Anuraag Kumar

University of Michigan, Department of Industrial and Operations Engineering • Ann Arbor, Michigan
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Education

University of Michigan Ann Arbor, MI
Ph.D. (expected), Department of Industrial and Operations Engineering *Aug. 2025 – Present*
- **Advisor:** Sushil Varma

University of Rochester Rochester, NY
Honors B.S. in Mathematics, Honors with Highest Distinction, Cum Laude (GPA: 3.82) *Aug. 2021 – May 2025*
- **Awards:** Dean's List (8/8 semesters), FRC Scholarship, Schwartz Discover Grant
- **Thesis:** *Hitting Times of Random Walks on Finite Groups.*
- **Advisor:** Jonathan Pakianthan.

Academic Projects

Online Bipartite Matching on Random Graphs Ann Arbor, MI
Researcher & Group Leader *August 2025 – Present*
- Proving results about degree-based and random matching policies in known i.i.d setting of online bipartite matching on random graphs
- Worked with undergrads to create simulations comparing our policies to those in the literature over a wide variety of graphs

Hitting Time Distributions of Random Walks on Finite Graphs Rochester, NY
Researcher & Group Leader *May 2024 – May 2025*
- Used Markov chains, spectral graph theory, and Fourier analysis to determine expected values and distributions of hitting times for random walks on finite groups.
- Led a project team of 4 students during the STEM-FOR-ALL program.
- Project was funded by the Schwartz Discover Grant which is only given to 60 students per year
- Paper on ArXiv on research findings.

Graph Theory Summer Research Rochester, NY
Team Member *Jul. 2023 – Sep. 2023*
- Explored the relationship between graph structure and Kolmogorov complexity using compression-based and Fourier-analytic methods.
- Collaborated with Prof. Alex Iosevich (University of Rochester) and Prof. Azita Mayeli (CUNY).

University of Rochester: Department of Data Science Rochester, NY
Team Member, Data Analysis Research Project *Sep. 2023 – Dec. 2023*
- Built predictive models for strike frequency using wage, inflation, and job satisfaction data.
- Aggregated and cleaned large datasets from federal databases.
- Applied supervised and unsupervised learning methods, achieving 0.85 accuracy on strike prediction.

Teaching Experience

University of Rochester Rochester, NY

Teaching Assistant *Sep. 2022 – May 2025*

- Served as TA for 6 semesters, covering Calculus I-III, Honors Abstract Algebra, and Intro to Proof classes.
- Led students in twice weekly group problem-solving sessions totaling 2 hours and 40 minutes per week.
- Graded assignments weekly and provided detailed feedback.
- Had a TA rating of 4.9 out of 5

University of Rochester Rochester, NY

Tutor Mentor *Jan. 2022 – May 2025*

- Tutored students 8 hours per week in Calculus, Linear Algebra, and Logic/Proof-based courses.
- Interviewed prospective tutors and guided them to improve student engagement.
- Organized the first-ever Drop-In Math Tutoring session during exam season (December 2023).

Presentation Experience

The Average Case of Online Stochastic Ann Arbor, MI

Poster Presenter *Jun 2026*

- Created and presented a poster on progress on the problem of Online Bipartite Matching

The Secretary Problem and its connection to Edge-Weighted Matching Ann Arbor, MI

Presenter, Reading Group *Feb. 2026*

- Presented on the secretary problem and how the $\frac{1}{e}$ waiting algorithm could extend to edge-weighted matching

Distribution of Hitting Times of Random Walks in Finite Graphs Rochester, NY

Presenter, Various Locations *Oct. 2024*

- Presented research findings on hitting times of random walks in finite graphs at two venues: the University of Rochester Summer Research Symposium and the MAA Seaway Fall 2024 Meetup.

Selected Coursework

University of Rochester / University of Michigan Rochester, NY / Ann Arbor, MI

- Measure Theory, Measure-Theoretic Probability, Stochastic Processes I & II
- Graduate Algebra, Graduate Complex Analysis
- Linear Optimization, Non-Linear Optimization, Machine Learning, Algorithms
- Data Mining, Operations Research I & II

Skills

- **Programming & Tools:** Advanced LaTeX, Python, R (Intermediate), Java, SQL, Manim, C, C++, Microsoft Office Suite.
- **Mathematical & Analytical:** Advanced mathematical modeling, probability, optimization, combinatorics, graph theory, Fourier analysis.
- **Languages:** Fluent in English; conversational in Telugu and Spanish.
- **Other:** Data analysis, visualization, scientific computing, machine learning basics.