

ALEXANDER C. GAGNON

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Curriculum Vitae: July 15, 2019

EDUCATION:

Ph.D., Chemistry, California Institute of Technology. (2010)
Thesis: *Geochemical Mechanisms of Biomineralization from Analysis of Deep-Sea and Laboratory Cultured Corals*. Advisors: Jess Adkins and Doug Rees.

B.S., Chemistry, and (2002)
B.A., Molecular and Cell Biology, University California, Berkeley.

EMPLOYMENT HISTORY:

Assistant Professor, School of Oceanography, (June 2013-Present)
University of Washington

Geological Postdoctoral Fellow, Lawrence Berkeley National Lab (2010 – 2013)
Advisors: Jim DeYoreo and Don DePaolo

RESEARCH GRANTS:

NSF: "CAREER: The Mechanism and Geochemical Factors Controlling Skeletal Nucleation in Coral" **Sole PI:** 3/2016/-1/2021.

Seeley Family (Private Donor): "Changing Waters: Ocean Acidification at Tetiaroa Ecostation." 1//2014-12/2021. **Co PI.**

EMSL/PNNL User Proposals. Current proposal: "Mapping the Organic-Mineral Interactions Responsible for Calcification in a Biogeochemically Significant Microbe." 10/2018 to 9/2019.
Lead PI. Other successful user proposals from 10/2014 to 9/2016 (**Sole PI**) and 10/2013 to 9/2014 (**Sole PI**).

M.J. Murdock Charitable Trust: "Trace Element Laboratory for Environmental Science" **Lead PI** (2/2016-6/2018)

NSF: "OCE-RIG: Improving Climate Records Through a Mechanistic Understanding of Sub-Micron Proxy Heterogeneity in Spinose Foraminifera." **Sole PI:** 9/2014/-8/2016.

NSF: "FSML: Friday Harbor Lab Instruments" **Co-PI:** 9/2014-8/2016.

NSF-MG&G: "Trace Metal Proxies in Non-spinose Planktic Foraminifera: Environmental Calibrations and Incorporation Processes." **Subaward:** 7/2013-6/2016.

Royalty Research Fund: "Acid in the Past: A Pre-Instrumental History of Ocean Acidification Recorded by Puget Sound and Pacific Coast Cold-Water Corals." **Sole PI:** 7/2014-1/2016.

Faculty Sponsor for **Student Technology Fee Award** to Oceanography (2014 and 2019),

GRADUATE STUDENTS AS PRIMARY SUPERVISOR

MaryMargaret Stoll. Graduate Student, Chemical Oceanography, UW (2019-present)
Awarded PCC Graduate Fellowship

Isaiah Bolden. Graduate Student, Chemical Oceanography, UW (2015-present)
Passed General Exam 2019, Defended MS 2017
Awarded NSF-GRFP
Awarded IPOC-IGERT fellowship
Awarded ARCS

Marta Wolfshorndl. Graduate Student, Chemical Oceanography, UW (2016-present)
Passed general exam 2018
Transferred to Gagnon Lab in 2016
Awarded NSF-GRFP prior to joining Gagnon Lab

Elisa Bonin. Graduate student, Chemical Oceanography, UW. (2013-2019)
Now Postdoc University Gottingen
Defended PhD 2019, Passed general exam 2017, Defended MS 2016
IPOC-IGERT Associate

POST-DOCTORAL SUPERVISION

Oscar Branson, Co-advised with Professor Howard Spero of UC Davis (2014-2016)
Now Faculty at Cambridge University.

Anne Gothman, Primary faculty advisor (2015-2017)
Now Faculty at St. Olaf
Awarded JISAO Postdoctoral Fellowship

Nick Roden, Co-advised with Professor Julian Sachs (2017-2018)
Now a postdoc in Bergen, Norway

PROFESSIONAL SERVICE:

Proposal Review Panel Member: NSF: Chemical Oceanography (2017); California State Sea Grant -Ocean Acidification and Hypoxia Call (2014).

Invited Presenter: National Research Council of the National Academies, Chemical Sciences Roundtable: "Chemical Phenomena at the Mesoscale: Geochemical Processes" (2014).

Theme Co-Chair Goldschmidt 2014: "Geochemistry: Nano-scale to meso-scale results." Coordinating a theme with 5-6 invited sessions at the premier annual international geochemistry conference.

Guest Editor: *Proceedings of the National Academy of Sciences* (2014).

External Thesis Reviewer or External Thesis Committee Member:

Anne Roepert - Universiteit Utrecht (2019)

Dr. Itay Cohen - Hebrew University, Jerusalem (2017)

Dr. Kat Allen - Lamont-Doherty Earth Observatory (2012)

Ad Hoc Proposal Reviewer: NSF-Ocean Acidification, NSF-Chemical Oceanography, NSF-Marine Geology and Geophysics, NSF-Low-T Geochemistry and Geobiology, NSF-Paleo Perspectives on Climate Change, NSF-Physiology Mechanisms & Biomechanics, NERC (UK), European Research Council, Leuvenheim Trust (UK), United States-Israel Binational Science Foundation; MJ Murdock Charitable Trust, UW: Royalty Research Fund.

Convener or Co-Convener of Conference Sessions: *American Geophysical Union Meeting, Ocean Science Meeting, Goldschmidt*

Journal Referee: *Science, Nature Climate Change, Proceedings of the National Academy of Sciences, Nature Communications, Geochimica et Cosmochimica Acta, Earth and Planetary Science Letters, Proceedings of the Royal Society B, Journal of the Royal Society, Geophysical Research Letters, Paleoceanography, Scientific Reports, Chemical Geology, Limnology and Oceanography: Methods, Elementa, Coral Reefs, Journal of Experimental Marine Biology and Ecology, Frontiers in Marine Science, Biogeosciences.*

Consulting Oceanographer: Foster-Pepper PLLC (2013)

Sierra Madre Search & Rescue Team Member. (2005-2008)

A group of dedicated volunteers committed to saving lives in the wilderness.

UNIVERSITY COMMITTEES, DUTIES, SERVICES:

Royalty Research Fund Review Committee, UW (2018-present)

Lead PI: Trace Element Lab (2017-present)

Undergraduate Scholarship Application Reviewer (Spring 2019)
College of the Environment, UW.

Science Communication Advisory Group, (2015-2018)
College of the Environment, UW.

School of Oceanography Faculty Council, Appointed Member (2014-2016)

Search Committee: Assistant Dean of Research, College of the Environment (2015)

Search Committee: Future of Ice Faculty (Fall 2014-Spring 2015)

Graduate Recruitment Coordinator, Chemical Oceanography (Winter 2015)

Faculty Field Tour, UW (Summer 2014)

School of Oceanography Curricular Committee (Spring 2014)

Faculty Fellows Program, UW (2013)

SELECTED TALKS and PRESENTATIONS:

Biomineralization Gordon Conference (<i>Invited Speaker</i>)	(Invited for 2020)
American Geophysical Union (AGU) Fall Meeting (<i>Talk</i>)	(2018)
Ocean Science Meeting 2018 (<i>Poster</i>)	(2018)
European Coral Reef Symposium, Oxford (<i>Invited Session Keynote</i>)	(2017)
Centre Scientifique de Monaco (<i>Invited Speaker</i>)	(2017)
CNRS - Aix-Marseille Université, NanoScience Center (<i>Talk</i>)	(2017)
Friday Harbor Lab seminar (<i>Talk</i>)	(2017)
Goldschmidt 2017 Conference (<i>Talk</i>)	(2017)
Geobiology Gordon Conference (<i>Invited Speaker</i>)	(2016)
BASE-LiNE Earth Workshop, Prague (<i>Invited Keynote</i>)	(2016)
SCORE: Modern Planktonic Foraminifera and Ocean Change (<i>Invited Talk</i>)	(2015)
Conference on High Resolution Proxies of Paleoclimate (<i>Invited Keynote</i>)	(2015)
National Research Council, Chemical Sciences Roundtable (<i>Invited Talk</i>)	(2014)
Georgia Institute of Technology (<i>Talk</i>)	(2014)
University of Georgia, Marine Science Seminar (<i>Invited Talk</i>)	(2014)
Goldschmidt 2014 Conference (<i>Talk</i>)	(2014)
Ocean Acidification Primary Investigator Meeting, Washington D.C. (<i>Poster</i>)	(2014)
Program on Climate Change Seminar, University of Washington (<i>Invited Talk</i>)	(2013)
Lamont-Doherty Earth Observatory Geochemistry Seminar (<i>Invited Talk</i>)	(2012)
American Geophysical Union (AGU) Fall Meeting (<i>Invited Talk</i>)	(2012)
International Coral Reefs Symposium (<i>Talk</i>)	(2012)
Goldschmidt 2012 Conference (<i>Invited Talk</i>)	(2012)
University of Washington Oceanography Seminar (<i>Invited Talk</i>)	(2012)
UC Merced Environmental Systems Seminar (<i>Invited Talk</i>)	(2012)
UC Museum of Paleontology (<i>Invited Talk</i>)	(2012)
UC Davis Geology Departmental Seminar (<i>Invited Talk</i>)	(2011)
Goldschmidt 2011 Conference (<i>Talk</i>)	(2011)
Princeton University Geosciences Departmental Seminar (<i>Invited Talk</i>)	(2011)
Stanford University Non-Traditional Stable Isotopes Seminar (<i>Invited Talk</i>)	(2011)
Bodega Marine Lab Seminar (<i>Invited Talk</i>)	(2011)
American Geophysical Union (AGU) Fall Meeting (<i>Invited Talk and Poster</i>)	(2010)
DOE –BES Isotope Geochemistry Workshop (<i>Invited Talk</i>)	(2010)
UC Santa Cruz Ocean Science Seminar (<i>Invited Talk</i>)	(2010)
MIT Chemical Oceanography and Biogeochemistry Seminar (<i>Invited Talk</i>)	(2010)
International Conference on Paleoceanography X (<i>Invited Talk</i>)	(2010)

PEER-REVIEWED PUBLICATIONS:

(*) *Denotes Advisees*

Citations since 2014: 833; h-index: 18

- (25) Bolden*, Sachs, **Gagnon (in Press)**. Temporally-Variable Productivity Quotients on a Coral Atoll: Implications for Estimates of Reef Metabolism. *Marine Chemistry*
- (24) Bonnin*, Zhu, Fehrenbacher, Russell, Hönisch, Spero, **Gagnon (2019)**. Submicron Sodium Banding in Cultured Planktic Foraminifera Shells. *Geochimica et Cosmochimica Acta*.
- (23) Johnson, Muller, Khatib, Bonnin*, **Gagnon**, and Raschke. (2019). Infrared Nano-Spectroscopic Imaging in the Rotating Frame. *Optica*.
- (22) Vielzeuf, **Gagnon**, Ricolleau, et. al. (2018). Growth kinetics and distribution of trace elements in precious corals. *Frontiers in Earth Science*
- (21) Chen, **Gagnon**, and Adkins (2018). Carbonic anhydrase, coral calcification and a new model of stable isotope vital effects. *Geochimica et Cosmochimica Acta*.
- (20) Fehrenbacher, Russell, Davis, **Gagnon**, Spero, Martin, Cliff, Zhu (2017). Light cycle triggers Mg-banding in *Neogloboquadrina dutertrei*: implications for chamber formation and biomineralization in planktic foraminifers. *Nature Communications*
- (19) Branson*, Bonnin*, Perea, Spero, Zhu, Winters, Hönisch, Russell, Fehrenbacher, **Gagnon (2016)**. The Nanometer-Scale Chemistry of a Calcite Biomineralization Template: Implications for Skeletal Composition and Nucleation. *Proceedings of the National Academy of Sciences*.
- (18) Giuffrè, **Gagnon**, De Yoreo, and Dove (2015). Isotopic tracer evidence for the amorphous calcium carbonate to calcite transformation by dissolution-reprecipitation. *Geochimica et Cosmochimica Acta*.
- (17) Eiler, Bergquist, Bourg, Cartigny, Farquhar, **Gagnon**, et al., (2014). Frontiers of Stable Isotope Geoscience. *Chemical Geology*.
- (16) Thresher et al. (2014). Strong Depth-Related Zonation of Megabenthos on a Rocky Continental Margin (700–4000 m) off Southern Tasmania, Australia. *PlosONE*.
- (15) Robinson, Adkins, Frank, **Gagnon**, Prouty, Roark, and van de Flierdt (2014). The geochemistry of deep-sea coral skeletons: applications for paleoceanography. *Deep Sea Research*.
- (14) **Gagnon**, Adkins, Erez, Eiler, and Guan. (2013). Sr/Ca Sensitivity to Aragonite Saturation in Cultured Coral: Mechanism of Biomineralization During Ocean Acidification. *Geochimica et Cosmochimica Acta*.
- (13) **Gagnon**. (2013). Commentary: Coral calcification feels the acid. *Proceedings of the National Academy of Sciences*.
- (12) Hathorne, **Gagnon**, et al. (2013). Inter-laboratory study for coral Sr/Ca and other element/Ca ratio measurements. *Geochemistry Geophysics Geosystems*.

PEER REVIEWED PUBLICATIONS (continued):

- (11) Vielzeuf, Garrabou, **Gagnon**, et al. (2013) Distribution of Sulfur and Magnesium in the Red Coral. *Chemical Geology*.
- (10) Gabitov, **Gagnon**, Guan, Eiler, and Adkins (2013). Accurate Mg/Ca, Sr/Ca, and Ba/Ca ratio measurements in carbonates by SIMS and NanoSIMS and an assessment of heterogeneity in common calcium carbonate standards. *Chemical Geology*.
- (9) **Gagnon**, Adkins, and DePaolo. (2012) Precise Overgrowth Composition During Biomineral Culture and Inorganic Precipitation. *Chemical Geology*.
- (8) **Gagnon**, Adkins, and Erez. (2012). Seawater Transport During Coral Biomineralization. *Earth and Planetary Science Letters*.
- (7) Anagnostou, Sherrell, **Gagnon**, LaVigne, Field and McDonough. (2011). Seawater nutrient and carbonate ion concentrations recorded as P/Ca, Ba/Ca, and U/Ca in the deep-sea coral *Desmophyllum dianthus*. *Geochimica et Cosmochimica Acta*.
- (6) Case, Robinson, Auro, and **Gagnon**. (2010). Environmental and biological controls on Mg and Li in deep-sea scleractinian corals. *Earth and Planetary Science Letters*.
- (5) Fernandez, **Gagnon**, and Adkins. (2010). An Isotope Dilution ICP-MS Method for Determination of Mg/Ca and Sr/Ca Ratios in Calcium Carbonate. *Geostandards and Geoanalytical Research*.
- (4) Tripathi, Eagle, Thiarajagan, **Gagnon**, Bauch, Halloran, and Eiler. (2010). ^{13}C - ^{18}O isotope signatures and 'clumped isotope' thermometry in foraminifera and coccoliths. *Geochimica et Cosmochimica Acta*.
- (3) **Gagnon**, Adkins, Fernandez, and Robinson. (2007). Sr/Ca and Mg/Ca vital effects correlated with skeletal architecture in a scleractinian deep-sea coral and the role of Rayleigh fractionation. *Earth and Planetary Science Letters*.
- (2) Robinson, Adkins, Scheirer, Fernandez, **Gagnon**, and Waller. (2007). Deep-sea scleractinian coral age and depth distributions in the northwest Atlantic for the last 225,000 years. *Bulletin of Marine Science*.
- (1) Robinson, Adkins, Fernandez, Burnett, Wang, **Gagnon**, and Krakauer. (2006). Primary U distribution in scleractinian corals and its implications for U series dating. *Geochemistry Geophysics Geosystems*.

COURSES TAUGHT at UW:

Course Titles: Climatic Extremes, Marine Biogeochemical Cycles*, Aquatic Chemistry, Indigenous Science*, Fundamentals of Mass Spectrometry*, Introduction to Oceanography Lab, Marine Bioinorganic Chemistry*, Marine Benthic Ecology. (* denotes newly developed course)

Average class size (last 3 years): 28 students; Average combined score (last 3 years): 4.5

MENTEES AND COMMITTEES

Primary Graduate Faculty Advisor:

Elisa Bonin, Graduate student, Chemical Oceanography, UW. (2013-2019)
Isaiah Bolden, Graduate Student, Chemical Oceanography, UW (2015-present)
Marta Wolfshorndl, Graduate Student, Chemical Oceanography, UW (2016-present)
MaryMargaret Stoll, Graduate Student, Chemical Oceanography, UW (2019-present)

Graduate Committee Member:

Michael Kipp, Earth and Space Science/Astrobiology, UW. (2019-present)
Lukas Defilippo, Aquatic and Fishery Sciences (2019-present)
Laura Moore, Chemical Oceanography, UW. (2019-present)
Susan Rundell, Biological Oceanography, UW. (2019-present)
Amy Wyeth, Biological Oceanography, UW. (2019-present)
Jana Meixnerova, Earth and Space Science, UW. (2018-present)
Zac Cooper, Biological Oceanography, UW. (2017-present)
Susanna Michael, Chemical Oceanography, UW. (2016-present)
Sasha Seroy, Biological Oceanography (2015-present)
Theresa Whorley, MG&G, UW (2014-present)
Trevor Hillebrand, Earth and Space Science, UW. (2019)
Julia Kelson, Earth and Space Science, UW. (2015-2019)
Keith Hodson, Earth and Space Science, UW. (2016-2018)
Evan Firth, Biological Oceanography, UW. (2013-2017)
Marta Wolfshorndl, Chemical Oceanography, UW. (2013-2016)
Will Gagne-Maynard, Chemical Oceanography, UW. (2013-2016)

External Member Of PhD Thesis Defense Committee:

Kat Allen, Paleoceanography, LDEO/Columbia University (2012)

Research Mentor:

Tamas Ugrai, Research Scientist (Technician) in Gagnon Lab. (2017-present)
Amy Larsen, Oceanography Undergraduate Researcher, UW. (2018-present)
Dan Anderson, Oceanography Undergraduate Researcher, UW. (2014-present)
Awarded Mary Gates Fellowship.
Signe Bergman, Oceanography Undergraduate Researcher, UW. (2016-2018)
Julien Butwin, High School Research Assistant. (2014-2015)
Caleb Birchard, Research Scientist (Technician) in Gagnon Lab. (2015)
Now a graduate student in geochemistry at WSU.
Lauern Brandkamp, Scientist in Residence, French Polynesia (2014-2015)
Co-advised with Professor Julian Sachs.
Now preparing for veterinary school.

Postdoctoral Advisor:

Nick Roden, Co-advised with Professor Julian Sachs (2017-2018)
Anne Gothman, Primary faculty advisor (2015-2017)
Oscar Branson, Co-advised with Professor Howard Spero of UC Davis (2014-2016)

OUTREACH and QUOTES in the PRESS

Lead a series of "Climate and Chemistry Workshops" for Washington State high school chemistry teachers (2019). Two all-day workshops with attendance of ~20 teachers each. Demonstrates connections between climate science, oceanography, and the high school chemistry curriculum. Workshop was recorded and edited into a four part series of online video lessons for high school teachers. Conducted in partnership with Northwest Educational Service District.

Invited Panelist: Meet, Greet, Teach: "Expanding the universe | braiding the path" College of the Environment, UW, (2017).

Attended COMPASS Science Communication Workshop, College of Environment, UW, (2013).

Quoted in the Press:

New York Times (6/2017): "In Coral Skeletons, Microscopic Portraits of Resilience?"

Parentmap (8/2016): "Raising Kids in a Warming World"

Wired (9/2015): "Think Like a Tree: A New Kind of Eco-Friendly Concrete Inspired by Coral"

NatureJobs (8/2015): "Lab budgets: A numbers game"