TIANYU WANG

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Education

Columbia University — New York, United States
Ph.D. in Operations Research — Aug. 2021 - Present
M.S. in Operations Research — Aug. 2021 - Jun. 2022
Advisors: Garud Iyengar, Henry Lam

Tsinghua University — Beijing, China
B.E. in Information Management and Information Systems — Aug. 2017 - Jun. 2021
B.S. in Pure and Applied Mathematics — Aug. 2018 - Jun. 2021

National University of Singapore — Singapore
Exchange Student — Jul. 2019 - Dec. 2019

Research Interests

- Data-Driven Decision-making (Methodology): optimization with performance guarantees, contextual stochastic optimization, robust models against distribution shifts,
- Trustworthy Machine Learning (Application): robustness, explainability and evaluations in operations.

Publications and Preprints

- Garud Iyengar, Henry Lam, **Tianyu Wang***. Uncertainty Quantification of Data-Driven Decisions in Contextual Stochastic Optimization. *Submitted.*
- Jiashuo Liu, Jiayun Wu, **Tianyu Wang**, Hao Zou, Peng Cui. Geometry-Calibrated DRO: Combating Over-Pessimism with Free Energy Implications. *Submitted*
  - Preliminary version appeared in *NeurIPS 2023 Workshop on Distribution Shifts*.
- Garud Iyengar, Henry Lam, **Tianyu Wang***. Optimizer's Information Criterion: Dissecting and Correcting Bias in Data-Driven Optimization. *Under Preparation for Operations Research.*
- **Tianyu Wang**, Ningyuan Chen, Chun Wang. Contextual Optimization under Covariate Shift: A Doubly Robust Perspective. *Under Preparation for Operations Research.*
- Garud Iyengar, Henry Lam, **Tianyu Wang***. Hedging Complexity in Generalization via a Parametric Distributionally Robust Optimization Framework. *Under review at Management Science*.
  - Preliminary version appeared in *AISTATS 2023* (**Notable Paper, 32/1689 = 1.9% of submissions**).
- Jiashuo Liu$^+$, **Tianyu Wang**$^+$, Peng Cui, Hongseok Namkoong. On the Need for a Language Describing Distribution Shifts: Illustrations on Tabular Datasets. *NeurIPS 2023, Datasets and Benchmarks Track.*
- Chi Seng Pun, **Tianyu Wang**, Zhenzhen Yan*. Data-Driven Distributionally Robust CVaR Portfolio Optimization Under Regime-Switching Ambiguity Set. *Manufacturing & Service Operations Management, 2023*.
- **Tianyu Wang**, Chenye Wu, Wei Qi. On Data-Driven Multi-Product Pricing. *IEEE Control Systems Letters,* **5**(5): 1687-1692, 2020. doi: 10.1109/LCSYS.2020.3043591.

*: Authors are listed in alphabetical order. $^+$: Authors are equally contributed.

Talks and Presentations

- Optimizer's Information Criterion: Dissecting and Correcting Bias in Data-Driven Optimization
  INFORMS Annual Meeting, Oct. 2023.
- Hedging against Complexity: Distributionally Robust Optimization with Parametric Approximation
  Oral: *AISTATS 2023 (Apr. 2023), PhD seminar (Sept. 2022)*
  Poster: *NYC Operations Day (May 2023), Columbia Statistical ML Symposium (Apr. 2023)*
- Distributionally Robust Prescriptive Analytics with Wasserstein Distance
  INFORMS Annual Meeting, Oct. 2021 (Remote).

- On Data-Driven Multi-Product Pricing
  American Control Conference (ACC), May. 2021 (Remote).

Research Projects

- Model Selection in Contextual Bandits
  Advisor: David Simchi-levi, at MIT (remote), 2020
  Proposed a nearly optimal and computationally efficient general contextual bandit algorithm to handle model selection problems.
- Real-world Performance Evaluations of General Contextual Bandit Algorithms
  Advisor: David Simchi-levi, at MIT (remote), 2020
  Conducted extensive numerical studies between different general contextual bandit algorithms under different real-world machine learning and revenue management datasets.
- Robust Stochastic Portfolio Optimization: a Clustering Approach
  Advisor: Melvyn Sim, at National University of Singapore, 2019 - 2020.
  Established a distributionally robust portfolio model with event-wise moments ambiguity sets, derived tractable reformulations and implemented efficiently using unsupervised learning approaches.

Industry Experience

Amazon Bellevue, United States
Research Scientist Intern May 2023 - Aug. 2023
Uncertainty Attribution in IPC Simulation

Teaching Experience

At **Columbia University**:

Teaching Assistant, IEOR 4004: Optimization Models and Methods *(MS Core Course)* Spring 2023
- Hold office hours and answer regular questions, give lectures on optimization solvers, help prepare and grade exam questions.
- TA evaluation: 4.34/5.00 (Enrollment: 110)

Teaching Assistant, IEOR 4650: Business Analytics Spring 2022
- Hold office hours, give lectures on basic machine learning models, help prepare exam questions (coding in R) and evaluate group projects.
- TA evaluation: 4.75/5.00 (Enrollment: 29)

At **Tsinghua University**:

Tutor, Basic Courses Fall 2018 - Spring 2021
- Provide academic and problem-solving guidance in courses such as *Calculus, Linear Algebra, Probability and Statistics* and *Computer Programming* for junior students.
- Tutor evaluation: 4.99/5.00 (Service hours: over 300)

Selected Honors and Awards

- Columbia IEOR Department Fellowship, Columbia University 2021
- Distinguished Undergraduate Thesis Award, Tsinghua University 2021
- Comprehensive Excellence Scholarship, Tsinghua University 2018, 2019, 2020
- Fellowship of the 13th “Spark” Innovative Talent Cultivation Program 2019

Additional Information

- Languages: English (Fluent, TOEFL: 104, GRE: 331), Mandarin (Native)
- Computer Skills:
  - Data/Statistic Packages: R, SPSS, Stata
  - Optimization Tools: Gurobi, CPLEX, LINGO
  - Languages: C/C++, Java, Python, SQL, MATLAB, LaTeX