

# 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	📖 <b>Massachusetts Institute of Technology</b> PhD in Computer Science	
2019–2023	📖 <b>Indian Institute of Technology Bombay, India</b> B.Tech. with Honors in Computer Science Minor in Mathematics	9.75 CPI (top 10% of department)
2017–2019	📖 <b>Sri Chaitanya Junior College, India</b> Intermediate/+2	97.80%
2010–2017	📖 <b>Delhi Public School, Hyderabad, India</b> 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

- 2024 **Teaching Assistantship** *Instructor: Prof. Sam Hopkins*  
6.S977 (The Sum of Squares Method)  
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](https://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**