

Ann Mariam Thomas
CV last updated: August 2024

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EDUCATION

Northwestern University Mar 2021 - Present
PhD Program in Earth and Planetary Sciences, Integrated Data Science Certificate
Advisor: Prof. Suzan van der Lee
Relevant Coursework: Machine Learning; Digital Signal Processing; Data-Driven Research in Physics, Geophysics, and Astronomy; Mathematical Inverse Methods in Earth and Environmental Sciences

Colby College Aug 2017 - May 2020
Bachelor of Arts in Physics, Summa Cum Laude
Minor in Environmental Studies

EMPLOYMENT

EarthScope Consortium May 2024 – Aug 2024
Education Data & Resources Intern

- Developed technical documentation for software and instrumentation used in geophysical experiments (seismic refraction and electrical resistivity).
- Designed educational figures using Adobe Illustrator to enhance student learning
- Modified web content to increase accessibility for users with screen readers and color-blindness.

Colby College, Information Technology Services Oct 2017 - Mar 2020
IT Support Technician

- Diagnosed and resolved software issues in computers, projection systems, and printers on campus
- Provided technical assistance to college faculty and students in-person, by phone, and by email

RESEARCH EXPERIENCE

Northwestern University, Earth & Planetary Sciences Mar 2021 – Present

- Advised by Prof. Suzan van der Lee (PhD Advisor)
- Developed supervised and unsupervised machine learning models to detect local earthquakes and unique manmade signals (e.g. quarry blasts) in noisy, urban data. Compared findings with an existing deep learning model.
- Perform cross-correlation and spatiotemporal analysis to characterize detected events
- Create a labeled dataset of seismic events to design and improve future seismic methods.

Northwestern University, Earth & Planetary Sciences Jan 2022 - Dec 2022

- Advised by Prof. Elvira Mulyukova
- Investigated the effects of time-varying mantle viscosity on Glacial Isostatic Adjustment (GIA) using analytical and numerical methods
- Designed time-varying viscosity scenarios based on recent microphysical models of viscosity

Northwestern University, Civil & Environmental Engineering

Sep 2020 - Mar 2021

- Advised by Prof. Alessandro Rotta Loria
- Initiated collaborations with Chicago businesses and installed 40+ temperature sensors in underground parking garages, streets, and basements in Chicago's Loop district to monitor its subsurface conditions.
- Conducted and published a comprehensive literature review on current methods and numerical modelling techniques to study subsurface urban heat islands.

Colby College, Physics & Astronomy

Sep 2018 - May 2019

- Advised by Dr. Elizabeth McGrath
- Performed a comparative data analysis on data from CANDELS, an astronomical survey of the distance universe. Compared the structural data of cataloged quiescent disk galaxies with that of star-forming galaxies to better understand the quenching process.

Colby College, Environmental Studies Program

Sep 2017 - May 2018

- Advised by Dr. Philip Nyhus
- Digitized natural and manmade objects using GIS in Botswana's Makgadikgadi-Nxai Pan region. Our research team collaborated with Round River Conservation Studies to discuss a potential removal of animal fences in the region.

TEACHING EXPERIENCE

Northwestern University, Teaching Assistant

EARTH202: Earth's Interior

Winter 2023, Winter 2022

- EARTH361: Scientific Programming in Python
- NU-Geopaths (high school internship program)

Fall 2022

Summer 2022

Colby College, Teaching Assistant

- PH241: Modern Physics I
- PH145: Foundation of Electricity and Magnetism
- PH141: Foundations of Mechanics

Fall 2019

Spring 2019

Fall 2018

PUBLICATIONS

A. Rotta Loria, A. Thota, **A. Thomas**, N. Friedle, J. Lautenberg, & E. Song (2022). Subsurface heat island across the Chicago Loop district: Analysis of localized drivers. Urban Climate 44, 101211 (2022). <https://doi.org/10.1016/j.uclim.2022.101211>

CONFERENCE PRESENTATIONS

A. Thomas, O. Ranadive, & S. van der Lee (2023). Towards Detecting Small, Local Earthquakes in Greater Chicago Using Single-station Data. American Geophysical Union Fall Meeting.

A. Thomas, O. Ranadive, & S. van der Lee (2023). Feature Engineering and Clustering for Single-Station Seismic Waveform Classification in an Urban Environment. Seismological Society of America Annual Meeting.

A. Thomas, T. Davis, B. Alonzo, H. Bausch, A. Burdick, S. Camilleri, P. Puleo, M. Selensky, C. Wan, S. Woods, & S. van der Lee (2022). NU-Geopaths: Engaging Mentees and Mentors in an Inclusive Internship Experience. American Geophysical Union Fall Meeting.

A. Thomas & E. Mulyukova (2022). Incorporating the Microphysics of Transient Viscosity to Model Postglacial Rebound. American Geophysical Union Fall Meeting.

A. Thomas, H. Zhang, & S. van der Lee (2021). Seismic event detection in suburban Chicago using a single broadband seismic station. American Geophysical Union Fall Meeting.

M. Flanagan, V. Tang, O. Ranadive, **A. Thomas**, & S. van der Lee (2021). Earthquake Detective: Citizen Scientists Use Eyes and Ears to Classify Small Seismic Events. American Geophysical Union Fall Meeting.

PROFESSIONAL SERVICE/COMMUNITY ENGAGEMENT

Workshop: Volcano & Rift Seismicity in the Northern Branches of The East African Rift System April – May 2024

Workshop Leader

- Designed and led a half-day workshop on Machine Learning: Theory and Applications in Solid Earth Geophysics. Workshop exercises are available on [GitHub](#).

NU-Geopaths High School Internship Program Jun 2022 - Aug 2023

Organizing Committee Member and Mentor

- Organized programming and logistics, in collaboration with Chicago public school teachers, to implement an additional internship year of NU-Geopaths after NSF funding expired. Served as a mentor for two years, advising a high school student on a summer geophysics project.

Expanding Your Horizons (EYH) Chicago Mar 2021 – Mar 2023

2022 & 2023 Fundraising Co-Chair, 2021 Conference Volunteer

- Organized individual and corporate fundraisers for EYH Chicago: a workshop-based symposium for middle-school girls to engage with STEM leaders. Served as a day-of volunteer, assisting with conference photography and food distribution.

EvanSTEM Apr 2021 - May 2021

Mentor for the Climate Action Project

- Mentored a sixth-grade student through weekly, one-hour sessions, on their app-based project on air pollution

Colby Storytellers and the Alzheimers Association, Maine Chapter Oct 2019 - Nov 2019

Volunteer Scribe

- Recorded the life stories of a Waterville resident with early stages of Alzheimer's disease and created a short book to be shared with her and her loved ones.

Women in Physics, Colby College Jan 2018 - Mar 2020

Co-President (Sep 2018- May 2019) and Member

- Planned the all-campus STEMInist dinner, club social events, and travel details for the Conference for Undergraduate Women in Physics

Training/Workshops

Earth Educators Rendezvous	July 2024
- Relevant workshops: Improving the Sustainability of Data-rich Activities using the Community Contribution Tool, Guiding Students to Use Evidence to Support Their Scientific Reasoning	
Northwestern University CoDex Workshop on Data Visualization	April 2024
NU-Geopaths Mentorship Training	Summer 2022, Summer 2023
Remote Online Sessions for Emerging Seismologists (ROSES)	Summer 2021

AWARDS & HONORS

Marion Sloss Award for Outstanding Graduate Teaching Assistant, Northwestern University (2024)
COHEN Graduate Service Award, Northwestern University (2023)
CIERA Board of Visitors Graduate Fellowship (declined offer), Northwestern University (2023)
Inductee to Phi Beta Kappa (2020)
Outstanding Learning Assistant, American Association of Physics Teachers (2019)
William A. Rogers Prize in Physics and Astronomy, Colby College (2019)
Presidential Scholar, Colby College (2017)

TECHNICAL SKILLS

Programming: Python, MATLAB, Interactive Data Language (IDL), LaTeX

Design: Adobe Illustrator, Vectorworks

Analytics/tools: Git, QUEST (Northwestern University's High Performance Computing Cluster), OPTUMG2 (finite-element software), ArcGIS

Languages: English and Malayalam (speaking only)