Tianjiao Li

ISyE Main Building, 755 Ferst Drive Northwest, Atlanta, GA, 30318
Email: tli432@gatech.edu | Phone: (470) 452-9327
Webpage: tli432.github.io | Google Scholar: scholar.google.com

RESEARCH INTERESTS

My research focuses on the design and analysis of novel first-order methods for *Nonlinear Optimization, Stochastic Optimization*, and *Dynamic Decision-Making*. I also actively pursue the practical value of these methods in relevant applications. I am particularly interested in

(i) Parameter-free methods for convex and nonconvex optimization
(ii) Stochastic optimization for statistical and machine learning
(iii) Policy optimization and policy evaluation in reinforcement learning
(iv) Real-life applications, e.g., E-commerce, healthcare, financial technology

EDUCATION

Aug 2020 - **Jun 2025** (expected)	**Georgia Institute of Technology**, Atlanta, GA, USA Ph.D. in Operations Research Advisors: Guanghui (George) Lan, Ashwin Pananjady Minor: Machine Learning Department: H. Milton Stewart School of Industrial and Systems Engineering
Aug 2019 - **May 2021**	**Georgia Institute of Technology**, Atlanta, GA, USA M.S. in Quantitative and Computational Finance
Sep 2015 - **Jun 2019**	**Fudan University**, Shanghai, China B.S. in Information and Computational Science Department: School of Mathematical Sciences

PUBLICATIONS

- **A Simple Uniformly Optimal Method without Line Search for Convex Optimization**

  Tianjiao Li, Guanghui Lan
  Under major revision, *Mathematical Programming Series A*

- **Accelerated Stochastic Approximation with State-Dependent Noise**

  Sasila Ilandarideva, Anatoli Juditsky, Guanghui Lan, **Tianjiao Li** (alphabetic order)
  Mathematical Programming Series A, 2024

- **Stochastic First-Order Methods for Average-Reward Markov Decision Processes**

  Tianjiao Li, Feiyang Wu, Guanghui Lan
  Under major revision, *Mathematics of Operations Research*

- **Faster Algorithm and Sharper Analysis for Constrained Markov Decision Process**

  Tianjiao Li, Ziwei Guan, Shaofeng Zou, Tengyu Xu, Yingbin Liang, Guanghui Lan
  Operations Research Letters, vol. 54, 107107, 2024

- **Accelerated and Instance-Optimal Policy Evaluation with Linear Function Approximation**

  Tianjiao Li, Guanghui Lan, Ashwin Pananjady
  SIAM Journal on Mathematics of Data Science, vol. 5, no. 1, pp. 174-200, 2023

- **Simple and Optimal Methods for Stochastic Variational Inequalities, I: Operator Extrapolation**

  Georgios Kotsalis, Guanghui Lan, **Tianjiao Li** (alphabetic order)
  SIAM Journal on Optimization, vol. 32, no. 3, pp. 2041-2073, 2022

- **Simple and Optimal Methods for Stochastic Variational Inequalities, II: Markovian Noise and Policy Evaluation in Reinforcement Learning**

  Georgios Kotsalis, Guanghui Lan, **Tianjiao Li** (alphabetic order)
  SIAM Journal on Optimization, vol. 32, no. 2, pp. 1120-1155, 2022

AWARDS AND HONORS

- **Alice and John Jarvis Best Student Paper Award, 2024**
  - Awarded annually to one Ph.D. student in ISyE across all disciplines
- **Shabbir Ahmed PhD Fellowships for Excellence in Research, 2023**
  - Awarded annually to one Ph.D. student (co-winner) in ISyE for research in optimization
- **Second Place, Poster Competition, YinzOR Student Conference 2024**
- **First Place, Best Poster Award, Georgia Statistics Day 2023**
- **Fudan University School of Mathematical Sciences Academic Scholarship**

TEACHING AND STUDENT MENTORING

- **Course Instructor, Summer 2024, Georgia Tech**
  Statistics and Applications (ISyE 3770)
  - Description: one-semester probability and statistics course for engineering students
  - Class size: **64** (26 on campus + 38 online)
  - Teaching evaluation: **4.8/5.0** (response rate: 56%)

- **Guest Lecturer, Fall 2024, Georgia Tech**
  Computational Data Analysis / Machine Learning (ISyE 6740)
  - Description: general machine learning course for master and Ph.D. students
  - Instructor: Guanghui (George) Lan
  - Responsibility: 2 Lectures in machine learning and data analysis

- **Guest Lecturer, Spring 2024, Georgia Tech**
  Optimization Methods for Reinforcement Learning (ISyE 8803)
  - Description: advanced topic in optimization for RL for ISyE Ph.D. students
  - Instructor: Guanghui (George) Lan
  - Responsibility: 8 Lectures in policy evaluation and average-reward MDPs

- **Student Mentoring:**
  - Milind Nakul, ISyE PhD Student, Georgia Tech
    Research project: Experience replay for policy evaluation in reinforcement learning

  - Feiyang Wu, CS Master Student, Georgia Tech
    Research project: Stochastic first-order methods for average-reward MDPs

VISITING EXPERIENCE

Apr 2024 - **Laboratoire Jean Kuntzmann, University Grenoble Alpes**, Grenoble, France
May 2024 Visiting Graduate Student

Host: Anatoli Juditsky
Project: Stochastic Optimization Algorithms for Machine Learning Applications

Oct 2021 -	**Simons Institute for the Theory of Computing, UC Berkeley**, Berkeley, CA
Nov 2021	Visiting Graduate Student
	Host: Ashwin Pananjady
	Program: Computational Complexity of Statistical Inference

INTER-INSTITUTIONAL COLLABORATION

Nov 2023 -	**University of Louisville Health and Hospital**
Present	Project: reinforcement learning method for clinical decision making within surgical operations

- Realtime intra- and post-operative clinical recommendation for prevention and mitigation of cardiac surgery-associated acute kidney injury (CSA-AKI)
- Realtime intra-operative treatment recommendation for management of hypotension during surgeries

Oct 2022 -	**AI Institute for Advances in Optimization (AI4OPT)**
May 2023	Project: AI4OPT collaboration with Intel Corporation

- Implemented the factorial model and random forest to detect significant factors in a process control problem (targeting at reducing the variability of a time series) with limited and highly skewed data

INDUSTRIAL EXPERIENCE

May 2023 -	**Amazon**, Seattle, WA, USA
Aug 2023	Position: Applied Scientist Intern

- Developed an automated seasonality detection and seasonal-trend decomposition module for Amazon Payment anomaly detection platform
- The internal paper is accepted by 2023 Amazon Machine Learning Conference (AMLC)

SERVICES

- **Journal Reviewing:**

  - SIAM Journal on Optimization
  - Mathematical Programming
  - Annuals of Statistics
  - Computational Optimization and Applications
  - Optimization Letters

- **Conference Reviewing:**

  - Conference on Learning Theory (COLT) 2022-2024

- **Session Organization:**

  - **INFORMS Annual Meeting 2024**, Seattle, WA, Oct 2024
    Session: Advances in Continuous Optimization Algorithms
    Session: Advances in Non-Smooth Optimization
  - **International Symposium on Mathematical Programming (ISMP 2024)**, Montreal, Canada, Jul 2024
    Session: Advances in First-Order Methods for Stochastic and Continuous Optimization

TALKS AND PRESENTATIONS

- **INFORMS Annual Meeting**, Seattle, WA, Oct 2024

  - Session: First-Order Methods in Continuous and Stochastic Optimization
  - Title: A Simple Uniformly Optimal Method without Line Search for Convex Optimization

- **YinzOR Student Conference, CMU Tepper School of Business**, Pittsburg, PA, Aug 2024

  - Poster presentation: Accelerated Stochastic Approximation with State-Dependent Noise
  - Won the Second Place in the poster competition

- **International Symposium on Mathematical Programming (ISMP 2024)**, Montreal, Canada, Jul 2024

  - Session: Advances in Stochastic First-Order Methods
  - Title: A Simple Uniformly Optimal Method without Line Search for Convex Optimization

- **DAO Team Seminar at Laboratoire Jean Kuntzmann**, Grenoble, France, May 2024

  - Title: A Simple Uniformly Optimal Method without Line Search for Convex Optimization

- **INFORMS Optimization Society Conference**, Houston, TX, Mar 2024

  - Session: Advances in Continuous Optimization Algorithms
  - Title: A Simple Uniformly Optimal Method without Line Search for Convex Optimization

- **INFORMS Annual Meeting**, Phoenix, AZ, Oct 2023

  - Session: Recent Advances in Policy Optimization and Reinforcement Learning
  - Title: Accelerated and Instance-Optimal Policy Evaluation with Linear Function Approximation

- **Georgia Statistics Day**, Atlanta, GA, Oct 2023

  - Poster presentation: Accelerated and Instance-Optimal Policy Evaluation with Linear Function Approximation
  - Won the First Place in the poster competition

- **SIAM Conference on Optimization**, Seattle, WA, May 2023

  - Session: New Sparse Optimization
  - Title: Accelerated Stochastic Approximation with State-Dependent Noise

- **INFORMS Annual Meeting**, Indianapolis, IN, Oct 2022

  - Session: Reinforcement Learning Theory
  - Title: Stochastic First-Order Methods for Average-Reward Markov Decision Processes

- **Asilomar Conference on Signals, Systems, and Computers**, Online, Nov 2021

  - Session: Theory of Reinforcement Learning
  - Title: Faster Algorithm and Sharper Analysis for Constrained Markov Decision Process

- **INFORMS Annual Meeting**, Online, Oct 2021

  - Session: Stochastic Optimization in Machine Learning
  - Title: Simple and Optimal Methods for Stochastic Variational Inequalities

REFERENCES

- **Guanghui (George) Lan (Professor)**

  H. Milton Stewart School of Industrial and Systems Engineering, Georgia Tech
  Email: george.lan@isye.gatech.edu
  Phone: (404) 385-5402

- **Ashwin Pananjady (Assistant Professor)**

  H. Milton Stewart School of Industrial and Systems Engineering, Georgia Tech
  Email: ashwinpm@gatech.edu
  Phone: (510) 384-7711

- **Anatoli Juditsky (Professor)**

  Laboratoire Jean Kuntzmann, University Grenoble Alpes
  Email: anatoli.juditsky@univ-grenoble-alpes.fr
  Phone: 0033(0)457421744