Alan D. Foreman

Climate Geochemistry Department, Max Planck Institute for Chemistry
Hahn-Meitner-Weg 1 ♦ Mainz, Germany ♦ 55128 ♦ +49 174 241 8023 ♦ alan.foreman@mpic.de
https://orcid.org/0000-0002-5082-5786

EDUCATION

Massachusetts Institute of Technology 2009
Bachelor of Science in Chemistry
Bachelor of Science in Earth, Atmospheric, and Planetary Sciences.

University of California, San Diego - Scripps Institution of Oceanography 2012
Masters of Science in Earth Sciences

University of California, San Diego - Scripps Institution of Oceanography 2017
Ph.D. in Oceanography: *"The Evolution of Glacial Conditions in the Southern Atlantic Ocean: A Depth Transect Approach"*
Advisor: Professor Christopher Charles

PROFESSIONAL EXPERIENCE

DFG Priority Program "Eigene Stelle" Position, Max Planck Institute for Chemistry June 2026-June 2029
Principal Investigator Mainz, DE

Martinez-Garcia Laboratory, Max Planck Institute for Chemistry January 2018-June 2026
Postdoctoral Researcher Mainz, DE

Charles Laboratory, Scripps Institution of Oceanography September 2009 – September 2017
Graduate Research Assistant San Diego, CA

Kolber Laboratory, Monterey Bay Aquarium Research Institute June 2008 – August 2008
Undergraduate Research Assistant Monterey, CA

Chisholm Laboratory, MIT June 2007 – August 2007
Undergraduate Research Assistant Cambridge, MA

Woods Hole Oceanographic Institute, MIT June 2006
Undergraduate Research Assistant Cambridge, MA

AWARDS AND HONORS

SPP 2299 'Tropical Climate Variability and Coral Reefs' DFG Eigene Stelle Position, PI (€265,000)	2026-2029
Rohr Foundation direct award to support field campaigns ($750,000)	2020-2023
USSSP-IODP Schlanger Ocean Drilling Fellowship ($30,000)	2014-2015
SIO Department Graduate Student Excellence Travel Award ($500)	2013
UCSD Friends of the International Center Fellowship ($2,000)	2013
NSF Graduate Research Fellowship (NSF GRFP) ($121,500)	2011-2013
UCSD Regents Fellowship ($25,000)	2010
Induction to Sigma Xi (Scientific Research Honor Society)	2009
Monterey Bay Aquarium Research Institute (MBARI) Summer Internship ($5000)	2008
MIT Undergraduate Research Opportunity (UROP) Fellowship ($3600)	2007

PEER-REVIEWED PUBLICATIONS

** *Papers on which I am either first or co-first author*

Jung, J., Wald, T., **Foreman, A.D.**, Bieler, A., Janussen, D., Moretti, S., et al. (2026). Crustose Coralline Algae as a Proxy for Marine Nitrogen Cycling and Coral Trophic Strategies. ***Nature Communications Earth & Environment*** (accepted) . doi:10.21203/rs.3.rs-7609740/v1.

Jung J., N. Duprey, **A. D. Foreman**, J. P. D'Olivo, C. Pellio, Y. Ryu, E. L. Murphy, B. Romshoo, D. K. Kersting, G. O. Cardoso, T. Wald, F. Fripiat, C. Jimenez, E. Gischler, P. Montagna, C. Alonso-Hernández, M. Gomez-Batista, C. Treinen-Crespo, J. Carriquiry, M. R. Ong, N. F. Goodkin, R. Guppy, H. Aardema, H. Slagter, L. Heins, I. Hrabe de Angelis, A. L. Bieler, M. Yehudai, T. P. Noël, K. James, D., Scholz, C. Hu, B. B. Barnes, A. Pozzer, C. Pöhlker, J. Lelieveld, U. Pöschl,

H. Vonhof, G. H. Haug, R. Schiebel, D. M. Sigman, and A. Martínez-García (2025), Equatorial upwelling of phosphorus drives Atlantic N_2 fixation and *Sargassum* blooms, ***Nature Geoscience*** 10.1038/s41561-025-01812-2.

Wald, T., F. Fripiat, **A. D. Foreman**, Y. Ryu, D. Marconi, T. Tanhua, G. Sisma-Ventura, D. M. Sigman, G. H. Haug, and A. Martínez-García (2025), Origins of the Nitrate 15N Depletion in the Mediterranean Sea, ***Global Biogeochemical Cycles***, *39*(6), e2023GB008035.

**** A. D. Foreman,** N. N. Duprey, M. Yuval, M. Dumestre, J. N. Leichliter, M. C. Rohr, R. C. Dodwell, G. A. Dodwell, E. E. Clua, T. Treibitz, A. Martinez-Garcia (2024), Severe cold-water bleaching of a deep-water reef underscores future challenges for Mesophotic Coral Ecosystems, ***Science of the Total Environment***, *951*, 175210.

Duprey, N., **A. D. Foreman**, J. Carriquiry, C. Charles, S. Sanchez, H. Vonhof, F. Rubach, R. Rabenstein, M. Rohr, and H. Reyes-Bonilla, D. Marconi, D. M. Sigman, G. H. Haug, A. Martinez-Garcia (2024), Decadal oscillations in the ocean's largest oxygen-deficient zone, ***Science***, *386*(6725), 1019-1024.

Jung, J., S. F. Zoppe, T. Söte, S. Moretti, N. N. Duprey, **A. D. Foreman**, T. Wald, H. Vonhof, G. H. Haug, D. M. Sigman, A. Mulch, E. Schindler, D. Janussen, A. Martinez-Garcia (2024), Coral photosymbiosis on Mid-Devonian reefs, ***Nature***, 1-7.

** Moretti, S., N. N. Duprey, **A. D. Foreman**, A. Arns, S. Brömme, J. Jung, X. E. Ai, A. Auderset, A. L. Bieler, C. Eck, J. Farmer, B. Hinnenberg, M. Lacerra, J. Leichliter, T. Lüdecker, S. Oleynik, F. Rubach, M. Schmitt, M. Vink, T. Wald, M. Yehudai, D. Sigman, A. Martinez-Garcia (2024), Analytical improvements and assessment of long-term performance of the oxidation-denitrifier method, ***Rapid Communications in Mass Spectrometry*** 38 (1), p. 9650

Choisnard, N., N. N. Duprey, T. Wald, M. Thibault, F. Houlbrèque, **A. D. Foreman**, P. Cuet, M. M. Guillaume, H. Vonhof, D. M. Sigman, G.H. Huag, H. Maguer, S. L'Helguen, A. Martínez-García, A. Lorrain (2024), Tracing the fate of seabird-derived nitrogen in a coral reef using nitrate and coral skeleton nitrogen isotopes, ***Limnology and Oceanography***, *69*(2), 309-324.

Granger, R., S. Smart, **A. D. Foreman**, A. Auderset, E. C. Campbell, T. A. Marshall, G. Haug, D. M. Sigman, A. Martínez-García, and S. E. Fawcett (2024), Tracking Agulhas leakage in the South Atlantic using modern planktic foraminifera nitrogen isotopes, ***Geochemistry, Geophysics, Geosystems***, *25*(9), e2023GC011190.

Schiebel, R., H. M. Aardema, M. L. Calleja, A. Dragoneas, L. Heins, I. Hrabe de Angelis, C. Pöhlker, H. Slagter, H. Vonhof, D. Walter, A. I. Arns, N. Adolphs, A. Auderset, S. Basic, A. Bieler, J. D. Brüwer, S. Chaabane, Y. Cheng, M. T. Chiliński, J. D. Cybulski, T. Disper, N. Duprey, G. Eichele, B. Fiedler, A. Fischer, **A. D. Foreman**, B. M. Fuchs, S. Galer, J. Härri, K. P. Jochum, A. Jost, J. Jung, H. Kleta, G. Lammel, O. Larink, P. Leibold, A. Martínez-García, S. Moretti, J.-G. Müller, B. Nillius, X. Pan, S. S. Raj, J. Repschläger, E. Rodrigues, S. E. Ruff, M. Schmitt, J. L. Schmitter, A. S. Lara, P. Silva, S. M. Smart, M. Sörgel, B. Stoll, H. Su, M. Vogt, T. Wald, B. Weber, J. Weber, U. Weis, R. Amann, J. Arístegui, T. Dittmar, M. González, A. O'Dea, U. Pöschl, and G. H. Haug (2024), Preface: Special Issue on Probing the Open Ocean With the Research Sailing Yacht Eugen Seibold for Climate Geochemistry, ***Journal of Geophysical Research: Atmospheres***, *129*(17), e2023JD040581.

Marshall, T. A., D. M. Sigman, L. M. Beal, **A. D. Foreman**, A. Martínez-García, S. Blain, E. Campbell, F. Fripiat, R. Granger, E. Harris, G. H. Haug, D.. Marconi, S. Oleynik, P. Rafter, R. Roman, K. Sinyanya, S. M. Smart, S.E. Fawcett (2023), The Agulhas Current Transports Signals of Local and Remote Indian Ocean Nitrogen Cycling, ***Journal of Geophysical Research: Oceans***, e2022JC019413.

Leichliter, J. N., T. Lüdecke, **A. D. Foreman**, N. Bourgon, N. N. Duprey, H. Vonhof, V. Souksavatdy, A.-M. Bacon, D. M. Sigman, T. Tütken, A. Martinez-Garcia (2023), Tooth enamel nitrogen isotope composition records trophic position: a tool for reconstructing food webs, ***Communications Biology***, *6*(1), 373.

Lüdecke, T., J. N. Leichliter, V. Aldeias, M. K. Bamford, D. Biro, D. R. Braun, C. Capelli, J. D. Cybulski, N. N. Duprey, M. J. Ferreira da Silva, **A. D. Foreman**, J. M. Habermann, G. H. Haug, F. I. Martínez, J. Mathe, A. Mulch, D. M. Sigman, H. Vonhof, R. Bobe, S. Carvalho, and A. Martínez-García (2022), Carbon, nitrogen, and oxygen stable isotopes in modern tooth enamel: A case study from Gorongosa National Park, central Mozambique, ***Frontiers in Ecology and Evolution***, Volume 10 - 2022.

Martínez-García, A., J. Jung,X. E. Ai, D. M. Sigman, A. Auderset, N. Duprey, **A. D. Foreman**, F. Fripiat, J. Leichliter, and T. Lüdecke, Simone Moretti, Tanja Wald (2022), Laboratory Assessment of the Impact of Chemical Oxidation, Mineral Dissolution, and Heating on the Nitrogen Isotopic Composition of Fossil-bound Organic Matter, ***Geochemistry, Geophysics, Geosystems***, e2022GC010396.

Leichliter, J. N., T. Lüdecke, **A. D. Foreman**, N. N. Duprey, D. E. Winkler, E. R. Kast, H. Vonhof, D. M. Sigman, G. H. Haug, M. Clauss, T. Tütken, A. Martinez-Garcia (2021), Nitrogen isotopes in tooth enamel record diet and trophic level enrichment: Results from a controlled feeding experiment, ***Chemical Geology***, *563*, 120047.

SUPERVISION OF RESEARCHERS IN EARLY CAREER PHASES

Mentored M.Sc. University of Leipzig student Eleanor Percy-Rouhad *(accepted as Ph.D. Student, Max Planck Institute for Chemistry)*	2024-2025
Mentored M.Sc. Johannes Gutenberg University student Cornelia Hermann *(pursuing a career in the environmental science industry)*	2023-2025
Mentored M.Sc. Goethe University student Camino Eck *(now Ph.D. candidate, University of Milano-Bicocca)*	2022-2023
Ph.D. committee member for Dr. Robyn Granger *(now Postdoctoral Researcher, Netherlands Institute for Sea Research)*	2020-2023
Co-mentored M.Sc. Goethe University student Alina Jaeger *(now Ph.D. candidate, University of Brest)*	2022-2023
Co-mentored M.Sc. Goethe University student Jonathan Jung *(now Ph.D. candidate, Max Planck Institute for Chemistry)*	2020-2021
Mentored undergraduate Eric Zubar (*UCSD*) in completion of his undergraduate thesis	Spring 2013
Mentored undergraduate Joanna Rose (*San Diego State University*)	2012-2013

TEACHING EXPERIENCE

Teaching Assistant (led two weekly lecture sessions for students) for UCSD course Earth Systems 102	Winter 2011
Teaching Assistant (led one weekly lecture session for students) for USCD course SIO 15	Fall 2010

FIELD EXPERIENCE

- **Led Coral Coring Expedition:** Malpelo (Colombia)*, in collaboration with the Colombian National Park Authority* — ***Nov 2023-Dec 2023***
- **Co-led Coral Coring Expedition:** Clipperton Atoll (France)*, in collaboration with S/Y Acadia and Dr. Nicolas Duprey* — ***Jan 2023-Feb 2023***
- **Led Coral Coring Expedition:** Revillagigedo Archipelago (Mexico)*, in collaboration with the Autonomous University of Baja California Sud and Revillagigedo National Park* — ***Oct 2022-Nov 2022***
- **Led Coral Coring Expedition:** Mahé and St. Joseph Atoll (Seychelles)*, in collaboration with the University of Seychelles and Save Our Seas Foundation* — ***Oct 2021-Nov 2021***
- **Led Coral Coring Expedition:** Isla del Cocos (Costa Rica)*, in collaboration with the University of Costa Rica* — ***May 2021***
- **Led Coral Coring Expedition:** Galápagos (Ecuador); *in collaboration with Charles Darwin Institute and Galápagos National Park* — ***Jan 2021-Feb 2021***
- **Co-Led Coral Coring Expedition:** Coiba, Gulf of Chiriquí (Panama)*, in collaboration with Smithsonian Tropical Research Institute* — ***Nov 2020 – Dec 2020***
- **Co-Led Coral Coring Expedition:** Islas Las Perlas (Panama), *in collaboration with Smithsonian Tropical Research Institute* — ***Oct 2020 – Nov 2020***
- **Co-Led, MIST Student Research Cruise:** R/V Roger Revelle
Colombo, Sri Lanka - Kaohsiung, Taiwan — ***Dec 2013 – Jan 2014***
- **Participant, CLIVAR A10 cruise:** R/V Ronald Brown
Cape Town, South Africa - Rio de Janeiro, Brazil — ***Aug 2011 – Nov 2011***
- **Participant, OPEREX cruise:** R/V Kilo Moana
Honolulu, HI — ***Jul 2008 – Aug 2008***

INVITED LECTURES AND CONFERENCE PARTICIPATION AS FIRST AUTHOR

Invited Speaker, Max Planck Institute for Evolutionary Anthropology	Jan. 2026
Invited Speaker, University of Leipzig's "Advances in Earth System Sciences" Colloquium Series	Jan. 2026
Invited Speaker, Smithsonian Tropical Research Institute Tupper Seminar	Dec. 2025
Invited Speaker, SPP 2299 "Tropical Climate Variability and Coral Reefs" Annual Meeting	Oct. 2025
Invited Speaker, Diamond Jubilee Lecture Series CSIR – Indian National Institute of Oceanography	Sep 2025
Poster, 15th International Conference for Paleoceanography	Sep 2025
Invited Speaker, SPP 2299 "Tropical Climate Variability and Coral Reefs" Annual Meeting	Sep. 2024
Institute Seminar, Max Planck Institute for Chemistry	Oct. 2023
Invited Speaker, University of Colorado, Boulder	Aug. 2023
Invited Speaker, SPP 2299 "Tropical Climate Variability and Coral Reefs" Annual Meeting	May 2023

Presentation, 15th International Coral Reef Society Conference	June 2022
Poster, 14th International Conference for Paleoceanography	June 2022
Institute Seminar, Max Planck Institute for Chemistry	May 2022
Poster, 13th International Conference for Paleoceanography	June 2019
Invited Speaker University of Leicester	Jan. 2019
Invited Speaker, Woods Hole Oceanographic Institute	June 2015
Poster, AGU Fall Meeting	Dec. 2014
Poster, 11th International Conference for Paleoceanography	Sep. 2013
Presentation, Goldschmidt Meeting	Aug. 2013

VOLUNTEER ACTIVITIES AND OUTREACH

Ad-hoc Reviewer for *Paleoceanography* and *Nature Communications*	2014-Present
Outreach Lecture, Colombia National Parks Authority	Feb. 2024
Outreach Lecture, University of Ensenada	Nov. 2023
Written Contribution for MPIC World Ocean's Day Outreach	Jun. 2022
Outreach Lecture, University of the Seychelles	Nov. 2021
Outreach Lecture, Seychelles National Parks Authority	Nov. 2021
Outreach Lecture, Universidad de Costa Rica, CIMAR	Mar. 2021
Outreach Lecture, Galápagos National Park	Feb. 2021
Developed research blog for student-led MIST Cruise	Winter 2013
Outreach lectures for visiting University of Arizona class with Prof. Matthew Sullivan	2011-2013
Volunteer, Ocean Discovery Institute	2009-2010

CURRENT RESEARCH ACTIVITIES

- History of Indian Ocean subtropical gyre expansion inferred from coral-bound nitrogen isotopes
- Reconstruction of Eastern Tropical North Pacific ocean oxygen deficient zone dynamics inferred from coral-bound nitrogen isotopes
- History of Arabian Sea ocean oxygen deficient zone strength inferred from coral-bound nitrogen isotopes
- Reconstruction of coral calcification rates and spatial macrobioerosion trends using micro-CT scanning
- Quantification of the impact of changes in seabird-derived nutrient subsidies on coral islands in the South Pacific
- Assessment of reef-wide nutrient loading and resulting changes in coral calcification
- Inference of Agulhas circulation on glacial-interglacial timescales using foraminiferal-bound nitrogen isotopes

ACADEMIC RESEARCH INTERESTS

Paleoceanography, paleoclimate, climate change, circulation, nitrogen isotopes, corals, biogeochemical Pacific Ocean variability, Indian Ocean climate reconstruction, oxygen deficient zones, Anthropocene, subtropical gyre expansion, ice age cycles, ventilation history of the South Atlantic and Southern Ocean, Agulhas circulation reconstruction

CURRENT COLLABORATORS

N. Duprey (University of Brest), M. Leray (University of Hong Kong), S. Connolly (STRI), A. Sellers-Lara (STRI), C. Charles (UC San Diego), N. Slowey (Texas A&M), J. Adkins (California Institute of Technology), J. Rae (University of St. Andrews), S. Fawcett (University of Cape Town), A. Auderset (University of Southampton), J. Farmer (Boston University), J. Jung (Max Planck Institute for Chemistry), M. Yehudai (Max Planck Institute for Chemistry), T. Wald (Max Planck Institute for Chemistry), J. Leichliter (Max Planck Institute for Chemistry), T. Leudecke (Max Planck Institute for Chemistry), R. Schiebel (Max Planck Institute for Chemistry), H. Vonhof (Max Planck Institute for Chemistry), S. Moretti (Max Planck Institute for Chemistry), A. Martínez-García (Max Planck Institute for Chemistry), G. Haug (Max Planck Institute for Chemistry), D. Sigman (University of Princeton), T. Marshall (University of Princeton)