

Zachary James McNulty

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EDUCATION University of California, Berkeley

Ph.D. Candidate in Applied Mathematics

- Advisor: Steven Evans; interests: stochastic processes, random trees, statistical learning

Graduate Certificate in Applied Data Science

University of Washington, Seattle

2020

B.S. Applied Math (Discrete Math & Algorithms); 3.98/4 summa cum laude

Relevant Coursework: Statistical learning theory, random matrices, stochastic processes, high-dimensional probability, convex optimization, random graphs. [Full list.](#)

SKILLS Languages: Python, C++, Bash/Unix, SQL

Systems: git, Docker, Linux

EXPERIENCE **Jane Street Capital**, Quantitative Research Intern

Summer 2025

- Designed sequential statistical decision rules based on e-processes for change detection and A/B testing, enabling valid inference with controlled false positive rates under continuous monitoring.
- Built custom EDGAR ingestion pipeline for SEC 10-K/10-Q filings; constructed LLM-based knowledge graphs and evaluated graph embeddings for downstream ML tasks.

Five Rings Capital, Quantitative Research Intern

Summer 2024

- Analyzed high-frequency limit order book data to study market microstructure and short-horizon price dynamics surrounding economic events.
- Trained statistical prediction models and constructed a simulated execution framework to evaluate trading performance, transaction-cost sensitivity, and robustness.

UCB Evans Research Group, Graduate Student Researcher

2022+

- Developed limit theory for combinatorial stochastic processes, including graphons, negatively reinforced Markov processes, and entropy-regularized stochastic control systems.
- Derived convergence-rate and sample-complexity guarantees for phylogenetic inference procedures, including ASTRAL and related coalescent-based models.

UW Shea-Brown Lab, Undergraduate Researcher

2018-2020

- Studied ability of recurrent neural networks to extract low-dimensional representations of latent variables in predictive learning tasks; implemented neural networks and dimensionality reduction methods in TensorFlow/Keras.
- Implemented machine learning workflows on remote GPU clusters; Worked with HPC environments incorporating shared and distributed memory parallel computing systems.

Center for Reproducible Biomedical Modeling, Summer Intern

Summer 2018

- Maintained a Docker-based JupyterHub environment on remote Linux servers to support reproducible computational biology workflows and interactive research tutorials.
- Formulated reproducibility guidelines and containerized examples for scientific modeling pipelines, including persistent data-management and deployment practices.

PAPERS Z. McNulty, *An Improved Bipartition Cover Bound for the Multispecies Coalescent Model*, submitted to *Bulletin of Mathematical Biology*; arXiv:2604.09509, 2025.

Z. McNulty and D. Raban, *Self-Balancing Sequential Sampling: Fast Convergence with Controlled Predictability*, arXiv:2607.20818, 2026.

Z. McNulty, *Diffusion Limits in Entropy-Regularized Stochastic Optimal Control*, in preparation.