Mahrukh Tauseef

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Passionate about solving real-world problems through user-centered design and prototyping

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EDUCATION

VANDERBILT UNIVERSITY   **Nashville, TN**
Doctor of Philosophy in Electrical and Computer Engineering, December 2025
Master of Science in Electrical and Computer Engineering, August 2024 (Overall GPA: 3.87)
Concentration: Mixed Reality, Human-Computer Interaction, Machine Learning

New York University Abu Dhabi   **Abu Dhabi, UAE**
Bachelor of Science, May 2020 (Overall GPA: 3.60)
Major: Electrical Engineering
- Two years of research experience in the Applied Interactive Multimedia (AIM) Lab, focusing on human-computer interaction and haptic technology.

EXPERIENCE
2021 - Present

Robotics and Autonomous Systems Lab   **Nashville, TN**
Graduate Research Assistant
- Dissertation Topic: Developing a machine learning-based solution for mapping users' real-world motion to avatar trajectories in AR telepresence across dissimilar physical environments. Awarded Meta's ARIA Research Grant to tackle challenges in spatial mismatch and trajectory prediction using sensor fusion from Meta's ARIA smart glasses.
- Co-designed an Augmented Reality (AR) telepresence system to allow two or more geographically separated users to interact with each other. Developed two multiplayer AR games, *Checkers* and *Apples-to-Apples* in Augmented Reality. Designed a network pipeline to support real-time audio, body, and facial data communication within acceptable range for AR (< 100ms latency).
- Deployed the AR telepresence system to user's residence and performed feasibility and acceptability testing for connecting older adults with their family members with **53 older adults**. Tested the scalability and transferability of the system with 8 autistic individuals to support interpersonal interaction between them during two- and four- person activities.
- Conceptualized the design of an LLM-based AI assistant for dementia care. Went through two incubator programs to test the product's potential for commercialization. Procured **$15,000** for customer discovery and prototype development. Patent application in process.
- Co-designed a collaborative virtual environment for AI-supported soft skills training for autistic individuals. Developed a LEGO-based assessment task to quantitatively measure the degree of collaboration using multimodal data. Tested the system with **54 individuals.**
- Supported commercialization of an AR-based simulation system to support nursing education as a technical lead. Conducted over **100 customer discovery interviews** and conceptualized the design of the minimal viable product (MVP).

SELECTED DESIGN CENTERED PROJECTS

• Currently designing and 3D printed ergonomic daily-use objects to enhance usability through iterative prototyping.

• Co-teaching an MBA course on *Entrepreneurship* at Vanderbilt University Owen Graduate School of Management, guiding students through hands-on product development using a design thinking approach.

• Currently developing a smart plant monitoring system and a two-way intercom as personal projects, integrating custom PCB design, CAD modeling, and sensor-driven interaction.

SKILLS

Programming & Tools: Python, C#, Unity, Unreal, CAD (Fusion), PCB Design.
Technical Areas: Augmented/Virtual Reality, Human Computer Interaction, Human Factors Engineering, Machine Learning, End-to-end Product Development, Qualitative/Quantitative Data Analysis.
Professional Skills: Teaching, Research, Entrepreneurship

AWARDS

- Received the NSF I-Corp Grant for $50,000 to support AR-based nursing simulation.
- Awarded the LIVE Spark Grant worth $10,000 for prototype development of the AI assistant for dementia care.
- Received two internal grants worth $5000 to support customer discovery and prototype development of the AI assistant for dementia care.

RELEVANT PUBLICATIONS

- **Tauseef, M.**, et al. (2024). From Lab to a Long-Term Care Facility: Lessons Learned from Field Deployment of Augmented Reality Telepresence System as an Interactive Communication Technology. *IEEE International Symposium on Mixed and Augmented Reality Adjunct (ISMAR-Adjunct)*.
- Ullal, A., **Tauseef, M**., et al. (2024). An Iterative Participatory Design Approach to Develop Collaborative Augmented Reality Activities for Older Adults in Long-Term Care Facilities. *Proceedings of the CHI Conference on Human Factors in Computing Systems*
- Maxwell, C., **Tauseef, M.**, et al. (2023). Designing Collaborative Augmented Reality Activities with Older Adults in Long-Term Care. *Innovation in Aging* 7. Suppl 1: 1017.
- Amat, A. Z., Adiani, D., **Tauseef, M**., Breen, M., Hunt, S., Swanson, A. R., ... & Sarkar, N. (2023). Design of a desktop virtual reality-based collaborative activities simulator (ViRCAS) to support teamwork in workplace settings for autistic adults. *IEEE Transactions on Neural Systems and Rehabilitation Engineering*, *31*, 2184-2194.
- **Tauseef, M**., et al. (2022). Design of a Virtual Task to Understand the Nature of Collaboration Between Autistic and Neurotypical Adults in the Workplace Using Multimodal Data. *International Conference on Human-Computer Interaction* (pp. 410-426). Cham: Springer International Publishing.