

ERIN M. BERTRAND

Assistant Professor and Tier II Canada Research Chair
Department of Biology, Dalhousie University
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[Bertrand Lab Webpage](#)

EDUCATION

Massachusetts Institute of Technology
Woods Hole Oceanographic Institution Joint Program, Massachusetts USA
PhD in Chemical Oceanography 2012
Dissertation: “Insights into vitamin B12 production, use and acquisition in marine microbes”

Bates College, Lewiston Maine USA
B.Sc. in Chemistry and Environmental Studies Magna Cum Laude 2005
Honours Thesis: “Substrate-based mechanistic inquiries into alkane hydroxylation by AlkB in Pseudomonas putida GPo1 and uncharacterized alkane hydroxylases from bacteria from deep sea hydrothermal vents”

RESEARCH AND PROFESSIONAL EXPERIENCE

Department of Biology Dalhousie University, Halifax NS Canada
Assistant Professor 2015 – current

J. Craig Venter Institute and Scripps Institution of Oceanography
Postdoctoral Fellow 2012 – 2015

Marine Chemistry and Geochemistry Dept.
Woods Hole Oceanographic Institution
Graduate Student Research Assistant 2006 - 2011

Marine Chemistry and Geochemistry Dept.
Woods Hole Oceanographic Institution
Research Assistant II 2005 – 2006

Department of Chemistry, Bates College and Dept. of
Environmental Engineering, Cornell University
Research Assistant 2003 – 2005

FELLOWSHIPS AND AWARDS

Simons Foundation Early Career Investigator Award 2017 – 2020
NSERC Tier II Canada Research Chair, Marine Microbial Proteomics 2015 – 2020
US National Science Foundation Polar Programs Postdoctoral Fellowship 2012 – 2015
Ruth and Paul Fye Award for Excellence in Oceanographic Research 2010 – 2015
US National Science Foundation Graduate Research Fellowship 2009 – 2012
US Environmental Protection Agency STAR Graduate Research Fellowship 2006 – 2009

Woods Hole Oceanographic Institution Summer Student Fellowship	2005
Drake R. Bradley Award for Excellence in Undergraduate Research, Bates College	2005
Lawrence Award for Excellence in Research, Bates College Chemistry Department	2005
Howard Hughes Medical Institute Undergraduate Research Fellowship	2003

RESEARCH SUPPORT (SINCE 2015; GIVEN IN \$CAD)

OFI (Ocean Frontier Institute)

North West Atlantic Microbial Observatory co-investigator with 3 others	\$1,262,499	2017-2022
Simons Foundation - Early Career Investigator in Quantitative Marine Microbial Ecology	\$720,000	2017-2020
CFI/NSRIT Canada Foundation for Innovation John Evans Leadership Fund	\$312,000	2015-2016
NSERC (Canadian National Science and Engineering Council) Discovery Grant	\$160,000	2015-2020
Dalhousie Biology Dept. Startup funds	\$140,000	2015-

TEACHING EXPERIENCE

Dalhousie University

Hacking the Blue Planet: the Scientific and Social Dimensions of Ocean Fertilization Developed and administered to 17 students: MARI/OCEA4665 and BIOL/OCEA 5665	Fall 2016
Diversity of Plants and Microorganisms Administered the microbial portion of the course to 224 students and made updates to the environmental and ecological content designed by A. Simpson: BIOL2004	Winter 2017
Undergraduate Honours Research and Thesis Participated as one of three or four instructors providing feedback on student presentations and projects throughout the Fall and Winter semesters, 1-2 x weekly; BIOL/MARI 4900	2015-2018
Hacking the Blue Planet: the Scientific and Social Dimensions of Ocean Fertilization 23 students: MARI/OCEA4665 and BIOL/OCEA 5665	Fall 2017
Woods Hole Partnership Education Program Course Instructor- Chemical Oceanography	2009-2010
MIT/WHOI Joint Program Teaching Assistant 'Marine Chemistry' class	2008
Bates College Teaching Assistant and peer assisted learning group coordinator,	2003-2005

SUPERVISORY EXPERIENCE

Loay Jabre, Dalhousie Biology PhD student	2018- current
Maria Soto, Dalhousie Biology MSc student	2017- current
Dr. Elden Rowland, Research Associate	2017-current
Dr. Miao Wu, Postdoctoral Fellow	2017-current
J. Scott McCain, Dalhousie Biology PhD student	2017-current
Kira More, Research Assistant	2017-current
Tor Kitching, USRA student and Honours Student	2016-current
Catalina Albury, Honours Student	2018-current
Esther Barber, Visiting graduate student fellow	2017-2018
Sonja Rose, Dalhousie Biology Honours Student (joint with LaRoche)	2017-2018
Carolyn Kachuk, Research Assistant	2016-2017
Megan Roberts, Dalhousie Biology Honours Student	2016-2017
Hugo Arriojas, Dalhousie Biology Honours Student	2016-2017
Heba El-Swais, Dalhousie Biology/ TOSST PhD Student	2016
Rebecca Aucoin, Dalhousie Biology Honours Student	2015-2016
Meghan Chen, Dalhousie Biology Honours Student	2015-2016

CITATION METRICS

Google Scholar: 1050 citations; h-index 16 29 July 2018

PUBLICATIONS (*HQP CO-AUTHORS) ** = MOST RELEVANT FOR TEMPLETON

****In Press E. M. Bertrand.** *Quantification of vitamin B12-related proteins in marine microbial systems using selected reaction monitoring mass spectrometry.* MiMB Microbime Analysis: Methods and Protocols (Springer, Book Chapter).

In Revision G. Lax, Y. Eglit, L. Eme, **E.M. Bertrand**, A. J. Roger, A.G. B. Simpson. *Hemimastigophora is a 'novel' supra-kingdom-level lineage of Eukaryotes.* **Nature.**

In Revision J. K. Brunson, S. M. K. McKinnie, J. R. Chekan, J. P. McCrow, Z. D. Miles, E. M. Bertrand, V. A. Bielinski, H. Luhavaya, M.Obornik, G. Smith, D. A. Hutchins, A. E. Allen², B. S. Moore. *Biosynthesis of the amnesic shellfish poison domoic acid in a bloom forming diatom.* **Science.**

In Revision J. Spackeen, D. Bronk, R. Sipler, **E. M. Bertrand**, D. A. Hutchins, A. E. Allen. Stoichiometric N:P ratios, temperature, and iron impact carbon and nitrogen uptake by Ross Sea microbial communities. **J. Geophysical Research: Biogeosciences**

In Revision J. Spackeen, **E. M. Bertrand**, R. Sipler, D. A. Hutchins, A. E. Allen, D. Bronk. *Impact of temperature, CO₂, and iron on nutrient uptake by a late-season microbial community from the Ross Sea, Antarctica.* **Aquatic Microbial Ecology**

****2018** R. Paerl, **E. M. Bertrand**, E. Rowland*, P. Chatt, M. Mehiri, T. D. Niehaus, L. Riemman, A.D. Hanson, F. Yves-Bouget. *Carboxythiazole is a key microbial nutrient currency and critical component of thiamin biosynthesis.* **Scientific Reports.** 8(1) 5940.

2018 A. O. Tatters, A. Schnetzer, K. Xu, N. G. Walworth, F. Fu, J. L. Spackeen, R. E. Sipler, **E. M. Bertrand**, J. B. McQuaid, A. E. Allen, D. A. Bronk, K. Gao, J. Sun, D. A. Caron, D. A. Hutchins. *Interactive effects of temperature, CO₂ and nitrogen source on a coastal California diatom assemblage.* **J. Plankton Research** 40(2) <https://doi.org/10.1093/plankt/fbx074>

2017 J. L. Spackeen, R. E. Sipler, K. Xu, A. O. Tatters, N. G. Walworth, E. M. Bertrand, J. B. McQuaid, D. A. Hutchins, A. E. Allen, D. A. Bronk. *Interactive effects of elevated temperature and CO₂ on nitrate, urea, and dissolved inorganic carbon uptake by a coastal California, USA, microbial community.* **Marine Ecol. Progress Series** 577(49-65)

****2017** T. J. Browning, E. P. Achterberg, I. Rapp, A. Engel, **E. M. Bertrand**, A. Tagliabue, C. M. Moore. *Nutrient co-limitation at the boundary of an oceanic gyre.* **Nature.** doi:10.1038/nature24063

2017 Spackeen, R. Sipler, K. Xu, A. Tatters, N. Walworth, **E. M. Bertrand**, J. McQuaid, D. A. Hutchins, A. E. Allen, D. Bronk. *Interactive effects of elevated temperature and CO₂ on nitrate, urea, and DIC uptake by a coastal California microbial community.* **Marine Ecology Progress Series.** <https://doi.org/10.3354/meps12243>.

2016 P.A. Lee, **E. M. Bertrand**, M.A. Saito, G. R. DiTullio. *Influence of vitamin B₁₂ availability on oceanic dimethylsulfide and dimethylsulfoniopropionate.* **Environmental Chemistry** 13(2) 293-301
doi: [10.1071/EN15043](https://doi.org/10.1071/EN15043)

****2015** **E. M. Bertrand**, J. P. McCrow, A. Moustafa, H. Zheng, Jeff. McQuaid, T. O. Delmont, A. F. Post, R. Sipler, J. Spackeen, K. Xu, D. A. Bronk, D. A. Hutchins, A. E. Allen. *Phytoplankton-bacterial interactions mediate micronutrient colimitation at the coastal Antarctic sea ice edge* **Proceedings of the National Academy of Sciences, USA.** 112 (32).9938–9943, doi: [10.1073/pnas.1501615112](https://doi.org/10.1073/pnas.1501615112)

****2015** R. W. Paerl, **E. M. Bertrand**, A. E. Allen, B. Palenik, F. Azam. *Vitamin B₁ ecophysiology of marine picoeukaryotic algae: Strain-specific differences and a new role for bacteria in vitamin cycling.* **Limnology and Oceanography.** 60, 215-228. doi: [10.1002/lno.10009](https://doi.org/10.1002/lno.10009)

****2013** **E.M. Bertrand**, D.M. Moran, M.R. McIlvin, J.M. Hoffman, A.E. Allen, M. A. Saito. *Methionine synthase interreplacement in diatom cultures and communities: Implications for the persistence of B₁₂ use by marine eukaryotic phytoplankton.* **Limnology and Oceanography.** 4: 1431-1450 doi: [10.4319/lno.2013.58.4.1431](https://doi.org/10.4319/lno.2013.58.4.1431)

2013 **E.M. Bertrand**, R. Keddiss, J.T. Groves, C. Vetriani, R.N. Austin. *Identity and mechanisms of alkane-oxidizing metalloenzymes from deep-sea hydrothermal vents.* **Frontiers in Microbiology.** 4:109. doi: [10.3389/fmicb.2013.00109](https://doi.org/10.3389/fmicb.2013.00109)

- 2012 **E.M. Bertrand** and A.E. Allen. Influence of vitamin B auxotrophy on nitrogen metabolism in eukaryotic phytoplankton. *Frontiers in Microbiology*. 3(375). doi: [10.3389/fmicb.2012.00375](https://doi.org/10.3389/fmicb.2012.00375)
- **2012 **E.M. Bertrand**, A. E. Allen., C.L. Dupont, T. Norden-Kirchmar, J. Bai, R. E. Valas, M.A. Saito. Influence of cobalamin starvation on diatom molecular physiology and the identification of a novel cobalamin acquisition protein. *Proceedings of the National Academy of Sciences, USA*. 109(26) E1762-E1771 doi: [10.1073/pnas.1201731109](https://doi.org/10.1073/pnas.1201731109) (* Faculty of 1000 Biology “Recommended” article)
- 2012 S. Dyhrman, B. Jenkins, T. Rynearson, M. Saito, M. Mercier, H. Alexander, L. Whitney, A. Drzewianowski, V. Bulygin, **E. Bertrand**, Z. Wu, C. Benitez-Nelson, and A. Heithoff. The Transcriptome and Proteome of the Diatom *Thalassiosira pseudonana* Reveal a Diverse Phosphorus Stress Response. *PLoS ONE*. 7(3) e33768. doi: [10.1371/journal.pone.0033768](https://doi.org/10.1371/journal.pone.0033768)
- 2012 L.L. Wurch, **E.M. Bertrand**, M.A. Saito, B. Van Mooy, S. Dyhrman. Proteome changes driven by phosphorus deficiency and recovery in the brown tide forming alga *Aureococcus anophagefferens*. *PLoS ONE*. 6(12) e28949. doi: [10.1371/journal.pone.0028949](https://doi.org/10.1371/journal.pone.0028949)
- 2011 **E.M. Bertrand**, M.A. Saito, P.A. Lee, P.N. Sedwick, R.B. Dunbar, G. R. DiTullio. Iron limitation of a springtime bacterial and phytoplankton community in the Ross Sea: implications for vitamin B12 nutrition. *Frontiers in Microbiology* 2(160).doi: [10.3389/fmicb.2011.00160](https://doi.org/10.3389/fmicb.2011.00160)
- **2011 M. A. Saito, **E. M. Bertrand**, S. Dutkiewicz, V. V. Bulygin, D. M. Moran, F. M. Monteiro, M. J. Follows, F. W. Valois, J. B. Waterbury. Iron conservation by reduction of metalloenzyme inventories in the marine diazotroph *Crocospaera watsonii*. *Proceedings of the National Academy of Sciences, USA*. 108 (6) 2184-2189. doi: [10.1073/pnas.1006943108](https://doi.org/10.1073/pnas.1006943108) (*Featured in the podcasts: “This Week in Microbiology” and “Nature Microbiology”)
- **2011 **E.M Bertrand**, M.A. Saito, Y.J. Jeon, B.A. Neilan. Profiling vitamin B12 biosynthesis gene diversity in the Ross Sea: the identification of a new group of putative polar B12- biosynthesizers. *Environmental Microbiology*. 13(5) 1285–1298. doi:[10.1111/j.1462-2920.2011.02428.x](https://doi.org/10.1111/j.1462-2920.2011.02428.x)
- 2011 C. J. Gobler, many others, **E. M. Bertrand**, M. A. Saito, I.V. Grigoriev. Niche of harmful alga *Aureococcus anophagefferens* revealed through ecogenomics. *Proceedings of the National Academy of Sciences, USA*. 108(11) 4352-7. doi: [10.1073/pnas.1016106108](https://doi.org/10.1073/pnas.1016106108)
- 2010 M.A. Saito, T.J. Goepfert, A.E. Noble, **E.M. Bertrand**, P.N. Sedwick, and G.R. DiTullio. A Seasonal study of dissolved cobalt in the Ross Sea, Antarctica: micronutrient behavior, absence of scavenging, and relationships with Zn, Cd, and P. *Biogeosciences*. 7, 4059-4082. doi: [10.5194/bg-7-4059-2010](https://doi.org/10.5194/bg-7-4059-2010)
- 2008 R.N. Austin, K. Luddy, K. Erikson, M. Pender-Cudlip, **E. M. Bertrand**, D. Deng, R. S. Buzdygon, J.B. van Beilen, J. T. Groves. Cage escape competes with geminate recombination during alkane hydroxylation by the diiron oxygenase AlkB. *Angewandte Chemie*, 120, 28, 5310–5312. doi: [10.1002/anie.200801184](https://doi.org/10.1002/anie.200801184)

****2007** E. M. Bertrand, M.A. Saito, J.M. Rose, C. R. Riesselman, M.C. Lohan, A. E. Noble, P.A. Lee, G. R. Ditullio. Vitamin B12 and iron co-limitation of phytoplankton growth in the Ross Sea. *Limnology and Oceanography*. 52 (3) 1079-1093 [doi: 10.4319/llo.2007.52.3.1079](https://doi.org/10.4319/llo.2007.52.3.1079) (*Faculty of 1000 Biology "Recommended" article)

2007 E.A. Rozhkova-Novosad, J.C. Chae, G.J. Zylstra, **E.M. Bertrand**, M. Alexander-Ozinskas, D. Deng, L.A. Moe, J.T. Groves, R.N. Austin. Profiling mechanisms of alkane hydroxylase activity in vivo using the diagnostic substrate norcarane. *Chemistry and Biology*. 14: 165-172 [doi: 10.1016/j.chembiol.2006.12.007](https://doi.org/10.1016/j.chembiol.2006.12.007)

2005 E. Bertrand, R. Sakai, E. Rozhkova-Novosad, L. Moe, B. G. Fox, J.T. Groves, R. N. Austin. Reaction mechanisms of non-heme diiron hydroxylases characterized in whole cells. *Journal of Inorganic Biochemistry*. 99: 1998–2006 [doi: 10.1016/j.jinorgbio.2005.06.020](https://doi.org/10.1016/j.jinorgbio.2005.06.020)

PATENTS

2016 M. Saito, **E. Bertrand**. Cobalamin Acquisition Protein and Use Thereof. US Patent [9,234,012](https://patents.google.com/patent/9,234,012)

OUTREACH PUBLICATIONS

2011 E. M. Bertrand. Psychotherapy for Plankton: life can be stressful out there in the microscopic marine world [Oceanus Magazine](https://www.oceanusmagazine.com/issue-49-1). 49(1).

PUBLISHED ABSTRACTS (SINCE 2014) (*STUDENT CO-AUTHORS)

2017 J.S. McCain*, C. Kachuk*, **E. M. Bertrand**. End-to-end Metaproteomics: Advances in sample processing and mass spectrometry bioinformatics for environmental microbiology, Canadian Society for Microbiologists 2017, Waterloo, Ontario: **Contributed Poster**

2016 E. M. Bertrand, J. McCrow, T. Delmont, D. Hutchins, A. Allen. Multi-omic insights into the role of temperature and iron availability in shaping coastal Southern Ocean microbial dynamics. Int. Soc. for Microbial Ecology, Montreal Quebec: **Contributed Talk**

2016 E. M. Bertrand, J. McCrow, D. Bronk, D. Hutchins, A. Allen. Planktonic Responses to Simulated Warming and Elevated Iron Availability in McMurdo Sound: Community Composition and Microbial Interactions. ASLO Ocean Science Meeting, New Orleans, LA: **Contributed Poster**

2014 E. Bertrand, J. McQuaid, D. Bronk, D. Hutchins, A. Allen. Metatranscriptomic analysis of continuous flow experiments manipulating iron, CO₂, and temperature: controls on late season primary production in the Ross Sea. ASLO Ocean Sciences meeting, Honolulu HI: **Contributed Poster**

INVITED TALKS AND PRESENTATIONS (SINCE 2015)

Ocean Carbon Biogeochemistry Summer Workshop, Woods Hole, MA, Plenary Invited talk 2018

Ocean Sciences, Portland OR, <i>Invited talk</i>	2018
Chemical Oceanography Gordon Research Conference, New London NH, <i>Invited talk</i>	2017
Canadian Society of Microbiologists, Annual Meeting, Waterloo ON, <i>Plenary Invited talk</i>	2017
ASM Microbe Annual Meeting, New Orleans LA, <i>Plenary Invited talk</i>	2017
Marine Microbial Proteomics Working Group, Woods Hole MA, <i>Invited talk</i>	2017
St. Mary's University, Dept. of Biology, Halifax NS, <i>Invited talk</i>	2017
Columbia University and Barnard College, <i>Invited talk</i>	2016
Princeton University EGGS Seminar, <i>Invited talk</i>	2016
Columbia University and Barnard College, <i>Invited talk</i>	2016
Dalhousie University, Chemistry Department, <i>Invited talk</i>	2016
Dalhousie University, Biochemistry and Molecular Biol. Dept, <i>Invited talk</i>	2015
Dalhousie University, Oceanography Department, <i>Invited talk</i>	2015
Mt. Allison University, Biochemistry Department, <i>Invited talk</i>	2015
Bedford Institute of Oceanography, <i>Invited talk</i>	2015
CIFAR Microbial Biodiversity Meeting, <i>Invited talk</i>	2015
Concordia University Biology Department, <i>Invited talk</i>	2015

INVITED WORKSHOP PARTICIPATION

17th Annual Systems Biology Workshop, Bellairs Research Station, Barbados <i>The Reef Microbiome</i>	2018
Marine Microbial Proteomics Working Group, Woods Hole Oceanographic Inst. MA, USA <i>Best Practices meeting for Data Sharing of Ocean and Environmental Metaproteomics</i>	2017
CIFAR Global Women in Science Leadership Workshop; Banff Centre, Alberta https://www.cifar.ca/events/global-women-in-science-leadershipworkshop/	2016

CRUISE PARTICIPATION AND FIELD WORK

Atlantic Zone Monitoring Program Cruise; CCGS Hudson (two Bertrand lab members)	Spring 2018
ANAO8A- Amundsen Sea Research Cruise, R/V IB Araon (one Bertrand Lab member)	Jan- Feb 2018
Atlantic Zone Monitoring Program Cruise; R/V Coriolis II (two Bertrand lab members)	Spring 2017
Atlantic Zone Monitoring Program Cruise; CCGS Hudson (two Bertrand lab members)	Fall 2016
Atlantic Zone Monitoring Program Cruise; CCGS Hudson (Bertrand and one lab member)	Spring 2016
McMurdo Sound, Antarctica; Postdoctoral Research	2014-2015
West Antarctic Peninsula, Phantastic II Cruise, R/VIB N.B. Palmer; Postdoctoral Research	2014
McMurdo Sound, Antarctica; Postdoctoral Research	2013
Metzyme Cruise, Equatorial Pacific, R/V Kilo Moana; Postdoctoral Research	2011

Station Aloha, CMORE photoperiod cruise, R/V Kilo Moana; PhD research	2009
McMurdo Sound, Antarctica; PhD research	2009
Ross Sea, CORSACS II Cruise R/VIB N.B. Palmer; PhD research	2006
Ross Sea, CORSACS I Cruise R/VIB N.B. Palmer; research assistant	2005
Costa Rica Dome, R/V Knorr; summer student fellow	2005

SERVICE

Manuscript reviewer

Biogeosciences, 2010- current
 Oceanography, 2011- current
 Marine Chemistry, 2011-current
 Limnology and Oceanography, 2012- current
 Journal of Plankton Research, 2013-current
 Environmental Microbiology, 2014- current
 Proteomics, 2015- current
 ISME Journal, 2014-current
 Limnology and Oceanography Methods, 2015- current
 Rapid Communications in Mass Spectrometry, 2014- current
 Metallomics, 2016- current
 Frontiers in Microbiology, 2016- current
 Proceedings of the National Academy of Sciences, 2016- current
 Plant Physiology, 2016- current
 Current Biology, 2017-current

Proposal reviewer

Canadian National Science and Engineering Council 2016-2018
 U.S. National Science Foundation 2015-2018
 European Research Council 2016-2018

Session organizer

Microbial growth factors in the sea: Characterizing their importance at the molecular and ecosystem level. With Ryan Paerl. Ocean Sciences 2014 Honolulu, HI

Panel participant

Roundtable for Canada's Fundamental Science Review (Naylor report), Sept 2016

Departmental Service

Biology Department Seminar Committee- Chair	2015-present
Biology Department Graduate Admissions Committee	2017-present
Dalhousie Biology Department Representative, Science Atlantic	2016-present
Participant, Marine Block planning committee	2016-present

Search Committee CRC Tier II in Marine Quantitative Ecology- Member 2016

University Service

Search Committee for Chair, Department of Chemistry- Member 2016

Search committee for Associate Vice President and Scientific Director
of the Ocean Frontier Institute- member 2017-present

MEMBERSHIPS

Dalhousie's Women in Research Caucus (WiRC)

Dalhousie's Centre for Comparative Genomics and Evolutionary Bioinformatics ([CGEB](#))

International Society for Microbial Ecology ([ISME](#))

Canadian Society of Microbiologists ([CSM](#))

Association for the Sciences of Limnology and Oceanography ([ASLO](#))

Canadian National Proteomics Network ([CNPC](#))

[Science Atlantic](#)