

# Liam O'Carroll

ocarroll@stanford.edu  
<https://liamocarroll.github.io/>

## EDUCATION

---

### Stanford University

*Ph.D. in Computer Science, Advisor: Aaron Sidford*

GPA: 4.23/4.3 (A+ = 4.3)

Selected coursework: Deep Reinforcement Learning, Optimization Algorithms

Stanford, CA

Sept. 2023 - June 2028 (exp.)

### Northwestern University

*Bachelor of Science in Computer Science and Mathematics (double major)*

Summa Cum Laude, GPA: 3.98/4

Selected coursework: Machine Learning, Algorithms for Big Data, Graduate Probability Theory

Evanston, IL

Sept. 2019 - June 2023

## PUBLICATIONS

---

**Broad research interests:** machine learning, theoretical computer science | **Specific focus:** optimization algorithms

In my field, author names are ordered **alphabetically**.

1. Ishani Karmarkar, **Liam O'Carroll**, Aaron Sidford. Fast, Parallel, Query-Efficient Binary Classification. To appear in *Proceedings of the 39th Annual Conference on Learning Theory (COLT 2026)*.
2. Ishani Karmarkar, **Liam O'Carroll**, Aaron Sidford. Solving Matrix Games with Near-Optimal Matvec Complexity. In *Proceedings of the 58th Annual ACM Symposium on Theory of Computing (STOC 2026)*. [arXiv:2601.02347](https://arxiv.org/abs/2601.02347)
3. Annie Marsden, **Liam O'Carroll**, Aaron Sidford, Chenyi Zhang. Isotropic Noise in Stochastic and Quantum Convex Optimization. In *Proceedings of the 39th Conference on Neural Information Processing Systems (NeurIPS 2025)*. [arXiv:2510.20745](https://arxiv.org/abs/2510.20745)
4. Ishani Karmarkar, **Liam O'Carroll**, Aaron Sidford. Solving Zero-Sum Games with Fewer Matrix-Vector Products. In *Proceedings of the 66th IEEE Symposium on Foundations of Computer Science (FOCS 2025)*. [arXiv:2509.04426](https://arxiv.org/abs/2509.04426)
5. Yair Carmon, Arun Jambulapati, **Liam O'Carroll**, Aaron Sidford. Extracting Dual Solutions via Primal Optimizers. In *Proceedings of the 16th Innovations in Theoretical Computer Science Conference (ITCS 2025)*. [arXiv:2412.02949](https://arxiv.org/abs/2412.02949)
6. **Liam O'Carroll**, Vaidehi Srinivas, Aravindan Vijayaraghavan. The Burer-Monteiro SDP method can fail even above the Barvinok-Pataki bound. In *Proceedings of the 36th Conference on Neural Information Processing Systems (NeurIPS 2022)*. [arXiv:2211.12389](https://arxiv.org/abs/2211.12389)

## HONORS

---

### Amazon AI PhD Fellowship [[SDS page](#)] [[article](#)]

Fall '25

Award amount: Full funding for two academic years

### NSF GRFP Honorable Mention

Spring '25

### Outstanding Senior Award, Northwestern University Computer Science Department

Spring '23

### Tau Beta Pi, Northwestern University

Fall '21

### Outstanding Peer Mentor Award, Northwestern University Computer Science Department

Winter '21

Award amount: \$300

Given for excellence as an undergraduate teaching assistant and peer mentor.

## RESEARCH AND PROFESSIONAL EXPERIENCE

---

### Research Rotation, Stanford University

Fall '25

- Topic: Machine learning theory (memory/sample trade-offs)
- Advisor: Gregory Valiant

### Research Intern, University of Illinois Urbana-Champaign

Summer '22

- Topic: Deep learning theory and stochastic gradient methods
- Advisor: Matus Telgarsky

### Research Intern, Northwestern University

June '20 - May '22

- Topic: Semidefinite programming and optimization algorithms
- Advisor: Aravindan Vijayaraghavan

### Software Engineering Intern, Select Rehabilitation, Inc., Chicago, IL

Summer '19, Summer '18

- 2018: NumPy and pandas project, 2019: Ruby on Rails project

## GRADUATE TEACHING ASSISTANT EXPERIENCE

---

**CS 229 Machine Learning**, Stanford University Fall '25  
**CS 369O/MS&E 312/CME 334 Optimization Algorithms**, Stanford University Fall '24  
**MS&E 111X/211X Introduction to Optimization (Accelerated)**, Stanford University Spring '25

## UNDERGRADUATE COURSE PEER MENTOR EXPERIENCE

---

**Design and Analysis of Algorithms**, Northwestern University Fall '21, Fall '20  
**Mathematical Foundations of Computer Science**, Northwestern University Winter '22, Winter '21, Spring '20  
**Intro to the Theory of Computation**, Northwestern University Spring '22  
**Economics of Networks**, Northwestern University Spring '21

## MENTORING/SERVICE

---

**Stanford CS Mentoring Program Graduate Mentor**, Stanford Computer Science Department Oct. '23 - June '25  
• Year-long mentorship program to engage undergraduate students in research at Stanford.  
**Stanford Splash Teacher**, Stanford University Fall '23, Fall '24, Spring '24  
• Taught hundreds of local high school students information theory.  
**Application Review Volunteer**, Stanford Computer Science Student-Applicant Support Program Fall '23  
• Application feedback program for prospective PhD students to increase accessibility.  
**Research Peer Mentor**, Northwestern University Office of Undergraduate Research Summer '22  
• Mentored a cohort of undergraduates as they completed summer research projects.

## TECHNICAL SKILLS

---

**Python libraries:** PyTorch, scikit-learn, pandas, NumPy