Amama Mahmood

Department of Computer Science

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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](https://scholar.google.com/citations?user=uUyk0ioAAAAJ&hl=en)

**Journal Articles**

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| **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](https://arxiv.org/abs/2403.02421)] (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](https://arxiv.org/abs/2312.07454)] (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**

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| **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](https://arxiv.org/abs/2509.15378)] (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](https://arxiv.org/abs/2507.13468)] |
| **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**

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| **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](https://arxiv.org/abs/2409.15495)] |
| **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](https://arxiv.org/abs/2111.08830)] |

**Theses**

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| **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](https://jscholarship.library.jhu.edu/items/8fe63665-8820-4a4b-b498-3b09272de756) |
| **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](https://jscholarship.library.jhu.edu/server/api/core/bitstreams/a3c4a7ea-34cb-44a1-aa69-71dcccea9251/content) |
| **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**