

Shubham SINGH

Ph.D. Candidate

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RESEARCH INTERESTS

Algorithmic Fairness Machine Learning Privacy and Security Computational Social Science

EDUCATION

Expected 2025 **Doctor of Philosophy, Computer Science**, University of Illinois Chicago (UIC)
2024 **Master of Science, Computer Science**, University of Illinois Chicago (UIC)
2016 **Bachelor of Technology, Computer Science**, Indraprastha Institute of Information Technology (IIIT), Delhi

PUBLICATIONS

* indicates equal contributions.

- **Shubham Singh**, Jackie Hu, Cormac Herley, Elissa Redmiles, Siddharth Suri, and Oshrat Ayalon. To Bid or Not to Bid: Using Auctions to Understand User Valuation of Digital Accounts, 2025. Under Review.
- **Shubham Singh**, Chris Kanich, and Ian A. Kash. Effect of Resources on the Efficiency-Fairness Tradeoff for Allocation Problems, 2025. Under Review.
- **Shubham Singh**, Ian A. Kash, and Mesrob I. Ohannessian. Scoring is Not Enough: Addressing Gaps in Fairness-Utility Tradeoff for Ranking, 2025. Working Paper.
- Irene Solaiman, Zeerak Talat, William Agnew, Lama Ahmad, Dylan Baker, Su Lin Blodgett, Canyu Chen, Hal Daumé III, Jesse Dodge, Isabella Duan, Ellie Evans, Felix Friedrich, Avijit Ghosh, Usman Gohar, Sara Hooker, Yacine Jernite, Ria Kalluri, Alberto Lusoli, Alina Leidinger, Michelle Lin, Xiuzhu Lin, Sasha Luccioni, Jennifer Mickel, Margaret Mitchell, Jessica Newman, Anaelia Ovalle, Marie-Therese Png, **Shubham Singh**, Andrew Strait, Lukas Struppek, and Arjun Subramonian. Evaluating the Social Impact of Generative AI Systems in Systems and Society, 2024.
- Ayse Gizem Yasar, Andrew Chong, Evan Dong, Thomas Krendl Gilbert, Sarah Hladikova, Roland Maio, Carlos Mougán, Xudong Shen, **Shubham Singh**, Ana-Andreea Stoica, Savannah Thais, and Miri Zilka. AI and the EU Digital Markets Act: Addressing the Risks of Bigness in Generative AI. In *Workshop on Generative AI + Law 2023 (GenLaw '23)*, Co-located with the 40th International Conference on Machine Learning (ICML 2023), Jul 23, 2023, Honolulu, HI, USA, July 2023.
- Raya Siddiqi*, **Shubham Singh***, Lenore Zuck, and Chris Kanich. Tracking, But Make It Offline: The Privacy Implications of Scanning QR Codes Found in the World. In *7th Workshop on Technology and Consumer Protection (ConPro '23)*, Co-located with the 44th IEEE Symposium on Security and Privacy, May 25, 2023, San Francisco, CA, USA, May 2023.
- **Shubham Singh**, Bhuvni Shah, Chris Kanich, and Ian A. Kash. Fair Decision-Making for Food Inspections. In *Equity and Access in Algorithms, Mechanisms, and Optimization*, EAAMO '22, New York, NY, USA, October 2022. Association for Computing Machinery.
- Tanya Berger-Wolf, Allison Howell, Chris Kanich, Ian A. Kash, Moniba Keymanesh, Barbara Kowalczyk, Gina Nicholson Kramer, Andrew Perrault, and **Shubham Singh**. Open Problems in (Un)fairness of the Retail Food Safety Inspection Process. In *Responsible Decision Making in Dynamic Environments Workshop, Held in Conjunction with ICML 2022, July 23, 2022, Baltimore MD, USA*, July 2022.
- Mohammad Taha Khan, Christopher Tran, **Shubham Singh**, Dimitri Vasilkov, Chris Kanich, Blase Ur, and Elena Zheleva. Helping Users Automatically Find and Manage Sensitive, Expendable Files in Cloud Storage. In *30th USENIX Security Symposium (USENIX Security 21)*. USENIX Association, August 2021.
- Rishabh Kaushal, **Shubham Singh**, and Ponnurangam Kumaraguru. NeXLink: Node Embedding Framework for Cross-Network Linkages Across Social Networks. In *Proceedings of NetSci-X 2020: Sixth International Winter School and Conference on Network Science*, pages 61–75, Cham, 2020. Springer International Publishing.
- **Shubham Singh**, Rishabh Kaushal, Arun Balaji Buduru, and Ponnurangam Kumaraguru. KidsGUARD: Fine Grained Approach for Child Unsafe Video Representation and Detection. In *Proceedings of the 34th ACM/SIGAPP Symposium on Applied Computing, SAC '19*, page 2104–2111, New York, NY, USA, 2019. Association for Computing Machinery.

NeurIPS 2024	Evaluating Evaluations for Generative AI Workshops, Program Committee
EAAMO 2024	Program Committee
NSF SaTC 2024	Aspiring PI Workshop, Organizing Volunteer
AAAI 2024	External Reviewer
EAAMO 2023	Program Committee, Socials Facilitator
FACCT 2023	Paper Presentation and CRAFT Sessions, Student Volunteer
NeurIPS 2022	Algorithmic Fairness through the Lens of Causality and Privacy (AFCP) Workshop, External Reviewer
FACCT 2022	Paper Presentation and CRAFT Sessions, Student Volunteer
NeurIPS 2021	Algorithmic Fairness through the Lens of Causality and Robustness (AFCR) Workshop, External Reviewer
CSCW 2022	Reviewer

 RESEARCH

January 2020 Present	Research Assistant, UNIVERSITY OF ILLINOIS CHICAGO, USA Mentors: Prof. Chris Kanich, Prof. Ian A. Kash, Prof. Mesrob I Ohannessian <ul style="list-style-type: none">▶ Fair ML for Public Decision-Making. Studied the use of machine learning by Chicago Department of Public Health (CDPH) and the unfair health inspection scheduling for the residents. Proposed in-processing and post-processing methods to generate a fair schedule while achieving efficiency. Worked with a team of Food Science researchers at OSU, Data Science team at the City of Chicago offices.▶ User-driven ML for Sensitive Files. Analysed and coded user study data to understand how do users store sensitive and useful files on online cloud storage. Developed ML-based system to help users remove sensitive files from online cloud storage and reducing their risk of breach by 26%. Cross-collaboration between UIC and U Chicago. Live app: cloudsweeper.app▶ QR Code Privacy. Studied the use of QR codes in the wild to learn the privacy threats users are subjected to when scanned. Analysed 900+ QR code scans and observed the current landscape of QR codes does not possess an active threat to users.▶ Redistricting in Chicago. Performed empirical analysis on the redistricting data for Chicago to learn if voter turnout influences the ward and precinct boundaries of the city.▶ Algorithmic Recommendation for Kids Videos. Studied the effect of YouTube recommendation system on suggestions for kids-focused videos and the relationship between videos and the advertisements shown. Mentored an undergraduate student as a part of the project.
May 2023 Jul 2023	Summer Research Assistant, IDEAL INSTITUTE, Chicago, USA Mentors: Prof. Ozan Candogan, Prof. Ian A. Kash <ul style="list-style-type: none">▶ Fair Public Transit. Surveyed the literature to understand fairness notions for public transit. Worked with the NYC MTA dataset to employ a multinomial choice model and estimate time distance between origin-destination pairs. The estimation helped us determine the efficiency and fairness of the train services.
May 2022 Aug 2022	Research Intern, MAX PLANCK INSTITUTE FOR SOFTWARE SYSTEMS, Germany Mentors: Dr. Oshrat Ayalon, Dr. Elissa M. Redmiles <ul style="list-style-type: none">▶ Behavioral Economics for Online Accounts Value Recruited undergraduate and graduate students as participants from MPI-SWS and Saarland University to conduct in-lab user study and Prolific for online study. Conducted the study to elicit true value of people's online accounts using behavioral economics methods. Presented the preliminary results from the qualitative data analysis at the Cornell, Maryland, Max Planck Research School (CMMRS) 2022.
October 2017 July 2019	Research Associate, PRECOG RESEARCH LAB, New Delhi Mentors: Prof. Ponnurangam Kumaraguru, Prof. Arun Balaji Buduru <ul style="list-style-type: none">▶ Applied deep learning models to detect unsafe content on video streaming platforms, making them 30% more safe for children.▶ Created node embedding framework for efficient cross-network representation of user profiles, beating the then state-of-the-art approach by 20%.▶ Studied the discriminative features of entity-specific sensitive information on the internet.

INDUSTRY

- June 2016
September 2017 | **Full Stack Developer, TAPZO (ACQUIRED BY AMAZON PAY), Bengaluru**
Mentor: Adarsh Pandey
- Saved hundreds of hours in development cycle by building a generic cross-category coupons module for Android application, that was used by 7 other teams. Also, developed food, bill payment and hotel categories from scratch and launched to 5M users.
 - Wrote back-end services to track transaction state changes and user actions for providing better user reinforcements that improved user's post-transaction experience.
- May 2015
July 2015 | **Application Developer Intern, MOBIKWIK, Gurgaon**
Mentor: Atul Goyal
- Migrated Android build environment from Maven to Gradle for better dependency management and faster build times.
 - Rewrote the application network layer for multi-thread performance and error handling to support low-bandwidth users.

TEACHING

- March 2024
May 2024 | **Guest Lecturer, CS 401: ARTIFICIAL INTELLIGENCE, University of Illinois Chicago**
Mentor: Prof. Ian A. Kash
- Taught lectures on Machine Learning and Fairness in AI and ML to a graduate of 20+ registered students.
- August 2019
May 2021 | **Graduate Teaching Assistant, CS 361: COMPUTER SYSTEMS PROGRAMMING, University of Illinois Chicago**
Mentor: Prof. Chris Kanich
- Designed, instructed, and evaluated programming labs and assignments for Computer Systems Programming course, taken by 180+ undergraduate students in both in-class and remote environments.
 - Received an average 4.48/5.0 in the evaluation feedback.
- June 2018 | **Lab Instructor, SUMMER SCHOOL ON SOCIAL COMPUTING, IIIT-Hyderabad**
- Taught lab sessions for 50+ summer school participants on data collection using APIs, data analysis and constructing network graphs.
 - Made the tutorial code public at [precog-iiitd/social-computing-18](https://github.com/precog-iiitd/social-computing-18) .
- January 2016
May 2016 | **Teaching Assistant, CSE 501: DESIGNING HUMAN CENTERED SYSTEMS, IIIT-Delhi**
Mentor: Prof. Ponnurangam Kumaraguru
- One of the select few undergraduate teaching assistants, for a class taken by 80+ undergraduate and graduate students.
 - Assisted in defining the course structure, designed and evaluated assignments and course projects.

LEADERSHIP ACTIVITIES

- 2023–Present | **Working Groups Co-Leader, EAAMO Bridges**
Coordinator of six working groups organizers that bring together researchers from diverse backgrounds around the world. The working groups focus on issues related to Civic Participation, Climate and Inequality.
- 2020–2023 | **Treasurer, CSGSA, UIC**
Treasurer and organizer for social and professional events for Computer Science graduate students at UIC.
- 2016 | **Student Mentor, IIIT-Delhi**
Mentored 10+ freshman students for the academic and non-academic issues faced by them. Received the **Best Student Mentor Award**.
- 2014 | **Placement Coordinator, IIIT-Delhi T&P Cell**
Organized and managed the campus recruitment interviews with 35+ company officials for 250+ students of the senior batch.

TALKS

- Oct 2024 **Effect of Resources on the Efficiency-Fairness Tradeoff for Allocation Problems**, Poster, ACM EAAMO 2024 Doctoral Consortium
- Apr 2024 **Fair Decision-Making for Food Inspections**, UIC Economics EARL Seminar
- Oct 2023 **Fair Resource Allocation for Public Services**, Poster, ACM EAAMO 2023 Doctoral Consortium
- Aug 2022 **Q&A Panel with Experienced International TAs**, UIC New TA Orientation
- Aug 2021 **Q&A Panel with Experienced International TAs**, UIC New TA Orientation
- July 2019 **Cybersafety for Kids on Video Streaming Platforms**, ACM Summer School on Cybersecurity and Data Analytics, IIIT-Delhi

AWARDS & HONORS

- Sep 2024 **ACM Travel Grant**, ACM EAAMO 2024. Travel grant to attend ACM EAAMO 2024 conference in San Luis Potosí, Mexico.
- Oct 2023 **ACM Travel Grant**, ACM EAAMO 2023. Travel grant to attend ACM EAAMO 2023 conference in Boston, MA.
- Feb 2023 **Google CSRMP**, Google CS Research Mentorship Program. Selected as a advanced stage Ph.D. student mentee for the program.
- June 2021 **Graduate Student Service Award**, UIC CSGSA. Received a certificate and award money.
- Feb 2017 **Employee of the Month**, Tapzo (Acquired by Amazon-Pay). Received a certificate, public recognition, and a gift.
- May 2016 **Best Student Mentor**, IIIT-Delhi. Received a certificate.

SKILLS

Programming Languages	Python, R, MATLAB, Java, JavaScript, C, C++
Frameworks	PyTorch, Keras, Numpy, Scikit, Flask, NodeJS, Celery, Android
Databases	MongoDB, MySQL, PostgreSQL
Tools	Git, Docker, VSCode, Vim, Sublime, Jupyter, IntelliJ, \LaTeX

VOLUNTEER WORK

- 2023–2024 **River Ranger**, Urban Rivers
8+ hours of Kayak cleaning at Chicago River.
- 2023 **Volunteer**, Montrose Dunes Stewardship
Beach cleaning at Montrose Beach Dunes Natural Area.
- 2021–2022 **Volunteer**, Greater Chicago Food Depository
Food repacking volunteer at one of the largest food banks in Chicagoland.
- 2013 **Teaching Volunteer**, Pratham Delhi
Taught underprivileged children science and mathematics in understaffed Pratham education centers.