

# AMAN AGARWAL

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## EDUCATION

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**Cornell University**

2016 - present

PhD in Computer Science

Advisor: Professor Thorsten Joachims

Focus in machine learning: learning from logged bandit feedback, learning-to-rank, causal inference

**California Institute of Technology**

2012 - 2016

BS in Computer Science

Significant Coursework in Mathematics\*\*

GPA: 4.0

\*\* Completed all but 2 courses toward BS in Mathematics

## GRADUATE RESEARCH

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August 2016 - present

- A. Agarwal, I. Zaitsev, X. Wang, C. Li, M. Najork, T. Joachims. **Estimating Position Bias without Intrusive Interventions**. WSDM 2019.  
A. Agarwal, I. Zaitsev, T. Joachims. Consistent Position Bias Estimation without Online Interventions for Learning-to-Rank. ICML 2018 CausalML Workshop.  
Z. Fang, A. Agarwal, T. Joachims. Intervention Harvesting for Context-Dependent Examination-Bias Estimation. NeurIPS 2018 Causal Learning Workshop.  
Z. Fang, A. Agarwal, T. Joachims. **Intervention Harvesting for Context-Dependent Examination-Bias Estimation**. Submitted to SIGIR 2019.  
Consistent position bias estimation from user logs generated by multiple rankers without additional interventions or relevance modeling assumptions. Follow-up work done for position bias dependent on context such as query features.
- A. Agarwal, X. Wang, C. Li, M. Bendersky, M. Najork. **Addressing Trust Bias for Unbiased Learning-to-Rank**. WWW 2019.  
Extension of the simple model with position-dependent noise in relevance judgments, estimated via EM, and used for unbiased LTR via a novel objective based on inverse propensity scoring and Bayes' rule.
- A. Agarwal, I. Zaitsev, T. Joachims. **Counterfactual Learning-to-Rank for Additive Metrics and Deep Models**. Submitted to SIGIR 2019.  
A. Agarwal, I. Zaitsev, T. Joachims. Counterfactual Learning-to-Rank for Additive Metrics and Deep Models (short version). ICML 2018 CausalML Workshop.  
A. Agarwal, I. Zaitsev, T. Joachims. Counterfactual Learning-to-Rank for Optimizing DCG. WSDM 2018 Task IR Workshop.  
Generalization of the counterfactual approach to metrics such as DCG, with both linear SVM and neural net based learning methods. The linear SVM formulation reduces to repeated Ranking SVMs via the Convex Concave Procedure.
- A. Agarwal, S. Basu, T. Schnabel, T. Joachims. **Effective Evaluation using Logged**

## **Bandit Feedback from Multiple Loggers.** KDD 2017.

Unbiased estimators for off-policy evaluation with provably lower variance than direct inverse propensity scoring.

- A. Agarwal, X. Wang, C. Li, M. Bendersky, M. Najork. **Comparison of Ranking Functions using Randomized Data.** RecSys 2018 REVEAL Workshop.  
Matching and interleaving based methods for comparing ranking functions with greater statistical efficiency than direct matching.
- Y. Su, A. Agarwal, T. Joachims. **Learning from Logged Bandit Feedback of Multiple Loggers.** ICML 2018 CausalML Workshop.

## **INDUSTRY EXPERIENCE**

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**Google AI** (Research & Machine Intelligence), *ML Researcher* *May 2018 - August 2018*

- Worked with Xuanhui Wang and Marc Najork on learning-to-rank from click logs for search applications in Gmail and Drive. Trust project improved metrics in **live experiments**, initiating production launch process. Propensity project yielded offline estimates comparable to online randomized interventions, submitted to WSDM. Rankings comparison project accepted at RecSys REVEAL workshop.

**Bloomberg**, *ML Engineer* *June 2017 - August 2017*

- Worked in the ML R&D team to improve auto-complete suggestions in the Bloomberg terminal using user logs. Adapted our counterfactual PropDCG model, and developed the full learning pipeline.

**Two Sigma**, *Quantitative Software Developer* *June 2015 - August 2015*

- Worked in the Market Making team to develop tools for analysis and strategy simulation, and derive trading insights from historical high-frequency data.

## **UNDERGRADUATE RESEARCH**

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*Online Learning Project* *October 2015 - December 2015, April 2016 - June 2016*

- Worked with Professor Yisong Yue on an online convex optimization algorithm for Dueling Bandits.

*Summer Undergraduate Research Fellow* *July 2014 - September 2014*

- Worked with Professor Chris Umans on complexity theoretic reductions related to polynomial identity testing and factorization.

*Summer Undergraduate Research Fellow* *June 2013 - August 2013*

- Worked with Professor Mathieu Desbrun in graphics on a discrete shells model for cloth simulation.

Selected code is available here: <https://github.com/aman-agarwal>

## **AWARDS AND HONORS**

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- **WSDM Doctoral Consortium NSF Award.** 2019
- Invited to **Amazon Graduate Research Symposium** for poster presentation. 2017.
- **KDD 2017 Student Travel Award.** 2017.
- **Cornell Fellowship** awarded to select first-year computer science PhD students. 2016.
- **Hixon Writing Prize** - \$1500 for the best freshman humanities paper “Two Approaches to Knowledge”. 2013.
- **Third Prize** at the Caltech Computer Science Fair for an **Android photo-sharing app** called Grapevine. 2015.

- **Jack Memorial Award nomination** by the Dean for being in the **upper 5 percent of the junior class. 2015.**
- **Searle Prize nomination** by Prof. Cowie for bioethics paper “What’s So Wrong About Human Cloning?” **2016.**
- **Top 25 students selected from across India for the International Math Olympiad (IMO). 2011.**
- **Top 20 students selected from across India for the International Olympiad in Informatics (IOI). 2010.**
- **National Talent Search Examination scholarship** from the Government of India. **2008.**
- **Junior Science Talent Search scholarship (Rank 1)** from the Delhi state government. **2010.**
- **Vice Head Boy** of student government in Delhi Public School; chosen from 930 students. **2011-12.**
- **Black stripe belt in Taekwondo. 2005.**