Jialin Yu

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yujl1.github.io

Education

Georgia Institute of Technology Aug. 2024 - Aug. 2029 (expected)
PhD student in Operations Research | GPA: 4.0/4.0
Advisor: Prof. Moïse Blanchard

ShanghaiTech University Sep. 2020 - Jun. 2024
BS in Mathematics and Applied Mathematics
GPA: 3.87/4.0 | Major rank: 2/15

Massachusetts Institute of Technology Sep. 2022 - Jan. 2023
Special Student Program (nondegree) | GPA: 5.0/5.0

Research Interests

Memory-constrained optimization, online learning, reliable ML

Publications

Distribution-Free Sequential Prediction with Abstentions
Jialin Yu, Moïse Blanchard
The 36th Annual Conference on Learning Theory, 2026.

Robust SGD under Dataset-Level Corruption: A Batch-Size Rule and an Estimator Separation
Amin Benalla, Katya Scheinberg, **Jialin Yu** *(authors listed alphabetically)*
NeurIPS 2026 Workshop: Dynamics at the Frontiers of Optimization, Sampling, and Games.

Preprints

Exponential memory/query-complexity tradeoffs in high-accuracy feasibility problems
Jialin Yu, Moïse Blanchard
Manuscript submitted to STOC 2027.

Tight Mistake–Abstention Tradeoffs for Sequential Prediction under Adversarial Injections
Moïse Blanchard, Ezra Edelman, Surbhi Goel, Shyam Narayanan, **Jialin Yu** *(authors listed alphabetically)*
Manuscript submitted to ICLR 2027.

Research Experience

Memory-constrained optimization

- Established for high-accuracy feasibility problems, the first memory/query-complexity lower bound tradeoff result --- our theorem shows that algorithms with insufficient memory incurs exponentially more iterates.
- Developed information-theoretic arguments connecting limited algorithmic memory to the difficulty of recovering geometric information from oracle interactions.
- The lower bound involves constructing a hard class of problem instances, which essentially maximize the noise in gradient observations under geometric constraints of the problem. We believe this noise-maxing structure is fundamental, and can be insightful for other problems.

Sequential prediction with abstentions

- Developed algorithms for sequential prediction that abstains from making a prediction whenever it suspects a sample is out-of-distribution. Our algorithm gives near-tight tradeoffs between the prediction error and the abstention error, without any assumption on knowing the distribution of true samples.
- Developed AbstainBoost, a boosting-based algorithm with sublinear-error guarantees for general VC classes under oblivious adversaries and for structured classes, including linear classifiers, under adaptive adversaries.

Robust stochastic gradient descent (SGD) under dataset-level corruption

- Recovered a principled minibatch-size rule for robust SGD under the dataset-level corruption we consider.
- Established a population separation between geometric-median and radius-based estimators under vanishing contamination, which matches the performance of the corresponding robust SGDs in MNIST experiments.

Technical Skills

Programming: Python, MATLAB, Julia

Selected Honors

ISyE Stewart Fellowship, Georgia Institute of Technology, 2024.

Bronze Medal, 36th National Physics Olympiad, 2019; Liaoning provincial finalist team.