MICHÈLE G. LAVIGNE, PH.D.

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EDUCATION

Ph.D. Oceanography: 2010
Rutgers University Graduate Program in Oceanography
B.A. Environmental Chemistry/Geology: 2003
Hampshire College Amherst, MA

ACADEMIC APPOINTMENTS

Assistant Professor of Earth and Oceanographic Science ***2013 - present***
Bowdoin College, Department of Earth and Oceanographic Science
Visiting Assistant Professor of Earth and Oceanographic Science ***2012 - 2013***
Bowdoin College, Department of Earth and Oceanographic Science
Postdoctoral Scholar and Lecturer ***2010- 2012***
University of California Davis, Bodega Marine Laboratory and Department of Geology
Graduate Fellow ***2004-2010***
Rutgers University Institute of Marine and Coastal Sciences
Research Technician ***2003-2004***
Rutgers University Inorganic Analytical Laboratory: Institute of Marine and Coastal Sciences

SELECTED ACADEMIC HONORS AND AWARDS

- Andrew W. Mellon Faculty Leave Fellowship, Bowdoin College **2016-2017**
- University of California President's Postdoctoral Fellowship Finalist **2010**
- AAAS Canon National Parks Science Scholarship **2007-2010**
- Rutgers Graduate Excellence Fellowship for Doctoral Study in Oceanography **2004-2005**

GRANTS IN SUPPORT OF RESEARCH

Carlon, D., **LaVigne, M. (Co-PI).** $214,361 RUI: Experimental Seawater Laboratory at the Coastal Studies Center, Bowdoin College. NSF-FSML: Improvements in Facilities, Communications, and Equipment at Biological Field Stations and Marine Laboratories *(2015-2016)*.

LaVigne, M. (PI). $99,994 RUI-OCE-RIG: Decadal climate, carbon and nutrient variability: New Insights from deep-sea bamboo coral records on the California Margin. National Science Foundation: Ocean Science Research Initiation Grant *(2014-2016)*.

LaVigne, M. (PI) $4,000. Evaluating the Effects Ocean Acidification on Phippsburg, Maine Clam Flats. Bowdoin College Faculty Research Award *(2014)*.

LaVigne, M. (PI) $3,200 Climate reconstructions using bamboo coral geochemical data. Bowdoin College Gibbons Summer Research Award *(2013)*.

LaVigne, M. (PI) $4,000. Nutrient loading, primary productivity, and coral health in the Florida Keys National Marine Sanctuary: Using corals to reconstruct pre-anthropogenic baselines Bowdoin College Faculty Research Award *(2012-2013).*

LaVigne, M. (PI) $80,000, Reconstructing Nutrient Histories of Biscayne and Dry Tortugas National Park Coral Reef Environments From the Geochemistry of Coral Skeletons. AAAS/Canon National Parks Science Scholarship *(2007-2010).*

Sherrell, R. M. (in support of Ph.D. research: **M. LaVigne** contributed to writing and preparing the proposal) $430,947, A Coral Skeleton P/Ca Proxy for Surface Ocean Phosphate: Testing and calibration. NSF: Chemical Oceanography *(2008-2011).*

Sherrell, R. M. (in support of Ph.D. research: **M. LaVigne** contributed to writing and preparing the proposal) $100,000, Development and Application of a Direct Coral Proxy for Surface Water Phosphate in the Paleo-Ocean. American Chemical Society: Petroleum Research Fund. *(2008-2010).*

PEER-REVIEWED PUBLICATIONS
*** denotes undergraduate student author**

*Freiberger, M. ('16), *Miller, H. ('17), Hill, T., McNichol, A., Lardie, M., **LaVigne, M.**, ***(in prep)*** Growth Rate Nonlinearity in Bamboo Corals. *For submission to: Deep-Sea Research.*

*Serrato Marks, G., **LaVigne, M.**, Hill, T., Sauthoff, W., Guilderson, T., Roark, E., Dunbar, R. ***(submitted)*** Ba/Ca ratios in North Pacific bamboo corals record changes in intermediate water chemistry. *Paleoceanography.*

Dassié, E., DeLong, K., Kilbourne, H., Williams, B., Abram, N., Brenner, L., Brahmi, C., Cobb, K., Corrège, T., Dissard, D., Emile-Geay, J., Evangelista, H., Evans, M., Farmer, J., Felis, T., Gagan, M., Gillikin, D., Goodkin, N., Khodri, M., Lavagnino, A.C., **LaVigne, M.**, Lazareth, C., Linsley, B., Lough, J., McGregor, H., Nurhati, I., Ouellette, G., Perrin, L., Raymo, M., Rosenheim, B., Sanstrom, M., Schöne, B., Sifeddine, A., Stevenson, S., Thompson, D., Waite, A., Wanamaker, A., Wu, H. ***(accepted)*** Save our Marine Annually-Resolved Proxy Archives (MARPA)! *Eos.*

LaVigne, M., Grottoli, A., Palardy, J., Sherrell, R. (2016) Multi-colony calibrations of coral Ba/Ca with a contemporaneous *in situ* seawater barium record*. Geochimica et Cosmochimica Acta* ***179, 203-216.***

Hofmann G., Evans T., Kelly M., Padilla-Gamiño J., Blanchette C., Washburn L., Chan F., McManus M., Menge B., Gaylord B., Hill T., Sanford E., **LaVigne M.**, Rose J., Kapsenberg L., Dutton J., (2014) Exploring local adaptation and the ocean acidification seascape – Studies in the California Current Large Marine Ecosystem. *Biogeosciences* ***11,*** *1053-1064.*

LaVigne, M., Nurhati, I., Cobb, K., McGregor, H., Sinclair, D., Sherrell, R. (2013) ENSO-driven nutrient variability recorded by central equatorial Pacific corals. *Geophysical Research Letters* ***40,*** *1-6.* ***Highlighted in: American Geophysical Union Research Spotlight:*** GRL, EOS

Pespeni M., Palumbi S., Sanford E., Gaylord B., Hill T.M., Hosfelt J., **LaVigne M.,** Lenz E., Russell A.D., Young M. (2013) Evolutionary change during experimental ocean acidification. *Proceedings of the National Academy of Sciences* **110,** 6937-6942.

LaVigne, M., Hill, T.M., Sanford, E., Gaylord, B. Russell, A.D., Lenz, E.A., Hosfelt, J.D., Young, M.K. (2013) The elemental composition of purple sea urchin (*Strongylocentrotus purpuratus)* calcite and potential effects of pCO_2 during early life stages*. Biogeosciences* ***10,*** *3465-3477.*

Hill, T.M., **LaVigne, M.,** Spero, H.J., Guilderson, T.P., Gaylord, B., Clague, D. (2012) Variations in seawater Sr/Ca recorded in deep-sea bamboo corals. *Paleoceanography,* **27**, PA 3202.

LaVigne, M., Hill, T.M, Spero, H.J., Guilderson, T.P. (2011) Bamboo coral Ba/Ca: Calibration of a new deep ocean refractory nutrient proxy. *Earth and Planetary Science Letters,* **312**, 506-515.

Hill, T.M., Spero, H.J., Guilderson, T., **LaVigne, M.**, Clague, D., Macalello, S., Jang, N. (2011)

Temperature and vital effect controls on Bamboo coral (*Isididae*) isotope geochemistry: A test of the "lines method". *Geochemistry, Geophysics, Geosystems,* **12,** Q04008

Anagnostou, E., Sherrell, R. M., Gagnon, A., **LaVigne, M.,** Field, M. P., McDonough, W. (2011) Seawater nutrient and carbonate ion concentrations recorded as P/Ca, Ba/Ca, and U/Ca in the deep-sea coral *D. dianthus*. *Geochimica et Cosmochimica Acta* **75**, 2529-2543

LaVigne, M., Matthews, K. A., Grottoli, A. G., Cobb, K. M., Cabioch, G., Sherrell, R. (2010) Coral skeleton P/Ca proxy: multi-colony calibration with a contemporaneous seawater phosphate record. *Geochimica et Cosmochimica Acta* **74,** 1282-1293.

LaVigne, M., Field, M. P., Anagnostou, E. Grottoli, A, G., Wellington, G., Sherrell, R. M., (2008) Skeletal P/Ca tracks upwelling in Gulf of Panamá coral: Evidence for a new seawater phosphate proxy. *Geophysical Research Letters* **35**, L05604.
Highlighted in: Science Editor's Choice 21 March 2008: vol. 319 p.1590
American Geophysical Union Journal Highlight: GRL, EOS

Helman, Y. Natale, F. Sherrell, R. **LaVigne, M**. Starovoytov, V., Gorbunov, M. Y., and Falkowski, P. G. (2008) Extracellular matrix production and calcium carbonate precipitation by coral cells *in vitro*. *Proceedings of the National Academy of Sciences* **105,** 54-58.

Field, M. P., **LaVigne, M**., Murphy, K. R., Ruiz, G. M., Sherrell, R. M. (2007) Direct determination of P, V, Mn, As, Mo, Ba and U in seawater by SF-ICP-MS. *Journal of Analytical Atomic Spectrometry* **22**, 1145-1151.

Draxler, A.F.J. Sherrell, R.M. Wieczorek, D. **LaVigne, M.** and Paulson, A.J. (2005) Manganese concentration in lobster (*Homarus Americanus)* gills as an index of exposure to reducing conditions in western Long Island Sound. *Journal of Shellfish Research* **24**, 815-820.

INVITED SEMINARS

Global Change Biology Gordon Research Seminar: 17 July 2016
"*Past and Present: The Use of Biogeochemical Proxies to Assess Ocean Change and Biological Effects"*

Kennebec Estuary Land Trust Fall Lecture Series: 18 November 2015 (talk given by me and the students enrolled in my *Marine Biogeochemistry* course (EOS 2525)):
"Investigating Ocean Acidification on Maine Clam Flats Through Undergraduate Research"

Society for Women in Marine Science (MIT/WHOI Joint Program): *10 October 2015*
"Developing an Oceanography Research Program at a Liberal Arts College"

Bigelow Laboratory for Ocean Sciences: *11 May 2015*
"Linking Ocean Nutrient Dynamics to Climate using Geochemical Coral Proxies"

Phippsburg Shellfish Commission: *23 May 2015*
"Investigating Ocean Acidification on Phippsburg Clam Flats"

Maine Maritime Academy, Department of Ocean Studies: *11 Nov. 2014*
"Investigating Ocean Acidification on Maine's Clam Flats Through Undergraduate Research"

Tufts University, Department of Earth and Ocean Sciences: *26 Nov. 2012*
"Climate Clues from Coral Reefs"

William Paterson University, Department of Environmental Science: *29 Feb. 2012*
"Climate Clues from Coral Reefs"

Adelphi University, Environmental Studies Program: ***2 Feb. 2012***
"Climate Clues from Coral Reefs"

UC Davis, Bodega Marine Laboratory: ***17 Aug. 2011***
"Climate Clues from Deep-Sea Bamboo Corals"

Mills College Environmental Sciences Seminar Series: ***14 April 2011***
"Using Corals as Climate Archives"

San Francisco State University, Department of Geosciences: ***15 March 2011***
"Linking Pacific Ocean Nutrient Dynamics to Climate with Geochemical Proxies from Corals"

UC Santa Cruz, Ocean Sciences Department Seminar Series: ***27 October 2010***
"Coral records of reduced nutrient availability in central equatorial Pacific surface waters during the 1980's"

Distinguished Guest Lecturer: Department of Earth & Environmental Sciences, University of the Pacific: ***6 Oct. 2010***
"Unraveling Past Ocean Biogeochemistry With Novel Proxies from Corals"

RECENT PROFESSIONAL MEETINGS & ABSTRACTS

(Past 3 years; * denotes undergraduate student author and presenter)

LaVigne, M., *Freiberger, M., *Serrato Marks, G., *Miller, H., Hill, T.M., McNichol, A., Lardie Gaylord, M. (September 2016) Growth Rate Nonlinearity in Bamboo Corals: Implications for Intermediate Ocean Proxy Reconstructions. International Deep Sea Coral Symposium, Boston, MA.
****Received Best Early Career Poster Award****

LaVigne, M., DeLong, K., (June 2016) Annual seawater barium cycles recorded by scleractinian corals. International Sclerochronology Conference, Portland, ME.

*Freiberger, M., *Miller, H. ('17), Hill, T., McNichol, A., Lardie, M., **LaVigne, M.**, (June 2016) Growth Rate Nonlinearity in Bamboo Corals. International Sclerochronology Conference, Portland, ME.

*Miller, H., **LaVigne, M.,** Indrick, R., *and students of EOS 2525 Marine Biogeochemistry* (March 2016) Seasonal variability in carbonate chemistry on Kennebec Estuary clamflats. Benthic Ecology Meeting, Portland, ME

*Maine, J., **LaVigne, M.**, White, M., Mook, B., Kingston, S. (2016) THE BIVALVE BREAKDOWN: The effect of calcite saturation state on the elemental composition of juvenile Eastern Oyster shells. Benthic Ecology Meeting, Portland, ME

LaVigne, M., *Serrato Marks, G., *Freiberger, M., *Miller, H., Hill, T., McNichol, A., Lardie Gaylord, M., (Feb. 2016) Insights Into Intermediate Ocean Barium Cycling From Deep-Sea Bamboo Coral Records on the California Margin. Ocean Sciences Meeting, New Orleans, LA.

*Freiberger, M., *Miller, H., Hill, T., McNichol, A., Lardie, M., **LaVigne, M.**, (Dec. 2015) Reconnaissance ^{14}C Dating and the Evaluation of Mg/Li as a Temperature Proxy in Bamboo Corals from the California Margin. American Geophysical Union Fall Meeting, San Francisco, CA.

*Serrato Marks, G., **LaVigne, M.**, Hill, T., Sauthoff, W., Guilderson, T., Roark, B., Dunbar, R. (Dec. 2015) Ba/Ca ratios in North Pacific bamboo corals record changes in intermediate water biogeochemistry. American Geophysical Union Fall Meeting, San Francisco, CA.

*L. Anderson, *B. Mortiz, **M. LaVigne**, R. Indrick (2015) *Mya arenaria* and an Acidifying Ocean: Assessing the Carbonate System and Saturation State in a Phippsburg, ME Clam Flat. Geological

Society of Maine Spring Meeting. Waterville, ME.

*I. Bolden, I., **LaVigne,** K. DeLong (2015) A Calibration of the Ba/Ca Ratio in Floridian Surface Corals as a Paleo-discharge Proxy. Geological Society of Maine Spring Meeting. Waterville, ME.

*L. Anderson, *B. Mortiz, **M. LaVigne**, R. Indrick (2015) *Mya arenaria* and an Acidifying Ocean: Assessing the Carbonate System and Saturation State in a Phippsburg, ME Clam Flat. Maine Sustainability and Water Conference. Augusta, ME.

*G. Serrato Marks, M. **LaVigne**, T. Hill, W. Sauthoff, T. Guilderson, B. Roark, R. Dunbar, (2014) Ba/Ca Reproducibility and Growth Banding in Gulf of Alaska Bamboo Corals. American Geophysical Union Fall Meeting, San Francisco, CA.

M. LaVigne, K. Matthews, A. Grottoli, J. Palardy, R. Sherrell (2014) Multi-colony calibrations of coral Ba/Ca with a contemporaneous *in situ* seawater barium record. American Geophysical Union Fall Meeting, San Francisco, CA.

Sherrell, R., **LaVigne, M.**, Sinclair, D., Anagnostou, E., Harazin, K., McGregor, H., Tudhope, S., Nurhati, I., Cobb, K., Adkins, J. (2013) Development and application of the P/Ca coral proxy for oceanic phosphate – a status update. 11th International Conference on Paleoceaongraphy, Barcelona, Spain.

COURSES TAUGHT

Bowdoin College

Research in Oceanography: Topics in Paleoceanography: Course #EOS 3515 *Fall 2013,2014*
Marine Biogeochemistry: Course #EOS 2525 *Spring 2013,2015, Fall 2015*
Equatorial Oceanography: Course #EOS 2540 *Spring 2015, Fall 2015*
Earth Climate History: Course #EOS 302 *Spring 2013*
Biogeochemistry: An Analysis of Global Change: Course #EOS 200 *Fall 2012*
Department of Earth and Oceanographic Science Field Seminar: Grand Manan Island, New Brunswick, Canada: *Sept. 2012;* Hurricane Island, Maine: *Sept. 2013*

UC Davis: The Oceans: Course # GEL 16: *Fall 2011*
Rutgers University: Ocean Science Inquiry: Course # 11:628:303: *Spring 2009*

UNDERGRADUATE RESEARCH MENTORING: BOWDOIN COLLEGE

Senior Honors Thesis Advisor:

- *Hannah Miller ('17):* "Seasonal variability in carbonate chemistry on Kennebec Estuary clam flats"
- *Megan Freiberger ('16):* "Decadal climate, carbon and nutrient variability: New Insights from deep-sea bamboo coral records on the California Margin"
- *Julia Maine ('16):* "The chemical responses of oyster shell composition to ocean acidification"
- *Lloyd Anderson ('16):* "Investigating non-carbonate alkalinity in salt marsh ecosystems"
- *Gabriela Serrato Marks ('15):* "Ba/Ca variability in deep-sea bamboo coral records on the California Margin and Gulf of Alaska" (Currently: Ph.D.student, MIT-WHOI Joint Program)
- *Isaiah Bolden ('15):* "Corals, coasts, and climate change." (Currently: Ph.D. student, U. Washington)

Independent Study Advisor:

- *Jamie Ptacek ('17):* "Bomb-radiocarbon based growth rates from deep-sea bamboo coral records on the California Margin"
- *Hannah Miller:* "Ocean acidification impacts on Maine clam flat sediments." *(Spring 2016)*
- *Gabriela Serrato Marks:* "Growth bands and trace elements in bamboo corals from the Gulf of Alaska." *(Spring 2014)*

- *Isaiah Bolden:* "Corals, coasts, and climate change." *(Fall 2013)*
- *Jessica Turner:* "Investigating the impact of ocean acidification on larval *Ostrea lurida* shell geochemistry using scanning electron microscopy." *(Spring 2013).*

Fellowship Program Faculty Advisor:

2015-2016: Clare Boothe Luce Fellowship Program *Faculty advisor for Megan Freiberger ('16): Fellowship aimed to support women in physical science and engineering.*

2015-2016: Bowdoin Science Experience *Faculty advisor for Joshua Hollis ('19): Program aimed to introduce students from underrepresented groups to scientific research and academic opportunities at Bowdoin.*

2013-2015: Mellon Mays Undergraduate Fellowship Program *Faculty advisor for Isaiah Bolden ('15): Research fellowship aimed to expand minority faculty in higher education.*

Summer Research Advisor:

2016

- *Jamie Ptacek ('17):* "Decadal climate, carbon and nutrient variability: New Insights from deep-sea bamboo coral records on the California Margin": supported by NSF OCE-RIG Grant to M. LaVigne
- *Hannah Miller ('17):* "Ocean acidification impacts on Maine clam flat sediments": supported by Freedman Summer Felloship Grant to H. Miller
- *Benjamin Geyman ('16):* "Barium isotopes in deep-sea bamboo corals on the California Margin": hosted and advised by T. Horner with support of WHOI Summer Student Fellowship

2015

- *Megan Freiberger ('16):* "Decadal climate, carbon and nutrient variability: New Insights from deep-sea bamboo coral records on the California Margin": supported by a Clare Boothe Luce Fellowship and NSF OCE-RIG Grant to M. LaVigne
- *Hannah Miller ('17):* "Decadal climate, carbon and nutrient variability: New Insights from deep-sea bamboo coral records on the California Margin": supported by NSF OCE-RIG Grant to M. LaVigne
- *Gabriela Serrato-Marks ('15):* "Decadal climate, carbon and nutrient variability: New Insights from deep-sea bamboo coral records on the California Margin": supported by NSF OCE-RIG Grant to M. LaVigne

2014

- *Bailey Mortiz ('16):* "Effects of Alkalinity and Ocean Acidification on Clam Shell Development in Phippsburg, ME.": supported by Rusack Coastal Studies Fellowship.
- *Lloyd Anderson ('16):* "An Assessment of pH and the Effects of Ocean Acidification in Phippsburg Clam Flats.": supported by Rusack Coastal Studies Fellowship.

2013

- *Gabriela Serrato Marks ('15):* "Climate reconstructions from bamboo corals": supported by Bowdoin College Gibbons Summer Research Award.
- *Isaiah Bolden ('15):* "Corals, coasts, and climate change": supported by Mellon Mays Undergraduate Research Fellowship.

Honors Thesis Advisory Committee Member: Bowdoin College Department of Earth and Oceanographic Science: *2012-present*

Undergraduate thesis committee member for S. Kramer ('16), D. Gustafson ('15), C.Payne ('15), D. White ('15), D. Lesser ('14), C. Adams ('14), R. Peabody ('14), A. Westervelt ('14), K. McDonough ('14), T. Thibodeau ('13).

TEACHING DEVELOPMENT

- Workshop: *On the Cutting Edge* Teaching Oceanography: *June 2103*
- Webinar Series: Effective Strategies for Undergraduate Geoscience Teaching: *Spring 2103*
- Bowdoin College New Course Development Award: *Spring 2013*
- Teaching Workshop Series: UC Davis Center for Excellence in Teaching and Learning: *Summer 2011*
- Workshop: *On the Cutting Edge* Preparing for an Academic Career in the Geosciences: *2011*

OTHER SCHOLARLY ACTIVITIES

SELECTED SERVICE AND OUTREACH

Journal Reviewer:
Biogeosciences, Coral Reefs, Chemical Geology, Continental Shelf Research, Earth and Planetary Science Letters, Environmental Monitoring and Assessment, Geochimica et Cosmochimica Acta, Geophysical Research Letters, Journal of Geophysical Research-Biogeosciences, Mediterranean Marine Science, Nature Communications, Quaternary Science Reviews

National Science Foundation:
***Reviewer**: Chemical Oceanography, Marine Geology and Geophysics, Paleo Perspectives on Climate Change (P2C2), and Polar Programs*
***Panelist:** Marine Geology and Geophysics: 2015*

Session Convener:
American Geophysical Union Fall 2014 Meeting: *High resolution archives of marine biogeochemistry, climate, and environmental change.*
Ocean Sciences 2014 Meeting: *Records of Biogeochemical and Physical Processes in the Tropical Ocean*
American Geophysical Union Fall 2012 Meeting: *Climate Variability from High Resolution Proxies*
American Geophysical Union Fall 2010 Meeting*: Paleoceanography at the Interface of Emerging Micro-analytical Technologies*

Instructor: Upward Bound Oceanography Module (NSF-Funded): *July 2015, July 2016*

Outstanding Student Paper Awards Session Liaison and Judge:
American Geophysical Union Fall 2014 Meeting: *High resolution archives of marine biogeochemistry, climate, and environmental change.*
American Geophysical Union Fall 2012 Meeting: *Climate Variability from High Resolution Proxies*
Ocean Sciences 2012 Meeting: *The Response of Marine Calcifiers to Global Climate Change and Ocean Acidification*

Invited Speaker:
Phippsburg, ME Shellfish Commission: *April 2015*
Aspirations in Maine High School Visit Day: *November 2013*
Coastal Studies for Girls Science and Leadership School: *November 2013*
"Career Day" Knollwood Elementary School, Piscataway, NJ: *May, 2009*

<u>Bowdoin College Service</u>

Committees:
EOS/Coastal Studies Center Laboratory Instructor Search Committee: *2015*

Coastal Studies Center Laboratory Technician Search Committee: *2015*
Faculty Development Teaching Committee: *2015-2016*
Faculty Development Research Committee: *2014-2015*
EOS Department Visiting Assistant Professor Search Committee: *2013; 2014-15, 2015-16*

Panelist:
Freshman Orientation Faculty Panel and Q&A: *August 2015*
Accepted Students Community Engagement Panel: McKeen Center For The Common Good: *April 2015*

PROFESSIONAL MEMBERSHIPS

- American Geophysical Union
- American Society of Limnology and Oceanography
- National Association of Geoscience Teachers
- Earth Science Women's Network
- Deep Sea Biology Society