Amama Mahmood

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Research Overview

My research, situated at the intersection of HCI and Health, focuses on enhancing human-machine interactions to support health and well-being. Specifically, I design, develop, and evaluate AI assistants-powered by LLMs-that enable seamless, adaptive interactions by understanding user behaviors in various real-world contexts. With a focus on empowering older adults in managing their health to facilitate aging in place, my work emphasizes situated, long-term, sustainable, "in the wild" human-machine interactions.

Keywords: *Human-Computer Interaction, Human-AI Interaction, Human-Robot Interaction, Conversational Agents, Large Language Models, Human-Subjects Research, Health*

Current Position

Postdoctoral Fellow, Johns Hopkins Malone Center for Engineering in Healthcare **September 2025 — Present**

- Advised by Dr. **Chien-Ming Huang**, **Ziang Xiao, and Paul Yi**

Education

Doctor of Philosophy in Computer Science, *Johns Hopkins University* **2020 — 2025**

- Advised by Dr. **Chien-Ming Huang**.

Master of Science in Engineering (Computer Science), *Johns Hopkins University* **May 2022**

Master of Science in Engineering (Robotics), *Johns Hopkins University* **May 2020**

Bachelors in Electrical Engineering, *National University of Sciences & Technology (NUST)* **June, 2017**

Research/Work Experience

Graduate Research Assistant, *Johns Hopkins University* **August 2019 — August 2020**

Research Assistant, *Satellite Servicing Mission NASA Project-Johns Hopkins University* **March 2019 — Dec 2019**

Research Assistant, *Signal, Image and Video Processing lab, LUMS, Pakistan* **Oct 2017 — July 2018**

Undergraduate Researcher, *National University of Sciences and Technology, Pakistan* **Feb 2016 — Sept 2017**

Honors/Awards

Malone Postdoctoral Fellowship, *Johns Hopkins University* **2025-2026**

Creel Family Engineering Fellowship, *Johns Hopkins University* **2020-2021**

Computer Science Department Fellowship, *Johns Hopkins University* **2020-2021**

Fulbright Scholar **2018-2020**

Publications

Google Scholar

Journal Articles

J.9 From Text to Conversation: Evaluating an LLM-Powered Voice Assistant for Sleep Diary Intake Through a Month-Long Deployment
Amama Mahmood*, Bokyung Kim*, Honghao Zhao, Molly Atwood, Luis Buenaver, Michael Smith, Chien-Ming Huang
[In preparation] (2025)

J.8 "Mango Mango, How to Let The Lettuce Dry Without A Spinner?": Exploring User Perceptions of Using An LLM-Based Conversational Assistant Toward Cooking Partner
Szeyi Chan, Jiachen Li, Bingsheng Yao, Amama Mahmood, Chien-Ming Huang, Holly Jimison, Elizabeth D. Mynatt, and Dakuo Wang
Proceedings of the ACM on Human-Computer Interaction (CSCW) (2025) https://doi.org/10.48550/arXiv.2310.05853

J.7 Situated Understanding of Errors in Older Adults' Interactions with Voice Assistants: A Month-Long, In-Home Study
Amama Mahmood, Junxiang Wang, and Chien-Ming Huang
Proceedings of *ACM Transactions on Accessible* Computing [Under review. arXiv] (2025)

J.6 User Interaction Patterns and Breakdowns in Conversing with LLM-powered Voice Assistants
Amama Mahmood, Junxiang Wang, Bingsheng Yao, Dakuo Wang, and Chien-Ming Huang
International Journal of Human-Computer Studies (IJHCS) (2025)
Volume 195 https://doi.org/10.1016/j.ijhcs.2024.103406

J.5 Care to Explain? AI Explanation Types Differentially Impact Physician Diagnostic Performance and Trust in AI
Drew Prinster*, Amama Mahmood*, Suchi Saria, Jean Jeudy, Cheng Ting Lin, Paul Yi, and Chien-Ming Huang
Radiology (2024)
Volume 313, Issue 2 https://doi.org/10.1148/radiol.233261

J.4 Gender Biases in Error Mitigation by Voice Assistants
Amama Mahmood and Chien-Ming Huang
Proceedings of the ACM on Human-Computer Interaction (CSCW) (2024)
Volume 8, Issue CSCW1, Article 60, Pages 1–27 https://doi.org/10.1145/3637337

J.3 "You Might Like It": How People Respond to Small Talk in Human-Robot Collaboration
Kaitlynn Taylor Pineda, Amama Mahmood, and Chien-Ming Huang
[Under review, arXiv] (2024)

J.2 Crowdsourcing Thumbnail Captions: Data Collection and Validation
Carlos Aguirre*, Shiye Cao*, Amama Mahmood, and Chien-Ming
ACM Transactions on Interactive Intelligent Systems (TIIS)(2023)
Volume 13, Issue 3, Article 14, Pages 1–28 https://doi.org/10.1145/3589346, Invited article following IUI'22 (C.4)

J.1 SmartSIM-A Virtual Reality Simulator for Laparoscopy Training Using a Generic Physics Engine
Zohaib Amjad Khan, Nabeel Kamal, Asad Hameed, Amama Mahmood, Rida Zainab, Bushra Sadia, Shamyl Bin Mansoor, and Osman Hasan
The International Journal of Medical Robotics and Computer Assisted Surgery (2017)
Volume 13, Issue 3, Pages e1771 https://doi.org/10.1002/rcs.1771

Conference Full Papers

C.9 Re-imagining Behavioral Sleep Medicine: Designing Conversational Sleep Diary and Visualization Tool
Amama Mahmood, Bokyung Kim, Honghao Zhao, Molly Atwood, Luis Buenaver, Michael Smith, Chien-Ming Huang
[Under review, arXiv] (2025)

C.8 ERR@ HRI 2.0 Challenge: Multimodal Detection of Errors and Failures in Human-Robot Conversations
Shiye Cao, Maia Stiber, Amama Mahmood, Maria T. Parreira, Wendy Ju, Micol Spitale, Hatice Gunes, Chien-Ming Huang
Proceedings of the 33rd ACM International Conference on Multimedia (ACM-MM) (2025) [arXiv]

C.7 Interruption Handling for Conversational Robots
Sally Cao, Jiwon Moon, Amama Mahmood, Victor Antony, Ziang Xiao, Anqi Liu, and Chien-Ming Huang

Proceedings of the 2025 Robotics: Science and Systems Conference (RSS) (2025)
https://doi.org/10.48550/arXiv.2501.01568 |Acceptance rate: 27.4%

C.6 Voice Assistants for Health Self-Management: Designing for and with Older Adults
Amama Mahmood, Shiye Cao, Maia Stiber, Victor Antony, and Chien-Ming Huang
Proceedings of 2025 ACM Conference on Human Factors in Computing Systems (CHI) (2025)
https://doi.org/10.48550/arXiv.2409.15488 | Acceptance rate: 25.1%

C.5 Effects of Rhetorical Strategies and Skin Tones on Agent Persuasiveness in Assisted Decision-Making
Amama Mahmood and Chien-Ming Huang
Proceedings of 2022 ACM International Conference on Intelligent Virtual Agents (IVA) (2022)
Article 7, Pages 1–8 https://doi.org/10.1145/3514197.3549628

C.4 Crowdsourcing Thumbnail Captions Using Time-Constrained Methods
Carlos A Aguirre, Amama Mahmood, and Chien-Ming
Proceedings of the 2022 ACM International Conference on Intelligent User Interface (IUI) (2022)
Pages 36–48 https://doi.org/10.1145/3490099.3511136 | Acceptance rate: 24.5%

C.3 Owning Mistakes Sincerely: Strategies for Mitigating AI Errors
Amama Mahmood, Jeanie W Fung, Isabel Won, and Chien-Ming Huang
Proceedings of the 2022 ACM Conference on Human Factors in Computing Systems (CHI) (2022)
Article 578, Pages 1–11 https://doi.org/10.1145/3491102.3517565 | Acceptance rate: 24.7%

C.2 Visual Monitoring and Servoing of a Cutting Blade during Telerobotic Satellite Servicing
Amama Mahmood, Balazs P Vagvolgyi, Will Pryor, Louis L Whitcomb, Peter Kazanzides, and Simon Leonard
IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) (2020)
Pages 1903-1908 https://doi.org/10.1109/IROS45743.2020.9341485

C.1 Classification of Multi-class Motor Imagery EEG Using Four Band Common Spatial Pattern
Amama Mahmood, Rida Zainab, Rushda Basir Ahmad, Maryam Saeed, and Awais Mehmood Kamboh
39th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC) (2017)
Pages 1034-1037 https://doi.org/10.1109/EMBC.2017.8037003

Refereed Symposium, Workshop Papers and Conference Abstracts

S.1 From Our Lab to Their Homes: Learnings from Longitudinal Field Research with Older Adults
Amama Mahmood and Chien-Ming Huang
AAAI Fall Symposium on Aging in Place (2024) [symposium, arXiv]

A.1 Care To Explain? Differential Impacts Of Explanation Types On Physician Trust In AI
Drew Prinster*, Amama Mahmood*, Suchi Saria, Jean Jeudy, Cheng Ting Lin, Paul Yi, Chien-Ming Huang
2023 Conference on Machine Intelligence in Medical Imaging (Society for Imaging Informatics in Medicine)
Podium presentation [conference abstract]

W.1 How Mock Model Training Enhances User Perceptions of AI Systems
Amama Mahmood, Gopika Ajaykumar, Chien-Ming Huang
Human Centered AI (HCAI) workshop at NeurIPS (2021) [workshop, arXiv]

Theses

T.3 Designing Conversation Experience: From Traditional to LLM-Powered Voice Assistants
Amama Mahmood
Department of Computer Sciences, Johns Hopkins University (2025)
Doctor of Philosophy (Ph.D.) Thesis

T.2 Robot Assisted 3D Block Building to Augment Spatial Visualization Skills in Children - An Exploratory Study
Amama Mahmood
Laboratory for Computational Sensing and Robotics, Johns Hopkins University (2020)
Master of Science in Engineering (M.S.E.) Robotics Thesis

T.1 Classification of Multiclass Motor Imagery EEG for Control Applications of Brain Computer Interface
Amama Mahmood, Rida Zainab, Rushda Basir Ahmad
School of Electrical Engineering and Computer Science, National University of Sciences and Technology (2017)
Bachelor's of Science in Electrical Engineering (B.S.E.) Thesis

Teaching and Mentorship

Course Instructor, EN.601.491/691 **Human-Robot Interaction** **Spring 2025**
Department of Computer Science**,** *Johns Hopkins University*
Overall quality: 4.11/5.00 (responses = 29, size = 30)
Teaching effectiveness: 4.21/5.00 (responses = 29, size = 30)

Teaching Assistant, EN.601. 490/690 **Introduction to Human-Computer Interaction** **Fall 2021**
Department of Computer Science**,** *Johns Hopkins University*

Course Assistant, EN.601.491/691 **Human-Robot Interaction** **Spring 2020**
Department of Computer Science**,** *Johns Hopkins University*

Human-Computer Interaction Reading Group Organizer **Summer 2020 – Spring 2023**
Intuitive Computing Lab, *Johns Hopkins University*

Student Mentor, *Johns Hopkins University* **2020-present**
Mentored undergraduates and graduate students: Co-authored papers C.3, C.7, C.9, J.3, J.6, J.7, and J.9.

Service

Peer Reviewer **2020 — Present**

- Peer reviewed (3 special mentions) for ACM Conference on Human Factors in Computing Systems – **CHI'24, CHI'25**
- Peer reviewed paper for ACM Transactions on Human-Robot Interaction – **THRI 2021**
- Peer reviewed for ACM/IEEE International Conference on Human-Robot Interaction – **HRI'21**
- Peer reviewed paper for ACM International Conference on Multimodal Interaction - **ICMI 2020**

Organizer Lab Hackathon **Summer 2023**

- Organized hackathon for research group on integrating LLMs into voice assistants and robots

Organizer Community Outreach Expo **Summer 2024**

- Organized a community outreach exhibition at a local senior living center

Member of Robotics Graduate Student Association, *Johns Hopkins University* **2020 — 2024**