Yiyun He

University of California San Diego

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Education and Employment

- ICERM Postdoctoral Fellow — Jan 2026 – May 2026
  Institute for Computational and Experimental Research in Mathematics, Brown University
- Stefan E. Warschawski Math Fellow — Jul 2025 – Current
  University of California San Diego
- Ph.D. degree in Mathematics — Sep 2020 – Jun 2025
  M.S. degree in Mathematics — Sep 2020 – Jun 2022
  University of California Irvine
  Advisor: **Prof. Roman Vershynin**
- B.S. degree in Mathematics and Applied Mathematics — Sep 2016 – Jun 2020
  University of Science and Technology of China, China
  Advisor: **Prof. Xiande Zhang**
  Special class of the Gifted Young

Publications

Published and Accepted Papers

- *Minimax Optimal Differentially Private Synthetic Data for Smooth Queries*
  with Rundong Ding, Yizhe Zhu.
  Extended abstract published at **Conference on Learning Theory (COLT)**, PMLR 336:1963–1964, 2026.
  Full version submitted to **IEEE Transactions on Information Theory**.
- *FL-Sailer: Efficient and Privacy-Preserving Federated Learning for Scalable Single-Cell Epigenetic Data Analysis via Adaptive Sampling*
  with Guangyi Zhang, Yi Dai, Junhao Liu.
  To appear in **Transactions on Machine Learning Research (TMLR)**.
- *Sparse Hanson-Wright Inequalities with Applications*
  with Ke Wang, Yizhe Zhu.
  Electronic Journal of Probability, 2026, 31: 1-49.
- *Differentially private low-dimensional synthetic data from high-dimensional datasets*
  with Thomas Strohmer, Roman Vershynin, Yizhe Zhu.
  Information and Inference: A Journal of the IMA, 2025, 14(1): iaae034.
- *Online Differentially Private Synthetic Data Generation*
  with Roman Vershynin, Yizhe Zhu.
  IEEE Transactions on Privacy, 2024, 1: 19-30.
- *Strong quantum nonlocality and unextendibility without entanglement in N-partite systems with odd N*
  with Fei Shi, Xiande Zhang.
  Quantum, 2024, 8: 1349.
- *Algorithmically Effective Differentially Private Synthetic Data*
  with Roman Vershynin, Yizhe Zhu.
  Conference on Learning Theory (COLT), PMLR 195:3941-3968, 2023.

Preprints and Manuscripts

- *Perturbation bounds for low-rank matrix approximation algorithms*
  with Alberto Bucci, Christopher Musco, Swati Padmanabhan, David Persson, Arvind Saibaba.
  In preparation, expected to be posted in November 2026.
- *Differentially Private Synthetic Data under Maximum Mean Discrepancy*
  with Rundong Ding, Yizhe Zhu.
  Submitted to **International Conference on Algorithmic Learning Theory**, 2027.
- *Concentration of bounded sparse chaoses and sparse Khatri-Rao embeddings*
  with Guozheng Dai, Ke Wang, Yizhe Zhu.
  Submitted to **International Conference on Algorithmic Learning Theory**, 2027.
- *Intrinsic-Dimensional Wasserstein Guarantees for Private Synthetic Measures*
  Submitted to **Information and Inference: A Journal of the IMA**, 2026.
- *A Note on the Improved Sparse Hanson-Wright Inequalities*
  with Guozheng Dai, Ke Wang, Yizhe Zhu.
  Submitted to **Latin American Journal of Probability and Mathematical Statistics**, 2025.

Invited and Contributed Talks

- Computational and Applied Mathematics Seminar, NC State University — Sept 2026
- Fairness and Foundations in Machine Learning Workshop, AIM, California Institute of Technology — Jul 2026
  Video available: https://vimeo.com/1235203028
- Probability Seminar, Fields Institute, University of Toronto — May 2026
- Probability Seminar, Brown University — Apr 2026
- ICERM Graduate Seminar, ICERM, Brown University — Feb 2026
- Probability Seminar, University of California, San Diego — Jan 2025
- Joint Mathematics Meetings, Seattle, WA — Jan 2025
- Probability Seminar, University of Southern California — Aug 2024
- Group Seminar of Prof. Deanna Needell, University of California, Los Angeles — May 2024
- Southern California Applied Mathematics Symposium — Apr 2024
- Probability Seminar, University of Washington — Apr 2024
- Joint Mathematics Meetings, San Francisco, CA — Jan 2024
- Conference on Learning Theory — Jul 2023
- Southern California Applied Mathematics Symposium — Apr 2023

Teaching Experience

- Instructor, *MATH 11: Introductory Probability & Statistics, lower division*, UCSD — Fall 2026
- Instructor, *MATH 10A: Calculus I, lower division*, UCSD — Fall 2025
- Teaching Assistant, *MATH 3A: Calculus I, lower division*, UCI — Summer 2024
- Teaching Assistant, *MATH 130B: Probability II, upper division*, UCI — Spring 2024
- Teaching Assistant, *MATH 121A: Linear Algebra I, upper division*, UCI — Fall 2021
- Reader, *MATH 121A: Linear Algebra I, upper division*, UCI — Summer 2021
- Reader, *MATH 140A: Elementary Analysis I, upper division*, UCI — Spring 2021
- Teaching Assistant, *Combinatorics*, USTC — Fall 2019

Directed Reading Program

- *Differential privacy in machine learning*, UCI — Spring 2024
  with Jiaxin Sara-Grace Lien, Mitra Tara Rezvany, Alejandro Salmeron-Tarancon, Kaijie Zhang
- *Pattern Recognition and Bayesian Analysis*, UCI — Winter 2025
  with Haochen Tan, David Wang
- *Random Matrix Theory*, UCI — Spring 2025
  with Parsa Gorji, Harita Kalvai, Shiya Tang, Vincent Wang,

Reviewer Service

Journals:

- *Annals of the Institute of Statistical Mathematics*
- *Annals of Applied Probability*
- *Information and Inference*
- *IEEE Transactions on Information Theory*
- *IEEE Transactions on Privacy*

Conferences:

- *Conference on Algorithmic Learning Theory, 2027*
- *Topology, Algebra, and Geometry in Data Science, 2026*
- *Conference on Neural Information Processing Systems, 2026*
- *International Conference on Learning Representations, 2026*
- *Conference on Algorithmic Learning Theory, 2026*
- *Conference on Algorithmic Learning Theory, 2025*

Academic Service and Student Mentoring

- Organizer of *Mathematics Graduate Student Colloquium*, UCI — 2024 – 2025
- Academic Reference for Zirui Song — Winter 2026
- Academic Reference for Madison Winter — Fall 2025