

CONTACT INFORMATION	Department of Mathematics University of Michigan <i>Cell:</i> (734) 255-8806 <i>Email:</i> eaxinn@umich.edu
EDUCATION	University of Michigan PhD in Applied and Interdisciplinary Mathematics (Expected 2029) Dissertation: <i>Optimization of Noisy ODE Models for Polyphasic Rodent Sleep</i> Advisor: Professors Victoria Booth and Denise Kirschner University of Michigan MS in Applied and Interdisciplinary Mathematics (2026) Tufts University BS in Mathematics (2024) Magna Cum Laude
INTERESTS	Stochastic optimization, inverse problems, parameter estimation, algorithm design.
PUBLICATIONS	Axinn, E. et al. “Orthogonal Polynomials on Bubble-Diamond Fractals.” <i>Complex Analysis and Operator Theory</i> , 2025.
RESEARCH EXPERIENCE	Gradient-based Optimization of Noisy ODE Models <i>2024–present</i> <i>University of Michigan · Advisor: Professor Victoria Booth</i> • Developing a gradient-based parameter inference pipeline in PyTorch to calibrate a stochastic ODE model of polyphasic rodent sleep-wake dynamics against empirical EEG/EMG recordings • Designed a domain-informed summary statistic loss function, resolving fundamental optimization disconnects present in Maximum Mean Discrepancy-based approaches for high-dimensional stochastic time series • Automated hyperparameter optimization using Optuna’s Tree-structured Parzen Estimator, reducing search time from weeks to ~20 hours of compute • Applied iterative density-based calibration (CaliPro) and Neural Spline Flow simulation-based inference to characterize posterior distributions over model parameters and reduce parameter search space by 88% Probability of Tree Changes in the Ancestral Recombination Graph <i>Summer 2023</i> <i>Indiana University REU</i>

- Derived closed-form expressions for transition probabilities of genealogical tree topologies under the ancestral recombination graph using martingale and Markov chain methods
- Characterized long-run distributional behavior of tree change events as a function of recombination rate

Orthogonal Polynomials on Bubble-Diamond Fractals *Summer 2022*
Tufts University VERSEIM REU

- Published in *Complex Analysis and Operator Theory* (2025)
- Constructed orthogonal polynomial bases and analyzed spectral properties on Sierpinski-type fractal geometries using fractal calculus analogs

PROJECTS

WNBA Player Valuation and Salary Cap Optimization *Summer 2026*
Erdős Institute Data Science Boot Camp · Awarded With Distinction

- Built a Random Forest regression model to predict WNBA player fair market value (FMV) salaries from on-court performance statistics, trained on 2021–2024 seasons and evaluated on a 2025 holdout set (RMSE: \$41,368; R^2 : 0.634)
- Engineered features from player advanced statistics, per-game production, and team context across 965 player-season records; performed contract-group-stratified model evaluation to account for CBA salary floor constraints
- Constructed a team-level Cost Per Win (CPW) framework comparing actual versus model-implied roster spending efficiency across all 2025 WNBA teams
- Automated hyperparameter tuning via cross-validated grid search; compared Random Forest against five baseline models including Ridge Regression and Gradient Boosting

CONFERENCES,
WORKSHOPS AND
TALKS

Talks:

- *Gradient-based Optimization of Noisy ODE Models for Polyphasic Rodent Sleep*: 2025 Fall Eastern Virtual Sectional Meeting (contributed talk), October 25, 2025.
- *Gradient-based Optimization of Noisy ODE Models for Polyphasic Rodent Sleep*: Applied and Interdisciplinary Math Departmental Seminar, University of Michigan, September 26, 2025.
- *The Coalescent With Recombination*: Indiana REU Conference, Indianapolis, IN, July 26, 2023.
- *Introduction to Control Theory*: Tufts Directed Reading Program Symposium, Medford, MA, Dec 8, 2022.
- *Orthogonal Polynomials on the Bubble Fractal Family*: VERSEIM-REU Symposium, Medford, MA, Aug 10, 2022.

Contributed Posters:

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

Workshops and Conferences Attended:

- 2025 Fall Eastern Virtual Sectional Meeting, Virtual, October 2025.
- Indiana REU Conference, Indianapolis, IN, July 2023.
- Joint Mathematics Meeting, Boston, MA, Jan 2023.
- Xena Project Undergraduate Workshop, Imperial University, London, UK, Sept 2022.
- Cornell Conference on Analysis, Probability, and Mathematical Physics of Fractals, Ithaca, NY, June 2022.

TEACHING
EXPERIENCE

Instructor of Record: Calculus I and Precalculus

2024–2026

University of Michigan

- Sole instructor for sections of 20 students; independently designed and delivered lectures, quizzes, and exams

Grader: Differential Equations

2024

University of Michigan

- Evaluated 120 weekly problem sets; developed detailed rubrics to reinforce conceptual understanding

LEADERSHIP AND
SERVICE

Executive Board Member, Association for Women in Mathematics, University of Michigan Chapter *2024–present*

MEMBERSHIPS	Society for Industrial and Applied Mathematics (SIAM)
	American Mathematical Society (AMS)
	Association for Women in Mathematics (AWM)
COMPUTER SKILLS	MATLAB, Python (NumPy, SciPy, PyTorch), High-Performance Computing (Great Lakes Cluster), Lean, GitHub, L ^A T _E X