

JIANHAO MA

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

RESEARCH INTERESTS

Nonconvex optimization; algorithmic robust statistics; compressed sensing and signal processing.

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

- Rackham Predoctoral Fellowship, University of Michigan *2024-2025*
- INFORMS Junior Faculty Interest Group Paper Competition – Second Place (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, “Convergence of Gradient Descent with Small Initialization for Unregularized Matrix Completion”, Conference on Learning Theory (COLT), 2024. [link]
2. **Jianhao Ma**, Rui Ray Chen, Yinghui He, Salar Fattahi, Wei Hu, “Robust Sparse Mean Estimation via Incremental Learning”, *ICLR Workshop on Bridging the Gap Between Practice and Theory in Deep Learning*, 2024. [link]
3. **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]
4. **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]
5. **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]

6. Jiaye Teng*, **Jianhao Ma***, Yang Yuan, “Towards Understanding Generalization via Decomposing Excess Risk Dynamics”, *International Conference on Learning Representations (ICLR)*, 2022. [link]
7. **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, “Can Learning Be Explained By Local Optimality In Low-rank Matrix Recovery?”, submitted for publication, 2023. [link]

INVITED TALK/PRESENTATION

1. “Robust Matrix Recovery through Nonconvex Optimization: Challenges and Promises”. SEEM Seminar Series at The Chinese University of Hong Kong, Hong Kong, April 2024.
2. “Convergence of Gradient Descent with Small Initialization for Unregularized Matrix Completion”. INFORMS Optimization Society Conference, Houston, TX, March 2024.
3. “Behind the Scenes of Gradient Descent: A Trajectory Analysis via Basis Function Decomposition”. INFORMS Annual Meeting, Phoenix, AZ, October 2023.
4. “Blessing of Nonconvexity in Deep Linear Models: Depth Flattens the Optimization Landscape Around the True Solution”. INFORMS Annual Meeting, Indianapolis, IN, October 2022.
5. “Global Convergence of Sub-gradient Method for Robust Matrix Recovery: Small Initialization, Noisy Measurements, and Over-parameterization”. INFORMS Optimization Society Conference, Greenville, SC, March 2022.
6. “Sign-RIP: A Robust Restricted Isometry Property for Low-rank Matrix Recovery”. INFORMS Annual Meeting, Anaheim, CA, October 2021.
7. “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 Information Theory, IEEE Transactions on Signal Processing, ICML, NeurIPS, ICLR, AISTATS, NeurIPS Workshop on Optimization for Machine Learning.

PROFESSIONAL SKILLS

Programming Languages Python, MATLAB, R.