

## KELBY ANDERSON

### RESEARCH INTERESTS

A highly motivated and capable Chemical and Environmental Engineering PhD student at Yale University, dedicated to researching and designing applicable, scalable, and integrated closed loop systems for reducing society's dependence on depleting raw materials. Experienced in conducting experiments in wet and dry labs and in the field, conceiving and testing my own hypotheses, explaining concepts to peers, writing research grants, and leading teams.

### EDUCATION

**PhD in Chemical and Environmental Engineering** **Expected 2028**  
Yale University, New Haven, CT

**Master of Engineering in Environmental Engineering** **May, 2023**  
Lehigh University, Bethlehem, PA  
GPA 4.0

**Bachelor of Science in Chemical Engineering** **May, 2022**  
**Global Citizenship Program Certification**  
Lehigh University, Bethlehem, PA  
GPA 3.97

### RESEARCH EXPERIENCE

**Environmental Engineering Research Assistant for Lea Winter** **August 2023 – Present**

- Conducting reactor studies using a novel plasma-electrochemical flow cell
- Operating a Denton Evaporator for depositing metal catalyst onto gas diffusion electrodes
- Running analysis with gas chromatography and NMR spectroscopy and preparing chemical solutions
- Studying plasma chemistry, electrochemistry, and associated laboratory procedures

**Chemical Engineering Research Assistant for Professor Hugo Caram** **June – August 2022**

- Directed the writing of a United States Department of Energy grant explaining and defending further experimentation of a cyclical thermal swing adsorption process for direct air capture of carbon dioxide
- Critically thought about how to handle water vapor naturally present in air to decrease the associated energy and cost requirements

**Campus Sustainability Impact Fellow** **August 2021 – August 2022**

- Conducted literature review and waste audits on recycling streams at Lehigh University to create a process for reuse of plastic as new construction materials
- Led behavioral experiments, ultimately concluding that the local recycling stream was contaminated with trash because students did not know or care how to recycle
- Developed a full-scale and implementable strategy to improve recycling behavior with educational components, user feedback, and quantifiable metrics of success

**Chemical Engineering Research Assistant for Professor Steven McIntosh** **June – August 2020**

- Explored, analyzed, and compared green chemical solutions to closing the phosphorus cycle

- Realized that a multifaceted approach – in this case including adjusting inputs, minimizing process losses, recovering waste, and reusing material – is essential to solve any problem and especially to create closed loop systems
- Advanced skills in reading and analyzing academic articles

### **TEACHING EXPERIENCE**

#### **Teaching Assistant for Mass Transfer Class**

**January – May 2022**

- Taught over 30 students how to use Aspen Plus
- Explained the fundamental concepts of mass transfer theory, including distillation and separation processes, during class time and in office hours
- Graded writing assignments and analyzed process flow diagrams, models, and simulations

#### **Teaching Assistant for Professional Development Class**

**September 2020 – December 2021**

- Formulated a reasonable grading rubric and graded more than 30 homework responses
- Assisted professor in updating the grading software

#### **Lehigh Academic Services Calculus Tutor**

**September – December 2019**

- Assisted any students that needed help with Calculus 1, 2, or 3
- Clarified and re-explained certain concepts in varying ways

### **INTERNSHIP EXPERIENCE**

#### **Mussel Polymers Intern**

**June – August 2021**

- Formulated an underwater adhesive to be used in coral applications
- Conducted and led experiments in wet and dry labs: adhered lap shears and pulled according to ASTM D1002 standards, prepared solutions of various concentrations, and performed time to withstand 10-pound tests
- Directed the analysis of polymers with NMR and FTIR spectroscopy
- Developed organic chemistry skills, focusing on mechanisms of polymerization and biomimetics

### **LEADERSHIP EXPERIENCE**

#### **Engineers Without Borders Stillwater Project Lead**

**January 2022 – August 2023**

- Initiated communication with the partnered community in Stillwater, New Jersey to understand the social capital and determine an appropriate list of technical priorities
- Created an approved work plan that detailed the scope and schedule for improving the water distribution system
- Worked to transfer ArcGIS data points into EPANET model to determine pressure and chlorine concentrations throughout system

#### **Engineers Without Borders President**

**August 2021 – May 2022**

- Handled the club's international partnerships post-Covid
- Closed out a project and initiated two new water distribution projects in communities that needed engineering services, one internationally and one domestically
- Oversaw 11 subdivisions of the club, including project classes, social classes, fundraising, outreach, and translating
- Established communication between professors, students, and the partnered international communities in two meetings each week

**Engineers Without Borders Vice President****August 2020 – May 2021**

- Ran weekly virtual meetings with four academic advisors to discuss club updates and any questions, concerns, and thoughts
- Directed a complete reorganization of the club's databases to transfer all information into one Google Drive

**Community Gardens Project Lead****August 2019 – May 2020**

- Communicated with four students to design and implement an irrigation system at a local community garden
- Designed system, calculated pressure head required to reach the spigots, and performed cost analysis

**Engineers Without Borders Travel Team****March 2019**

- Traveled abroad to Dominican Republic to assess the community and the potential for a partnership
- Acquired GIS and water quality data to begin development of a water distribution system in El Manantial

**Engineers Without Borders Fundraising Chair****January – May 2019**

- Planned three fundraising events for the organization, acquiring donations from local businesses, gaining university approval, and advertising events to the community

**HONORS AND AWARDS****Presidential Scholarship****2022 – 2023**

Provides students with a GPA above 3.75 free tuition to pursue a year of graduate study

**Harry M. Ullman Prize****2022**

Awarded to the highest-ranking seniors majoring in chemistry and chemical engineering

**Robert Ridgeway Senior Cup****2022**

Awarded to the senior(s) in the P.C. Rossin College of Engineering and Applied Science with the highest cumulative grade point average

**Dean's List Highest Honors****2018 – 2022**

Awarded to students with a grade point average above 3.8

**Robert C. Hicks Prize****2021**

Mr. Robert C. Hicks, Class of 1949, endowed prize at Lehigh University to encourage and recognize outstanding scholastic achievement in chemical engineering

**SKILLS****Technical:** Unit Operations, Process Control, Instron Testing, Cleanroom Training, NMR Spectroscopy, Gas Chromatography, Denton Evaporator**Software:** MATLAB, MS Visio, Aspen Plus and Aspen Dynamics, ArcGIS, EPANET, Google Earth Engine, Python, R, Microsoft Suite**PROFESSIONAL MEMBERSHIPS****Phi Beta Kappa****2022 – Present**

An honor society which recognizes scholastic achievement in liberal arts and sciences

**Tau Beta Pi****2022 – Present**

An engineering honor society which recognizes both scholastic achievement and devotion to integrity

## **WORK EXPERIENCE**

### **Sales Clerk at the Boat House**

**July – August 2023, June – October 2020**

- Operated the cash register and closed out the drawer at the end of shift
- Marketed products to customers and designed product displays

### **Lehigh Library Graduate Supervisor**

**August 2022 – May 2023**

- Provided students, faculty, and alumni with necessary resources
- Operated all phone calls to the university, directing the caller to the appropriate department

### **Lehigh University Newman Center**

**August 2018 – May 2022**

- Assisted church officials with any necessary daily tasks
- Greeted newcomers and visitors

### **Busser at Matunuck Oyster Bar**

**June – August 2019**

- Cleared tables, maintained restaurant cleanliness, and restocked supplies
- Assisted managers, waitresses, and customers with anything they needed

### **Takeout Window Employee at Cap'n Jacks**

**June – August 2018**

- Served ice cream, bagged and organized over ten dinners and desserts at a time
- Operated cash flow