Marc Foster

Cambridge, MA | fosterm@mit.edu | he/him/his

Education

Massachusetts Institute of Technology/Woods Hole Oceanographic Institution — Cambridge, MA
Doctor of Philosophy in Environmental Chemistry — Expected Aug. 2026, GPA: 4.9/5.0
Advisor: Dr. Desiree Plata

University of Oregon — Eugene, OR
Master of Science in Physical Chemistry — 2021, GPA: 3.95/4.00
Adivsor: Dr. Geraldine Richmond

Whitman College — Walla Walla, WA
Bachelor of Arts in Biophysics, Biochemistry, and Molecular Biology (BBMB) — 2018, Cum Laude
Advisor: Dr. Dalia Biswas

Awards and Fellowships

- Martin Family Society of Fellows for Sustainability Fellowship — 2025 - 2026
- Ocean Ventures Fund (*Degradation of plastics through bacterial produced reactive oxygen species*), WHOI — 2024 - 2025
- 3^{rd} Place Presentation Award, Northeast Open Research Alliance, BASF — March 2024
- National Science Foundation Graduate Research Fellowship — 2020 - 2023
- American Chemical Society Award for Outstanding Senior Student in Physical Chemistry — 2018
- Whitman College Academic Distinction — 2016 - 2018

Publications

$*$ = Mentored Undergraduates

(1) **M. J. Foster**, C. Becker, D. J. Madden*, P. A. Wasson, A. Sichert, M. G. Hayden, A. V. Subhas, S. Gross, D. L. McRose, O. X. Cordero, D. L. Plata; Metabolic Interactions Enhance Mineralization of Polyesters by Marine Bacteria. *Under Review at Proceedings of the National Academy of Sciences*, 2025
(2) **M. J. Foster**, A. P. Carpenter, G. L. Richmond; Dynamic Duo: Vibrational Sum Frequency Scattering Investigation of Carboxylic Acid/carboxylate Surfactants on Nanodroplet Surfaces. *Journal of Physical Chemistry B*, 2021
(3) A. P. Carpenter, **M. J. Foster**, G. L. Richmond; Effects of Salt-Induced Charge Screening on Surfactant Adsorption to the Planar and Nanoemulsion Oil-Water Interfaces. *Langmuir*, 2021
(4) S. Z. Oener, **M. J. Foster**, S. W. Boettcher; Accelerating Water Dissociation in Bipolar Membranes and for Electrocatalysis. *Science* 369 (1099-1103) 2020.

Patents

(1) S. Z. Oener, S. W. Boettcher, and **M. J. Foster**; Bipolar Membranes. U.S. Patent Application 16/817,502, filed November 26, 2020.

Presentations

(1) "Environmental insights into the biodegradation of polyesters by marine bacteria", BASF Northeast Open Research Alliance, Wyandotte, MI, July 2025
(2) *Invited Speaker*: "Biodegradation of polyesters: environmental implications and bioreactor considerations", MIT Climate and Sustainability Consortium, May 2025
(3) *Invited Speaker*: "Coopertaive metabolisms enable a marine bacterial community to mobilize and mineralize synthetic biodegradable polyesters", MIT Climate and Sustainability Consortium, August 2024
(4) "Community dynamics within a marine microbial consortia that can degrade and mineralize aromatic aliphatic co-polyesters", BASF Northeast Open Research Alliance, Research Triangle Park, NC, March 2024, *3rd*
(5) *Invited Panelist*: Reflections on Spring 2024 ACS National Meeting, ENY-ACS Local Chapter, March 2024
(6) "Community dynamics within a microbial consortia that can degrade and mineralize an aromatic, aliphatic co-polyester" ACS Spring National Meeting, Sustainable Polymers Design: Advancing Understanding, Quantification and Collaboration, March 2024

(7) "Engineering of Microbial Consortia to Investigate Degradation Pathways and Recycling of Plastics" ACS Spring National Meeting, AIChE/ACS Frontiers of Chemistry, Materials Science and Chemical Engineering for Circular Economy, March 2023
(8) "Molecular details and adsorption behavior of pH-switchable carboxylate surfactants on nanoemulsion surfaces" ACS Spring National Meeting, LGBTQ+ Student/Postdoc Symposium, April 2021

Posters

(1) "Synthesis of functional catalysts for CO conversion based on Mo-containing CO dehydrogenase" ACS Spring National Meeting, 2018, New Orleans, LA
(2) "Synthesis of Functional Catalysts for CO Conversion Based on Mo-Containing CO Dehydrogenase" Molecular Engineering and Sciences Undergraduate Research Symposium at University of Washington, 2017,Seattle, WA
(3) "Synthesis of Functional Catalysts for CO Conversion Based on Mo-Containing CO Dehydrogenase" Volcano Conference in Chemical Biology, 2017, Eatonville, WA
(4) "Designing Functional Catalysts for Toxic Carbon Monoxide Conversion Using a Novel Dimetallic Complex" Murdock College Science Research Conference, 2016, Spokane, WA

Teaching Experience

Teaching Assistant, Environmental Microbial Biogeochemistry, 1.089 – MIT	2024
Student Teacher, Education theory and practice practicum experience – MIT	2023
Co-Teaching Assistant, Marine Chemistry, 12.742 – MIT/WHOI	2022
Kaufman Teaching Certificate Series – MIT	2022 – 2023
Lecturer, Presidential Undergraduate Research Scholar Program – University of Oregon	2020 – 2021
Teaching Assistant, General Chemistry Lab – University of Oregon	2018 – 2019
Teaching Assistant, Organic Chemistry – Whitman College	2018
Tutor for Calculus, Organic Chemistry, and Intro Biology – Whitman College	2016 – 2018

Outreach

Organizer, Graduate Climate Conference – MIT	2025 – current
Organizer, Interdepartmental book club – MIT	2025 – current
Leader, Joint Program Community Garden – MIT/WHOI	2025 – current
Graduate Student Representative, LGBT Employee Resource Group – WHOI	2024 – 2025
Co-creator, Sustainable Polymer Roundtable – MIT	2024
Elected Representative, Joint Program Chemistry Student Representative – MIT/WHOI	2022 – 2023
Module Creator and Leader, CEE Department K-12 Outreach/DEI Efforts – MIT	2022 – 2023
Writer, Through the Porthole Newsletter – WHOI	2022
Co-director, Mad Duck Science Friday – University of Oregon	2021
Module Creator and Leader, Summer Academy to Inspire Learning (SAIL) – University of Oregon	2019
Module Leader, Whitman Institute for Scholastic Enrichment	2017
Volunteer, Whitman College Science Outreach	2017 – 2018

Mentorship

$*$ = currently pursuing post-graduate studies

Parker McClain (Freshman MIT undergradauate, Undergraduate Research Opportunity (UROP))	2025 – current
Anna Wardle (Junior undergraduate, MIT summer visiting student)	Summer 2025
Deborah Madden (Junior undergraduate, MIT Summer Research Program (MSRP), co-author)	Summer 2024
Hannah Goldberg* (Senior undergraduate, Visiting summer student)	Summer 2022
Liza Briody-Pavlik (First year graduate student, Rotation student)	Winter 2021
Kayd Meldrum* (First year graduate student, Rotation student)	Fall 2020
Katelyn Alley* (Senior Undergraduate, Research Experience for Undergradatuates (REU) at UO)	Summer 2020
Allan Solis (First year graduate student, Rotation student)	Fall 2019
Resident Assistant (Whitman College)	2017