Hongyang (Ryan) Zhang

Khoury College of Computer Sciences
177 Huntington Avenue, Floor 22, Room 2211, Boston, MA 02115, US
Email: ho.zhang@northeastern.edu
Homepage: https://www.hongyangzhang.com/
Born: August, 1990

Current Position

2020-   *Assistant Professor*, Computer Science, Northeastern University, Boston

Research Areas

Machine learning, Learning theory, Design and analysis of algorithms, Social networks

Previous Employment

2019-2020   *Postdoctoral Researcher*, Department of Statistics and Data Science, University of Pennsylvania, Philadelphia

2012-2013   *Research Assistant*, School of Physical and Mathematical Sciences, Nanyang Technological University, Singapore

Education

2019   **Ph.D.** in **Computer Science**, Stanford University, Stanford

2012   **B.Eng.** in **Computer Science**, Shanghai Jiao Tong University, Shanghai

Research Papers

* indicates alphabetical authorship or equal contribution
† indicates that the student is advised by me during the project
See also DBLP for bibliographic information

Working Papers

Precise High-Dimensional Asymptotics for Quantifying Heterogeneous Transfers, by F. Yang, H. R. Zhang, S. Wu, C. Ré, and W. Su

Noise Stability Optimization for Flat Minima with Tight Rates, by H. Ju[†], D. Li[†], and H. R. Zhang, 2023. Presented at NeurIPS Workshop on Optimization 2023

Refereed Conference and Journal Publications

2023 **Graph Neural Networks for Road Safety Modeling: Datasets and Evaluations for Accident Analysis**, by A. Nippani[†], D. Li[†], H. Ju[†], H. N. Koutsopoulos, H. R. Zhang, in *Proceedings of NeurIPS* 2023 (Datasets Track)

Improved Group Robustness via Classifier Retraining on Independent Splits, by T. H. Nguyen, H. R. Zhang, and H. L. Nguyen, in *Transactions on Machine Learning Research* 2023

Boosting Multitask Learning on Graphs through Higher-Order Task Affinities, by D. Li[†], by H. Ju[†], A. Sharma, and H. R. Zhang, in *Proceedings of KDD* 2023

Identification of Negative Transfers in Multitask Learning Using Surrogate Models, by D. Li[†], H. L. Nguyen, and H. R. Zhang, in *Transactions on Machine Learning Research* 2023, *featured certification*

Generalization in Graph Neural Networks: Improved PAC-Bayesian Bounds on Graph Diffusion, by H. Ju[†], D. Li[†], A. Sharma, and H. R. Zhang, in *Proceedings of AISTATS* 2023

Optimal Intervention on Weighted Networks via Edge Centrality, by D. Li[†], T. Eliassi-Rad, and H. R. Zhang, in *Proceedings of SDM* 2023

2022 **Robust Fine-Tuning of Deep Neural Networks with Hessian-based Generalization Guarantees**, by H. Ju[†], D. Li[†], H. R. Zhang, in *Proceedings of ICML* 2022

Correct-N-Contrast: A Contrastive Approach for Improving Robustness to Spurious Correlations, by M. Zhang, N. Sohoni, H. R. Zhang, C. Finn, and C. Ré, in *Proceedings of ICML* 2022, *long presentation*

Incentive Ratio: A Game Theoretical Analysis of Market Equilibria, by N. Chen[*], X. Deng[*], B. Tang[*], H. R. Zhang[*], and J. Zhang[*], in *Information and Computation* 2022

2021 **Improving Regularization and Robustness for Fine-tuning in Neural Networks**, by D. Li[†] and H. R. Zhang, in *Proceedings of NeurIPS* 2021

Observational Supervision for Medical Image Classification using Gaze Data, by K. Sabb, S. Hooper, N. Sohoni, J. Parmar, B. Pogatchnik, S. Wu, J. Dunnmon, H. R. Zhang, D. Rubin, and C. Ré, in *Proceedings of MICCAI* 2021

2020 **Learning Over-Parametrized Two-Layer ReLU Neural Networks beyond NTK**, by Y. Li[*], T. Ma[*], and H. R. Zhang[*], in *Proceedings of COLT* 2020

On the Generalization Effects of Linear Transformations in Data Augmentation, by S. Wu[*], H. R. Zhang[*], G. Valiant, and C. Ré, in *Proceedings of ICML* 2020

Understanding and Improving Information Transfer in Multi-Task Learning, by S. Wu[*], H. R. Zhang[*], and C. Ré, in *Proceedings of ICLR* 2020

2019   **Pruning based Distance Sketches with Provable Guarantees on Random Graphs**, by H. Zhang, H. Yu, and A. Goel, in *Proceedings of WWW* 2019, *oral presentation*

Recovery Guarantees for Quadratic Tensors with Sparse Observations, by H. Zhang, V. Sharan, M. Charikar, and Y. Liang, in *Proceedings of AISTATS* 2019

2018   **Algorithmic Regularization in Over-parameterized Matrix Sensing and Neural Networks with Quadratic Activations**, by Y. Li[*], T. Ma[*], and H. Zhang[*], in *Proceedings of COLT* 2018, *best paper award*

2016   **Approximate Personalized PageRank on Dynamic Graphs**, by H. Zhang, P. Lofgren, and A. Goel, in *Proceedings of KDD* 2016

Incentives for Strategic Behavior in Fisher Market Games, by N. Chen[*], X. Deng[*], B. Tang[*], and H. Zhang[*], in *Proceedings of AAAI* 2016

2015   **A Note on Modeling Retweet Cascades on Twitter**, by A. Goel[*], K. Munagala[*], A. Sharma[*], and H. Zhang[*], in *Proceedings of WAW* 2015

Connectivity in Random Forests and Credit Networks, by A. Goel[*], S. Khanna[*], S. Raghvendra[*], and H. Zhang[*], in *Proceedings of SODA* 2015

2012   **Computing the Nucleolus of Matching, Cover and Clique Games**, by N. Chen, P. Lu, and H. Zhang[*], in *Proceedings of AAAI* 2012, *oral presentation*

Incentive Ratios of Fisher Markets, by N. Chen[*], X. Deng[*], *H. Zhang*[*], and J. Zhang[*], in *Proceedings of ICALP* 2012

Fixed-parameter tractability of almost CSP problem with decisive relations, by C. Zhang[*] and H. Zhang[*], in *Proceedings of FAW-AAIM* 2012

2011   **On Strategy-proof Allocation without Payments or Priors**, L. Han[*], C. Su[*], L. Tang[*], and H. Zhang[*], in *Proceedings of WINE* 2011

Advising

2021-   Dongyue Li, Ph.D. in CS

2021-   Haotian Ju, MS in Data Analytics Engineering; Ph.D. in CS since 2024

2023-   Mahdi Maghifam, Khoury Postdoc Fellow

Professional Services

Departmental Service: Ph.D. Admissions Committee 2020-2023, Ph.D. Curriculum Committee 2023-2024

Conference Organization: INFORMS Session Chair 2023-2024

Program Committee/Reviewer: COLT 2024, NeurIPS 2019-2023, ICML 2019-2023, ICLR 2019-2023, KDD 2022-2023, AAAI 2019-2023, AISTATS 2021-2022, WSDM 2023-2024, WWW 2022

Senior Program Committee/Meta-Reviewer: ICML 2024, AISTATS 2023-2024, ALT 2024

Ad-hoc Conference Reviewer: STOC, FOCS, SODA, ITCS, WINE, ICALP, CVPR

Ad-hoc Journal Reviewer: Algorithmica, ACM Transactions on Modeling and Performance Evaluation of Computing Systems, IEEE Transactions on Information Theory, Journal of Machine Learning Research, Transactions on Machine Learning Research

Proposal Reviewer and Panelist: NSF Information and Intelligent Systems 2022, NSF Reviewer and Panelist 2024

Presentations

2023   *Generalization in Neural Networks: Recent Trend and Future Outlook:* Yale, March 2023

Information Transfer in Multitask Learning, Data Augmentation, and Beyond: New Faculty Highlight talk at AAAI, February 2023

2022   *Information Transfer from Heterogeneous Sources via High-dimensional Asymptotics:* INFORMS

Mining social, mobility networks: A random walk: Network Science Institute, Northeastern, April 2022

Understanding and improving generalization in multitask and transfer learning: One World Seminar Series on the Mathematics of Machine Learning, May 2022; Northeastern University CS Theory Lunch Seminar, March 2022

2021   *Robust and Generalizable Algorithms for Learning from Multiple Datasets:* Shanghai Jiao Tong University, October 2021; Worcester Polytechnic Institute, November 2021

2020   *Generalization Effects of Linear Transformations in Data Augmentation*: Northeastern University Data Lab, July 2020; Workshop on Equivariance and Data Augmentation, University of Pennsylvania, September 2020

        Information Transfer in Multi-task Learning: ML+X Seminar, Brown, December 2020

2019   *Better Algorithms and Generalization for Large-Scale Data*: Tsinghua University, December 2018; Hong Kong University of Science and Technology, February 2019; Chinese University of Hong Kong, February 2019; Google Research, March 2019; Northeastern University, March 2019; Peking University, April 2019; Rensselaer Polytechnic Institute, April 2019; Salesforce Research, April 2019

2018   *Algorithmic Regularization in Over-parameterized Models*: Conference on Learning Theory, July 2018; UC Santa Cruz, July 2018; Google Research, July 2018; Peking University, December 2018

Teaching

Supervised Machine Learning and Learning Theory	Fall 2021, Fall 2022, Fall 2024
Machine Learning	Fall 2023
Machine Learning and Data Mining I	Spring 2023
Advanced Machine Learning	Spring 2021, Spring 2022, Spring 2023
Algorithmic and Statistical Aspects of Deep Learning	Fall 2020

Recognition & Fellowship

2023   Featured Certification, Transactions on Machine Learning Research

2023   New Faculty Highlights, Association for the Advancement of Artificial Intelligence

2018   Best Paper Award, Annual Conference on Learning Theory

2013   School of Engineering Fellowship, Stanford University