Jacob D. McErlean

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GRADUATE STUDENT, MATHEMATICS, DUKE UNIVERSITY

CITIZENSHIP	**American**

EDUCATION

Duke University, Durham, North Carolina
Ph.D., **Mathematics**   *Aug 2021 - May 2026 (Expected)*
Certificate in College Teaching
Certificate in Innovation and Entrepreneurship

Boston College, Newton, Massachusetts
B.S., Mathematics   *Aug 2017 - May 2021*
GPA: 3.92/4.0

RESEARCH INTERESTS

High-dimensional and data, statistics, and sampling, manifold learning, signal processing, random matrix theory, applied differential geometry, and applied harmonic analysis with applications to materials science, medical signals, and finance.

PAPERS AND PREPRINTS

1. Unsupervised Ensembling of Multiple Software Sensors with Phase Synchronization: A Robust approach For Electrocardiogram-derived Respiration with J. Malik*, Y.-T. Lin, R. Talmon, and H.-T. Wu. Submitted for publication, Apr 2023. * *co-first author*

2. Lower Bounds on Volumes of Hyperbolic 3-Manifolds via Decomposition with C. Adams, M. Capovilla-Searle, D. Li, Q. Li, A. Simons, N. Stewart, and X. Wang. Preprint uploaded to Arxiv, Nov 2021.

3. Generalized Augmented Cellular Alternating Links in Thickened Surfaces are Hyperbolic with C. Adams, M. Capovilla-Searle, D. Li, Q. Li, A. Simons, N. Stewart, and X. Wang. Preprint uploaded to Arxiv, Jul 2021.

GRANTS, AWARDS, & HONORS

2022	**NSF aiM Graduate Traineeship and Fellowship** ($34,000)
2021	**NSF Graduate Research Fellowship** ($138,000)
2021	**Paul J. Sally, Jr. Distinguished Alumnus prize**, Boston College ($3,000)
2021	**Summa Cum Laude**, Boston College
2020	**Phi Beta Kappa Honor Society - Junior Inductee**, Boston College
2018	**Advanced Study Grant**, Boston College (approx. $3,000)
2017	**Gabelli Presidential Scholarship**, Boston College (approx. $220,000)

TEACHING & GRADING

2023 Fa	**TA**, MATH 465: Introduction to High Dimensional Data Analysis, Duke
2021 Fa	**TA**, MATH 111L: Laboratory Calculus I, Duke
2020 Fa	**TA**, MATH 4445: Combinatorics, Boston College
2020 Fa	**Grader**, MATH 4445: Combinatorics, Boston College
2019 Sp	**Grader**, MATH 2211: Linear Algebra (Honors), Boston College

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CONFERENCES AND WORKSHOPS ATTENDED

2023 July	**Concentration Inequalities and Localization Techniques in High Dimensional Probability and Geometry (SLMath)**
2023 May	**Summer School on Random Matrix Theory and Its Applications (OSU)**

	2023 Feb	**Triangle Area Graduate Mathematics Conference** (TAGMaC), Duke
	2022 Jun	**Sampling Methods and Inverse Problems**, Duke
	2021 Nov	**Triangle Area Graduate Mathematics Conference** (TAGMaC), Duke
	2020 Jul	**REU Conference**, UConn

Under-graduate Mentoring

2021 Fa	**Twoples** mentor for Bowen Li (Carleton) in Discrete Morse Theory

Service to the Profession

2021-23	**Officer**, Duke SIAM Chapter
2023	**Co-organizer**, Triangle Area
2021	**Co-organizer**, Triangle Area Graduate Mathematics Conference (TAGMaC)
2020	**Social Chair**, SMALL REU
2020-21	**Executive Board Member**, Boston College Mathematics Society
2018-20	**Tutor**, Boston College Mathematics Department

Diversity, Inclusion and Equity Work

2021	**Teaching for Equity**, anti-racism in teaching workshop, Duke
2020	**Faces**, general anti-racism workshop, Boston College

Outreach

2018	**Volunteer Tutor**, Suffolk County House of Corrections at South Bay

Relevant Skills

Human Languages: English (Native), **German** (B1), **Portuguese** (Novice)
Computer Languages: Python (Proficient), MATLAB (Proficient), R(Novice), Git (Novice), C++ (Novice)