Mufan (Bill) Li

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RESEARCH POSITIONS

Postdoctoral Research Associate, Princeton University 2023–Present
Department of Operations Research and Financial Engineering
Supervised by Boris Hanin

DEGREES

Ph.D. Statistics, University of Toronto 2017–2023
Thesis: *Analysis of Learning Algorithms via Diffusion Limits*
Supervised by Daniel M. Roy and Murat A. Erdogdu

M.Sc. Statistics, University of Toronto 2015–2016

B.A.Sc. Engineering Science, University of Toronto 2010–2015

PUBLISHED ARTICLES

See also my Google Scholar or Semantic Scholar pages.

1. Blake Bordelon, Lorenzo Noci, **M. Li**, Boris Hanin, and Cengiz Pehlevan, *Depthwise Hyperparameter Transfer in Residual Networks: Dynamics and Scaling Limit.* To appear at ICLR 2024. M3L Workshop Oral Presentation. arXiv:2309.16620.
2. Lorenzo Noci*, Chuning Li*, **M. Li***, Bobby He, Thomas Hofmann, Chris Maddison, and Daniel M. Roy, *The Shaped Transformer: Attention Models in the Infinite Depth-and-Width Limit.* NeurIPS 2023. arXiv:2306.17759.
3. Matthew Zhang, Sinho Chewi, **M. Li**, Krishnakumar Balasubramanian, and Murat A. Erdogdu, *Improved Discretization Analysis for Underdamped Langevin Monte Carlo.* COLT 2023. arXiv:2302.08049.
4. **M. Li** and Murat A. Erdogdu, *Riemannian Langevin Algorithm for Solving Semidefinite Programs.* Bernoulli 2023. arXiv:2010.11176.
5. **M. Li**, Mihai Nica, and Daniel M. Roy, *The Neural Covariance SDE: Shaped Infinite Depth-and-Width Networks at Initialization.* NeurIPS 2022 (Selected for Oral, Nominated for Outstanding Paper Award). arXiv:2206.02768.
6. Raphaël Berthier and **M. Li**, *Acceleration of Gossip Algorithms through the Euler–Poisson–Darboux Equation.* IMA Journal of Applied Mathematics 2022. arXiv:2202.10742.
7. Sinho Chewi, Murat A. Erdogdu, **M. Li**, Ruoqi Shen, and Matthew Zhang, *Analysis of Langevin Monte Carlo from Poincaré to Log-Sobolev.* COLT 2022 Extended Abstract. arXiv:2112.12662.
8. **M. Li**, Mihai Nica, and Daniel M. Roy, *The Future is Log-Gaussian: ResNets and Their Infinite-Depth-and-Width Limit at Initialization.* NeurIPS 2021. arXiv:2106.04013.

PREPRINTS

1. Yunbum Kook, Matthew S. Zhang, Sinho Chewi, Murat A. Erdogdu, and **M. Li**, *Sampling from the Mean-Field Stationary Distribution.* Preprint 2024. arXiv:2402.07355.
2. **M. Li** and Mihai Nica, *Differential Equation Scaling Limits of Shaped and Unshaped Neural Networks.* Preprint 2023. arXiv:2310.12079.
3. **M. Li**, and Maxime Gazeau, *Higher Order Generalization Error for First Order Discretization of Langevin Diffusion.* Preprint 2021. arXiv:2102.06229.

*Equal Contribution.

AWARDS

Doctoral Award, University of Toronto — 2023
Ontario Graduate Scholarship — 2019–2023
Student Research Presentation Award, Stat. Soc. of Canada — 2021
MITACS Accelerate Fellowship, with Borealis AI — 2018–2019
Undergraduate Summer Research Fellowship, University of Toronto — 2012

INVITED TALKS

LCDS Seminar, Brown University — November 2023
Geometric Dyson Brownian Motion and the Free Log-Normal for Minor of Products of Random Matrices

Google DeepMind — August 2023
The Shaped Transformer: Attention Models in the Infinite Depth-and-Width Limit

DeepProb, University of Oxford — Feb 2023
Neural Covariance SDE: Shaped Infinite Depth-and-Width Networks at Initialization

OPTML++, MIT (Video) — Feb 2023
Neural Covariance SDE: Shaped Infinite Depth-and-Width Networks at Initialization

Layer 6 AI — November 2022
Neural Covariance SDE: Shaped Infinite Depth-and-Width Networks at Initialization

Deep Learning Foundations, University of Maryland (Video) — Sept 2022
Neural Covariance SDE: Shaped Infinite Depth-and-Width Networks at Initialization

CONTRIBUTED TALKS

Statistical Society of Canada Annual Meeting — May 2023
Neural Covariance SDE: Shaped Infinite Depth-and-Width Networks at Initialization

Institute of Mathematical Statistics Annual Meeting — Jun 2022
Analysis of Langevin Monte Carlo from Poincaré to Log-Sobolev

Statistical Society of Canada Annual Meeting — May 2022
Analysis of Langevin Monte Carlo from Poincaré to Log-Sobolev

Statistical Society of Canada Annual Meeting — May 2021
Riemannian Langevin Algorithm for Solving Semidefinite Programs

TEACHING ASSISTANT POSITIONS

ESC103 Engineering Math and Computation, University of Toronto — 2017–2021
STA414 Statistical Learning, University of Toronto — 2021–2022
STA286 Probability and Statistics, University of Toronto — 2018–2019
STA410 Statistical Computing, University of Toronto — 2017

WORK EXPERIENCE

Research Intern, Borealis AI — Aug 2018–Apr 2019
Investment Analyst, Ontario Teachers' Pension Plan — Jul 2016–Jul 2017
Electronic Trading Intern, RBC Capital Markets — May 2013–Aug 2014

PEER REVIEW

Journal of Machine Learning Research (JMLR)
Transactions on Machine Learning Research (TMLR) Expert Reviewer
SIAM Journal on Mathematics of Data Science (SIMODS)
Journal of Computational and Graphical Statistics (JCGS)
Neural Information Processing Systems (NeurIPS)
International Conference on Learning Representations (ICLR)
International Conference on Machine Learning (ICML)