

# JOSHUA P. HAZELNIS

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Jphazeln@umich.edu

## EDUCATION

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**University of Michigan** Ann Arbor, MI  
*Ph.D. Candidate in Chemistry* Anticipated May 2025

**University at Buffalo** Buffalo, NY  
*Bachelor of Science in Chemical Engineering · Bachelor of Arts in Chemistry* May 2020  
GPA: 3.91 · Dean's List 2016 - 2020

## AWARDS & HONORS

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University of Michigan 3rd Year Seminar Travel Award (\$250) Spring 2023  
National Science Foundation Graduate Student Fellowship (NSF GRFP) Awardee Spring 2020  
Professor Edward P. Furlani Scholarship (\$2,500) Spring 2019  
Transforming Our Tomorrow 2019 Competition - First Place Oral Presentation (\$3,000) Spring 2019  
Transforming Our Tomorrow 2019 Competition - Social Innovation Award (\$250) Spring 2019  
Ralph F. Theuer Scholarship (\$350) Spring 2019  
William E. Townsend Scholarship (\$4,000) Spring 2019  
Peter T. Lansbury Award (\$3,000) Spring 2019  
WNYACS Undergraduate Research Symposium - First Place Poster Presenter Spring 2018  
UB CURCA Undergraduate Research Award (\$500) Spring 2018  
Provost Scholarship (\$5,000) Fall 2016 – Spring 2018

## RESEARCH EXPERIENCE

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**University of Michigan, Professor Stephen Maldonado** Ann Arbor, MI  
*Graduate Student Researcher* August 2020 - Present

- Perform in-situ X-Ray reflectivity experiments of liquid metal interfaces under potential control
- Electrodeposit the first known ordered metallic structures at a liquid metal/electrolyte interface
- Materials characterization of synthesized metallic and semiconductor particles and films

**University at Buffalo, Professor Timothy R. Cook** Buffalo, NY  
*Undergraduate Research Assistant* September 2017 – May 2020

- Investigate the utilization of redox-flow batteries for non-aqueous electrolyte systems
- Aid in the assembly and optimization of University at Buffalo's first working redox-flow battery
- Investigate membrane conductivity and selectivity using 4-electrode impedance spectroscopy

**University at Buffalo, Professor Carl R. F. Lund** Buffalo, NY  
*Undergraduate Research Assistant* February 2017 – May 2017

- Researched the propagation and reaction fronts in oxygen generating chlorate candles
- Analyzed mathematical modeling and programming in MATLAB

## PUBLICATIONS

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(1) **Hazelnis, J. P.** and S. Maldonado "Synthesis of a Gallium – Iron Gallium Superlattice at Liquid Ga/Water Interfaces." (In-Preparation)

(2) **Hazelnis, J. P.** and S. Maldonado (2023). "Electrosynthesis of Quasi-Epitaxial Crystals on Liquid Metals." *Journal of the American Chemical Society* 145(50): 27616-27625.

(3) **Hazelnis, J. P.**, Wu, H., et al. (2023). "Understanding and Expanding the Prospects for Electrosynthesis with Liquid Metal Electrodes." *Accounts of Chemical Research*.

(4) Hazelnis, J. P., Sartori, A. et al. (2022). "Detection of Ge-Containing Adlayers at the Liquid Hg/Water Interface by In Situ X-ray Reflectivity in Aqueous Borate Electrolytes Containing Dissolved GeO<sub>2</sub>." *The Journal of Physical Chemistry C* 126(18): 8177-8189.

(5) Anjula M. Kosswattaarachchi, Joshua P. Hazelnis, Ellen M. Matson, Timothy R. Cook, et al. (2019) **Transport and Electron Transfer Kinetics of Polyoxovanadate-Alkoxide Clusters** *Journal of the Electrochemical Society* 166: A464-A472.

## PRESENTATIONS

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<b>Pittcon 2024 (Invited Oral Presentation)</b> <i>Electrosynthesis of Quasi-Epitaxial Crystals on Liquid Metals</i>	San Diego, CA Winter, 2024
<b>ECS Detroit Section Meeting Poster Presenter</b> <i>Quasi-Epitaxial Metal Electrodeposition at a Liquid Metal Electrode</i>	Detroit, MI Summer, 2023
<b>Electrochemistry Gordon Research Conference Poster Presenter</b> <i>Liquid Metal Electrodes as Growth Media for Single-Crystalline Metal Films &amp; Superlattices</i>	Ventura, CA Fall, 2022
<b>American Chemical Society (ACS) Oral Presentation</b> Title: <i>In-Situ electrochemical X-Ray reflectivity of liquid metal-electrolyte interfaces</i>	Chicago, IL Fall, 2022
<b>Transforming Our Tomorrow 2019: A New Clean Energy Vision Oral Presentation</b> Title: <i>Jeans for Renewable Energy Storage</i> (1 <sup>st</sup> Place & Social Innovation Award)	Buffalo, NY Spring 2019
<b>WYNACS Undergraduate Research Symposium</b> Title: <i>The Molecular Chemistry of Redox Flow Batteries</i> (1 <sup>st</sup> Place)	Buffalo, NY Spring 2018
<b>CURCA: Celebration of Student Academic Excellence Poster Presenter</b> Title: <i>The Molecular Chemistry of Redox Flow Batteries</i>	Buffalo, NY Spring 2018

## TEACHING and LEADERSHIP EXPERIENCE

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<b>University of Michigan ECS Student Chapter</b> <i>Secretary</i>	Ann Arbor, MI May, 2023 - Present
<ul style="list-style-type: none"> <li>Assist with the organization and administrative task of the first ever ECS student chapter club</li> </ul>	
<b>University of Michigan, Maldonado Research Group</b> <i>Safety Officer and Inventory Manager</i>	Ann Arbor, MI May, 2020 - Present
<ul style="list-style-type: none"> <li>Oversee the safety practices of the laboratory and address identified safety deficiencies</li> <li>Manage grants and funds of the laboratory to order necessary items, instruments and chemicals</li> </ul>	
<b>University of Michigan, Chemistry</b> <i>Graduate Student Mentor</i>	Ann Arbor, MI August, 2023 – May, 2023
<ul style="list-style-type: none"> <li>Facilitated helpful discussion and guidance for an incoming first year graduate student</li> </ul>	
<b>University of Michigan</b> <i>Research Proposal Grader</i>	Ann Arbor, MI February 2023 – May 2023
<ul style="list-style-type: none"> <li>CHEM 516: Professional Development in Chemistry</li> </ul>	
<b>University of Michigan</b> <i>Graduate Student Laboratory Instructor</i>	Ann Arbor, MI August 2020 – May 2021
<ul style="list-style-type: none"> <li>CHEM 211: Organic Chemistry I</li> </ul>	
<b>University at Buffalo Campus Living</b> <i>Resident Advisor</i>	Buffalo, NY October 2017 – May 2019
<ul style="list-style-type: none"> <li>Maintain an active and supportive leadership role by being a resource for dormitory residents</li> </ul>	

## INTERNSHIP EXPERIENCE

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<b>Wendel Energy Services, LLC</b> <i>Intern</i>	Williamsville, NY June 2018 – September 2018
<ul style="list-style-type: none"> <li>Optimized the energy expenditures for capital improvement projects across the United States</li> </ul>	

- Proposed the innovation of existing chillers, HVAC, lighting, insulation and fume hood systems
- Calculated utility efficiency using AutoCAD, Bluebeam, Hoboware and Microsoft EXCEL

### EXTRACURRICULAR PROJECT EXPERIENCE

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**Buffalo Public Schools** Buffalo, NY  
*Volunteer Engineering Adviser* September 2019 – May 2020

- Consulted on the design small scale classroom demonstrations on renewable energy storage

**American Society of Civil Engineering Concrete Canoe** Buffalo, NY  
*Mix Team Member* September 2017 – June 2018

- Created a concrete mixture of low density and high durability to withstand competitive canoe races

**Wind Turbine Experimentation and Design** Buffalo, NY  
*Head of Research & Development* September 2016 – November 2016

- Accounted for and tested various design factors that increased turbine performance

### VOLUNTEER WORK EXPERIENCE

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**Logan Elementary Science Fair** Ann Arbor, MI  
*Science Demonstrator* April, 2023

- Performed fundamental science demonstrations to teach and spark curiosity in students

**Undergraduate Research Symposium** Ann Arbor, MI  
*Poster Presentation Judge* August, 2022

- Assessed the multi-disciplinary research presentations of undergraduate students

**Karle Research Symposium** Ann Arbor, MI  
*Event Organizer* August, 2022

- Prepared the event abstract book and coordinated poster judges during the event

**University at Buffalo Sustainability Camp** Buffalo, NY  
*Guest Speaker & Mentor* July 2019

- Taught local middle school students product cycle analysis as it pertains to engineering design

**Veteran Affairs (VA) Medical Center** Buffalo, NY  
*Emergency Room Volunteer* November 2017 – December 2018

- Assisted medical personnel in tending to the needs and transport of patients

### PROFESSIONAL AFFILIATIONS

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The Electrochemical Society (ECS) 2023 – Present  
 American Chemical Society (ACS) 2019 - Present  
 American Institute of Chemical Engineers (AIChE) 2019 - 2020

### CERTIFICATIONS

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Laboratory Inventory Manager May 2020 - Present  
 Laboratory Safety Officer May 2020 - Present  
 EHS Laboratory Safety Training November 2019 – Present  
 Black Belt in the art of Tang Soo Do June 2014

### TECHNICAL SKILLS & INTERESTS

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**Languages:** Limited working proficiency in Brazilian Portuguese and Spanish

**Personal:** Public Speaking, Leadership, Technical Writing, Formatting, Team Management

**Coding Languages:** Python, MATLAB

**Software Proficiencies:** VESTA, Crystal Maker SingleCrystal, EC-Lab, Microsoft Office, EXCEL, Powerpoint, Adobe Illustrator, Origin, Jana2006, GATAN, Velox, ImageJ

## **LABORATORY TECHNICAL SKILLS**

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- Cyclic Voltammetry (CVs)
- Galvanostatic and Potentiostatic Materials Deposition
- Open Circuit Potential Analysis (OCP)
- Linear Sweep Voltammetry
- Redox Flow Battery Set-Up and Data Collection
- Electrochemical Data Analysis
- Electrochemical Cell Design
- Impedance Spectroscopy
- X-Ray Diffraction (XRD)
- Air-Free Glovebox Proficiency
- Raman Spectroscopy
- Transmission Electron Microscopy (TEM)
- Selected Area Electron Diffraction (SAED)
- Micro-Electron Diffraction (Micro-ED)
- Electron Back Scattered Diffraction (EBSD) Characterization
- Python Data Fitting and Modeling
- Beamline Data Collection
- In-Situ X-Ray Reflectivity of liquid metal interfaces
- Metallic and Semiconductor Materials Characterization
- X-Ray Photoelectron Spectroscopy
- Plasma Focused Ion Beam Manipulation (PFIB) for TEM sample preparation
- Scanning Electron Microscopy (SEM) Imaging
- Energy-Dispersive X-Ray Spectroscopy (EDS)
- X-Ray Fluorescence Spectroscopy
- Inductively coupled plasma mass spectrometry (ICP-MS)