

# Anming Gu

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CONTACT INFORMATION	<a href="mailto:gu.anming106@gmail.com">gu.anming106@gmail.com</a> <a href="https://anminggu.github.io">anminggu.github.io</a>	
RESEARCH INTERESTS	Foundations of Machine Learning, High-Dimensional Statistics, Stochastic Calculus, Optimal Transport  I'm interested in applying tools in theoretical computer science, high-dimensional statistics, and mathematics to prove theoretical results on machine learning algorithms and architectures. Currently, I'm especially passionate about optimal transport, mathematical analysis, and stochastic calculus.	
EDUCATION	<b>Boston University</b> B.A. in Computer Science, Minor in Mathematics Honors in Major (Thesis) GPA: 3.96/4.0	Boston, MA Expected May 2024
HONORS AND AWARDS	Putnam Math Competition Top 35% 3x AIME Qualifier USA Biology Olympiad Top 30 University of Toronto Biology Competition International 18th Place	2022 2017, 2019, 2020 2020 2019
RESEARCH EXPERIENCE	<b>Chien Lab, Boston University</b> <i>Research Assistant, supervised by Prof. Edward Chien</i> <ul style="list-style-type: none"><li>• Undergraduate Research Opportunity Program (Spring 2021, Fall 2021)</li><li>• Honors Thesis I &amp; II (Fall 2023, Spring 2024)</li><li>• Optimal transport for k-mixup regularization in deep learning.</li><li>• Optimal transport, stochastic calculus, calculus of variations, and mean-field Langevin dynamics for latent trajectory inference of probability distributions.</li></ul>	Boston, MA Sept 2020 – Present
PUBLICATIONS	<b>Journals</b> K. Greenewald, A. Gu, M. Yurochkin, J. Solomon, E. Chien. <b>k-Mixup Regularization for Deep Learning via Optimal Transport</b> . <i>Transactions on Machine Learning Research</i> , 2023. <a href="https://arxiv.org/abs/2106.02933">arXiv: 2106.02933</a> .	
PRESENTATIONS	<b>k-Mixup Regularization for Deep Learning via Optimal Transport</b> Boston University SIAM, March 2023	
TEACHING EXPERIENCE	<b>Boston University</b> <ul style="list-style-type: none"><li>• CS332: Theory of Computation</li><li>• CS320: Concepts of Programming Languages</li><li>• CS330: Analysis of Algorithms</li></ul>	Boston, MA Spring 2024 Fall 2023 Spring 2022
INDUSTRY EXPERIENCE	<b>Amazon</b> <i>Software Engineer Intern</i>  <b>Capital One</b> <i>Software Engineer Intern</i>	Sunnyvale, CA Summer 2023  McLean, VA Summer 2022

## SKILLS

- **Languages:** Python, C/C++, OCaml, Java, Bash, MATLAB
- **Technologies:** PyTorch, TensorFlow, Pandas, Jupyter Notebook
- **Other:** Linux, Git/Github, L<sup>A</sup>T<sub>E</sub>X, Make

## ACADEMIC PROJECTS

### Smoothed Complexity of Nash Equilibria

Explored algorithmic game theory and smoothed complexity. Wrote an exposition on the paper [[Smoothed Complexity of 2-player Nash Equilibria](#)], Complexity Theory, Fall 2023.

### American Option Pricing via Particle Filters

Implemented American option pricing algorithms in Python under stochastic volatility and jump-diffusion models using Monte Carlo simulation and particle filters, Financial Econometrics, Spring 2023.

### $\lambda$ -Calculus Compiler

Wrote a type-checker and compiler for a  $\lambda$ -calculus based language to the C language via A-normal form and closure conversion, Functional Compilers, Fall 2022.

### Hypergraph Expanders from Cayley Graphs

Explored spectral graph theory and expander graphs for hypergraphs. Wrote an exposition on the paper [[Hypergraph Expanders of All Uniformities from Cayley Graphs](#)], Mathematical Methods for Theoretical CS, Spring 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.

## GRADUATE COURSEWORK

- **Theory:** Complexity Theory, Mathematical Methods for Theoretical Computer Science, *Advanced Optimization Theory*
- **ML/AI:** Machine Learning, Artificial Intelligence, Deep Learning, *Mathematics of Deep Learning*
- **Mathematics/Statistics:** Functional Analysis, Stochastic Calculus, *PDEs, Stochastic PDEs*
- **Other:** Functional Compilers, Geometry Processing, Financial Econometrics

[*Current*]