

# Gaurav Jain

Email: gaurav@cs.columbia.edu  
Homepage: <https://gaurav1302.github.io/>  
Phone #: +1 (332) 217-9124

Office:  
Room No. 6LE5, Schapiro CEPsR  
530 W 120th St, New York, NY 10027

## Research Areas

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Human-Computer Interaction, AI-driven Interactive Systems, Accessibility, Computer Vision & Deep Learning

## Education



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<b>Ph.D. in Computer Science</b> Columbia University, USA Advisor: Brian A. Smith	Sep 2020 – May 2025
<b>M.S. in Computer Science</b> Columbia University, USA	Sep 2020 – May 2022
<b>B.S. in Computer Science</b> Delhi Technological University, India	Aug 2016 – May 2020

## Publications

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### Full Conference and Journal Publications

- [C7] **G. Jain**, B. Hindi, Z. Zhang, K. Srinivasula, M. Xie, M. Ghasemi, D. Weiner, S. Paris, X. Xu, M. Malcolm, M. Turkcan, J. Ghaderi, Z. Kostic, G. Zussman, B. Smith. “*StreetNav: Leveraging Street Cameras to Support Precise Outdoor Navigation for Blind Pedestrians*” in ArXiv (under submission at **UIST 2024**). [PDF](#)
- [C6] **G. Jain**, B. Hindi, C. Courtien, C. Wyrick, X. Xu, M. Malcolm, B. Smith. “*Front Row: Automatically Generating Immersive Audio Representations of Tennis Broadcasts for Blind Viewers*” in Proceedings of the Annual ACM Symposium on User Interface Software and Technology (**UIST 2023**). [PDF](#)
- [C5] **G. Jain**, Y. Teng, D. Cho, Y. Xing, M. Aziz, B. Smith. “*I want to Figure Things Out: Supporting Exploration in Navigation for People with Visual Impairments*” in Proceedings of the ACM on Human-Computer Interaction (**CSCW 2023**). [PDF](#)  
 **Impact Recognition Award**
- [C4] A. S. Parihar, **G. Jain\***, S. Chopra\*, S. Chopra\*. “*SketchFormer: Transformer-based Approach for Sketch Recognition using Vector Images*” in Multimedia Tools and Applications, 2021. [PDF](#)
- [C3] **G. Jain\***, S. Chopra\*, S. Chopra\*, A. S. Parihar. “*Attention-Net: An Ensemble Sketch Recognition Approach using Vector Images*” in IEEE Transactions on Cognitive and Developmental Systems, 2020. [PDF](#)
- [C2] **G. Jain\***, N. Awasthi\*, S. K. Kalva, M. Pramanik, P. K. Yalavarthy. “*Deep Neural-Network Based Sinogram Super-resolution and Bandwidth Enhancement for Limited Data Photoacoustic Tomography*” in IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control, 2020. [PDF](#)  
 **Among Most Popular Articles: Top 10 in Mar 2020, Top 30 in Dec 2020, and Top 40 in Feb 2021**
- [C1] G. S. Walia, **G. Jain**, N. Bansal, K. Singh. “*Adaptive Weighted Graph Approach to Generate Multimodal Cancelable Biometric Templates*” in IEEE Transactions on Information Forensics and Security, 2020. [PDF](#)

## Peer Reviewed Posters and Demos

- [P3] **G. Jain**, B. Hindi, M. Xie, Z. Zhang, K. Srinivasula, M. Ghasemi, D. Weiner, X. Xu, S. Paris, C. Tedjo, J. Bassin, M. Malcolm, M. Turkcan, J. Ghaderi, Z. Kostic, G. Zussman, B. Smith. "Towards Street Camera-based Outdoor Navigation for Blind Pedestrians" in Proceedings of the 25th International ACM SIGACCESS Conference on Computers & Accessibility, Posters (**ASSETS 2023**). [PDF](#)
- [P2] **G. Jain**, B. Hindi, C. Courtien, C. Wyrick, X. Xu, M. Malcolm, B. Smith. "Towards Accessible Sports Broadcasts for Blind and Low-Vision Viewers" in Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, Extended Abstracts (**CHI 2023**). [PDF](#)
- [P1] **G. Jain\***, S. Chopra\*, S. Chopra\*, A. Parihar. "TransSketchNet: Attention-based Sketch Recognition using Transformers" in Proceedings of 24th European Conference on Artificial Intelligence (ECAI 2020). [PDF](#)

\*Equal contribution

## Research Internships

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**AI/ML Research Intern, Apple**, Seattle, USA

May 2024 – Aug 2024

Mentor: Cole Gleason

Accessibility research with the Human Centered Machine Intelligence (HCMI) team.

## Research Experience

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**Columbia University**, New York, USA

Sep 2020 – Present

Graduate Research Assistant

Led research projects and mentored 20+ graduate and undergraduate students.

**Université Clermont Auvergne**, Clermont-Ferrand, France

Jun 2020 – Jul 2020

Research Fellow

Generated synthetic data for 2D/3D registration in laparoscopic surgery guidance.

**Delhi Technological University**, New Delhi, India

Jan 2019 – May 2020

Undergraduate Research Assistant

Designed and implemented a Transformer-based network for sketch recognition.

**Indian Institute of Technology**, New Delhi, India

Sep 2018 – Feb 2020

Research Assistant

Developed a network for scale-invariant breast cancer detection from mammograms.

**Indian Institute of Sciences**, Bangalore, India

May 2019 – Aug 2019

Summer Research Fellow

Developed a network for sinogram super-resolution for photoacoustic tomography.

**Defense Research & Development Organization**, New Delhi, India

Feb 2018 – Nov 2019

Research Assistant

Designed a graph fusion approach for a cancelable multimodal biometric system.

## Awards & Recognitions

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**Impact Recognition Award**, ACM CSCW 2023 ([details](#))

2023

**Professional Development Scholarship**, Columbia University ([details](#))

2023

**Gary Marsden Travel Award**, ACM SIGCHI ([details](#))

2023

<b>Greenwoods Fellowship</b> , Columbia University ( <a href="#">details</a> )	2020
<b>Research Excellence Award</b> , Delhi Technological University	2020, 2021
<b>Summer Research Fellowship</b> , Indian Academy of Sciences	2019

## Selected Press Coverage

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<b>CEAL Lab wins Impact Recognition Award at CSCW 2023</b> Columbia University, <a href="#">Columbia Engineering</a>	2023
<b>Creating tools to help people with vision impairments navigate the world</b> Columbia University, <a href="#">Voices of CS: Gaurav Jain</a>	2023
<b>Clearing the Way: Using AI to help blind and low vision users 'see'</b> Columbia University, <a href="#">Columbia Engineering Magazine</a>	2021

## Invited Talks & Lectures

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<b>Center for Smart Streetscapes (CS3) Research Exchange</b> ( <a href="#">details</a> ) <i>Leveraging street cameras to support precise outdoor navigation for blind pedestrians.</i>	Mar. 2024
<b>Vision Zero Research on the Road Symposium</b> , New York City Government ( <a href="#">details</a> ) <i>Leveraging street cameras to support precise outdoor navigation for blind pedestrians.</i>	Nov. 2023
<b>Guest Lecture, COMS E6178: HCI Research Seminar</b> , Columbia University <i>How to give effective research presentations?</i>	Feb. 2023

## Community & Professional Services

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<b>Organizing Committee</b> Publicity Co-chair, UIST 2024	2024 – Present
<b>Student Volunteer</b> CHI 2024 ASSETS 2023	2023 – Present
<b>External Reviewer</b> CHI 2021, 2023, 2024* / ASSETS 2023 / CSCW 2022, 2023, 2024* UIST 2023, 2024 / IMWUT 2024 *Special Recognition for Outstanding Reviews	2021 – Present
<b>Women in Science (WISC) Mentoring Program</b> , Barnard University <i>Mentored undergraduates to help prepare a roadmap toward their career goals.</i>	2022
<b>Pre-Submission Application Review Program</b> , Columbia University <i>Advised PhD applicants from underrepresented backgrounds.</i>	2020

## Teaching & Research Mentoring Experience

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<b>Teaching Assistant</b> , Columbia University COMS W4170: <i>User Interface Design</i> COMS E6178: <i>Human-Computer Interaction (Research Seminar)</i>	Fall 2021/22/23 Spring 2021/22/23
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<b>Amazon SURE Program Mentor</b> , Columbia University & Amazon Inc. <i>Mentored visiting undergraduates on research projects (<a href="#">details</a>).</i> Conrad Wyrick ( <i>University of Florida</i> ) Maryam Aziz ( <i>University of Connecticut</i> ) Dan Weiner ( <i>Lehman College, CUNY</i> )	2022/23
<b>XR Access REU Program Mentor</b> , National Science Foundation <i>Mentored visiting undergraduates on accessibility research (<a href="#">details</a>).</i> Xinyi Xu ( <i>Pomona College</i> ) Sophie Ana Paris ( <i>NYU</i> ) Chloe Tedjo ( <i>Texas A&amp;M University</i> ) Josh Bassin ( <i>Penn State University</i> )	2022/23
<b>Mentor, VISIONS</b> services for the blind and visually impaired <i>Co-designing solutions with and mentoring blind &amp; low-vision students (<a href="#">details</a>).</i> Michael Malcolm ( <i>SUNY at Albany</i> ) Connor Courtien ( <i>Hunter College</i> ) Sebastián Mercado Sáez ( <i>Fordham University</i> )	2020 – Present
<b>Research Lead</b> , Columbia University <i>Managing research projects and mentoring students at the CEAL Lab.</i> <i>B.S. students:</i> David Rios, Ethan Chang, Jessica Peng. <i>M.S. students:</i> Zihao Zhang, Koushik Srinivasula, Uttam Gurram, Aditi Patil, Lindsey Weiskopf, Arjun Nichani, Mingyu Xie, Basel Hindi, Yuanyang Teng, David Cho, Yunhao Xing.	2020 – Present

## Skills

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**Research:** System Development & Prototyping, User Interface Design, User Evaluations (Study design, Statistical analysis), Qualitative Research (Thematic analysis, Grounded theory approach, Critical incident technique), Co-design.

**Languages & Frameworks:** C, C++, Python, MATLAB, Swift, TensorFlow, PyTorch, Keras, OpenCV, Robot Operating System (ROS), Linux, Unity, AWS Mechanical Turk, HTML, CSS, Javascript, R, Hive, Cloudera, Docker, Blender, Paraview.

**Design:** Balsamiq, Figma, Affinity Photo, Adobe Photoshop, Adobe Premiere Pro, MS Office.