

Samantha C. Carter

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EDUCATION

The Ohio State University, Columbus, Ohio

Ph.D. in Earth Science (Aug 2020)

Advisor: Dr. Elizabeth M. Griffith

Dissertation: Improving our understanding of the marine barium cycle and constructing a new archive of erosion and sediment transport

The University of Texas at Arlington, Arlington, Texas

M.S. in Environmental and Earth Sciences (May 2015)

Advisor: Dr. Elizabeth M. Griffith

Thesis: Equatorial Pacific export production and carbonate accumulation over the Middle Miocene Climate Transition

Texas A&M University, College Station, Texas

B.S. in Geology (Dec 2012)

Minor in Mathematics; Minor in Geoinformatics

AWARDS AND GRANTS

Chapman Meeting Travel Support \$1400 (2020) The U.S. Science Support Program

Presidential Fellowship (2019) The Ohio State University

Urbino Summer School in Paleoclimatology Scholarship \$3300 (2019) The National Science Foundation

International Conference on Paleoceanography Travel Grant \$1000 (2019) The Oceanography Society

Friends of Orton Hall Fund \$750 Travel Award (2019) The Ohio State University

School of Earth Sciences Fellowship (Spring 2018) The Ohio State University

Friends of Orton Hall Fund \$600 Travel Award (2018) The Ohio State University

Outstanding Student Paper Award (2017) American Geophysical Union, Fall Meeting

Friends of Orton Hall Fund \$600 Travel Award (2017) The Ohio State University

Dean's Excellence Scholarship (2017) University of Texas at Arlington (awarded but not accepted due to move to OSU)

RESEARCH EXPERIENCE

Visiting Project Scientist (Current)

The University of California-Santa Cruz, Santa Cruz, California

- I am working to separate calcium from natural samples using column chemistry, and analyzing them for their isotopic composition using thermal ionization mass spectrometry

Research Assistant (Summer 2020)

The Ohio State University, Columbus, Ohio

- Worked with collaborators at Ohio State University and University of Texas at Arlington on a project investigating new modes of teaching math with an Earth Science context, funded by the National Science Foundation's Pathways into Geoscience (GEOPATHS) program

- Performed numerous statistical analyses on survey data investigating differences in the perception of geoscience between underrepresented minority and nonminority students, and am in the process of preparing a manuscript reporting the results

Presidential Fellow (Jan 2019 – Dec 2019)

The Ohio State University, Columbus, Ohio

- Carried out individual research regarding incorporation of the marine barium cycle into a global carbon cycle model, written in Fortran
- Performed sensitivity analyses on the modified model to investigate controls on the marine barium cycle and prepped two manuscripts for publication

Research Assistant (Summer 2018, Fall 2018)

The Ohio State University, Columbus, Ohio

- Worked in the Thermal Ionization Mass Spectrometry (TIMS) Laboratory, clean laboratory, and wet geochemistry laboratory and managed laboratory inventory and supplies
- Developed and applied method for Nd separation in clean lab using column chromatography, analyzed concentrations using inductively coupled plasma mass spectrometry (ICP-MS), and developed Nd analysis protocol on the TIMS
- Trained graduate students on sample preparation and proper use of the TIMS, including loading and running samples for Sr and Nd isotopes

I-Engage Graduate Mentor (Summer 2016)

The University of Texas at Arlington, Arlington, Texas

- Mentored an undergraduate student during the completion of a research project as part of the I-Engage program, which included analyzing and interpreting a grain-size distribution record and writing a paper summarizing the results and implications
- Introduced the undergraduate student to laboratory techniques including preparing sediment samples for isotopic analysis and analysis of bulk grain size

Research Assistant (Summers 2014, 2015)

The University of Texas at Arlington, Arlington, Texas

- Carried out individual research doing sequential extraction of barite, including acid digestions, ashing, and imaging samples on a scanning electron microscope (SEM)
- Developed and performed statistical analysis and image processing techniques using MATLAB
- Mentored two undergraduate students by introducing them to laboratory work, including coulometry work for CaCO₃ weight percent at the Texas Bureau of Economic Geology

Undergraduate Research Assistant (Aug 2012-Dec 2012)

Texas A&M University, College Station, Texas

- Assisted Dr. Mike Tice and Zhirui Zeng with their research project regarding microbial cerium reduction
- Prepared samples and ran experiments in an anaerobic chamber
- Developed and tested a spectrophotometric method of analyzing cerium reduction

TEACHING EXPERIENCE

Academic Program Specialist (Current)

The Ohio State University, Columbus, Ohio

- I am developing geoscience-themed math curriculum for an ongoing research project related to improving undergraduate STEM education and providing pathways into earth science as a major

Instructor (Current)

The University of Dayton, Dayton, Ohio

- GEO 109: Dynamic Earth (online)

Graduate Teaching Assistant (Fall 2017, Spring 2020)

The Ohio State University, Columbus, Ohio

- ES 1121: Dynamic Earth (student evaluation rating 4.5/5)
- ES 1100: Planet Earth (student evaluation 4.7/5)

Lecturer (Spring 2017)

The University of Texas at Arlington, Arlington, Texas

- GEOL 1350: Introduction to Oceanography (student evaluation rating 4.75/5)
- Lectured and led the laboratory section, with 32 students, including a field trip to introduce field techniques and sample processing procedures

Graduate Teaching Assistant (2015-2017)

The University of Texas at Arlington, Arlington, Texas

- GEOL 1350: Introduction to Oceanography (student evaluation rating 4.3/5)
- GEOL 3340/EVSE 5311: Geology for Engineers (student evaluation rating 4.5/5)
- GEOL 3387/3388: Field Geology

PUBLICATIONS

6. **Carter, S.C.**, E.M. Griffith, W.A. Griffith, and T.A. Jorgensen (in prep) The (not-so) great outdoors: What do underrepresented students value in career?
5. **Carter, S.C.**, E.M. Griffith, A.M.E. Winguth, and T. Beaty (in prep) The marine barium cycle in an ocean biogeochemical cycle.
4. **Carter, S.C.**, A. Paytan, and E.M. Griffith (2020) Toward an improved understanding of the marine barium cycle and the application of marine barite as a paleoproductivity proxy. *Minerals*, 10, 421. doi:10.3390/min10050421
3. **Carter, S.C.**, E.M. Griffith, P.D. Clift, H.D. Scher, and T.M. Dellapenna (2020) Clay-fraction strontium and neodymium isotopes in the Indus Fan: implications for sediment transport and provenance. *Geological Magazine*, 157: 879-894. doi: 10.1017/S0016756820000394
2. **Carter, S.C.**, E.M. Griffith, H.D. Scher, and the Expedition 355 Scientists (2017) Data report: $^{87}\text{Sr}/^{86}\text{Sr}$ in pore fluids from IODP Expedition 355 Arabian Sea Monsoon. In D.K. Pandey, P.D. Clift, D.K. Kulhanek, and the Expedition 355 Scientists, *Arabian Sea Monsoon*. Proceedings of the International Ocean Discovery Program, 355: College Station, TX (International Ocean Discovery Program). <https://doi.org/10.14379/iodp.proc.355.201.2017>
1. **Carter, S.C.**, E.M. Griffith, and D.E. Penman (2016) Peak intervals of equatorial Pacific export production during middle Miocene climate transition. *Geology*, 44 (11): 923-926. doi:10.1130/G38290.1

INVITED PRESENTATIONS

- Carter, S.C.** Radiogenic isotopes in paleoceanography. *Nuclear and Radiochemistry Group, Los Alamos National Laboratory, Los Alamos, NM, October 2019* (oral).
- Carter, S.C.** Radiogenic isotopes in provenance studies. *Central Ohio Mass Spectrometry Discussion Group, The Ohio State University, Columbus, OH, September 2019* (oral).
- Carter, S.C.** Clay fraction strontium and neodymium isotopes in the Indus Fan: their implication for sediment provenance and transport. *Geocheminar, The University of South Carolina, Columbia, SC, March 2019* (oral).
- Carter, S.C., E.M. Griffith, H.D. Scher, T. Dellapenna, and P.D. Clift.** Long-term evolution of sediment provenance in the Indus Fan inferred from clay $^{87}\text{Sr}/^{86}\text{Sr}$ and ϵ_{Nd} from IODP Sites U1456 and U1457. *Fall meeting of the American Geophysical Union, Washington DC, USA, December 2018* (oral).
- Carter, S.C.** Peak intervals of equatorial Pacific export production during the middle Miocene climate transition. *Geosociety Meeting, University of Texas at Arlington, Arlington, TX, USA, December 2016* (oral).

ABSTRACTS

- Carter, S.C., E.M. Griffith, H.D. Scher, T. Dellapenna, and P.D. Clift** (2020) Clay fraction strontium and neodymium isotopes in the Indus Fan: implications for provenance and sediment transport. Evolution of the Monsoon, Biosphere, and Mountain Building in Cenozoic Asia, Washington D.C. (poster).
- Carter, S.C., E.M. Griffith, A.M.E. Winguth, and T. Beaty.** (2019) Controls on the marine barium cycle in a global biogeochemical model. *International Conference on Paleoceanography, Sydney, AUS* (poster).
- Carter, S.C., E.M. Griffith, H.D. Scher, T.M. Dellapenna, and P.D. Clift** (2018) Long-term evolution of sediment provenance in the Indus Fan inferred from clay $^{87}\text{Sr}/^{86}\text{Sr}$ and ϵ_{Nd} from IODP Sites U1456 and U1457. EOS Trans. AGU, Fall Meet. Suppl., Abstract U13B-15 (oral).
- Carter, S.C., E.M. Griffith, H.D. Scher, T.M. Dellapenna, and P.D. Clift** (2017) Long-Term Changes in Chemical Weathering in the Himalayan Region from Indus Fan Sediments. EOS Trans. AGU, Fall Meet. Suppl., Abstract OS54B-08 (oral).
- Carter, S.C., E.M. Griffith, H.D. Scher, T. Dellapenna, and P.D. Clift** (2017) Delving into the intricacies of the Asian Monsoon: Initial results from a multiproxy study from IODP Expedition 355. *Land-ocean interactions across the Indian Ocean: Toward regional integration of recent drilling results, Graduate School of Oceanography, Narragansett, RI* (oral).
- Carter, S.C., E.M. Griffith, H.D. Scher, and IODP Expedition 355 scientists** (2016) $^{87}\text{Sr}/^{86}\text{Sr}$ in pore fluids from the Arabian Sea Monsoon IODP Expedition 355. *12th International Conference on Paleoceanography, Utrecht, Netherlands* (poster).
- Griffith, E.M. and S.C. Carter** (2016) Peaks in equatorial Pacific export production during the Middle Miocene Climate Transition. Ocean Sciences, New Orleans, LA, PC14A-2060 (poster).
- Carter, S.C., and E.M. Griffith** (2014) Equatorial Pacific export production over the Middle Miocene Climate EOS Trans. AGU, Fall Meet. Suppl., Abstract PP53B-1224 (poster).

TECHNICAL SKILLS

Wet geochemistry experience: sequential digestions for the separation of barite, developing and applying laboratory protocols for clay separation and refractory sample dissolution, elemental separation using column chromatography, training students in lab techniques

Instrumentation: Thermal Ionization Mass Spectrometer (TIMS), Inductively Couple Plasma-Optical Emission Spectrometer (ICP-OES), ICP-Mass Spectrometer (ICP-MS), Scanning Electron Microscope (SEM), UV-VIS spectrophotometer, UIC coulometer, Malvern® Mastersizer 2000™

Software: ArcGIS, Maple, MATLAB, Adobe Illustrator

Computer Languages: C++, Java, Fortran, Unix

Computational Modeling: Hamburg Oceanic Carbon Cycle Model (HAMOCC), MATLAB

WORKSHOPS ATTENDED

Graduate teaching assistant - teaching toolkit workshop series, The Ohio State University, Spring 2020

Evolution of the monsoon, biosphere, and mountain building in Cenozoic Asia, American Geophysical Union, Washington, D.C., January 2020

Urbino Summer School in Paleoclimatology, The University of Urbino Carlo Bo, Urbino, Italy, July 2019

Elemental analysis using inductively couple plasma optical emission spectroscopy and mass spectrometry, The Ohio State University, Columbus, OH, March 2018

Implicit Bias Mitigation Training, The Ohio State University, Columbus, OH, November 2017

Land-ocean interactions across the Indian Ocean: Toward regional integration of recent drilling results, Graduate School of Oceanography, University of Rhode Island, Narragansett, RI, July 2017.

Place-based learning in the earth sciences, The University of Texas at Arlington, Arlington, TX, March 2015

FIELD ACTIVITIES

Field Assistant (January 2016) San Salvador Island, Bahamas

- Worked at multiple sites and along a transect within Storr's Lake on San Salvador Island measuring water chemistry, taking measurements with a YSI field probe, and collecting water and microbialite samples for laboratory analysis

Field Assistant (2017) Davis, Oklahoma

- In-situ precipitation experiment of travertine at three sites within Honey Creek and its tributaries
- Seasonal trips to field sites to collect substrates placed for travertine precipitation, measure water chemistry in the field, and collect water samples for further laboratory analysis

Field Camp (Summer 2012)

- Texas A&M Course GEOL 300 – 6 week field course in Dillon, Montana involving individual and paired mapping exercises of sedimentary, igneous, and metamorphic geology as well as construction of cross sections and sedimentary columns

PROFESSIONAL AFFILIATIONS

American Geophysical Union (2014-current)
Geological Society of America (2014-current)
The Oceanography Society (2019-current)
Earth Science Women's Network (2019-current)
Geochemical Society (2020-current)

ACADEMIC SERVICE & PUBLIC OUTREACH

Reviewer for *Geochimica et Cosmochimica Acta*, Geological Journal
Goldschmidt Session Convener, Virtual Conference (2020)
Green STEM Girls Program, Franklin Park Conservatory (Spring 2020)
Annual Celebration of Excellence by Students (ACES), Poster Judge, The University of Texas at Arlington (Spring 2017)
Fort Worth Regional Science and Engineering Fair, Judge, The University of Texas at Arlington (Spring 2017)
AAPG UTA student chapter, Vice President, The University of Texas at Arlington (2016-2017)
I-Engage program, Graduate mentor, The University of Texas at Arlington (2016)
Environmental Club, Member, The University of Texas at Arlington (2016)
IODP Expedition 355 Arabian Sea Monsoon sampling party, Gulf Coast Repository, Texas A&M University (2015)
Geology and Geophysics Society, Member, Texas A&M University (2011-2012)