

# 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 of the 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

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|--------------------------|---|---------------------------|
| 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. |
| Jianfeng Lu,             | Professor, Duke University,                           | jianfeng@math.duke.edu.   |