

Abiodun Emmanuel Idowu

Environmental Engineering | Environmental Biotechnology

Rolla, Missouri, USA

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Research on biological defluorination, protein and enzyme engineering, and synthetic biological systems for screening molecular activity. Experimental work combines analytical chemistry, microbiology, and reproducible data analysis.

Education

PhD in Environmental Engineering - in progress

Missouri University of Science & Technology, Rolla, Missouri | 2024 - Present

MSc in Environmental Engineering

University of Belgrade, Serbia | 2022 - 2024

BSc in Biochemistry / Science Laboratory Technology

Ekiti State University, Ado-Ekiti, Nigeria | 2012 - 2018

Research Experience

Graduate Research Assistant

Missouri University of Science & Technology, Rolla, Missouri | 2024 - Present

- Design and execute defluorination activity assays for model organofluorines, using fluoride release as a quantitative readout with appropriate controls and biological and technical replicates.
- Quantify fluoride using ion-selective electrodes and ion chromatography, including TISAB conditioning, calibration curves, blank and drift checks, carryover control, and analytical reporting.
- Generate enzyme variants through site-directed mutagenesis and error-prone PCR. Perform molecular cloning and verify constructs using colony PCR, gel electrophoresis, and Sanger sequencing.
- Prepare plasmids, quantify DNA, and support recombinant expression and screening in *E. coli*. Apply aseptic technique, media preparation, serial dilution, colony counting, and growth measurements.
- Analyze experimental data in Python and Excel to produce calibration models, growth curves, and research figures.

Graduate Researcher

University of Belgrade, Serbia | 2022 - 2023

- Applied atomic absorption spectroscopy and HPLC to environmental and food samples, including trace metals, phenolic compounds, and pesticide residues.
- Evaluated zeolite sorbents through cation exchange capacity testing and copper removal from aqueous solutions.
- Presented a seminar on PFOS and PFOA in food systems, covering occurrence, exposure pathways, and risk implications.

Industrial Experience

Internship Trainee

Frikom DOO, Belgrade, Serbia | 2023

- Collected field and laboratory water samples and assessed hardness and key physicochemical parameters for water quality monitoring.
- Evaluated water and wastewater treatment processes and supported the development of efficient wastewater disposal strategies.

Student Technologist / Research Intern

Federal Institute of Industrial Research (FIIRO), Oshodi, Nigeria | 2016

- Performed proximate analysis of food samples and charcoal analysis using standard analytical methods.
- Assisted with materials characterization and the processing and drying of food and agro-allied products in pilot-scale operations.

Clinical Laboratory Experience

Laboratory Technologist

Hope Medical Centre, Sango-Ota, Nigeria | 2018 - 2020

- Performed clinical laboratory analyses on blood, body fluids, tissues, and cells to support diagnostic workflows.
- Conducted blood crossmatching and differential cell counts; operated and maintained microscopes, cell counters, and precision laboratory equipment.
- Recorded and reported laboratory results and supported quality assurance and quality control practices.

Awards and Scholarships

Certificate of Merit - ACS ENVR student presentation competition | 2026

Recognized for the oral presentation "Discovering enzymatic pathways to break carbon-fluorine bonds in perfluorinated carboxylic acids."

FSB World in Serbia Scholarship | 2022

Scholarship for postgraduate study in Serbia.

Teaching and Service

Graduate Teaching Assistant

Missouri University of Science & Technology, Rolla, Missouri | 2025

- Supported undergraduate laboratory and recitation sessions through preparation, instructional assistance, grading, and feedback.
- Helped students troubleshoot experimental and calculation errors and reinforced laboratory safety and proper experimental technique.

Circular Economy Education Project for Kids

University of Belgrade, Serbia | 2023

- Translated educational content on circular economy and waste management into Yoruba. Original material was developed by Dr. Maja B. Đolić and Alexandra Vučinić.

Coding for Kids - Volunteer Instructor

Lagos, Nigeria | 2020

- Introduced primary school students to programming through Scratch and HTML.

Undergraduate Tutor

Ekiti State University, Ado-Ekiti, Nigeria | 2014 - 2017

- Tutored second- and third-year undergraduates in Biochemistry and Science Laboratory Technology courses.

Journal Article

Amoh, P. O., **Idowu, A. E.**, Grube, E. R., Mormile, M. R., & Schroer, H. W. (2025). Draft genome sequences of four phosphate-solubilizing microbes of the family Burkholderiaceae isolated from tailings from the former Pea Ridge Mine in Washington County, MO, USA. *Microbiology Resource Announcements*, 14(12), e01144-25.

<https://doi.org/10.1128/mra.01144-25>

Technical Skills

Analytical chemistry: Fluoride ion-selective electrodes; ion chromatography; atomic absorption spectroscopy; HPLC; sample preparation; calibration; analytical quality assurance and control.

Molecular biology: Site-directed mutagenesis; error-prone PCR; Gibson assembly; Golden Gate assembly; restriction-ligation cloning; plasmid preparation; colony PCR; gel electrophoresis; Sanger sequencing verification.

Microbiology and screening: Recombinant expression in *E. coli*; transformation and co-transformation; aseptic technique; culture media preparation; serial dilution; colony counting; growth kinetics; defluorination assays.

Data analysis: Python and Excel for experimental data analysis, calibration models, growth curves, and research figures.

Conference Presentations

Idowu, A. E., Rathbun, C., & Schroer, H. (2026). Discovering enzymatic pathways to break carbon-fluorine bonds in perfluorinated carboxylic acids. ACS Fall 2026 · Division of Environmental Chemistry (ENVR).

Oral presentation | Certificate of Merit

Idowu, A. E., Rathbun, C., & Schroer, H. (2025). Discovering enzymatic pathways to break carbon-fluorine bonds in perfluorinated carboxylic acids. Mid-America Environmental Engineering Conference (MAEEC) · Washington University in St. Louis.

Conference presentation | October 11, 2025

Idowu, A. E., Rathbun, C., & Schroer, H. (2025). Discovering enzymatic pathways to break carbon-fluorine bonds in perfluorinated carboxylic acids. AEESP Research and Education Conference · Duke University.

Poster presentation | May 21, 2025

Conference program

Idowu, A. E., & Schroer, H. (2024). Engineering Biocatalysts to Mineralize Perfluorinated Carbon Chains. Mid-America Environmental Engineering Conference (MAEEC).

Conference presentation

Seminar Presentations

Perfluorooctane sulfonate and perfluorooctanoic acid in food (2023).

The Baia Mare gold mine cyanide spill: Causes, impacts and liability (2023).

Nanomaterials as waste (2023).

The state of the art of environmental engineering and wastewater management in Nigeria (2023).

Research and Writing Online

Schroer Lab, Missouri University of Science & Technology
Say It, Abiodun - Substack