Bailey B. Bowers

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Academic Appointments

Oberlin College, Oberlin, Ohio

Assistant Professor of Chemistry and Biochemistry — July 2024 – present

Earlham College, Richmond, Indiana

Visiting Assistant Professor of Chemistry — August 2022 – July 2024

Convener of Quality Science Minor — August 2023 – July 2024

Education

Carnegie Mellon University, Doctor of Philosophy in Chemistry — August 2017 – July 2022

Dissertation: *Understanding Everyday – Everywhere Chemicals and their Transformation Products via High Resolution Mass Spectrometry of Environmentally-Relevant Matrices*
Advisor: Dr. Ryan C. Sullivan

College of Wooster, Bachelor of Arts in Chemistry — August 2013 – May 2017

Graduated *magna cum laude* and with Departmental Honors
Thesis: *The Effect of pH on the Direct Photolysis of Warfarin in Aqueous Solution*
Advisor: Dr. Karl Feierabend

Research Interests

mass spectrometry
nontarget analysis
persistent organic pollutants
contaminant remediation chemistry
photochemical transformations
per- and polyfluoroalkyl substances

Awards, Honors, and Fellowships

Bhakta and Sushama Rath Graduate Award	2022
Edwin N. Lassettre Graduate Travel Award	2022
Steinbrenner Institute Fellowship	2018-2019
Heinz Presidential Fellowship	2018-2019
American Chemical Society Wooster Section Senior Award	2017

Leadership, Academic Service, and Professional Activities

Reviewer for *Environmental Science & Technology*	November 2023 - present
Reviewer for *Environmental Toxicology and Chemistry*	August 2023 - present
CMU Academic Review Board and University Disciplinary Committee Member	July 2019 – July 2022

Undergraduate Researchers Advised

Mentorship of Undergraduate Researchers at Earlham College

Aqueous photodegradation of fluorinated pharmaceuticals: rate constants, quantum yields, and modeling

Reece Zonts (Chemistry, 2025)	Summer 2023
Niloy Barua (Biochemistry, 2025)	Summer 2023
Helena Aleluya José (Computer Science, 2025)	Summer 2023

Mentorship of Undergraduate Researchers at Carnegie Mellon University

New-TAML remediation of quaternary ammonium compounds and chlorinated pesticides

Katie Ziegler (Chemistry, 2021)	Fall 2020 - Spring 2021
Vinnie Silverman (Chemistry, 2020)	Spring 2018 - Spring 2020

Surface activity and remediation of per and polyfluorinated alkyl substances (PFAS)

Brian Woolley (Chemical Engineering, 2023)	Summer 2019
Jonathan Goodstein (Chemistry, 2022)	Spring 2019

Teaching and Mentoring Experience

Courses Taught at Earlham College

CHEM 371: Environmental Chemistry and Toxicology (+ lab)	Fall 2023
CHEM 111 Lab: General Chemistry	Fall 2023
CHEM 331: Equilibrium and Analysis (+ lab)	Fall 2022
CHEM 431: Advanced Analytical Chemistry (+ lab)	Fall 2022
CHEM 111 Lab: General Chemistry	Fall 2022

Teaching Assistantships at Carnegie Mellon University

Laboratory III: Molecular Design and Synthesis	Spring 2021
Environmental Systems on a Changing Planet	Fall 2020
Introduction to Modern Chemistry I	Spring 2020
Laboratory I: Introduction to Chemical Analysis	Fall 2019
Air Quality Engineering	Fall 2018
Modern Chemistry II	Spring 2018
Introduction to Modern Chemistry I	Fall 2017

Professional Societies

American Chemical Society (ACS) December 2013 - present

American Association for Aerosol Research (AAAR) August 2019 - present

Society of Environmental Toxicology and Chemistry (SETAC) May 2020 – present

Publications

Bowers, B. B.; Lou, Z.; Xu, J.; Xinhua, X.; De Silva, A. O.; Lowry, G. V.; Sullivan, R. C. Nontarget analysis and fluorine atom balances of transformation products from UV/sulfite degradation of perfluoroalkyl contaminants. *Environ. Sci.: Processes Impacts*, 2023, 25, 472-483. https://doi.org/10.1039/D2EM00425A.

Bowers, B. B.; Thornton, J. A.; Sullivan, R. C. Evaluation of iodide chemical ionization mass spectrometry for gas and aerosol-phase per- and polyfluoroalkyl substances (PFAS) analysis. *Environ. Sci. Processes Impacts* 2023, *25* (2), 277–287. https://doi.org/10.1039/D2EM00275B.

Jahl, L. G.; **Bowers, B. B.**; Jahn, L. G.; Thornton, J. A.; Sullivan, R. C. Response of the Reaction Probability of N_2O_5 with Authentic Biomass-Burning Aerosol to High Relative Humidity. *ACS Earth Sp. Chem.* 2021, 5, 10, 2587–2598. https://doi.org/10.1021/acsearthspacechem.1c00227.

Jahn, L. G.; Jahl, L. G.; **Bowers, B. B.**; Sullivan, R. C. Morphology of Organic Carbon Coatings on Biomass-Burning Particles and Their Role in Reactive Gas Uptake. *ACS Earth Sp. Chem.* 2021, *5* (9), 2184–2195. https://doi.org/10.1021/acsearthspacechem.1c00237.

Jahl, L. G.; Brubaker, T. A.; Polen, M. J.; Jahn, L. G.; Cain, K. P.; **Bowers, B. B.**; Fahy, W. D.; Graves, S.; Sullivan, R. C. Atmospheric Aging Enhances the Ice Nucleation Ability of Biomass-Burning Aerosol. *Sci. Adv.* 2021, *7* (9), eabd3440. https://doi.org/10.1126/sciadv.abd3440.

Jahn, L. G.; Jahl, L. G.; Bland, G. D.; **Bowers, B. B.**; Monroe, L. W.; Sullivan, R. C. Metallic and Crustal Elements in Biomass-Burning Aerosol and Ash: Prevalence, Significance, and Similarity to Soil Particles. *ACS Earth Sp. Chem.* 2021, *5* (1), 136–148. https://doi.org/10.1021/acsearthspacechem.0c00191.

Conference Posters and Presentations

Bowers, B. B.; Lou, Z.; Xu, J.; De Silva, A.; Xinhua, X.; Lowry, G.V.; Sullivan, R.C. The effect of pre-concentration by sorption or aerosolization on the transformation products from UV/sulfite reduction of per- and polyfluoroalkyl substances. Platform presentation at the 263rd ACS National Meeting and Exposition, San Diego, CA, March 2022.

Bowers, B. B.; Lou, Z.; Xu, J.; Gu, Y.; Xinhua, X.; Lowry, G.V.; Sullivan, R.C. Transformation products and reaction mechanisms of UV/sulfite remediation of PFOS, PFOA, PFBS and GenX desorbed from carbon nanotubes. Platform presentation at the 2020 AGU Fall Meeting, December 2020.

Bowers, B. B.; Stapleton, H. M.; Sullivan, R. C. The Effect of Flame Retardants on Toxics Emitted from Foam Combustion. Oral presentation at the SETAC North America 41st Annual Meeting, November 2020.

Bowers, B. B.; Feierabend, K.J. Effect of solvent on the equilibrium constant of the H- π complexation of phenol and benzene. Poster presented at the 251st ACS National Meeting and Exposition, San Diego, CA, March 2016.

Invited Seminars and Colloquia

Bowers, B. B. Understanding Everyday – Everywhere Chemicals and their Transformation Products via High Resolution Mass Spectrometry of Environmentally-Relevant Matrices, Earlham College Biology Colloquium, April 2023.

External Grant Funding

Borman Family Foundation (2023), Purchase of a Photoreactor System; B. Bowers (PI); $7,996

Media Coverage and Contributions

Kaitlyn Landram, "All eyes on forever chemicals." *Carnegie Mellon University College of Engineering*. February 23, 2023. https://engineering.cmu.edu/news-events/news/2023/02/23-forever-chemicals.html

Kirsten Heuring, "Bailey Bowers Wins Rath Award" Carnegie Mellon University News. *July 8, 2022*. https://www.cmu.edu/news/stories/archives/2022/july/bailey-bowers-wins-rath-award

Earlham College video covering 2023 Summer Research on Photodegradation of Pharmaceuticals: https://youtu.be/cNRUybraj1A?si=65u88wCYsvEpZvfN