Yuqi Zhou

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Yuqi Zhou is a Computer Science Ph.D. candidate at Purdue University, with an expected graduation date of May 2026. He is advised by Professor Voicu Popescu. His research interests are in extended reality (XR), including virtual reality (VR), mixed reality (MR), and augmented reality (AR). Specifically, his research focuses on providing realistic, versatile, and safe haptic feedback during XR interactions. His approach integrates concerted visual and physical extensions of reality, by developing perception-aware redirection algorithms as well as innovative encountered-type haptic devices. His research also focuses on distributed XR systems to provide low latency, edge server scalability with the number of clients, as well as strict XR environment complexity management to support thin XR clients. His research results have been validated with hundreds of users through rigorous human-computer interaction studies, and published at top XR venues.

Education

2020 – 2026 **Ph.D. in Computer Science**, *Purdue University*, West Lafayette, IN.
Advisor: Dr. Voicu Popescu

2016 – 2020 **B.E. in Computer Science**, *Rose-Hulman Institute of Technology*, Terre Haute, IN.

Publications

The IEEE Conference on Virtual Reality and 3D User Interfaces (VR) and the IEEE International Symposium on Mixed and Augmented Reality (ISMAR) are the premier venues focusing on XR research. The top papers at VR and ISMAR are published in the IEEE Transactions on Visualization and Computer Graphics (TVCG) journal.

[1] (**TVCG**) Liao, Shuqi, **Yuqi Zhou**, and Voicu Popescu. "The Effect of Realism on Hand Redirection in Immersive Environments." *IEEE Transactions on Visualization and Computer Graphics.* ISMAR 2025. (7.2%).

[2] (**TVCG**) **Zhou, Yuqi**, and Voicu Popescu. "Dynamic Redirection for Safe Interaction with ETHD-Simulated Virtual Objects." *IEEE Transactions on Visualization and Computer Graphics.* VR 2025. (17.3%).

[3] (**ISMAR**) **Zhou, Yuqi**, and Voicu Popescu. "Detectability of ETHD Position and Speed Redirection for VR Haptics." *2024 IEEE International Symposium on Mixed and Augmented Reality.* ISMAR 2024. (30.4%).

[4] (**TVCG**) **Zhou, Yuqi**, and Voicu Popescu. "CloVR: Fast-Startup Low-Latency Cloud VR." *IEEE Transactions on visualization and Computer Graphics.* VR 2024. (12.6%).

[5] (**HUCAPP**) **Zhou, Yuqi**, and Voicu Popescu. "Look-Over-There: Real-World Co-Located Cross-Referencing Using Augmented Reality." *19th International Conference on Human Computer Interaction Theory and Applications, HUCAPP 2024.* (22.3%).

[6] (**VR-W**) **Zhou, Yuqi**, and Voicu Popescu. "Meet Me Half-Way: Concerted Physical and Virtual World Manipulations for Effective Haptic Feedback in VR", VR 2024 Workshop on Novel Input Devices and Interaction Techniques (NIDIT) 2024.

[7] (**TVCG**) **Zhou, Yuqi**, and Voicu Popescu. "Dynamic Redirection for VR Haptics with a Handheld Stick." *IEEE Transactions on Visualization and Computer Graphics.* VR 2023. (10%).

[8] (**VR**) Liao, Shuqi, **Yuqi Zhou**, and Voicu Popescu. "AR Interfaces for Disocclusion-A Comparative Study." *2023 IEEE Conference Virtual Reality and 3D User Interfaces.* VR 2023. (21%).

[9] (**VR**) **Zhou, Yuqi**, and Voicu Popescu. "Tapping with a handheld stick in VR: Redirection detection thresholds for passive haptic feedback." *2022 IEEE Conference on Virtual Reality and 3D User Interfaces.* VR 2022. (21.5%).

Research Projects

Jan. 2021 – Present
Thesis Research: Haptic Feedback for Extended Reality
- Developed perception-aware redirection algorithms for stationary and dynamic virtual objects to bridge physical-virtual gaps in position, speed, and shape, in a way that is undetectable by the user.
- Designed and built a custom $300 large-scale Cartesian robot as an encountered-type haptic device (ETHD) for XR haptic feedback.
- Designed and built a custom ETHD-based impact simulator to evaluate force-feedback realism and early-stopping safety protocols.
- Validated my XR haptics results in IRB-approved HCI user studies involving hundreds of users.
- My XR haptics results provided part of the preliminary results for securing the NSF grant #2506783, "Using Extended Reality Simulations to Support Students in Understanding Abstract STEM Concepts" ($900,000).

Jun. 2022 – Present
Distributed Virtual Reality
- Developed a virtual environment complexity management strategy to make complex virtual environments tractable on thin VR clients, such as all-in-one XR headsets.
- Implemented support for fast scene loading via continuous progressive refinement; demonstrated scalability across multiple clients.
- Engineered a scalable multicast system for city-scale multi-user VR scene transfer, reducing load time from minutes to seconds.

Nov. 2021 – May 2022
Attention Guidance with Augmented Reality
- Developed a collaborative AR application enabling one user to point out real-world landmarks to another user in real time.
- Linked devices (e.g., tablets, phones) through a 3D homography constructed on shared scene features, enabling accurate directional guidance.
- Designed and evaluated a transparent display paradigm for unobtrusive and intuitive attention redirection.

Teaching Experience

- Teaching Assistant: CS 490/590 Introduction to Virtual Reality and Augmented Reality.   2022, 2024
- Teaching Assistant: CS 334 Fundamentals of Computer Graphics.   2023

Peer Reviewing

- **Special Recognitions for Outstanding Reviews:**
  - 1 recognition for ACM CHI 2025 Papers
  - 1 recognition for ACM UIST 2024 Papers

- **Conference Reviewer:**
  - IEEE VR (2024, 2025, 2026)
  - ACM CHI (2024, 2025, 2026)
  - ACM UIST (2024, 2025)
  - IEEE ISMAR (2023, 2025)
  - ACM VRST (2023, 2024, 2025)
  - IEEE WHC (2025)