

Mia Teresa Tuccillo

miatuccillo@u.northwestern.edu

Based in Chicago, IL, on the unceded homelands of the Council of Three Fires – Ojibwe, Odawa, and Potawatomi Nations – the Miami, Ho-Chunk and Menominee nations.

**Northwestern University Department of Earth & Planetary Sciences
Technological Institute: 2145 Sheridan Road, Evanston, IL 60208-3130**

Updated: September 2024

EDUCATION

Sept. 2020 - Present

Ph.D. Candidate in Earth & Planetary Sciences

Northwestern University

Sept. 2016 - May 2020

B.A. in Biogeochemistry

Wellesley College

RESEARCH INTERESTS

Sedimentary pigments, collaborative arctic research, current & past climates, paleolimnology, (paleo)ecology, cyanobacterial blooms, water security and quality in the Arctic.

RESEARCH PROJECTS

NSF-DDRI: A Paleolimnological Investigation of Climate and Nitrogen Impacts on Primary Producers in Greenland Lakes and Community Water Supplies (2024-Present)

Co-Investigator, Northwestern University & National Science Foundation Doctoral Dissertation Improvement Award

Co-I: *Dr. Yarrow Axford, Ph.D.* | Dpt. Earth & Planetary Science

Characterizing Holocene ecosystem shifts of primary producers with sedimentary pigment biomarkers extracted from lake sediment cores in Narsaq, Greenland. Targeted lakes in Greenland resemble those used for water supplies or fishing. This work centers community relationship building, collaborative science, & the involvement of both local and Indigenous knowledge.

Cyanobacterial & Algal Pigment Biomarkers in Lake Sediments of Southwest Greenland Illuminate Holocene Responses to Hydrological Changes and Stratification (2022-Present)

Graduate Student Investigator, Northwestern University

Advised by *Dr. Yarrow Axford, Ph.D.* | Dpt. Earth & Planetary Science

HPLC-MS (QTOF) analysis of cyanobacterial pigments to reconstruct primary production regimes and characterize lake stratification changes through dynamics of aquatic biota (Narsarsuaq, Greenland).

Characterizing Lake Biological Responses to Permafrost Thaw Across a Discontinuous-to-Continuous Permafrost Landscape: Inuvik to Tuktoyaktuk, Northwest Territories, Canada (2023-Present)

Graduate Student Investigator, Northwestern University

Advised by *Dr. Yarrow Axford, Ph.D.* | Dpt. Earth & Planetary Science

Analyzing lake water for water quality parameters and microbial-ecological communities (DNA and pigment analysis). Complementary analyses on surface sediments provide the basis for a modern calibration in a shifting environment with applications to downcore measurements from ancient sediments.

Characterizing Transport & Deposition of Organic Carbon in a Floodplain of the Upper Sangamon River, Robert Allerton Park, Monticello, IL (2020-21)

Graduate Student Investigator; Northwestern University

Advised by *Dr. Neal E. Blair, Ph.D.* | Dpt. Earth & Planetary Science/Civil & Environmental Engineering

Organic geochemical analysis of sources, residence time, and deposition of organic carbon in floodplains using chemical and isotopic biomarkers, in conjunction with the Critical Interface Network (CINet) and in pursuit of *Ph.D. Candidacy*.

Identifying the Deep Chlorophyll Maximum (DCM) in Lake Baikal's Northern Basin (2019)

Undergrad. Student Investigator, Wellesley College Lake Baikal Research Program

Advised by *Dr. Marianne Moore, Ph.D.* | Irkutsk & Bolshie Koty Field Station, Russia.

Quantifying chlorophyll & dissolved oxygen to identify a DCM in the vertical water column.

Modeling the Ecological Niche of *Alliaria petiolata* through Soil Nutrient Analysis and Statistical Frameworks (2017-2019)

Undergrad. Student Research Assistant, Wellesley College

Advised by *Dr. Alden Griffith, Ph.D.* | [NSF Research Award](#) #1655541

Analytical chemistry/spectrophotometric analysis of soil nutrients and greenhouse experimentation with environmental conditions successfully modelled the ecological niche of Garlic Mustard, an invasive plant species. Press coverage available [here](#) (p. 4).

PUBLICATIONS

Nichols, F., Pontefract, A., Masterson, A.L., Thomspson, M.L., Carr, C.E., Tuccillo, M.T., Osburn, M.R. (2024) Leveraging Machine Learning Approaches to Predict Organic Carbon Abundance in Mars-Analog Hypersaline Lake Sediments. JGR Machine Learning and Computation, 1(2), e2024JH000138.

CONFERENCE ABSTRACTS

American Geophysical Union, AGU:

Tuccillo, M.T., Nash, B., Puleo, P., Garla, S., Osburn, M.R., Axford, Y. (2023) A Biological Tipping Point? Sediment Accumulation Rates from a South Greenland Lake Point to an Abrupt Late Holocene Drop in Primary Productivity.

Puleo, P., Osburn, M.R., **Tuccillo, M.T.**, Douglas 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.

van der Lee, S., Davis, T., **Tuccillo, M.T.**, Harp, R., Larocca, L., Bausch, H., Montgomery, A., Nichols, F., Savatic, K., Puleo, P., Perkins, K., Bueno, N., Woods, S., Drane, D. (2021). NU-Geopaths 1.0 Increased Awareness of and Aided the Possible Diversification of the Geosciences.

RESEARCH FIELD EXPERIENCE

Narsaq & Nuuk, Southwest Greenland (2024): Collection of Lake Sediments to Investigate Primary Productivity Shifts in Arctic Lakes; Community Networking to Frame Research Questions & Build Research Partnerships.

Graduate Student, Advised by *Dr. Yarrow Axford* | Northwestern University

NSF-DDRIG; Award # 2330271

Residence at the Narsaq International Research Station, advised by *Lise Autogena*

Inuvik & Tuktoyaktuk, Northwest Territories, Canada (2023): Collection of Lake Sediments and Modern Surface Waters to Investigate the Impact of Melting Permafrost on Lake Water Quality & Hydrologic Connectivity.

Graduate Student, Advised by *Dr. Yarrow Axford* & *Dr. Andrew Medeiros* | Northwestern University, Dalhousie University, and Aurora Research Institute in Inuvik

Pituffik U.S. Airbase, Northwest Greenland (2022): Collection of Lake Sediments, Surface & Atmospheric Waters, and Plant Material for a Paleoclimate Modern Calibration Study.

Graduate Student, Advised by *Dr. Yarrow Axford* & *Dr. Magdalena R. Osburn* | Northwestern University

NSF Award # (FAIN) 2002515

Crystal Lake, Illinois, U.S.A. (2021, 2022): Lake Sediment Coring.

Graduate Student, Advised by *Dr. Yarrow Axford* | Northwestern University

Lake Baikal, Siberia, Russia (2019): Lake Sediment Coring, Water Sampling, Cultural Immersion (including spoken language).

Undergraduate Student, Advised by *Dr. Katrin Monecke* | Dpt. Geosciences, Wellesley College

Collaboration with Institute of the Earth's Crust, Irkutsk, Siberia.

Glacier National Park, Montana, U.S.A. (2017): Ecological demographic study (organism census) of an alpine desert shrub (*Smelowskia calycina*).

Undergraduate Student, Advised by *Dr. Alden Griffith* | Dpt. Environ. Studies, Wellesley College

TEACHING EXPERIENCE & PROFESSIONAL DEVELOPMENT

School of the Arts Institute (SAIC) - Lecturer (2024)

Part-time Lecturer in Liberal Arts Department for SCIENCE-3314: Abrupt Climate Change.
<https://www.saic.edu/profiles/faculty/mia-t-tuccillo>

Northwestern Prison Education Program (NU-PEP) - Coordinator & TA (2023)

Co-coordinator and course TA for EARTH-171: The Science of Fossils.

Undergraduate Teaching in STEM: MOOC CIRTl Course Completion (2022)

Course Certificate of Completion for an 8-week online course on research-backed approaches to teaching STEM in undergraduate institutions.

NU - Geopaths Academic Mentorship Training Completion (2020, 2022)

Two-session, 5-hour training for graduate students to develop better approaches for mentoring high school students in STEM (Northwestern University Geopaths Program; NSF Award # 2023263).

General Teaching Assistantships at Northwestern University

EARTH106 - The Ocean, The Atmosphere and Our Climate; *Dr. Neal E. Blair* (2021)

NU-Geopaths Summer Program for High School Students- Program TA; *Dr. Suzan van der Lee* (2021)

EARTH105 - Climate Catastrophes in Earth History; *Dr. Matthew T. Hurtgen* (2022)

Guest Lecturing Experiences

2022: Community, Art and a Shifting Environment. Free educational and artmaking event hosted by OKO Exhibits at The Martin Gallery in Chicago. Delivered a lecture about climate science and social perceptions of climate change.

2023: Substitute lecture at School of the Arts Institute of Chicago (SAIC) for "SCIENCE 3003-01S: Environmental Archives of lake bed and seafloor sediments."

OUTREACH & SERVICE

Northwestern University Mentoring Opportunities for Research Engagement (MORE) (2022-Present)

Outreach Panel Coordinator & Mentor for Chicago-area High School Students

MORE is a "science outreach group consisting of graduate students seeking to inspire students to pursue STEM careers. The group holds virtual and in-person discussions with high school students across Illinois at different points throughout the school year. Panels of 3-4 graduate volunteers present on topics such as STEM careers and education, their own research (at a level accessible for high school students), and applying to STEM programs."

Northwestern University "NU-Geopaths" Summer Research & Mentorship Program (2021 and 2023)

High School Student Mentor

One-on-one guidance of high school students through a self-designed research projects focused on collecting real-time environmental data and characterizing diatom algae in Lake Michigan.

NU-Geopaths is supported under NSF Award # 2023263.

URGE (Unlearning Racism in Geoscience) Northwestern University Pod (2021)

Northwestern University Pod Member

Curriculum included devising plans for implementing anti-racist strategies in the within the Northwestern Dpt. of Earth and Planetary Sciences and in the field at large. URGE is supported by NSF under grants EAR-1714909 and EAR-2126109. More at:

<https://urgeoscience.org/>

District 65/EvanSTEM 6th Grade Climate Action Project Mentoring Program (2021)

Graduate Student Mentor for a 6th-Grade Student.

Serving as a mentor to support a 6th grade student in completing a local Climate Action Project.

Northwestern University GeoEquity Student Organization (2021-2023)

Outreach and Fundraising Organizer

Student organization aiming to cultivate inclusion and diversity, and to build actively anti-racist culture and structures in the Northwestern University Dpt. of Earth and Planetary Sciences, local, and academic community. More at: <https://www.earth.northwestern.edu/about/geoequity.html>

FELLOWSHIPS, GRANTS & AWARDS

National Science Foundation Doctoral Dissertation Research Improvement Award (NSF-DDRI, Arctic Systems Science)

Awarded Proposal: *A Paleolimnological Investigation of Climate and Nitrogen Impacts on Primary Producers in Greenland Lakes and Community Water Supplies*. Co-PI with Dr. Yarrow Axford, Northwestern University. Award supports one scientific field season (Narsaq, Greenland) and community relations and networking trips to Nuuk, Greenland and Washington, D.C.
NSF Award # 2330271

Northwestern University Buffett Institute of Global Affairs Fellowship (2023-2024)

Funded program for Ph.D. students whose research is interdisciplinary, international, and exhibits relevance to at least one of the 17 United Nations Sustainable Development Goals. I was selected in part for my research on Greenland's lakes, which has relevance to the UN's priority of monitoring freshwater quality and resourcing global communities with clean drinking water infrastructure.

Northwestern University Earth and Planetary Sciences COHEN Graduate Service Award (2022)

Granted for contributions and service to the department through management of and mentorship in the NU-Geopaths program in Summer 2021, and participation in other justice-oriented initiatives in the Earth and Planetary Sciences Department.

Madeline Albright '59 Institute of Global Affairs Fellowship (2020)

3-week program of interdisciplinary lectures, resulting in giving a presentation to Secretary Madeleine Albright regarding international issues of women's justice. Fellow profile available [here](#).

Stanford Calderwood Prize in Public Writing (2019)

Awarded annually to exceptional student writing in the Sciences, Humanities, and Social Science nominated by instructors and selected by an oversight committee. Read the winning essay [here](#).

Wellesley College Dorothy Thorndike '75 Fellowship (2017-18)

Fellowship in Wellesley College Botanic Gardens, aimed at connecting the community to plants, nature, and the environment. Personal work summary [here](#) (p. 12).

Wellesley College Undergraduate Summer Research Program Stipend (2017)

Wellesley College Environmental Studies Department-sponsored research assistantship program for current undergraduate students.

CONFERENCES

American Geophysical Union (AGU) Conference - San Francisco, CA (2023)

Greenland Science Week (GSW) - Nuuk, Greenland (2023)

American Geophysical Union (AGU) Conference - Chicago, IL (2022)

ArcticNet Conference - Toronto, Ontario, Canada (2022)

American Quaternary Association (AMUQA) - Madison, WI (2022)

Ruhlman Research Conference at Wellesley College (x2; 2017, 2019)

SKILLS

Software: Microsoft Office, Google Office.

Coding Languages: R (proficient), Python (intermediate).

Laboratory Equipment & Analysis:

- High Performance Liquid Chromatography (HPLC-MS) on QTOF and Triple-quad -MS
- GeoTEK Sediment Core Scanner, with Magnetic Susceptibility (MS), Hyper-Spectral Imaging Spectrophotometry, and X-Ray Fluorescence (XRF) Detectors.
- Elemental Analyzer (EA) & Isotope Ratio Mass Spectrometry (IRMS).
- Cuvette Spectrophotometry & Biotek Multi-mode Well Reader.
- Fourier Transform Infrared Reflectance (FTIR)
- Geochronology techniques including C-14, Pb-210, and Cs-137 radiometric chronometry.