

DR. JESSE R. FARMER

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EDUCATION & PROFESSIONAL EXPERIENCE

2023-Present	Assistant Professor, School for the Environment, University of Massachusetts Boston
2017-2022	Postdoctoral Research Associate, Department of Geosciences, Princeton University
2017-2020	Visiting International Postdoctoral Fellow, Department of Climate Geochemistry, Max-Planck-Institute für Chemie
2011-2017	Ph.D., Department of Earth and Environmental Sciences, Columbia University (Advisor: Dr. Bärbel Hönisch)
2009-2011	Research Assistant, U.S. Geological Survey (Reston, VA)
2009	Sc.B Geological Sciences (Honors), Brown University

FUNDING

2023-2026	National Science Foundation (NSF) OCE-2305427 “Collaborative Research: Deciphering the Subantarctic South Pacific Ocean’s Role in Pleistocene Climate Evolution with IODP Expedition 383 Sediments,” J. Farmer (PI), \$342,538 (with G. Winckler, PI; J. Middleton and A. Ravelo, co-PIs).
2023-2026	NSF OCE-2303549 “Collaborative Research: Collaborative Research: A revised Plio-Pleistocene view of the effect of climate on North Pacific oxygenation from foraminifera-bound nitrogen isotopes,” J. Farmer (PI), \$141,024 (with D. Sigman, PI).
2021-2024	NSF OCE-2327031 “Collaborative Research: Bounding global ice volumes over the last glacial cycle using reconstructions of Bering Strait flooding,” J. Farmer (PI), \$250,473 (with T. Pico, PI).
2019	Integrated Ocean Discovery Program, Expedition 383 participation and Post-Expedition Award, \$49,500
2012-2016	NSF Graduate Research Fellowship, \$136,000
2016	LDEO Climate Center, “Late Quaternary Arctic Ocean Paleoceanography and Carbon Cycling”, J. Farmer (PI), \$10,000
2014	USGS Technical Liaison, “Boron isotope measurements on Arctic Ocean benthic foraminifers”, B. Hönisch (PI) and J. Farmer (co-PI), \$13,770
2012	NSF Scholarship for Urbino Summer School in Paleoclimatology, \$3,000

PEER-REVIEWED PUBLICATIONS

29. Moretti, S., Duprey, N.N., Foreman, A.D., ... Farmer, J. *et al.*, 2023. Analytical improvements and assessment of long-term performance of the oxidation-denitrification method. In press at *Rapid Communications in Mass Spectrometry*.
28. Marchitto, T.M. and Farmer, J.R., 2023. Nutrient Proxies, in S. Elias (Ed.), *Encyclopedia of Quaternary Science* (3rd Edition), Elsevier, doi:10.1016/B978-0-323-99931-1.00051-9.
27. Farmer, J.R., Keller, K.J., Poirier, R.K., Dwyer, G.S., Schaller, M.F., Coxall, H.K., O'Regan, M. and Cronin, T.M., 2023. A 600-kyr reconstruction of deep Arctic seawater $\delta^{18}\text{O}$ from benthic foraminiferal $\delta^{18}\text{O}$ and ostracode Mg/Ca paleothermometry. *Climate of the Past*, 19, 555-578.
26. Farmer, J.R., Pico, T., Underwood, O.M., Cleveland Stout, R., Granger, J., Cronin, T.M., Fripiat, F., Martínez-García, A., Haug, G.H. and Sigman, D.M., 2023. The Bering Strait was flooded 10,000 years before the Last Glacial Maximum. *Proceedings of the National Academy of Sciences*, 120(1), e2206742119.
25. Uchikawa, J., Penman, D.E., Harper, D.T., Farmer, J.R., Zachos, J.C., Planavsky, N.J. and Zeebe, R.E., 2023. Sulfate and phosphate oxyanions alter B/Ca and $\delta^{11}\text{B}$ in inorganic calcite at constant pH: Crystallographic controls outweigh normal kinetic effects. *Geochimica et Cosmochimica Acta*, 343, 353-370.
24. Farmer, J.R., 2022. Deepening the Late Quaternary's deep ocean carbon mysteries. *Geophysical Research Letters*, 49(13), e2022GL099161.
23. Cronin, T.M., Dwyer, G.S., Keller, K.K., Gemery, L. and Farmer, J.R., 2022. Mg/Ca ratios in ostracode genera Sarsicytheridea and Paracyprideis: A potential paleotemperature proxy for Arctic and subarctic continental shelf and slope waters. *Marine Micropaleontology*, 174, 102035.
22. Farmer, J.R., Sigman, D.M., Granger, J., Underwood, O.M., Fripiat, F., Cronin, T.M., Martínez-García, A. and Haug, G.H., 2021. Arctic Ocean stratification set by sea level and freshwater inputs since the last ice age. *Nature Geoscience*, 14(9), 684-689.
21. Farmer, J.R., Hertzberg, J.E., Cardinal, D., Fietz, S., Hendry, K., *et al.*, 2021. Assessment of C, N and Si isotopes as tracers of past ocean nutrient and carbon cycling. *Global Biogeochemical Cycles*, 35(7), e2020GB006775.
20. Horner, T.J., Little, S.H., Conway, T.M., Farmer, J.R., Hertzberg, J.E., *et al.*, 2021. Bioactive trace metals and their isotopes as paleoproductivity proxies: An assessment using GEOTRACES-era data. *Global Biogeochemical Cycles*, 35(11), e2020GB006814.
19. Gutjahr, M., Bordier, L., Douville, E., Farmer, J.R., Foster, G.L., *et al.*, 2021. Sub-permil interlaboratory consistency for solution-based boron isotope analyses on marine carbonates. *Geostandards and Geoanalytical Research*, 45(1), pp.59-75.
18. Farmer, J.R., Goldstein, S.L., Haynes, L.L., Hönisch, B., Kim, J., *et al.*, 2019. Data constraints on ocean-carbon cycle feedbacks at the mid-Pleistocene transition. *PAGES Magazine* 27, 62-63.

17. Cronin, T.M., Keller, K.J., Farmer, J.R., Schaller, M.F., O'Regan, M., *et al.*, 2019. Interglacial paleoclimate in the Arctic. *Paleoceanography and Paleoclimatology*, 34(12), 1959-1979.
16. Farmer, J.R., Hönisch, B., Haynes, L.L., Kroon, D., Jung, S., *et al.*, 2019. Deep Atlantic Ocean carbon storage and the rise of 100,000-year glacial cycles. *Nature Geoscience*, 12(5), 355-360.
15. Salacup, J.M., Farmer, J.R., Herbert, T.D. and Prell, W.L., 2019. Alkenone paleothermometry in coastal settings: evaluating the potential for highly resolved time series of sea surface temperature. *Paleoceanography and Paleoclimatology*, 34(2), 164-181.
14. Flöter, S., Fietzke, J., Gutjahr, M., Farmer, J.R., Hönisch, B., Nehrke, G. and Eisenhauer, A., 2019. The influence of skeletal micro-structures on potential proxy records in a bamboo coral. *Geochimica et Cosmochimica Acta*, 248, 43-60.
13. Farmer, J.R., Branson, O., Uchikawa, J., Penman, D.E., Hönisch, B. and Zeebe, R.E., 2019. Boric acid and borate incorporation in inorganic calcite inferred from B/Ca, boron isotopes and surface kinetic modeling. *Geochimica et Cosmochimica Acta*, 244, 229-247.
12. Osborne, E., Cronin, T.M. and Farmer, J.R., 2018. Paleoclimate Records: Providing context and understanding of current Arctic change. *Bulletin American Meteorological Society*, 99(8), s150-s152.
11. Cronin, T.M., Dwyer, G.S., Caverly, E.K., Farmer, J.R., DeNinno, L.H., Rodriguez-Lazaro, J. and Gemery, L., 2017. Enhanced Arctic amplification began at the Mid-Brunhes Event~400,000 years ago. *Scientific Reports*, 7(1), 1-7.
10. Saenger, C., Gabitov, R.I., Farmer, J.R., Watkins, J.M. and Stone, R., 2017. Linear correlations in bamboo coral $\delta^{13}\text{C}$ and $\delta^{18}\text{O}$ sampled by SIMS and micromill: Evaluating paleoceanographic potential and biomineralization mechanisms using $\delta^{11}\text{B}$ and Δ_{47} composition. *Chemical Geology*, 454, 1-14.
9. Dassié, E., ... Farmer, J.R., *et al.* (2017). Saving our Marine Archives. *EOS* 98.
8. Farmer, J.R., Hönisch, B. and Uchikawa, J., 2016. Single laboratory comparison of MC-ICP-MS and N-TIMS boron isotope analyses in marine carbonates. *Chemical Geology*, 447, 173-182.
7. Welte, C., Wacker, L., Hattendorf, B.,... Farmer, J.R., *et al.*, 2016. Laser ablation–accelerator mass spectrometry: an approach for rapid radiocarbon analyses of carbonate archives at high spatial resolution. *Analytical Chemistry*, 88(17), 8570-8576.
6. Farmer, J.R., Robinson, L.F. and Hönisch, B., 2015. Growth rate determinations from radiocarbon in bamboo corals (genus *Keratois*). *Deep Sea Research Part I: Oceanographic Research Papers*, 105, 26-40.
5. Farmer, J.R., Hönisch, B., Robinson, L.F. and Hill, T.M., 2015. Effects of seawater-pH and biomineralization on the boron isotopic composition of deep-sea bamboo corals. *Geochimica et Cosmochimica Acta*, 155, 86-106.

4. Cronin, T.M., Farmer, J.R., Marzen, R.E., Thomas, E. and Varekamp, J.C., 2014. Late Holocene sea level variability and Atlantic Meridional Overturning Circulation. *Paleoceanography*, 29(8), 765-777.
3. Farmer, J.R., Cronin, T.M. and Dwyer, G.S., 2012. Ostracode Mg/Ca paleothermometry in the North Atlantic and Arctic oceans: Evaluation of a carbonate ion effect. *Paleoceanography*, 27(2), PA2212.
2. Cronin, T.M., Dwyer, G.S., Farmer, J.R., Bauch, H.A., Spielhagen, R.F., *et al.*, 2012. Deep Arctic Ocean warming during the last glacial cycle. *Nature Geoscience*, 5(9), 631-634.
1. Farmer, J.R., Cronin, T.M., De Vernal, A., Dwyer, G.S., Keigwin, L.D. and Thunell, R.C., 2011. Western Arctic Ocean temperature variability during the last 8000 years. *Geophysical Research Letters*, 38(24), L24602.

ORAL PRESENTATIONS

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| 2023 | “The history of the Bering Strait as told by the Arctic Ocean nitrogen cycle,” UConn Avery Point Marine Sciences Seminar, UMass Boston Biology Seminar Series, UMass Amherst Geosciences Guest Lecturer Series |
| 2022 | “Tracing past ocean gateways with the marine nitrogen cycle,” MIT Sack Lunch Seminar, Princeton Environmental Geology & Geochemistry Seminar, University of California Santa Cruz Whole Earth Seminar, & Hebrew University of Jerusalem Institute of Earth Sciences Seminar |
| 2022 | “Reconstructing climate change at the top of the world: New insights from the Arctic Ocean,” University of California Berkeley Earth and Planetary Science Seminar, University of Rhode Island, and University of Massachusetts Boston |
| 2021 | “Nitrogen isotopes reconstruct Bering Strait flooding prior to the Last Glacial Maximum,” (invited), Comer Climate Conference 2021. |
| 2020 | “Sea level and climate control the Arctic Ocean halocline over the last 35,000 years,” (invited), AGU FM 2020, PP028-06. |
| 2020 | “Sea level and climate controls on Arctic Ocean halocline strength over the last 35,000 years,” Woods Hole Oceanographic Institution Paleo Seminar |
| 2020 | “Past ocean carbon cycle disruptions: A guide to our climate future?” Yachay Tech |
| 2019 | “The Arctic Ocean fixed nitrogen cycle in past climates: Insights from foraminifera-bound nitrogen isotopes,” AGU FM 2019, PP33A-03. |
| 2019 | “Tracking past ocean gateways with nitrogen isotopes in foraminifera,” Brown University Department of Earth, Environmental and Planetary Sciences |
| 2019 | “The carbon cycle at climate transitions: Million-year old lessons from the mid-Pleistocene,” Massachusetts Institute of Technology Department of Earth, Atmospheric and Planetary Sciences |

- 2018, 2019 "The role of ocean carbon cycle disruptions in past and present climate shifts," Lafayette College and Pomona College and University of Hawaii-Manoa
- 2018 "A new perspective on Holocene North Atlantic Subpolar Gyre variability from deep-sea coral nitrogen isotopes," AGU FM 2018, PP23B-02.
- 2018 "Evolution of Late Pleistocene Ocean Carbon Cycle-Climate Feedbacks," California Institute of Technology
- 2017 "Deep Atlantic Ocean Carbon Storage and the Rise of 100,000-year Glacial Cycles," Environmental Geology and Geochemistry Seminar, Princeton University
- 2017 "Paired B/Ca and $\delta^{11}\text{B}$ measurements on inorganic calcite: Constraints on boron incorporation and implications for boron proxies" (invited), Goldschmidt 2017.
- 2017 "Ocean Amplification of Plio-Pleistocene Climate Evolution," Max-Planck-Institut für Chemie
- 2016 "Bring out the Boron: $\delta^{11}\text{B}$ offsets and deep ocean carbon storage at the Mid-Pleistocene Transition," Yale University
- 2014 "Boron isotopes in Bamboo corals: The deep-sea coral pH proxy challenge," National Oceanography Centre Southampton, UK and University of Bristol, UK
- 2012 "Western Arctic Ocean temperature variability during the last 8000 years," Lamont-Doherty Geochemistry Seminar

POSTER PRESENTATIONS (FIRST AUTHOR ONLY)

- 2021 Farmer, J., T. Pico, et al. The Bering Strait was flooded during Marine Isotope Stage 3: Evidence from foraminifera-bound nitrogen isotopes and glacial isostatic adjustment modeling. AGU FM 2021, PP55E-05.
- 2019 Farmer, J., D.M. Sigman, J. Granger and F. Fripiat. Past constraints on the Arctic Ocean fixed nitrogen cycle from foraminifera-bound N isotopes. Goldschmidt 2019.
- 2018 Farmer, J., A. Martínez-García, R. Schiebel, D.M. Sigman and G.H. Haug. Nitrogen isotopic evidence for Pliocene closure of the Central American Seaway. Goldschmidt 2018.
- 2016 Farmer, J., et al. Trace element evidence for abrupt changes in deep South Atlantic Ocean nutrient and carbonate chemistry across the Mid-Pleistocene Transition. AGU FM 2016, PP31B-2279.
- 2013 Farmer, J., B. Hönisch, L. Robinson and T. Hill. What controls the boron isotopic composition of deep-sea bamboo corals? Seawater pH vs. biomineralization. Int'l Conference in Paleoceanography XI.
- 2011 Farmer, J., B. Hönisch, T. Hill, M. LaVigne and L. Robinson. Boron isotopes in deep-sea bamboo corals: pH, vital effects, and environmental factors. AGU FM 2011, PP41A-1740.

2010 *Farmer, J., et al.* Holocene climate variability in the Beaufort Sea, Arctic Ocean from benthic foraminifers, stable isotopes and pollen. AGU FM 2010, PP21B-1689.

TEACHING EXPERIENCE

- 2023 **“Geological Oceanography,” “Global Environmental Change” and “Field Trips in Environmental Science”, University of Massachusetts Boston**
- 2021-2022 **Course Advisor, “Climate: Past, Present and Future,” Princeton University**
Managed asynchronous instruction, online course presence, assignments and grading
- 2020 **Lecturer, “Climate: Past, Present and Future,” Princeton University**
Managed transition to asynchronous virtual instruction for 154 students; led virtual laboratory instruction in weather, climate, paleoclimate, and climate impacts
- 2020 **Lecturer, “Ocean, Atmosphere, and Climate,” Princeton University**
Led laboratory instruction in data collection, climate data analysis, and scientific writing; facilitated transition to online instruction during COVID-19
- 2015 **Teaching Assistant, “Chemical Oceanography,” Columbia University**
Lecturer on carbonate chemistry and marine sediments; trained students in data visualization software; designed problem sets and class project on ocean chemistry
- 2014 **Teaching Assistant, “Chemistry of Continental Waters,” Columbia University**
Lecturer on atmospheric structure, composition, and chemistry;
Designed and graded problem sets and class project on precipitation chemistry
- 2012, 2013 **Teaching Assistant, “Oceanography,” Columbia University**
Lecturer on history of oceanography and paleoceanography; co-led Arctic Ocean Case Study; Led weekly office hours and review sessions; Designed homework and exam questions
- 2008, 2009 **Teaching Assistant, “Stratigraphy and Sedimentation” and “Earth: Evolution of a Habitable Planet,” Brown University**
Assisted undergraduates in developing science writing skills and data analysis

MENTORING

Matthew Lacerra, Princeton University (current PhD student, Princeton University)

Anthea Arns, Max-Planck-Institut für Chemie (current PhD student, Johannes Gutenberg University)

Undergraduate Senior Theses: Ona Underwood, Princeton University '21 (recipient of Edward Sampson, Class of 1914 Prize in Environmental Geosciences); Phoebe Salowey, Pomona College '22; Josh Anderson, Pomona College '19

Undergraduate Research Interns: Alexander Moosbrugger and Michael Kim (2021); Jennifer Falsetta (2015)

PROFESSIONAL & VOLUNTEER ACTIVITIES

2020-Present Alaska Native Science & Engineering Program Insight Session, “An Ice Age View from Alaska’s Shores” (with T. Pico)

- 2020-Present Guest lecturer, RISE Career Launch for underrepresented and first-generation college graduates
- 2021-2023 Postdoctoral Representative, Diversity Committee, Princeton University Department of Geosciences
- 2021-2023 Princeton University Department of Geosciences Pod Leader, “Unlearning Racism in Geoscience (URGE)”
- 2021 Guest lecturer, Princeton Program in Teacher Preparation QUEST Summer Institute, “Climate and the Ocean”
- 2017 Guest lecturer, National Geographic Expeditions “Exploring Patagonia”
- 2015 Lead organizer, “Reading the Carbonate Record,” Department of Earth and Environmental Sciences Graduate Student Field Trip, Exuma, Bahamas
- (Ongoing) Conference session co-convenor:
- 2023 American Geophysical Union PP012 “Climate and Tectonic Archives of the North Pacific and Beringia: Insights into Fans, Faults, Ice Sheets and Ocean Gateways”
 - 2021 American Geophysical Union PP34B/35C “Refinement of paleo-proxies in the GEOTRACES era”
 - 2020 European Geosciences Union CL1.8 “Orbital forcing and internal climate feedbacks in climate transitions of the last 5 million years”
 - 2018 Goldschmidt Conference Session 08d “Dynamics and Mechanisms of Warm Climates and Climate Transitions”
 - 2013 American Geophysical Union Fall Meeting Session PP023 “Reconstructing Past Carbon Cycle Perturbations: Novel Developments and Applications”
- (Ongoing) Ad-hoc reviewer for: *Biogeosciences*, *Chem. Geol.*, *Earth Planet. Sci. Lett.*, *Front. Mar. Sci.*, *Geochem. Geophys. Geosyst.*, *Geochim. Cosmochim. Acta*, *Geophys. Res. Lett.*, *The Holocene*, *Paleoceanogr. Paleoclimatol.*, *Nat. Commun.*, *Nat. Geosci.*, *Nat. Rev. Earth Environ.*, *Quat. Sci. Rev.*, *Science*, *Sci. Adv.*, and *Sci. Rep.*
- (Ongoing) Proposal reviewer for: National Science Foundation MGG, P2C2, and OCE-PF Programs; Swiss National Science Foundation
- (Ongoing) Science blogger for: *J Farmer’s Almanac*, *State of the Planet*, & *Coastal Review Online*

FIELD EXPERIENCE

- 2023 Arctic Icebreaker Coordinating Committee (AICC) Chief Scientist Training Cruise, *R/V Sikuliaq* (Seward to Nome, SKQ202309T)
- 2019 Sedimentologist, Integrated Ocean Discovery Program Expedition 383: Dynamics of the Pacific Antarctic Circumpolar Current, *JOIDES Resolution*
- 2015 Coring of mangrove swamps, sinkholes, and back-beach lagoons, Exuma, Bahamas

- 2013 Laboratory culturing of live-collected planktic foraminifera, Catalina Island
- 2010 Vibracoring of Nottoway Swamp, Courtland VA
- 2010 Atlantic Coastal Plain coring of Pliocene-age Yorktown Formation
- 2010 Box-coring of Western North Atlantic continental slope for ostracode Mg/Ca calibration, *R/V Oceanus* Expedition 461
- 2009 Abrupt Glacial Lake Drainage Study: Coring of Champlain Sea sediments
- 2008 Livingston coring of Narragansett Bay, RI estuarine sediments
- 2007 SeaBird CTD profiling of hypoxic events, Narragansett Bay, RI

AWARDS

- 2015 Finalist, Columbia University Graduate Student Presidential Teaching Award
- 2012 Sara Fitzgerald Langer Book Prize, Lamont-Doherty Earth Observatory, "To a pre-oral graduate student who has contributed to both academic and student life"
- 2012 NSF Graduate Research Fellowship
- 2009 Senior Award, Brown University, "In recognition of outstanding academics, research and service"