

Sameena Hossain

Human-AI Interaction · Human Factors Engineering · Responsible AI · Accessible Computing

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Research Areas

Human-AI interaction and collaboration; human factors engineering; artificial intelligence and generative AI; human-centered and responsible AI; AI evaluation and measurement; accessible and inclusive computing; intelligent learning systems; AI ethics and governance in educational contexts; computing education; immersive and multimodal systems.

My research focuses on designing and evaluating human-centered AI systems that augment human capabilities while preserving human agency, accessibility, and meaningful engagement. I develop and empirically evaluate AI-enabled interactive systems, with particular interests in generative AI, human-AI collaboration, human factors, responsible AI, accessible computing, and intelligent learning technologies.

Education

Ph.D. in Computer Science

October 2024

Arizona State University, Tempe, AZ, USA

Dissertation: Human-AI Collaborative Framework to Aid in Computer Science Technical Sign Generation: Towards Enhancing Deaf and Hard of Hearing Participation in Technical Higher Education (Advisor: Dr. Sandeep K. S. Gupta)

Master of Science in Computer Science

June 2013

McMaster University, Hamilton, ON, Canada

Thesis: Semantics of Function Tables on the Reals (Advisor: Dr. Jeffery Zucker)

Bachelor of Science in Computer Science

August 2004

Indiana University of Pennsylvania, Indiana, PA, USA

Applied Computer Science track; Minor in Mathematics; Magna Cum Laude.

Academic Appointments

Postdoctoral Research Scholar

September 2024 - Present

ICAP Center for Teaching & Learning, Arizona State University, Tempe, AZ, USA

Supervisors: Dr. Michelle T. H. Chi and Dr. Kurt VanLehn

- Design and empirical evaluation of a generative-AI tutoring system grounded in the ICAP framework, investigating human-AI interaction and support for deeper cognitive engagement.
- Design studies investigating interactions between generative AI, instructors, and learners, with emphasis on cognitive engagement, human agency, and decision making.
- Design human evaluation protocols, scoring rubrics, and assessment methods for evaluating LLM-generated feedback and recommendations.
- Design and implementation of an immersive VR study investigating how constructive activities influence learning and user engagement within a virtual biology laboratory environment.
- Analyze assessment, survey, dialogue, and behavioral interaction data to evaluate AI-enabled interactive systems and human-AI interactions.
- Contribute to faculty development initiatives introducing ICAP-based lesson design and activity-upgrade strategies to STEMM instructors.

Doctoral Researcher

August 2019 - July 2024

IMPACT Lab, School of Computing and Augmented Intelligence, Arizona State University, Tempe, AZ, USA

Advisor: Dr. Sandeep K. S. Gupta

- Led research within the Computer Science Accessible Virtual Education (CSAVE) project, designing human-centered AI and immersive technologies to improve accessibility of technical education for Deaf and Hard of Hearing (DHH) students.
- Designed CSigGen, a human-AI collaborative framework for searching, learning and evaluating American Sign Language (ASL) technical gestures to aid in standardization of ASL technical gestures.
- Developed EDGCon, an automated iconicity rating assigner for evaluating crowdsourced technical gestures based on lexical

- properties of ASL and gesture similarity.
- Developed and evaluated an expert grounded two step method for assessing automated feedback.
- Designed and conducted IRB-governed human-subject studies with Deaf and Hard of Hearing participants, annotators, and domain experts to evaluate system usability, automated feedback, and human-AI interaction.

Instructor of Record

August 2016–May 2024

School of Computing and Augmented Intelligence, Arizona State University, Tempe, AZ, USA

Designed and delivered undergraduate and graduate computer science courses across programming, data structures, mobile computing, applied cryptography, and data visualization; developed assessments and grading rubrics; led course discussions; and coordinated instructional teams.

Part-Time Faculty

Summer 2019, 2017, 2014

Department of Computer Science, American International University–Bangladesh, Dhaka, Bangladesh

Part-Time Faculty

March 2016 - June 2016

Sheridan College, Oakville, Ontario, Canada

Graduate Research Assistant

September 2010 - April 2013

Department of Computing and Software, McMaster University, Hamilton, Ontario, Canada

Lecturer

July 2005 - August 2010

Department of Computer Science, Independent University Bangladesh, Dhaka, Bangladesh

Publications

Peer Reviewed Publications

- Hossain, S.**, Kamboj, P., Maity, A., Azuma, T., Banerjee, A., & Gupta, S. K. S. (2023). “EdGCon: Auto-assigner of iconicity ratings grounded by lexical properties to aid in generation of technical gestures.” *Proceedings of the ACM Symposium on Applied Computing (SAC 2023)*, Tallinn, Estonia.
- Hossain, S.**, Banerjee, A., & Gupta, S. K. S. (2022). “Quantifying semantic congruence to aid in technical gesture generation in computing education.” *International Conference on Artificial Intelligence in Education (AIED 2022)*, Durham, UK.
- Hossain, S.**, Kamzin, A., Amperayani, V. N. S. A., Paudyal, P., Banerjee, A., & Gupta, S. K. S. (2021). “Engendering trust in automated feedback: A two-step comparison of feedbacks in gesture-based learning.” *International Conference on Artificial Intelligence in Education (AIED 2021)*, Utrecht, The Netherlands.
- Banerjee, A., Lamrani, I., **Hossain, S.**, Paudyal, P., & Gupta, S. K. S. (2020). “AI enabled tutor for accessible training.” *International Conference on Artificial Intelligence in Education (AIED 2020)*.
- Hossain, S.**, Banerjee, A., & Gupta, S. K. S. (2020). “Personalized technical learning assistance for deaf and hard of hearing.” *Workshop on Artificial Intelligence in Education, 34th AAAI Conference on Artificial Intelligence*, New York, NY.

Selected Research Projects

ICAP AI Tutor: Generative AI for Cognitive Engagement

2025 - Present

ICAP Center for Teaching & Learning, Arizona State University

- Generative-AI tutoring system that supports instructors in learning ICAP classification and activity-upgrade strategies.
- Uses dialogue-based interaction, classification, feedback, and instructional recommendations to support deeper cognitive engagement while preserving user reasoning and decision making.
- Ongoing research evaluates human-AI interaction, instructor reasoning and learning, system response quality, and opportunities for adaptive support.

ICAP in VR: Cognitive Engagement in Immersive STEM Learning

2024 - Present

ICAP Center for Teaching & Learning, Arizona State University

- Designed and implemented an experimental study examining cognitive engagement and learning outcomes from ICAP-enhanced activities embedded within an immersive virtual biology laboratory.
- Investigates how the design of activities within immersive environments influences learner interaction, cognitive engagement, and learning.
- Exploring future work on how contextual and multimodal information may support adaptive interventions within immersive and augmented environments.

Computer Science Accessible Virtual Education (CSAVE)

2019 - 2024

IMPACT Lab, Arizona State University

- Developed an accessible virtual learning framework integrating immersive environments, AI tutoring, automated feedback, and collaborative technical gesture generation to support Deaf and Hard of Hearing students in computer science education.
- Designed CSigGen, a human-AI collaborative framework for searching, learning, and evaluating technical signs.
- Developed EDGCon, an automated iconicity-rating method for evaluating crowdsourced technical gestures using lexical properties and gesture similarity.
- Developed and evaluated an expert grounded, two-step method for assessing automated feedback in gesture based learning.

Research Funding

ASU Pandemic Impact Research Funding

Fall 2020

Arizona State University

Research support recipient for the Computer Science Accessible Virtual Education (CSAVE) project.

Mentoring and Advising

- Co-supervised Barrett Honors College student at Arizona State University, on an honors thesis based on the CSAVE and CSigGen research programs (Fall 2023 - Spring 2024).
- Supervised applied machine learning capstone projects at Arizona State University as a course instructor.
- Mentor graduate researchers and collaborators on experimental design, AI system evaluation, annotation protocols, and research workflows.
- Worked with Deaf and Hard of Hearing student annotators and domain experts across IRB governed studies.

Courses Taught

Arizona State University

Mobile Computing; Applied Cryptography; Data Visualization; Object Oriented Programming and Data Structures; Computer Literacy; Principles of Programming with Java; Principles of Programming with C++

American International University-Bangladesh

Human Computer Interaction; Data Mining; Discrete Mathematics.

Sheridan College

Cryptography; Principles of Programming with Java.

Independent University Bangladesh

Database Systems; Principles of Programming with C; Introduction to Computer Science.

Invited Talks and Presentations

Invited Speaker, Marquette University

October 2026

Invited Speaker Colloquium in the Department of Computer Science at Marquette University

Invited Speaker, ASBMB Annual Meeting

March 2026

Symposium on Innovative Strategies to Broaden Engagement through Teaching and Mentoring, Washington, DC.

Conference Presentation, Artificial Intelligence in Education, Durham, UK.

2022

Conference Presentation, Artificial Intelligence in Education, Utrecht, The Netherlands.

2021

Professional Service

Program Committees

Program Committee Member, ACM SIGCSE Virtual, 2026.

Journal and Conference Reviewing

- *Computers & Education Journal*
- ACM International Conference on Human Agent Interaction (HAI)
- ACM Technical Symposium on Computer Science Education (SIGCSE)
- International Conference on Artificial Intelligence in Education (AIED)
- Nordic Conference on Human Computer Interaction (NordiCHI)

Institutional and Community Service

- Co-facilitator, ICAP faculty development workshops for STEMM instructors, Arizona State University.
- General Secretary, Bangladesh Student Association, Arizona State University, September 2019–November 2020.
- Vice President, Viqarunnisa Noon Science Club, Dhaka, Bangladesh, 1998–1999.

Honors and Awards

ASU SCAI Doctoral Fellowship

2024, 2022, 2021

School of Computing and Augmented Intelligence, Arizona State University

Graduate Entrance Scholarship

September 2010

McMaster University

Magna Cum Laude Honors Graduate

2004

College of Natural Sciences & Mathematics, Indiana University of Pennsylvania

Research Methods & Technical Expertise

Generative AI and LLM-based systems; human–AI interaction and human-centered AI evaluation; human factors and usability evaluation; experimental and quasi-experimental design; human-subject research; qualitative and quantitative analysis; statistical analysis; multimodal and behavioral interaction analysis; assessment and rubric design; Python-based data analysis.

Professional Memberships

International Artificial Intelligence in Education Society (IAIED).

Association for Computing Machinery (ACM).

ACM Special Interest Group on Computer-Human Interaction (SIGCHI).

ACM Special Interest Group on Computer Science Education (SIGCSE).

ACM Special Interest Group on Accessible Computing (SIGACCESS).