

# Kevin E. Pataroque

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## PROFESSIONAL PREPARATION

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**Yale University**, New Haven, CT

*Advisor: Menachem Elimelech*

Ph.D. Environmental Engineering, *Expected Graduation: May 2026*

**Case Western Reserve University**, Cleveland, OH

*Advisors: Christine Duval, Mohan Sankaran*

B.S.E. Chemical Engineering, *magna cum laude*, May 2021

GPA: 3.84

**Case Western Reserve University**, Cleveland, OH

B.A. English, *magna cum laude*, May 2021

GPA: 3.84

## HONORS AND ACHIEVEMENTS

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**Arnold and Mabel Beckman Foundation: Beckman Scholar Award** May 2019-August 2020

**AIChE Environmental Division: 1<sup>st</sup> Place Undergraduate Poster Award** November 2020

CWRU ChBE Communication to Public Award November 2020

NESOWEA Student Design Challenge 1<sup>st</sup> Place: Wastewater Division March 2020

Case Alumni Association Junior/Senior Scholarship June 2020-May 2021

CWRU Intersections Poster Symposium: Engineering District, 3<sup>rd</sup> Place Fall 2018

CWRU Summer Undergraduate Research in Energy and Sustainability Scholar May 2018-August 2018

CWRU University Scholarship May 2017-August 2021

## RESEARCH EXPERIENCE

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*Yale University*

**Elimelech Lab** – Aug. 2021-Present

- Primary researcher. Investigates transport phenomena in High Pressure Reverse Osmosis (HPRO) setup for water desalination and decontamination. Uses analytical chemistry techniques to measure salt and water flux across Reverse Osmosis membrane.
- Responsible for literature review, experimental design and execution, data analysis, scientific communication. Research proposal under review by the National Science Foundation.

*Case Western Reserve University*

**Duval & Sankaran Labs** – Dec. 2017-Aug. 2020

- Primary researcher. Engineered electrochemical micro-gap plasma to degrade EPA emerging contaminant perfluorooctanoic acid (PFOA). Elucidated mechanisms of water-based radical generation using analytical chemistry techniques such as fluorescence and UV-VIS spectroscopy.
- Collaborated with UIUC researchers to model reaction kinetics and radical speciation using software such as COMSOL, MINTEQA2, and Origin
- Responsible for experimental design and execution, data analysis, scientific communication. Developed scientific proposal to the Arnold & Mabel Beckman *Beckman Scholars Program*, received \$21,000 in funding.

### **Duval Lab – Case Western Reserve University (Sept. 2020-Aug. 2021)**

- Assisted Ph.D. candidate in Duval Lab to functionalize commercial membrane for selective separation of copper-67 isotope for applications in medical theranostics.
- Assisted Ph.D. candidate to functionalize commercial membranes for selective separation of actinide and lanthanide species in nuclear waste streams.
- Responsible for experimental execution, data analysis, scientific communication. Presented scientific results at CWRU Spring 2021 Intersections Research Symposium.

### **ENGINEERING DESIGN AND PROJECTS**

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#### **First Solar: Achieving 90% CdTe Recovery in Recycled Solar Cell**

*Senior Design Capstone, January-May 2021*

- Designed separation process to separate and recycle First Solar cadmium telluride photovoltaic modules. Developed a caustic-recycling loop to lower operating costs to \$10,000 annually.
- Worked in an engineering team setting to develop PFD, assess techno-economic considerations, and analyze OSHA and EPA safety standards. Presented final presentation and report to First Solar executives.

#### **No Waste, Problem Aced: Optimizing Beneficial Reuse of Biosolids Prior to BNR Upgrades.**

*Northeast Ohio Student Design Competition, August 2019-May 2020*

- Developed composting process to efficiently dispose of biosolids in Upper Tuscarawas WWTP wastewater treatment process. Determined a payback period below 6 years compared to pre-existing process.
- Worked with environmental engineers to develop PFD, analyze OSHA and EPA safety standards. Presented final presentation and report at OWEA and WEFTEC conferences.

### **PROPOSAL WRITING EXPERIENCE**

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#### **Closed-Loop Wastewater Processes: Transport Mechanisms in High-Pressure Reverse Osmosis**

*Submitted to National Science Foundation, November 2021*

- Proposal advised by PI-Menachem Elimelech
- Contributed text to introduction, intellectual merit, broader impacts. Reviewed literature relating to electrodialysis and ion separation, proposed preliminary experiments.

#### **Degradation of Perfluoroalkyl Compounds by Interfacial Reactions between a Non-Equilibrium Plasma and Water**

*Submitted to the Arnold and Mabel Beckman Foundation, awarded May 2019*

- Proposal advised by PI-Mohan Sankaran, co-PI Christine Duval
- Contributed text to the literature search, introduction, experimental methods. Collected and analyzed preliminary data. Presented and defended proposal before three different departments.

## POSTER PRESENTATIONS AT CONFERENCES

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1. Suresh, Priyanka; **Pataroque, Kevin**; Duval, CE. “Affinity-Based Separations of Lanthanides and Actinides.” *CWRU Intersections: SOURCE Symposium and Poster Session Beckman Series*, Cleveland, OH, April 2021.
2. **Pataroque, Kevin**; Sankaran, Mohan; Duval, CE. “Elucidation of Radical Species in an Electrolytic Non-equilibrium Plasma-Water System” *American Institute of Chemical Engineers Poster Symposium*, San Francisco, CA, November 2020.
3. **Pataroque, Kevin**; Sankaran, Mohan; Duval, CE. “Elucidation of Radical Species in an Electrolytic Non-equilibrium Plasma-Water System” *CWRU Intersections: SOURCE Symposium and Poster Session*, Cleveland, OH, November 2020.
4. **Pataroque, Kevin**; Sankaran, Mohan; Duval, CE. “Degradation of Perfluoroalkyl Compounds by Interfacial Reactions between a Non-Equilibrium Plasma and Water” *Arnold & Mabel Beckman Foundation*, Irvine, CA, August 2020.
5. **Pataroque, Kevin**; Mann, Aaron; Thompson, Peter; Rhoads, Kurt. “No Waste, Problem Aced: Optimizing Beneficial Reuse of Biosolids Prior to BNR Upgrades.” *Water Environment Federation’s Technical Exhibition and Conference*, New Orleans, LA, August 2020.
6. **Pataroque, Kevin**; Sankaran, Mohan; Duval, CE. “Degradation of Perfluoroalkyl Compounds by Interfacial Reactions between a Non-Equilibrium Plasma and Water” *CWRU Intersections: SOURCE Symposium and Poster Session*, Cleveland, OH, May 2020.
7. **Pataroque, Kevin**; Sankaran, Mohan; Duval, CE. “Degradation of Perfluoroalkyl Compounds by Interfacial Reactions between a Non-Equilibrium Plasma and Water” *CWRU Intersections: SOURCE Symposium and Poster Session*, Cleveland, OH, December 2018.
8. **Pataroque, Kevin**; Sankaran, Mohan; Duval, CE. “Mechanisms of the Decomposition of Perfluorooctanoic Acid through Micro-Gap Plasma Treatment” *CWRU Summer Undergraduate Research in Energy and Sustainability*, Cleveland, OH, May 2018.

## PROFESSIONAL ACTIVITIES & COMMUNITY SERVICE

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### Member

- Water and Environment Federation 2020-Present
- American Institute of Chemical Engineers 2018-Present

### Leadership

- CWRU Labre Homeless Outreach (Executive Board) 2018-2020
- Creative Writing Club (Event Coordinator, President) 2018-2021

Office of Energy and Sustainability: Sustainability Ambassador Intern 2017-2020

Undergraduate Admissions & First Year Experience: Orientation Leader, Tour Guide 2018-2020

## STEM OUTREACH EXPERIENCE

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### *The Observer Primary Science Writer (Fall 2020-May 2021)*

- Responsible for publishing weekly articles in student-run newspaper focused on COVID-related policy, science education, and global science news coverage. Used audio technology to interview students, faculty, and surrounding communities around the Cleveland area. Corresponded with copy and content editors to publish fifteen articles.

***Synapse Content Editor (April 2021)***

- One of seven content editors of the Spring 2021 edition of *Synapse*, a Northeast Ohio intercollegiate science magazine. Worked on an individual basis with writers, edited for accessibility, content depth, and basic grammar.

***Freelance Writer & Editor (April 2020-Present)***

- Works independently to edit undergraduate, graduate, medical, and law school personal statements in STEM. Marketed personal services using social media and freelance sites (Upwork, NextDoor). Participated in entrepreneurial seminars, applied and received micro grant.

***CWRU Science and Human Rights Coalition Sciencepalooza Volunteer (Fall 2020)***

- Volunteered with Duval Lab Group, wrote abstract and informational material for group submission. Used powerpoint and Geiger counter activity to educate high school students on radiation in everyday life.

***CWRU Undergraduate Research Hear Their Stories, Discover Your Possibilities Panelist (Fall 2020)***

- Representative for Office of Undergraduate Research, primary speaker and representative for undergraduate research experience at CWRU to 1000+ students in the CWRU class of 2024.

***CWRU Alpha Phi Omega Replay for Kids Volunteer (Spring 2020)***

- Repaired broken childrens' toys. Soldering loose wire and sewed cloth over empty patches.