IAN MCPHERSON

imcpher1@jh.edu

EDUCATION

Johns Hopkins University *August 2022 - Present*
Ph.D. in Applied Mathematics and Statistics (GPA: 4.0)
Research Advisors: Mauro Maggioni and Mateo Díaz

Tufts University *August 2020 - May 2022*
M.Sc. in Pure Mathematics: Probability and Computation (GPA: 4.0)

Occidental College *August 2015 - May 2019*
B.A. in Biochemistry & Economics

RESEARCH INTERESTS

Riemannian Optimization, Statistical Optimal Transport, Wasserstein Gradient Flows, Manifold Learning

RESEARCH PROJECTS

Papers In Preparation:
Ian McPherson, Mauro Maggioni. *Computing Barycenters on Unknown Wasserstein Submanifolds*.
Ian McPherson, Benjamin Grimmer, Mateo Díaz. *Convergence Rates for Riemannian Proximal Bundle Methods*.
Ian McPherson, Luhao Zhang, Rui Gao. *Neural Network Approach for Discrete Time Portfolio Optimization.*

In Progress:
Pedro Izquierdo Lehmann, **Ian McPherson**, Mateo Díaz, Clément Royer. *Scalable SDP Project*

CONFERENCES AND WORKSHOPS

September 2025	*Funded* for **Mathematical Aspects of Data Science Summer School** (at EFPL)
	Poster: Computing Empirical Barycenters on Unknown Wasserstein Submanifolds
August 2025	*Funded* for **Princeton Machine Learning Theory Summer School**
	Poster: Computing Empirical Barycenters on Unknown Wasserstein Submanifolds
July 2025	**International Conference on Continuous Optimization** (ICCOPT)
	Talk: Riemannian Proximal Bundle Methods
April 2025	**SIAM Conference on Applied Mathematics**
	Poster: Computing Empirical Barycenters on Unknown Wasserstein Submanifolds
March 2025	Funded for **Statistics and Optimal Transport Workshop** at *Colombia University*
	Poster: Computing Empirical Barycenters on Unknown Wasserstein Submanifolds
December 2024	Funded for **Optimization Workshop** at *Universidad de Los Andes*
	Poster: Computing Empirical Barycenters on Unknown Wasserstein Submanifolds
August 2024	Funded for *Princeton Machine Learning Theory* Summer Graduate School
June 2024	Funded for **SLMath (UC Berekley) Summer Graduate School**
	Interacting Particle Systems: Analysis and Computation
May 2024	Funded **ICERM (Brown University) Workshop Participant**
	Interacting Particle Systems: Analysis, Control, Learning and Computation
June 2023	Funded **ICERM (Brown University) Workshop Participant**
	Modern Applied and Computational Analysis
May 2023	Funded **ICERM (Brown University) Workshop Participant: Optimal Transport**
January 2023	**Joint Mathematical Meetings Annual Conference**

TALKS

July 2025	"Convergence Rates for Riemannian Proximal Bundle Methods", *ICCOPT*, USC
April 2025	"Convergence Rates for Riemannian Proximal Bundle Methods", *Jr. Mathematical Institute of Data Science (MINDS) Seminar*, JHU
April 2025	"Convergence Rates for Riemannian Proximal Bundle Methods", *University of Wisconsin-Madison SIAM Student Seminar*, UW-Madison
March 2025	"Convergence Rates for Riemannian Proximal Bundle Methods", *Applied Mathematics and Statistics Student Seminar*, JHU
October 2024	"Empirical Wasserstein Barycenters: Riemannian Optimization Guarantees", *Applied Mathematics and Statistics Student Seminar*, JHU
January 2024	"Riemannian Optimization and Wasserstein Barycenters", *Applied Mathematics and Statistics Student Seminar*, JHU

AWARDS AND SCHOLARSHIPS

Duncand Research Fund Grant *September 2024*
Funding to attend Summer School at EFPL

Whiting School of Engineering Teaching Assistant Award *April 2024*
Sole Recipient across WSE for 2024, in recognition of excellence and talent as a graduate TA.

Rufus P. Isaacs Graduate Fellowship *Fall 2023-Spring 2024*

PROFESSIONAL SERVICE AND COMMUNITY INVOLVEMENT

Fall 2025	Mathematics of Operations Research Journal Referee (1)
Summer 2025	ICCOPT - Session Chair: Optimization on Manifolds and Geometric Approaches
Fall 2023 - Spring 2024	Graduate Student Seminar Co-organizer
Fall 2023	Foundations of Data Science Journal Referee (1)
Fall 2023	Ph. D. Committee Member for an External Review of JHU's AMS Department

TEACHING

Johns Hopkins University

Fall 2025	**Teaching Assistant** EN.553.747 Mathematics of Data Science for *Mateo Díaz* Ph.D level course on topics in high-dimensional statistics, optimization, and geometry
Fall 2024	**Instructor of Record** EN.500.111 Geometric Toolbox for Data Science Designed a survey course in Geometric Methods for High Dimensional Statistics.
Fall 2024	**Teaching Assistant** EN.553.634 Elements of Statistical Learning Undergraduate/graduate level course on the theory behind statistical learning
Summer 2024	**Instructor** Master's Program Probability Review Designed and gave a review series on probability fundamentals for incoming Master's students
Spring 2024	**Teaching Assistant** 553.738 for Professor *Mauro Maggioni* Graduate-level course on High-Dimensional Approximation, Probability, and Statistical Learning
Fall 2023	**Teaching Assistant** 553.632 for Professor *Sergey Kushnarev* Undergraduate/graduate-level course on Bayesian statistics
Summer 2023	**Instructor** Master's Program Probability Review Designed and gave a review series on probability fundamentals for incoming Master's students
Spring 2023	**Teaching Assistant** 553.681 Numerical Analysis for Professor *Mario Micheli* Undergraduate/graduate-level course on numerical analysis
Fall 2022	**Teaching Assistant** 553.691 Dynamical Systems for Professor *Yannis Kevrekedis* Undergraduate/graduate-level course on nonlinear dynamical systems

Tufts University

Summer 2022	**Teaching Assistant and Guest Lecturer** Math 70 Linear Algebra for *Curtis Heberle* Undergraduate introduction to linear algebra, giving five guest lectures
Spring 2022	**Teaching Assistant** Math 166 Statistics for Professor *Bruce Boghosian* Undergraduate mathematical statistics introduction
Fall 2021	**Teaching Assistant** Math 126 Numerical Linear Algebra for Professor *Abiy Tassisa* Undergraduate introduction to numerical linear algebra
Summer 2021	**Teaching Assistant and Guest Lecturer** Math 21 Introductory Statistics for *Linda Garant* Undergraduate introduction to statistics, giving four guest lectures

EXPERIENCE

MIT Lincoln Laboratories - Group 33 May 2022 - August 2022
Research Intern *Lexington, MA*

- Obtained DoD Security Clearance: Secret Level
- Developed algorithms for the classification of RF signals in Python.
- Verified the well-posedness of a MILP Battle Management Optimization problem, and compared and contrasted different MILP solvers within MATLAB.
- Field work in White Sands Missle Range for testing different radar array parts, as well as assisting with the teardown and packaging of a few sites.

Tufts University's Data Intensive Studies Center January 2022 - May 2022
DISC Research Intern *Medford, MA*

- Research assistant to Dr. Abani Patra, working on understanding and implementation of Markov Random Fields with an eye towards analysis of polar caps.

Tufts University's Math Department May 2021 - August 2021
Research Assistant *Medford, MA*

- Research assistant to Dr. Kasso Okoudjou, working with a set of orthogonal polynomials on the Sierpinski Gasket with an eye towards producing analogs to the Legendre Polynomials on the unit interval.

TECHNICAL QUALIFICATIONS

Proficient Coding Languages MATLAB, Python, Java, LaTeX.

HOBBIES

Dancing and choreographing, long distance running, rock climbing, and cooking.