

Anming Gu

CONTACT INFORMATION	gu.anming106@gmail.com anminggu.github.io
RESEARCH INTERESTS	optimal transport, sampling and optimization, differential privacy, machine learning theory, theoretical computer science, statistics
EDUCATION	Boston University Boston, MA GPA: 3.97 / 4.0 (<i>summa cum laude</i>) Sept 2020 – May 2024 B.A. in Computer Science, Minor in Mathematics Honors in Major (Thesis with defense) Thesis: <i>Latent Trajectory Inference with Drift Prior</i> (slides) Committee: Edward Chien, Kristjan Greenewald, Mark Bun
HONORS AND AWARDS	BU, CS Convocation Student Speaker (video) 2024 BU, Department of CS College Prize 2024 Undergraduate Research Opportunity Program (UROP) funding 2021
PUBLICATIONS	($\alpha\beta$) denotes alphabetical, * denotes equal contribution [2] A. Gu , E. Chien, K. Greenewald. <i>Partially Observed Trajectory Inference using Optimal Transport and a Dynamics Prior</i> . International Conference on Learning Representations 2025. arXiv: 2406.07475 . Preliminary version in OPT Workshop on Optimization for Machine Learning 2024. [1] K. Greenewald, A. Gu , M. Yurochkin, J. Solomon, E. Chien. <i>k-Mixup Regularization for Deep Learning via Optimal Transport</i> . Transactions on Machine Learning Research 2023. arXiv: 2106.02933 .
RESEARCH EXPERIENCE	Chien Lab, Boston University Boston, MA <i>Research Assistant</i> Sept 2020 – Present <ul style="list-style-type: none">Working on optimal transport for machine learning with Ed Chien, Assistant Professor @ BU and Kristjan Greenewald, Research Scientist @ IBM.<i>k-mixup regularization</i>: Generalized the mixup regularization technique using optimal transport. Ran experiments on a variety of architectures and datasets. Publication [1].<i>Latent trajectory inference</i>: Proposed an algorithm to recover a latent path-space distributions from observed marginal distributions. Proved theoretical guarantees of the method using optimal transport, stochastic calculus, and variational calculus. Publication [2].<i>Differentially private Wasserstein barycenter</i>: Using the Johnson-Lindenstrauss and DP-SGD for private Wasserstein barycenter algorithms.<i>Differentially-private trajectory inference</i>: Continuous-time private synthetic data generation via trajectory inference. External Research Remote With Marc Finzi, Post-doc @ CMU Apr 2024 – Jun 2024 <ul style="list-style-type: none">Ran experiments to test a novel empirical Freedman-type martingale concentration inequality for LLM generalization bounds. With Vishwak Srinivasan, PhD student @ MIT Aug 2024 – Oct 2024

	<ul style="list-style-type: none"> Analyzed the convergence of the unadjusted Langevin algorithm for sampling on Riemannian manifolds in Rényi divergence. Proved guarantees when the stationary distribution satisfies a log-Sobolev or Poincaré inequality. 	
	With Atsushi Nitanda, Principal Scientist @ A*STAR, Singapore	Oct 2024 – Present
	<ul style="list-style-type: none"> Analyzing the convergence of the mean-field Langevin dynamics and its discretization under a uniform Poincaré inequality. Verbally offered PhD research internship at A*STAR. 	
TALKS	Mean-Field Langevin Dynamics: Convergence under a Poincaré Inequality Boston University Algorithms and Theory Seminar	(scheduled) February 2025
	k-Mixup Regularization for Deep Learning via Optimal Transport Boston University SIAM	March 2023
TEACHING EXPERIENCE	Boston University, Department of Computer Science <ul style="list-style-type: none"> CS565: Algorithmic Data Mining CS330: Analysis of Algorithms CS235: Algebraic Algorithms CS332: Theory of Computation CS320: Concepts of Programming Languages 	Boston, MA Spring 25 Spring 22, Fall 24, Spring 25 Fall 24 Spring 24 Fall 23
EMPLOYMENT	Boston University, Department of Computer Science <i>Post-Bacc Academic Fellow</i>	Boston, MA Sept 2024 – May 2025
	Amazon <i>Software Development Engineer Intern</i>	Sunnyvale, CA Summer 2023
	Capital One <i>Software Engineer Intern</i>	McLean, VA Summer 2022
SERVICE	Reviewer: ICLR 2025, ICML 2025	
MENTORING	Sasidhar Kunapuli (high school)	Oct 2024 – Present
SKILLS	<ul style="list-style-type: none"> Languages: Python, C/C++, OCaml, Java, Bash, MATLAB Technologies: PyTorch, TensorFlow, Pandas, Jupyter Notebook Other: Linux, Git/Github, L^AT_EX, Make 	
PHD COURSEWORK	<ul style="list-style-type: none"> Theory: Complexity Theory, Mathematical Methods for Theoretical Computer Science ML/AI: Machine Learning, Artificial Intelligence, Deep Learning Mathematics: Functional Analysis, PDEs, Stochastic PDEs Statistics: Stochastic Calculus, Mathematics of Deep Learning Other: Functional Compilers, Geometry Processing, Financial Econometrics 	