

Katherine Benjamin

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EDUCATION University of Oxford

DPhil, Mathematics 2021–2025

- Thesis title: Topological data analysis for spatial biology
- Supervisors: Prof. Heather Harrington, Prof. Ulrike Tillmann
- Awards: JT Hamilton Scholarship

MMathCompSci, Mathematics and Computer Science 2017–2021

ARTICLES Preprints

Katherine Benjamin, Aneesha Bhandari, Zhouchun Shang, Yanan Xing, Yanru An, Nannan Zhang, Yong Hou, Ulrike Tillmann, Katherine R. Bull, Heather A. Harrington. *Multiscale topology classifies and quantifies cell types in subcellular spatial transcriptomics*. arXiv:2212.06505. December 2022.

Journal articles

Katherine Benjamin, Lamisah Mukta, Gabriel Moryoussef, Christopher Uren, Heather A. Harrington, Ulrike Tillmann, Agnese Barbensi. *Homology of homologous knotted proteins*. *Journal of the Royal Society Interface* 20(201). April 2023.

Katherine Benjamin. *Sum-free sets which are closed under multiplicative inverses*. *Online Journal of Analytic Combinatorics* 16:08. September 2021.

TALKS Invited talks

AIM-AMS Special Session on Applied Topology Beyond Persistence Diagrams, JMM 2024, San Francisco. January 2024.

Special Session on Nonlinear Algebra and Its Applications, PGMODays, EDF Lab Paris-Saclay. November 2023.

Minisymposium on Higher Order Networks in Complex Systems, ICIAM Tokyo. August 2023.

Minisymposium on Algebraic Methods in Biological Systems, SIAM Conference on Applied Algebraic Geometry, Eindhoven. July 2023.

Topology of Data in Rome, Tor Vergata. September 2022.

Contributed talks

Syennesis to Aristotle, 2400 years on: The implications of the machine learning revolution in medicine for the future of humanities research. Humanities Forward: Opportunities and Challenges for the Next Twenty Years, Oxford. Joint with Jenny Vo-Phamhi. May 2023.

Homology of homologous knotted proteins. British Early Career Mathematicians' Colloquium, Birmingham. July 2022.

Internal talks

Multiscale topology classifies and quantifies cell types in subcellular spatial transcriptomics. Centre for Topological Data Analysis centre meeting, Oxford. September 2023.

Persistent homology in theory and practice. Junior Topology and Group Theory Seminar, Oxford. November 2022.

Workshop tutorials

Topological data analysis tutorial. London Geometry and Machine Learning Summer School. July 2022.

SERVICE Organiser, London Geometry and Machine Learning Summer School 2024

TEACHING Mathematical Institute, University of Oxford

Departmental Tutor

Computational Mathematics

C3.9 Computational Algebraic Topology

Michaelmas Term 2023

Hilary Term 2023

Teaching Assistant

B3.5 Topology and Groups

B1.2 Set Theory

Michaelmas Term 2022

Hilary Term 2022