Amit Rajaraman

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amitrajaraman
https://amitrajaraman.github.io/

Research Interests

Theoretical computer science, Markov chains, inference, optimization, sum-of-squares method

Education

2023 – Present — **Massachusetts Institute of Technology**
PhD in Computer Science

2019 – 2023 — **Indian Institute of Technology Bombay, India** — 9.75 CPI
B.Tech. with Honors in Computer Science — (top 10% of department)
Minor in Mathematics

2017 – 2019 — **Sri Chaitanya Junior College, India** — 97.80%
Intermediate/+2

2010 – 2017 — **Delhi Public School, Hyderabad, India** — 10.0 GPA
Matriculation

Publication(s)

1. K. Liu, S. Mohanty, P. Raghavendra, **A. Rajaraman**, and D. X. Wu, "Locally Stationary Distributions: A Framework for Analyzing Slow-Mixing Markov Chains," *arXiv preprint arXiv:2405.20849*, 2024, To appear at FOCS 2024.
2. K. Liu, S. Mohanty, **A. Rajaraman**, and D. X. Wu, "Fast Mixing in Sparse Random Ising Models," *arXiv preprint arXiv:2405.06616*, 2024, To appear at FOCS 2024.
3. H. Narayanan, **A. Rajaraman**, and P. Srivastava, "Sampling from Convex Sets with a Cold Start Using Multiscale Decompositions," in *Proceedings of the 55th Annual ACM Symposium on Theory of Computing*, ser. STOC 2023, Orlando, FL, USA: Association for Computing Machinery, 2023, 117–130, ISBN: 9781450399135. DOI: 10.1145/3564246.3585172.

Service

Teaching Assistantship

2020 **MA 109 (Calculus I)** — *Instructor: Prof. Ravi Raghunathan*
2023 **CS 228 (Logic for CS)** — *Instructors: Prof. Ashutosh Gupta and Prof. Krishna S.*
Responsible for conducting tutorial sessions for a batch of students throughout the semester, helping them clear conceptual doubts through personal interaction, and correcting answer sheets
2024 **6.S977 (The Sum of Squares Method)** — *Instructor: Prof. Sam Hopkins*
Responsible for holding office hours to clear the students' doubts, as well as designing problem sets and preparing notes for the course

2021–2022 — **Mentor, Summer of Science**
Guided students interested in topology and graph theory by creating an action plan, recommending resources, clearing doubts, having discussions, and reviewing their reports

Service (continued)

2020–2023 **Notes**
Prepared notes for various undertaken courses and other topics, referred to by hundreds of peers, which can be found at amitrajaraman.github.io/notes

Reading Projects

2022 **Representation Theory of Finite Groups** *Summer of Science under Math Club, IIT Bombay*
Studied representation theory from *Representation Theory of Finite Groups* by Benjamin Steinberg
Prepared a report on the topics studied, which can be found here

2022 **Derandomization and Pseudorandomness Course Project**
Presented a paper on pseudorandom generators for space-bounded computation by Nisan

2020 **Topics in Algebra II Course Project**
Prepared a presentation on the quiver of the Tits algebra and the Saliola lemma

Scholastic Achievements

2019 Secured All India Rank 12 in JEE Advanced among 245,000 aspirants
2019 Secured All India Rank 102 in JEE Main among 1.2 million aspirants
Conferred an AP grade for exceptional performance in
- 2022 MA214 (Numerical Analysis), awarded to 7 out of 739 students
- 2020 MA106 (Linear Algebra), awarded to 8 out of 1108 students
- 2019 CS101 (Computer Programming and Utilization), awarded to 1 out of 1212 students
- 2019 MA105 (Calculus), awarded to 35 out of 1137 students
- 2019 PH107 (Quantum Physics and Application), awarded to 12 out of 1115 students

2017 Recipient of the prestigious Kishore Vaigyanik Protsahan Yojana (KVPY) Fellowship

Technical Skills

Software LaTeX, MATLAB, Git, LEAN
Programming C++, C, Python, Bash, Julia

Select Courses Undertaken

Computer Science Algorithmic Statistics, Discrete Probability and Stochastic Processes, Derandomization and Pseudorandomness, Artificial Intelligence and Machine Learning
Mathematics Weak Convergence and Martingale Theory, Graph Theory, Combinatorics I, Topics in Algebra II, Real Analysis, Complex Analysis, General Topology, Linear Algebra