Shixuan Zhang

Contact

Position: Graduate Research Assistant, Georgia Institute of Technology
Address: Main 314, 755 Ferst Drive NW, Atlanta, GA 30332
Email: zhangshixuanus@gatech.edu

Education

- Ph.D in Operations Research, Georgia Institute of Technology, Atlanta, Georgia 2017–Present
  Advisor: Xu Andy Sun, Minor: Mathematics
- B. S. in Mathematics and Physics, Tsinghua University, Beijing, China 2013-2017

Publications and Preprints

1. Amin Gholami, Kaizhao Sun, Shixuan Zhang, and Xu Andy Sun, "Solving Large-scale Security Constrained AC Optimal Power Flow Problems." (2021, Submitted to *Operations Research*).
2. Shixuan Zhang and Xu Andy Sun. "On Distributionally Robust Multistage Convex Optimization: New Algorithms and Complexity Analysis." arXiv preprint arXiv:2010.06759 (2020, Submitted to *Mathematics of Operations Research* under minor revision).
3. Shixuan Zhang and Xu Andy Sun. "Stochastic Dual Dynamic Programming for Multistage Stochastic Mixed-Integer Nonlinear Optimization." arXiv preprint arXiv:1912.13278 (2019, Submitted to *Mathematical Programming* under minor revision), **Honorable Mention** for IOS Student Paper Prize 2021.
4. Shixuan Zhang, Sheng Liu, Tianhu Deng, and Zuo-Jun Max Shen. "Transient-State Natural Gas Transmission in Gunbarrel Pipeline Networks." INFORMS Journal on Computing (2020).
5. Deng, Tianhu, Yong Liang, Shixuan Zhang, Jingze Ren, and Shuyi Zheng. "A Dynamic Programming Approach to Power Consumption Minimization in Gunbarrel Natural Gas Networks with Nonidentical Compressor Units." INFORMS Journal on Computing 31, no. 3 (2019): 593-611.

Honors and Awards

- Honorable Mention for INFORMS Optimization Society Best Student Paper Prize 2021
- Prize winning team (GMI-GO) in the ARPA-E Grid Optimization Competition 2019 & 2021

Research Projects

- **Sum of Squares and Quadratically Constrained Programs** 2020–Present
  Working paper, Advisor: Prof. Andy Sun
  - Study on the exactness of sum-of-squares relaxation of quadratically constrained programs
  - Application in energy system optimization and data-driven adaptive optimization
- **Multistage Data-Driven Distributionally Robust Optimization** 2020–Present
  Working paper, Advisor: Prof. Andy Sun
  - Study on the model and performance comparison of multistage distributionally robust optimization
  - Application in energy system with renewable integration and inventory control problems
- **Grid Optimization Competition (Challenges 1 & 2)** 2018–2021
  Team Leader: Prof. Andy Sun, Teammates: Prof. Santanu Dey, Amin Gholami, Kaizhao Sun
  ★ Our team placed **3rd** worldwide in Challenge 1 and 6th in Challenge 2
  - Based on real-world power grid operational data and sponsored by ARPA-E with multimillion prize
  - Progress on fast algorithms for security-constrained alternating current optimal power flow problems

Teaching Experience

- Teaching Assistant for Deterministic Optimization (ISYE6669) Fall 2017
- Teaching Assistant for Deterministic Optimization Online Course (ISYE6669OAN) Spring & Fall 2018

Invited Talks

1. New Algorithms and Complexity Analysis for Distributionally Robust Multistage Convex Optimization, INFORMS Annual Meeting 2021
2. Iteration Complexity for Stochastic Dual Dynamic Programming Algorithms, SIAM Southeastern Atlantic Section Conference 2021
3. Complexity for Multistage Distributionally Robust Dual Dynamic Programming, SIAM Conference on Optimization 2021 (OP21)
4. Generalized Conjugacy Method for Nonconvex Stochastic Optimization in Power Systems, INFORMS Annual Meeting 2020
5. Stochastic Dual Dynamic Programming Algorithm for Multistage Stochastic Mixed-integer Nonlinear Optimization, MIP Workshop 2020
6. Stochastic Dual Dynamic Programming Algorithm for Nonconvex Multistage Optimization Problems, INFORMS Annual Meeting 2019
7. New Algorithms for Solving the Natural Gas Transient Scheduling Problem, IISE Annual Meeting 2019
8. A Minor Perspective on Rank Constrained Optimization, INFORMS Annual Meeting 2018

Academic Services

1. Reviewer for *Mathematical Programming* and *Mathematical Programming Computation*
2. Reviewer for *SIAM Journal on Optimization*
3. Reviewer for *Operations Research* and *INFORMS Journal on Computing*
4. Reviewer for *IEEE Transactions on Power Systems* and *Transactions on Control of Network Systems*