Aoife Zuercher

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EDUCATION

University of Maryland | College Park, MD August 2024 - Present
PhD Materials Science and Engineering
Research Advisor: Dr. Eric Wachsman
Clark Doctoral Fellow

Ohio University, Honors Tutorial College | Athens, OH August 2020 - May 2024
B.S in Chemistry and B.S. in Mathematics
GPA: 3.80 Magna Cum Laude
Research Advisors: Dr. Katherine Cimatu, Dr. Martin Mohlenkamp
Thesis: "Using Microscopy Methods and Density Functional Theory to Characterize Surface Properties and Interfacial Stability of Different Molecular Systems"
Awards: The Department of Chemistry and Biochemistry Undergraduate Research Award, 2024 ACS Undergraduate Award in Inorganic Chemistry, Honorable Mention for Best Thesis Award

Rocky River High School | Rocky River, OH May 2020

EXPERIENCE

Maryland Energy Innovation Institute | College Park, MD August 2024 – Present
Graduate Student Researcher

- Synthesizing doped LLZO garnet electrolyte and mixed ionic- and electronic- conducting garnet and fabricating the solid-state ceramic electrolytes into coin and pouch cell batteries.
- Characterizes materials using SEM/EDS, EIS, and XRD.

Ohio University Department of Chemistry and Biochemistry | Athens, OH September 2021 – May 2024
Physical Chemistry Undergraduate Researcher

- Conduct computational and experimental research in Dr. Cimatu's surface science and physical chemistry research group.
- Synthesized Rh BODIPY transition metal complexes and a molecularly imprinted polymer, tested and characterized using AFM, UV Vis, SEM and other techniques.
- Predict and validate experimental results with computational chemistry using Density Functional Theory through Gaussian and GaussView.

NASA Glenn Research Center | Cleveland, OH May 2023 – August 2023
Electrochemical Intern

- Researched energy storage materials to fabricate a solid-state Lithium-Sulfur battery for the SABERS project in application to electric aircraft and the Mars Helicopter.
- Engineered a thin scalable solid-state electrolyte and lightweight cathode in coin cells and pouch cells. Characterized performance through EIS and cell cycling.

NASA Langley Research Center | Hampton, VA January 2023 – May 2023
Advanced Materials and Processing Intern

- Worked on SPARRCI project which focuses on battery safety through the implementation of sensors and non-destructive evaluation to predict degradation and failure of Li-ion pouch cell batteries.
- Characterized Li-metal surface through scanning electron microscopy, optical microscopy, and impedance spectra through stages of battery cell cycling and destructive physical analysis.
- Performed non-automated nondestructive evaluation of digital radiograph x-ray and ultrasound throughout battery life.
- Continued as through NASA Student Volunteer Program from November 2023 – May 2024

ITW Permatex | Solon, OH May 2022 – August 2022
Research and Development Intern

- Formulated a new product, Permatex® Head Gasket Repair Stop Leak, and reformulated existing products across silicone and aqueous chemistry for automotive-aftermarket products.

- Worked cross-functionally with marketing, engineering, and production teams through ITW's business models to create a new product and conduct quality control testing under iso9001 standards.

LEADERSHIP AND MEMBERSHIP

Rose of Tralee International Festival | Tralee, IRL June 2024 – June 2025
Ohio Rose

- Represented Ohio in an international celebration of Irish women and their accomplishments. Advocated for women in STEM through radio, television, and new sources on a local and global level.
- Raised money for many different charities including Beyond T1D and Chernobyl Children and spent time visiting children's hospitals, nursing homes, libraries, and local businesses.

Sigma Kappa Sorority | Athens, OH April 2021 – May 2024
Vice President of Academic Excellence

- Set up educational resources for members. Oversaw and improved academic standing of the chapter and its members. Meet with the executive board to develop plans to improve our sorority.
- Acted as a Delegate for Beta Upsilon chapter at 2022 Sigma Kappa National Conference to vote on behalf of our members on bylaws and constitution.

Ohio University Department of Chemistry | Athens, OH August 2023 – May 2024
Teaching Assistant

- Work as a TA for Ohio University's Chem 1205 lecture and lab; Survey of Chemistry for Health Sciences.
- Aid in lab set-up, experimental and fundamental chemistry explanation along with grading exams and lab reports.

HONORS AND AWARDS

1st Place Undergraduate Chemistry and Biochemistry at Ohio University Student Expo, ACS Undergraduate Inorganic Chemistry, Department of Chemistry and Biochemistry Undergraduate Research Award
Clark Doctoral Fellowship| College Par, MD 2024-2028
Honors Premier Scholarship | Athens, OH 2020-2024

- Scholarship accompanies Honors Tutorial College acceptance. Honors tutorial experience includes personalized advanced education, one-on-one student driven courses, and a senior thesis.

Ohio Space Grant | Cleveland, OH 2023
Andrea Delmage Scholarship | Athens, OH 2022-2023
Dean's Scholarship | Athens, OH 2022-2023

PUBLICATIONS

Ambagaspitiya, T., Garza, D., **Zuercher, A.** Cimatu, K.L. Investigating the self-assembly of pH-sensitive switchable diamine surfactants using sum frequency generation spectroscopy and molecular dynamics simulations. *The Journal of Chemical Physics* **2024.** 161, 164709.
Webster, M., Frankforter, E., **Zuercher, A.,** Deshpande, S., Lam, W.-C.A., Caicedo, D., DeMattia, B., Lin, Y., Perey, D. Ultrasonic Assessment of Aging in Lithium Metal Batteries. *Journal of Power Sources* **2024**. 606, 234552.
Skelton, E., Erasuin, U., Sukul, A., **Zuercher, A.,** White, J., Bythell, B., Cimatu K.L. Visible Light Assisted Coordination of a Rh(III) Complex to Guanine. *Inorganic Chemistry* **2023**, 62 (8), 3368-3380.
Zuercher, A. Caicedo, D. Deshpande, S., Lam, W.-C.A., Perey, D., DeMattia, B., Lin, Y. Lithium Dendrite growth and morphology evaluations of Li-metal pouch cell batteries. **(In Progress)**

PRESENTATIONS

Zuercher, A. Ambagaspitiya, T., Mohlenkamp, M., Cimatu, K.L. The Detection of Sulfapyridine using Molecularly Imprinted Polymers through Surface Characterization and Density Functional Theory. Poster presentation delivered at The Ohio University Student Expo. April 2024.

Zuercher, A. Perey, D. Lin, Y. Failure Detection and Characterization of Li Metal Pouch Cell Batteries. Oral presentation delivered at the NASA Langley Research Center Advanced Materials and Processing Branch Spring Student Research Symposium. May 2023.

SKILLS

Proficient in MATLab, Gaussian16 program, Density Functional Theory, and Python coding language.
Wet Lab skills include SEM, EDX AFM, OM, Ultrasound, DR X-ray, EIS, FTIR, UV Vis Spectroscopy, XRD.
Excellent written and verbal communication