

JIANHAO MA

jianhao@umich.edu <https://jianhaoma.github.io>

RESEARCH INTERESTS

Nonconvex optimization; algorithmic robust statistics; deep learning theory.

EDUCATION

University of Michigan, Ann Arbor

Department of Industrial and Operational Engineering

Advisor: Prof. Salar Fattahi

January 2021 - 2025 (expected)

Ph.D. candidate

Tsinghua University

B.E. in Industrial Engineering and B.S. in Mathematics

September 2016 - June 2020

University of California, Berkeley

Exchange student in the Department of Statistics

January 2019 - August 2019

AWARDS

- Finalist for the INFORMS JFIG Paper Competition (as a coauthor), 2023.
- Katta Murty Prize for Best Research Paper on Optimization, IOE Department, 2023.
- NeurIPS Scholar Award, 2022.

EXPERIENCE

IIIS, Tsinghua University

Visiting student, hosted by Prof. Yuhao Wang.

August 2020 - June 2021

AI Lab, ByteDance

Machine learning engineer intern in deep reinforcement learning lab.

April 2020 - July 2020

PUBLICATIONS

1. **Jianhao Ma**, Salar Fattahi, “Global Convergence of Sub-gradient Method for Robust Matrix Recovery: Small Initialization, Noisy Measurements, and Over-parameterization”, *Journal of Machine Learning Research (JMLR)*, 2023. [link]
2. **Jianhao Ma**, Lingjun Guo, Salar Fattahi, “Behind the Scenes of Gradient Descent: A Trajectory Analysis via Basis Function Decomposition”, *International Conference on Learning Representations (ICLR)*, 2023. [link]
3. **Jianhao Ma**, Salar Fattahi, “Blessing of Nonconvexity in Deep Linear Models: Depth Flattens the Optimization Landscape Around the True Solution”, *Advances in Neural Information Processing Systems* (NeurIPS), 2022 (**Spotlight**). [link]
4. Jiaye Teng*, **Jianhao Ma***, Yang Yuan, “Towards Understanding Generalization via Decomposing Excess Risk Dynamics”, *International Conference on Learning Representations (ICLR)*, 2022. [link]
5. **Jianhao Ma**, Salar Fattahi, “Sign-RIP: A Robust Restricted Isometry Property for Low-rank Matrix Recovery”, NeurIPS Workshop on Optimization for Machine Learning, 2021. [link]

PREPRINTS

1. **Jianhao Ma**, Salar Fattahi, “Convergence of Gradient Descent with Small Initialization for Unregularized Matrix Completion”, submitted for publication, 2024. [link]
2. **Jianhao Ma**, Rui Ray Chen, Yinghui He, Salar Fattahi, Wei Hu, “Robust Sparse Mean Estimation via Incremental Learning”, submitted for publication, 2023. [link]
3. **Jianhao Ma**, Salar Fattahi, “On the Optimization Landscape of Burer-Monteiro Factorization: When do Global Solutions Correspond to Ground Truth?”, submitted for publication, 2023. [link]

INVITED TALK/PRESENTATION

1. “Blessing of Nonconvexity in Deep Linear Models: Depth Flattens the Optimization Landscape Around the True Solution”. INFORMS Annual Meeting, Indianapolis, IN, October 2022.
2. “Global Convergence of Sub-gradient Method for Robust Matrix Recovery: Small Initialization, Noisy Measurements, and Over-parameterization”. INFORMS 2022 Optimization Society Conference, Greenville, SC, March 2022.
3. “Sign-RIP: A Robust Restricted Isometry Property for Low-rank Matrix Recovery”. INFORMS Annual Meeting, Anaheim, CA, October 2021.
4. “Sign-RIP: A Robust Restricted Isometry Property for Low-rank Matrix Recovery”. MOPTA Conference, Bethlehem, PA, August 2021.

ACTIVITIES/ACADEMIC SERVICE

Organizer

Co-organizer of the session “Recent Advances in Data-Driven Nonconvex Optimization” at INFORMS Annual Meeting, Anaheim, CA, October 2021.

Reviewer

IEEE Transactions on Signal Processing, ICML, NeurIPS, ICLR, AISTATS, NeurIPS Workshop on Optimization for Machine Learning.

PROFESSIONAL SKILLS

Programming Languages

Python, MATLAB, R.