

Gaurav Jain

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Research Areas



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

Education

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

Publications

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). [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

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

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

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

2023

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

2023

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

2023

Greenwoods Fellowship , Columbia University (details)	2020
Research Excellence Award , Delhi Technological University	2020, 2021
Summer Research Fellowship , Indian Academy of Sciences	2019

Selected Press Coverage

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

Invited Talks & Lectures

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

Community & Professional Services

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

Teaching & Research Mentoring Experience

Teaching Assistant , 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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Amazon SURE Program Mentor , Columbia University & Amazon Inc. <i>Mentored visiting undergraduates on research projects (details).</i> Conrad Wyrick (<i>University of Florida</i>) Maryam Aziz (<i>University of Connecticut</i>) Dan Weiner (<i>Lehman College, CUNY</i>)	2022/23
XR Access REU Program Mentor , National Science Foundation <i>Mentored visiting undergraduates on accessibility research (details).</i> Xinyi Xu (<i>Pomona College</i>) Sophie Ana Paris (<i>NYU</i>) Chloe Tedjo (<i>Texas A&M University</i>) Josh Bassin (<i>Penn State University</i>)	2022/23
Mentor, VISIONS services for the blind and visually impaired <i>Co-designing solutions with and mentoring blind & low-vision students (details).</i> Michael Malcolm (<i>SUNY at Albany</i>) Connor Courtien (<i>Hunter College</i>) Sebastián Mercado Sáez (<i>Fordham University</i>)	2020 – Present
Research Lead , 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

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.