Erin M. Bertrand

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Associate Professor and Canada Research Chair in Marine Microbial Proteomics
Department of Biology, Dalhousie University, Halifax, NS, Canada, B3H 4R2

Expertise

Leveraging quantitative protein and metabolite measurements, my research group develops and applies novel approaches for quantifying the impact of microbial processes and micronutrients on marine biogeochemical cycles and ecosystems. We apply these approaches throughout the global ocean and within a place-based, relational research paradigm with Inuit communities.

Education

PhD, Chemical Oceanography, Massachusetts Inst Technology/Woods Hole Oceanographic Inst. (MIT/WHOI) Joint Program, Massachusetts, USA (2012); BSc, Chemistry and Environmental Studies, Bates College, Maine USA (2005)

Appointments

Associate Professor with Tenure, Dept of Biology, Dalhousie University (2020-current)*
*Maternity and Parental Leave July 2021-June 2022
Assistant Professor, Dept of Biology, Dalhousie University (2015–2020)
NSF Polar Programs Postdoctoral Fellow, J. Craig Venter Institute and Scripps Inst. Oceanography, Marine and Environmental Genomics (2012-2015)

Awards

CNC SCOR Award for Early Career Research in Canadian Ocean Sciences (2023)
Tier II Canada Research Chair in Marine Microbial Proteomics, Dalhousie University (2015-2026)
Dalhousie Killam Prize (2022) and President's Research Excellence Award (2022)
Nova Scotia Discovery Awards- Emerging Professional (2018)
Simons Foundation Early Career Investigator for Quantitative Marine Microbial Ecology (2017-2020)
Ruth and Paul Fye Award for Excellence in Ocean Research (2010-2015)
US NSF Office of Polar Programs Postdoctoral Research Fellowship (2012-2015)
US NSF Graduate Research Fellowship (2009)
US Environmental Protection Agency's Science to Achieve Results Fellowship (EPA STAR) (2006)

Selected Publications Since 2020 (Trainees*, Community Partners**)

59 career peer-reviewed scientific publications, 1 patent, 3 book chapters, 3723 citations

Accepted C Bannon*, PL White*, E Rowland*, KJ More*, A Gleason*, M Roberts*, E Devred, L Beazley, J LaRoche, **EM Bertrand**. Seasonal patterns in B-vitamins and cobalamin co-limitation in the Northwest Atlantic. **Limnol. and Oceanog.**, 10.1101/2024.11.10.622835

2025 PL White*, **EM Bertrand**, JS Spence*, MA Cavaco, C Parrott, S Waterman, E Rowland*, ME Roberts*, T Noah**, T Mellett, D Hallé, AK Hamilton, RM Bundy, D Didier, MP Bhatia. Shifting phytoplankton ecological strategies along a continuum of tidewater glacier retreat. **ISME Comm**. 5, 1, ycaf045 https://doi.org/10.1093/ismeco/ycaf045

2025 NM Levine, H Alexander, **EM Bertrand**, VJ Coles, S Dutkiewicz, SG Leles, E Zakem. Microbial Ecology to Ocean Carbon Cycling: From Genomes to Numerical Models. **Annual Review of Earth and Planetary Sciences**, 53 https://doi.org/10.1146/annurev-earth-040523-020630

2025 B Durham, WM Johnson, CC Bannon*, **EM Bertrand**, AE Ingalls, BR Edwards, A Apprill, A K Boysen, R M Bundy, H Chen, FX Ferrer-González, C Fiore, KR Heal, C Kuhlisch, S Liu, K Lu, LE Meke, S Pontrelli, PV Ramalingam, AM Reigel, JS Sacks, JE Schreier, J Sekar, M Uchimiya, EB Kujawinski. An ecological framework for microbial metabolites in the ocean ecosystem. **Limnology and Oceanography Letters** https://doi.org/10.1002/lol2.70046

2024 J Young, S Rundell, Z Cooper, H Dawson, S Carpenter, T Ryan-Keogh, E Rowland*, **EM Bertrand**, J. Deming. Photosynthetic processes in Antarctic sea ice during the spring melt. **Limnol. and Oceanog**. 69, 7, p. 1562-1576

2024. MJ Bittner, C Bannon*, E Rowland*, J Sundh, EM Bertrand, AF Andersson, RW Paerl, L Riemann. New chemical and microbial perspectives on vitamin B1 and vitamer dynamics of a coastal system. **ISME Communications**. 4, 1. https://doi.org/10.1093/ismeco/ycad016

2024. M Roberts*, M Bhatia, E Rowland*, P White*, S Waterman, M Cavaco, P Williams, J Young, J Spence, JC Montero Serrano, JE Tremblay, **EM Bertrand**. Rubisco in High Arctic tidewater glacier-marine systems: A new window into phytoplankton dynamics. **Limnology and Oceanography**. https://doi.org/10.1002/lno.12525

2024. C Eich*, M van Manen, JSP McCain*, LJ Jabre*, WH van de Poll, J Jung, S Pont, H Tian, I Ardiningsih, G Reichart, **EM Bertrand**, C Brussaard, R Middag Temperature-enhanced effects of iron on Southern Ocean phytoplankton. **Biogeosciences**. 21, 20, 4637–4663

2024. S Rose*, B Robicheau, J Tolman, D Fonseca-Batista, E Rowland*, D Desai, J Ratten, EH Kantor, AM Comeau, M Langille, J Jerlström-Hultqvist, E Devred, G Sarthou, **EM Bertrand**, J LaRoche. Nitrogen fixation in the widely distributed marine γ-proteobacterial diazotroph Candidatus *Thalassolituus haligoni*. **Science Advances** 10, 31, eadn1476

2023. C Bannon*, E Mudge, **EM Bertrand**. Shedding light on cobalamin photodegradation in the ocean. **Limnology and Oceanography Letters**. https://doi.org/10.1002/lol2.10371

2023. RW Paerl, NP Curtis, MJ Bittner, MR Cohn, SM Gifford, CC Bannon*, E Rowland*, **EM Bertrand**. Use and detection of a vitamin B1 degradation product yields new views of the marine B1 cycle and plankton metabolite exchange. **Mbio**, e00061-23 https://doi.org/10.1128/mbio.00061-23

2023. BM Robicheau, J Tolman, **EM Bertrand**, J LaRoche. Highly-resolved interannual phytoplankton community dynamics of the coastal Northwest Atlantic. **ISME Communications** 2 (1), 1-12 https://doi.org/10.1038/s43705-022-00119-2

2023. MA Soto*, D Desai, C Bannon*, J LaRoche, **EM Bertrand**. Cobalamin producers and prokaryotic consumers in the Northwest Atlantic. **Environmental Microbiology**. 22,7, 1300-1313 https://doi.org/10.1111/1462-2920.16363

2022 M Moran, EB Kujawinski, WF Schroer, SA Amin, NR Bates, **EM Bertrand**, R Braakman, CT Brown, MW Covert, SC Doney, ST Dyhrman, AS Edison, AM Eren, NM Levine, L Li, AC Ross, MA Saito, AE Santoro, D Segrè, A Shade, MB Sullivan, A Vardi. Microbial metabolites in the marine carbon cycle. **Nature Microbiology** 7, 508-523

2022 HL Joy-Warren, AC Alderkamp, GL Dijken, LJ Jabre*, **EM Bertrand**, EN Baldonado, MW Glickman, KM Lewis, R Middag, K Seyitmuhammedov, KE Lowry, W van de Poll, KR Arrigo. Springtime phytoplankton responses to light and iron availability along the western Antarctic Peninsula. **Limnology and Oceanography** 67, 4.

2022. CC Bannon*, I Rapp*, **EM Bertrand**. Community Interaction Co-Limitation: Nutrient Limitation in a Marine Microbial Community Context. **Frontiers in Microbiology** 10.3389/fmicb.2022.846890

2022 JSP McCain*, AE Allen, **EM Bertrand**. Proteomic traits vary across taxa in a coastal Antarctic phytoplankton bloom. **ISME Journal** 16, 569–579.

2021 JSP McCain*, A Tagliabue, E Susko, EPAchterberg, AE Allen, **EM Bertrand**. Cellular costs underpin micronutrient limitation in phytoplankton. **Science Advances** 7 (32), eabg6501

2021 L Jabre*, AE Allen, JSP McCain*, JP McCrow, N Tenenbaum, JL Spackeen, RE Sipler, BR Green, DA Bronk, DA Hutchins, **EM Bertrand**. Molecular underpinnings and biogeochemical consequences of enhanced diatom growth in a warming Southern Ocean. **PNAS** 118 (30) e2107238118

2021 MP Bhatia, S Waterman, DO Burgess, PL Williams, RM Bundy, T Mellett, M Roberts*, **EM Bertrand**. Glaciers and Nutrients in the Canadian Arctic Archipelago Marine System. **Global Biogeochemical Cycles,** e2021GB006976

2021 PL Williams, D Burgess, SN Waterman, M Roberts, **EM Bertrand**, M Bhatia
Nutrient and Carbon Export from a Tidewater Glacier to the Coastal Ocean in the Canadian Arctic Archipelago. **Journal of Geophysical Research-Biogeosciences** 10.1029/2021JG006289

2020 L Jabre* and **EM Bertrand**. Interactive effects of iron and temperature on the growth of *Fragilariopsis cylindrus*. **Limnology and Oceanography Letters**. LOL2-19-0069.

Track Record, Supervision and Service

Funding: > $7 million (CAD) from Canadian and international sources since 2015

Example relevant recent funding:

- Transforming Climate Action (TCA): Reducing uncertainties on carbon cycling in Atlantic's North Western Seas (UNCERTAIN-SEA) $670,000; 2024-2029
- IFREMER/Amundsen Science/TCA Ship Time: "ADOCCS: Understanding Carbon Cycling from the Atmosphere to the Deep Ocean in the Labrador Sea" PI, with 8 co-PIs, co-mission lead with E. Devred, M. Ringuette; $1,100,000; 2025
- NSERC Discovery Ship Time Program: " BELAS: Biological Carbon Export in the Labrador Sea; Principal Investigator and Co-Chief Scientist, with 9-co PIs; $ 300,000; 2022-2024
- Simons Foundation CBIOMES Collaboration: "Proteomic insights into cellular foundations of marine ecosystems" $1,200,000; 2022-2027
- Fisheries and Oceans (Canada) Ecosystems and Ocean Science Contribution Framework "Collaborative Proposal: Understanding the bio-physical processes impacting the evolution of Tallurutiup Imanga and Pikialasorsuaq in a warming climate. Principal applicant: Paul Myers $ 623,533; 2022-2025
- New Frontiers in Research Fund- Exploration "Glaciers and marine productivity in the Canadian Arctic" Principal Investigator with three co-PIs. $250,000; 2019-2023

Training since 2015:
Current HQP: 2 PhD students, 2 MSc students, 2 co-supervised MSc students, 3 co-supervised PhD students, 1 BSc honours student, 3 post-doctoral fellows, 2 Research Associates.
Past HQP: 2 post-doctoral fellows, 3 PhD students, 2 co-supervised PhD students, 4 MSc students, 3 co-supervised MSc students, 11 undergraduate honours students, 4 research assistants.
Former PhD student current positions: Assistant Professor, Mt Allison University Dept of Biology; Postdoctoral Fellow, Massachusetts Inst. Technology; Postdoctoral Fellow Max Plank Institute for Marine Microbiology
Former MSc student current positions: PhD students, Laboratory manager, Assistant Research Director at community science NGO

Invited Talks since 2015:
40 invited scientific presentations, 10 plenary or keynote and 3 Gordon Research Conferences (Marine Microbes, Chemical Oceanography, Polar Marine Systems)

Field Experience: >400 days at sea and in the field, group leader or co-chief scientist on three major oceanographic expeditions and coastal field work

Selected Service and Leadership Roles:
2023-Current: co-chair SCOR Working Group PRiMO "Physiology and Rates for Microbial Oceanography"
2023-Current International BioGeoSCAPES Science Planning Committee, member
2023-Current: International Geotraces Program Scientific Steering Committee, member
2023-Current: Canadian National Committee SCOR, member
2018- Current; Canadian National BioGeoSCAPES Planning Committee, co-chair