JAYDEE EDWARDS

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Education

DOCTOR OF PHILOSOPHY in Earth and Environmental Sciences / May 2025

University of Pennsylvania

Philadelphia, PA | Benjamin Franklin Fellow | Outstanding Teaching Assistant | Dr. Andy Binns Impact Award

BACHELOR OF SCIENCE in Chemistry / May 2020

John Brown University

Siloam Springs, AR | Chancellor's Scholar | Cum Laude | Chemistry Honors Student

Study Abroad / Spring 2019

Handong Global University

Pohang, South Korea | Study Abroad Semester

Educational and Professional Experience

The Headwater Group • Data Science and Sustainability Consultant

Dec 2025 – Present

Conduct quantitative and geospatial analysis to support evaluation of large-scale land-use and infrastructure-adjacent initiatives.
Develop analytical workflows to assess system performance, uncertainty, and tradeoffs across heterogeneous datasets.
Translate analytical outputs into decision-ready insights for cross-functional and external stakeholders.

Lumiere Education • Research Mentor

June 2025 – Present

Mentor for program serving students interested in learning more about research and wanting to gain experience with writing and publishing.
Consists of organizing and conducting weekly meetings with the students to empower their research understanding, contribute to developing their writing skills, and guide them as they experience research for the first time.

Doctoral Researcher

August 2020 – May 2025

Conducted 5 years of independent research on tire-derived microplastics in urban environments, integrating fieldwork, laboratory and instrumental analysis, and large-scale data modeling using Python.
Designed and led 4 field campaigns and 3 laboratory workflows for microplastic sampling, processing, and analysis.
Mentored undergraduate (4) and master's (2) students in research design, data analysis, and scientific writing.
Authored and co-authored peer-reviewed manuscripts (2) advancing understanding of urban microplastic pollution.
Presented findings at 4 national conferences, a subject-specific symposium, and regional competitions (2).

Graduate Student Center • Academic and Intellectual Programming Fellow

July 2024 – Aug 2025 | University of Pennsylvania

Directed the design and delivery of 7 university-wide workshops for research communication, academic writing, and community.
Collaborated with campus partners and individual students to develop programs that foster academic, intellectual, and community engagement among Penn's 17,000+ graduate students.
Supported front desk operations and logistical coordination to ensure smooth daily functioning of the Graduate Student Center.

Head Teaching Assistant • Class: Earth Systems Science

Fall 2022 | University of Pennsylvania | Department of Earth and Environmental Science

Led 2 weekly recitation classes of ~25 students, facilitating discussions and reinforcing key course content.
Guest lectured to the entire class of 200 students on core Earth system topics.
Provided support in supervision and coordination of TA team (4 TAs), overseeing recitations, grading, and exam proctoring.
Taught material on Earth systems—including rock and mineral formation, earthquakes, and geologic time—while encouraging critical thinking about system interactions.

Center for Excellence in Teaching, Learning, and Innovation (CETLI) • Coordinator for STEM TA Trainers for University Wide Graduate Student TA Training

March – August 2024 | University of Pennsylvania

Promoted to leadership role coordinating the university-wide STEM TA Training Program
Assisted in managing the team of trainers and supported the preparation of 300+ new graduate TAs for teaching roles
Contributed to the hiring and onboarding processes for new trainers, and mentored team members throughout training preparation
Provided support in design and facilitation of pedagogical workshops and provided feedback on teaching demonstrations

Center for Excellence in Teaching, Learning, and Innovation (CETLI) • Graduate Fellow

AY 2023-2024 | University of Pennsylvania

Planned and execute teaching workshops for the EES department (total: 7)

Planned and execute university wide teaching workshop (total: 2)

Observed and evaluate peers' teaching for their personal teaching development and to fulfill one part of the CETLI certification requirements

Attended weekly meetings with other graduate fellows to brainstorm, update, and plan workshops, observations, and teaching issues

Center for Excellence in Teaching, Learning, and Innovation (CETLI) • Trainer for University Wide Graduate Student TA Training

Fall 2023 | University of Pennsylvania

Collaborated with the TA Training Team to design and deliver university-wide training for over 300 new graduate teaching assistants
Facilitated interactive workshops and led discussions on effective teaching practices, including how to navigate challenging classroom scenarios

Teaching Assistant • Class: Intro to Environmental Science

Fall 2023 | University of Pennsylvania | Department of Earth and Environmental Science

Led 2 weekly recitations with ~25 students, facilitating discussion and reinforcing key content.

Taught material related to the environment such as climate change, air pollution, and water quality while helping students develop analytical skills (excel, GIS mapping, statistics).

Teaching Assistant • Class: Intro to Geology

Fall 2022 | University of Pennsylvania | Department of Earth and Environmental Science

Led 2 weekly recitations with ~25 students, facilitating discussion and reinforcing key content.

Taught material related to understanding geology and earth science such as formation of rocks and minerals, earthquakes, geologic time. Encouraged students to think critically about earth systems and interactions

Graduate and Professional Student Assembly • Executive Vice President

May 2022-Dec 2022 | University of Pennsylvania

Chief of staff for the Executive Board

Set agendas and meetings through partnering with the president

Managed individual travel grant funding for international conference travel

Teaching Assistant • Class: Intro to Environmental Science

Spring 2022 | University of Pennsylvania | Department of Earth and Environmental Science

Led 2 weekly recitations with ~25 students, facilitating discussion and reinforcing key content.

Taught material related to the environment such as climate change, air pollution, and water quality while helping students develop analytical skills (excel, GIS mapping, statistics).

Graduate and Professional Student Assembly • Research Council Chair

AY 2021-2022 | University of Pennsylvania

Led a university-wide council representing research-focused graduate students across Penn's 12 graduate schools

Reviewed and awarded competitive research and travel grants to support student scholarship and conference participation

Advocated for graduate student priorities related to academic policy, health insurance, and institutional support

Climate, Diversity, Equity, Inclusion Committee (CDEIC) • Earth and Environmental Sciences Department

AY 2021-2022 | University of Pennsylvania

Graduate student representative on departmental committee for climate, diversity, equity, and inclusion

Teaching Assistant • Class: Intro to Environmental Science

Spring 2021 | University of Pennsylvania | Department of Earth and Environmental Science

Led 2 weekly recitations with ~25 students, facilitating discussion and reinforcing key content.

Course taught via zoom to accommodate COVID restrictions.

Taught material related to the environment such as climate change, air pollution, and water quality while helping students develop analytical skills (excel, GIS mapping, statistics).

Graduate and Professional Student Assembly • Representative

Fall 2020 – Spring 2021 | University of Pennsylvania

Representative in the General Assembly

Member of Research Council

Advocated for graduate student needs (i.e., health insurance, academic affairs)

School of Arts and Science Government • VP of Communications

Fall 2020 – Spring 2021| University of Pennsylvania

Maintained communications with the general body of representatives

Recorded minutes for General Body meetings and Executive Board meetings

Acted as official representative to GAPSA from SASgov Executive Board

Graduate Women in STEM: Philly Chapter • Treasurer

Fall 2020 – Spring 2021 | University of Pennsylvania

Managed funding for Philly Chapter

Secured funding for annual Symposium

JBU Enactus: Project embr • Environmental Scientist/Advisor

Fall 2018 – Spring 2020 | embrwater.org

embr is an Enactus project seeking to improve the quality of life for residents of Pignon, Haiti.

Analyzed potential environmental and health impacts of implementing a trash incinerator.

Researched and studied literature concerning municipal solid waste.

Contributed as a writer to procedural processes, project summary, etc.

Teaching Assistant to Dr. Susan Newton • John Brown University

Fall 2019 – Spring 2020 | Department of Chemistry

Teaching Assistant for Biochemistry I, specifically laboratory instrumentation (HPLC/UV-VIS)

Prepared for laboratory experiments, supervised waste and clean up, assisted and trained instrumentation, graded materials from class, etc.

Research Student • John Brown University

Spring 2017 – Spring 2020 | Jill Ellenbarger Research Group

Utilized computational chemistry to study the interactions between water contaminants and potential sensors for identification through investigation of urea compounds and fragments.

Explored a fragment-based method for calculating interaction energies between bisurea structures and potential anion contaminants.

Attend weekly group and individual meetings to discuss research and problem solve.

Research Intern • NSF-REU • University of Arkansas

Summer 2018 | Rob Coridan Research Group: rcoridan.hosted.uark.edu

Investigation of photoelectrochemical cells (PEC's) characteristics to improve the chemical process for conversion of solar energy to chemical fuels.

Researched and conducted lab experiments using various chemical solutions, such as methanol and glycerol, to increase water oxidation catalysis.

Attended weekly group meetings, engaged in problem solving and discussion, and actively learned about the different aspects of the project.

Resident Assistant • John Brown University

Academic years of 2017-2020

Student leader in the resident halls for social community by encouraging students to engage well with each other and leading by example through service, open mindedness, and academic support.

Research Publications

Edwards J., Ertel B., Weinstein J., Gieré R. Morphology and mineral encrustations of density-separated tire- and road-wear particles collected in Charleston, South Carolina. Polymer Bulletin (2025). https://doi.org:10.1007/s00289-025-05743-1.

Gieré, R., **Edwards, J.**, Dietrich, V., Stoček, R., Heinrich, G. Vehicle Tire Particles in the Environment. United Nations Environment Program. 2024.

Research Presentations

Edwards, J., Root, C., Lugardo, D.V., Burney, D., Gieré, R. Urban Road Dust and TRWPs: Understanding their Composition, Distribution, and Interactions. Oral presentation at Tire Emissions and Sustainability 2025. Irvine, California. Spring 2025.

Edwards, J., Ertel, B., Weinstein, J, Gieré, R. Comprehensive characterization of individual tire- and road-wear particles through image and elemental analysis. Oral presentation at the Goldschmidt annual conference. Lyon, France. Summer 2023.

Edwards, J., Ertel, B., Weinstein, J, Gieré, R. Magnifying Microplastics: Exploring tire- and road-wear particles through image and elemental analysis. Poster presentation at the SINGH Center Annual User Conference. Philadelphia, PA. Fall 2022.

Edwards, J., Ertel, B., Weinstein, J, Gieré, R. Magnifying Microplastics: Exploring tire- and road-wear particles through image and elemental analysis. Oral presentation at the Goldschmidt annual conference. Honolulu, HI. Summer 2022.

Edwards, J., Gieré, R. Characterization and fate of microplastics as emerging contaminants in Philadelphia's freshwater systems. Oral presentation at the Geological Society of America annual conference. Portland, OR. Fall 2021.

Edwards, J., Newkirk, E., Ellenbarger, J. Exploring structural, energetic, and colorimetric properties to predict bis-urea sensors of anionic contaminants. American Chemical Society National Conference. Philadelphia, PA. Spring 2020. *Abstract Accepted. *Cancelled due to COVID-19.

Edwards, J., Ellenbarger, J. Exploring the additivity of urea and anion interactions. John Brown University, Science Underground Poster Presentation. Siloam Springs, AR. Fall 2019.

Edwards, J., Norman, M., Coridan, R. Characterizing electrochemical hole scavengers for hierarchically structured zinc oxides. Southwest Regional ACS Meeting Poster Presentation. Little Rock, AR. Fall 2018.

Edwards, J., Norman, M., Coridan, R. Characterizing electrochemical hole scavengers for hierarchically structured zinc oxides. University of Arkansas, Poster Presentation. Fayetteville, AR. Summer 2018.

Edwards, J., Ellenbarger, J. Exploring the additivity of urea and anion interactions. John Brown University's Celebration of Academic Excellence, Oral Presentation. Siloam Springs, AR. Spring 2018.

Edwards, J., Ellenbarger, J. Exploring the additivity of urea and anion interactions. American Chemical Society National Meeting Poster Presentation. New Orleans, LA. Spring 2018.

Awards

Dr. Andy Binns Impact Award for Outstanding Service to Graduate and Professional Student Life. University of Pennsylvania. Spring 2025.

3 Minute Thesis Competition: First Place Winner. University of Pennsylvania. Spring 2025.

Outstanding Teaching Assistant Award. University of Pennsylvania, Department of Earth and Environmental Sciences, 2022. Award recognizes the contribution of the teaching assistant to undergraduate teaching.

Outstanding Undergraduate Research Award. John Brown University, Spring 2020.
Award recognizes the student that best displays excellence in completion of an undergraduate research project in science or mathematics.

Tony Jude Award Recipient for Outstanding Researcher during Research
Experience for Undergraduates program at University of Arkansas. Fayetteville, AR. Summer 2018. Awarded as the outstanding undergrad researcher.

First Place Recipient of John Brown University's Celebration of Academic Excellence. Siloam Springs, AR. Spring 2018. Awarded first place out of sixteen oral presentations from a variety of fields for my oral presentation on Exploring the additivity of urea and anion interactions.

Professional Affiliations

American Chemical Society. Fall 2017 – Winter 2025.
Geological Society of America. Fall 2020 – Winter 2025.
University of Pennsylvania: Graduate and Professional Student Assembly. Fall 2020 – May 2024.
URGE: Unlearning Racism in the Geosciences. Penn Pod. Spring 2020 – Spring 2022.
Graduate Women in STEM: Philadelphia Chapter. Fall 2020 – Spring 2021.
University of Pennsylvania: School of Arts and Sciences Government. Fall 2020 – Spring 2021.

Grants

Graduate Student Grant Recipient - Geological Society of America. Spring 2024. (2500$)
Student Grant Recipient - International Association of GeoChemistry. Spring 2024. (2300$)
Geological Society of America – Graduate Student Grant Recipient. Awarded Spring 2022.
GEOAllies Program - National Science Foundation Grant Recipient. Awarded Fall 2021.
Water Center at Penn Student Grant Recipient. Awarded Fall 2020.

Certifications, Skills, and Abilities

- Certification in College and University Teaching
- Statistical Analysis Training

- Teaching
- Lab preparation and supervision
- Communication skills
- Budget management
- Computer Skills: ArcGIS, Python, Prezi, Microsoft Suites
- Public Speaking
- Critical thinking and analysis
- Strong interpersonal skills
- Goal oriented
- Work well independently and in groups
- Instrumentation – High Performance Liquid Chromatography (HPLC), Ultra-Violet Visible Spectroscopy (UV-VIS), Scanning Electron Microscopy (SEM), Energy dispersive X-ray spectroscopy (EDX), Gaussian 03/16 Program, Liquid chromatography-Mass spectrometry (LCMS), Inductively coupled plasma-optical emission spectroscopy (ICP-OES), x-ray diffractometry (XRD), particle size analyzer