Kenneth McCabe

Northeastern University, Department of Mathematics, Boston, MA
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Research Interests

Computational geometry and topology, topological data analysis, multiparameter persistent homology, approximation and stability of filtrations, topological dimensionality reduction.

Education

PhD in Mathematics, Northeastern University, Boston, MA 2024–2029 (expected)
Advisor: José A. Perea

MA in Mathematics, University at Albany, SUNY, Albany, NY 2022–2024

BA in Mathematics, University at Albany, SUNY, Albany, NY 2020–2022

Preprints

1. Kenneth McCabe and José A. Perea. *Wasserstein Stability of the Nerve Map.* Submitted. arXiv:2611.15938.
2. Kenneth McCabe. *Lower Bounds for Approximating the Vietoris–Rips Filtration.* Submitted. arXiv:2607.06524.
3. Michael Lesnick and Kenneth McCabe. *Sparse Approximation of the Subdivision-Rips Bifiltration for Doubling Metrics.* arXiv:2408.16716.
4. Michael Lesnick and Kenneth McCabe. *Nerve Models of Subdivision Bifiltrations.* arXiv:2406.07679.

Presentations

Invited Talks

Wasserstein Stability of the Nerve Map Oct. 2026
Applied Topology in Albany (ATiA) Seminar, Albany, NY

Nerve Models of the Subdivision-Rips Bifiltration Mar. 2025
AMS Spring Southeastern Sectional Meeting, Clemson, SC

Nerve Models of the Subdivision-Rips Bifiltration Oct. 2024
AMS Fall Eastern Sectional Meeting, Albany, NY

Contributed Talks

Wasserstein Stability of the Nerve Map Dec. 2026 (upcoming)
Computational Persistence 2026, University of Florida, Gainesville, FL

Lower Bounds for Approximating the Vietoris–Rips Filtration[1] Nov. 2026
Fall Workshop on Computational Geometry, Tufts University, Medford, MA

[1] Peer-reviewed extended abstract available here.

The Shape of Data: An Introduction to Persistent Homology Apr. 2026
Northeastern Graduate Student Seminar, Boston, MA

Sparse Approximation of the Subdivision-Rips Bifiltration for Doubling Metrics Nov. 2024
Applied Topology in Albany (ATiA) Seminar, Albany, NY

Interleavings and Stability of Persistent Homology June 2024
Summer School on TDA & Geometric Invariant Theory, Montréal, QC

Nerve Models of Subdivision Bifiltrations Apr. 2024
UAlbany Graduate Student Seminar, Albany, NY

Computability of the Subdivision-Rips Bifiltration Apr. 2023
UAlbany Showcase Day, Albany, NY

Posters

Wasserstein Stability of the Nerve Map May 2026
ICERM, Brown University, Providence, RI

Shellability: Connection Between Topology and Combinatorics Apr. 2024
UAlbany Showcase Day, Albany, NY

Teaching

Northeastern University (Teaching Assistant)

MATH7241 Probability 1	Fall 2025, Fall 2026
MATH1341 Calculus for Science & Engineering	Summer 2025, Summer 2026
MATH7234 Optimization & Complexity	Spring 2026
MATH4571 Advanced Linear Algebra	Spring 2025
MATH1231 Calculus for Business & Economics	Fall 2024

University at Albany, SUNY (Teaching Assistant)
Mathematics Tutoring Center Fall 2023–Spring 2024
Tutored students in Precalculus, Calculus I & II, and Statistics; assisted with exam grading.

University at Albany, SUNY (Student Grader)
AMAT584 Topological Data Analysis II Spring 2023

Professional Experience

Anthropic (Mathematics Consultant) Feb.–Aug. 2026
Evaluated undergraduate- to research-level mathematics problems, reference solutions, and AI model responses. Verified answers and proofs, flagged errors and ambiguities, and assessed problem difficulty and realism.

Service

Organizer, Northeastern Graduate Student Seminar	Fall 2026
External Reviewer, SODA 2027, ICALP 2026	2025–2026
Referee, *Homology, Homotopy, and Applications*	2025