 10, 2021. (*Office action*)
- 3) Baumann, A. E., Downing, J., Hersam, M. C., **Thoi, V. S.** Graphene-MOF Composite Sulfur Electrodes for Li-S Batteries with High Volumetric Capacity. PCT Application filed July 22, 2021. (*Office action*)

## Invited Presentations

- 75) **Telluride Science Research Center Workshop**, Telluride, CO, July 17-21, 2023, “Solar Solutions to Energy and Environmental Problems” Workshop. *Organized by Profs. Yogesh Surendranath (MIT), Matthew Sheldon (Texas A&M), and Sara Thoi (Johns Hopkins University)*
- 74) **ACS 2023 Spring National Meeting**, Indianapolis, IN, March 26-30, 2023, “Theoretical and Experimental Approaches to Catalyst Development.” *Organized by Prof. Robert Neilson (UC Irvine), Dr. Ba Tran (PNNL) and Dr. Samantha Johnson (PNNL)*
- 73) **ACS 2023 Spring National Meeting**, Indianapolis, IN, March 26-30, 2023, Invited talk for “Surface Science” by the COLL division. *Organized by Profs. Lorena Tribe (Penn State Berk), Andrew Teplyakov (University of Delaware), Shelley Claridge (Purdue University), and Xuemei Zhou (Sichuan University)*
- 72) **ACS 2023 Spring National Meeting**, Indianapolis, IN, March 26-30, 2023, “WCC Awards Symposium.”
- 71) **Boston College**, Department of Chemistry, Newton, MA. March 16, 2022. *Invited by Prof. Matthias Waegle.*
- 69) **University of California, Los Angeles**, Department of Chemistry, Los Angeles, CA. October 12, 2022. *Invited by Prof. Chong Liu.*
- 70) **University of Southern California**, Department of Chemistry, Los Angeles, CA. October 11, 2022. *Invited by Prof. Smaranda Marinescu.*



- 68) **Telluride Science Research Center Workshop**, Telluride, CO, September 25-30, 2022  
“Molecular Chemistry in Electrochemical Energy Storage” Workshop. *Organized by Profs. Tianbiao Liu, Utah State, Guihua Yu, UT Austin, and Kimberly See, Caltech.*
- 67) **Electrochemistry Gordon Research Conference**, Ventura, CA, September 11-16, 2022,  
“Hydrogen-Materials Interactions: Activation, Storage, and Utilization from Molecules to Bulk.”  
*Invited by Prof. Stephen Maldonado (University of Michigan).*
- 66) **ACS 2022 Fall National Meeting**, Chicago, IL, August 21-25, 2022, “Emerging Areas in Inorganic Chemistry” Symposium. *Organized by Profs. Charles Machan, University of Virginia, and Kate Waldie, Rutgers University.*
- 65) **Catalysis Gordon Research Conference**, Ventura, CA, June 19 – 24, 2022, “Advancing Sustainable Technologies Through Catalysis.” *Invited by Prof. Susannah Scott (University of California, Santa Barbara).*
- 64) **University of California, San Diego**, Department of Chemistry, La Jolla, CA. June 10-11, 2022.  
*Invited by Prof. Michael Sailor and Seth Cohen, UC San Diego Materials Research Science and Engineering Center (UCSD MRSEC)*
- 63) **Boston University Virtual Workshop** on “The Future of Electrochemical Systems - New Architectures and Functional Materials,” February 25, 2022. *Invited by Profs. Emily Ryan, Srikanth Gopalan, Sahar Sharifzadeh, and Joerg Werner (Boston University).*
- 62) **University of California, Berkeley**, Department of Chemistry, Berkeley, CA. February 11, 2022.  
*Invited by Prof. Christopher Chang.*
- 61) **Stanford University**, Department of Chemistry, Stanford, CA. February 10, 2022. *Invited by Prof. Hemamala Karundasa.*
- 60) **PacifiChem 2021**, Honolulu, Hawaii, December 20 – December 21, 2021, “Hydrogen-Materials Interactions: Activation, Storage, and Utilization from Molecules to Bulk.” *Invited by Prof. Connie Lu (University of Minnesota, Twin Cities) and Dr. Takanori Shima (RIKEN, Japan).*
- 59) **2021 MRS Fall Meeting & Exhibit**, Boston, Massachusetts, November 28 – December 3, 2021.  
“Solid-State Chemistry of New Materials.” *Invited by Dr. Craig Brown (National Institute of Standards and Technology) and Profs. Amparo Fuertes (Institut de Ciència de Materials de Barcelona), Hiroshi Kageyama (Kyoto University), and Brent Melot (University of Southern California).*
- 58) **University of Rochester**, Department of Chemistry, Rochester, NY, October 4, 2021. *Invited by Prof. William Jones.*
- 57) **ACS Division of Inorganic Chemistry Online Symposium Series**, Sustainable Energy and Environment Subdivision, September 15, 2021, *Invited by Profs. Natalia Shustova (University of South Carolina) and Jenny Yang (University of California, Irvine).*
- 56) **University of Illinois, Urbana Champagne**, Department of Chemistry, September 13, 2021  
*Invited by Profs. Andrew Gewirth and Jefferson Chan.*
- 55) **International Conference on Lithium Sulfur Batteries** (Virtual), Dresden, Germany, June 28 – July 1, 2021, keynote speaker. *Organized and invited by Prof. Stefan Kaskel (Fraunhofer-Institut für Werkstoff- und Strahltechnik IWS, Technische Universität Dresden).*
- 54) **Telluride Science Research Center Workshop**, Telluride, CO, June 22-26, 2021 (virtual),  
“Exploring Nitrogen Fixation” Workshop. *Organized by Drs. Elisa Miller and Kate Brown, National Renewable Energy Laboratory.*
- 53) **49<sup>th</sup> ACS MARM**, University of Delaware, June 9-11, 2021, “Porous Materials.” *Organized by Prof. Erich Bloch, University of Delaware.*
- 52) **49<sup>th</sup> ACS MARM**, University of Delaware, June 9-11, 2021, “Inorganic and Organometallic Young Investigator Symposium.” *Organized by Dr. Wesley S. Farrell, U. S. Naval Academy.*
- 51) **North Park University**, Department of Chemistry, Elk Grove Village, IL, April 23, 2020. *Invited by Professor John Randazzo.*

- 50) **University of North Carolina, Chapel Hill**, Department of Chemistry, Chapel Hill, NC, April 6, 2021. *Invited by Profs. Gerald Meyer and Jillian Dempsey.*
- 49) **University of Utah**, Department of Chemistry, Columbus, OH, March 23, 2021. *Invited by Prof. Caroline Saouma.*
- 48) **North Carolina State University**, Department of Chemistry, Raleigh, NC, February 25, 2021. *Invited by Prof. Felix Castellano.*
- 47) **Applied Physics Laboratory**, “Power on the Move,” Laurel, Maryland, February 9, 2021. *Invited by Dr. Jeff Maranchi, APL Materials Science.*
- 46) **Ohio State University**, Department of Chemistry, Columbus, OH, January 27, 2021. *Invited by Prof. Casey Wade.*
- 45) **Colorado State University**, Department of Chemistry, Fort Collins, CO, January 19, 2021. *Invited by Chemistry Graduate Student Organization (student invite).*
- 44) **Yale University**, Department of Chemistry, New Haven, MA, November 16-17, 2020. *Invited by Professor James Mayer and Hailiang Wang.*
- 43) **Cornell University**, Department of Chemistry, Ithaca, NY, November 5, 2020. *Invited by Professor Phillip Milner*
- 42) **Reed College**, Department of Chemistry, Portland, OR, October 22, 2020. *Invited by Professor Miriam Bowring.*
- 41) **Main Group Symposium**, August 27-28, 2020. *Organized by Prof. Alexander Spokoyny, UCLA.*
- 40) **103<sup>rd</sup> Canadian Chemistry Conference and Exhibition**, Winnipeg, Canada, May 24-28, 2020, “From Coordination Polymers to Metal-Organic Frameworks: The Chemistry and Application of Scaffolding Materials.” *Invited by Profs. Michael Katz, Memorial University of Newfoundland, and Ashlee Howarth, Concordia University.* Rescheduled to August 16-20, 2021 due to COVID-19.
- 39) **University of California, Riverside**, Department of Chemistry, Riverside, CA, May 8, 2020. *Invited by Prof. Pingyun Feng.* Rescheduled to April 30, 2021 due to COVID-19.
- 38) **University of California, Irvine**, Department of Chemistry, Riverside, CA, May 7, 2020. *Invited by Profs. Andy Borovick and Jenny Yang.* Rescheduled to April 29, 2021 due to COVID-19.
- 37) **OneChemistry Symposium on “Energy Materials at Scales,”** Johns Hopkins University, Baltimore, MD, April 21, 2020. *Invited by Profs. Rebekka Klausen and Rigoberto Hernandez.* Rescheduled to April 20-21, 2021 due to COVID-19.
- 36) **University of Maryland**, Department of Chemistry, College Park, Maryland, April 9, 2020. *Invited by Alliance for Diversity in Science and Engineering (UMD chapter, student invite).* Rescheduled to December 3, 2020 due to COVID-19.
- 35) **259<sup>th</sup> ACS National Meeting**, Philadelphia, PA, March 22-26, 2020, “Contributions of Synthetic Chemistry to Energy Storage” Symposium. *Organized by Profs. Shiyu Zhang and Cristo Sevov, Ohio State University.* Rescheduled due to COVID-19.
- 34) **University of Michigan**, Department of Chemistry, Ann Arbor, MI, March 11, 2020. *Invited by Prof. Stephen Maldonado.* Rescheduled due to COVID-19.
- 33) **Michigan State University**, Department of Chemistry, East Lansing, MI, March 9, 2020. *Invited by Prof. Selvan Demir.*
- 32) **Pittcon 2020**, Chicago, IL, March 1-5, 2020, “Molecules and Materials for Solar Fuels” Symposium. *Organized by Prof. Charles Machan, University of Virginia.*
- 31) **Colorado School of Mines**, Department of Chemistry, Golden, CO, February 21, 2020. *Invited by Profs. Brian Trewyn and Thomas Gennett.*
- 30) **Albright University** Department of Chemistry, Reading, PA, February 7, 2020. *Invited by Prof. Nicholas Piro.*
- 29) **Electrochemistry Gordon Research Conference**, University of New England, Biddeford, ME, January 9, 2020, “Modulating the Electrode-Electrolyte Interfaces through Charged Assemblies.” *Organized by Prof. Janine Mauzeroll, McGill University, and Prof. Stephen Maldonado, University of Michigan.*

- 28) **Nature Conference on “Physical Properties of Metal–Organic Frameworks”**, Nankai University, Tianjin, China, November 19-21, 2019. *Organized and invited by Nature Publishing.*
- 27) **University of Memphis**, Department of Chemistry, Memphis, TN, October 18, 2019. *Invited by Prof. Xuan Zhao.*
- 26) **University of Mississippi**, Department of Chemistry, Oxford, MS, October 17, 2019. *Invited by Prof. Jonah Jurss.*
- 25) **University of Sydney**, Sydney, Australia, Department of Chemistry, September 25, 2019. *Invited by Prof. Elizabeth New.*
- 24) **University of New South Wales**, Sydney, Australia, Faculty of Engineering, September 24, 2019. *Invited by Prof. Nicholas Bedford.*
- 23) **258<sup>th</sup> ACS National Meeting**, San Diego, CA, August 24-29, 2019, “Charge & Substrate Transport in 3D Electrocatalytic Materials” Symposium. *Organized by Profs. Charles McCrory, University of Michigan, Shoji Hall, Johns Hopkins University, and V. Sara Thoi, Johns Hopkins University.*
- 22) **258<sup>th</sup> ACS National Meeting**, San Diego, CA, August 24-29, 2019, “Identification & Design of Catalytic Sites in Electrochemical Reactions” Symposium. *Organized by Profs. Hailiang Wang, Yale University, and Chong Liu, UCLA.*
- 21) **North American Solid State Chemistry Conference**, Golden, CO, July 31-Aug 2, 2019, “Framework Materials for Energy Storage and Conversion.” *Organized by Profs. Eric Toberer, Colorado School of Mines.*
- 20) **National Renewal Energy Laboratory**, Golden, CO, July 30, 2019, “Porous and Molecular Frameworks to Elucidate Chemical Processes in Catalysis and Energy Storage Devices.” *Invited by Dr. Elisa Miller Link.*
- 19) **Telluride Science Research Center Workshop**, Telluride, CO, July 8-12, 2019, “Solar Solutions to Energy and Environmental Problems” Workshop. *Organized by Profs. Yogesh Surendranath, MIT, and Gordana Dukovic, University of Colorado, Boulder.*
- 18) **U.S. Army Combat Capabilities Development Command (CCDC)**, Aberdeen Proving Ground, MD, May 7, 2019, “Porous and Molecular Frameworks to Elucidate Chemical Processes in Catalysis and Energy Storage Devices.” *Invited by Dr. Jared Decoste.*
- 17) **258<sup>th</sup> ACS National Meeting**, Orlando, FL, March 30 – April 4, 2019, “Through the Lens of Inorganic Chemistry: Understanding Heterogeneous Processes in Energy Conversion and Storage” Symposium. *Organized by Profs. Jenny Yang, UC Irvine, Smaranda Marinescu, University of Southern California, and V. Sara Thoi.*
- 16) **Young Investigator MOF Symposium**, Rotorua, New Zealand, December 8, 2018, “Tunable Structures of Novel Polysilane MOFs.” *Organized by Kenji Sumida, Adelaide University, Australia.*
- 15) **University of Delaware**, Department of Chemistry, Newark, DE, November 28, 2018, “Porous and Molecular Frameworks to Elucidate Chemical Processes in Catalysis and Energy Storage Devices.” *Invited by Prof. Eric Bloch.*
- 14) **National Institute of Standards and Technology**, Gaithersburg, MD, November 14, 2018, “Using Metal-Organic Frameworks for Sulfur Redox Cycling.” *Invited by Dr. Megan Butala.*
- 13) **Virginia Tech**, Department of Chemistry, Blacksburg, VA, October 26, 2018, “Using Metal-Organic Frameworks for Sulfur Redox Cycling.” *Invited by Prof. Amanda Morris.*
- 12) **University of Richmond**, Department of Chemistry, Richmond, VA, October 19, 2018, “Using Metal-Organic Frameworks for Sulfur Redox Cycling.” *Invited by Prof. Miles Johnson.*
- 11) **University of South Dakota**, Department of Chemistry, Logan, SD, October 1, 2018, “Using Metal-Organic Frameworks for Sulfur Redox Cycling.” *Invited by Prof. Rick Wang.*
- 10) **Millersville University**, Millersville, PA, September 10, 2018, “Using Metal-Organic Frameworks for Energy Storage Applications.” *Invited by Prof. Kathryn Allen.*
- 9) **Inorganic Chemistry Gordon Research Conference**, University of New England, Biddeford, ME, June 21, 2018, “Heterogeneous Processes Through the Lens of Inorganic Chemistry.”



*Organized by Dr. Stosh Kozimer, Los Alamos National Laboratory, and Prof. Amy Prieto, Colorado State University.*

- 8) **George Washington University**, Department of Chemistry, Washington, D.C., February 23, 2018, “Bridging Molecular Chemistry with Materials Application.” *Invited by Prof. Adelina Voutchkova.*
- 7) **Elizabethtown College**, Elizabethtown, PA, October 20, 2017, “Upcycling Petroleum Waste Chemicals to Value-Added Products.” *Invited by Prof. Thomas Hagan.*
- 6) **University of Maryland**, Department of Chemical Engineering, College Park, MD, November 14, 2017, “Developing Porous Carbon Materials and Molecular Frameworks for Energy Conversion and Storage.” *Invited by Prof. Dongxia Liu.*
- 5) **254<sup>th</sup> ACS National Meeting**, Washington, D.C., August 22, 2017, “Fundamental Aspects of Metal Organic Framework Catalysis” Symposium. *Organized by Profs. Amanda Morris and John Morris, Virginia Tech.*
- 4) **253<sup>rd</sup> ACS National Meeting**, San Francisco, CA, April 2, 2017, “Celebrating the Division of Inorganic Chemistry’s 60<sup>th</sup> Birthday” Symposium. *Organized by Prof. Debbie Crans, Colorado State University.*
- 3) **253<sup>rd</sup> ACS National Meeting**, San Francisco, CA, April 4, 2017, “Sustainability in Electrocatalytic Fuel and Chemical Production” Symposium. *Organized by Profs. Jillian Dempsey, University of North Carolina, Chapel Hill, and Louise Berben, UC Davis.*
- 2) **Young Investigator MOF Symposium**, San Diego, CA, September 10, 2016, “Engineering Molecular Materials for Applications in Energy Storage.” *Organized by Prof. Rick Wang, University of South Dakota.*
- 1) **Muhlenberg College**, Muhlenberg, PA, September 25, 2015, “Conductive Inorganic and Organic Porous Materials for Renewable Energy Catalysis.” *Invited by Prof. Joseph Keane.*

## **Society Memberships and Professional Services**

- **Editorial Advisory Board**, *ACS Applied Energy Materials*, 2022-2024
- **Guest Editor**, *Inorganic Chemistry*, Special Forum on “*Heterogeneous Interfaces Through the Lens of Inorganic Chemistry*,” 2020
- **Member**, American Chemical Society, 2014-present
  - **Sustainable Energy and Environment Subdivision Chair-Elect (2022) and Chair (2023)**, Division of Inorganic Chemistry
  - Served on ACS DIC Strategic Planning Committee, 2022
  - Served on two ACS Awards Committees
  - Organized two ACS symposia:
    - “**Through the Lens of Inorganic Chemistry: Understanding Heterogeneous Processes in Energy Conversion & Storage**,” 257th ACS National Meeting, Orlando FL, March 30 – April 4, 2019. Co-organizers: Prof. Jenny Yang (University of California, Irvine) and Prof. Smaranda Marinescu (University of Southern California)
    - “**Charge & Substrate Transport in 3D Electrocatalytic Materials**,” 258th ACS National Meeting, San Diego, CA, August 24-29, 2019. Co-organizers: Prof. A. Shoji Hall (Johns Hopkins University) and Prof. Charles McCrory (University of Michigan)
  - **Faculty Advisor** for JHU Student Chapter, 2019-present
    - Selected recipient for a 2022 Mini Grant from the Maryland Section of American Chemical Society for enriching the experience of chemistry undergraduates at JHU.
- **Member**, Materials Research Society, 2021-present
- **Workshop Co-organizer**, Telluride Science Research Conference: “*Solar Solutions to Energy and Environmental Problems*,” July 2023

- **Molecular Foundry Proposal Review Board (PRB)**, Lawrence Berkeley National Laboratory, 2021-present

## University and Departmental Services

- **Leadership Council**, [Ralph O’Conner Sustainable Energy Institute \(ROSEI\)](#), Johns Hopkins University, 2021-present
  - **Storage Pillar Lead** (2021-present): lead one of four research pillars in ROSEI in energy storage
  - **ROSEI Tenure-Track/Tenure Faculty Search Committee** (2022-2023)
  - **Bloomberg Distinguished Professorship Search Committee in Sustainable Transformations and Energy Cluster** (2022-present)
- **KSAS Academic Workgroup on Sustainability**, Krieger School of Arts and Science, Johns Hopkins University, 2022-present
- **Johns Hopkins Tech Ventures Faculty Advisory Committee**, Johns Hopkins University, 2021-2023
- Co-PI for **NSF MRI grant** for “*Acquisition of 500 MHz Solid State NMR Spectrometer and Broad Band Probes for Cross-Disciplinary Research*” with PI Rebekka Klausen and co-PI Howard Fairbrother, 2019.
- **Chemistry Department Faculty Search Committees** (2015-2016, 2017-2018)
- **Departmental Committees**
  - *Graduate Recruitment*, 2016-present
  - *Diversity* 2016-present
  - *Instrumentation* 2017-present
- **Faculty Advisor**: Chemistry Diversity, Network, and Advancement (ChemDNA), graduate student-run organization for promoting an inclusive and diverse environment, 2017-present
- **Faculty Advisor**: Student Affiliates American Chemical Society (SAACS), Undergraduate Student Chapter of the American Chemical Society, 2018-present
- **Speaker** and **participant** for university initiatives aimed at enhancing STEM diversity
  - Penn State Millennium Scholar Symposium, July 2016
  - UMBC Meyerhoff Scholar Symposium, July 2016
  - Explore Hopkins Pathways to the Professoriate (STEM) Panel, Oct 2017
  - Explore Hopkins Reception/Social Hour, Oct 2018
  - First-Generation, Limited-Income (FLI) Network, 2018-present

## Teaching

*Assistant Professor, Johns Hopkins University*

- 030.404 Electrochemistry for Energy Conversion and Storage (advanced chemistry course for seniors and graduate students)
- 030.204 Chemical Structure and Bonding (intro inorganic chemistry for undergraduates)
- 030.449 Chemistry of Inorganic Compounds (advanced inorganic chemistry for seniors and graduate students)

## Community Service and Diversity Outreach

- **Team Leader/Mentor** – Mentors 3<sup>rd</sup> and 4<sup>th</sup> graders in inner Baltimore City schools as a part of the NSF-funded STEM Achievement in Baltimore Elementary Schools (SABES), JHU, 2016-present
- **Volunteer** – JHU President’s Day of Service, Baltimore, MD, April 2016, Oct 2016, Sept 2017

- **Speaker** – Penn State Millenium Scholar Symposium for enhancing diversity in STEM fields, JHU, July 2016
- **Speaker** – UMBC Meyerhoff Scholar Symposium for enhancing diversity in STEM fields, JHU, July 2016
- **Selected Attendee** – Cottrell Scholars Collaborative Workshop: New Active Learning Strategies and Teaching Methods, ACS National Office, DC, August 2016
- **Mentor** – ChemWMN, support network for female chemists, 2016-present
- **Volunteer** – Maryland Science Olympiad State Tournament for MD middle and high schools, April 2016
- **Judge** – 3-Minute Thesis Competition, American Chemical Society, Maryland Section, November 2015