

# RAHUL MAKHIJANI

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## Education

**Stanford University** (Sep' 14 - June 19)

*PhD in Operations Research, MS&E (Guide: Itai Ashlagi)*

Thesis Topic : Matching in Online Market Platforms.

*PhD Minor in Computer Science.*

Awarded the **Randy and Chris Battat** Fellowship, **Dantzig Lieberman** operations research fellowship.

**Stanford University** (Jan' 17 - Jan' 18)

*Masters in Statistics.*

**Indian Institute of Technology - Bombay, Mumbai, India.** (July' 09 – Aug' 13)

*Bachelor of Technology (Honors) in Electrical Engineering.*

*CGPA: 9.28/10.00*

**Undergraduate Research Award** from the Dean of Academic Affairs, IIT Bombay.

**K.C. Mukherjee award** for the Best Undergraduate Thesis in the Electrical Engineering Department.

## Research Interests

Online Platforms, Optimization, Machine Learning, Online Learning, Bandits, Recommendation Systems

## Internships/Consultancy

**Amazon, Seattle** (June 18 - Dec' 18)

*Applied Research Scientist, Amazon Prime Research.*

Worked on promotional optimization models for increasing customer acquisition and retention.

**Stripe, San Francisco** (July' 17 - Sep' 17)

*Data Scientist Intern*

Developed text and network based similarity features to detect merchants who are fraudsters or selling prohibited items which improved the recall of the fraud detection model.

**Adobe Research, San Jose** (June' 15 - Sep' 15)

*Data Scientist Intern, Big Data Lab*

Developed a robust anomaly/change detection algorithm for high dimensional spaces.

**Barclays Capital, Singapore** (May' 12 - Jul' 12)

*Quantitative Analyst Intern, Foreign Exchange (FX)*

Developed a model to calculate the hitting time probability density for double barrier exotic options which was useful for hedging FX exotic options with vanilla options from market data.

## Work Experience

**Barclays Capital** (July' 13 - Aug' 14)

*Quantitative Analyst, Foreign Exchange (FX)*

1. Statistical Analysis of Volatility Surfaces.
2. Exercise Probability of path dependent products such as TARN options. Calculated exercise probabilities using PDE methods by running finite difference solvers in parallel.

**Teaching Assistant, Stanford** (Sept' 15 - ongoing)

*Optimization (MS&E 211), Recent Trends in IT (MS&E 238), Analytics in Action (MS&E 235), Operations Management (MS&E 260), Optimization of Uncertainty and Applications in Finance (MSE 348)*

## Research Publications

1. **Rahul Makhijani**, Johan Ugander, "Parametric Models for Intransitivity in Pairwise Rankings", World Wide Web Conference (WWW), 2019.
2. Itai Ashlagi, Yossi Azar, Moses Charikar, Ashish Chiplunkar, Ofir Geri, Haim Kaplan, **Rahul Makhijani**, Yuyi Wang, and Roger Wattenhofer, "Min-cost Bipartite Matching with Delays" APPROX - 2017.
3. Borkar, Vivek S., **Makhijani, Rahul M.**, "Who is the fairest of them all?" (Allerton), 2012  
50th Annual Allerton Conference on Communication, Control, and Computing, pp.460 - 465, Oct. 2012.
4. Vivek S. Borkar, **Rahul Makhijani**, Rajesh Sundaresan, "How to gossip if you must", IEEE Journal of Selected Topics in Signal Processing.
5. Borkar, Vivek S., **Makhijani, Rahul M.**, Sundaresan Rajesh, "Gossip with transmission constraints", Information Theory and Applications Workshop 2013, UCSD.

## Working Papers

1. The Economics of Carpooling and Congestion.
2. Recommendation Systems with Constraints for Online Subscription Services.
3. Assortment Optimization for Two Sided Matching.

## Academic Projects

### Modeling Intransitivity in Pairwise Rankings.

Designed and implemented models for modeling intransitivity by modifying standard ranking models (Bradley Terry model and Thurstonian models) by employing multidimensional scores for objects.

### Online Linear Programming.

Analyzed and characterized the performance of parimutuel betting systems by using techniques such as online linear programming and sequential convex optimisation. Developed a mechanism for fulfilling orders to maximize revenue for an online resource allocation model.

### Online Bipartite Matching.

Designed robust algorithms for matching online bipartite objects (eg. cabs and passengers) for minimizing distance and waiting time costs.

## Achievements

1. Awarded the **Narotam Sekhsaria Certificate of Merit** and a cash prize of Rs. 50,000 for excellence in academic and extracurricular activities.
2. Only undergraduate selected for an oral talk at Electronic Materials Conference (E.M.C. 2011) at University of California, Santa Barbara (UCSB).
3. All India Rank **49** in IIT JEE 2009 (out of more than 5,75,000 students).
4. Honorable mention at Asian Physics Olympiad (**APhO**).
5. **Gold** Medalist at Indian National Physics, Chemistry and Maths Olympiads (among top **30** in India).

## Courses

Machine Learning, Deep Learning, Probability, Linear Programming, Convex Optimization, Statistical Learning, Dynamic Pricing and Revenue Management, Reinforcement Learning, Statistical Inference, Stochastic Systems, Game Theory, Artificial Intelligence, Reinforcement Systems.

## Skills

Python, C++, R, Matlab, Java, Julia, Hadoop, Spark, Data Visualization, HTML5, JavaScript.