

# Rukhshan Haroon

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## OVERVIEW

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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 worked on expanding access to AI for users in developing regions at scale. I also led mixed-methods studies of socio-technical challenges, including gender disparities among frontline healthcare workers and the spread of pandemic-related misinformation.

## SKILLS

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**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

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**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

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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, Uswah 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

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**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

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**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

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**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

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