YE HE

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Employment

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

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 and stochastic optimization algorithms used in Machine Learning (ML).

Honors and Awards

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

Publications

1. 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. *arXiv preprint arXiv:2405.16736*.
2. Ye He, Kevin Rojas, and Molei Tao (2024). Zeroth-Order Sampling Methods for Non-Log-Concave Distributions: Alleviating Metastability by Denoising Diffusion. *arXiv preprint arXiv:2402.17886*.
3. Yuqing Wang, Ye He, and Molei Tao (2024). Evaluating the design space of diffusion-based generative models. *arXiv preprint arXiv:2406.12839*.
4. Ye He, Krishnakumar Balasubramanian, and Promit Ghosal (2023). High-dimensional Scaling Limits and Fluctuations of Online Least-squares SGD with Smooth Covariance. *Submitted to Annals of Applied Probability*.
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. *Conference on Learning Theory 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. *To appear in 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. *Advances in Neural Information Processing Systems* **33**, 7366–7376.

Works in progress

1. Tyler Farghly, Ye He, Jun Yang, and Patrick Rebeschini (2023). Adaptive Langevin Monte Carlo Methods for Heavy-tailed Sampling via Weighted Functional Inequalities. *Request for the manuscript*.
2. Ye He, Krishna Balasubramanian, and Xiucai Ding (2023). High-dimensional Scaling Limits for Kernel Ridge Regression. *Request for the manuscript*.

Conference Talks and Posters

April 2022 Workshop: Stein's method and its applications in Machine Learning and Optimization, 1-hour talk.

Dec. 2020 The 34th Conference on Neural Information Processing Systems(NeurIPS 2020), poster.

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).

Professional Services

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

References

Krishna Balasubramanian,	Assistant professor, University of California Davis,	kbala@ucdavis.edu.
Murat A. Erdogdu,	Assistant professor, University of Toronto,	erdogdu@cs.toronto.edu.
Bharath K Sriperumbudur,	Associate professor, Pennsylvania State University,	bharathsv.ucsd@gmail.com.
Jianfeng Lu,	Professor, Duke University,	jianfeng@math.duke.edu.