Elena Axinn **Curriculum Vitae**

CONTACT INFORMATION

Department of Mathematics
University of Michigan

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EDUCATION

University of Michigan
PhD in Applied and Interdisciplinary Mathematics

Tufts University
Bachelor of Science in Mathematics (2024)
Magna Cum Laude

RESEARCH INTERESTS

Nonlinear dynamical systems, especially applications to biology.

PROJECTS

Senior Thesis: Biases Among Prime and Prime-like Numbers

- Proved the fact of infinitely many prime numbers in unique modular classes
- Described prominent biases and extended predictions to squarefree numbers and Mersenne numbers

IUREU (Indiana University): Probability of Tree Changes in the Ancestral Recombination Graph (ARG)

- Studied coalescent process to recreate phylogenetic trees using both ARG and SMC/SMC' algorithms
- Wrote original formulas to describe probability of distinct types of tree changes

VERSEIM-REU (Tufts University) Orthogonal Polynomials on Bubble-Diamond Fractals

- Studied fractal calculus analogs on Sierpinski Gasket, including an introduction to advanced mathematical fields like measure theory and topology
- Reconstructed fractal calculus on a new family of fractals called bubbles with the intent to produce a result relevant to quantum computing

Lean Proof Assistant Project: Bernoulli Numbers in Lean's Mathlib

- Translated proof statements from basic number theory into Lean software
- Entered original proofs about properties of Bernoulli numbers into Lean library

Research Assistant: Office of Institutional Research

- Create coding schemes to organize data from 100-500+ respondents per survey
- Produce formatted Excel tables of sorted data for use in university planning and decision making

Conferences, Workshops and Talks

Talks:

- *The Coalescent With Recombination*: Indiana REU Conference, Indianapolis, Indiana, July 26, 2023.
- *Introduction to Control Theory*: Tufts Directed Reading Program Symposium, Medford, Massachusetts, December 8, 2022.
- *Orthogonal Polynomials on the Bubble Fractal Family*: VERSEIM-REU Symposium, Medford, Massachusetts, August 10, 2022.

Contributed Posters:

- *Orthogonal Polynomials on the Bubble Fractal Family.* Joint Mathematics Meeting, Boston, MA, January 2-7 2023.
- *Lean as a Proof Assistant.* Tufts Undergraduate Research Symposium, Medford, MA, May 3, 2022.

Workshops and Conferences Attended:

- Indiana REU Conference, Indianapolis, Indiana, July 26 2023.
- Joint Mathematics Meeting, Boston, Massachusetts, January 2-7 2023.
- Xena Project Undergraduate Workshop, Imperial University, London, England, September 26-30 2022.
- 7th Cornell Conference on Analysis, Probability, and Mathematical Physics of Fractals, Cornell University, Ithaca, New York, June 4-8 2022.

Teaching Experience

Instructor: Calculus 1

Solely responsible for lectures, quizzes, and exam preparation for 20 students. Highly conceptual questions with Inquiry-Based Learning model.

Instructor: Math Corps

Through the University of Michigan Math Corps, guided a group of 10 middle schoolers from Ypsilanti, a suburb of Detroit. Also lead their 5 high school mentors. Was responsible for both emotional connection and academic progress.

Grader: Differential Equations

Evaluate common mistakes to create a comprehensive rubric to grade 120 weekly problem sets. Course was MATH0051 Differential Equations, graded from Fall 2022 to Spring 2024.

Memberships

Society for Industrial and Applied Math (SIAM)

American Math Society (AMS)

Association for Women in Math (AWM)

Computer Skills

MATLAB, Python, Lean