Rui Yao

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Education

Massachusetts Institute of Technology (MIT) – Cambridge, MA

Ph. D. of MIT EECS - MIT CASIL Theory Group, Advisor: Prof. Costis Daskalakis *Aug. 2023 – Expected May 2028*

- **Relevant Coursework:** 6.S891 Algorithmic Counting and Sampling: Probability, Polynomials, and More; 6.S896 Algorithmic Statistics
- **Research Interest**: Theoretical Computer Science (Algorithms), Statistics, Algorithm, Machine Learning

Massachusetts Institute of Technology (MIT) – Cambridge, MA

Master of Engineering - Conc. in Theoretical Computer Science *Aug. 2022 – May 2023*

- Master's Thesis: Concentration Inequalities for Dependent Random Variables on Bayesian Networks.

Massachusetts Institute of Technology (MIT) – Cambridge, MA GPA: 5.0/5.0

B.S. in Computer Science and Math (General) *Aug. 2019 – May 2022*

- **Relevant Coursework:** 18.675 Theory of Probability, 6.867 Advanced Machine Learning, 6.850 Geometric Computing, 6.854 Advanced Algorithms, 6.849 Geometric Folding Algorithms, 18.404 Theory of Computation, 6.851 Advanced Data Structures, 6.437 Inference and Information, 6.851 Advanced Complexity Theory, 14.12 Game Theory

Publication

Efficient Truncated Linear Regression with Unknown Noise Variance

Co-author with Prof. Costis Daskalakis, Patroklos Stefanou, and Manolis Zampetakis, accepted by NeurIPS 2021 *Jun. 2021*

Learning Gaussian DAG Models without Condition Number Bounds

Co-author with Costis Daskalakis and Vardis Kandiros, accepted by ICML 2025 *Feb. 2025*

Working Paper

Estimating Ising Models in Total Variation Distance

Co-author with Costis Daskalakis and Vardis Kandiros *Apr. 2025*

Fixed Point Computation: Beating Brute Force with Smoothed Analysis

Co-author with Idan Attias, Yuval Dagan, Costis Daskalakis, and Manolis Zampetakis. Arxiv Link. *Nov. 2024*

Research and Working Experience

Researcher Intern - Athena Research Center, Athens, Greece

Archimedes Summer Program *May 2024 – July 2024, June 2022 – Aug. 2022*

- Participated in the Archimedes Summer Program, which focuses on research for algorithms, machine learning, and statistics
- Researched with Prof. Constantinos Daskalakis, Prof. Yuval Dagan, etc. on various topics including causality, high-dimensional statistics, fixed point computation, etc.
- Attended talks given by other professors and students, and also gave a talk on Truncated Statistics
- Attended WALE workshop and presented a poster on Truncated Linear Regression results

Quantitative Trader Intern - New York, NY

Tower Research Capital *June 2023 – Aug. 2023*

- Researched a dataset over the 7 months, over 1 million logs of the market of virtual currencies, mainly using Python
- Worked on finding the cross-coin signals (alphas) of the dataset, and built several trading strategies based on the signals
- On the virtual trading experiments, the signals made a profit for most of the days and got a good profit-per-value ratio

Undergraduate Researcher - Veeramachaneni's Lab, MIT CSAIL, Cambridge, MA

Analysis on Liberty Mutual and Synthetic Data Vault (SDV) *Mar. 2021 – Aug. 2021*

- Both ran and tested experiments on insurance datasets from Kaggle, then investigated the Liberty Mutual dataset
- Designed experiments (merged into DAI-lab here) on SDV dataset to analyze correlations in the synthetic data
- Raised issues to the Synthetic Data Vault GitHub for bugs in the library and attempted to add more features to it

Undergraduate Researcher - Virginia Williams' Lab, MIT CSAIL, Cambridge, MA

Subtree Isomorphism Problem *June 2021 – Jan. 2022*

- Enhanced the query runtime from the 2015 paper using novel heuristics and tighter analysis to search for a better algorithm with Python
- Proposed novel algorithms for bounded degree cases to reduce the exponential constant

Projects

2021 Pokerbots - Cambridge, MA

Blotto Hold 'em bot *Jan. 2021*

* Built and developed a functional bot (here) to play Blotto Hold'em Poker using Python and Java; ranked in the top 10% of 110 teams
* Developed a playing strategy using both classical and counterfactual regret minimization methods

Extracurricular Awards

Morais (1986) and Rosenblum (1986) Fund UROP Award

For "Efficient Truncated Linear Regression with Unknown Noise Variance". Supervised by Prof. Costis Daskalakis. *2023*

The 82nd William Lowell Putnam Mathematical Competition

Ranked 7th out of 2975 in a university-level mathematics examination *Dec. 2021*

The 80th William Lowell Putnam Mathematical Competition

Ranked 6th out of 4229 in a university-level mathematics examination *Dec. 2019*

59th IMO Silver medalist

Ranked 49th out of 594 contestants *Aug. 2018*