Rukhshan Haroon

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OVERVIEW

As an **accessibility** and **human-computer interaction** researcher, I **study**, **build** and **evaluate AI-mediated communication systems** designed to **bridge communication differences** between **autistic** and **non-autistic** individuals, with a current focus on **benchmarking** whether and how **large language models** (LLMs) exhibit **normative biases** when mediating between them. A core theme of my research is **shared responsibility**: designing systems that provide communication support to both autistic and non-autistic users, rather than placing the burden on one side.

SKILLS

Research: System Design and Implementation, Quantitative (survey design, statistical analysis, dataset curation) and Qualitative (semi-structured interviews, focus groups, participatory design) Methods, User-study and Experimental Design, Bias and Fairness Evaluation, Technical Writing and Documentation.
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** to help non-autistic users practice and improve their 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**.
- Conducted a **mixed-methods, systematic evaluation 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 **generalizable 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.

NeuroBridge: Using Generative AI to Bridge Cross-neurotype Communication Differences through Neurotypical Perspective-taking. **Best Student Paper (top 1%) ACM ASSETS 2025.** PDF

TwIPS: A Large Language Model Powered Texting Application to Simplify Conversational Nuances for Autistic Users. **ACM ASSETS 2024.** PDF

Investigating Normative Bias in AI-mediated Cross-neurotype Communication. PDF (preprint)

Supporting Academic Advising in Higher Education Settings Through a Human-in-the-Loop Multi-Agent Framework. **Under review, ACM IUI 2026.** PDF

uLLM : A Unified API for Simplifying LLM Use in the Classroom. PDF (preprint)

LLMBridge: Reducing Costs in a Prompt-Centric Internet. **Under review, MLSys 2026.** PDF

On the Frontline During the Covid-19 Pandemic: Gender Inequality and Experiences of Healthcare Workers in Pakistan. **ACM COMPASS 2023/ACM JCSS 2024.** PDF

Unpacking Misinformation Amid the COVID-19 Pandemic: A Mixed Methods Study. **IEEE Internet Computing 2022.** PDF

EDUCATION

Tufts University, Greater Boston Area, MA, USA.
Ph.D. in Computer Science, Sept. 2022 - Sept. 2027 (expected)
Specialization: Accessibility, Human-computer Interaction
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).