# MATTHEW SHUNSHI ZHANG

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## 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

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

## CONFERENCE PUBLICATIONS

**Rényi-infinity constrained sampling with $d^3$ membership queries**
Yunbum Kook, Matthew S. Zhang SODA, 2025

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

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

**Improved discretization analysis for the underdamped Langevin Monte Carlo**
Matthew S. Zhang, 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, Matthew S. Zhang, 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, Matthew S. Zhang COLT, 2022

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

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

**One-Shot Pruning of Recurrent Neural Networks by Jacobian Spectrum Evaluation**
Matthew S. Zhang, Bradly Stadie ICLR, 2020

## PREPRINTS

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

**Covariance estimation with Markov chain Monte Carlo**
Yunbum Kook, Matthew S. Zhang — Preprint, 2024

**Uniform-in-$N$ log-Sobolev inequality for the mean-field Langevin dynamics with convex energy**
Sinho Chewi, Atsushi Nitanda, Matthew S. Zhang — Preprint, 2024

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

## INVITED TALKS AND PRESENTATIONS

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

**Analysis of Langevin midpoint methods using an anticipative Girsanov theorem**
Wasserstein Gradient Flows in Math and Machine Learning, BIRS — 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

**Sampling from mean-field stationary measures**
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), NeurIPS (2022, 2023, 2024, 2025) ICLR (2023, 2025), ICML (2023, 2024, 2025), COLT (2025), ALT (2024, 2025), AAAI (2025)

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

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

## REFERENCES

**Murat Erdogdu, Assistant Professor** erdogdu@cs.toronto.edu

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