Miranda C. Baker

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Education

PhD, Ocean Science | Advisors: Pratigya Polissar and Heather Savage | University of California Santa Cruz | *In Progress*
GPA: **4.0** | Selected Coursework: Deep Learning for Advanced Computer Vision, Introduction to Scientific Machine Learning

Bachelor of Science, Chemistry | Haverford College | *2017*
Minor: Computer Science | GPA: **3.69**

Professional Experience

Graduate Student Researcher | UC Santa Cruz Ocean Sciences Department | *May 2022 – Present*

- Developed novel untargeted geolipidomics approach using machine learning to analyze chemical changes in rapidly heated organic rich geological samples that simulate coseismic heating that occurs with earthquakes.
- Measuring biomarker thermal maturity indices (alkenones and n-alkanes) from the 2024 JTRACK expedition with more granular sampling of the complex geometry of the Japan Trench than the 2012 JFAST expedition.
- Improved spatial resolution of biomarker maturity indices measurements from the San Andreas Fault Observation at Depth with GC-MS/MS.

Chemist | US Geological Survey, Pacific Coastal and Marine Science Center | *November 2017 - 2024*

- Analyzed complex environmental samples (sediment, carbonate, tissue) using GC-MS/MS for sterols, PAHs, fatty acids, and n-alkanes.
- Conducted Python-based data analysis and management for large datasets.
- Supported multi-day research vessel fieldwork operations.

Research Technician | Central Coast Wetlands Group | *June 2017-April 2018*

- Constructed and calibrated SWAT (Soil Water Assessment Tool) model of the Moro Cojo Slough to inform management decisions concerning restoration.

Senior Thesis Student to Dr. Helen White | Chemistry Department, Haverford College | *September-May 2016*

- Researched marine fungal oil degradation through analysis of metabolites and oil transformation products via LC-QTOF MS and GC-MS.
- Characterized the chemical composition of weathered oil within oil-soaked sand patties from the Deepwater Horizon oil spill collected from Gulf Coast beaches.

NSF CSUMB REU Research Intern | Physical Oceanography Department, Moss Landing Marine Laboratories | Summer 2016

- Conducted an independent research project focused on the effects of current tide management on salinity extent and nutrient concentrations in the Moro Cojo Slough.

Research Intern | Ecology and Evolutionary Biology Department, UCSC | Summer 2014

- Completed a self-planned internship funded by Haverford College Koshland Integrated Natural Science Center focused on the ecological relationships between Lesser Long-nosed Bats, Pallid bats, and columnar cacti on the Baja peninsula through fieldwork.

Scholarships and Awards

- NSF Graduate Research Fellowship Program Honorable Mention (2024)
- UCSC Ocean Science Travel Award (2024 and 2026)
- USGS STAR Award recipient (2020, 2021, 2022)
- Questbridge National College Match Scholarship Recipient (2013-2017)

Publications and Data Releases

Feedrick, A. et al (In prep). Non-targeted Analysis with Gas Chromatography: The State of the Science and A Path Forward.

Baker, M. C., Polissar, P. J., & Savage, H. M. (2026). Geolipidomics: Non-targeted analysis of rapidly heated geologic samples with gas-chromatography-mass spectrometry. Journal of Geophysical Research: Machine Learning and Computation, 3, e2025JH000890. https://doi.org/10.1029/2025JH000890

Baker, M.C. and Prouty, N.G., 2022. Water-column environmental variables and accompanying discrete CTD measurements collected offshore the U.S. Mid- and South Atlantic (ver. 2.0, July 2022): U.S. Geological Survey data release, https://doi.org/10.5066/P9V7ODDR

Prouty, N.G. and **Baker, M.C.**, 2022. CTD (Conductivity Temperature Depth) data collected October-November 2019 offshore of California and Oregon: U.S. Geological Survey data release, https://doi.org/10.5066/P99MJ096

Prouty, N.G. and **Baker, M.C., 2022**. CTD profiles and discrete water-column measurements collected off California and Oregon during NOAA cruise RL-19-05 (USGS field activity 2019-672-FA) from October to November 2019, https://doi.org/10.5066/P9JKYWQU

Simister, R.L., Poutasse, C.M., Thurston, A.M., Reeve, J.L**., Baker, M.C.** and White H.K. Degradation of Oil by Fungi Isolated from Gulf of Mexico Beaches. *Marine Pollution Bulletin* 100: 327-333 (2015) https://doi.org/10.1016/j.marpolbul.2015.08.029

Presentations

Baker, M.C., Savage, H.M., and Polissar, P.J. (April 2026). Geolipidomics: Non-Targeted Analysis of Rapidly Heated Geologic Samples with Gas-Chromatography-Mass Spectrometry. Poster presentation at the Northern California Society for Environmental Toxicology and

Chemistry, Sacramento, California.

Baker, M.C., Savage, H.M., and Polissar, P.J. (April 2026). Geolipidomics: Non-Targeted Analysis of Rapidly Heated Geologic Samples with Gas-Chromatography-Mass Spectrometry. Oral presentation at the Best Practices for Non-targeted Analysis monthly webinar.

Baker, M.C., Savage, H.M., and Polissar, P.J. (October 2025). NTS of geologic samples with machine learning. Oral presentation at International Conference on Non-targeted Screening, Erding, Germany.

Baker, M.C., Lindemuth, E., Savage, H.M., and Polissar, P.J. (October 2025). Investigating Where Earthquakes Propagate to the Seafloor at the Japan Trench with Biomarkers. Poster presentation at 405 IODP Post-cruise meeting in Sendai, Japan.

Baker, M.C., Savage, H.M., and Polissar, P.J. (September 2025). Geolipidomics: Nontargeted Analysis of Geologic Samples with Machine Learning. Oral presentation at International Meeting of Organic Geochemists in Porto, Portugal.

Baker, M.C., Savage, H.M., and Polissar, P.J. (August 2024). Untargeted Analysis of Geologic Samples with Machine Learning. **Invited** oral presentation at Organic Geochemistry Gordon Research Conference in Holderness, New Hampshire.

Baker, M.C., Null, K.A., and Connolly, T. P. (February, 2017) Effects of Tidal Management on Salinity and Nutrient Concentrations in a Low-Flow Estuary. Oral presentation at Association for the Sciences of Limnology and Oceanography's Aquatic Sciences Meeting, Honolulu, HI.

Baker, M.C., Geng, Z., Janson, O., & White, H.K. (October, 2016) Investigating the Oil-degrading Potential of a Microbial Community Growing on Oil-Soaked Sand Patties. Poster session at the annual PennCHOP Microbiome Symposium, Philadelphia, PA.

Baker, M.C., Null, K.A., and Connolly, T. P. (October, 2016) Effects of Tidal Management on Salinity and Nutrient Concentrations in a Low-Flow Estuary. Poster session presented at annual SACNAS National Conference, Long Beach, CA.

Service and Mentorship Experience

2024 - *Present* | As a **C**ommunicating **O**cean Science **R**esearch **E**ffectively (CORE) member organized professional development workshops for transitioning from academia to industry and unwritten academic curriculum.

2024 - *Present* | Mentored senior thesis students and recent graduates from Earth and Planetary Sciences Department (Monet Pedrazzini, Emma Lindemuth and Kaela Rose).

May 2025 – *Present* | Participant in NSF professional development program Supporting All Students in the Geosciences

Fall 2025 | As a Graduate Student Peer Mentor met on a monthly basis with a first year Ocean Science graduate student to aid in the transition to graduate school.

2021-2022 | As a USGS **U**nlearning **R**acism in **Ge**osciences pod member contributed to deliverables collated in Morriss, M.C. et al. 2024, Unlearning Racism in Geoscience (URGE)—Summary of U.S. Geological Survey URGE pod deliverables: U.S. Geological Survey Circular 1515, 23 p., https://doi.org/10.3133/cir1515

2018-2019 | As a School Programs Volunteer communicated and interpreted scientific research to members of the public, including school-age children.