

CURRICULUM VITAE | MOLLY D. O'BEIRNE

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EDUCATION

2013 – present **PhD Candidate (*degree expected April 2018*) - Geology & Environmental Science**
University of Pittsburgh (PITT); Pittsburgh, PA, USA
Advisor: Dr. Josef P. Werne
Dissertation Topic: Isotopic biogeochemistry of organic sulfur

2011 – 2013 **MS - Water Resources Science**
University of Minnesota – Duluth (UMD); Duluth, MN, USA
Concentration: Limnology and Oceanography
Advisor: Dr. Josef P. Werne
Thesis: *“Anthropogenic climate change has driven Lake Superior productivity beyond the range of Holocene variability: An organic and stable isotopic study of human impacts on a pristine biogeochemical system.”*

2006 – 2009 **BS - Chemistry**
Bemidji State University (BSU); Bemidji, MN, USA
Concentration: Biochemistry
Minor: Biology
Honor graduate: Magna Cum Laude

RESEARCH INTERESTS

Organic and isotopic biogeochemistry, global biogeochemical cycles, sulfur biogeochemistry, nutrient cycling, (paleo)limnology, (paleo)oceanography, geomicrobiology, microbial geochemistry

PROFESSIONAL EXPERIENCE

Research:

2013 – present **Graduate Research Assistant - Graduate Assistant to the Lab Manager, PITT – Department of Geology & Environmental Science; Werne Lab (Organic Geochemistry)**

- Preparation and analysis of bulk sediment samples via EA-IRMS (carbon, nitrogen, sulfur)
- Extraction of sediment samples for total lipids (ASE, Soxhlet, Sonic, Bligh & Dyer)
- Laboratory method development and procedure optimization
- Instrument method development and troubleshooting (GC-FID/FPD and GC-MSD)
- Quantification and identification of organic compounds via GC-FID/FPD and GC-MSD

- Compound specific isotope analysis via GC-C-IRMS (carbon, hydrogen)
- Compound specific isotope analysis via GC-MC-ICP-MS (sulfur)
- Data analysis using Xcaliber, Isodat, Chromeleon, Excel and SigmaPlot

2011 – 2013 **Graduate Research Assistant, UMD - Large Lakes Observatory (LLO); Werne Lab (Organic Geochemistry)**

- Preparation and analysis of bulk sediment samples via EA-IRMS (carbon, nitrogen)
- Extraction of sediment samples for total lipids (ASE, Soxhlet, Sonic, Bligh & Dyer)
- Standard wet chemistry techniques (e.g. column chromatography, solid phase extraction, compound derivatization)
- Quantification and identification of organic compounds via GC-FID/FPD and GC-MSD
- Compound specific isotope analysis via GC-C-IRMS (carbon)
- Data analysis using ChemStation, Isodat, Excel and SigmaPlot

Teaching:

2013 – 2015 **Teaching Fellow, PITT – Department of Geology & Environmental Science; Geology (GEOL 0055; 0800) lab and recitation sections**

2012 – 2013 **Graduate Teaching Assistant, UMD – Department of Chemistry & Biochemistry; General Chemistry II (CHEM 1152) lab and recitation sections**

2017 **Invited Lecturer, PITT – Department of Geology & Environmental Science; Aquatic and Sedimentary Geochemistry (graduate course). Lecture topics: dissolved gases, dissolved inorganic carbon, and stable isotope fundamentals.**

GRANTS, FELLOWSHIPS, AWARDS & HONORS

2018	PITT – Kenneth P. Dietrich School of Arts and Sciences academic honoree
2017	PITT – Graduate Student Organization Summer Research Grant
2017	EAOG – European Association of Organic Geochemists Travel Scholarship
2017	PITT – Provost Development Fund Award - Predoctoral Fellowship (2017-2018 academic year)
2017	PITT – Henry Leighton Memorial Graduate Award
2016	PITT – Graduate Student Organization Travel Scholarship
2015	PITT – Andrew Mellon Predoctoral Fellowship (2015-2016 academic year)
2014	NSF Low Temperature Geochemistry & Geobiology to (P.I.) Werne and (Co-I.) Gilhooly; O’Beirne co-wrote to support PhD research (as non-P.I.)
2012	UMD – Water Resources Science Travel Grant recipient; GRC – organic geochemistry
2012	UMD – Water Resources Science Summer Fellowship
2009	BSU – Chemistry Department Harold T. Peters Memorial Scholarship
2008	BSU – Chemistry Department Henderson, Patton, Jones Memorial Scholarship
2006 – 2008	BSU – President’s Citation for earning a 4.0 GPA
2005 – 2009	Marshall H. and Nellie Alworth Memorial Fund Scholarship
2005 – 2006	UMD – Swenson Family Foundation Scholarship

PAPERS IN REFEREED JOURNALS

[3] Kurek, M.R., Gilhooly, W.P., Druschel, G.K., **O'Beirne, M.D.**, Werne, J.P. 2018. The use of dithiothreitol for the quantitative analysis of elemental sulfur concentrations and isotopes in environmental samples. *Chemical Geology* (IN PRESS). doi: 10.1016/j.chemgeo.2018.01.014

[2] **O'Beirne, M.D.**, Werne, J.P., Hecky, R.E., Johnson, T.C., Katsev, S., Reavie, E.D. 2017. Anthropogenic climate change has altered Lake Superior productivity. *Nature Communications*. doi: 10.1038/ncomms15713

[2a] **Open access, adapted version of article for high school students (including teaching resources):**
O'Beirne, M.D., Werne, J.P., Hecky, R.E., Johnson, T.C., Katsev, S., Reavie, E.D. 2017. How does climate change affect the Great Lakes? *Science Journal for Kids*. <http://www.sciencejournalforkids.org/science-articles/how-does-climate-change-affect-the-great-lakes>

[1] **O'Beirne, M.D.**, Strzok, L., Werne, J.P., Hecky, R.E., Johnson, T.C. 2015. Anthropogenic impacts on the sedimentary geochemical record of western Lake Superior (1800-present). *Journal of Great Lakes Research*. doi: 10.1016/j.jglr.2014.11.005

CONFERENCE PROCEEDINGS (first author only)

- 2017 **O'Beirne, M.D.**, Werne, J.P., van Dongen, B.E., Gilhooly, W.P. An Experimental Study of Low-Temperature Sulfurization of Carbohydrates Using Various Sulfides Reveals Insights into Structural Characteristics and Sulfur Isotope Compositions of Macromolecular Organic Matter in the Environment. *American Geophysical Union (AGU)*. New Orleans, Louisiana, USA. (oral presentation)
- 2017 **O'Beirne, M.D.**, Werne, J.P., Hecky, R.E., Johnson, T.C., Katsev, S., Reavie, E.D. Anthropogenic impacts on Lake Superior. *University of Pittsburgh - Science 2017*. Pittsburgh, PA, USA. (oral presentation)
- 2017 **O'Beirne, M.D.**, Werne, J.P., Hecky, R.E., Johnson, T.C., Katsev, S., Reavie, E.D. Lake Superior Sediments Record Anthropogenic Nitrogen Deposition. *Midwest Geobiology Symposium (MWGB)*, Indianapolis, Indiana, USA. (poster presentation)
- 2016 **O'Beirne, M.D.**, Werne, J.P., Gilhooly, W.P., Fouskas, F., Sessions, A.L. Elucidation of the Timing and Formation Pathway(s) of Organic Sulfur Compounds in Two Modern Euxinic Systems Using Compound Specific Sulfur Isotope Analysis (CSSIA). *American Geophysical Union (AGU)*, San Francisco, California, USA. (poster presentation)
- 2016 **O'Beirne, M.D.**, Werne, J.P., Gilhooly, W.P., Fouskas, F., Sessions, A.L. Compound Specific Sulfur Isotope Analysis (CSSIA) – implications for the timing and formation of organic sulfur compounds from a modern euxinic system. *Midwest Geobiology Symposium (MWGB)*, Cincinnati, Ohio, USA. (poster presentation)
- 2016 **O'Beirne, M.D.**, Werne, J.P., Gilhooly, W.P., Fouskas, F., Sessions, A.L. Compound Specific Sulfur Isotope Analysis (CSSIA) – implications for the timing and formation of organic sulfur compounds and (paleo)environmental connections from a modern euxinic system. *Gordon Research Conference on Organic Geochemistry*, Holderness, New Hampshire, USA. (poster presentation)
- 2015 **O'Beirne, M.D.**, Werne, J.P., Gilhooly, W.P., Harris, J., Fouskas, F. Refining gas chromatography techniques for the determination of inorganic polysulfide speciation – analysis and application to artificial and natural samples. *Midwest Geobiology Symposium (MWGB)*, Bloomington, Indiana, USA. (poster presentation)

- 2013 **O’Beirne, M.D.**, Werne, J.P., Hecky, R.E., Johnson, T.C., Katsev, S., Reavie, E.D. Anthropogenic climate change has driven Lake Superior productivity beyond Holocene variability. *American Geophysical Union (AGU)*. San Francisco, California, USA. (poster presentation)
- 2012 **O’Beirne, M.D.**, Werne, J.P., Hecky, R.E., Johnson, T.C., Katsev, S. Reconstruction of postglacial paleoproductivity in Lake Superior – placing recent changes in a historical context. *Gordon Research Conference on Organic Geochemistry*, Holderness, New Hampshire, USA. (poster presentation)

FIELD WORK

- 2017 Mahoney Lake (sediment coring and water column sampling; 2 weeks), British Columbia, Canada
- 2016 Fayetteville Green Lake – R/V Continental Drifter (in-situ water column filtration; 3 days), New York, USA
- 2015 Mahoney Lake (sediment coring and water column sampling; 2 weeks), British Columbia, Canada
- 2015 Fayetteville Green Lake (sediment coring and water column sampling; 2 weeks), New York, USA
- 2013 Lake Superior – R/V Blue Heron (sediment coring and seismic survey; day cruise), Minnesota, USA
- 2012 Lake Superior – R/V Blue Heron (water column sampling; day cruise), Minnesota, USA
- 2011 Island Lake Reservoir (water column sampling; weekly sampling over 3 months), Minnesota, USA
- 2011 Lake Superior – R/V Blue Heron (MN DNR fish trawling; 7-day cruise), Minnesota, USA

SYMPOSIA & SYNERGISTIC ACTIVITIES

Conference session chair:

- 2017 *Biogeochemistry & Geobiology of Anoxic/Euxinic Systems*. Geological Society of America (GSA) - NE & NC joint meeting, Pittsburgh, Pennsylvania, USA

Journal Review:

- 2016 – present *Geochimica et Cosmochimica Acta*

MENTORING & OUTREACH

Mentoring:

Graduate Students:

Dervla Kumar (MS 2017); Thesis: “*Production of Heterocyst Glycolipids and Glycerol Dialkyl Glycerol Tetraether membrane lipids in the water column of a stratified tropical lake, Malawi, Africa*”

Troy M. Ferland (MS 2017); Thesis: “*An Evaluation of the Organic Geochemical Potential to Reconstruct Mid-Pleistocene Paleoclimate Adjacent to an Established Hominin Site: Lake Magadi, Kenya*”

Undergraduate Students:

John Coyne (2016 – present): research topic “*Color analysis of a 10,000-yr sediment core from a modern euxinic lake – utility for paleoenvironmental reconstruction*”

Christina Puhnaty (2016): research involving organic synthesis and optimization of (poly)sulfide detection and speciation using gas chromatography

Tyler Myers (2015-2016): research involving compound specific carbon and hydrogen isotopes of fatty acids; fieldwork experience Fayetteville Green Lake

Evan Scott (2015): research involving compound specific carbon and hydrogen isotopes of fatty acids

Outreach:

- 2015 – 2016 **Graduate Student Teaching Mentor**; *PITT – Department of Geology & Environmental Science* – aided graduate and undergraduate teaching assistants with teaching responsibilities, student-teacher interactions, and organized teaching development seminars
- 2013 **R/V Blue Heron Science Friday Guide**; *LLO/UMD* – educational tour guide of the Research Vessel Blue Heron, including shipboard equipment demonstrations, for students (elementary through graduate) and the general public
- 2007 – 2009 **Vice President - Society of Geology and Environmental Geoscience**; *BSU* - development and volunteer of outreach and educational programs for area middle schools

PROFESSIONAL AFFILIATIONS

- 2015 – present Geological Society of America (GSA)
- 2013 – present American Geophysical Union (AGU)