

Anming Gu

CONTACT INFORMATION	gu.anming106@gmail.com anminggu.github.io
RESEARCH INTERESTS	Foundations of Machine Learning, Algorithms and Theory of Computation, Stochastic Calculus, Optimal Transport I'm interested in applying tools in theoretical computer science (e.g. Boolean Fourier analysis and pseudorandomness) and mathematics (e.g. stochastic calculus and analysis) to prove theoretical results on machine learning algorithms and architectures.
EDUCATION	Boston University Boston, MA B.A. in Computer Science, Minor in Mathematics Expected May 2024 GPA: 3.96/4.00
HONORS AND AWARDS	Putnam Math Competition Top 35% 2022 3x AIME Qualifier 2017, 2019, 2020 USA Biology Olympiad Top 30 2020 4x USA Biology Olympiad Semifinalist 2017 – 2020 British Biology Olympiad Gold Medal 2019, 2020 University of Toronto Biology Competition International 18th Place 2019
RESEARCH EXPERIENCE	Chien Lab, Boston University Boston, MA <i>Research Assistant, supervised by Prof. Edward Chien</i> Sept 2020 – Present <ul style="list-style-type: none">Undergraduate Research Opportunity Program (Spring 2021, Fall 2021), Honors Thesis I & II (Expected Fall 2023, Spring 2024).Optimal transport and spectral graph theory for k-mixup regularization in deep learning.Optimal transport, stochastic calculus, and mean-field Langevin dynamics for trajectory inference of probability distributions and particle filters. Independent Research Boston, MA <i>Primary Researcher</i> March 2023 – Present <ul style="list-style-type: none">Bernstein polynomial approximation, real analysis, topology, and probability theory for Fourier analysis of Boolean functions.
PUBLICATIONS	Manuscripts K. Greenewald, A. Gu , M. Yurochkin, J. Solomon, E. Chien. k-Mixup Regularization for Deep Learning via Optimal Transport. arXiv preprint: arXiv:2106.02933 .
PRESENTATIONS	k-Mixup Regularization for Deep Learning via Optimal Transport Boston University SIAM, March 2023
ACADEMIC PROJECTS	American Option Pricing via Particle Filters Created American option pricing algorithms in Python under stochastic volatility and jump-diffusion models using Monte Carlo simulation and particle filters, (Financial Econometrics, Spring 2023). λ-Calculus Compiler Wrote a type-checker and compiler for a λ -calculus language to the C language, (Functional

Compilers, Fall 2022).

Monte Carlo Geometry Processing

Implemented Monte Carlo algorithms in C++ to solve linear elliptic PDEs on triangle meshes following the paper [[Monte Carlo Geometry Processing: A Grid-Free Approach to PDE-Based Methods on Volumetric Domains](#)], (Geometry Processing, Spring 2022).

Hypergraph Expanders from Cayley Graphs

Explored spectral graph theory and expander graphs in the context of hypergraphs. Wrote an exposition on the paper [[Hypergraph expanders of all uniformities from Cayley graphs](#)], (Mathematical Methods for Theoretical Computer Science, Spring 2022).

TEACHING EXPERIENCE

Boston University

Boston, MA

- Teaching Assistant: Analysis of Algorithms (Spring 2022)
- Grader: Analysis of Algorithms, Linear Algebra, Honors Differential Equations, Calculus II (Fall 2021)

INDUSTRY EXPERIENCE

Amazon

Sunnyvale, CA
Summer 2023

Software Development Intern

BU Spark!

Boston, MA
Spring 2023

Machine Learning Engineer Intern

Capital One

McLean, VA
Summer 2022

Software Engineering Intern

SKILLS

- **Languages:** Python, C/C++, OCaml, Java, Bash, MATLAB
- **Technologies:** PyTorch, TensorFlow, Pandas, Jupyter Notebook
- **Other:** Linux, Git/Github, \LaTeX , Make

GRADUATE COURSEWORK

- **Upcoming:** Complexity Theory, Stochastic Calculus, Algebraic Topology, Game Theory
- **Theory:** An Algorithmist's Toolbox
- **ML/AI:** Machine Learning, Artificial Intelligence, Deep Learning
- **Software:** Functional Compilers
- **Applications:** Geometry Processing
- **Pure Mathematics:** Functional Analysis
- **Economics & Finance:** Financial Econometrics