MATTHEW SHUNSHI ZHANG

10330 Yonge St., Richmond Hill ON, L4C 5N1
(+1) 647-470-5998 ⋄ matthew.zhang@mail.utoronto.ca ⋄ matthewzhang1998.github.io

EDUCATION

University of Toronto January 2022 -
PhD, Computer Science, Supervised by Prof. Murat Erdogdu. Affiliated with the Vector Institute for Artificial Intelligence. GPA: 4.00/4.00

University of Toronto September 2020 - January 2022
MS, Computer Science, Supervised by Profs. Murat Erdogdu and Animesh Garg. Affiliated with the Vector Institute for Artificial Intelligence. GPA: 4.00/4.00

University of Toronto September 2016 - May 2020
BASc, Engineering Science, Machine Intelligence Specialization. High Honours, GPA: 3.94/4.00

JOURNAL PUBLICATIONS

Uniform-in-N log-Sobolev inequality for the mean-field Langevin dynamics with convex energy
Sinho Chewi, Atsushi Nitanda, **MSZ** SIMA, to appear

Analysis of Langevin Monte Carlo from Poincaré to Log-Sobolev
Sinho Chewi, Murat A. Erdogdu, Mufan (Bill) Li, Ruoqi Shen, **MSZ** FoCM, 2024

CONFERENCE PUBLICATIONS

Rényi-infinity constrained sampling with d^3 membership queries
Yunbum Kook, **MSZ** SODA, 2025

In-and-Out: Algorithmic diffusions for sampling convex bodies
Yunbum Kook, Santosh Vempala, **MSZ** NeurIPS, 2024 (spotlight)

Sampling from the mean-field stationary distribution
Yunbum Kook, **MSZ**, Sinho Chewi, Murat A. Erdogdu, Mufan Li COLT, 2024

Improved discretization analysis for the underdamped Langevin Monte Carlo
MSZ, Sinho Chewi, Mufan Li, Krishnakumar Balasubramanian, Murat A. Erdogdu
COLT, 2023

Tight regret and complexity bounds for Thompson Sampling via Langevin Monte Carlo
Tom Huix, **MSZ**, Alain Durmus AISTATS, 2023

Towards a Theory of Non-Log-Concave Sampling: First-Order Stationarity Guarantees for Langevin Monte Carlo
Krishnakumar Balasubramanian, Sinho Chewi, Murat A. Erdogdu, Mufan Li, Adil Salim, **MSZ**
COLT, 2022

Convergence and Optimality of Policy Gradient Methods in Weakly Smooth Settings
MSZ, Murat A. Erdogdu, Animesh Garg AAAI, 2022

Convergence of Langevin Monte Carlo in Chi-Squared and Rényi Divergence
Murat A. Erdogdu, Rasa Hosseinzadeh, **MSZ** AISTATS, 2022

One-Shot Pruning of Recurrent Neural Networks by Jacobian Spectrum Evaluation
MSZ, Bradly Stadie ICLR, 2020

PREPRINTS

Sublinear iterations can suffice even for DDPMs
MSZ, Stephen Huan, Jerry Huang, Nicholas Matthew Boffi, Sitan Chen, Sinho Chewi Preprint, 2025

Perspectives on Stochastic Localization
Bobby Shi, Kevin Tian, **MSZ** Preprint, 2025

Analysis of Langevin midpoint methods using an anticipative Girsanov theorem
MSZ Preprint, 2025

Shifted Composition IV: Underdamped Langevin and Numerical Discretizations with Partial Acceleration
Jason M. Altschuler, Sinho Chewi, **MSZ** Preprint, 2025

Covariance estimation with Markov chain Monte Carlo
Yunbum Kook, **MSZ** Preprint, 2024

Benchmarking Model-Based Reinforcement Learning
Tingwu Wang, Xuchan Bao, Ignasi Clavera, Jerrick Hoang, Yeming Wen, Eric Langlois, **MSZ**, Guodong Zhang, Pieter Abbeel, Jimmy Ba Preprint, 2019

INVITED TALKS AND PRESENTATIONS

Analysis of Langevin midpoint methods using an anticipative Girsanov theorem
Wasserstein Gradient Flows in Math and Machine Learning, BIRS July 2025
Fast and Curious 2: MCMC in action September 2025

Toward ballistic acceleration for log-concave sampling
Two Faces of Optimization, ETH July 2025

Uniform-in-N log-Sobolev inequality for finite-particle systems
Seminar, University of Tokyo November 2024

Sampling and isoperimetry for finite particle approximations
SIAM Conference on the Mathematics of Data Science October 2024

Sampling in the mean-field regime
Probability Summer School, Saint Flour (Student talk) July 2024
Seminar, Yale University March 2024

Isoperimetry and the convergence of LMC
Machine Learning Summer School, ÉMINES July 2022

Convergence of LMC in Rényi Divergence
Applied Mathematics Seminar, CERMICS June 2022

Analysis of LMC from Poincaré to log-Sobolev
Complexity of Sampling Working Group, Simons Institute November 2021

AWARDS

Canada Graduate Scholarship (Doctoral) 2023

University of Toronto Fellowships 2021

Daisy Intelligence Scholarship for Engineering Science 2019

Faculty of Applied Science and Engineering Award 2018

Engineering Society Awards 2018

Jane Elizabeth Ham Scholarship 2017

Canadian Freshman Debating Champion 2017

SERVICE

Conference Reviewer AISTATS (2022, 2023, 2024, 2025, 2026), NeurIPS (2022, 2023, 2024, 2025) ICLR (2023, 2025, 2026), ICML (2023, 2024, 2025), COLT (2025), ALT (2024, 2025), AAAI (2025, 2026), SODA (2026)

Journal Reviewer SPA, JAA, FoCM, JMLR, TMLR, Statistica Sinica

Teaching assistant CSC412 (Winter 2024), CSC343 (Winter 2023), CSC2532 (Winter 2022), CSC498 (Winter 2021), CSC343 (Fall 2020), ESC180 (Fall 2020)

Organized a **reading group on sampling algorithms and stochastic localization** at the Georgia Institute of Technology, 2023-2024.

REFERENCES

Murat Erdogdu, Associate Professor erdogdu@cs.toronto.edu

Sinho Chewi, Assistant Professor sinho.chewi@yale.edu