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 Sep 2020 – May 2025
Columbia University, USA
Advisor: Brian A. Smith

M.S. in Computer Science Sep 2020 – May 2022
Columbia University, USA

B.S. in Computer Science Aug 2016 – May 2020
Delhi Technological University, India

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 Proceedings of the Annual ACM Symposium on User Interface Software and Technology (**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

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 2023
Columbia University, *Columbia Engineering*

Creating tools to help people with vision impairments navigate the world 2023
Columbia University, *Voices of CS: Gaurav Jain*

Clearing the Way: Using AI to help blind and low vision users 'see' 2021
Columbia University, *Columbia Engineering Magazine*

Invited Talks & Lectures

Center for Smart Streetscapes (CS3) Research Exchange (*details*) Mar. 2024
Leveraging street cameras to support precise outdoor navigation for blind pedestrians.

Vision Zero Research on the Road Symposium, New York City Government (*details*) Nov. 2023
Leveraging street cameras to support precise outdoor navigation for blind pedestrians.

Guest Lecture, COMS E6178: HCI Research Seminar, Columbia University Feb. 2023
How to give effective research presentations?

Community & Professional Services

Organizing Committee 2024 – Present
Publicity Co-chair, UIST 2024

Student Volunteer 2023 – Present
CHI 2024
ASSETS 2023

External Reviewer 2021 – Present
CHI 2021, 2023, 2024* / ASSETS 2023 / CSCW 2022, 2023, 2024*
UIST 2023, 2024 / IMWUT 2024
*Special Recognition for Outstanding Reviews

Women in Science (WISC) Mentoring Program, Barnard University 2022
Mentored undergraduates to help prepare a roadmap toward their career goals.

Pre-Submission Application Review Program, Columbia University 2020
Advised PhD applicants from underrepresented backgrounds.

Teaching & Research Mentoring Experience

Teaching Assistant, Columbia University
COMS W4170: *User Interface Design* Fall 2021/22/23
COMS E6178: *Human-Computer Interaction (Research Seminar)* Spring 2021/22/23

Amazon SURE Program Mentor, Columbia University & Amazon Inc. 2022/23
Mentored visiting undergraduates on research projects (details).
Conrad Wyrick *(University of Florida)*
Maryam Aziz *(University of Connecticut)*
Dan Weiner *(Lehman College, CUNY)*

XR Access REU Program Mentor, National Science Foundation 2022/23
Mentored visiting undergraduates on accessibility research (details).
Xinyi Xu *(Pomona College*)
Sophie Ana Paris (*NYU*)
Chloe Tedjo (*Texas A&M University*)
Josh Bassin (*Penn State University*)

Mentor, VISIONS services for the blind and visually impaired 2020 – Present
Co-designing solutions with and mentoring blind & low-vision students (details).
Michael Malcolm *(SUNY at Albany)*
Connor Courtien *(Hunter College)*
Sebastián Mercado Sáez *(Fordham University)*

Research Lead, Columbia University 2020 – Present
Managing research projects and mentoring students at the CEAL Lab.
B.S. students: David Rios, Ethan Chang, Jessica Peng.
M.S. students: Zihao Zhang, Koushik Srinivasula, Uttam Gurram, Aditi Patil, Lindsey Weiskopf, Arjun Nichani, Mingyu Xie, Basel Hindi, Yuanyang Teng, David Cho, Yunhao Xing.

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.