R. Teal Witter

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Education

New York University — **New York, NY**
PhD in Computer Science — *September 2020–Present*
Advised by Lisa Hellerstein and Christopher Musco

Middlebury College — **Middlebury, VT**
BA in Mathematics, BA in Computer Science — *February 2017–May 2020*
Phi Beta Kappa, Summa Cum Laude

Research Interests

Algorithms for Social Good • Explainable AI • Fairness • Randomized Linear Algebra • Machine Learning • Deep Learning • Discrete Optimization • Graph Theory • Quantum Computing

National Awards

NSF Graduate Research Fellow *2022-2025*

Goldwater Scholar *2019*

Academic All-American *2015*

Teaching

Randomized Algorithms for Data Science — **Middlebury CSCI 1052**
Course Instructor — *Winter 2024*

Deep Learning — **Middlebury CSCI 1051**
Course Instructor — *Winter 2023*

Deep Learning — **NYU CS-GY 6953**
Course Assistant — *Fall 2022, Spring 2023, Fall 2023*

Algorithmic Machine Learning and Data Science — **NYU CS-GY 6763**
Course Assistant — *Fall 2021, Spring 2022, Fall 2023*

Machine Learning — **NYU CS-GY 6923**
Course Assistant — *Spring 2021, Spring 2023*

Preprints

In the tradition of theoretical computer science, authors appear in alphabetical order unless otherwise marked with an asterisk.

[1] Y. Liu, R. T. Witter, F. Korn, T. Alrashed, D. Paparas, J. Freire. *Kernel Banzhaf: A Fast and Robust Estimator for Banzhaf Values*. 2024.*

[2] C. Musco, R. T. Witter. *Leverage SHAP: Estimating Shapley Values with Leverage Score Sampling*. 2024.*

[3] K. Arabi, B. Feuer, R. T. Witter, C. Hegde, N. Cohen. *Hidden in the Noise: Two-Stage Robust Watermarking for Images*. 2024.*

[4] R. T. Witter, L. Rosenblatt. *FairlyUncertain: A Comprehensive Evaluation of Uncertainty in Algorithmic Fairness*. 2024.*

[5] R. T. Witter, L. Hellerstein. *Minimizing Cost Rather Than Maximizing Reward in Restless Multi-Armed Bandits*. 2024.*

Peer-Reviewed Publications

[6] R. T. Witter and C. Musco. *Benchmarking Estimators for Natural Experiments: A Novel Dataset and a Doubly Robust Algorithm*. Conference on Neural Information Processing Systems, 2024.*

[7] R. T. Witter and L. Rosenblatt. *I Open at the Close: A Deep Reinforcement Learning Evaluation of Open Streets Initiatives*. AAAI Conference on Artificial Intelligence, 2024.*

[8] M. Czekanski, S. Kimmel, R. T. Witter. *Robust and Space-Efficient Dual Adversary Quantum Query Algorithms*. European Symposium on Algorithms, 2023.

[9] L. Rosenblatt, R. T. Witter. *Counterfactual Fairness Is Basically Demographic Parity*. AAAI Conference on Artificial Intelligence, 2023.*

[10] L. Hellerstein, D. Kletenik, N. Liu, R. T. Witter. *Adaptivity Gaps for the Stochastic Boolean Function Evaluation Problem*. Workshop on Approximation and Online Algorithms, 2022.

[11] L. Hellerstein, T. Lidbetter, R. T. Witter. *A Local Search Algorithm for the Min-Sum Submodular Cover Problem*. International Symposium on Algorithms and Computation, 2022.

[12] C. Musco, I. Ramesh, J. Ugander, R. T. Witter. *How to Quantify Polarization in Models of Opinion Dynamics*. International Workshop on Mining and Learning with Graphs, 2022.

[13] S. Kimmel, R. T. Witter. *A Query-Efficient Quantum Algorithm for Maximum Matching on General Graphs*. Algorithms and Data Structures Symposium, 2021.

[14] R. T. Witter. *Backgammon is Hard*. International Conference on Combinatorial Optimization and Applications, 2021.

[15] R. T. Witter, A. Lyford. *Applications of Graph Theory and Probability in the Board Game Ticket to Ride*. International Conference on the Foundations of Digital Games, 2020.*

[16] K. DeLorenzo, S. Kimmel, R. T. Witter. *Applications of the Quantum Algorithm for st-Connectivity*. Conference on the Theory of Quantum Computation, Communication and Cryptography, 2019.

Talks

Estimating the Impact of Social Programs in Resource-Constrained Settings
NYU-KAIST Inclusive AI Workshop *November 2023*

Robust and Space-Efficient Dual Adversary Quantum Query Algorithms
Centrum Wiskunde & Informatica QuSoft Seminar *September 2023*

Quantum Computing and Optimization Minisymposium at SIAM NNP *October 2023*

Adaptivity Gaps for the Stochastic Boolean Function Evaluation Problem
Workshop on Approximation and Online Algorithms *September 2022*

How to Quantify Polarization in Models of Opinion Dynamics
International Workshop on Mining and Learning with Graphs *August 2022*

A Local Search Algorithm for the Min-Sum Submodular Cover Problem
International Symposium on Algorithms and Computation *December 2022*

International Workshop on Mining and Learning with Graphs *January 2022*

Backgammon is Hard
International Workshop on Mining and Learning with Graphs *December 2021*

A Query-Efficient Quantum Algorithm for Maximum Matching on General Graphs
International Workshop on Mining and Learning with Graphs *August 2021*

Applications of Graph Theory and Probability in the Board Game *Ticket to Ride*
International Workshop on Mining and Learning with Graphs *September 2020*

Contributed Paper Session at the Joint Mathematics Meetings *January 2020*

Applications of the Quantum Algorithm for *st*-Connectivity
Conference on the Theory of Quantum Computation, Communication and Cryptography *June 2019*

Service

Conference Reviewing
QIP 2022, ICALP 2022, TQC 2022, NeurIPS 2023, ICLR 2024, ICML 2024, NeurIPS 2024, AAAI 2025
Journal Reviewing
Information Processing Letters, Theoretical Computer Science

Outreach

Extracurricular Coding Club — **Brooklyn International High School**
Instructor — *Spring 2021-2023*

Advising

Syna Sachdeva — **Gaussian Splatting with Latent Representations**
Barnard College '26 — *Summer 2024*

Jack Liu — **Latent Guidance of Large Language Models**
New York University '25 — *Spring 2024-Present*

Xiaorui Lei — **Active Learning and Importance Sampling**
Brooklyn International High School '22 — *Summer 2022*

Bryant Chen — **Active Learning and Importance Sampling**
Brooklyn International High School '22 — *Summer 2022*

References

Christopher Musco
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Lisa Hellerstein
Professor of Computer Science and Engineering, New York University
lisa.hellerstein@nyu.edu

Shelby Kimmel
Associate Professor of Computer Science, Middlebury College
skimmel@middlebury.edu