Makenna Parkinson

makenna.parkinson@yale.edu | (805) 440-5870

Education

Ph.D. Yale University, Chemical and Environmental Engineering August 2023-present

M.Phil. Yale University, Chemical and Environmental Engineering July 2025

M.S. Yale University, Chemical and Environmental Engineering May 2025

B.S. Harvey Mudd College, Engineering May 2023

Major GPA - 3.96; Cumulative GPA - 3.83

Professional Experience

Graduate Researcher, Yale University August 2023-present

Advisors: Dr. John Fortner and Dr. Menachem Elimelech

Undergraduate Researcher, Harvey Mudd College January 2021-December 2022

Advisor: Dr. Albert Dato

Technical Intern, Arcadis May 2022-February 2023

Environmental engineering consulting firm based in Amsterdam, Netherlands
Worked in San Luis Obispo, CA office

Center for Strategic and International Studies Clinic, Harvey Mudd College August 2022-May 2023

Team project sponsored by Washington, D.C. based think tank
Built mathematical model of clean hydrogen production and trade

NASA/JPL Clinic, Harvey Mudd College August 2021-December 2021

Team project sponsored by NASA/JPL
Built risk assessment case study for the return of samples from other planets

Publications

Parkinson, M., Vardhan, H., Verduzco, R., Fortner, J., Elimelech, M. (2025) Toward Continuous, Oriented Covalent Organic Framework Membranes for Precise Molecular Separations. *ACS Nano* 19 (33), 29934–29960. DOI: 10.1021/acsnano.5c09252.

Violet, C.*, **Parkinson, M.***, Ball, A.K., Kulik, H.J., Fortner, J., Elimelech, M. (2024) Tuning Metal-Organic Framework Linker Chemistry for Transition Metal Ion Separations. *ACS Applied Materials and Interfaces* 17, 1911-1921. DOI: 10.1021/acsami.4c16173.
* co-first authors

Fan, H., **Parkinson, M.**, Agrawal, K.V., Barboiu, M., Bocquet, L., Getachew, B.A., Li, Q., Li, Y., Lin, S., Liu, C., Noy, A., Radha, B., Schwahn, D., Szymczyk, A., Elimelech, M. (2026) A Multiscale Perspective for Understanding Transport Mechanisms in Desalination and Ion Selective Membranes. *Nature Water*, accepted.

Yuan, J., Mai, Z., **Parkinson, M.**, Zhou, Y., Hou, J., Cao, X., Sun, S., Zhang, Y., Elimelech, M. (2025) Precision-Engineered Crystalline Covalent Organic Framework Membranes with Staggered ABC Stacking for High-Performance Desalination. *Journal of the American Chemical Society* 147 (51), 47477-47488. DOI: 10.1021/jacs.5c16195.

Cao, S., **Parkinson, M.**, Zhu, J., Zhai, Z., Zhang, Y., He, T., Elimelech, M. (2025) Affinity-Induced Upcycling of Palladium Nanoclusters in COF Membranes for Catalytic Water Treatment. *Chem Catalysis* 5, 101524. DOI: 10.1016/j.checat.2025.101524.

Sawhney, R., Hearn, J., Hibbett, R., Kingston, K., **Parkinson, M.**, Zacarias, M., Majkut, J. (2025) Techno-Economic Assessment of Green Hydrogen Production via an Optimized Solar and Wind System. *Renewable Energy Focus* 55, 100726. DOI: 10.1016/j.ref.2025.100726.

Miller, M.W., **Parkinson, M.**, Dato, A. (2022) Lotus-Like Water Repellency of Gas-Phase-Synthesized Graphene. *ACS Materials Letters* 4 (5), 995-1002. DOI: 10.1021/acsmaterialslett.2c00125.

Presentations

Oral Presentations

Parkinson, M., Miller, M.W., Dato, A. (2022) Water-Repelling Properties of Low-Dimensional Carbon Nanostructures. Materials Research Society Spring Meeting, Honolulu, HI. May 8-13, 2022.

Dato, A., Miller, M.W., **Parkinson, M.** (2022) Graphene Synthesized in Atmospheric Plasmas is Inherently Superhydrophobic. Materials Research Society Fall Meeting, Boston, MA. Nov 27-Dec 2, 2022.

Poster Presentations

Parkinson, M., Zhang, J., Fortner, J., Elimelech, M. (2025) Engineering Oriented Covalent Organic Framework Membranes for Highly Selective and Ultrafast Ion Transport. Materials Research Society Fall Meeting, Boston, MA. Nov 30-Dec 5, 2025.

Parkinson, M., Zhang, J., Fortner, J., Elimelech, M. (2025) Engineering Oriented Covalent Organic Framework Membranes for Ion Transport. Center for Enhanced Nanofluidic Transport Annual Symposium, Palo Alto, CA. August 8-9, 2025.

Violet, C., **Parkinson, M.**, Ball, A.K., Kulik, H.J., Fortner, J., Elimelech, M. (2024) Tuning UiO-66 Linker Chemistry for Transition Metal Ion Separations. Center for Enhanced Nanofluidic Transport Annual Symposium, Boston, MA. June 21-22, 2024.

Teaching and Grading Experience

Teaching Fellow, Yale University August 2024-present

Environmental Transport Processes (ENVE 448/ENAS 648)
Introduction to Environmental Engineering (ENVE 120)

Academic Excellence Facilitator, Harvey Mudd College August 2021-December 2022

Engineering Systems (ENGR079)
Participated in and led staff development meetings for teaching team

Undergraduate Grader, Harvey Mudd College August 2020-May 2023

Engineering Mathematics (ENGR072)
Global Climate Change (CHEM041)
Materials Engineering (ENGR086)

Grant Proposal Experience

Hybrid Process Integrating Electrodialysis and Reverse Osmosis for Beneficial Desalination of Brackish Water for Agricultural Irrigation. Submitted to US-Israel Binational Agricultural Research and Development (BARD) Fund. November 2024. Principle Investigator: Menachem Elimelech.

Contributions: Wrote section on the design and fabrication of a covalent organic framework (COF) membrane for divalent/monovalent ion selectivity; prepared two figures for COF membrane section

Novel Metal Organic Framework (MOF) based Membranes and Plasmonic Catalyst(s) for High Efficiency PFAS Separation and Defluorination. Submitted to Strategic Environmental Research and Development Program (SERDP). March 2024. Principle Investigators: John Fortner, Menachem Elimelech. Contributions: Wrote section on MOF membrane for PFAS rejection and passage of scale-forming species; prepared key figure detailing full treatment train

Fellowships and Awards

National Defense Science and Engineering Graduate (NDSEG) Fellowship Program 2025
US Department of Defense fellowship for graduate students in science and engineering, covers tuition and salary for three years

Yale Institute for Biospheric Studies Small Grants Program 2024
Awarded Early Grant for Ph.D. students in their first or second year of study, $3,000

Rohan Fellowship 2024
Named fellowship at Yale University in recognition of academic excellence

Johnson Excellence in Engineering Award 2023
Awarded to a graduating senior at HMC who shows clarity in problem solving

Harvey Mudd College Department Honors 2023
Graduated with Honors in the Engineering Department
Graduated with Honors in the Humanities, Social Sciences, and the Arts Department

Greever Clinic Award 2023
Highest level of distinction for team senior capstone project at HMC

Elks National Foundation Legacy Scholarship 2019-2023
Awarded merit-based undergraduate college tuition grant, $4,000

CSCAA Scholar All-America Honor 2021-2023
Awarded to college swimmers and divers who achieve academic and athletic excellence
Requires GPA above 3.50 and NCAA qualification score

Center Involvement

Center for Enhanced Nanofluidic Transport (CENT) June 2024-present
Department of Energy-funded inter-university collaborative center

Nanotechnology Enabled Water Treatment (NEWT) Center June 2024-July 2025
National Science Foundation-funded inter-university collaborative center

Service

Department Service

CEE Langer Symposium 2025
Member of five person team that organized annual Yale CEE Langer Symposium for graduate students and faculty

CEE Department Special Investigation Symposium 2025
Member of five person team that planned and organized an internal department symposium for first-year PhD students to present their research

CEE Department First-Year Mentorship Program 2024-2025
Member of five person team that coordinated first-year PhD student mentorship program

Chemical and Environmental Engineering Department Recruitment 2024
Member of six person team that planned and hosted PhD recruitment weekend

Community Service

Chemical and Environmental Engineering First-Year Mentor 2025-present
Mentored first-year PhD students in Chemical and Environmental Engineering

Peer-reviewer 2024-present
Reviewed research articles for *Science Advances*

Society of Women Engineers Mentorship Program 2024-2025
Mentored undergraduate engineering students at Yale

Qualification Profile

Computational Skills

Python (VS Code interface)
MATLAB
SolidWorks
AMPL
R (RStudio interface)
Adobe Illustrator

Relevant Coursework

Membrane Science and Technology
Materials Engineering
Aquatic Chemistry
Environmental Organic Chemistry
Physical and Chemical Processes
Environmental Transport Processes
Forces on the Nanoscale

Analytical Instrumentation

Atomic force microscopy (AFM)
Contact angle goniometry
Fourier-transform X-ray spectroscopy (FTIR)
Grazing incidence wide-angle X-ray scattering (GIWAXS)
Inductively coupled plasma mass spectrometry (ICP-MS)
Ion chromatography (IC)
Nuclear magnetic resonance spectroscopy (NMR)
Powder X-ray diffraction (XRD)
Quartz crystal microbalance with dissipation (QCM-D)
Scanning electron microscopy (SEM)
Thermogravimetric analysis (TGA)
Transmission electron microscopy (TEM)