

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 B.Tech. with Honors in Computer Science Minor in Mathematics	9.75 CPI (top 10% of department)
2017–2019	 Sri Chaitanya Junior College, India Intermediate/+2	97.80%
2010–2017	 Delhi Public School, Hyderabad, India Matriculation	10.0 GPA

Publications and Preprints

- 1 A. Rajaraman and D. X. Wu, “Markov Chains Approximate Message Passing,” *arXiv preprint arXiv:2512.02384*, 2025, Submitted.
- 2 P. Anderson, S. B. Hopkins, A. Rajaraman, and D. Steurer, “Faster MAX-CUT on Bounded Threshold Rank Graphs,” *arXiv preprint arXiv:2511.11499*, 2025, Submitted.
- 3 S. Mohanty and A. Rajaraman, “Eigenvalue Bounds for Random Matrices via Zerofreeness,” *arXiv preprint arXiv:2509.25471*, 2025, Submitted.
- 4 D. Z. Lee, F. Pernice, A. Rajaraman, and I. Zadik, “The Fundamental Limits of Recovering Planted Subgraphs,” in *Proceedings of Thirty Eighth Conference on Learning Theory*, ser. Proceedings of Machine Learning Research, vol. 291, PMLR, 2025, pp. 3578–3579.
- 5 B. Huang, S. Mohanty, A. Rajaraman, and D. X. Wu, “Weak Poincaré Inequalities, Simulated Annealing, and Sampling from Spherical Spin Glasses,” in *Proceedings of the 57th Annual ACM Symposium on Theory of Computing*, ser. STOC ’25, Prague, Czechia: Association for Computing Machinery, 2025, 915–923, ISBN: 9798400715105.  DOI: 10.1145/3717823.3718236
- 6 H. Narayanan, A. Rajaraman, and P. Srivastava, “Sampling from convex sets with a cold start using multiscale decompositions,” *Probability Theory and Related Fields*, 2024, An extended abstract of this paper appeared in the ACM Symposium on Theory of Computing (STOC) 2023, ISSN: 1432-2064.  DOI: 10.1007/s00440-024-01341-w
- 7 K. Liu, S. Mohanty, A. Rajaraman, and D. X. Wu, “Fast Mixing in Sparse Random Ising Models,” in *2024 IEEE 65th Annual Symposium on Foundations of Computer Science (FOCS)*, Los Alamitos, CA, USA: IEEE Computer Society, 2024, pp. 120–128.  DOI: 10.1109/FOCS61266.2024.00018
- 8 K. Liu, S. Mohanty, P. Raghavendra, A. Rajaraman, and D. X. Wu, “Locally Stationary Distributions: A Framework for Analyzing Slow-Mixing Markov Chains,” in *2024 IEEE 65th Annual Symposium on Foundations of Computer Science (FOCS)*, Los Alamitos, CA, USA: IEEE Computer Society, 2024, pp. 203–215.  DOI: 10.1109/FOCS61266.2024.00022

Experience

- **Teaching Assistantship**
 - 2024 **6.S977 (The Sum of Squares Method)** *Instructor: Prof. Sam Hopkins*
Responsible for holding office hours to answer questions, as well as designing problem sets and preparing notes for the course
 - 2023 **CS 228 (Logic for CS)** *Instructors: Prof. Ashutosh Gupta and Prof. Krishna S.*
 - 2020 **MA 109 (Calculus I)** *Instructor: Prof. Ravi Raghunathan*
Responsible for conducting tutorial sessions for a batch of students throughout the semester, answering questions through personal interaction, and correcting answer sheets
- 2022 ■ **Research Internship** *Guides: Piyush Srivastava and Hariharan Narayanan | TIFR, Mumbai*
- 2021 ■ **Research Internship** *Guide: Navin Goyal | Microsoft Research, Bengaluru*
- 2021–2022 ■ **Mentor, Summer of Science**
Guided students interested in topology and graph theory by creating an action plan, recommending resources, having discussions, and reviewing their reports
- 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

Scholastic Achievements

- 2025 ■ Awarded a MathWorks Fellowship for exemplary academic and research achievements
- 2023 ■ Awarded the Akamai Presidential Fellowship for exemplary academic and research 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, Information Theory, Derandomization and Pseudorandomness
- Mathematics ■ Weak Convergence and Martingale Theory, Graph Theory, Combinatorics I, Topics in Algebra II, Real Analysis, Complex Analysis, General Topology