Caleb Ju

Email: calebju4@gatech.edu
Web: jucaleb4.github.io

EDUCATION

Georgia Institute of Technology
Ph.D., Operations Research (Minor: Mathematics) 2021 –
Advisor: Professor Guanghui (George) Lan
Computational Science and Engineering (PhD admit in 2020. Transferred after 1 year)

University of Illinois Urbana-Champaign 2016 – 2020
B.S., Computer Science and Mathematics
Graduated with High Distinction

PAPERS

$^{\alpha}$ denotes alphabetical ordering. Asterisk denotes equal contribution.

1. **Caleb Ju**, Georgios Kotsalis, Guanghui Lan. *A model-free first-order method for linear quadratic regulator with $\tilde{O}(1/\varepsilon)$ sampling complexity*. SIAM Journal of Control and Optimization, Jun 2025.
2. **Caleb Ju** and Guanghui Lan. *Dual dynamic programming for stochastic programs over an infinite horizon*. Submitted, Apr 2025.
3. **Caleb Ju**$^{\alpha}$ and Guanghui Lan. *Strongly-Polynomial Time and Validation Analysis of Policy Gradient Methods*. Submitted, Nov 2024.
4. **Caleb Ju**$^{\alpha}$ and Guanghui Lan. *Policy Optimization over General State and Action Spaces*. Under revision, Sep 2024.
5. **Caleb Ju** and Constance Crozier. *Learning a Local Trading Strategy: Deep Reinforcement Learning for Grid-scale Renewable Energy Integration*. Hawaii International Conference on System Sciences (HICSS-58), Aug 2024.
6. Ji Gao, Abigael Wahlen, **Caleb Ju**, Yongsheng Chen, Guanghui Lan, Zhaohui Tong. *Reinforcement Learning-Based Control for Waste Biorefining Processes Under Uncertainty*. Communications Engineering, Feb 2024.
7. **Caleb Ju***, Yifan Zhang*, and Edgar Solomonik. *Communication lower bounds for nested bilinear algorithms*. Foundations of Computational Mathematics, Nov 2023.
8. **Caleb Ju**, Serif Yesil, Mengyuan Sun, Chandra Chekuri, Edgar Solomonik. *Efficient parallel implementation of the multiplicative weight update method for graph-based linear programs*. Pre-print, Jul 2023.
9. Yan Li, **Caleb Ju**, Ethan X. Fang, Tuo Zhao. *Implicit regularization of Bregman proximal point algorithm and mirror descent on separable data*. Pre-print, Aug 2021.
10. **Caleb Ju** and Edgar Solomonik. *Derivation and analysis of fast bilinear algorithms for convolution*. SIAM Review, Nov 2020.

AWARDS AND ACHIEVEMENTS

The Alice & John Jarvis Best Paper Award 2025
- Awarded annually to one Ph.D. student in Georgia Tech's ISyE across all disciplines.

Finalist for INFORMS 2023 Annual Meeting Poster Competition 2023
MOPTA 2023 Best Poster Award 2023

Department of Energy Computational Science Graduate Fellowship 2021 – 2025

Travel Awards

- ICCOPT 2025 Travel Award
- 2025 Grid Science Winter School and Conference Travel Grant
- SIAM LA24, PP24, OP21 Travel Award

TEACHING EXPERIENCE

Instructor (GSI) for *ISyE4133 Advanced Optimization* 2025

- 5-week upper-level undergrad course on linear, nonlinear, and integer programming.
- Designed 5 new lectures, 10+ new coding demos, and 2 new projects.
- Teaching effectiveness[1]: **4.33/5**. Response rate: **9/10**. Class size: **10** (all online).

Guest lecture (1 lecture) for *ISyE 8803 Optimization Methods for Reinforcement Learning* 2025

Guest lecture (6 lectures) for *ISyE 8803 Optimization Methods for Reinforcement Learning* 2024

Course Assistant: Algorithms 2020

Course Assistant: Intro to Algorithms and Models of Computation 2019

STUDENT ADVISING

Master's student Mr. Yuhui Han on *Numerical Methods for Stochastic Optimal Control* 2025

PRESENTATIONS

1. Caleb Ju. *Fast and Practical Optimization for Reinforcement Learning and Control*. ETH Zürich. 2025.
2. Caleb Ju. *Strongly Polynomial Time and Validation Analysis of Policy Gradient Methods*. ICSP 2025. 2025.
3. Caleb Ju. *Dual dynamic programming for solving infinite-horizon stochastic multi-stage programs*. ICCOPT 2025. 2025.
4. Caleb Ju. *Auto-explorative online algorithms*. Department of Energy Annual Program Review. 2025.
5. Caleb Ju and Guanghui Lan. *Strongly-Polynomial Time and Validation Analysis of Policy Gradient Methods*. ISyE PhD Student Seminar. 2025.
6. Caleb Ju and Constance Crozier *Learning a Local Trading Strategy: Deep Reinforcement Learning for Grid-scale Renewable Energy Integration*. 2025 Grid Science Winter School and Conference. 2025.
7. Caleb Ju and Guanghui Lan *Strongly-Polynomial Time and Validation Analysis of Policy Gradient Methods*. INFORMS Annual Review. 2024.
8. Caleb Ju, Serif Yesil, Mengyuan Sun, Chandra Chekuri, Edgar Solomnoik *Efficient parallel implementation of the multiplicative weight update method for graph-based linear programs*. SIAM Applied Linear Algebra. 2024.
9. Caleb Ju, Georgios Kotsalis, Guanghui Lan. *A First-Order Method for Solving Linear Quadratic Regulator*. INFORMS Annual Review. 2023.
10. Caleb Ju, Georgios Kotsalis, Guanghui Lan. *A First-Order Method for Solving Linear Quadratic Regulator*. ICSP23. 2023.
11. Caleb Ju, Georgios Kotsalis, Guanghui Lan. *A First-Order Method for Solving Linear Quadratic Regulator*. SIAM OP23. 2023.

[1] In response to "Considering everything, the instructor was an effective teacher."

12. Caleb Ju. *Dual dynamic programming for solving infinite-horizon stochastic multi-stage programs*. ISyE Student Seminar. 2023.
13. Caleb Ju, Georgios Kotsalis, Guanghui Lan. *Improved Convergence Rates for Linear Quadratic Regulator*. INFORMS Annual Review. 2022.
14. Caleb Ju and Sourabh Dalvi. *Decomposition Methods for Long-Duration Energy Storage*. NREL GPAC Seminar. 2022.
15. Caleb Ju. *Decentralized Distributed Optimization for Sum of Convex Functions*. Summer Argonne Students Symposium (SASSy). 2021.
16. Caleb Ju and Navjot Singh. *Solving Positive LPs in Parallel using the Multiplicative Weights Update (MWU)*. UIUC Parallel Graph Algorithms Reading Group. 2020.
17. Caleb Ju. *Parallel approximate undirected shortest paths via low hop emulators*. UIUC Theory Seminar. 2020.
18. Caleb Ju and Edgar Solomonik. *Bilinear algorithms for convolution*. University of Illinois Summer Presentation Poster Symposium. 2019.

SERVICE

Reviewer
- SIAM Journal on Optimization
- Mathematical Programming
- 2025 Hawaii International Conference on System Sciences

Session Chair
- ICSP 2025
- MOPTA 2023

Test writer for Georgia Tech ISyE high school statistics competition 2022
Reviewer for Georgia Tech SURE program 2022

NATIONAL LAB AND INDUSTRY EXPERIENCE

Lawrence Berkeley National Laboratory, Machine Learning and Analytics 2024
Visiting summer researcher
National Renewable Energy Laboratory, GPAC 2022
Visiting researcher ("Summer practicum")
Argonne National Laboratory, MCS Division 2021
Givens Associate
Fivetran 2018
Software Engineering Intern, Backend
Lab Intern, Formulations Group

PROFESSIONAL DEVELOPMENT

NextProf Nexus, Future Faculty Workshop (Upcoming) Sep 2025

SKILLS

Programming: Python, Julia, C++, C, MATLAB, Java
Libraries/Software: CUDA, NumPy, JuMP, petsc4py, OpenMP, Gurobi, CPLEX, AWS, PyTorch

Last updated: September 2025