

Elizabeth A. Boyd, E.I.

EDUCATION

Ph.D. in Systems Engineering
Emphasis in Chemical Engineering

(expected) May 2027

University of Louisiana at Lafayette

Dissertation Topic: Degradation of Perfluoroalkyl Substances (PFAS) using Advanced Oxidation Techniques

Bachelor of Science in Chemical Engineering

May 2021

Minors: Bioprocess Engineering, Mathematics, Chemistry

University of Louisiana at Lafayette

EXPERIENCE

Research Environmental Engineer

September 2025-Present

Energy Institute of Louisiana, University of Louisiana at Lafayette

- Evaluation of pollution sources and environmental impacts
- Conducting fieldwork to collect environmental and operational data
- Collection and assessment of data of port water usage and associated utilities
- Analysis of water and wastewater treatment processes to identify potential improvements

Research Assistant

August 2021-September 2025

Dept. of Chemical Engineering, University of Louisiana at Lafayette

- Designing, planning, and scheduling experiments across multiple areas of research based on available literature and research gaps
- Managing, scheduling, and planning research for a team of 1-2 undergraduate researchers to effectively meet research goals and deadlines
- Working with analytical chemists to develop accurate analytical methods for quantification of pollutants across a variety of analytical instruments
- Collecting, organizing, and analyzing data from experiments to advance understanding of reaction kinetics for removal of PFAS in water using advanced oxidation techniques
- Maintaining knowledge of EPA regulations, including RCRA, CERCLA, CAA, CWA, SDWA, and the P2 Act, to provide lectures to undergraduate students enrolled in a hazardous waste management course
- Demonstrating kinetic studies for undergraduate students learning reactor design and assisting students with the process of determining order of reaction from kinetic data
- Leading tours of laboratory spaces covering my own research and that of other researchers for groups of prospective undergraduate students and their parents interested in learning about the research done by the University
- Presenting to audiences of 20-30 people, including industry leaders and government officials, on new ideas in sustainable engineering and manufacturing as an ambassador of the University at an international workshop focused on development of a circular economy
- Presenting research at regional and national conferences to audiences of up to 125 people consisting of technical experts, industrial leaders, and colleagues

Team Member/Sales Leader

July 2020-July 2022

Tractor Supply Company

- Cultivated and maintained client relationships
- Addressed client questions and issues in-person and via telephone
- Provided technical knowledge of available products to customers to ensure client satisfaction

Undergraduate Research Assistant

August 2016-May 2020

University of Louisiana at Lafayette

- Worked on a variety of projects including comparison of analytical techniques for efficient analysis of volatile organic compounds from fermentation broth
- Shared research via poster presentation at the American Institute of Chemical Engineers Annual Student Meeting

Student Trainee

April 2018-March 2020

US Army Corps of Engineers

Engineering Research and Development Center - Concrete and Materials Branch

- Collected data from a variety of physical testing methods according to ASTM methods as required
- Analyzed and compared results from physical testing with outcomes from advanced modeling software under senior engineer supervision
- Collaborated in planning and facilitating a STEM outreach program for local high school students

Student Trainee

May 2014-April 2018

US Army Corps of Engineers

Vicksburg District Office - Hydraulics and Hydrology Branch

- Built, organized, and maintained large databases, digital and physical, for hydrology-related projects
- Provided front-line public communication by fielding telephone inquiries
- Supported hydrologic analyses and other mission-critical tasks through entering and managing data, interpreting information from water control manuals, and assisting in the preparation of technical reports
- Conducted fieldwork including attending dam inspections along the Yazoo and Sunflower Rivers near Warren County, MS

Relevant Coursework

- Wrote and defended an NSF-style grant proposal:
 - Developed and pitched potential proposal topics based on gaps in literature
 - Researched, planned, and authored the proposal including project methodology, project timeline, assessment of broader impacts, and annual budget planning
 - Utilized committee feedback to improve the initial proposal and successfully defended the final proposal before a graduate committee
- Design of a full municipal wastewater treatment plant given the population of the city with a presentation of the final design for critique and a full technical report for the design, including technical specifications and drawings
- Preliminary (30%) design work for environmental remediation of various polluted sites given constraints such as treatment type required by the client
 - While all client preferences for treatment type were considered for preliminary design, it was necessary to recommend more effective treatment options in some cases
- Development of a comprehensive project management plan for construction of a chemical plant including conducting market research on construction, equipment, and manpower costs, development of a project charter, definition of project scope including reasonable project timelines and budget estimates, establishing a communication plan, organizing a clear work breakdown structure, and conducting thorough risk assessments

Publications

Papers

M. Zappi, E. Boyd, W. Sharp, C. Zeringue, D.L. Fortela, G. Simon, S. Holmes; *An Assessment of Production Opportunities for Value-Added Co-Products from Selected Louisiana Seafood Processing Waste Sources*; May 25, 2023, Louisiana Department of Wildlife and Fisheries Grant No. 2000606948.

Posters and Presentations

K. Ashurst, E. Boyd, W. Holmes, M. Zappi; *Degradation of Perfluoro-Octanoic Acid (PFOA) using Hydrogen Peroxide/Ultraviolet Light-Based Advanced Oxidation Processes: Optimization of Process Parameters*; April

2, 2025, Southern Section Association of Official Analytical Chemists International, Atlanta, GA. Oral Presentation.

K. Ashurst, E. Boyd, W. Holmes, M. Zappi; *Effects of Hydrogen Peroxide Concentration and pH Adjustment on the Efficiency of Perfluorooctanoic Acid (PFOA) Degradation under Ultraviolet Irradiation*; March 24, 2025, UL Engineering and Technology Week, Lafayette, LA. Oral Presentation.

K. Ashurst, E. Boyd, W. Holmes, R. Hernandez, M. Zappi; *Determination of the Effect of Hydrogen Peroxide Concentration and pH Adjustment on Treatment Efficiency of Perfluoro-Octanoic Acid Degradation Under Ultraviolet Irradiation*; March 24, 2025, UL Engineering and Technology Week, Lafayette, LA. Poster Presentation.

K. Ashurst, E. Boyd, W. Holmes, R. Hernandez, M. Zappi; *Determination of the Effect of Hydrogen Peroxide Concentration on Perfluorooctanoic Acid (PFOA) Degradation Under Ultraviolet Irradiation*; November 15, 2024, Conference, Advance Undergraduate Research Conference, Lafayette, LA. Oral Presentation.

K. Ashurst, E. Boyd, W. Holmes, R. Hernandez, M. Zappi; *Determination of the Effect of Hydrogen Peroxide Concentration on Perfluorooctanoic Acid (PFOA) Degradation Under Ultraviolet Irradiation*; November 15, 2024, Conference, Advance Undergraduate Research Conference, Lafayette, LA. Poster Presentation.

E. Boyd, K. Ashurst, W. Holmes, R. Hernandez, E. Revellame, W. Chirdon, D. Gang, M. Zappi; *Investigation of Advanced Oxidation Processes for Removal of Perfluoro-octanoic Acid (PFOA) from Aqueous Matrices*; October 31, 2024, American Institute of Chemical Engineers Annual Meeting, San Diego, CA. Oral Presentation.

W. Holmes, E. Boyd, K. Ashurst, M. Zappi; *Removal of Perfluorooctanoic Acid (PFOA) in Water using FluoroMatch non-targeted PFAS Workflow with Next Generation Quadrupole Time-of-Flight Technology: The Agilent Revident LC/Q-TOF*. April 3, 2024, Southern Section Association of Official Agricultural Chemists International, Atlanta, GA. Oral Presentation.

S. Scelfo, C. Hontiveros, E. Boyd, K. Ashurst, A. Gallo, M. Zappi, W. Holmes; *Enhancing Hydrogen Peroxide Measurement Precision for Improved Oxidation Reaction Understanding*; April 2024, Southern Section Association of Official Agricultural Chemists International, Atlanta, GA. Poster Presentation.

E. Boyd, K. Ashurst, X. Lei, W. Holmes, D. Gang, R. Hernandez, M. Zappi; *Removal of Perfluorooctanoic Acid (PFOA) in Water Using Advanced Oxidation Processes*; March 2024, UL Engineering and Technology Week, Lafayette, LA. Poster Presentation.

K. Ashurst, E. Boyd, W. Holmes, D. Gang, R. Hernandez, M. Zappi; *Development of Alternative Methods for Analysis of Perfluorooctanoic Acid using Gas Chromatography and Mass Spectrometry*; November 4, 2023, Advance Undergraduate Research Conference, Lafayette, LA. Poster Presentation.

E. Boyd, S. Broussard, W. Holmes, D. Gang, R. Hernandez, M. Zappi; *Removal of 1,4-Dioxane in Water Using Advanced Oxidation Processes*; October 2023, Southwest Section Meeting of the American Water Works Association, Lafayette, LA. Poster Presentation.

E. Boyd, S. Broussard, W. Holmes, R. Hernandez, D. Gang, M. Zappi; *Degradation of Emerging Groundwater Pollutants via Advanced Oxidation Processes*; April 2022, Southwest Section Meeting of the American Water Works Association, Lafayette, LA. Poster Presentation.

E. Boyd, W. Holmes, and M. Zappi; *Comparison of Different Methodologies for Rapid Analysis of Volatile Organic Acids in Fermentation Broth using GC/MS*; November 12, 2019. Conference: 2019 AIChE Annual Meeting, Orlando, FL. Poster Presentation

Professional Memberships

American Institute of Chemical Engineers

- Environmental Division
- Education Division

American Society of Civil Engineers

- Environmental and Water Resources Institute (EWRI)
- Coasts, Oceans, Ports, and Rivers Institute (COPRI)

Louisiana Engineering Society

Skills

Technical

- Expertise in set-up and operation of bench-top scale reactors for advanced oxidation processes including ultraviolet irradiation-based processes and ozone-based processes
- Development of consistent data collection and management protocols
- Strong knowledge of a variety of analytical instruments:
 - High Performance Liquid Chromatography
 - Tandem Mass Spectroscopy (HPLC/MSn)
 - Quadrupole Time-of-Flight (HPLC/Q-ToF)
 - Gas Chromatography
 - Mass Spectroscopy (GC/MS)
 - Solid Phase Microextraction (SPME)
 - Purge and Trap
- Development of rudimentary scripts using Python and Visual Basic languages to streamline repetitive tasks
- Innovative troubleshooting using available and recycled materials to address emergent engineering challenges

Communication

- Sharing complex concepts on all levels of technical expertise both verbally and in writing
- Working independently and within a team for preparation of technical reports
- Preparing effective visual aids and posters to support oral presentations of data

Software

- Aspen Plus
- POLYMATH
- Python (basic)
- SAS-JMP statistical analysis software
- Microsoft Project
- HEC-RAS (basic)
- Auto-CAD (basic)
- Arc-GIS

Leadership

Treasurer – UL Graduate Student Organization

2025

Departmental Representative – UL Graduate Student Organization

2022-2025

Achievements & Qualifications

Licensed Engineer Intern in the State of Louisiana

University of Louisiana at Lafayette Bloodborne Pathogen Exposure Prevention Certification

CITI Program Introduction to Biosafety Stage 1 Certification

2025 Louisiana Engineering Foundation Vincent A. Forte Fellow