

Pete Puleo

Quaternary Sediment Lab, Department of Earth and Planetary Sciences
Northwestern University, Evanston, IL
Phone #: (920) 344-8141 Email: peterpuleo2024@u.northwestern.edu

Education

Ph.D., Northwestern University, Earth and Planetary Sciences *Anticipated June 2024*

Expertise in global climate change, general earth/environmental science, and reconstructing environmental change and paleoclimate over the past 15,000 years using stable isotopic, paleoecological, and other proxy-based methods from lake sediment cores. Anticipated dissertation title is *Reconstructing Abrupt, Seasonal Changes to Climate and Glaciers in Greenland over the last ~15,000 years using Oxygen Isotope Measurements and Lake Sediment Chemistry.*

B.A. with Honors, Northwestern University, Earth and Planetary Sciences *2019*

Foci included geology, geochemistry, and climate change. Honors in Earth and Planetary Sciences awarded for thesis *A ~14,500-year Paleoenvironmental and Paleoclimate Record from Sediments of Geneva Lake, Wisconsin.*

Marine Biological Laboratory, Semester in Environmental Science *Fall 2017*

15-week program of environmental science courses, lab work, and field work.

Teaching Assistant Appointments

Teaching Assistant for Earth: A Habitable Planet, Professor Rosemary Bush *Fall 2023*

Developing new materials for an updated version of this core Environmental Science Program required course on introductory Earth system science, including developing a list of topics and suggested teaching order, textbook options, and learning goals for each topic. Additionally, I clarify course content with students in office hours and over email, and grade quizzes and homework assignments. I will be developing and giving at least one lecture later this Fall.

Teaching Assistant for Energy and Climate Course, Professor Yarrow Axford *Fall 2020*

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

Guest Lectures

Guest Lecture for Sediment Archives course, Professor Sarah Rosengard *Fall 2023 (Planned)*

I am creating a class lecture to give at SAIC on my research on climate and glacial change using sediment cores sampled from the Midwest and Greenland.

Guest Lecturer for Arctic Ecology Seminar, Professor Mary Heskell *Fall 2022*

I created and gave a class lecture at Macalester College on my background as a scientist and my research on climate change in Greenland during the Younger Dryas.

Guest Lecturer and Grader for Quaternary Paleoclimate: From the Ice Age to the Age of Oil Course, Professor Yarrow Axford *Winter 2022*

I designed a class lecture and lab-based activities including students working at microscopes and observing sediment cores. I also graded most of the assignments and corresponded with students about their grades.

Journalism Class Lab Lectures *Winter 2019, 2020, 2022*

I helped lead two-hour long lab tours for groups of Medill journalism students each winter. We started off by giving a broad introduction to our lab and our research goals. Then we broke the class into small groups and gave them more specific information on the instruments in our lab and research techniques. We concluded with a Q&A period.

Formal Pedagogical Training

CIRTL Course, Transforming Your Research Into Teaching *Summer 2023*

In this 8-week synchronous online course, I developed a syllabus with units, subunits, learning objectives, assignments, and instructional methods for a course on climate change over the last 25,000 years. It culminated in a course presentation.

Mentored Discussions of Teaching at Northwestern University *Spring 2023*

In this quarter-long program, I observed classroom teaching by a professor in my field and discussed the teaching approaches I saw with the professor. I also attended three group meetings where we discussed evidence-based teaching practices and reflected on how our readings, assignments, and observations informed our teaching philosophies.

CIRTL Course, Advancing Learning Through Evidence-Based STEM Teaching *Winter 2023*

I learned how to implement effective teaching strategies in a college STEM classroom through this 8-week online course. Topics included peer instruction, problem-based learning, inquiry-based labs, cooperative learning, learning through diversity, flipped classrooms, and teaching philosophy.

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, organic sediment chemistry, X-ray fluorescence measurement, magnetic susceptibility measurement, spectrophotometry, oxygen isotope measurement, identifying sedimentary macrofossils, radiocarbon sampling and submission, sediment bulk density measurement

Field Skills: gear organization and acquisition, sampling plan development, water sample collection, plant sample collection, sediment core collection, surface sediment collection, wilderness first aid, field safety preparation, remote camping

Data Analysis and Visualization Skills: ArcGIS, 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 and a current organizer of the Inclusion and Diversity initiatives. For more information, visit our website: <https://sites.northwestern.edu/geoequity/>

Graduate Student Climate Survey Organizer, Northwestern University

Spring 2022-Present

I helped design, revise, facilitate, analyze, and share an annual survey given to graduate students in the Northwestern University Department of Earth and Planetary Sciences. It aims to facilitate conversations between graduate students and faculty to improve the general experience in the department.

Graduate Curriculum Committee

Fall 2020-Spring 2021, Fall 2022

This committee developed an updated version of the graduate student curriculum. The committee consisted of five faculty and me. It involved weekly or biweekly 1-hour meetings. We also meet ad-hoc to discuss topics that come up related to the curriculum.

NU-Geopaths, Northwestern University

Summer 2022

This 3-week long mentorship program allowed me to work closely with a high school student on a project in the Earth Sciences. 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 history of the Chicago River and worked with me to develop a presentation and physical model of the river. I also provided feedback on my mentee's college application materials.

Research Communication Training Program, Northwestern University

Summer 2020

This 9-week online course offered educational materials and practice explaining your research to people unfamiliar with it. Some topics included being aware of your audience, avoiding jargon, storytelling, visual communication, and presenting.

Science with Seniors, SPOT at Northwestern University

Summer 2020

I virtually presented my research on climate change to senior citizens at a local nursing home. This allows me to engage with the community and voters in the area on why climate change is an important issue and how we know about past climate change.

Weinberg College Student Advisory Board, Northwestern University

2016-2019

I was a board member representing the Department of Earth and Planetary Sciences. I provided feedback on the collegiate experience at Northwestern to advisors, organized events for students, and discussed program ideas with faculty advisors. The full board met once every few months and I worked with the director of undergraduate studies weekly.

Honors, Scholarships, and Awards

National Science Foundation Graduate Research Fellowship

2021-Present

Scott Award for Outstanding Graduate Research, Dept. of Earth and Planetary Sciences, Northwestern University

2023

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

2021

Seymour Schlanger Undergraduate Earth Sciences Award, Dept. of Earth and Planetary Sciences, Northwestern University

2019

Undergraduate Research and Arts Exposition Award, Northwestern University

2019

Junior Research Achievement Award, Northwestern University 2018
Institute for Sustainability and Energy at Northwestern Research Grant Summer 2018
Valedictorian, Beaver Dam High School, Beaver Dam, WI 2015

Research Experience

PhD Student Research, Northwestern University 2019-Present

- Project 1: From Lake N14 (south Greenland) sediments, I sampled and developed a radiocarbon chronology and generated a high-resolution record of lake water stable oxygen isotopic change through the Younger Dryas using chironomid head capsules, aquatic mosses, and aquatic moss derived cellulose.
- Project 2: I reconstructed outlet glacier (Kiattuut Sermiat) history in south Greenland over the last ~12,000 years using lake sediment chemistry and geomorphological evidence.
- Project 3: I am developing a novel aquatic moss oxygen isotope proxy for reconstructing seasonal hydroclimate from lake sediment records in Greenland.

Senior thesis, Northwestern University 2018-2019

I worked in the field to retrieve sediment cores from Geneva Lake of Southeastern Wisconsin and created oxygen isotope and trace element records using ostracods from the sediment to reveal past environmental and climatic change over the last ~15,000 years.

Independent Research Project, Marine Biological Laboratory Fall 2017

I collected sediment cores from Siders Pond and analyzed sediment chemistry (C, N, Fe, S, P) to reconstruct wastewater input and salinity change over the past 1,000 years.

Undergraduate Research Assistant Program, Northwestern University Summer 2017

I made protocols for two instruments (Mastersizer 3000 and GeoTek MSCL) in the Quaternary Sediment Laboratory and learned essential paleoclimate/paleolimnology laboratory skills.

Publications: Peer Reviewed

Puleo, P.J.K., Osburn, M., Tuccillo, M., Akers, P.D., Kopec, B.G., Welker, J.M., Axford Y. (In prep). Developing a Proxy for Seasonality of Arctic Climate: $\delta^{18}\text{O}$ of Seasonal Aquatic Moss Growth.

Puleo, P.J.K. and Axford, Y. 2023. Duration and Ice Thickness of a Late Holocene Outlet Glacier Advance near Narsarsuaq, South Greenland. *Climate of the Past*. 19, 1777–1791. <https://doi.org/10.5194/cp-19-1777-2023>.

Puleo, P.J.K., Masterson, A.L., Medeiros, A.S., Schellinger, G., Steigleder, R., Woodroffe, S.A., Osburn, M.R., Axford, Y. 2022. Younger Dryas and Early Holocene Climate in South Greenland Inferred from Chironomid, Moss, and Cellulose Oxygen Isotopes. *Quaternary Science Reviews* 296, 107810. <https://doi.org/10.1016/j.quascirev.2022.107810>.

Medeiros, A.S., Chipman, M.L., Francis, D.R., Hamerlík, L., Langdon, P., **Puleo, P.J.K.**, Schellinger, G., Steigleder, R., Walker, I.R., Woodroffe, S., Axford, Y. 2022. A continental-scale chironomid training set for reconstructing Arctic temperatures. *Quaternary Science Reviews* 294, 107728. <https://doi.org/10.1016/j.quascirev.2022.107728>.

Puleo, P.J.K., Axford, Y., McFarlin, J.M., Curry, B.B., Barklage, M., Osburn, M.R. 2020. Late glacial and Holocene paleoenvironments in the midcontinent United States, inferred from Geneva Lake leaf wax, ostracode valve, and bulk sediment chemistry. *Quaternary Science Reviews* 241, 106384. <https://doi.org/10.1016/j.quascirev.2020.106384>.

Conference Abstracts

Oral Sessions

American Geophysical Union Fall Meeting, San Francisco, CA *Fall 2023 (Planned)*

Puleo, P.J.K., Osburn, M., Tuccillo, M., Akers, P.D., Kopec, B.G., Welker, J.M., Axford Y. 2023. Developing a Proxy for Seasonality of Arctic Climate: $\delta^{18}\text{O}$ of Seasonal Aquatic Moss Growth.

American Geophysical Union Fall Meeting, Chicago, IL *Fall 2022*

Puleo, P., Axford, Y. 2022. Timing and Ice Thickness of the Late Holocene Narsarsuaq Advance, South Greenland, from Lake Sediments.

Poster Sessions

American Geophysical Union Fall Meeting, Chicago, IL *Fall 2022*

Osburn, M.R., Bianca, F., **Puleo, P.**, Axford, Y. 2022. Plant colonization and response to late glacial abrupt climate change in south Greenland, viewed through leaf waxes and pollen. Presented by Magdalena Osburn.

American Quaternary 2022 Biennial Meeting, Madison, WI *Summer 2022*

Puleo, P., Axford, Y., Masterson, A.L., Osburn, M.R., Woodroffe, S.A., Schellinger, G.C., Steigleder, R., Medeiros, A. 2022. Younger Dryas and Early Holocene Climate in South Greenland inferred from Chironomid, Moss, and Cellulose Oxygen Isotopes. Presented by Yarrow Axford.

US Atlantic Meridional Overturning Circulation Science Team Meeting, Online *Spring 2022*

Puleo, P., Axford, Y., Masterson, A.L., Osburn, M.R., Woodroffe, S.A., Schellinger, G.C., Steigleder, R., Medeiros, A. 2022. Younger Dryas Climate Shifts in South Greenland in Response to AMOC Changes Inferred from Lake Sediment Proxies.

American Geophysical Union Fall Meeting, Online

Fall 2021

Puleo, P., Axford, Y., Masterson, A.L., Woodroffe, S.A., Schellinger, G.C., Steigleder, R., Osburn, M.R. 2021. Younger Dryas and Early Holocene Climate in South Greenland Inferred from Chironomid, Moss, and Cellulose Oxygen Isotopes at Lake N14.

American Geophysical Union Fall Meeting, Online

Fall 2020

Puleo, P., Axford, Y., Schellinger, G.C., Masterson, A.L., Coston, T. 2020. Younger Dryas Climate in South Greenland Inferred from Chironomid and Moss Chemistry at Lake N14.

American Geophysical Union Fall Meeting, San Francisco, CA

Fall 2019

Puleo, P.J.K., Axford, Y., McFarlin, J.M., Curry, B.B., Barklage, M., Osburn, M.R. 2019. Late glacial and Holocene paleoenvironments in the midcontinent United States, inferred from Geneva Lake leaf wax, ostracode valve, and bulk sediment chemistry.

Field Experience

Midwest Lake Coring and Water Sampling, Northwestern University

Spring 2018, 2022, 2023

I led and assisted members of the Quaternary Sediment Lab as we collected water samples and sediment cores from lakes in Illinois and Wisconsin on three occasions. The trips lasted 1-5 days.

Remote South Greenland Lake Coring, Northwestern University

Summer 2018, 2019, 2022

I was a science expedition leader (and in earlier years assistant for) field teams from the Quaternary Sediment Lab, recovering sediment cores and sampling modern waters and plants. I taught sampling methods and field logistics to junior graduate students, made decisions on field science objectives each day, took photos to characterize lake watersheds, oversaw camps, coordinated travel by helicopter. The three trips lasted ~1 month each.

Sedimentology and Stratigraphy Field Course, Utah and Colorado

Summer 2016

I went on a month-long field course focused on mapping, describing, and interpreting the depositional environment of sedimentary rocks.

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.

NOLS/REI Wilderness First Aid course, Chicago Botanic Garden

Summer 2019

I went through two days of training on managing injuries appropriately while immediate care facilities are unavailable.

NSF Arctic Field Training, Northwestern University

Spring 2018

I learned how to prepare for and deal with arctic conditions and wildlife over a daylong session.

Publications: General

AMQUA Quaternary Times

Spring 2021

A summary of my NSF GRFP awarded research proposal on assessing the seasonality of the Younger Dryas in southern Greenland (pg. 7-9).

[https://www.amqua.org/public/QT/Quaternary%20Times_Vol.%2043\(1\).pdf](https://www.amqua.org/public/QT/Quaternary%20Times_Vol.%2043(1).pdf)

Stories in Science

Summer 2020

A story I wrote about my experience becoming a geoscientist.

<https://storiesinscience.org/2020/08/04/the-past-is-the-key-to-the-future/>

AMQUA Quaternary Times

Spring 2020

A research report on the work I did at Geneva Lake with field photos and figures (pg. 14-17).

[https://www.amqua.org/public/QT/Quaternary%20Times_Vol.%2042\(1\)-Spring.pdf](https://www.amqua.org/public/QT/Quaternary%20Times_Vol.%2042(1)-Spring.pdf)