

Rukhshan Haroon

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OVERVIEW

My research seeks to understand and improve how human-AI systems shape the way people interact with each other. Specifically, my doctoral work focuses on AI-mediated communication, spanning the design and user-centered evaluation of systems that bridge communication differences between autistic and non-autistic individuals, as well as the development of benchmarking frameworks to audit large language models (LLMs) for neurotypical-centric communication bias. Previously, I led mixed-methods studies of socio-technical challenges, including gender disparities among frontline healthcare workers and the spread of pandemic-related misinformation. I also worked on expanding access to AI for users in developing regions at scale.

SKILLS

Research: System Design & Implementation, AI Prototyping, Quantitative (survey design, statistical analysis, dataset curation) & Qualitative (semi-structured interviews, focus groups, participatory design) Methods, User-study & Experimental Design, AI Bias & Fairness Evaluation, Technical Writing.

Technical: Full-stack Web-development, Retrieval Augmented Generation, Prompt Engineering, PyTorch, TensorFlow, C#, C/C++, Python, ReactJS, NodeJS, Git, Unity, ARKit, MySQL, MongoDB.

Selected Coursework: Generative AI for Social Impact, HCI for Disabilities, Deep Learning, Statistics, Advanced Programming, Software Engineering, Data Science, Databases, Data Structures, Algorithms.

WORK EXPERIENCE

Research Lead (AI, Accessibility, and HCI)—Tufts University, Boston, MA. *Sept 2022 - present.*

- Designed and implemented 2 web-based **LLM-powered computer-mediated communication tools**: (1) a training platform that uses **conversational simulations** to help non-autistic users practice and improve cross-neurotype conversational skills, and (2) an assistive writing interface that supports autistic users in expressing and interpreting social cues and linguistic nuances.
- Led multi-phase **user studies** with **30+** autistic and non-autistic individuals to evaluate the aforementioned tools, integrating task-based activities with think-aloud protocols, semi-structured interviews, and surveys; contributed a novel **simulation-based** method for usability testing.
- Conducted a **mixed-methods benchmarking study** of LLMs as communication mediators between autistic and non-autistic conversational partners, contributing a dataset of cross-neurotype dialogues and a novel persona-prompting methodology to investigate neurotypical-centric bias in LLMs; revealed biases related to fairness in mediation and empathic reasoning.
- Contributed to a **research grant** proposing an augmented-reality (AR) based communication training tool and a real-time communication support system to facilitate cross-neurotype interactions in high-stakes social scenarios.

Researcher (AI, ICT4D, and HCI)—Tufts University, Boston, MA. *Jan - Dec 2024.*

- Contributed to the design and implementation of a scalable, cost-saving proxy to expand LLM-access in resource-constrained regions, reducing costs by up to **50%** without compromising output quality.
- Integrated the proxy with a WhatsApp-based chatbot and deployed it in **3 countries** over **12+ months**, supporting **85k+** user-requests.

Research Lead (Security, Privacy, and HCI)—LUMS, Lahore, Pakistan. *May 2020 - Sept 2022.*

- Led **2 large-scale mixed-methods studies** in Pakistan during COVID-19 to: (1) investigate gender disparities among frontline healthcare workers, devising socio-technical interventions to mitigate them, and (2) study how socio-cultural factors shaped pandemic-related misinformation spread, identifying disproportionate impacts on low-income and less-educated groups.
- Designed and implemented a **benchmarking framework** to facilitate performance evaluation of software debloating tools, integrating **15+** GNU core utilities as test programs; built a multi-tool pipeline that achieved up to **70%** reduction in program size and **40%** reduction in common CVEs.

SELECTED RESEARCH

ASSETS is the flagship ACM SIGACCESS conference and the premier venue in CS for research on computing for people with disabilities.

Rukhshan Haroon, Kyle Wigdor, Katie Yang, Nicole Toumanios, Eileen Crehan, and Fahad Dogar. 2025. *NeuroBridge: Using Generative AI to Bridge Cross-neurotype Communication Differences through Neurotypical Perspective-taking*. In *Proceedings of the 27th International ACM SIGACCESS Conference on Computers and Accessibility* (ASSETS '25).  **Best Student Paper (top 1%)** [PDF](#)

Rukhshan Haroon and Fahad Dogar. 2024. *TwIPS: A Large Language Model Powered Texting Application to Simplify Conversational Nuances for Autistic Users*. In *Proceedings of the 26th International ACM SIGACCESS Conference on Computers and Accessibility (ASSETS '24)*. [PDF](#)

Rukhshan Haroon, Haisum Haroon, Wren Kritzer, and Fahad Dogar. *Investigating Normative Bias in AI-mediated Cross-neurotype Communication*. 2025. [PDF \(preprint\)](#)

Rukhshan Haroon, Ayesha Naeem, Priya Sajjad, and Zartash Uzmi. 2024. *On the Frontline During the COVID-19 Pandemic: Gender Inequality and Experiences of Healthcare Workers in Pakistan*. *ACM Journal on Computing and Sustainable Societies*. [PDF](#)

Priya Sajjad, **Rukhshan Haroon**, Ayesha Naeem, Us wah F., Zartash Uzmi. 2022. *Unpacking Misinformation Amid the COVID-19 Pandemic: A Mixed Methods Study*. *IEEE Internet Computing*. [PDF](#)

Hiba Eltigani, **Rukhshan Haroon**, Abdullah Faisal, and Fahad Dogar. *uLLM: A Unified API for Simplifying LLM Use in the Classroom*. 2025. [PDF \(preprint\)](#)

Wendan Jiang, Shiyuan Wang, Hiba Eltigani, **Rukhshan Haroon**, Abdullah Bin Faisal, and Fahad Dogar. *AdvisingWise: Supporting Academic Advising in Higher Education Settings Through a Human-in-the-Loop Multi-Agent Framework*. 2025. [PDF \(preprint\)](#)

Noah Martin, Abdullah Faisal, Hiba Eltigani, **Rukhshan Haroon**, Swaminathan Lamelas, and Fahad Dogar. *LLMBridge: Reducing Costs to Access LLMs in a Prompt-Centric Internet*. [PDF \(preprint\)](#)

EDUCATION

Tufts University, Greater Boston Area, MA, USA.

Ph.D. in Computer Science, Sept. 2022 - Sept. 2027 (expected)

Specialization: Human-computer Interaction, Artificial Intelligence, Accessibility

Advisor: [Fahad Rafique Dogar](#)

Lahore University of Management Sciences (LUMS), Lahore, Pakistan.

B.Sc. in Computer Science, Sept. 2018 - May 2022

SERVICE AND VOLUNTEERING

Reviewer, ACM CHI, ACM IUI, ACM TACCESS, and ACM UIST 2025

Volunteer, Calmer Con Boston (sensory-friendly version of Comic-Con for autistic individuals) 2024

HONORS AND AWARDS

Best Student Paper, ACM ASSETS, [Press](#) 2025

NSF Travel Award, ACM ASSETS Doctoral Consortium 2025

XR Hackathon Winner, Harvard University, [Blog](#) 2023

Award of Academic Distinction, LUMS 2020–2022

Students as Co-Researchers Grant, LUMS 2021

LANGUAGES

English, Urdu (native fluency); Punjabi, Hindi (spoken proficiency).