

Jiixin (Dawn) Duan

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EDUCATION AND PROFESSIONAL APPOINTMENTS

- 2023–Present **Paul Scherrer Institut** Postdoctoral Fellow, Center for Photon Science, MX Group
Villigen, Switzerland
Group Leader: Meitian Wang
Research area: Detector and data processing workflow commissioning in macromolecular crystallography at 4th generation synchrotron (Max IV) and SwissFEL
- 2018–2023 **Northwestern University** Ph. D. in Chemistry (Master included)
Illinois, the United States
Advisor: Joseph T. Hupp
Thesis title: *Metal–Organic Frameworks in Electrochemistry and Electrocatalysis*
Awards:
NUBonD Travel Grant
2022 GLCACS Out Standing Student Research Award
- 2014–2018 **University of Minnesota–Twin Cities** B. S. in Chemistry | Minor in Mathematics
Minnesota, the United States
Advisor: Andreas Stein
Research topic: *Enhancing thermal stability of Metal–Organic Frameworks via Nanocasting*
Awards:
All-terms (2014-2018) Dean’s List
Travel grant for American Chemical Society 255th National Meeting
Dr. Paul F. and Patricia Guehler Chemistry Scholarship
J. Lewis Maynard Memorial Prize in Advanced Inorganic Chemistry
Thomas DuBruil Undergraduate Research Award
Undergraduate Research Opportunities Program
McGraw Hill’s Book Prize for Student Achievement in Introductory Chemistry

TEACHING AND WORKING EXPERIENCE

- 2019–2023 **Northwestern University, Laboratory Assistant**
Northwestern University Micro/Nano Fabrication Facility (Cleanroom)
- 2023 Winter **Northwestern University, Teaching Assistant**
Crystallography (CHEM 432)
~30 students
- 2022 Winter Advanced Physical and Analytical Chemistry (CHEM 435/445)
2021 Winter ~30-40 students/term
- 2021 Spring Organic Chemistry (SPS) (CHEM 230)
5 students
- 2020 Winter Advanced Laboratory 2 (CHEM 350)
2019 Winter ~15-20 students/term
- 2020 Fall General Chemistry Labs (CHEM 142, CHEM 151, CHEM 182, CHEM 181)
2019 Summer ~40-50 students/term
2019 Winter
2018 Fall

University of Minnesota–Twin Cities, Teaching Assistant

2017 Summer	Advanced Inorganic Chemistry Laboratory (CHEM 4711W) ~30-40 students
2017 Fall 2018 Spring 2017 Spring 2016 Fall	General Chemistry Laboratory (CHEM 1065, CHEM 1066, CHEM 1075H) ~40-50 students/term
2016 Spring 2015 Fall	General Chemistry Discussion group (CHEM 1061, CHEM 1062) ~20 students/term

Feedbacks from students

- Dawn was a great TA and thoroughly explained each experiment and characterization technique effectively which helped us have a very firm grasp on our data and its interpretation.
- Dawn was very helpful and nice. She was well prepared and responsive via email.
- Dawn was an amazing TA. The class was difficult, but Dawn was always there to help.
- Dawn made the chemistry lab course much more enjoyable and clear than I would have expected. If possible, I would have Dawn for every lab section I am in because she made it really clear on what is important in lab and matched the way I learn from instructors.
- Dawn is the sweetest girl in the world, the fact that she has an amazing gift for chemistry on top of that is a wonder. She is always kind, and patient with everyone no matter how obvious some questions may be. She is genuine and understanding, yet confident in her abilities. She gets my highest praise, and she deserves a raise regardless of her position. Give her a prize, a gold star, and ice cream cone. Whatever it is, know that Dawn is the real super TA.

Only feedback addressed to me in short answers format are selected. Majority of the feedback are scored and along with the full course. These are not included in here.

SUPERVISED AND SUPPORTED STUDENTS

2022 Summer	Dereck Lefcort Northwestern University - International Institute for Nanotechnology REU Summer Intern Project: <i>Qualitatively and quantitatively compositional analysis of Metal–organic frameworks (MOFs)</i>
2021-2023	Supported and mentored 2 junior students within the Hupp group regarding instrumentations, experimentations, and data analysis
2019	Written letters of recommendation helping 1 undergraduate mentee applying to summer research and other internship opportunities

COMMUNITY SERVICE AND OUTREACH

2022	STEM outreach at the Bloc (a boxing gym), teach students how to build remote-control car
2022 Summer	Expand Your Horizons Chicago (IT)
2022 Spring	Splash teaching – Hydrogen fuel cell
2021–2022	Letters to a Pre-Scientist program (Letters with 7 th grade)
2021–2022	Science in the classroom (In-classroom science experiments/demos with 3 rd or 4 th grade)
2021	Electrochemistry demo video (https://youtu.be/qb-WW-nXaqU)
2020–2021	Books & Breakfast (Tutor for middle schoolers)
2020–2021	Expand Your Horizons Chicago (Workshop assistant, and social media assistant)
2019 Spring	ACS the Great Lake Regional Meeting (Session Presider)
2014–2016	Minnesota Science Museum (Activity Leader present demos to children)

PUBLICATIONS (= co-first author)

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- 22** Chen, Z.; Rabbani, S. M. G., A.; Liu, Q.; Bi, W.; **Duan, J.**; Lu, Z.; Schweitzer, N. M.; Getman, R. B.; Hupp, J. T.; Chapman, K. W. Atomically Precise Single-Site Catalysts via Exsolution in a Polyoxometalate–Metal–Organic–Framework Architecture. *J. Am. Chem. Soc.*, **2024**, *146*, 7950–7955.
- 21** Campitelli, P.; Tombesi, A.; Nicola, C. D.; Pettinari, C.; Mauri, A.; Galli, S.; Yan, T.; Liu, D.; **Duan, J.**; Goswami, S.; Tuci, G.; Giambastiani, G.; Hupp, J. T.; Rossin, A. CO₂ Capture and Conversion to C1 Chemicals with Mixed-Metal Copper/Nickel Bis(amino)bipyrazolate Metal–Organic Frameworks. *ACS Appl. Energy Mater.*, **2023**, *6*, 9231–9242.
- 20** Wang, R.; Bukowski, B. C.; **Duan, J.**; Zhang, K.; Snurr, R. Q.; Hupp, J. T. Geometry and Chemistry: Influence of Pore Functionalization on Molecular Transport and Diffusion in Solvent-Filled Zirconium Metal–Organic Frameworks. *ACS Appl. Mater. Interfaces*, **2023**, *15*, 51854–51862.
- 19** Wang, Q.; **Duan, J.**; Goetjen, T.; Hupp, J. T.; Notestein, J. Bimetallic NiCu catalysts supported on a Metal–Organic framework for Non-oxidative ethanol dehydrogenation. *J. Catal.*, **2023**, *422*, 86–98.
- 18** **Duan, J.**; Shabbir, H.; Chen, Z.; Bi, W.; Liu, Q.; Sui, J.; Đorđević, L.; Stupp, S. I.; Chapman, K. W.; Martinson, A. B.; Li, A.; Schaller, R. D.; Goswami, S.; Getman, R. B.; Hupp, J. T. Synthetic Access to a Framework-Stabilized and Fully Sulfided Analogue of an Anderson Polyoxometalate that is Catalytically Competent for Reduction Reactions. *J. Am. Chem. Soc.*, **2023**, *145*, 7268–7277.
- 17** Lu, Z.; **Duan, J.**; Tan, H.; Du, L.; Zhao, X.; Wang, R.; Kato, S.; Yang, S.; Hupp, J. T. Isomer of NU-1000 with Blocking c-pore Exhibits High Water-Vapor Uptake Capacity and Greatly Enhanced Cycle-stability. *J. Am. Chem. Soc.*, **2023**, *145*, 4150–4157.
- 16** Liu, Q.; Chen, Z.; Shabbir, H.; **Duan, J.**; Bi, W.; Lu, Z.; Schweitzer, N.; Alayoglu, S.; Goswami, S.; Chapman, K. W.; Getman, R. B.; Wang, Q.; Notestein, J. M.; Hupp, J. T. Presentation of gas-phase-reactant-accessible single-rhodium-atom catalysts for CO oxidation, via MOF confinement of an Anderson polyoxometalate. *J. Mater. Chem. A*, **2022**, *10*, 18226–18234.
- 15** Wang, X.; Ma, K.; Goh, T.; Mian, M. R.; Xie, H.; Mao, H.; **Duan, J.**; Kirlikovali, K. O.; Stone, A. E. B. S.; Ray, D.; Wasielewski, M. R.; Gagliardi, L.; Farha, O. K. Photocatalytic Biocidal Coatings Featuring Zr₆Ti₄-Based Metal–Organic Frameworks. *J. Am. Chem. Soc.*, **2022**, *144*, 12192–12201.
- 14** Lu, Z.; **Duan, J.**; Du, L.; Liu, Q.; Schweitzer, N.; Hupp, J. T. Incorporation of Free Halide Ions Stabilizes Metal–Organic Frameworks (MOFs) Against Pore Collapse and Renders Large-pore Zr-MOFs Functional for Water Harvesting. *J. Mater. Chem. A*, **2022**, *10*, 6442–6447.
- 13** **Duan, J.**; Goswami, S.; Patwardhan, S.; Hupp, J. T. Does the Mode of MOF/Electrode Adhesion Determine Rates for Redox-hopping-based Charge-Transport within Thin-film Metal–Organic Frameworks? *J. Phys. Chem. C*, **2022**, *126*, 4601–4611.
- 12** **Duan, J.**; Goswami, S.; Hupp, J. T. Redox-hopping Based Charge Transport Mediated by Ru(II)-Polypyridyl Species Immobilized in a Mesoporous Metal-organic Framework. *Front. Chem. Eng.*, **2022**, *3*, 828266.
- 11** Wang, R.; Bukowski, B.; **Duan, J.**; Sui, J.; Snurr, R.; Hupp, J. T. Art of Architecture: Efficient Transport through Solvent-Filled Metal–Organic Frameworks Regulated by Topology. *Chem. Mater.*, **2021**, *33*, 6832–6840.
- 10** Li, X.; Yu, J.; Lu, Z.; **Duan, J.**; Fry, H.; Gosztola, D.; Maindan, K.; Rajasree, S.; Deria, P. Photoinduced Charge Transfer with a Small Driving Force Facilitated by Exciplex-like Complex Formation in Metal–Organic Frameworks. *J. Am. Chem. Soc.*, **2021**, *143*, 15286–15297.
- 9** Lu, Z.; Wang, R.; Liao, Y.; Farha, O. K.; Bi, W.; Sheridan, T. R.; Zhang, K.; **Duan, J.**; Liu, J.; Hupp, J. T. Isomer of linker for NU-1000 yields a new she-type, catalytic, and hierarchically porous, Zr-based metal–organic framework. *Chem. Comm.*, **2021**, *57*, 3571–3574.
- 8** Ray, D.; Goswami, S.; **Duan, J.**; Hupp, J. T.; Cramer, C.; Gagliardi, L. Tuning the Conductivity of Hexa-Zirconium(IV) Metal–Organic Frameworks by Encapsulating Heterofullerenes. *Chem. Mater.*, **2021**, *33*, 1182–1189.

- 7 Nagatomi, H.; Gallington, L.; Goswami, S.; **Duan, J.**; Chapman, K.; Yanai, N.; Kimizuka, N.; Farha, O. K.; Hupp, J. T. Regioselective Functionalization of the Mesoporous Metal – Organic Framework, NU-1000, with Photo-Active Tris-(2,2'-bipyridine)ruthenium(II). *ACS Omega*, **2020**, *5*, 30299–30305.
- 6 Wang, R.; Bukowski, B. C.; **Duan, J.**; Sheridan, T. R.; Atilgan, A.; Zhang, K.; Snurr, R. Q.; Hupp, J. T. Investigating the Process and Mechanism of Molecular Transport within a Representative Solvent-Filled Metal–Organic Framework. *Langmuir*, **2020**, *36*, 10853–10859.
- 5 Kung, C.-W.; Goswami, S.; Hod, I.; Wang, T. C.; **Duan, J.**; Farha, O. K.; Hupp, J. T. Charge Transport in Zirconium-Based Metal–Organic Frameworks. *Acc. Chem. Res.* **2020**, *53*, 1187–1195.
- 4 Goswami, S.; Hod, I.; **Duan, J.**; Kung, C.-W.; Rimoldi, M.; Malliakas, C. D.; Palmer, R. H.; Farha, O. K.; Hupp, J. T. Charge Transport in Zirconium-Based Metal–Organic Frameworks. *J. Am. Chem. Soc.*, **2019**, *141*, 17696–17702.
- 3 Desai, S. P.; Ye, J.; Zheng, J.; Ferrandon, M. S.; Webber, T. E.; Platero-Prats, A. E.; **Duan, J.**; Garcia-Holley, P.; Camaioni, D. M.; Chapman, K. W.; Delferro, M.; Farha, O. K.; Fulton, J. L.; Gagliardi, L.; Lercher, J. A.; Penn, R. L.; Stein, A.; Lu, C. C. Well-Defined Rhodium–Gallium Catalytic Sites in a Metal–Organic Framework: Promoter-Controlled Selectivity in Alkyne Semihydrogenation to E-Alkenes. *J. Am. Chem. Soc.* **2018**, *140*, 15309–15318.
- 2 Malonzo, C. D.; Wang, Z.; **Duan, J.**; Zhao, W.; Webber, T. E.; Li, Z.; Kim, I. S.; Kumar, A.; Bhan, A.; Platero-Prats, A. E.; Chapman, K. W.; Farha, O. K.; Hupp, J. T.; Martinson, A. B. F.; Penn, R. L.; Stein, A. Application and Limitations of Nanocasting in Metal–Organic Frameworks. *Inorg. Chem.* **2018**, *57*, 2782–2790.
- 1 Desai, S. P.; Malonzo, C. D.; Webber, T. E.; **Duan, J.**; Thompson, A. B.; Tereniak, S. J.; DeStefano, M. R.; Buru, C. T.; Li, Z.; Penn, R. L.; Farha, O. K.; Hupp, J. T.; Stein, A.; Lu, C. C. Assembly of dicobalt and cobalt–aluminum oxide clusters on metal–organic framework and nanocast silica supports. *Farad. Discuss.* **2017**, *201*, 287–302.

#10 (external collaboration) and #15 (internal collaboration with another group) published without Ph.D. Advisor as independent collaborations

PRESENTATIONS AT CONFERENCES

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|-------------|---|
| 2024 Summer | The SRI 2024 (Oral)
<i>Jungfrauoch: A System for 2 kHz Framerate Data Acquisition with Large Format Detector and Data Processing at 4th-Generation Synchrotrons and X-ray Free Electron Laser Facilities</i> |
| 2022 Fall | The Electrochemical Society 242 th Meeting (Oral, Virtual recording)
<i>Suppressing the Dark Current through Interfacial Modification Using Metal–Organic Framework Thin Film Grown with Layer-By-Layer Method</i> |
| 2022 Fall | American Chemical Society National Meeting (Oral)
<i>Does the Mode of Metal–Organic Framework/Electrode Adhesion Determine Rates for Redox-Hopping Based Charge Transport within Thin-Film Metal–Organic Frameworks?</i> |
| 2022 Spring | The Great Lake Chinese American Chemical Society 2022 Annual Meeting (Oral)- Awarded
<i>Does the Mode of Metal–Organic Framework/Electrode Adhesion Determine Rates for Redox-Hopping Based Charge Transport within Thin-Film Metal–Organic Frameworks?</i> |
| 2022 Spring | Gender Equity in Academic Research Symposium (Oral)
<i>Electrical Conductivity and Electrocatalytic Activity of Metal–Organic Frameworks</i> |
| 2021 Winter | The Electrochemical Society 239 th Meeting (Poster, Virtual recording)
<i>The Balance between Conductivity and Electro-/Photo-Catalytic Performance of Guest-Incorporated Metal–Organic Frameworks</i> |
| 2019 Fall | Nanoporous Materials Genome Center (NMGC) All-Hands Meeting (Poster)
<i>Engendering and Engineering Electrical Conductivity in Metal–Organic Frameworks</i> |

2018 Spring American Chemical Society 255th National Meeting (Poster)
Nanocasting—Introducing Secondary Supports into Metal–Organic Frameworks to Increase Their Stability

PROFESSIONAL DEVELOPMENTS

2023 Fall Advanced C++
2022 Fall Field-programmable Gate Array Training (NU-LED)
2022 Spring NSF-sponsored Workshop to envision a National Facility for Automated Chemical Synthesis and Democratized Molecular Innovation
2022 Winter M³S (Midwest Microscopy and Microanalysis Spring Meeting)
2022 Winter 2nd Annual Women in Microscopy Conference
2022 Winter The US National Committee for Crystallography Workshop Series
2022 Summer LabView Training (NU-LED) – equivalent to CLAD certification
2022 Summer Kellogg certification – Management for Scientists and Engineers
2021 Fall Laboratory Automation and Accelerated Synthesis: Empowering Tomorrow's Chemist
2021 Fall 4th US School on Total Scattering Analysis (PDFGui, RMCProfile, DISCUS)
2021 Summer 23rd National School on Neutron and X-Ray Scattering (NXS2021)
2021 Spring Telluride School on Fundamentals for Electrochemical Energy Conversion and Storage
2020 Fall Rigaku School for Advanced Topics in Practical Crystallography (pass with honors)
2019 Fall The Electrochemical Society 236th Meeting (Short Course on Advanced Impedance Spectroscopy)

LEADERSHIP & SERVICES

Electrochemical Society

2022–Present Student Committee Member of the Individual Membership Committee

Great Lake Chinese American Chemical Society

2022–2023 Student Committee Member

PLU

2022–2023 Vice President

- Planned and hosted talk focused on profession development (average attendance ~15-20):
 - 50 years of battery innovation by Prof. Jeff Lopez
 - Advanced battery technology and current market by Dr. Venkat Srinivasan
 - Thermal batteries and HAVC solution through the Black Ice technology by Prof. Said Al-Hallaj
 - Deep Sustainability Solutions for Northwestern by Prof. Patricia A. Beddows
 - Climate change, air quality and EVs by Prof. Daniel Ethan Horton

2021–2022 President

- Led and organized organization meetings year round and organized annual Marple-Schweitzer lecture

2020–2021 Secretary

- Took care of logistics, meeting notes, and website updates

Northwestern University Building on Diversity (NUBonD)

2022-2023

- Constructed Google Scripts and set up a system to manage the department internal library initiated by NU Bond
- Invited speakers and facilitated workshops promoting inclusion, equality and diversity across the NU Chemistry department

Graduate out in STEM (GoSTEM)

- 2022
- Constructed GoSTEM website and be one of the starting board members to make GoSTEM into existence

The Tinker Program from The Garage

2021–2022 Brewed non-profit idea (TediFlow) and explored resources provided from The Garage (Northwestern’s home for student entrepreneurs)

TediFlow: A smart interactive assistant scripts/app to automate tedious steps in research life including but not limited to data processing/migrating/plotting/backing up

Graduate International Student Association (G-ISA)

2021–2022 Website manager (<https://sites.northwestern.edu/gisa/>)

- Revamped the website to increase public exposure so that information can be spread out among more international graduate students

Climate Tech Club (Formerly known as Northwestern Energy and Technology Group)

2022–2023 Secretary

2021–2022 External Vice President

- Planned and hosted talk focused on climate, sustainability and energy related technologies (average attendance ~15-20):
 - 50 years of battery innovation by Prof. Jeff Lopez
 - Advanced battery technology and current market by Dr. Venkat Srinivasan
 - Thermal batteries and HAVC solution through the Black Ice technology by Prof. Said Al-Hallaj
 - Deep Sustainability Solutions for Northwestern by Prof. Patricia A. Beddows
 - Climate change, air quality and EVs by Prof. Daniel Ethan Horton

2020–2021 Webmaster (<https://sites.northwestern.edu/netg0/>)

- Revamped official website and migrated website from Weebly to WordPress
- Facilitated alumni network by reaching out to them to obtain consent and constructed alumni page

2019–2021 General Board Member