YE HE

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Employment

Aug. 2023 – present, Hale Visiting Assistant Professor, School of Mathematics, Georgia Institute of Technology.
Mentor: Prof. Molei Tao.

Education

Sep. 2018 – Jun. 2023, Ph,D. in Mathematics, University of California Davis.
Advisor: Prof. Krishna Balasubramanian.
Sep. 2016 - Jun. 2018, M.A. in Mathematics, University of Wisconsin Madison.
Sep. 2013 - Jun. 2017, B.A. in Mathematics, Shanghai Jiao Tong University.

Research

➤ My research focuses on applying probabilistic and Partial Differential Equations (PDE) tools to understand sampling, stochastic optimization algorithms and diffusion-based generative models used in Machine Learning (ML).

Honors and Awards

June 2022 Alice Siu-Fun Leung Scholarship in mathematics, UC Davis.

Publications

1. Ye He, Krishnakumar Balasubramanian, and Promit Ghosal (2024). High-dimensional Scaling Limits and Fluctuations of Online Least-squares SGD with Smooth Covariance. *Annals of Applied Probability (under minor revision)*.
2. Ye He, Alireza Mousavi-Hosseini, Krishnakumar Balasubramanian, and Murat A Erdogdu (2024). A Separation in Heavy-Tailed Sampling: Gaussian vs. Stable Oracles for Proximal Samplers. *NeurIPS, 2024*.
3. Ye He, Kevin Rojas, and Molei Tao (2024). Zeroth-Order Sampling Methods for Non-Log-Concave Distributions: Alleviating Metastability by Denoising Diffusion. *NeurIPS, 2024*.
4. Yuqing Wang, Ye He, and Molei Tao (2024). Evaluating the design space of diffusion-based generative models. *NeurIPS, 2024*.
5. Alireza Mousavi-Hosseini, Tyler Farghly, Ye He, Krishnakumar Balasubramanian, and Murat A Erdogdu (2023). Towards a Complete Analysis of Langevin Monte Carlo: Beyond Poincaré Inequality. *COLT 2023*.
6. Ye He, Krishnakumar Balasubramanian, and Murat A Erdogdu (2022). An analysis of Transformed Unadjusted Langevin Algorithm for Heavy-tailed Sampling. *IEEE Transactions on Information Theory*.
7. Ye He, Krishnakumar Balasubramanian, Bharath Sriperumbudur, and Jianfeng Lu (2022). Regularized Stein Variational Gradient Flow. *Foundations of Computational Mathematics*.
8. Ye He, Tyler Farghly, Krishnakumar Balasubramanian, and Murat A. Erdogdu (2022). Mean-square Analysis of Discretized Itô Diffusions for Heavy-tailed Sampling. *Journal of Machine Learning Research*.
9. Ye He, Krishnakumar Balasubramanian, and Murat A Erdogdu (2020). On the ergodicity, bias and asymptotic normality of randomized midpoint sampling method. *NeurIPS, 2020*.

Works in progress

1. Tyler Farghly, Ye He, Jun Yang, and Patrick Rebeschini (2024). Adaptive Langevin Monte Carlo Methods for Heavy-tailed Sampling via Weighted Functional Inequalities. *Request for the manuscript*.
2. Ye He, Promit Ghosal, and Krishnakumar Balasubramanian (2024). High-dimensional scaling limits of two-layer neural network. *Request for manuscript*.
3. Ye He, Shi Zhaoyang, Krishna Balasubramanian, and Xiucai Ding (2024). High-dimensional Scaling Limits for Kernel Ridge Regression. *Request for the manuscript*.

Attended Workshops and Summer Schools

April 2022	Workshop: Stein's method and its applications in Machine Learning and Optimization, Online.
Oct. 2021	Workshop: Dynamics and Discretization: PDEs, Sampling, and Optimization, Berkeley.
Sep. 2021	Workshop: Sampling Algorithms and Geometries on Probability Distributions, Berkeley.
Aug. 2021	Workshop: Probability, Geometry, and Computation in High Dimensions Boot Camp, Berkeley.
Summer 2021	Summer School: Online Open Probability School (a second series of online courses after the 2020 Online Open Probability School).
Summer 2020	Summer School: Online Open Probability School (joint ofthe 2020 Séminaire de mathématiques supérieures on Discrete Probability, Physics and Algorithms and the 2020 CRM-PIMS school).

Teaching

Introduction to Linear Algebra; Differential Equations; Short Calculus III.

Professional Services

Reviewer in AAAI, AISTATS, COLT, NeurIPS, ICML, ICLR, TMLR, FOCS, Mathematical Programming.

References

Molei Tao,	Associate professor, Georgia Institute of Technology,	mtao@gatech.edu.
Krishna Balasubramanian,	Associate professor, University of California Davis,	kbala@ucdavis.edu.
Murat A. Erdogdu,	Assistant professor, University of Toronto,	erdogdu@cs.toronto.edu.
Bharath K Sriperumbudur,	Professor, Pennsylvania State University,	bharathsv.ucsd@gmail.com.