

# MATTHEW SHUNSHI ZHANG

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## EDUCATION

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- University of Toronto** January 2022 - June 2026 (expected)  
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. High Honours, GPA: 3.94/4.00

## JOURNAL PUBLICATIONS

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- [1] **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

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- [2] **Rényi-infinity constrained sampling with  $d^3$  membership queries**  
Yunbum Kook, **Matthew S. Zhang** SODA, 2025
- [3] **In-and-Out: Algorithmic diffusions for sampling convex bodies**  
Yunbum Kook, Santosh Vempala, **Matthew S. Zhang** NeurIPS, 2024 (spotlight)
- [4] **Sampling from the mean-field stationary distribution**  
Yunbum Kook, **Matthew S. Zhang**, Sinho Chewi, Murat A. Erdogdu, Mufan Li COLT, 2024
- [5] **Improved discretization analysis for the underdamped Langevin Monte Carlo**  
**Matthew S. Zhang**, Sinho Chewi, Mufan Li, Krishnakumar Balasubramanian, Murat A. Erdogdu COLT, 2023
- [6] **Tight regret and complexity bounds for Thompson Sampling via Langevin Monte Carlo**  
Tom Huix, **Matthew S. Zhang**, Alain Durmus AISTATS, 2023
- [7] **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
- [8] **Convergence and Optimality of Policy Gradient Methods in Weakly Smooth Settings**  
**Matthew S. Zhang**, Murat A. Erdogdu, Animesh Garg AAI, 2022
- [9] **Convergence of Langevin Monte Carlo in Chi-Squared and Rényi Divergence**  
Murat A. Erdogdu, Rasa Hosseinzadeh, **Matthew S. Zhang** AISTATS, 2022
- [10] **One-Shot Pruning of Recurrent Neural Networks by Jacobian Spectrum Evaluation**  
**Matthew S. Zhang**, Bradly Stadie ICLR, 2020

## PREPRINTS

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- [11] **Sharp propagation of chaos in Rényi divergences**  
**Matthew S. Zhang** Preprint, 2026

- [12] **Stability of the Kim–Milman flow map**  
 Sinho Chewi, Aram-Alexandre Pooladian, **Matthew S. Zhang** Preprint, 2025
- [13] **Sublinear iterations can suffice even for DDPMs**  
**Matthew S. Zhang**, Stephen Huan, Jerry Huang, Nicholas Matthew Boffi, Sitan Chen, Sinho Chewi  
 Preprint, 2025
- [14] **Perspectives on Stochastic Localization**  
 Bobby Shi, Kevin Tian, **Matthew S. Zhang** Preprint, 2025
- [15] **Analysis of Langevin midpoint methods using an anticipative Girsanov theorem**  
**Matthew S. Zhang** Preprint, 2025
- [16] **Shifted Composition IV: Underdamped Langevin and Numerical Discretizations with Partial Acceleration**  
 Jason M. Altschuler, Sinho Chewi, **Matthew S. Zhang** Preprint, 2025
- [17] **Uniform-in- $N$  log-Sobolev inequality for the mean-field Langevin dynamics with convex energy**  
 Sinho Chewi, Atsushi Nitanda, **Matthew S. Zhang** Preprint, 2024
- [18] **Covariance estimation with Markov chain Monte Carlo**  
 Yunbum Kook, **Matthew S. Zhang** Preprint, 2024
- [19] **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

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- Sublinear iterations can suffice even for DDPMs**  
 Seminar, NUS Computer Science November 2025
- Perspectives on stochastic localization**  
 Seminar, University of Pennsylvania November 2025
- Analysis of Langevin midpoint methods using an anticipative Girsanov theorem**  
 IMS Young Mathematical Scientists Forum – Statistics and Data Science November 2025  
 Fast and Curious 2: MCMC in action, University of Toronto September 2025  
 Wasserstein Gradient Flows in Math and Machine Learning, BIRS July 2025
- Toward ballistic acceleration for log-concave sampling**  
 Seminar, NUS Mathematics November 2025  
 Two Faces of Optimization, ETH July 2025
- Uniform-in- $N$  log-Sobolev inequality for finite-particle systems**  
 INFORMS October 2025  
 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

## AWARDS

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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

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**Conference Reviewer** AISTATS (2022, 2023, 2024, 2025, 2026), NeurIPS (2022, 2023, 2024, 2025), ICLR (2023, 2025, 2026), ICML (2023, 2024, 2025), COLT (2025, 2026), 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

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Murat Erdogdu, Associate Professor	erdogdu@cs.toronto.edu
Sinho Chewi, Assistant Professor	sinho.chewi@yale.edu
Daniel Lacker, Associate Professor	daniel.lacker@columbia.edu