Luca Podrecca

Sedimentary Geochemistry Lab, Department of Earth, Environmental, and Planetary Sciences
Northwestern University, Evanston, IL
Phone #: (305) 731-6850 | Email: lucapodrecca2024@u.northwestern.edu

Education

Ph.D., Northwestern University, Earth and Planetary Sciences, IL *2025*

Expertise in global climate change, general earth/environmental science, and paleoenvironmental/paleoclimate reconstruction from both marine and lake sediment cores. I have extensive training utilizing stable isotope (S, C, O) and radiogenic (Os) geochemistry, and changes in mineralogy, grain size, and fossil assemblage. I have a strong background in coalescing multiple regional records via bio-, chemo-, and lithostratigraphy to create robust, integrated histories of global/regional change. I have taught lab portions of numerous courses and led multi-week, undergraduate trips into the field. Dissertation title: *An Inquiry into the Relationships between Earth's Orbit, Relative Sea Level Change, Sedimentation Rate, Anoxia, and the Preservation of the C, S and Os Biogeochemical Cycles in the Stratigraphic Record, from the Holocene to the Early Cretaceous* (GPA: 3.8)

MSc., Rutgers University, Earth and Planetary Sciences, NJ *2019*

Studied Paleocene/Eocene boundary sediments, the most abrupt warming event since the extinction of non-avian dinosaurs. Worked with the USGS to drill multiple sediment cores on the New Jersey Coastal Plain and tied the data collected from these cores into the existing literature. Ultimately, I built a paleoenvironmental model that addresses, explains, and predicts the environmental change on the east coast in response to massive, abrupt warming. Additionally, I taught multiple sections of Geology 101 labs each semester and led undergraduate trips into the field. (GPA 4.0)

BSc., University of Florida, Geological Sciences, FL *2013*

Foci included geology, geochemistry, and climate change. (GPA: 3.48)

Primary Teaching Experience

Visiting Professor for Advanced Stratigraphy, NU *Summer & Fall 2025*

This course taught a mixed student body (upper-level undergraduate and graduate students) and involved 4-week field trip through Colorado, Arizona, and Utah where students learned fundamental field methods (mapping and measuring section) alongside incho- and lithofacies

applications for paleoenvironmental interpretations. During the summer field component I mentored and was responsible for the students alongside a co-instructor while we tracked the rise and fall of the mid Cretaceous Western Interior Seaway. During the in-classroom fall component students digitized their field notes and built a comprehensive report, synthesizing published materials into their own observations and interpretations, learning how to make useful scientific figures and ultimately how to create a peer review style paper.

Adjunct for Principles of Sedimentology and Stratigraphy, NEIU *Fall 2019*

I taught this upper level 400 level course at Northeastern Illinois University (NEIU) in the Fall of 2019. Filling in for a permanent lecturer who had taken a medical leave of absence. This course covered the fundamentals of sedimentology and stratigraphy course to upper level (Junior and Senior year) Earth Science undergraduate students. We discussed the various physical, chemical, and biological processes that influence and control the formation of sediments and sedimentary rocks, and the techniques used to place these strata within the context of geologic time and environment of deposition.

Outreach Science Teacher aboard the Rutgers Science Explorer, RU *Fall 2016 – 2018*

I traveled to various Middle schools throughout New Jersey and taught dozens of hands-on science activities aboard a tour bus that has been converted into a teaching-based science lab. Staffed entirely by graduate students, we taught roughly a dozen activities that ranged from 45 to 120 minutes per session, (3 to 8 sessions per day). This program strove to provide hands on experiments to underserved classrooms across the state. The content of the activities ranged from building ecosystems and displaying the importance of saltwater marshes to a coastline, to using an agarose gel medium to differentiate various DNA samples via electrophoresis. For more information visit the website: https://sciencebus.rutgers.edu/

Relevant Work Experience

Curation assistant, Rutgers University core lab *Fall 2016 – 2018*

While at Rutgers University I worked in the core lab where I helped move, catalog, store and sample rock and sediment cores for scientific research.

Wellsite Geologist, Selman Geological Services *Fall 2013 – 2015*

I lived and worked on drill sites in West Texas and Southeast New Mexico for up to 6 weeks at a time; 12-hour shifts, 7 days a week, safely and in inclement weather when necessary. Onsite, I set up and monitored gas measuring equipment (GC-MS) and continuously maintained communication with various working groups during drilling operations. I curated the operations log (e.g. changes in drilling mud properties, drill-pipe connection times, changes in drilling rate or required torque/weight, etc.) while I collected, cleaned, and analyzed drilling mud samples,

to record lithology and performed wet chemistry to test for hydrocarbon presence. This information, which I recorded in the "mud log" allowed for the construction of multi-well reports used for basin analysis by the Operational Geologist.

Teaching Assistant Appointments

Teaching Assistant for Earth Systems Revealed, Professors Andrew Jacobson & Brad Sageman, *Spring 2019-2024*

I designed and gave the weekly lab lectures in this foundational course that instructs incoming majors alongside non-science majors. I administered exams and was responsible for planning and organizing the 3-day field trip to Baraboo Wisconsin where I helped lead field excursions, lectures, and report writing.

Teaching Assistant for Oceans and Climate, Professor Neal Blair, *Fall 2020*

Taught the hands-on laboratory examining the relationship between the ocean, land, and climate. Helped undergraduates plan small projects that involved sampling water and beach sand along lake Michigan.

Teaching Assistant Introduction to Energy Systems for the 21st Century, Professor Yip-Wah Chung, *Winter 2020*

I discussed course topics with students online, answered student questions over email, and graded assignments in this online course.

Teaching Assistant for Intro to Geology, Professor Don Monteverde, *Fall 2017, Spring 2018*

At Rutgers University, I introduced the fundamental concepts of geology, environmental science, and climate change to incoming majors and many non-science major undergraduates.

Formal Pedagogical Training

CIRTL Course, Transforming Your Research Intro Teaching *Anticipated Summer 2025*

In this 8-week online course, I will develop a syllabus with units, subunits, learning objectives, assignments, and instructional methods for a course on "Major climate events through Earth history".

The Inclusive Teaching Practices Workshop *Fall 2020*

This 2-hour long online workshop ran by the Office of Diversity and Inclusion and the Searle Center at Northwestern University discussed some resources and practices for making teaching more equitable and inclusive.

Northwestern Graduate Student Teaching Conference *Fall 2019, 2020*

This one-day conference focused on learning about assessment techniques, inclusive classrooms, written feedback, and virtual learning from past and current teaching assistants at Northwestern University.

Technical Skills Relevant to Student Training

Laboratory Skills: microscopy, wet chemistry, particle size analysis, X-ray fluorescence measurement, magnetic susceptibility measurement, spectrophotometry, stable isotope geochemistry and associated oxygen, carbon, and sulfur stable isotope measurements, osmium isotope geochemistry and associated isotope measurements, sediment bulk density measurements, (hard and soft) sediment core description

Field Skills: gear organization and acquisition, sampling plan development, water sample collection, sediment core collection, surface sediment collection, mineral identification, identification of sedimentary structures, construction of stratigraphic columns, wilderness first aid, field safety preparation, remote camping

Data Analysis and Visualization Skills: R, Excel, Adobe Illustrator

---

Service, Outreach, and Mentoring Activities

GeoEquity, Northwestern University *Summer 2020-Present*

GeoEquity is a group of students, staff, and faculty from the Earth and Planetary Sciences Department at Northwestern that aims to improve the inclusivity of our department, reduce the barriers to entry for those routinely excluded from STEM and higher education, and educate those around us on anti-racism, justice, and equity. I am one of the founding members, I previously organized the Inclusion and Diversity Initiatives and am the current organizer for the Outreach and Funding Pillar. For more information, visit our website: https://sites.northwestern.edu/geoequity/

NU-Geopaths, Northwestern University *Summer 2023*

This summer mentorship program allowed me to work closely with a Chicago high school student on a project in the Earth Sciences. Students were given a stipend to perform research utilizing lab spaces at Northwestern. I received mentorship training, generated research project

ideas, designed an individual curriculum, and met with my mentee daily to discuss their interests and progress. My student researched the relationship between oxygen isotopes and water; we collected water from various bottles and compared their oxygen isotopic fingerprint with their reported source; we also sampled water from a beaker over 2 weeks to evaluate the isotopic effect of evaporation which we compared to a sample set we collected at an hourly interval during a storm. I helped guide my mentee through the curation of an end-project presentation which they gave in front of their family and peers. Afterwards I wrote a letter of recommendation for my mentee which they used in their successful college application.

Graduate Student Handbook Organizer, Northwestern University *Spring 2022*

I helped design, revise, analyze, and share an updated handbook given to incoming graduate students in the Northwestern University Department of Earth and Planetary Sciences. This handbook aims to introduce graduate students to the department, associated lab spaces, expectations, and resources for extracurricular activities/groups, and (mental) health services, while also detailing strategies for conflict resolution and out to safely escalate grievances through the department and university system. This handbook facilitates conversations between incoming and current graduate students with faculty and staff to improve the general experience in the department.

Department Seminar Organizer, Northwestern University *Spring 2021*

In the Spring oof 2021 I organized the weekly seminar session for the Earth and Planetary Sciences after our COVID-related hiatus from the event. I contacted various professors across the hemisphere to organize a multi-field seminar season that was the first to include the hybrid (zoom or in-person) model. This seminar session had the primary goal of rebooting departmental culture in the wake of COVID by bringing in experts in fields ranging from modern climate change, ancient Martian riverbeds, or diamonds from the Earth's interior.

Honors, Scholarships, and Awards

Horace A. Scott Graduate Award for Outstanding Research, Northwestern University
2025

Graduate Service Award, Dept. of Earth and Planetary Sciences, Northwestern University
2023

Graduate Teaching Assistant Award, Dept. of Earth and Planetary Sciences, Northwestern University
2022

Geological Society of America Graduate Student Research Grant
2022

Institute for Sustainability and Energy at Northwestern Graduate Research Fellowship
2019-2020

Rocky Mountain Geologist Graduate Student Research Grant
2019

H. Grant Goodell Fellowship in Sedimentary Geology
2018 – 2019

Graduate Teaching Assistant Award, Dept. of Earth and Planetary Sciences, Rutgers University
2018

Research Experience

PhD Student Research, Northwestern University

2018-Present

- Project 1: From Loch Duart (NW Scotland) sediments, I sampled and developed a high-resolution record of lake water stable carbon and sulfur isotopic change since the last glacial maximum tying these changes to changes in relative sea level/marine influence.
- Project 2: I evaluated changes in sulfur isotopes in the Mid-Cretaceous Western Interior Seaway at 3 different locations, evidence suggest that the microbial waste on the shallow sea floor is modulated by sea level, which was ultimately driven by changes in Earth's orbit around the Sun.
- Project 3: Building a timescale for the early Cretaceous Ocean Anoxic Event 1a, incorporating radioisotopic dates from our Japanese samples into a newly constructed astrochronologic record built from geochemical measurements of a sediment core from France.

Publications: Peer Reviewed

Singer, B. S., Takashima, R., Li, Y., Schmitz, M.D., Selby, D., Sageman, B. B., **Podrecca, L. G.,** Nishi, H., Jicha, B.R., Yamanaka, T. (in press). Radioisotopic age, Osmium isotopes, and global correlation of the Albian-Cenomanian boundary. *GSA Bulletin.*

Podrecca, L. G., Masterson, A. L., Hurtgen, M. T., Taylor, J., Lloyd, J. M., Selby, D., Sageman, B. B. (2025). Microbial Sulfate Reduction Regulated by Relative Sea Level Change in a Pleistocene – Holocene Sedimentary Record: Insights from Loch Duart, Scotland, UK. *Chemical Geology*. 122633. https://doi.org/10.1016/j.chemgeo.2025.122633

Taylor, J., Selby, D., Lloyd, J. M., Smeaton, C., Bendle, J., Allison, M., Ling, Y., **Podrecca, L.**, Sageman, B. B., Austin, W., Szidat, S. (2025). Palaeoenvironmental reconstruction of a fjord catchment NW Scotland, UK since the Last Glacial Maximum: a multi-geochemical approach. *Journal of Quaternary Science*. *356*, 109311. https://doi.org/10.1016/j.quascirev.2025.109311

Makarova, M., Schmelz, J. W., Miller, K.G., Herbert, T. D., **Podrecca, L. G.,** Browning, J. V., Mortlock, R. A., Godfrey, L. V., Wright, J. D. (2025). Warming and Carbon Injection at the Paleocene-Eocene Boundary: Bayesian Modeling Supports Synchroneity. *Paleoceanography and Paleoclimatology*. *40*(1), e2024PA004884. https://doi.org/10.1029/2024PA004884

Li, Y., Singer, B. S., Takashima, R., Schmitz, M. D., **Podrecca, L. G.**, Sageman, B. B., Selby, D., Yamanaka, T., Mohr, M., Hayashi, K., Tomaru, T., Savatic, K. (2024). Radioisotopic chronology of ocean anoxic event 1a: Framework for analysis of driving mechanisms. *Science Advances. 10*(47), p.eadn8365. DOI: 10.1126/sciadv.adn8365

Taylor, J., Selby, D., Lloyd, J. M., **Podrecca, L.**, Masterson, A. L., Sageman, B. B., Szidat, S. (2024). Palaeoenvironmental reconstruction of Loch Duart (NW Scotland, UK) since the Last Glacial Maximum: implications from a multiproxy approach. *Journal of Quaternary Science*, *39*(1), 6-23. https://doi.org/10.1002/jqs.3566

Podrecca, L. G., Makarova, M., Miller, K. G., Browning, J. V., & Wright, J. D. (2021). Clear as mud: Clinoform progradation and expanded records of the Paleocene-Eocene Thermal Maximum. *Geology*, *49*(12), 1441-1445. https://doi.org/10.1130/G49061.1

Singer, B. S., Takashima, Li, Y., R., Schmitz, M. D., Selby, D., Sageman, B. B., **Podrecca, L. G.**, Nishi, H., Jicha, B. R., Yamanaka, T. (in press). Radioisotopic age, Osmium isotopes, and global correlation of the Albian-Cenomanian boundary. *Geological Society of America Bulletin*.

Taylor, J., Selby, D., Lloyd, J. M., Best L., **Podrecca, L. G..**, Sageman, B. B., Simms A. R. (in review). From Ice to Isolation: Reconstructing the palaeoenvironmental evolution and relative sea-level history of Gairloch, NW Scotland (UK) since the Last Glacial Maximum. *Journal of Quaternary Science*.

Podrecca, L. G., Sageman, B.B., Masterson, A.L., Todes, J., Hurtgen, M., Application of Sulfur Isotope Records to the Reconstruction of Relative Sea Level Changes in the Late Cretaceous Western Interior Seaway. (in prep)

Podrecca, L. G., Meyers, S., Sageman, B. B., Singer, B. S., Li, Y., Selby, D., Taylor, J., Savatic, K., Schmitz, M., Mohr, M., Takashima, R., Establishing the Global Chronostratigraphic Framework for Ocean Anoxic Event 1a (OAE1a): Chemostratigraphic Correlation of High-precision Radioisotopic Ages Anchor an Astrochronologic Record. (in prep)

Wan, C., Sageman, B. B., **Podrecca, L. G.**, Waldeck, A., Jacobson, A. D., A Tale of Two OAEs; Utilizing Osmium and Calcium Isotope Records to differentiate between Pathways of Ocean Anoxic Event Evolution (OAE1a and OAE2). (in prep)

Wan, C., Clemente, J. N., **Podrecca, L. G.**, Jacobson, A. D., Nielsen, S. G., Sageman, B. B., Deoxygenation during Oceanic Anoxic Event 1a: Insights from Novel Thallium Isotope. (in prep)

Conference Abstracts

First Authored Oral Sessions

Podrecca, L., Todes, J., Masterson, A.L., Hurtgen, M., Sageman, B.B., 2025, Changes in Relative Sea Level Modulate the Sulfur Isotope Record of Marine Pyrite: Case Studies in the Cretaceous Western Interior Seaway, GSA Annual Meeting, San Antonio, TX.

Podrecca, L., Meyers, S., Sageman, B., Singer, B.S., Li, Y., Selby, D., Schmitz, M., Mohr, M., Takashima, R., 2024, Refining Global Chronostratigraphy of Ocean Anoxic Event 1a (OAE1a): Chemostratigraphic Correlation of High-precision Radioisotopic Ages Anchor an Astrochronologic Record, GSA Annual Meeting, Annaheim, CA.

Podrecca, L., Hurtgen, M., Masterson, A.L., Todes, J., Sageman, B.B., 2023, Application of Sulfur Isotope Records to the Reconstruction of Relative Sea Level Changes in the Late Cretaceous Western Interior Seaway, GSA Annual Meeting, Pittsburgh, PA.

Podrecca, L., Taylor, J., Masterson, A.L., Sageman, B.B., Hurtgen, M., Lloyd, J., Selby, D., 2022, Holocene Sedimentary Record Preserves Sulfur System Dynamics in Loch Duart (NW Scotland); Evidence for Variability in $\delta^{34}S$ Driven by the Interplay of Post-glacial Eustatic Rise and Isostatic Rebound, GSA Annual Meeting, Denver, CO.

Podrecca, L., Hurtgen, M., Masterson, A.L., Todes, J., Sageman, B.B., 2022, The Role of Relative Sea Level in Microbial Sulfate Reduction and the Local S-isotope Record, GSA Annual Meeting, Portland, OR.

Podrecca, L., Makarova, M., Miller, K. G., Browning, J., Wright, J. D., 2019, Expanded record of the Paleocene-Eocene Thermal Maximum in the Appalachian Amazon, GSA Annual Meeting, Phoenix, AZ.

Podrecca, L., Miller, K. G., Wright, J. D., Browning, J., and Emge, T., 2017, Clear as mud: Changes in paleoshelf environments and deposition rates at Medford, New Jersey during the Paleocene.

Field Experience

Baraboo, WI, Earth 201 Field Trip, Northwestern University *Spring 2019, 2023, 2024*

I have helped organize transportation, food, and exercises in this fieldtrip for undergraduates taking Earth 201: Earth Systems Revealed. Worked as driver, organizer, and assistant teacher in the field.

Remote Nakatengu Rainforest, Hokkaido, Japan, Northwestern University *Summer 2022*

I was a science expedition assistant and primary researcher from the Sedimentary Geochemistry lab, extracting sediment and volcanic ash samples from an exposed riverbed in the remote Nakatengu Rainforest in central Hokkaido, Japan. I taught sampling methods and field logistics to junior graduate students, made decisions on field science objectives each day, took photos and coordinated lunch preparation and travel to and from the site. ~4 weeks.

Sedimentology and Stratigraphy Field Course, Utah and Colorado *Summer 2018*

A month-long field course focused on mapping, describing, and interpreting the depositional environment of sedimentary rocks. Notes from the field were later translated electronically into adobe illustrator to construct an article style report on the Greenhorn Cyclothem

---

Formal Field Safety Training

Wilderness Medical Associates WFR Training, Northwestern University *Summer 2022*

This 5-day long wilderness first responder course with 25 hours of pre-course work taught me many medical skills through lectures and realistic scenarios.

References

Dr. Brad Sageman (PhD advisor)
Northwestern University
847-467-2257
b-sageman@northwestern.edu

Dr. Andrew Jacobson (Professor, fieldwork, colleague)
Northwestern University
847-491-3132
adj@earth.northwestern.edu

Kenneth Miller (MSc advisor)
Rutgers University

609-577-3297
kgm@eps.rutgers.edu