Jiajin Li

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Research Interests

My research lies in the interface of continuous optimization and machine learning, with a primary focus on the algorithmic and theoretical foundations for solving data-driven decision-making problems.

Academic Experience

Stanford University Nov 2021 -
Postdoctoral Researcher
Advisor: Jose H. Blanchet

The Chinese University of Hong Kong Aug 2017 - Aug 2021
Ph.D. in Operation Research
Advisor: Anthony Man-Cho So

Massachusetts Institute of Technology Aug 2020 - Mar 2021
Visiting Ph.D. Student
Advisor: Justin Solomon

Chongqing University Sep 2013 - Jun 2017
B.S. in Statistics

Selected Publications

1. Nonsmooth Composite Nonconvex-Concave Minimax Optimization PDF
   Jiajin Li, Linglingzhi Zhu, Anthony Man-Cho So
   NeurIPS 2022 Workshop on Optimization for Machine Learning (**OPT 2022**), **Oral**.
   To be submitted to **Mathematical Programming**.

2. Tikhonov Regularization is Optimal Transport Robust under Martingale Constraints PDF
   Jiajin Li, Sirui Lin, Jose Blanchet, Viet Anh Nguyen.
   Neural Information Processing Systems (**NeurIPS**), 2022.

3. Fast and Provably Convergent Algorithms for Gromov-Wasserstein in Graph Data PDF
   Jiajin Li, Jianheng Tang, Lemin Kong, Huikang Liu, Jia Li, Anthony Man-Cho So and Jose Blanchet.
   Preliminary version has been submitted to (**ICLR**), 2023.
   To be submitted to **Journal of Machine Learning Research**.

4. Modified Frank Wolfe in Probability Space PDF
   Jose Blanchet*, Peter Glynn*, Carson Kent*, Jiajin Li* (alphabetical order)
   Preliminary version appeared in Neural Information Processing Systems (**NeurIPS**), 2021.
   To be submitted to **Foundations of Computational Mathematics**.

5. Towards a First-Order Algorithmic Framework for Distributionally Robust Risk Minimization PDF
   Jiajin Li, Caihua Chen, Anthony Man-Cho So, Sen Huang.
   Preliminary version appeared in Neural Information Processing Systems (**NeurIPS**), 2019.
   To be submitted to **Mathematical Programming**.

Full Publication List (Google scholar)

1. Policy Optimization with Second-Order Advantage Information PDF
   Jiajin Li*, Baoxiang Wang*. (alphabetical order)
   International Joint Conference on Artificial Intelligence (**IJCAI**), 2018.

2. A First-Order Algorithmic Framework for Distributionally Robust Logistic Regression PDF
Jiajin Li, Sen Huang, Anthony Man-Cho So.
Neural Information Processing Systems (**NeurIPS**), 2019.

3. Understanding Notions of Stationarity in Nonsmooth Optimization: A Guided Tour of Various Constructions of Subdifferential for Nonsmooth Functions PDF
Jiajin Li, Anthony Man-Cho So, Wing-Kin Ma.
IEEE Signal Processing Magazine (**SPM**), 2020, 37(5):18-31.

4. Fast Epigraphical Projection-based Incremental Algorithms for Wasserstein Distributionally Robust Support Vector Machine PDF
Jiajin Li, Caihua Chen, Anthony Man-Cho So.
Neural Information Processing Systems (**NeurIPS**), 2020.

5. Dirichlet Graph Variational Autoencoder PDF
Jia Li, Jianwei Yu, **Jiajin Li**, Honglei Zhang, Kangfei Zhao, Yu Rong, Hong Cheng, Junzhou Huang.
Neural Information Processing Systems (**NeurIPS**), 2020.

6. The Gambler's Problem and Beyond PDF
Baoxiang Wang, Shuai Li, **Jiajin Li**, Siu On Chan.
International Conference on Learning Representations (**ICLR**), 2020.

7. Low-Cost Lipschitz-Independent Adaptive Importance Sampling of Stochastic Gradients PDF
Huikang Liu, Xiaolu Wang, **Jiajin Li**, Anthony Man-Cho So.
International Conference on Pattern Recognition (**ICPR**), 2020.

8. Modified Frank Wolfe in Probability Space PDF
Carson Kent, **Jiajin Li**, Jose Blanchet, Peter Glynn
Neural Information Processing Systems (**NeurIPS**), 2021.

9. Deconvolutional Networks on Graph Data PDF
Jia Li, **Jiajin Li**, Yang Liu, Jianwei Yu, Yueting Li, Hong Cheng
Neural Information Processing Systems (**NeurIPS**), 2021.

10. A Splitting Scheme for Flip-Free Distortion Energies PDF
Oded Stein, **Jiajin Li**, Justin Solomon
SIAM Journal on Imaging Sciences (**SIIMS**), 2022.

11. Rethinking Graph Neural Networks for Anomaly Detection PDF
Jianheng Tang, **Jiajin Li**, Ziqi Gao, Jia Li.
International Conference on Machine Learning (**ICML**), 2022.

12. Tikhonov Regularization is Optimal Transport Robust under Martingale Constraints PDF
Jiajin Li, Sirui Lin, Jose Blanchet,Viet Anh Nguyen.
Neural Information Processing Systems (**NeurIPS**), 2022.

13. Nonsmooth Composite Nonconvex-Concave Minimax Optimization PDF
Jiajin Li, Linglingzhi Zhu, Anthony Man-Cho So.
NeurIPS 2022 Workshop on Optimization for Machine Learning (**OPT 2022**).
To be submitted to **Mathematical Programming**.

14. Robust Attributed Graph Alignment via Joint Structure Learning and Optimal Transport
Jianheng Tang Weiqi Zhang, **Jiajin Li**, Kangfei Zhao, Fugee Tsung, Jia Li.
Accepted by International Conference on Data Engineering (**ICDE**), 2023.

15. A Convergent Single-Loop Algorithm for for Gromov-Wasserstein in Graph Data PDF
Jiajin Li, Jianheng Tang, Lemin Kong, Huikang Liu, Jia Li, Anthony Man-Cho So and Jose Blanchet.
Submitted to **ICLR 2023**.

16. Learning Proximal Operators to Discover Multiple Optima PDF
Lingxiao Li, Noam Aigerman, Vladimir G. Kim, **Jiajin Li**, Kristjan Greenewald, Mikhail Yurochkin, Justin Solomon
Submitted to **ICLR 2023**.

17. Wasserstein Distributionally Robust Linear-Quadratic Estimation under Martingale Constraints
Kyriakos Lotidi, Nicholas Bambos, Jose Blanchet, **Jiajin Li**
Submitted to **AISTATS 2023**.

18. Synthetic Principle Component Design: Fast Experimental Design with Synthetic Controls PDF
Yiping Lu, **Jiajin Li**, Jose Blanchet, Lexing Ying.
NeurIPS 2022 Workshop on Causality for Real-world Impact.
Submitted to **AISTATS 2023**.

Working Papers

19. Escape from the Limit Cycle: Double Smoothed GDA for Nonconvex-Nonconcave Minimax Optimization
Taoli Zheng, Linglingzhi Zhu, Anthony Man-Cho So, Jose Blanchet, **Jiajin Li**.

20. Unifying Divergence and Wasserstein DRO: An Optimal Transport Approach
Jose Blanchet*, Daniel Kuhn*, **Jiajin Li***, Bahar Taskesen* (alphabetical order)

21. Outlier-Robust Gromov-Wasserstein
Lemin Kong, Anthony Man-Cho So, **Jiajin Li**.

22. Sinkhorn Frank-Wolfe Method in Probability Space
Work with Jose Blanchet and Kyriakos Lotidis.

23. Optimistic Optimal Transport for Automatic Outilier Removal Mechanism
Jose Blanchet*, **Jiajin Li***, Markus Pelger* and Greg Zanotti* (alphabetical order)

24. Minimax Optimization in Probability Space with Wasserstein Geometry
work with Jose Blanchet.

25. Rockfellia Relaxation in Probability Space with Wasserstein Geometry
Work with Jose Blanchet, Yiping Lu and Johannes O. Royset.

Professional Services

- **Session Chair**, International Conference on Continuous Optimization (ICCOPT) 2022, Bethlehem, PA
Recent Advances in Distributionally Robust Optimization
- **Reviewer**, Neural Information Processing Systems (NeurIPS) 2021, 2020
- **Reviewer**, International Conference on Machine Learning (ICML) 2022, 2021, 2020
- **Reviewer**, International Conference on Learning Representation (ICLR) 2022
- **Reviewer**, International Conference on Artificial Intelligence and Statistics (AISTATS) 2023
- **Reviewer**, Operation Research
- **Reviewer**, Mathematics of Operation Research
- **Reviewer**, Mathematical Programming
- **Reviewer**, SIAM Journal on Optimization
- **Reviewer**, Journal of Global Optimization
- **Reviewer**, IEEE Transactions on Knowledge and Data Engineering (T-KDE)
- **Reviewer**, Pattern Recognition

Invited Presentations

1. Tikhonov Regularization is Optimal Transport Robust under Martingale Constraints
   — INFORMS Anuual Meeting, October, 2022.
   — UT Austin EECS Rising Stars Workshop, October, 2022.

2. Nonsmooth Composite Nonconvex-Concave Minimax Optimization in Distributionally Robust Optimization
   — International Conference on Continuous Optimization (ICCOPT), July, 2022.

3. Modified Frank-Wolfe in Probability Space
   — Workshop "Robustness and Resilience in Stochastic Optimization and Statistical Learning: Mathematical Foundations", May, 2022.
   — VinAI NeurIPS 2021 Workshop, Nov, 2021.

4. Efficient and Provable Algorithms for Wasserstein Distributionally Robust Optimization in Machine Learning
   — INFORMS Anuual Meeting, October, 2021.
   — University of Maryland, College Park (UMD), January, 2021.
   — ETH AI Center Post-Doctoral Fellowship Symposium, March, 2021.
   — Shanghai Jiao Tong University (SJTU), April, 2021.

5. Fast Epigraphical Projection-based Incremental Algorithms for Wasserstein Distributionally Robust Support Vector Machine
   — Geometric Data Processing Group, MIT, August, 2020.
   — NeurIPS 2020 (Poster), December, 2020.

6. A First-Order Algorithmic Framework for Distributionally Robust Logistic Regression
   — The 17th Chinese Workshop on Machine Learning and applications (MLA 2019).
   — NeurIPS 2019 (Poster), December, 2019.

7. Policy Optimization with Second-Order Advantage Information
   — IJCAI 2018 (Poster), July, 2018.

Awards and Honors

UT Austin EECS Rising Star	2023
Shortlist for ETH AI Center Post-Doctoral Fellowship	2021
Postgraduate Scholarship in CUHK	2017-2021
NeurIPS Student Travel Award	2019
ICML Student Travel Award	2018
IJCAI-ECAI Student Travel Grant	2018
Outstanding Graduates of Chongqing City	2017
Outstanding Undergraduate Thesis of Chongqing University	2017
Meritorious Winner at the American Interdisciplinary Contest in Modeling (ICM)	2015

Teaching Assistants in the Chinese University of Hong Kong

ENGG 5501: Foundation of Optimization	Fall 2019, 2020
ESTR 2004: Discrete Mathematics for Engineers (ELITE Stream)	Fall 2019, 2020
SEEM 4670: Service Systems	Spring 2019
ENGG 2440B: Discrete Mathematics for Engineers	Fall 2018
ENGG 1410A: Linear Algebra and Vector Calculus	Spring 2018

List of Referees

1. Jose H. Blanchet (jose.blanchet@stanford.edu)
   Professor, Department of Management Science and Engineering
   Stanford University

2. Anthony Man-Cho So (manchoso@se.cuhk.edu.hk)
   Professor, Department of Systems Engineering and Engineering Management
   The Chinese University of Hong Kong

3. Justin Solomon (jsolomon@mit.edu)
   Associate Professor, Department of Electrical Engineering & Computer Science
   Massachusetts Institute of Technology

4. Johannes O. Royset (joroyset@nps.edu)
   Professor, Operations Research Department
   Naval Postgraduate School