

# MARGARET MURAKAMI

[mmurakami@utexas.edu](mailto:mmurakami@utexas.edu) | (614) 633-5070

Department of Earth and Planetary Sciences  
Jackson School of Geosciences  
The University of Texas at Austin  
Austin, TX 78712

---

## EDUCATION

<b>Ph.D. Geological Sciences, The University of Texas at Austin</b>	expected May 2028
<b>M.Sc. Atmospheric Sciences, University of Helsinki</b>	May 2023
Thesis: Water Mass Transformations Within Prydz Bay Coastal Polynyas from Clustered Drifters	
<b>B.Sc. Geosciences with honors, The University of Texas at Austin</b>	May 2021

---

## ACADEMIC APPOINTMENTS

<b>Graduate Research Assistant, The University of Texas at Austin</b>	2023–present
Oden Institute for Computational Engineering and Sciences	
<b>Graduate Research Assistant, University of Helsinki</b>	2022–2023
Institute for Atmospheric and Earth System Research	
<b>Undergraduate Research Assistant, The University of Texas at Austin</b>	2018–2021
The Bureau of Economic Geology	

---

## RESEARCH EXPERIENCE

### Graduate Research Assistant, The University of Texas at Austin

Oden Institute for Computational Engineering and Sciences | Advisor: Patrick Heimbach

- Conducted budget analysis of water mass transformation to study the changing Nordic Seas and the Arctic Ocean using the Arctic Subpolar Gyre State Estimate.
- Developed and implemented advanced budgeting tools for analyzing ocean physics, enabling detailed studies of heat and salt changes using ECCO products.
- Collaborated on cutting-edge automatic differentiation projects, utilizing tools like TAF with MITgcm/ECCO and Julia-based frameworks such as oceananigans.jl and Enzyme.jl.

### Graduate Research Assistant, University of Helsinki

Institute for Atmospheric and Earth System Research | Advisors: Petteri Uotila and Aleksi Nummelin

- Conducted a targeted case study within the Southern Ocean using a regional ocean modeling system
- Implemented a unique Lagrangian particle package in the model and applied a novel clustering method to analyze simulation output
- Demonstrated proficiency in both working with a climate model and post-processing the output from it using effective data visualization strategies

This work resulted in two accepted abstracts at scientific conferences and one first-authored manuscript pending review, funded by the Academy of Finland.

### Undergraduate Research Assistant, The University of Texas at Austin

Bureau of Economic Geology | Advisors: Sahar Bakhshian and Susan Hovorka

- Utilized high performance and parallel computing to model and visualize pore-scale two-phase fluid dynamics in sandstone
- Employed applications to visualize and animate high-resolution output from a scientific model

- Contributed to a dynamic programming package to automatically correlate well-logs using Python, and managed large datasets necessary for this task

This appointment resulted in one second-authored publication in *Geophysical Research Letters* (GRL) and two scientific poster presentations.

---

## PUBLICATIONS

### Peer-Reviewed Research Articles

- Bakhshian, S., **Murakami, M.**, Hosseini, S.A., and Kang, Q. (2020). Scaling of Imbibition Front Dynamics in Heterogeneous Porous Media. *Geophysical Research Letters*, 47(14), <https://doi.org/10.1029/2020GL087914>

### Submitted Research Articles

- **Murakami, M.**, Nummelin, A., Galton-Fenzi, B.K., Uotila, P. (2023). Water Mass Transformations Within Antarctic Coastal Polynyas of Prydz Bay from Clustered Drifters. [DOI: 10.22541/essoar.169228932.20068035/v2](https://doi.org/10.22541/essoar.169228932.20068035/v2)

### Accepted Abstracts

- **Murakami, M.**, Nummelin, A., Galton-Fenzi, B.K., Uotila, P. (2023). Interactions with Meltwater in East Antarctica Influence Antarctic Bottom Water Formation: A Study Using Clustered Lagrangian Drifters. *Ocean Sciences Meeting Abstracts*.
- **Murakami, M.**, Nummelin, A., Galton-Fenzi, B.K., Uotila, P. (2023). Clustered Drifters Show that Interaction with the Ice Shelf Meltwater Controls Antarctic Bottom Water Formation in East Antarctica, *AGU Fall Meeting Abstracts*.
- Bakhshian, S., **Murakami, M.**, Hosseini, S.A. (2019). Pore-scale study of spontaneous imbibition in fractured rocks using the lattice Boltzmann method. *AGU Fall Meeting Abstracts*.

---

## PRESENTATIONS

### Invited Talks

- **Murakami, M.**, Nummelin, A., Galton-Fenzi, B.K., Uotila, P. Interactions with Meltwater in East Antarctica Influence Antarctic Bottom Water Formation: A Study Using Clustered Lagrangian Drifters. Ocean Sciences Meeting. New Orleans, LA. February 2024.
- **Murakami, M.**, Nummelin, A., Galton-Fenzi, B.K., Uotila, P. Clustered Drifters Show that Interaction with the Ice Shelf Meltwater Controls Antarctic Bottom Water Formation in East Antarctica. AGU Fall Meeting. San Francisco, CA. December 2023.

### Poster Presentations

- **Jackson School of Geosciences**. February 2024 Student Research Symposium. "Arctic Ocean Water Mass Transformation in the Arctic Subpolar gyre sTate Estimate (ASTE): Budget Analysis in Temperature-Salinity Space". **Murakami, M.**, Nguyen, A.T., Pillar, H.R., Schulz, K., and Heimbach, P.
- **CAMAS Workshop and Early Career School**. February 2024 Scientific Poster Session. "Arctic Ocean Water Mass Transformation in the Arctic Subpolar gyre sTate Estimate (ASTE): Budget Analysis in Temperature-Salinity Space". **Murakami, M.**, Nguyen, A.T., Pillar, H.R., Schulz, K., and Heimbach, P.
- **TACC Symposium for Texas Researchers**. September 2019 Scientific Poster Session. "A high-performance lattice Boltzmann solver with applications to multiphase flow in porous media" **Murakami, M.**, Bakhshian, S., and Hosseini, S.A.

---

## HONORS AND AWARDS

**Best Undergraduate Poster**, UT Energy Week (2020)

## REFERENCES

Patrick Heimbach  
Professor  
Department of Earth and Planetary Sciences  
The University of Texas at Austin  
Austin, TX 78712  
Phone: (512)232-7694  
Email: [heimbach@oden.utexas.edu](mailto:heimbach@oden.utexas.edu)  
(Current research advisor)

Aleksi Nummelin  
Tenure-track research professor  
Finnish Meteorological Institute  
Helsinki, FI  
Email: [aleksi.h.nummelin@gmail.com](mailto:aleksi.h.nummelin@gmail.com)  
(Graduate research advisor)

Sahar Bakhshian  
Research assistant professor  
Bureau of Economic Geology  
The University of Texas at Austin  
Austin, TX 78713  
Phone: (512)471-2243  
Email: [sahar.bakhshian@beg.utexas.edu](mailto:sahar.bakhshian@beg.utexas.edu)  
(Undergraduate research advisor)