Anish Jayant

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Education

University of Southern California Aug. 2022 - May 2026
B.S. Computer Science, B.S. Applied and Computational Mathematics GPA: 4.0/4

PhD courses: Theoretical Machine Learning, Structure & Dynamics of Networked Information, Advanced Analysis of Algorithms

Research Experience

Memory-Sample Lower Bounds for Ill-Conditioned Regression Jun. 2024 – Present

- Extending memory sample lower bounds to poorly-conditioned linear systems to resolve a conjecture from STOC'19; jointly advised by Prof. Vatsal Sharan (USC) and Prof. Moïse Blanchard (Columbia/Georgia Tech)
- Analyzed (through simulation and mathematically) the spectral properties of iterative methods for linear regression
- Surveyed recent breakthroughs in information-theoretic techniques for showing memory-query lower bounds in (non-smooth) convex optimization and branching program lower-bounds for linear systems
- Assisted in proving novel total variation bounds for detecting noise added to Gaussian mixtures, via Fourier analysis

Streaming Lower Bounds for Sparse PCA Jul. 2025 – Present

- Studying memory sample lower bounds for learning sparse spiked signal in Wigner matrices; advised by Prof. Vatsal Sharan
- Derived a novel reduction algorithm from signed support recovery in spiked Wigner to sparse Gaussian mean estimation
- Proved a lower bound for detecting a sparse spike in the Wigner model; working towards similar results for Wishart case

Robust Federated Optimization Nov. 2024 – May. 2025

- Attempted to extend results in federated optimization to minimax setting, advised by Prof. Sai Praneeth Karimireddy
- Extended convergence rates for gradient mapping on the maximum of functions with bounded Hessian dissimilarity

Talks & Other Projects

CSCI 670: "Simple Algorithms for Smoothed Online Learning" Fall 2025

- Surveyed and presented recent algorithmic results in smoothed online learning as a final course project

CSCI 673: "Community Detection using Justified Representation" Spring 2025

- Assisted in writing a final course project extending ideas in social choice theory to clustering & core detection on graphs
- Surveyed recent results in correlation clustering and attempted to extend the technique to random geometric graphs (RGGs)

CSCI 476: "Cryptographic Hardness of Learning" Fall 2024

- Surveyed and presented a classical Boolean circuit lower bound at the intersection of learning theory and cryptography

CSCI 699: "Robustness implies Privacy in Estimation" Fall 2023

- Wrote a final course project and presented recent results connecting robustness and privacy in statistical estimation
- Gave a follow-up talk on similar material in a future offering of CSCI 699, Fall 2025

Awards

Trustee Scholarship
Full-tuition scholarship awarded by USC (approx. 100 students, $275,000 total amount) Fall 2022 - Spring 2026

Provost Research Fellowship (4 times)
Research merit recognition awarded by USC ($1,000 per semester, $3,000 per summer) Fall 2024 - Present

Viterbi Fellowship
Living stipend awarded by USC Viterbi School of Engineering ($1,500 per semester) Fall 2022 - Spring 2026

WVT Rusch Engineering Honors Program (undergrad. thesis track) Spring 2024 - Spring 2026

Groups

Viterbi Volunteer, teaching assistant for CS@SC program offering remote programming lectures 2025 - Present
Tutor, with EnCorps organization, teaching math to economically disadvantaged students around USC 2025 - Present
QuantSC, project member for designing and presenting trading/investment projects Fall 2022 - Fall 2023
Trojan Climbing, team member participating in weekly practices Fall 2025 - Present