

# William C. Daniels

Department of Geosciences, University of Massachusetts Amherst

627 N. Pleasant Street, Amherst, MA, 01035, USA

ORCID ID: 0000-0002-3424-2273

Tel: 612-226-9790; Email: [wcdaniels@geo.umass.edu](mailto:wcdaniels@geo.umass.edu); Blog: <https://limnowill.com/>

## RESEARCH INTERESTS

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My scientific interests lie in exploring the connections between humans and the environment, and between climate and the biosphere. My research interests lie in using geochemical, isotopic, and biological indicators to track environmental change, both in modern systems and in the geologic past. I am particularly passionate about limnology and paleolimnology because lakes and lake sediments are excellent integrators of the climatic, ecologic, and anthropogenic changes that occur over time. In an era when climate is changing rapidly and freshwater ecosystems are stressed by cultural eutrophication, heavy metal contamination, and plastic pollution, paleolimnologic records provide critical context regarding natural climate variations and baseline ecosystem structure and function.

## KEYWORDS

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Paleoclimate, paleolimnology, limnology, organic geochemistry, stable isotope geochemistry, water isotopes, biogeochemical cycles, invasive species, aquatic ecology, Arctic and Antarctic systems, Quaternary geology, human impacts in ecology

## EDUCATION

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**2017 Ph.D., Brown University**, Department of Earth, Environmental and Planetary Sciences (Providence, RI) and **Marine Biological Laboratory**, Ecosystems Center (Woods Hole, MA). Drs. James M. Russell and Anne E. Giblin, advisors.

*Climatic and ecological change in Arctic Alaska over the last 32,000 years inferred from lacustrine records and experiments*

**2013 M.Sc., Brown University**, Department of Earth, Environmental and Planetary Sciences (Providence, RI) and **Marine Biological Laboratory**, Ecosystems Center (Woods Hole, MA). Drs. James M. Russell and Anne E. Giblin, advisors.

*Benthic community metabolism in deep and shallow arctic lakes during 13 years of whole-lake fertilization*

**2007 B.A., Lawrence University**, Appleton, WI. Magna cum laude in biology. Dr. Bart T. De Stasio, advisor.

*Dreissena polymorpha and suspended sediment effects on the lower food web in Green Bay, Lake Michigan and Lake Winnebago, Wisconsin: A modeling approach*

## PROFESSIONAL EXPERIENCE

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- 2017-2019**     **Post-doctoral Scholar**, University of Massachusetts Amherst, Department of Geological Sciences. Drs. Isla S. Castañeda and Julie Brigham-Grette, supervisors.  
*Reconstructing Arctic climate change with biomarkers during and since the mid-Pliocene Warm Period*
- 2018**           **Mission Commander**, HERA Mission XVII, NASA-Johnson Space Center. I was one of four crewmembers in a 45-day space flight analog in the Human Exploration Research Analog program.
- 2011-2017**     **Research and Teaching Assistant**, Brown University and MBL.
- 2009-2011**     **Research Assistant**, Marine Biological Laboratory. Research duties included monitoring Nitrex™ nitrate removal barriers, maintaining and sampling lab incubations, Antarctic research cruise with Palmer Long-Term Ecological Research Station (measuring bacterial productivity, dissolved oxygen, nutrients, etc.), Arctic limnology at the Toolik Lake LTER Station (nutrient lab manager, field sampling for a wide array of sample types).
- 2009-2010**     **Teaching Assistant**, Semester in Environmental Science, MBL, Woods Hole, MA. Teaching duties included lab and field preparations for aquatic components of the course (estuary and lake biogeochemistry), instruction on analytical techniques, undergraduate project guidance and development, field trip leader
- 2008-2009**     **Lab Technician II**, St. Croix Watershed Research Station, Marine on St. Croix, MN. Duties included field sampling (sediment coring and stream/lake/bog sampling), maintenance of field and lab equipment, laboratory analyses of sediments including loss-on-ignition, trace metals, gamma spectrometry sample preparation for radiogenic isotopes, grain size analysis, and sample archiving.
- 2007-2008**     **Naturalist and Dogsled Musher**, YMCA Camp Menogyn, Grand Marais, MN
- 2005-2007**     **Research and Classroom Assistant**, Lawrence University, Appleton, WI. Research duties included maintaining a bi-weekly lake monitoring program in Lake Winnebago and Green Bay, performing routine limnological analyses (chlorophyll a, phosphorus, nitrate), zooplankton identification and enumeration, data management.

## TEACHING EXPERIENCE

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- 2018**           **Guest lecturer, Honors Oceanography, University of Massachusetts.** Lectured for two classes, covering ocean salinity, sediments, and seasonality.
- 2017**           **Teaching assistant, Oceanography, Brown University.** Responsible for review sessions, office hours, grading, and co-leading field trips.
- 2011-2017**     **Elementary school science volunteer.** I designed and taught hands-on science lessons for grades 2-4 on a bi-monthly basis at the Vartan Gregorian Elementary School (Providence, RI) and The Common School (Amherst, MA).
- 2014-2017**     **Climate change guest teacher.** I taught an interactive lesson on climate change to 6<sup>th</sup> grade classes per year at the Marshfield Middle School in MA, and co-taught a week-long middle school SPARK program on meteorology at Brown University.
- 2016**           **Teaching assistant, Limnology, Brown University.** Responsible for laboratory sections each of which included a 10-15 minute introductory lecture, leading field trips, delivering 2 class lectures, and grading lab reports.
- 2015-2016**     **Instructor, Kaktovik Oceanography Program.** I helped coordinate and teach a week-long science camp for Inupiat children in Kaktovik, AK, and was the lead instructor for the geology lessons which included hypothesis-driven mapping of coastal erosion and sediment coring of Kaktovik Lagoon.

- 2013/2016 **Teaching Certificates I (Reflective pedagogy) and II (Course and syllabus Design)**, Brown University Sheridan Center for Teaching and Learning.
- 2013 **Teaching assistant, *Climate and Climate Change*, Brown University.** Held office hours and review sessions, administered and graded assignments and exams.
- 2012 **Teaching assistant, *Environmental Science in a Changing World*, Brown University.** Held review sessions and office hours, and was responsible for the two lab sections of the course including developing two lectures on biogeochemical cycling, leading field excursions, overseeing laboratory measurements, and coordinating group work.
- 2009-2010 **Teaching assistant and undergraduate project co-advisor;** Semester of Environmental Science, Ecosystems Center, MBL, Woods Hole, MA.
- 2007-2008 **Naturalist lecturer, dogsled musher, and activities coordinator:** YMCA Camp Menogyn, Minnesota.

#### **UNDERGRADUATE MENTORING**

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- 2018-2019 Kayley Donze and Kurt Lindberg (University of Massachusetts Amherst). Trained in sedimentary biomarker analysis (GDGTs) and lake water D/H and  $^{18}\text{O}/^{16}\text{O}$  analysis.
- 2017 Sophia Rudin (Brown University). Trained in Bolivia coring, XRF analysis, bulk sediment  $\delta^{13}\text{C}$  and  $\delta^{15}\text{N}$  analysis, and trace metal analysis to reconstruct pollution history of urban ponds.
- 2016 Jasmine McAdams (Brown University). Trained in estuarine diatom analysis and identification. Honors thesis: *Paleoecological Analysis of Diatoms as Indicators of Environmental Change in Narragansett Bay, RI.*
- 2106 Rebecca Rose (Brown University): Analyzed C and N content and stable isotope ratios in lacustrine records from Alaska. Honors thesis: *Effects of Holocene Climate Change on the Carbon Cycle in Northern Alaska.*
- 2016 Allison Cluett (Brown University). Analyzed leaf wax hydrogen isotopes in Holocene-length lacustrine records from Alaska. Honors thesis: *High-resolution leaf wax isotope records of Holocene climate in Arctic Alaska.*
- 2015 Patrick Holland-Stergar (Brown University). Analyzed leaf wax hydrogen isotopes in a 32,000 year sediment record from Alaska. Honors thesis: *A leaf wax hydrogen isotopic record of Northern Alaska temperature from the Last Glacial Maximum to the present.*

## PUBLICATIONS

- Daniels, W. C.**, Russell, J. M., Morrill, C., Longo, W. M., Giblin, A. E., Holland-Stergar, P., Welker, J. M., Wen, X., Hu, A., Huang, Y. Regional feedbacks strongly modulated Arctic Alaskan climate since the last ice age. *Geophysical Research Letters*. Under Review.
- Longo, W. M., Huang, Y., Russell, J. M., Morrill, C., **Daniels, W. C.**, Giblin, A. E., Crowther, J. Insolation and greenhouse gases drove Holocene winter and spring warming in Arctic Alaska. *PNAS*. Under Review.
- Vachula, R. S., Huang, Y., Longo, W. M., Dee, S. G., **Daniels, W. C.**, Russell, J. M. 2019. Evidence of Ice Age humans in eastern Beringia suggests early migration to North America. *Quaternary Science Reviews*. 205: 35-44. DOI /10.1016/j.quascirev.2018.12.003.
- Daniels, W. C.**, Huang, Y., Russell, J. M., Giblin, A. E. 2018. Effect of continuous light on leaf wax isotope ratios in *Betula nana* and *Eriophorum vaginatum*: Implication for Arctic paleoclimate reconstructions. *Organic Geochemistry*. 125: 70-81. DOI 10.1016/j.orggeochem.2018.08.008
- Daniels, W. C.**, Russell, J. M., Giblin, A. E., Welker, J. M., Klein, E. S., Huang, Y. 2017. Hydrogen isotope fractionation in leaf waxes in the Alaskan Arctic tundra. *Geochimica et Cosmochimica Acta*. 213: 216-236. DOI 10.1016/j.gca.2017.06.028.
- Daniels, W. C.**, Novis, P. M., Edlund, M. B. 2016. The valid transfer of *Cyclotella bodanica* var. *intermedia* to *Lindavia* (Bacillariophyceae). *Notulae algarum* 14. ISSN 2009-8987.
- Daniels, W. C.**, Giblin, A. E., Kling, G. W. 2015. Benthic community metabolism in deep and shallow arctic lakes during 13 years of whole-lake fertilization. *Limnology and Oceanography*. 60(5): 1604-1618. DOI 10.1002/lno.10120
- Daniels, W. C.** 2012. *Cyclotella bodanica*. In *Diatoms of the United States*.  
[http://westerndiatoms.colorado.edu/taxa/species/cyclotella\\_bodanica\\_intermedia](http://westerndiatoms.colorado.edu/taxa/species/cyclotella_bodanica_intermedia)
- De Stasio, B. T., Schrimpf, M. B., Beranek, A. E., **Daniels, W. C.**, Hoyer, E. (2010). *Dreissenid* driving tests: going the “wrong” way in Green Bay, Lake Michigan? *Verh. Intern. Verein. Limnol.* 30(10): 1540-1544. DOI 10.1080/03680770.2009.11902372
- De Stasio, B. T., Schrimpf, M. B., Beranek, A. E., **Daniels, W. C.** 2008. Increased Chlorophyll a, phytoplankton abundance, and cyanobacteria occurrence following invasion of Green Bay, Lake Michigan by *dreissenid* mussels. *Aquatic Invasions* 3(1): 21-27. DOI 10.3391/ai.2008.3.1.5

### **ORAL PRESENTATIONS AT CONFERENCES**

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- Daniels, W. C.**, Castañeda, I. C., Brigham-Grette, J. Three million year climate history of the terrestrial Arctic inferred from biomarkers at Lake El'gygytgyn. European Geophysical Meeting. 2019.
- Brigham-Grette, J., Castañeda, I. S., DeConto, R., Roychowdhury, R., de Wet, G., Habicht, H., Keisling, B., **Daniels, W. C.** Terrestrial Arctic Climate from Lake El'gygytgyn: Normal vs. Super Interglacial Teleconnections. Goldschmidt, Boston, MA. 2018
- Daniels, W. C.** Castañeda, I. S., Salacup, J. M., Brigham-Grette, J. Lacustrine biomarker reconstruction of Arctic climate before, during and after the mid-Pliocene warm period. Northeast GSA, Burlington, VT. 2018.
- Daniels, W. C.**, Russell, J. M., Morrill, C., Longo, W. M., Giblin, A. E., Holland-Stergar, P., Huang, Y. Western Arctic temperature sensitivity varies under different mean states. AGU Fall Meeting, San Francisco, CA. 2017.
- Longo, W. M., Huang, Y., Russell, J. M., Morrill, C., **Daniels, W. C.**, Giblin, A. E., Crowther, J. A high-resolution lacustrine alkenone record demonstrates progressive cold season warming during the Holocene in arctic Alaska. AGU Fall meeting 2017.
- Vachula, R. S., Longo, W. M., Daniels, W. C., Dee, S., Russell, J. M., Huang, Y. Evidence of Ice Age humans in Beringia: new insights on the peopling of the Americas. Invited. AGU Fall Meeting 2017.
- Longo, W. M., Huang, Y., Russell, J. M., Giblin, A. E., McNichol, A. P., Xu, L., **Daniels, W. C.** Differential millennial-scale responses of terrestrial carbon cycling dynamics to warming from two contrasting lake catchments in arctic Alaska. AGU Fall Meeting, 2016.
- Daniels, W. C.**, Russell, J. M. Huang, Y., Giblin, A. E., Longo, W. M., Holland-Stergar, P. Changing primary production in Arctic lakes at seasonal to millennial time scales. **Invited.** ASLO All-Science Meeting, Granada, Spain, 2015

### **INVITED ACADEMIC LECTURES**

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- American Geophysical Union Fall Meeting.** "Hydrologic and ecologic change in Arctic Alaska during and since the Last Glacial Maximum. Dec. 13, 2018.
- Greenfield Community College, Massachusetts STEM week.** "Geoscience in extreme environments: Experiences from the Arctic, Antarctic, and a NASA space pod". Oct. 24, 2018.
- Woods Hole Oceanographic Institute.** "Probing recent Arctic climate changes with 30 years of lake water isotopes" Oct. 16, 2018.
- University of Massachusetts Amherst, Department of Geological Sciences.** "Mashapaug Pond: A Paleolimnological story of people and pollution." Oct. 20, 2017.
- USGS-Reston.** "Past climate change in Beringia – New insights gained from lacustrine biomarkers." August 21, 2017
- Marine Biological Laboratory, Arctic LTER Annual Meeting.** "Paleoclimate and Paleolimnology records from Lake E5, Arctic Alaska." Feb. 2017

## POSTER PRESENTATIONS

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- Daniels, W. C.** 2019. Arctic Lake Water Isotopes Track Hydrologic and Climatic Processes. Water Isotope Workshop, NCAR/CLIVAR, Boulder, CO.
- Daniels, W. C.**, Castañeda, I. S., Salacup, J., Brigham-Grette, J. 2018. GDGT distributions in Lake El'gygytgyn (Far East Russia) sediments during and since the Pliocene. AGU.
- Husain, F., Longo, W. M., **Daniels, W. C.**, Russell, J. M., Giblin, A. E., Huang, Y. 2018. High-resolution 10,000-year temperature reconstruction from Lake Fog 2, northern Alaska. AGU.
- Daniels, W. C.**, Castañeda, I.S., Salacup, J.S., Brigham-Grette, J. 2018. Orbital variability in regular- and H-shaped GDGTs and *n*-alkyl lipids in Arctic lacustrine sediments during the Pliocene. Gordon Research Conference for Organic Geochemistry.
- Castañeda, I. S., Brigham-Grette, J., Habicht, M. H., **Daniels, W. C.**, Patterson, M., de Wet, G., Keisling, B., DeConto, R., Burns, S., Salacup, J. 2018. Plio-Pleistocene Arctic climate variability: Organic geochemical temperature reconstructions from Lake El'gygytgyn, Far East Russia. EGU.
- Husain, F., Longo, W. M., **Daniels, W. C.**, Russell, J. M., Giblin, A. E., Huang, Y. 2017. A 10,000-year record of Arctic temperature variability during the Holocene inferred from lipid biomarkers in lacustrine sediments from Northern Alaska. Northeast/Northcentral GSA.
- Daniels, W. C.**, Russell, J. M., Giblin, A. E., Longo, W. M., Morrill, C., Holland-Stergar, P., Rose, R., Huang, Y. 2016. Paleolimnologic and modeling perspectives on the physical and ecological sensitivity of Arctic tundra lakes to temperature change. AGU.
- Daniels, W. C.**, Russell, J. M., Longo, W. M., Holland-Stergar, P., Giblin, A. E., Morrill, C., Huang, Y. 2015. Deglacial Warming and Wetting of Northern Alaska. AGU.
- Longo, W. M., Crowther, J., **Daniels, W. C.**, Russell, J. M., Giblin, A. E., Morrill, C., Zhang, X., Wang, X., Huang, Y. 2015. Seasonally distinct reconstructions of Northern Alaskan temperature variability since the Last Glacial Maximum. AGU.
- Daniels, W. C.**, Russell, J. M., Huang, Y., Giblin, A. E. 2013. Leaf wax hydrogen isotopes record summer temperature in Arctic lake sediments. AGU.
- Daniels, W. C.** and Arctic LTER Lakes Group. 2013. Analyzing plankton communities in Arctic lakes using flow cytometry. Arctic LTER site review.
- Daniels, W. C.**, Giblin, A. E., Kling, G. W., Luecke, C. 2012. Low-level nitrogen and phosphorus addition drives hypolimnetic oxygen drawdown in deep arctic lakes. LTER All Scientist Meeting.
- Moraska Lafrancois, B., Karns, B., Miller, W., Schuetz, B., **Daniels, W. C.**, Peterson, E. 2009. Nitrogen patterns and sources in an upper Mississippi River tributary: a stable isotope approach. NABS.

## RESEARCH FUNDING

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- 2019**      **National Science Foundation Post-doctoral Fellowship.** Biomass burning in the terrestrial Arctic during past warm periods: New insights from organic biomarkers in Lake El'gygytgyn (Siberia). To start in April, 2020.
- 2019**      **Zuckerman Postdoctoral Fellowship.** Stipend and research support to study at the University of Haifa, Israel. Project title: Reconstructing Climate and Environments in the Heart of the Bering Strait. Advisor: Dr. Nicolas Waldmann. To start October, 2019.
- 2016**      **Institute at Brown for Environment and Society outreach grant.** Received travel and supply funds to volunteer with the Kaktovik Oceanography Program in northern Alaska. \$2134. W. C. Daniels.
- 2014**      **Geological Society of America Graduate Research Grant.** Calibrating the leaf wax hydrogen isotope proxy in Arctic Alaska using experimental and field studies. Award amount: \$2500. W. C. Daniels.

## **FIELD EXPERIENCE**

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- 2018, 2019** Paleolimnology field campaign to southern Greenland. Sediment trap recovery and deployment, ekman sampling, soil and vegetation sampling. PIs: Ray Bradley and Isla Castañeda, University of Massachusetts
- 2017** UNOLS Chief Scientist Training Program (R/V Blue Heron). 5-day research cruise on the Laurentian great lakes. Large volume water filtration and ponar sediment sampling for organic geochemical and stable isotope analyses. Large Lakes Observatory. PI: Doug Ricketts
- 2010–2015** Arctic Long-term Ecological Research and Alaska paleoclimate projects. Gravity and livingstone coring, sediment trap deployment, vegetation sampling, and limnologic sampling of remote Arctic lakes, streams, and tundra. MBL and Brown University. PIs: Anne Giblin, Yongsong Huang, James Russell
- 2011** Palmer LTER (R/V Gould). Shipboard volunteer (2 month cruise), Western Antarctic Peninsula. MBL. PI: Hugh Ducklow
- 2010** Nitrex Barrier monitoring, involving groundwater and estuarine sampling and biogeochemical assays in Cape Code, MA. Marine Biological Laboratory. PI: Ken Foreman
- 2008–2009** Sediment coring in Lake Michigan (R/V Laurentian, 3 day cruise) and midwest lakes; monthly stream monitoring; bog water sampling (DOC, mercury, sulfate). St. Croix Watershed Research Station. PIs: Dan Engstrom, Mark Edlund, James Ahlmendinger
- 2005–2006** Weekly limnological sampling of Lake Winnebago and Lake Michigan, WI. Lawrence University. PI: Bart De Stasio

## **PROFESSIONAL SERVICE**

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- 2018** **Database coordinator and development team member**, Neotoma biomarker database
- 2018** **Session convener**, AGU Fall Meeting 2018, “Biomarkers from Source to Sink: Proxy Development, Mechanistic Theory, and Applications” (PP007)
- 2016** **Session convener**, AGU Fall Meeting 2016, “Water Isotope Systematics: Improving Modern and Paleoclimate Interpretations” (PP22)
- 2015–2018** **Reviewer** (manuscripts and proposals): Chemical Geology, Geochimica et Cosmochimica Acta, Geophysical Research Letters, International Journal of Digital Earth, Marine and Petroleum Geology, Organic Geochemistry, Phytotaxa, PlosONE, Quaternary Research, Science of the Total Environment, and NSF-EAR grant proposals.

## **PROFESSIONAL AFFILIATIONS**

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Association for the Sciences of Limnology and Oceanography (ASLO), Geological Society of America (GSA), American Geophysical Union (AGU)



### UNIVERSITY SERVICE, OUTREACH, LEADERSHIP

- 2019- **Founding Board Member**, Fort River Watershed Association, Amherst, MA  
(community-driven river advocacy and education). I organized a river-cleanup and festival, attended by ~150 residents.
- 2018 **Science fair judge**, Westfield High School, Westfield, MA.
- 2016 **Guest science lecturer**, Urban Pond Procession Full Circle Film Series, Providence, RI.
- 2015-2016 **Instructor**, Kaktovik Oceanography Program, Kaktovik, AK.
- 2015-2017 **Guest science lecturer**, Brown University Science Center. “The care and keeping of axolotls”. Keynote presentation to >80 undergraduates each year as part of the science center’s Axolotl Day.
- 2013-2015 **Graduate liaison to the Sheridan Teaching Center**, Brown University. I communicated upcoming teaching/learning events to other graduate students and encouraged participation in teaching certificate courses.
- 2013-2016 **Volunteer coordinator**, RI Watershed Extension. I coordinated a team of 8 people to perform weekly water quality monitoring in an adopt-a-pond program in RI.
- 2012-2017 **Science fair judge**, Lawrence Middle School, Falmouth, MA.
- 2011-2017 **Elementary and middle school science volunteer**, Vartan Gregorian Elem. School, Providence, RI, Marshfield Middle School, MA, The Common School, Amherst, MA
- 2011 **Geosciences graduate field trip director**, Brown University, Providence, RI.
- 2011 **Research volunteer**, Palmer Antarctic LTER.

### ONGOING PROJECTS AND COLLABORATIONS

- Reconstructing Arctic climate change with biomarkers during and since the mid-Pliocene Warm Period (Dr. Julie Brigham-Grette, Univ. Massachusetts. Dr. Isla Castañeda, Univ. Massachusetts)
- Alaska paleoclimate and paleoecology (Dr. James Russell, Brown University; Dr. Yongsong Huang, Brown University; Dr. Anne Giblin, MBL; Dr. Will Longo, Macalester College and WHOI)
- Alaska lake water isotopes as a proxy for climate change (Dr. David Boutt, Univ. Massachusetts; Dr. Anne Giblin, MBL)
- Novel applications of spectrometric tools in lacustrine geochemistry (Dr. Aaron Jubb, USGS-Reston).
- Peruvian paleolimnology at lake Sausacocha (Dr. Benjamin Vining, Univ. of Arkansas)

### AWARDS AND HONORS

- 2014 Graduate fellowship, Institute at Brown for the Study of Environment and Society
- 2014 Graduate research grant, Geologic Society of America
- 2012 Honorable mention, NSF Graduate Research Fellowship Program
- 2012 Antarctic Service Medal, United States Antarctic program and National Science Foundation, given for participation in scientific research in Antarctica
- 2007 Howard and Helen Russell Award for Excellence in Biological Research, Lawrence University

### WORKSHOPS AND TRAINING

- 2018 LacCore Training Program in Lake Drilling Coordination and Data Management
- 2017 University-National Oceanographic Laboratory System (UNOLS) Chief Scientist Training
- 2012 Ecology and Systematics of Diatoms, Iowa Lakeside Laboratory
- 2006 Semester in Environmental Science, Marine Biological Laboratory, Woods Hole, MA
- 2006 Recreational SCUBA certification



## REFERENCES

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Dr. James Russell  
Ph.D. co-advisor  
Department of Earth, Environmental and Planetary Sciences  
Brown University  
324 Brook St.  
Providence, RI, 02912, USA  
Telephone: (401) 863-6330  
Email: [James\\_Russell@brown.edu](mailto:James_Russell@brown.edu)

Dr. Anne E. Giblin  
Ph.D. co-advisor  
The Ecosystems Center  
Marine Biological Laboratory  
7 MBL St.  
Woods Hole, MA, 02543, USA  
Telephone: (508) 289-7488  
Email: [agiblin@mbl.edu](mailto:agiblin@mbl.edu)

Dr. Isla S. Castañeda  
Postdoctoral supervisor  
Department of Geosciences  
University of Massachusetts Amherst  
627 N. Pleasant St.  
Amherst, MA, 01003, USA  
Telephone: (413) 577-1124  
Email: [isla@geo.umass.edu](mailto:isla@geo.umass.edu)