Ryan Ghamandi – PhD Candidate

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Google Scholar: https://scholar.google.com/citations?user=gDjuLFwAAAAJ&hl=en&oi=ao

EDUCATION

University of Central Florida
- Bachelor of Science - Computer Science, Mathematics Minor; Cumulative GPA: 3.72 **(May 2021)**
- Masters of Science - Computer Science; Cumulative GPA: 3.75 (**December 2022)**
- Doctor of Philosophy - Computer Science (**Expected: May 2026)**

Relevant Coursework : Virtual Reality Engineering, Computer Graphics, Augmented Reality Engineering, Mixed Reality Project, 3D User Interfaces For Games and VR, Advanced Artificial Intelligence, Data Visualization, Current Topics in ML

Research Interests: XR Collaboration, HCI, Natural User Interfaces, User Interfaces, Interaction Techniques

Awards and Scholarships: Dean's List, President's List, Florida Bright Futures (FAS), UCF Accelerated BS to MS Program

WORK EXPERIENCE

Undergraduate Research Assistant   **April 2019 - May 2021**

Graduate Research - Interactive Systems And User Experience Lab   **May 2021 - Present**

Graduate Research Assistant, Software Developer

- Collaborated with researchers and designers to develop and prototype AR/VR/MR applications in Unity with MRTK, Vuforia, XRIT, Meta XR SDK, SteamVR for use in research on collaborative and guided task systems in XR environments to investigate interaction techniques, user interfaces and cognitive processes
- Designed and implemented a multimodal VR collaboration system supporting voice, gaze, and gesture input to study communication effectiveness (CHI '24 publication)
- Led experimental design and conducted VR-based user studies evaluating task performance and user experience across varying input modalities; analyzed results using Python and R
- Created VR simulations of real-world AR systems with support for virtual sensors (e.g., gyroscope, hand tracking, accelerometer) and ROS2 data streaming using MRTK and Vuforia
- Led a systematic literature review on collaborative XR, resulting in an interactive taxonomy (ISMAR '23 publication)
- Mentored junior lab members on project onboarding, Unity development, and research best practices, and version control

SKILLS

Programming Languages: C, C#, C++, Java, Python, MIPS, Javascript, HTML, CSS, Git

Tools: Unity, Visual Studio Community, Observable, Github, Blender, SPSS, R

Libraries/APIs: MRTK, Vuforia, XRIT, React, SteamVR, ROS2, OpenGL, Meta XR SDK, Pytorch, Tensorflow

PROJECTS

Tactile Telepresence   **August 2020 - May 2021**
- Developed AR-based haptic interaction framework using Unity and Vuforia, enabling remote sensory feedback through tracked tactile devices
- Implemented VuMark-based image recognition for accurate 6DOF tracking and localization of physical feedback hardware

Perceptually-Enabled Task-Based Guidance   **January 2022 - December 2024**
- Built a VR simulator emulating real-world AR systems and sensor input (e.g., accelerometer, gyroscope, hand tracking, voice input)
- Integrated ROS2 for real-time data streaming and designed interaction cues to support task guidance and user training

User Perception of LLM-Based Systems   **January 2025 - Present**
- Built a custom class scheduler using Llama 3.1 and Google OR Tools to interpret natural user input to build schedules
- Implemented interpretability methods and visualizations such as Integrated Gradients and Hidden Layer Evolution to demonstrate to users how their final schedule was built from their natural instruction through LLM usage

Natural Modality Use by Untrained Users   **October 2023 - May 2024**
- Developed an assembly task scenario and a Wizard-of-Oz-controlled virtual robot arm in VR
- Investigated natural modality use (voice, gesture, gaze) for system interaction by novice, untrained users

SELECTED PUBLICATIONS

- ***Ghamandi, R. K.**, Hmaiti, Y., Nguyen, T. T., Ghasemaghaei, A., Kattoju, R. K., Taranta, E. M., & LaViola, J. J. (2023, October). What And How Together: A Taxonomy On 30 Years Of Collaborative Human-Centered XR Tasks. In 2023 IEEE International Symposium on Mixed and Augmented Reality (ISMAR) (pp. 322-335). IEEE.* https://ieeexplore.ieee.org/abstract/document/10316494
- ***Ghamandi, R.K.**, Kattoju, R.K., Hmaiti, Y., Maslych, M., Taranta, E.M., McMahan, R.P. and LaViola, J., (2024, May). Unlocking Understanding: An Investigation of Multimodal Communication in Virtual Reality Collaboration.. ACM SIGCHI '24.* https://doi.org/10.1145/3613904.3642491
- *Kattoju, R.K., **Ghamandi, R**., Taranta, E.M. and Laviola, J.J., 2023, April. Automatic Improper Loading Posture Detection and Correction Utilizing Electrical Muscle Stimulation. ACM SIGCHI '23.* https://doi.org/10.1145/3544548.3581435