Mitchell T. Scott **Curriculum Vitae**

CONTACT INFORMATION

Department of Mathematics
Tufts University
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EDUCATION

Tufts University, Medford, Massachusetts, USA
M.S., Department of Mathematics, expected in May 2023
Concentration: Computational and Applied Mathematics
Advisor: Professor Xiaozhe Hu

Cornell University, Ithaca, New York, USA
Bachelor of Science, *Department of Biological Engineering*, December 2020
Concentration: Computational Biological Engineering
Minor(s): Pure Mathematics, Applied Mathematics
Advisor: Professor Buz Barstow
Senior Thesis: Designing and Optimizing a Protocol for Whole-Ovary Vitrification

RESEARCH INTERESTS

Applied Numerical Linear Algebra/ Numerical Analysis

Scientific Computing

Computational Fluid Dynamics

System Biology

ON-GOING RESEARCH

Structured matrices, arising from the abstraction of real world physical systems modelled by discretized fractional partial differential equations, are prevalent in fluid dynamics, computational finance, and image processing. Current ways to store and solve problems using these matrices can be slow. My current reseach is interested in finding ways that exploit hidden structure so that we can minimize storage and computational time. Through taking these matrices with block structure that arise in natural phenomenon, turning them into a tensor, and using tensor based decompositions, we find a way that can not only make a more robust preconditioner, it can also reduce the storage needed.

CONFERENCES, WORKSHOPS AND TALKS

Invited Talks:

- *Discovering Hierarchical Matrix Structure Through Recursive Tensor Decomposition* : Joint Mathmatics Meeting, Boston, MA, January 4, 2023.
- *Tensors and Tensor Decompositions*: Boston College Undergraduate Mathematics Club, Chestnut Hills, MA, October XX, 2022.
- *Introduction to Multilinear Algebra*: Mathematics Association of America - Boston University Chapter, Boston, MA, October XX, 2022.
- *It's Tensor Time!: A Computational Framework for Analyzing Structured Matrices*: Tufts Organization of Graduate Students in Mathematics, Medford, MA, Sept. 12, 2022.

- *Representation Schemas for Visualizing Quantum Algoroithms*: Quantum Computing Reading Group, Medford, MA, April 11, 2022.
- *Special Families of Matrices used in Quantum Algorithms*: Quantum Computing Reading Group, Medford, MA, February 28, 2022.

Workshops and Conferences Attended

- Joint Mathmatics Meeting, Boston, MA, January 4, 2023.
- Geometry and Analysis Seminar for Boston Area Graduate Students, Massachusetts Institute of Technology, Cambridge, MA, October 29-30, 2022
- Qiskit Global Summer School 2022: Quantum Simulations July 18-29,2022
- Geometry and Analysis Seminar for Boston Area Graduate Students, Massachusetts Institute of Technology, Cambridge, MA, November 6-7, 2021

Teaching Experience

Tufts University

Directed Reading Program Mentor

- Intoduction to Mathematical Control Theory (Fall 2022)

Course Assistant:

- Math 125 - Numerical Analysis (Fall 2022)
- Math 32 - Calculus I (Spring 2022)

Cornell University

Undergraduate Teaching Assistant:

- BEE 2600 - Introduction to Biological Engineering (Fall 2018)

Honors and Awards

The Fuertes Medal Memorial Prize for Public Speaking, Cornell University, College of Engineering, 2020.

Memberships

American Mathematical Society (AMS)

Society for Industrial and Applied Mathematics (SIAM)

Departmental Service

Member: Tufts Organization of Graduate Students in Mathematics, 2021-2023.

Member: Society for Industrial and Applied Mathematics, Tufts University Chapter, 2021-2023.

Relevant Courses

Tufts University

- Mathematical Modeling, Real Analysis I-II, Abstract Algebra I, Numerical Analysis, Partial Differential Equations I, Analysis I

Cornell University

- Numerical Linear Algebra, Chaos and Nonlinear Dynamics, Game Theory, Computational Algebra, Applied Complex Analysis, PDEs, Fluid Mechanics, Number Theory, Heat and Mass Transfer, Probability and Statistics, Calculus I-III, Linear Algebra, Ordinary Differential Equations

Language Skills

English: native speaker

French: reading proficiency, basic conversation

Programming: MATLAB, JULIA, PYTHON

Computer: LaTeX, Microsoft Office, HTML