

EDUCATION

Ph.D, Mathematics, University of Oregon. 2025
Advisor: Dev Sinha
M.S, Mathematics, University of Oregon. 2021
B.S.Mathematics, North Dakota State University. 2017
Magna cum laude

PAPERS AND PROJECTS

A forest is more than a bunch of trees: haplotypes in inferred ARGs. Halley Fritze, Peter Ralph, Nathaniel Pope, Ava Bamforth, Jerome Kelleher (in progress 2024).

2Mapper: Inferring topological structure through higher order mapper. Halley Fritze, Dev Sinha (in progress 2024).
[GitHub Repository](#)

Identifying orbits in atmospheric dynamical systems through temporally enriched mapper graphs. Halley Fritze, Dev Sinha, Joshua Dorrington (In progress 2024).

Neutrophil State-space Modeling: Combining morphology and dynamics. Halley Fritze, Bhagirath Mehta, Alexandra Stavrianidi, Arianna Cao, Ishani Mukherji, Dev Sinha, Ronald Davis, Sharada Kalanidhi (In progress 2024).

Embedded Graph Reconstruction Under Hausdorff Noise. Halley Fritze, Sushovan Majhi, Marissa Masden, Atish Mitra, Michael Stickney (2024)
[Extended Abstract](#)

ICML Topological Deep Learning Challenge 2024: Beyond the Graph Domain. PR #48. Halley Fritze, Marissa Masden (2024).
[White Paper](#)
Honorable Mention and Highlighted Submission.

The Erdős Institute Data Science Bootcamp: Foursquare Location Matching. Halley Fritze, Jay Hathaway, Max Vargas (2022).
[GitHub Repository](#)

RESEARCH EXPERIENCE

Stanford University, Remote Employment. 2023–Present
Statistician and Data Scientist at Stanford Genome Technology Center

University of Oregon, Eugene, OR. 2019–Present
Mathematics Department: Graduate Research 2021–Present
Institute of Evolution and Ecology: Kern-Ralph Co-Lab 2022–Present
Institute of Neuroscience: Mazzucato Lab 2022

Sam Houston State University, Huntsville, TX.
NSF Research Experience for Undergraduates Program

Summer 2016

North Dakota State University, Fargo, ND.
Ronald E. McNair Scholar

2015–2017

TEACHING EXPERIENCE

Mathematics Department, University of Oregon.
Instructor of Record for the following courses:

2019–Present

- Introduction to Probability and Statistics (Math 243)
- Calculus I (Math 251)
- Calculus II (Math 252)

Teaching Assistant and Grader for the following courses:

- College Algebra (Math 111)
- Introduction to Probability and Statistics (Math 243)
Lead TA: Fall 2023
- Calculus I (Math 251)
- Stochastic Processes (Math 467/567)
- Applied Mathematics II (Math 607)

Graduate Teaching Assistant, North Dakota State University.
Teaching Assistant and Grader for the following courses:

2017–2019

- College Algebra (Math 103)
- Trigonometry (Math 105)
- College Pre-calculus (Math 107)
- Calculus I (Math 165)
- Calculus II (Math 166)

PRESENTATIONS

Enhanced topological inference through higher dimensional mapper graphs.

AWM Workshop Poster Presentations, Joint Mathematics Meetings, Seattle, WA.

January 2025

Identifying orbits in atmospheric dynamical systems through temporally enriched mapper graphs.

Invited Speaker, Joint Mathematics Meetings, Seattle, WA.

January 2025

Stability of higher-order covers for mapper.

Invited Speaker, Topology and Geometry Seminar, Oregon State University.

November 2024

Embedded graph reconstruction under Hausdorff noise. Fall Workshop in Computational Geometry, Tufts University.	November 2024
Algebraic-topological tools for understanding higher-order structure in neural data. Neuroscience Journal Club, University of Oregon.	November 2024
Towers of Covers and Mapper. Student Topology and Geometry Seminar, University of Oregon.	May 2024
Inference in Hidden Markov Models. Neuroscience Journal Club, University of Oregon.	January 2024
Controllability of Nonlinear Systems. Neuroscience Journal Club, University of Oregon.	November 2023
Persistence Homology, an Overview. Student Topology and Geometry Seminar, University of Oregon.	April 2023
Topological Morphology Descriptors and Neuron Classification. Neuroscience Journal Club, University of Oregon.	March 2023
Topological Data Analysis and Tracking C. Elegans. Student Topology and Geometry Seminar, University of Oregon.	January 2023
Lefschetz Fibrations and Dehn Twists. Topology Geometry Seminar, North Dakota State University	April 2019
From Symplectic Geometry to Chaos. Graduate Colloquium, North Dakota State University	September 2018
Analysis of a Mathematical Model of the Carolina Wolfberry Plant. Applied Mathematics Seminar, North Dakota State University	August 2018

CONFERENCES AND WORKSHOPS ATTENDED

- 31st Annual Fall Workshop on Computational Geometry.** Tufts University, November 2024.
Accepted Abstract: Embedded graph reconstruction under Hausdorff noise.
- Climate Science at the Interface Between Topological Data Analysis and Dynamical Systems Theory.** Java Center, NY, June, 2024.
AMS Mathematics Research Communities Summer Conference.
- Topology and Geometry in Neuroscience.** ICERM, October, 2023.
Workshop in ICERM Semester Program Math+Neuroscience: Strengthening the Interplay Between Theory and Mathematics.
- Simons Laufer Mathematical Sciences Institute Summer Graduate School: Machine Learning.** University of California San Diego, June, 2023.
Topological data analysis and deep learning.
- Simons Laufer Mathematical Sciences Institute Summer Graduate School: From Symplectic Geometry to Chaos.** University of California Berkeley, July, 2018.
Symplectic geometry and dynamics related to the n -body problem.

HONORS AND AWARDS

Marie Vitulli Scholar, University of Oregon.	2019–2020
Ronald E. McNair Scholar, North Dakota State University.	2015–2017

LEADERSHIP, SERVICE AND OUTREACH

Mathematics Directed Reading Program Mentor. University of Oregon Modelling predator-prey systems with Lotka-Volterra equations.	2023–2024
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Mathematics Department Climate Committee. University of Oregon Graduate Student Member	2021–Present
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Graduate Topology and Geometry Seminar. University of Oregon. Organizer	2022–2024
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Association for Women in Mathematics. University of Oregon, Graduate Student Chapter. Vice President	2022–2023
Chair of the Social and Professional Enrichment Committee	2020–2023
Member of the Speaker Series Committee	2023–2024

American Mathematical Society. University of Oregon, Graduate Student Chapter. Founding Member	2020
Member at Large	2020–2021
Department Liason	2023–2024

uCodeGirl. Non-profit Organization. Mentor	2018–2019
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PROFESSIONAL AFFILIATIONS

The Erdős Institute. Member since 2022.
American Mathematical Society. Member since 2021.
Association for Women in Mathematics. Member since 2020.

TECHNICAL SKILLS

Programming Languages:

- Strong Proficiency: Python, \LaTeX
- Some Proficiency: R, Java, C, HTML

Software: ImageJ/Fiji