

Yanghua Duan

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ACADEMIC QUALIFICATIONS

Yale University	Jan 2024 – Present
Postdoctoral Scholar Advisor: Prof. Menachem Elimelech	
University of California, Berkeley	Aug 2022 – Dec 2023
Postdoctoral Scholar Advisor: Prof. David Sedlak	
University of California, Berkeley	Aug 2018 – Aug 2022
Ph.D., Civil and Environmental Engineering Dissertation: Electrochemical Advanced Oxidation Processes for Distributed Water Treatment Advisor: Prof. David Sedlak	
University of California, Berkeley	Aug 2017 – May 2018
M.S., Civil and Environmental Engineering	
Tongji University	Sept 2013 – Jun 2017
B.E., Environmental Engineering	

RESEARCH EXPERIENCE

Postdoctoral Scholar	University of California, Berkeley
Department of Civil and Environmental Engineering	2022 – 2023
<ul style="list-style-type: none">• Employed surface characterizations to understand factors affecting the longevity of electrodes.• Performed techno-economic analysis of electrochemical treatment processes for point-of-use water treatment.• Managed a research project and research team of five researchers, completed reports to funding agencies.	
Graduate Student Researcher	University of California, Berkeley
Department of Civil and Environmental Engineering	2017 – 2022
<ul style="list-style-type: none">• Designed and optimized electrochemical treatment processes for distributed water treatment and carbon sequestration.• Investigated the fate of reactive oxidants generated by electrochemical processes.• Developed and improved analytical methods for differentiating per- and polyfluoroalkyl substances (PFAS) associated with aqueous film forming foam from other PFAS sources.	

Research Intern

Lanzhou Institute of Chemical Physics

- Electrochemical resource recovery from source-separated urine

Chinese Academy of Sciences

2017

Undergraduate Researcher

College of Environmental Science and Engineering

- Weak magnetic field-assisted contaminants removal by zero valent iron

Tongji University

2015 – 2016

GRANT AND PROPOSAL WRITING EXPERIENCE

- National Alliance for Water Innovation (NAWI), *Electrochemical advanced oxidation*, \$1.3M David Sedlak (PI, University of California, Berkeley), Contributor.
- Molecular Foundry proposal, Lawrence Berkeley National Laboratory, *Electrochemical advanced oxidation for distributed water treatment*, Lead researcher.
- Advanced Light Source general user proposal, Lawrence Berkeley National Laboratory, *Mechanistic study of the conversion of H₂O₂ to •OH radical on stainless steel using Operando APXPS*, Lead researcher.

PUBLICATIONS

Peer-Reviewed Publications

1. Tsou, K., **Duan, Y.**, Parks, A., Olivares, C., Dixit, F., Sedlak, D. L. & Alvarez-Cohen, L., PFAS Release from AFFF Impacted Solids Eluted with Stormwater and Saltwater. *ACS ES&T Water*.
2. Jiang, W., Haider, M., **Duan, Y.**, Han, J., Ding, Y., Mi, B., Wang, A. Metal-free Electrified Membranes for Contaminants Oxidation: Synergy Effect between Membrane Rejection and Nanoconfinement. *Water Research* **2024**, 120862
3. Tsou, K., Antell, E., **Duan, Y.**, Olivares, C. I., Yi, S., Alvarez-Cohen, L., & Sedlak, D. L. Improved Total Oxidizable Precursor Assay for Quantifying Polyfluorinated Compounds Amenable to Oxidative Conversion to Perfluoroalkyl Carboxylic Acids. *ACS EST Water* **2023**, 3, 9, 2996–3003.
4. Wang, Y., Xu, S., Wang, J., **Duan, Y.**, Qian, Y., Wang, H., ... & Yang, X. (2023). Ferryl-Involved Oxidation Coupling Processes over K x FeOCl Enzyme-Mimetic Catalysis: Mechanistic Insights and Kinetic Modeling. *ACS EST Water* **2023**, 3, 9, 2978–2988.
5. **Duan, Y.**; Jiang, W.; Sedlak, D. L., Surface Processes Control the Fate of Reactive Oxidants Generated by Electrochemical Activation of Hydrogen Peroxide on Stainless-Steel Electrodes. *Environmental Science & Technology* **2023**.
6. Lammers, L. N.; **Duan, Y.**; Anaya, L.; Koishi, A.; Lopez, R.; Delima, R.; Jassby, D.; Sedlak, D. L., Electrolytic Sulfuric Acid Production with Carbon Mineralization for Permanent Carbon Dioxide Removal. *ACS Sustainable Chemistry & Engineering* **2023**, 11, (12), 4800-4812.
7. Wang, X.; Li, J.-P.; **Duan, Y.**; Li, J.; Wang, H.; Yang, X.; Gong, M., Electrochemical Urea Oxidation

- in Different Environment: From Mechanism to Devices. *ChemCatChem* **2022**, *14*, (13), e202101906.
8. Greenwald, H.; Kennedy, L. C.; Ehde, A.; **Duan, Y.**; Olivares, C. I.; Kantor, R.; Nelson, K. L., Is Flushing Necessary During Building Closures? A Study of Water Quality and Bacterial Communities During Extended Reductions in Building Occupancy. *Frontiers in Water* **2022**, *4*.
9. **Duan, Y.**; Sedlak, D. L., An Electrochemical Advanced Oxidation Process for the Treatment of Urban Stormwater. *Water Research X* **2021**, *13*, 100127.
10. Charbonnet, J. A.; **Duan, Y.**; van Genuchten, C. M.; Sedlak, D. L., Regenerated Manganese-Oxide Coated Sands: The Role of Mineral Phase in Organic Contaminant Reactivity. *Environmental Science & Technology* **2021**, *55*, (8), 5282-5290.
11. Charbonnet, J. A.; **Duan, Y.**; Sedlak, D. L., The Use of Manganese Oxide-coated Sand for the Removal of Trace Metal Ions from Stormwater. *Environmental Science: Water Research & Technology* **2020**, *6*, (3), 593-603.
12. Wang, Z.; Tu, Q.; Sim, A.; Yu, J.; **Duan, Y.**; Poon, S.; Liu, B.; Han, Q.; Urban, J. J.; Sedlak, D.; Mi, B., Superselective Removal of Lead from Water by Two-Dimensional MoS₂ Nanosheets and Layer-Stacked Membranes. *Environmental Science & Technology* **2020**, *54*, (19), 12602-12611.
13. Yang, X.; **Duan, Y.**; Wang, J.; Wang, H.; Liu, H.; Sedlak, D. L., Impact of Peroxymonocarbonate on the Transformation of Organic Contaminants during Hydrogen Peroxide in Situ Chemical Oxidation. *Environmental Science & Technology Letters* **2019**, *6*, (12), 781-786.
14. Charbonnet, J. A.; **Duan, Y.**; van Genuchten, C. M.; Sedlak, D. L., Chemical Regeneration of Manganese Oxide-Coated Sand for Oxidation of Organic Stormwater Contaminants. *Environmental Science & Technology* **2018**, *52*, (18), 10728-10736.

Publications Submitted

1. **Duan, Y.**, Sedlak, D. L., Electrochemical Advanced Oxidation by Separation of Hydrogen Peroxide Generation and Activation Processes in Flow-through Reactors: Enhanced Selectivity by Electrostatic Repulsion. Submitted to *Nature Water*.
2. Jiang, W., **Duan Y.**, Bandaru S., Radjenovic J., Sedlak D.L., Mi B., Inhibition of Chlorinated Byproducts Formation by Boron-Doped rGO Anodes During Electrooxidation of Trace Organic Contaminants. Submitted to *Water Research*.

RESEARCH PRESENTATIONS

1. Electrification of Water: Distributed Treatment Systems for a Resilient and Sustainable Future. AEESP Future Faculty Seminar Series 2023.
2. Electrode longevity: An Overlooked but Critical Factor for the Adaptation of Electrified Water Treatment Processes, 266th ACS National Meeting & Exposition.
3. Reagent-free Electrochemical Advanced Oxidation for Distributed Water Treatment Enabled by Air-diffusion and Stainless Steel Electrodes, 2022 AEESP Research and Education Conference.
4. Factors Affecting the Yield of Hydroxyl Radical by Electrochemical Activation of H₂O₂ on Stainless

Steel Electrodes, 2022 Gordon Research Conference, Environmental Sciences: Water. Poster Presentation.

5. Electrochemical Advanced Oxidation for Distributed Water Treatment Enabled by Air-diffusion and Stainless Steel Electrodes, 263rd ACS National Meeting & Exposition.

6. An Electrochemical Advanced Oxidation Process for the Treatment of Urban Stormwater, Department of Civil and Environmental Engineering, UC Berkeley. Oct. 2021. Research spotlight talk.

7. Factors Affecting the Yield of Electrochemical Activation of H₂O₂ by Stainless-Steel Electrodes, 262nd ACS National Meeting & Exposition.

8. Electrochemical Advanced Oxidation for Urban Stormwater Treatment and Recharge, 260th ACS National Meeting & Exposition.

9. Electrochemical Advanced Oxidation for Urban Stormwater Treatment and Recharge, 2019 AEESP Research and Education Conference. Poster Presentation.

10. Electrochemical Advanced Oxidation for Urban Stormwater Treatment and Recharge, CERC-WET Industrial Advisory Board Meeting, 2019. Poster Presentation.

HONORS AND AWARDS

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| • Ellen Gonter research paper award honorable mention finalist | 2023 |
| • National Water Research Institute (NWRI) Member Agency Fellowship, \$5000 | 2020 |
| • Outstanding Graduate Student Instructor, University of California, Berkeley, \$1000 | 2020 |
| • National Endeavor Scholarship of Tongji University, ¥ 5000 | 2016 |
| • The First Prize of Tongji Scholarship of Excellent, ¥ 5000 | 2016 |
| • Outstanding Student Award, Tongji University | 2016 |
| • National Endeavor Scholarship of Tongji University, ¥ 5000 | 2015 |
| • The First Prize of Tongji Scholarship of Excellent, ¥ 5000 | 2015 |
| • Outstanding Student Award, Tongji University | 2015 |
| • Guo XieBiRong Scholarship, Tongji University, ¥ 3000 | 2014 |

TEACHING AND MENTORING EXPERIENCE

Graduate Student Instructor – Fall 2020 CE 115 Water Chemistry (Instructor: Dr. David Sedlak). University of California, Berkeley

Assisted in converting in-person classes to virtual classes. Led discussion sections for about 60 students. Organized virtual study room. Held office hours. Manage class Q&A through online platforms.

Guest Lecture – Fall 2019 CE 115 Water Chemistry (Instructor: Dr. Joseph Charbonnet). University of California, Berkeley. “Equilibrium modeling with Visual MINTEQ”

Graduate Student Instructor – Fall 2019 CE 115 Water Chemistry (Instructor: Dr. Joseph Charbonnet). University of California, Berkeley

Helped with lesson plan. Led weekly discussion sections for about 60 students. Held office hours and review sessions.

Grader – Spring 2018 CE 107 Climate Change Mitigation (Instructor: Dr. William Nazaroff). University of California, Berkeley

Graded homework and provided feedbacks to the instructors (about 150 students).

Grader – Fall 2017 CE 111 Environmental Engineering (Instructor: Dr. William Nazaroff). University of California, Berkeley

Graded homework and provided feedbacks to the instructors (about 120 students).

Mentoring and Research Advising

Wenhui Ding, Graduate researcher, Tsinghua University 2023

Wenhui Ding is pursuing a PhD at Tsinghua University

Xin He, Graduate researcher, Tsinghua University 2023

Xin He is pursuing a PhD at Tsinghua University

Avery Parks, Undergraduate researcher, University of California, Berkeley 2023

Avery Parks is pursuing a MS at University of California, Berkeley

Wajeha Tauqir, Mentee, University of Connecticut 2023

Wajeha is pursuing a PhD at University of Connecticut

Chenghan Xie, Mentee, Peking University 2021

Chenghan is pursuing a PhD at Penn State University

Junchao Lin, Mentee, Tianjin University 2021

Junchao is pursuing a MEng at Duke University

Jinzhou fan, Mentee, Duke University 2020

Jinzhou is pursuing a PhD at Chinese Academy of Sciences

Hallie McManus, Undergraduate researcher, University of California, Berkeley 2019

Hallie is working at Environmental Protection Agency

Zherui Lin, Undergraduate researcher, University of California, Berkeley 2019

Zherui is pursuing a MS at Stanford University

PROFESSIONAL SERVICE AND LEADERSHIP

Reviewing activities: Proceedings of the National Academy of Sciences, Environmental Science & Technology, Accounts of Chemical Research, Frontiers of Environmental Science and Engineering, Environmental Research

(CEE)² Community-Engaged Education 2022– present

- Helped high school teachers to design and teach a course about sustainability
- Led in-class activities for bioswale design

CEE For Anti-Racism, Member 2021 – present

- Served as a member to promote anti-racism in the department

Bay Area Scientists Inspiring Students (BASIS), Volunteer 2019 – present

- Led in-class activities simulating urban stormwater treatment
- Designed and taught courses about SARS-CoV-2 wastewater-based epidemiology

Environmental Engineering Advocacy Team (EEAT), Member 2017 – present

- Conducted exit survey for graduating students
- Connected new graduate students with current students and alumni through “Buddy Systems”

UC Berkeley Superfund Research Program Leadership Committee 2019 – 2020

- Invited speakers and organized logistics for seminar
- Organized outreach activities

Graduate Applications Reading Committee, UC Berkeley 2019

- Reviewed graduate applications
- Created a rubric to improve diversity, equity, and inclusion in application review process

Environmental Engineering Seminar Planning Committee Fall 2019

- Invited speakers for departmental seminar

ReNUWIt Student Leadership Council, Campus Rep 2018 – 2019

- Organized welcome events for new students and postdocs
- Managed logistics for seminars
- Advocated for students needs and concerns

RESEARCH SKILLS

Analytical: Electroanalytical methods, liquid chromatography–mass spectrometry, inductively coupled plasma mass spectrometry, X-ray photoelectron spectroscopy, scanning electron microscopy, energy-dispersive X-ray spectroscopy, contact angle goniometry, ambient pressure X-ray photoelectron spectroscopy (familiar)

Material synthesis: Manganese oxide, modified graphene oxide

Modeling: Kintecus, Visual MINTEQ, PHREEQC