

Marc Foster

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Education

Massachusetts Institute of Technology/Woods Hole Oceanographic Institution

Cambridge, MA

Doctor of Philosophy in Environmental Chemistry

Exp. 2026, GPA: 4.9/5.0

Advisor: Dr. Desirée Plata

Anticipated thesis title: Environmental insights into the biodegradation of polyesters by marine bacteria

University of Oregon

Eugene, OR

Master of Science in Physical Chemistry

2021, GPA: 3.95/4.00

Advisor: Dr. Geraldine Richmond

Project: Vibrational sum-frequency investigation of carboxylic acid surfactants on nanodroplet surfaces

Whitman College

Walla Walla, WA

Bachelor of Arts in Biophysics, Biochemistry, and Molecular Biology (BBMB)

2018, Cum Laude

Advisor: Dr. Dalia Biswas

Thesis title: Synthesis of Functional Catalysts for the Conversion of Carbon Monoxide Based on a Bacterial Protein

Awards (*italics*) and Fellowships (**bold**)

2025–2026	MIT Martin Family Society of Fellows for Sustainability
2024–2025	<i>WHOI Ocean Ventures Fund Graduate Student Award (more info here)</i>
2024	<i>BASF Northeast Open Research Alliance Presentation Award</i>
2020–2023	National Science Foundation Graduate Research Fellowship
2018	<i>American Chemical Society Award for Outstanding Senior Student in Physical Chemistry</i>
2016–2018	<i>Whitman College Academic Distinction</i>

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

2025	"Environmental insights into the biodegradation of polyesters by marine bacteria", BASF Northeast Open Research Alliance, Wyandotte, MI
2025	<i>Invited Speaker</i> : "Biodegradation of polyesters: environmental implications and bioreactor considerations", MIT Climate and Sustainability Consortium
2024	<i>Invited Speaker</i> : "Cooperative metabolisms enable a marine bacterial community to mobilize and mineralize synthetic biodegradable polyesters", MIT Climate and Sustainability Consortium
2024	"Community dynamics within a marine microbial consortia that can degrade and mineralize aromatic aliphatic co-polyesters", BASF Northeast Open Research Alliance, RTP, NC
2024	<i>Invited Panelist</i> : Reflections on Spring 2024 ACS National Meeting, ENY-ACS Local Chapter
2024	"Community dynamics within a microbial consortia that can degrade and mineralize an aromatic, aliphatic co-polyester", ACS Spring National Meeting
2023	"Engineering of Microbial Consortia to Investigate Degradation Pathways and Recycling of Plastics", ACS Spring National Meeting, AIChE/ACS Frontiers of Chemistry
2021	"Molecular details and adsorption behavior of pH-switchable carboxylate surfactants on nanoemulsion surfaces", ACS Spring National Meeting, LGBTQ+ Student/Postdoc Symposium

Posters

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

Teaching Experience

2024	Teaching Assistant , Environmental Microbial Biogeochemistry (1.089), MIT
2023	Student Teacher , Education Theory and Practice Practicum, MIT <ul style="list-style-type: none"><i>Taught 3 core high school chemistry classes with 30 students each for 3 weeks.</i>
2022	Co-Teaching Assistant , Marine Chemistry (12.742), MIT/WHOI
2022–2023	Kaufman Teaching Certificate Series , MIT <ul style="list-style-type: none"><i>Subject Design, Lesson Planning, Microteaching, and Inclusive Teaching Tracks (more info here).</i>
2020–2021	Lecturer , Presidential Undergraduate Research Scholar (PURS) Program, University of Oregon <ul style="list-style-type: none"><i>Led weekly lectures on graduate school and graduate-level research to six undergraduate students awarded the PURS fellowship (more info here).</i>
2018–2019	Teaching Assistant , General Chemistry Lab, University of Oregon
2018	Teaching Assistant , Organic Chemistry, Whitman College
2016–2018	Tutor , Calculus, Organic Chemistry, and Intro Biology, Whitman College

Outreach

2025–present	Organizer , Graduate Climate Conference, MIT
2025–present	Organizer , Interdepartmental Book Club, MIT
2025–present	Leader , Joint Program Community Garden, MIT/WHOI
2024–2025	Graduate Student Representative , LGBT Employee Resource Group, WHOI <ul style="list-style-type: none"><i>Promoting LGBT community on WHOI's campus.</i>
2024	Co-creator , Sustainable Polymer Roundtable, MIT <ul style="list-style-type: none"><i>Monthly meeting connecting 5 research groups at MIT to discuss current topics in sustainable polymer innovation.</i>
2022–2023	Elected Representative , Joint Program Chemistry Student Representative, MIT/WHOI <ul style="list-style-type: none"><i>Advocated for graduate student well-being.</i>
2022–2023	Module Creator and Leader , CEE Department K-12 Outreach/DEI Efforts, MIT
2022	Writer , Through the Porthole Newsletter, WHOI
2021	Co-director , Mad Duck Science Friday, University of Oregon
2019	Module Creator and Leader , Summer Academy to Inspire Learning (SAIL), University of Oregon
2017	Module Leader , Whitman Institute for Scholastic Enrichment
2017–2018	Volunteer , Whitman College Science Outreach

Mentorship

* = currently pursuing post-graduate studies

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

Skills

Instruments	Techniques	Programming
LC–MS (triple quadrupole)	Targeted LC–MS	Python
TOC analyzer	Non-targeted LC–MS	MATLAB
Cavity ring-down spectrometer	Isotopic tracing	L ^A T _E X
Plate reader (absorbance)	16S amplicon sequencing	
Ti:sapphire laser	Protein purification	
Pendant drop tensiometer	Differential scanning calorimetry	
	X-ray diffraction	
	Nonlinear vibrational spectroscopy	
	IR spectroscopy	