

David Wu

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Education

University of California, Berkeley

Ph.D. in EECS, coadvised by Prasad Raghavendra and Anant Sahai. GPA: 4.0/4.0

Supported by an NSF GRFP and an OpenAI Superalignment Grant

Berkeley, CA

May 2027 (expected)

Massachusetts Institute of Technology

B.S. in Mathematics and Computer Science, GPA: 5.0/5.0

Cambridge, MA

May 2022

Research Interests

Weak-to-strong generalization, knowledge distillation, scaling laws, synthetic data, Markov chains and sampling, algorithms for statistical inference and machine learning

Publications

Papers listed by contribution.....

1. David X. Wu and Anant Sahai. Provable weak-to-strong generalization via benign overfitting. *International Conference on Learning Representations (ICLR)*, 2025 (Previously appeared at NeurIPS 2024 M3L workshop)
2. David X. Wu and Anant Sahai. Precise asymptotic generalization for multiclass classification with overparameterized linear models. In *Neural Information Processing Systems (NeurIPS)*, 2023 (**Spotlight**)
3. David X. Wu, Chulhee Yun, and Suvrit Sra. On the training instability of shuffling SGD with batch normalization. In *Proceedings of the 40th International Conference on Machine Learning (ICML)*, volume 202 of *Proceedings of Machine Learning Research*, pages 37787–37845. PMLR, 23–29 Jul 2023
4. David X. Wu and Anant Sahai. Lower bounds for multiclass classification with overparameterized linear models. In *2023 IEEE International Symposium on Information Theory (ISIT)*, pages 334–339, 2023
5. David X. Wu, David Palmer, and Daryl R DeFord. Maximum a posteriori inference of random dot product graphs via conic programming. *SIAM Journal on Optimization*, 32(4):2527–2551, 2022

Papers listed alphabetically.....

1. Brice Huang, Sidhanth Mohanty, Amit Rajaraman, and David X. Wu. Weak Poincaré Inequalities, Simulated Annealing, and Sampling from Spherical Spin Glasses. *arXiv preprint arXiv:2411.09075*, 2024 (In submission)
2. Kuikui Liu, Sidhanth Mohanty, Prasad Raghavendra, Amit Rajaraman, and David X. Wu. Locally Stationary Distributions: A Framework for Analyzing Slow-Mixing Markov Chains. *IEEE Symposium on Foundations of Computer Science (FOCS)*, 2024
3. Kuikui Liu, Sidhanth Mohanty, Amit Rajaraman, and David X. Wu. Fast Mixing in Sparse Random Ising Models. *IEEE Symposium on Foundations of Computer Science (FOCS)*, 2024
4. Sidhanth Mohanty, Prasad Raghavendra, and David X. Wu. Robust recovery for stochastic block models, simplified and generalized. *ACM Symposium on Theory of Computing (STOC)*, 2024

Skills

Experienced with Python (PyTorch, Tensorflow, numpy, scikit-learn, CVXPY, pandas), Java, \LaTeX , git.

Awards

- OpenAI Superalignment Grant April 2024
- NSF GRFP fellowship July 2022
- Robert M. Fano UROP Award July 2021
- Regneron Science Talent Search, 5th place finalist (\$90,000 award) March 2018

Work Experience

Hudson River Trading

New York, NY

Algorithm Developer Intern

Summer 2021

Developed low level high frequency signals in C++ and Python for trading cryptocurrency perpetuals. Implemented completely automated trading bot with two teammates in C++ for live trading. Modeled market impact of cryptocurrency liquidations with rigorous statistical techniques. Developed data structure to predict liquidation events based on open interest and price data.

Akuna Capital

Chicago, IL

Quantitative Trading Intern

Summer 2020

Identified and developed signals in C++ for a futures trading algorithm. Improved insight generation for feature engineering by creating an interactive market book visualization and an order history dashboard in Python. Designed and implemented a Python package for order-specific feature generation from market book data, taking into account tradeoffs related to data storage formats and scalability.

Akuna Capital

Boston, MA

Quantitative Developer Intern

Summer 2019

Created a user-friendly API in Python for researchers to calculate option theoretical values and greeks. Calculated trade quality metrics for PNL feedback and risk characteristics on trades. Profiled and optimized to remove bottlenecks by batching expensive API calls and using vectorization.

Invited Talks

1. Locally stationary distributions: Inference beyond rapid mixing. Probability Seminar, UC Davis, Davis, CA, November 2024
2. Locally stationary distributions: Inference beyond rapid mixing. Theory Lunch, CMU, Pittsburgh, PA, October 2024
3. Locally stationary distributions: Inference beyond rapid mixing. Algorithms and Combinatorics Seminar, MIT, Cambridge, MA, October 2024
4. Robust recovery for stochastic block models. Theory Lunch, Stanford University, Palo Alto, CA, May 2024
5. Robust recovery for stochastic block models. Algorithms Lunch, CMU, Pittsburgh, PA, March 2024
6. Robust recovery for stochastic block models. Computational Complexity of Statistical Inference Workshop, Banff International Research Station, Banff, Alberta, Canada, February 2024
7. Lower bounds for multiclass classification with overparameterized linear models. International Symposium on Information Theory, Taipei, Taiwan, June 2023
8. Random dot product graph inference. Combinatorics, Linear Algebra, and Number Theory Seminar, Washington State University, December 2020