Yanjun Han (Updated Oct. 2021)

CONTACT INFORMATION

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RESEARCH INTERESTS

- high-dimensional and nonparametric statistics
- online learning and bandits
- statistical machine learning
- information theory
- optimization
- probability theory

EDUCATION

University of California, Berkeley, Berkeley, CA, USA

Postdoctoral scholar, Simons Institute for the Theory of Computing

- Aug. 2021 - Present

Stanford University, Stanford, CA, USA

Ph.D., Electrical Engineering

- Sept. 2015 - Aug. 2021
- Advisor: Prof. Tsachy Weissman
- Co-advisor: Prof. Andrea Montanari

M.S., Electrical Engineering

- Sept. 2015 - Jun. 2017
- Advisor: Prof. Tsachy Weissman

Tsinghua University, Haidian, Beijing, China

B.E., Electronic Engineering, Aug. 2011 - Jul. 2015

B.S., School of Economics and Management (second degree), Sept. 2012 - Jul. 2015

PREPRINTS

(† stands for alphabetical order)

P4. Nived Rajaraman, **Yanjun Han**, Lin F. Yang, Kannan Ramchandran, Jiantao Jiao, "Provably Breaking the Quadratic Error Compounding Barrier in Imitation Learning, Optimally", Feb. 2021. (arXiv: 2102.12948)

P3. **Yanjun Han**, Zhengyuan Zhou, Aaron Flores, Erik Ordentlich, and Tsachy Weissman, "Learning to Bid Optimally and Efficiently in Adversarial First-price Auctions", Sept. 2020. (arXiv: 2007.04568)

P2. **Yanjun Han**, Zhengyuan Zhou, and Tsachy Weissman, "Optimal No-regret Learning in Repeated First-price Auctions", May 2020. (arXiv: 2003.09795)

P1. **Yanjun Han**, Zhengqing Zhou, Zhengyuan Zhou, Jose Blanchet, Peter Glynn, and Yinyu Ye, "Sequential Batch Learning in Linear Contextual Bandits", Mar. 2020. (arXiv: 2004.06321)

Journal Publications

J17. **Yanjun Han**, Kedar Tatwawadi, Zhengqing Zhou, Gowtham Kurri, Vinod Prabhakaran, and Tsachy Weissman, "Optimal Communication Rates and Combinatorial Properties for Common Randomness Generation", *IEEE Transactions on Information Theory*, to appear.

J16. **Yanjun Han**, Ayfer Özgür, and Tsachy Weissman, "Geometric Lower Bounds for Distributed Parameter Estimation under Communication Constraints", *IEEE Transactions on Information Theory*, to appear.

J15. **Yanjun Han**, Jiantao Jiao, and Tsachy Weissman, "Minimax Rate-Optimal Estimation of Divergences between Discrete Distributions", *Journal on Selected Areas in Information Theory*, vol. 1, no. 3, pp. 814–823, Nov. 2020.

J14. Leighton Barnes, **Yanjun Han**, Ayfer Özgür, "Lower Bounds for Learning Distributions under Communication Constraints via Fisher Information", *Journal of Machine Learning Research*, vol. 21, no. 236, pp. 1–30, 2020.

J13. **Yanjun Han**, Jiantao Jiao, Tsachy Weissman, and Yihong Wu, "Optimal Rates of Entropy Estimation over Lipschitz Balls", *the Annals of Statistics*, vol. 48, no. 6, pp. 3228–3250, Dec. 2020. **(AoS Special Invited Session at JSM 2021)**

J12. **Yanjun Han**, Jiantao Jiao, and Rajarshi Mukherjee, "On Estimation of L_r-Norms in Gaussian White Noise Models", *Probability Theory and Related Fields*, vol. 177, no. 3–4, pp. 1243–1294, 2020.

J11. Jiantao Jiao, and **Yanjun Han**, "Bias Correction Using Jackknife, Bootstrap, and Taylor Series", *IEEE Transactions on Information Theory*, vol. 66, no. 7, pp. 4392–4418, Jul. 2020.

J10. Jiantao Jiao, **Yanjun Han**, Irena Fischer-Hwang, and Tsachy Weissman, "Estimating the Fundamental Limits is Easier than Achieving the Fundamental Limits", *IEEE Transactions on Information Theory*, vol. 65, no. 10, pp. 6704–6715, Oct. 2019.

J9. **Yanjun Han**, Guanyang Wang, "Expectation of the Largest Bet Size in the Labouchere System", *Electronic Communications in Probability*, 24 (2019).

J8. Jiantao Jiao, **Yanjun Han**, and Tsachy Weissman, "Minimax Estimation of the L_1 Distance", *IEEE Transactions on Information Theory*, vol. 64, no. 10, pp. 6672–6706, Oct. 2018.

J7. Jiantao Jiao, **Yanjun Han**, and Tsachy Weissman, "Generalizations of Maximal Inequalities to Arbitrary Selection Rules", *Statistics & Probability Letters*, vol. 137, pp. 19–25, 2018.

J6. Jiantao Jiao, Kartik Venkat, **Yanjun Han**, and Tsachy Weissman, "Maximum Likelihood Estimation of Functionals of Discrete Distributions", *IEEE Transactions on Information Theory*, vol. 63, no. 10, pp. 6774–6798, Oct. 2017.

J5. **Yanjun Han**[†], Or Ordentlich, and Ofer Shayevitz. "Mutual Information Bounds via Adjacency Events," *IEEE Transactions on Information Theory*, Vol. 62, No. 11, pp. 6068–6080, Nov. 2016.

J4. **Yanjun Han**, Yuan Shen, Xiao–Ping Zhang, Moe Z. Win and Huadong Meng. "Performance Limits and Geometric Properties of Narrowband Array Localization", *IEEE Transactions on Information Theory*, Vol. 62, No. 2, pp. 1054–1075, Feb. 2016.

J3. **Yanjun Han**, Jiantao Jiao, and Tsachy Weissman. "Minimax Estimation of Discrete Distributions under ℓ_1 Loss", *IEEE Transactions on Information Theory*, Vol. 61, No. 11, pp. 6343–6354, Nov. 2015.

J2. Jiayi Zhang, Linglong Dai, **Yanjun Han**, Yu Zhang, and Zhaocheng Wang. "On the Ergodic Capacity of MIMO Free-Space Optical Systems over Turbulence Channels", *IEEE Journal on Selected Areas in Communications*, Vol. 33, No. 9, pp. 1925–1934, Sept. 2015.

J1. Jiantao Jiao, Kartik Venkat, **Yanjun Han**, and Tsachy Weissman. "Minimax Estimation of Functionals of Discrete Distributions", *IEEE Transactions on Information Theory*, Vol. 61, No. 5, pp. 2835–2885, May 2015.

Conference Publications

C26. **Yanjun Han**, Soham Jana, and Yihong Wu, "Optimal Prediction of Markov Chains with and without Spectral Gap", *Conference on Neural Information Processing Systems (NeurIPS)*, Dec. 2021.

C25. Nived Rajaraman, **Yanjun Han**, Lin Yang, Jingbo Liu, Jiantao Jiao, Kannan Ramchandran, "On the Value of Interaction and Function Approximation in Imitation Learning", *Conference on Neural Information Processing Systems (NeurIPS)*, Dec. 2021.

C24. Xi Chen, **Yanjun Han**†, and Yining Wang, "Adversarial Combinatorial Bandits with General Non-linear Reward Functions", *International Conference on Machine Learning (ICML)*, Jul. 2021.

C23. **Yanjun Han**, "On the High Accuracy Limitation of Adaptive Property Estimation", *International Conference on Artificial Intelligence and Statistics (AISTATS)*, Apr. 2021.

C22. **Yanjun Han**, Kirankumar Shiragur, "The Optimality of Profile Maximum Likelihood in Estimating Sorted Discrete Distributions", *Symposium on Discrete Algorithms (SODA)*, Jan. 2021.

C21. Zijun Gao, **Yanjun Han**, "Minimax Optimal Nonparametric Estimation of Heterogeneous Treatment Effects", *Conference on Neural Information Processing Systems (NeurIPS)*, Dec. 2020. **(Spotlight, 4% acceptance)**

C20. Jayadev Archaya, Clément Canonne, **Yanjun Han**†, Ziteng Sun, and Himanshu Tyagi, "Domain Compression and its Application to Randomness-Optimal Distributed Goodness-of-Fit", *Conference on Learning Theory (COLT)*, Jul. 2020.

C19. **Yanjun Han**, "Constrained Functional Value under General Convexity Conditions with Applications to Distributed Simulation", *Proceedings of IEEE International Symposium on Information Theory (ISIT)*, Jun. 2020.

C18. Zijun Gao, **Yanjun Han**†, Zhimei Ren, and Zhengqing Zhou, "Batched Multi-armed Bandits Problem", *Conference on Neural Information Processing Systems (NeurIPS)*, Vancouver, Canada, Dec. 2019. **(Oral, 0.5% acceptance)**

C17. Leighton Barnes, **Yanjun Han**, Ayfer Ozgur, "Fisher Information for Distributed Estimation under a Blackboard Communication Protocol", *Proceedings of the IEEE International Symposium on Information Theory (ISIT)*, Paris, France, Jul. 2019.

C16. **Yanjun Han**†, Jiantao Jiao, Chuan-Zheng Lee, Tsachy Weissman, Yihong Wu, and Tiancheng Yu, "Entropy Rate Estimation for Markov Chains with Large State Space", *Conference on Neural Information Processing Systems (NIPS)*, Montréal, Canada, Dec. 2018. **(Spotlight, 4% acceptance)**

C15. Jiantao Jiao, Weihao Gao, and **Yanjun Han**, "The Nearest Neighbor Information Estimator is Adaptively Near Minimax Rate-Optimal", *Conference on Neural Information Processing Systems (NIPS)*, Montréal, Canada, Dec. 2018. **(Spotlight, 4% acceptance)**

C14. **Yanjun Han**, Ayfer Özgür, and Tsachy Weissman, "Geometric Lower Bounds for Distributed Parameter Estimation under Communication Constraints", *Conference on Learning Theory (COLT)*, Stockholm, Sweden, Jul. 2018.

C13. **Yanjun Han**, Jiantao Jiao, and Tsachy Weissman, "Local Moment Matching: a Unified Methodology for Symmetric Functional Estimation and Distribution Estimation under Wasserstein Distance", *Conference on Learning Theory (COLT)*, Stockholm, Sweden, Jul. 2018.

C12. **Yanjun Han**, Pritam Mukherjee, Ayfer Özgür, and Tsachy Weissman, "Distributed Statistical Estimation of High-dimensional and Nonparametric Distributions", *Proceedings of the IEEE International Symposium on Information Theory (ISIT)*, Vail, USA, Jun. 2018.

C11. Jiantao Jiao, **Yanjun Han**, and Tsachy Weissman, "Bounding Exploration Bias for General Measurements", *Proceedings of the IEEE International Symposium on Information Theory (ISIT)*, Aachen, Germany, Jun. 2017.

C10. Jiantao Jiao, Kartik Venkat, **Yanjun Han**, and Tsachy Weissman, "Beyond Maximum Likelihood: from Theory to Practice", *Proceedings of Annual Asilomar Conference on Signals, Systems, and Computers (ASILOMAR)*, Pacific Grove, USA, Nov. 2016.

C9. **Yanjun Han**, Jiantao Jiao, and Tsachy Weissman, "Minimax Rate-optimal Estimation of KL Divergence between Discrete Distributions", *Proceedings of the IEICE International Symposium on Information Theory and Its Applications (ISITA)*, Monterey, USA, Nov. 2016. **(Student Paper Award)**

C8. Jiantao Jiao, **Yanjun Han**, and Tsachy Weissman, "Minimax Estimation of L_1 Distance", *Proceedings of the IEEE International Symposium on Information Theory (ISIT)*, Barcelona, Spain, Jul. 2016. **(Best Student Paper Award Finalist)**

C7. **Yanjun Han**, Jiantao Jiao, and Tsachy Weissman, "Does Dirichlet Prior Smoothing Solve the Shannon Entropy Estimation Problem?", *Proceedings of the IEEE International Symposium on Information Theory (ISIT)*, Hong Kong, China, Jun. 2015.

C6. **Yanjun Han**, Jiantao Jiao, and Tsachy Weissman, "Adaptive Estimation of Shannon Entropy", *Proceedings of the IEEE International Symposium on Information Theory (ISIT)*, Hong Kong, China, Jun. 2015.

C5. **Yanjun Han**, Jiantao Jiao, and Tsachy Weissman. "Minimax Estimation of Discrete Distributions under ℓ_1 Loss", *Proceedings of the IEEE International Symposium on Information Theory (ISIT)*, Hong Kong, China, Jun. 2015.

C4. Jiantao Jiao, Kartik Venkat, **Yanjun Han**, and Tsachy Weissman, "Minimax Estimation of Information Measures", *Proceedings of the IEEE International Symposium on Information Theory (ISIT)*, Hong Kong, China, Jun. 2015.

C3. Jiantao Jiao, Kartik Venkat, **Yanjun Han**, and Tsachy Weissman, "Maximum Likelihood Estimation of Information Measures", *Proceedings of the IEEE International Symposium on Information Theory (ISIT)*, Hong Kong, China, Jun. 2015. **(Semi-plenary talk)**

C2. **Yanjun Han**, Peiyao Zhao, Linzhi Sui, and Zhenkai Fan, "Time-Varying Channel Estimation Based on Dynamic Compressive Sensing for OFDM Systems", *IEEE International Symposium on Broadband Multimedia Systems and Broadcasting (BMSB)*, Beijing, China, Jun. 2014.

C1. **Yanjun Han**, Huadong Meng, Yuan Shen, and Yimin Liu. "Fundamental Localization Accuracy in Narrowband Array-based Systems," *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, Florence, Italy, May 2014. **(Oral)**

Invited Talks

T10. Learning to bid in repeated first-price auctions

- Department of Statistics, Harvard University — Feb. 2021
- MIT EECS Special Seminar — Feb. 2021
- Statistics Group, Department of DSO, USC Marshall — Feb. 2021
- Department of IOE, University of Michigan — Feb. 2021
- Stanford Statistics Seminar — Feb. 2021
- Informs Annual Meeting — Nov. 2020
- Econ Reading Group, Stanford Graduate School of Business — Oct. 2020
- Stanford Information Theory Forum — Sept. 2020
- Quant Marketing WIP Seminar, Stanford Graduate School of Business — Sept. 2020
- Yahoo! Faculty and Research Engagement Program (FREP) — Jul. 2020
- Conference on Information Sciences and Systems (CISS), Princeton University (canceled due to Covid-19) — Mar. 2020

T9. High-accuracy optimality and limitation of the Profile Maximum Likelihood

- Prof. Yury Polyanskiy's group meeting — Feb. 2021
- Symposium on Discrete Algorithms (SODA), virtual — Jan. 2021
- Stanford Information Theory Forum — Sept. 2020

T8. Optimal rates of entropy estimation over Lipschitz balls

- Annals of Statistics Special Invited Session at JSM — Aug. 2021
- Department of Electronic Engineering, Tsinghua University — Jul. 2018

T7. Optimal communication rates and combinatorial properties for distributed simulation

- Workshop on Local Algorithms (WOLA), virtual — Jul. 2020

T6. Domain compression and its application to randomness-optimal distributed goodness-of-fit

- Conference on Learning Theory (COLT), virtual — Jul. 2020

T5. Constrained functional value under general convexity conditions with applications to distributed simulation

- International Symposium on Information Theory (ISIT), virtual — Jun. 2020

T4. Batched multi-armed bandit problem

- Conference on Information Sciences and Systems (CISS), Princeton University (canceled due to Covid-19) — Mar. 2020
- Oral presentation at Neural Information Processing Systems (NeurIPS), Vancouver, Canada — Dec. 2019

T3. Geometric lower bounds for distributed parameter estimation under communication constraints

- Conference on Learning Theory (COLT), Stockholm, Sweden — Jul. 2018

– International Symposium on Information Theory (ISIT), Vail, Colorado, USA Jun. 2018

T2. Local moment matching: A unified methodology for symmetric functional estimation and distribution estimation under Wasserstein distance

– Conference on Learning Theory (COLT), Stockholm, Sweden Jul. 2018
– Department of Electronic Engineering, Tsinghua University Jul. 2017

T1. Approximation in high-dimensional and nonparametric statistics

– International Symposium on Information Theory and Its Applications (ISITA), Monterey, California, USA Oct. 2016
– Department of Electronic Engineering, Tsinghua University Jul. 2016

Selected Awards & Honors

Yahoo! Faculty and Research Engagement Program (FREP) Award Jul. 2019
ISITA Student Paper Award Nov. 2016
ISIT Best Student Paper Award Finalist Jul. 2016
Outstanding Undergraduates in Tsinghua **(highest honor)** Jul. 2015
Google Research Award Feb. 2015
Tsinghua presidential award **(highest honor for undergraduates)** Nov. 2014
Gold medal in Chinese Mathematics Olympiad Jan. 2011
Silver medal in Chinese Physics Olympiad Nov. 2010

Teaching Experience

Instructor: EE378C - Information-theoretic Lower Bounds in Data Science Spring 2021
Mentor and main editor of online journal for high schoolers Summer 2019, 2020
Link: https://theinformaticists.com/category/blog/journal-for-high-schoolers/
Online lecture: information-theoretic lower bounds Summer 2019
Link: https://theinformaticists.com/category/blog/online-lectures/
Course Assistant: EE376A - Information Theory Winter 2018 - 2021
Course Assistant: EE378A - Statistical Signal Processing Spring 2016, 2017
Course Assistant: EE376C - Universal Schemes in Information Theory Autumn 2016

Software

Two-stage nearest-neighbor estimator for heterogeneous treatment effect estimation:
– Github: https://github.com/Mathegineer/NonparametricHTE

BaSE (Batched Successive Elimination) policy for batched bandits:
– Github: https://github.com/Mathegineer/batched-bandit

HJW (Han–Jiao–Weissman) Kullback–Leibler divergence estimator:
– Github: https://github.com/Mathegineer/HJW_KL_divergence_estimator

JVHW (Jiao–Venkat–Han–Weissman) entropy and mutual information estimators:
– Github: https://github.com/EEthinker/JVHW_Entropy_Estimators

JVHW (Jiao–Venkat–Han–Weissman) Rényi entropy estimators:
– Github: https://github.com/EEthinker/JVHW-Renyi-entropy-estimators

Professional Activities

Co-organizer:

– 2019 NeurIPS workshop on information theory and machine learning
– Stanford Information Theory Forum

Journal Reviews:

– IEEE Transactions on Information Theory

- The Annals of Statistics
- Bernoulli
- Journal of the American Statistical Association
- Management Science
- Probability and Statistics Letters
- IEEE Transactions on Wireless Communications
- IEEE Communications Letter

Conference Reviews:

- International Symposium on Information Theory (ISIT): 2016 – 2020
- Conference on Learning Theory (COLT): 2018 – 2021
- Neural Information Processing Systems (NeurIPS): 2018 – 2020
- International Conference on Machine Learning (ICML): 2019 – 2020
- Information Theory Workshop (ITW): 2017 – 2020
- Conference on Artificial Intelligence (AAAI): 2020
- International Conference on Artificial Intelligence and Statistics (AISTATS): 2020 – 2021
- Conference on Uncertainty in Artificial Intelligence (UAI): 2020 – 2021