# Ashudeep Singh

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## Research Interests

Fairness and Responsibility aspects of Machine Learning for Search and Recommendation systems, and Machine Learning from interactive feedback.

Machine Learning · Recommender Systems · Information Retrieval

## Education

2015-2021 (exp.) **Ph.D. Computer Science**, *Cornell University*, Ithaca, NY.
Advisor: Thorsten Joachims
Thesis Committee: Solon Barocas, Karthik Sridharan, David Mimno.
Topic: Fairness in Ranking and Recommendation Systems.
Grade Point Average (GPA)– 4.0

2010–2015 **B.Tech.-M.Tech. Dual Degree**, *Indian Institute of Technology (IIT) Kanpur*, India.
M.Tech. Cumulative Performance Index (CPI)– 10/10
BTech. Cumulative Performance Index (CPI)– 9.6/10

## Selected Publications

Marco Morik*, Ashudeep Singh*, Jessica Hong, Thorsten Joachims. **"Controlling Fairness and Bias in Dynamic Learning-to-Rank"**. In Proceedings of 43rd International ACM SIGIR Conference on Research and Development in Information Retrieval 2020. (*equal contribution) **[Best Paper Award]**

Ashudeep Singh, Yoni Halpern, Nithum Thain, Konstantina Christakopoulou, Ed H. Chi, Jilin Chen, and Alex Beutel. **"Building Healthy Recommendation Sequences for Everyone: A Safe Reinforcement Learning Approach"**. In FAccTRec Workshop at ACM RecSyS, 2020.

Ashudeep Singh and Thorsten Joachims. **"Policy Learning for Fairness in Ranking"**. In Proceedings of Advances in Neural Information Processing Systems (NeurIPS) 2019, Vancouver, BC, Canada.

Ashudeep Singh and Thorsten Joachims. **"Fairness of Exposure in Rankings"**. In KDD '18: The 24th ACM SIGKDD International Conference on Knowledge Discovery & Data Mining (KDD), 2018, London, UK.

Ashudeep Singh, Thorsten Joachims. **"Equality of Opportunity in Rankings"**. At Workshop on Prioritising Online Content at NeurIPS 2017, Long Beach, CA.

Ashudeep Singh, Thorsten Joachims. **"Learning Item Embeddings using Biased Feedback"**. At Causal Inference and Machine Learning for Intelligent Decision Making Workshop at NeurIPS 2017, Long Beach, CA.

Tobias Schnabel, Adith Swaminathan, Ashudeep Singh, Navin Chandak, Thorsten Joachims. **"Recommendations as Treatments: Debiasing Learning and Evaluation"** In Proceedings of The International Conference on Machine Learning (ICML), 2016, New York, NY.

## Research Internships

January–May 2020 **Google Brain**, *New York, NY.*
**"Avoiding Unhealthy Recommendation Experiences using Safe Reinforcement Learning"**
*Research Internship project mentors by **Alex Beutel** (Google Brain).*
Formulated a sequential recommendation framework that considers the long-term well being of the users and proposed a novel Safe RL algorithm that provides guarantees for the worst-case users.

May–August 2019 **Microsoft Research**, *Montreal, QC, Canada.*
**"Feedback Loops and Producer-side Fairness in Recommender systems"**
*Research Internship project working with **Fernando Diaz** (FATE Group).*
Studied the intertwined phenomenon of *selection bias* in recommender system feedback loops and *exposure unfairness* for the producers. The goal was to specify the conditions under which these effects amplify and propose algorithms to alleviate them.

May–August 2017 **Facebook**, *Menlo Park, CA.*
**"Active Learning for Multilabel Classification for Newsfeed Ranking"**
*Research internship project working with **Khalid El-Arini** (Feed Content Classification Team at Facebook Newsfeed).*
Developed an active learning approach to optimize for the trade-off between model accuracy and human labeling effort for a large-scale multilabel classification problem on the Facebook newsfeed.

May–August 2016 **Microsoft Research Lab**, *New York City, NY.*
**"Contextual Bandits for Personalization of notifications in Microsoft Health"**
*Research internship project working with **John Langford** (MSR NYC) and **Ryen White** (Microsoft Health and MSR Redmond).*
Developed a *Contextual Bandits*-based approach to personalize reminder and notification messages on the Microsoft Health App to optimize for user's long term health and fitness.

## Awards and Achievements

2020 Awarded the **Best Paper Award** at ACM SIGIR 2020.

2019 Awarded the NeurIPS Travel Award to attend NeurIPS 2019, Vancouver, BC, Canada.

2019 Outstanding TA Award by the Department of Computer Science for CS6780: Advanced Machine Learning class.

2018 Awarded the ACM Student Travel Award to attend SIGKDD 2018, London, UK.

2015 **Ranked first** in the M.Tech. class of 108 students graduating in 2015 at IIT Kanpur.

2011–2015 Awarded **Academic Excellence Award** for outstanding academic achievements at IIT Kanpur for four consecutive years.

2010–2014 Awarded **CBSE Merit Scholarship** for Professional Studies by Central Board of Secondary Education, India.

2012 Recipient of **Summer Undergraduate Research Grant for Excellence (SURGE)**, granted by Dean Resource Planning and Generation, IIT Kanpur.

## Professional Service

- **Program Committee** (PC member) for ACM FAccT Conference 2021, FAccTRec workshop at ACM RecSys 2020, FACTS-IR Workshop at SIGIR 2019, Repl4NLP Workshop at ACL 2018.
- **Reviewer** for ICLR 2021, NeurIPS 2020, ICML 2020, AAAI 2020, ICML 2019, NeurIPS 2019.

## Positions of Responsibility and Extra Curricular Activities

- Co-developed **ViCoRecS: Virtual Conference Recommender System** to match attendees at KDD 2020 with relevant Networking and Paper recommendations, which was used by ∼1000 users. **(2020)**
- Organized the **Machine Learning Discussion Group** at Cornell University. **(2016-18)**
- Coordinated the PhD Visit Day 2016 for Cornell Computer Science as a **Visit Day Czar**. **(2016)**
- Student Guide, Academic Mentor, and Link Student for Counselling Service, IIT Kanpur. **(2011–13)**

## Teaching

- **Teaching Assistant** for CS6780: Advanced Machine Learning, CS4786: Machine Learning for Data Science, CS4780/5780 : Machine Learning for Intelligent Systems at Cornell University. (2015-19)
  - Awarded an **Outstanding TA Award** for CS 6780: Advanced Machine Learning. (Spring 2019)
- **Teaching Assistant** for CS679: Machine Learning for Vision, and ESC101: Fundamentals of Computing at IIT Kanpur. (2014–15)