Mingchen Ma

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Education

University of Wisconsin-Madison, Department of Computer Sciences — Madison, WI, USA
Ph.D. Student, Computer Science, Advisor: Ilias Diakonikolas Christos Tzamos — *2021- present*

Nanjing University, Department of Mathematics — Nanjing, Jiangsu, China
B.S., Major: Mathematics — *2016- 2020*

Research Interest

Theoretical Foundation of Machine Learning
Recent Research Focus:
Robust Learning (designing efficient learning algorithms that are robust to noise and distribution shift)
Interactive Learning (active learning, online learning and their algorithmic applications)
Large Language Model (efficient and expressive model architecture, AI discovery for theory research)

Experience

Shanghai University of Finance and Economics, ITCS — Yangpu, Shanghai, China
Visiting Student, Host:Nick Gravin, Zhihao Tang and Xiao Wang — *2020- 2021*

Publications and Manuscripts

(Author orders for all papers are alphabetical, except the ones marked by $*$)

- Beyond Multi-Index Models: Learning Intersections of Degree-2 PTFs,
  with I.Diakonikolas, D.Kane, L.Ren, T.Tran
  Under Review
- Gaussian Partitioning for Reliable Learning of Multi-Index Models,
  with I.Diakonikolas, G.Iakovidis, D.Kane
  Under Review
- The Effect of Layer Ordering in Hybrid Architectures*,
  with J.Cooper, J.Mo, S.Qiu, N,Bastian, I.Diakonikolas, F.Sala,
  Under Review
- Robustly Learning Multi-Index Models under Logconcave Distributions via Weak Partial Learners,
  with I.Diakonikolas, D.Kane,
  Proceedings of the 67th Annual Symposium on Foundations of Computer Science (FOCS 2026)
- Polynomial-Time Robust Multiclass Linear Classification under Gaussian Marginals,
  with I.Diakonikolas, G.Iakovidis,
  Advances in Neural Information Processing Systems (NeurIPS 2026)
  (Selected for Spotlight Presentation)

- Expressivity-Efficiency Tradeoffs for Hybrid Sequence Models,
  with J.Cooper, I.Diakonikolas, F.Sala,
  Proceedings of the 43th International Conference on Machine Learning (ICML 2026)
  (Selected for Oral Presentation)
- Efficiently Learning Drifting Halfspaces with Massart Noise*,
  with G.Cao, J.Diakonikolas, I.Diakonikolas
  Proceedings of the 43th International Conference on Machine Learning (ICML 2026)
- Robust Regression of General ReLUs with Queries,
  with I.Diakonikolas, D.Kane,
  Advances in Neural Information Processing Systems (NeurIPS 2025)
- Learning Intersections of Two Margin Halfspaces under Factorizable Distributions,
  with I.Diakonikolas, L. Ren, C.Tzamos,
  Proceedings of the 38th Annual Conference on Learning Theory (COLT 2025)
- Statistical Query Hardness of Multiclass Linear Classification with Random Classification Noise,
  with I.Diakonikolas, L. Ren, C.Tzamos,
  Proceedings of the 42th International Conference on Machine Learning (ICML 2025)
  (Selected for Oral Presentation)
- Active Learning of General Halfspaces: Label Queries vs Membership Queries,
  with I.Diakonikolas, D.Kane,
  Advances in Neural Information Processing Systems (NeurIPS 2024)
- Active Classification with Few Queries under Misspecification,
  with V.Kontonis, C. Tzamos,
  Advances in Neural Information Processing Systems (NeurIPS 2024)
  (Selected for Spotlight Presentation)
- Active Learning with Simple Questions,
  with V.Kontonis, C. Tzamos,
  Proceedings of the 37th Annual Conference on Learning Theory (COLT 2024)
- Fast Co-Training under Weak Dependence via Stream-Based Active Learning,
  with I.Diakonikolas, L. Ren, C.Tzamos,
  Proceedings of the 41th International Conference on Machine Learning (ICML 2024)
  (Selected for Oral Presentation)
- The Gain from Ordering for Online Learning,
  with V.Kontonis, C.Tzamos,
  Advances in Neural Information Processing Systems (NeurIPS 2023)

- Buying Information for Stochastic Optimization ,
  with C.Tzamos,
  Proceedings of the 40th International Conference on Machine Learning (ICML 2023)
  (Selected for Oral Presentation)
- Clustering with Queries under Semi-Random Noise,
  with A. Del Pia, C.Tzamos,
  Proceedings of the 35th Annual Conference on Learning Theory (COLT 2022)
- k—median: exact recovery in the extended stochastic ball model,
  with A. Del Pia,
  Mathematical Programming Series A 2022
- Proximity in Concave Integer Quadratic Programming,
  with A. Del Pia,
  Mathematical Programming Series A 2021

Awards and Honors

- NeurIPS Scholar Award, 2023, 2024
- Student Research Grants Competition (SRGC) Award, 2023
- UW Madison CS Departmental Research Fellowship, 2021
- Outstanding Graduate at Nanjing University, 2020
- Elite Program Scholarship, 2017-2018, 2018-2019
- People's Scholarship, 2018-2019
- Sumsung Scholarship, 2017-2018
- Outstanding Student at Nanjing University, 2017-2018

Talks

- SQ Hardness of Multiclass Linear Classification with Random Classification Noise, ICML, IFDS 2025
- Learning Intersections of Two Margin Halfspaces under Factorizable Distributions, COLT,TTIC 2025
- Active Learning of General Halfspaces: Label Queries vs Membership Queries, SUFE ITCS,NJU AI 2024
- Active Learning with Simple Questions, COLT 2024
- Fast Co-Training under Weak Dependence via Stream-Based Active Learning, ICML 2024
- Buying Information for Stochastic Optimization, ICML 2023
- Clustering with Queries under Semi-Random Noise, COLT 2022
- Proximity in Concave Integer Quadratic Programming, MIP 2021, IPCO 2021, INFORMS Annual Meeting

Professional Activities

- Conference Reviewer:
  Conference on Learning Theory (COLT) 2025, 2026
  International Conference on Machine Learning (ICML) 2025, 2026
  International Conference on Learning Representations (ICLR) 2025, 2026, 2027
  Neural Information Processing Systems (NeurIPS) 2024, 2025, 2026
  International Conference on Algorithmic Learning Theory (ALT) 2027
  Innovations in Theoretical Computer Science (ITCS) 2023, 2025,
  ACM-SIAM Symposium on Discrete Algorithms (SODA) 2027,
  ACM Symposium on Theory of Computing (STOC) 2023, 2026,
  IEEE Symposium on Foundations of Computer Science (FOCS) 2026
- Journal Reviewer:
  Mathematical Programming, Transactions on Machine Learning Research

Teaching

- CS 726 Nolinear Optimization I, Teaching Assistant, UW-Madison, Spring 2022
- CS 513 Numerical Linear Algebra, Teaching Assistant, UW-Madison, Spring 2024
- CS 639 Introduction to Computational Learning Theory, Grader, UW-Madison, Fall 2025

Skills

- **Coding**: Python, C++, MATLAB, Mathematica, Pytorch
- **Language**: Chinese, English