

SHUOTAO DIAO

☎ +1 4849342368, +86 15919881135 ✉ sdiao@gbu.edu.cn, sonnydiao430@gmail.com

ACADEMIC APPOINTMENTS

Assistant Professor, Great Bay University (China)
Postdoctoral Scholar, Northwestern University

March 2025 - Present
March 2023 - March 2025

- **Advisor:** Dr. David P. Morton

EDUCATION

University of Southern California, Los Angeles, CA
Ph.D. in Industrial and Systems Engineering

August 2016 - August 2022

- **Dissertation:** On the Interplay between Stochastic Programming, Non-parametric Statistics, and Nonconvex Optimization
- **Advisor:** Dr. Suvrajeet Sen
- **Dissertation Committee:** Dr. John Carlsson, Dr. Phebe Vayanos, Dr. Rahul Jain

University of Southern California, Los Angeles, CA
M.S. in Computer Science

June 2017 - May 2021

Lehigh University, Bethlehem, PA
M.S. in Statistics

August 2014 - May 2016

Shandong University, Jinan, Shandong, China
B.S. in Physics

September 2010 - June 2014

RESEARCH INTERESTS

Stochastic programming; data-driven optimization; decomposition algorithms; stochastic dynamic programming; decision-making under uncertainty; applications in healthcare, public health, and industrial systems.

PUBLICATIONS

Peer Reviewed Journals

- Diao, Shuotao, and Suvrajeet Sen. “A reliability theory of compromise decisions for large-scale stochastic programs.” *Mathematical Programming*. Preprint online, 2026. <https://doi.org/10.1007/s10107-026-02336-2>
- Diao, Shuotao, and Suvrajeet Sen. “Distribution-free algorithms for predictive stochastic programming in the presence of streaming data.” *Computational Optimization and Applications*. 87.2 (2024): 355-395. <https://doi.org/10.1007/s10589-023-00529-5>
- Eisenberg, Bennett, and Shuotao Diao. “Properties of the Kelly bets for pairs of binary wagers.” *Statistics & Probability Letters*. 125 (2017): 215-219. <https://doi.org/10.1016/j.spl.2017.02.019>

Peer Reviewed Conferences

- Proceedings of INFORMS Optimization Society Conference Houston, TX, March 2024
“A unifying theory for the reliability of stochastic programming solutions using compromise decisions”, with Suvrajeet Sen. (Link to the conference paper website)

WORKING PAPERS

- Shuotao Diao, David P. Morton, Oscar Dowson and Bernardo Pagnoncelli. “A decomposition-based algorithm for infinite-horizon multistage stochastic programs on finite-state Markov chains.”
- Guyi Chen, Shuotao Diao, Katelyn Plaisier Leisman, David P. Morton, and Linda Pei. “Mitigating Pandemic Surges Using Wastewater Signals.”
- Shuotao Diao, Gökçe Kahvecioğlu, and David P. Morton. “Pareto Optimal Graph Clustering.”
- Diao, Shuotao, and Suvrajeet Sen. “Online Non-parametric Estimation for Nonconvex Stochastic Decomposition with Majorization-Minimization.” (Optimization Online link to the paper)

CONFERENCE PRESENTATIONS

- INFORMS Annual Meeting (upcoming) *San Francisco, CA, November 2026*
“A decomposition-based method for infinite horizon multistage stochastic programs on finite-state Markov chains,” with David Morton, Oscar Dowson and Bernardo Pagnoncelli.
- INFORMS Annual Meeting *Seattle, WA, October 2024*
“A reliability theory of compromise decisions for large-scale stochastic programs,” with Suvrajeet Sen.
- INFORMS Annual Meeting *Phoenix, AZ, October 2023*
“Comparisons between bagging and compromise decisions,” with Suvrajeet Sen.
- International Conference on Stochastic Programming XVI *Davis, CA, July 2023*
“Non-parametric stochastic decomposition for predictive stochastic programming in the presence of streaming data” with Suvrajeet Sen.
- INFORMS Annual Meeting *Anaheim, CA, October 2021*
“Non-parametric stochastic decomposition for two-stage predictive stochastic programming,” with Suvrajeet Sen.
- INFORMS Annual Meeting *Seattle, WA, October 2019*
“Non-parametric stochastic quasi-gradient method in stochastic programming,” with Suvrajeet Sen.
- International Conference on Stochastic Programming XV *Trondheim, Norway, August 2019*
“Learning enabled optimization with non-parametric estimation,” with Suvrajeet Sen.
- INFORMS Annual Meeting *Phoenix, AZ, November 2018*
“Stochastic algorithms for conditional stochastic optimization,” with Suvrajeet Sen.

SELECTED RESEARCH PROJECTS

Efficient Solution Methods for Bilevel Stochastic Programming *2026 - Present*

- Studied extreme point enumeration, decomposition-based methods, and difference-of-convex methods and possible fusions for solving bilevel stochastic programs.

Decomposition-Based Methods for Infinite-Horizon Multistage Stochastic Programs *2024 - Present*

- Studied contraction and semicontraction, as well as fixed-point existence, for abstract dynamic programming mappings arising in infinite-horizon multistage stochastic programs.
- Developed infinite-horizon variants of Stochastic Dual Dynamic Programming and Stochastic Decomposition.
- Integrated infinite-horizon stochastic programming algorithms with compromise-decision strategies to improve solution reliability.
- Manuscript in preparation for submission to a journal in operations research.

Design of Staged Alert System with a Wastewater Signal *2023 - 2025*

- Incorporated daily viral-load measurements into an SEIR compartmental model to study the relationship between wastewater signals and hospital census.
- Designed a wastewater-based staged-alert system to support public-health decision-making during epidemic surges.
- Manuscript in preparation for submission to a journal.

Finding All Pareto Optimal Solutions to a Graph Clustering Problem *2023 - 2025*

- Used matroid theory and total dual integrality to characterize the pattern of the Pareto optimal solutions to the graph clustering problems.
- Designed diversification strategy for column generation to improve the upper bound of the optimal cost.
- Manuscript in preparation for submission to a journal in operations research.

A Reliability Theory of Compromise Decisions for Large-Scale Stochastic Programs *2023 - 2025*

- Developed theoretical guarantees for compromise-decision variance-reduction strategies in large-scale stochastic programming.
- Used Rademacher averages of problem instances to derive sample-complexity bounds for compromise decisions.
- Published in *Mathematical Programming*.

Learning Enabled Optimization with Non-parametric Approximation *2016 - 2022*

- Integrated stochastic programming with non-parametric statistical learning, including k -NN estimation and kernel estimation.

- Designed a non-parametric stochastic quasi-gradient method for predictive stochastic programming problems with conditional-expectation objectives.
- Developed non-parametric extensions of Stochastic Decomposition algorithm for two-stage predictive stochastic linear programs and two-stage predictive stochastic quadratic programs.
- Published in *Computational Optimization and Applications*.

TEACHING EXPERIENCE

Instructor of Record, IEMS 351 Optimization Methods in Data Science, Northwestern *Fall 2024*

- Designed lectures, assignments, projects and exams for an undergraduate optimization course.
- Managed grading, office hours, course logistics, and supervision of one teaching assistant.
- Received course rating of 4.71/6.00 (vs. 4.18 under the previous instructor in Fall 2023) and instructor rating of 5.00/6.00 (vs. 4.75 in Fall 2023).

Guest Lecturer, ISE 638 Stochastic Optimization, University of Southern California *Spring 2022*

- Delivered an 80-minute lecture on first-order stochastic programming algorithms and almost-sure convergence of stochastic approximation.

Guest Lecturer, ISE 330 Introduction to Operations Research: Deterministic Models, University of Southern California *Fall 2019*

- Delivered four 80-minute lectures on linear algebra review, AMPL, the simplex algorithm, and Dijkstra's algorithm.

PROFESSIONAL SERVICE

Referee for *INFORMS Journal on Computing*, *Operations Research*, *INFORMS Journal on Optimization*, *SIAM Journal on Optimization*, and *European Journal of Operational Research*.

SOFTWARE AND TECHNICAL SKILLS

Languages	C++, Python, C, Java, Matlab, SQL, Xpress Mosel
Software & Tools	CPLEX, Gurobi, AMPL, SciPy, Numpy, Pandas, scikit-learn, PyTorch, LaTeX

HONORS AND AWARDS

Pearl-River Scholar (Youth), Guangdong Provincial Higher-Education Talent Program	<i>2025</i>
Meritorious Reviewer for INFORMS Journal on Computing	<i>2025</i>
Provost PhD Fellowship	<i>2016</i>
Outstanding Bachelor's Graduate	<i>2014</i>

OTHER EXPERIENCE

WBE (Wastewater-based Epidemiology) Seminar Series *March 2024*

Hosted by the Discovery Partners Institute of the University of Illinois System

- "Design of a Staged Alert System with a Wastewater Signal" with Guyi Chen and David P. Morton.

Research Scientist Intern, Amazon.com

May 2020 - August 2020

Teaching Assistant

2018 - 2022

- Undergraduate Courses: *ISE 225 Engineering Statistics I*, *ISE 220 Probability Concepts in Engineering*, *ISE 330 Introduction to Operations Research: Deterministic Models*

- Graduate Courses: *ISE 630 Foundations of Optimization*

Research Assistant

2018 - 2022

- Supported theoretical analysis of the stochastic programming algorithms proposed by the research team.

INFORMS Doctoral Student Colloquium

October 2017

- Invited to attend doctoral student colloquium and shared personal experience in Ph.D. education with peers.