

Madelyn K. Cook | mkcook@umich.edu

1100 North University Building, Room 2534, Ann Arbor, Michigan 48109-1063

EDUCATION

University of Michigan | Ann Arbor, MI | Ph.D. in Earth & Environmental Sciences | 2023*

Kenyon College | Gambier, OH | Bachelor of Arts in Chemistry | 2017 | *cum laude*

RESEARCH

University of Michigan, Ann Arbor – Department of Earth and Environmental Sciences

Fall 2018 – Present; Paleoceanography Research, *Ph.D. Advisor Prof. Ingrid L. Hendy*

Kenyon College – Department of Chemistry

2015 – 2017, Organic Chemistry Research, *Undergraduate research Advisor: Prof. Mo Hunsen*

MANUSCRIPTS (* indicates in preparation)

Cook, M. K., Dial, A. R., and Hendy, I. L. Iodine stability as a function of pH and its implications for simultaneous multi-element ICP-MS analysis of marine carbonates for paleoenvironmental reconstructions. Submitted to *Marine Chemistry*.

***Cook, M.K.** and Hendy, I. L. To clean or not to clean? Using depositional environment characteristics, target elements, and sample size to guide cleaning procedure choice for foraminiferal calcite samples. To be submitted to *Geochemistry, Geophysics, Geosystems*.

***Cook, M. K.**, Hendy, I. L., and Becker, U. Thermodynamics of iodate and iodide incorporation into calcite as a function of surface site geometry, alkali partner cation, and ion activities in seawater. To be submitted to *Geochimica et Cosmochimica Acta*.

ABSTRACTS

Cook, M. and Hendy, I. “To clean or not to clean: Influence of cleaning procedure on trace element-to-calcium ratios measured in foraminiferal calcite.” American Geophysical Union Fall Meeting, New Orleans, LA, December 14, 2021. *Published*.

Martin, P., Foster-Martinez, M., **Cook, M.**, Johnson, W., Arbic, B., Ansong, J., Nyadjro, E., Mahu, E., Gifty-Akita, L., Adjetey, J., and Nyarko, E. “A ‘Catch-All’ Approach to Ocean Capacity Building in West Africa.” American Geophysical Union Fall Meeting, New Orleans, LA, December 16, 2021. *Published*.

Northrup, P., Bostick, B., Nicholas, S., Hemming, S., Mahu, E., Olubunmi Ayoola, N., **Cook, M.** and Hendy, I. “Using Synchrotron microanalysis tools to study the formation of glauconite on the African coast.” Joint Conference of the African Light Source, African Physical Society, and Pan African Conference on Crystallography, November 17, 2021. *Published*.

Cook, M., Becker, U., and Hendy, I. “Examining the I/Ca paleo-proxy on a molecular level: A quantum-mechanical approach to understanding the thermodynamics of iodine incorporation in marine calcite.” American Geophysical Union (AGU) Virtual Fall Meeting 2020, December 8, 2020. *Published*.

Foster-Martinez, M., Martin, P., Johnson, W., Shroyer, E., Ansong, J., **Cook, M.**, Buckingham, C., Mahu, E., and Arbic, B. “Online capacity building for ocean sciences in West Africa.” American Geophysical Union (AGU) Virtual Fall Meeting 2020, December 7, 2020. *Published.*

Cook, M., Dial A., and Hendy, I. “Cleaning procedure influence on foraminiferal calcite trace element-to-calcium ratios.” American Geophysical Union (AGU) Centennial Meeting, San Francisco, CA, December 11, 2019. *Published.*

Cook, M. and Hendy, I. “Iodine distribution and redox speciation in the ocean.” 16th Annual Michigan Geophysical Union (MGU) Symposium, Ann Arbor, MI, April 17, 2019. *Published.*

Oles, A., Petek, A., **Cook, M.**, Petek, R., Kemboi, E., and Hunsen, M. “N-linked carbohydrate conjugated antioxidants.” 251st American Chemical Society National Meeting & Exposition, San Diego, CA, March 13-17, 2016. *Published.*

PRESENTATIONS

Cook, M. “Crystal surface structure and its influence on the thermodynamics of iodine incorporation into marine calcite,” presented on April 15, 2021, at the 17th Annual Michigan Geophysical Union Symposium, jointly hosted by the departments of Climate and Space Sciences and Engineering and Earth and Environmental Sciences at the University of Michigan.

Arbic, B., Johnson, W., **Cook, M.**, and Ansong, J. “Diversifying Oceanography: The Coastal Ocean Environment Summer School in Ghana,” presented November 20, 2020, for members of the Graduate School of Oceanography at the University of Rhode Island.

Cook, M. “Do planktonic foraminifera I/Ca ratios reflect ambient dissolved oxygen concentrations? Quantifying the I/Ca paleo-proxy in Santa Barbara Basin, California,” presented March 30, 2020, at the University of Michigan Department of Earth and Environmental Sciences as part of the oral qualifying exam for advancement to Ph.D. candidacy.

Cook, M. “Tuning interfacial surface chemistry of organic light emitting diodes through self-assembling monolayer addition on ITO anodes,” presented February 17, 2017, at Kenyon College to the department of chemistry and biochemistry as part of the Senior Comprehensive Exercise in Chemistry.

GRANTS

- **Cushman Foundation for Foraminiferal Research Joseph A. Cushman Award for Student Research**
 - **\$3000**, *California Oxygen Minimum Zone expansion during the last millennium? Investigating drivers of anomalously low bottom water O₂ through comparing benthic faunal assemblages to redox-sensitive trace element-to-calcium ratios in benthic foraminifera* (2021)
- **Geological Society of America Graduate Student Research Grant**
 - **\$2461**, *Mn/Ca and I/Ca ratios in benthic foraminifera: A multi-proxy approach for the reconstruction of bottom- and pore-water redox chemistry in Santa Barbara Basin, California, through the termination of the Last Glacial* (2019)
- **Department of Earth and Environmental Sciences at the University of Michigan, Ann Arbor Scott G. Turner Award in Earth Sciences** (internal award for students in U-M Earth dept., annual call for proposals with the exception of 2020 due to COVID-19)

- 2021: **\$2150**, *Assessing the relationship between seawater iodate concentrations and ambient dissolved oxygen from a restricted coastal ocean basin to ground truth the I/Ca paleo-redox proxy*
- 2019: **\$1898**, *Evaluating redox conditions versus nutrient dynamics as competing controls on foraminiferal calcite iodine to calcium ratios in a coastal ocean basin*
- 2018: **\$1750**, *I/Ca Ratios in Foraminifera as Proxy for Past O₂ concentrations in Santa Barbara Basin, California*
- **University of Michigan Rackham Graduate School**
 - 2021: **\$900**, Rackham Travel Grant to defray travel-related costs for presentation at American Geophysical Union Fall Meeting
 - 2019: **\$1500**, Rackham Graduate Student Research Grant for PhD pre-candidates
 - 2019: **\$800**, Rackham Travel Grant to defray travel-related costs for presentation at American Geophysical Union Fall Meeting

AWARDS AND FELLOWSHIPS

- **Rackham Predoctoral Fellowship**, one year of fellowship support for outstanding doctoral candidates working on dissertations that are unusually creative, ambitious and impactful during their final year of doctoral study, March 2022
- **Outstanding Graduate Student Instructor Award** in recognition of excellence as a graduate student instructor by faculty of the University of Michigan Department of Earth and Environmental Sciences, March 2022
- **Rackham Graduate School One-Term Dissertation Fellowship** recipient for the University of Michigan Department of Earth and Environmental Sciences, Fall 2021
- National Science Foundation Graduate Research Fellowship Program (NSF-GRFP) **Honorable Mention**, April 2020
- Turner Proposal “Gold Star” award for the **top ranked student proposal**, January 2020
- **Henry N. Pollack Endowed Graduate Fellowship in Geological Sciences**, University of Michigan Department of Earth and Environmental Sciences, Spring 2019, Spring 2022

TEACHING AND UNIVERSITY SERVICE

University of Michigan Department of Earth and Environmental Sciences | Ann Arbor, MI
Graduate Student Instructor (F, Fall semester; WN, Winter semester; Su, Summer term)

- Earth 333 – Inexhaustible seas? Upper Level Writing Requirement (**F20**)
- Earth 296 – Earth and Environmental Science Around Us (**Su20**)
- Earth 131 – Earth Chemistry (**F18, F19, WN20, WN21**)

University of Michigan Department of Earth and Environmental Sciences | Ann Arbor, MI
Graduate Student Mentor (GSM) September 2020-present

- Established by *U-M Center for Research on Learning and Teaching*, GSMs provide training, resources, and support to graduate student instructors in their department.

Coastal Ocean Environment Summer School in Ghana (COESSING) | Accra, Ghana
Summer school organizer and co-convener, July & August 2021

- Helped organize the first ever 2-week offering of the COESSING, invited speakers, registered participants, and organized opening and closing participant surveys

Resource person and virtual summer school organizer, August 2020

- Helped organize schedule and register participants for the Virtual offering of the Coastal Ocean Environment Summer School in Ghana

- Prepared an asynchronous lab using open source software (python and google sheets) to visualize sea-surface iodide concentrations

Resource person and biogeochemistry project group leader, August 2019

- Co-lead a biogeochemistry research project using data from the Bermuda-Atlantic Time Series (BATS) with west-African participants to develop data visualization/coding skills

Match Education | Boston, MA

AmeriCorps Tutor and AP Chemistry TA at Match High School, August 2017 - June 2018

Kenyon College Math and Science Skills Center | Gambier, OH

Introductory Chemistry Lead Tutor, September 2014 - May 2017

OUTREACH AND LEADERSHIP

FATE Mentorship Program through Give Merit | Detroit, MI

Student Mentor, October 2018 – May 2021

- Attended weekly workshops in Detroit working with high schoolers to build leadership and entrepreneurial skills while working towards a goal of 100% cohort graduation rate.

University of Michigan GEOClub Officer | Ann Arbor, MI

Outreach Coordinator, September 2019 – April 2020

- Communicate outreach opportunities to the EES undergraduate and graduate student body, with emphasis on local conservation and restoration organizations in SE Michigan

SEAGOING EXPERIENCE

***California Cooperative Oceanographic Fisheries Investigation (CalCOFI)** | *R/V Reuben Lasker* | January 5 – 29, 2022 | Hydrographic surveys & water sampling along California coast

***POSTPONED TO JULY 2022 DUE TO OMICRON COVID-19 VARIANT (01/22/2022)**

NOAA Office of Ocean Exploration and Research | *R/V Okeanos Explorer* | September 5 – 28, 2021 | “Explorer-In-Training” North Atlantic Seafloor Mapping Internship, EX2106

Sea Education Association (SEA) Semester, Boston University | *SSV Robert C. Seamans* | April 2 – May 10, 2016 | Lyttleton, New Zealand – Papeete, Tahiti | Study abroad program

PROFESSIONAL MEMBERSHIPS

- American Chemical Society, 2017-present
- American Geophysical Union, 2018-present
- Geological Society of America, 2018-present
- Cushman Foundation for Foraminiferal Research Inc., 2020-present