Xuning Hu

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Education

Xi'an Jiaotong-Liverpool University (XJTLU) 2022/09 – 2026/06 (Expected)
BSc in Information and Computing Science Suzhou, China
- GPA: GPA: 3.68/4.00 (First Class Honours, UK Education System)

Publications

First Author

[TVCG'25] X. Hu, Y. Zhang, Y. Wei, Y. Li, W. Stuerzlinger, H. Liang. "Exploring and Modeling the Effects of Eye-Tracking Accuracy and Precision on Gaze-Based Steering in Virtual Environments." *2025 IEEE Transactions on Visualization and Computer Graphics.* (🏆Honorable Mention Award) **Accepted**

[VR'25] X. Hu, X. Wen, Y. Wei, H. Zhang, J. Huang, H. Liang. "Optimizing Moving Target Selection in VR by Integrating Proximity-Based Feedback Types and Modalities." *2025 IEEE Conference on Virtual Reality and 3D User Interfaces.* DOI: 10.1109/VR59515.2025.00030 **Accepted**

[CHI-EA'25] X. Hu, Y. Zhang, Y. Wei, Yue. Li, W. Stuerzlinger, H. Liang. "Exploring and Modeling Gaze-Based Steering Behavior in Virtual Reality." *2025 ACM CHI Conference on Human Factors in Computing Systems late-breaking work.* DOI: 10.1145/3706599.3720273 **Accepted**

[ISMAR'24] X. Hu, X. Yan, Y. Wei, W. Xu, Y. Li, Y. Liu, H. Liang. "Exploring the Effects of Spatial Constraints and Curvature for 3D Piloting in Virtual Environments." *2024 IEEE International Symposium on Mixed and Augmented Reality.* DOI: 10.1109/ISMAR62088.2024.00065 **Accepted**

[TVCG'25] X. Hu, Y. Qi, X. Yan, W. Xu, J. Huang, H. Liang. "Exploring Freehand Selection Techniques of Polyhedron Faces in VR Environments." *2025 IEEE Transactions on Visualization and Computer Graphics.* **Conditional Accepted**

Co-Author

[VR'25] X. Wen, Y. Wei, **X.Hu**, W. Stuerzlinger, Y. Wang, H. Liang. "Predicting Ray Pointer Landing Poses in VR Using Multimodal LSTM-Based Neural Networks." *2025 IEEE Conference on Virtual Reality and 3D User Interfaces.* DOI: 10.1109/VR59515.2025.00034 **Accepted**

[SUI'24] R. Darbar, **X. Hu**, X. Yan, Y. Wei, H. Liang, W. Xu, S. Sarcar. "OnBodyQWERTY: An Empirical Evaluation of On-Body Tap Typing for AR HMDs." *Symposium on Spatial User Interaction.* DOI: 10.1145/3677386.3682084 **Accepted**

[PACMHCI'24] R. Shi, Y. Wei, **X. Hu**, Y. Liu, Y. Yue, L. Yu, H. Liang. "Experimental Analysis of Freehand Multi-Object Selection Techniques in Virtual Reality Head-Mounted Displays." *2024 Proceedings of the ACM on Human-Computer Interaction (ISS Track).* DOI: 10.1145/3698129 (🏆Honorable Mention Award) **Accepted**

[PACMCGIT'24] B. Chen, X. Yan, **X. Hu**, D. Kao, H. Liang. "Impact of Tutorial Modes with Different Time Flow Rates in Virtual Reality Games." *2024 Proceedings of the ACM on Computer Graphics and Interactive Techniques (SI3D Track).* DOI: 10.1145/3651296 **Accepted**

[ISMAR-Workshop'25] Y. Zhang, L. Zhang, **X. Hu**, H. Liang. " Exploring the Feasibility of Gaze-Based Navigation Across Path Types." *2025 IEEE International Symposium on Mixed and Augmented Reality Workshop.* **Accepted**

[CHI'26] X. Yang, **X. Hu**, H. Liang, X. Ma. "Investigating How Physical Surfaces Can Serve as Common-Region Cues for Perceptual Grouping of Virtual Elements in Augmented Reality." *2026 ACM CHI Conference on Human Factors in Computing Systems.* **Under Review**

[CHI'26] H. Zhang, Y. Xiao, J. Huang, X. Yan, **X. Hu**, H. Tu, F. Tian. "N-ary Gaussian Model Modeling Pointing Uncertainty Across Task Scenarios Using an Automated Multi-Gaussian Modeling Pipeline." *2026 ACM CHI Conference on Human Factors in Computing Systems.* **Under Review**

[CHI'26] Y. Z, D. Sui, **X. Hu**, L. Gu, Y. Qi, T. Wu, L. Ma. "Augmenting Clinical Decision-Making with an Interactive and Interpretable AI Copilot: A Real-World User Study with Clinicians in Nephrology and Obstetrics." *2026 ACM CHI Conference on Human Factors in Computing Systems.* **Under Review**

PATENTS

Interactive control methods, devices, equipment, and storage media for VR game tutorials. CN118416465A (Published)

Research Experience

University of Rochester | BEAR Lab 2024/03 – 2025/05
Advisor: Prof. Yukang Yan
Research Intern

Simon Fraser University | VVISE Lab 2024/12 – present
Advisor: Prof. Wolfgang Stuerzlinger
Research Intern

The Hong Kong University of Science and Technology | Computational Media Lab 2024/10 – present
Advisor: Prof. Hai-Ning Liang
Research Assistant

Chinese Academy of Sciences | The Institute of Software 2024/02 – 2024/10
Advisor: Prof. Jin Huang
Research Assistant

Xi'an Jiaotong-Liverpool University | X-CHI Lab 2023/05 – 2024/02
Advisor: Prof. Hai-Ning Liang
Research Assistant

Selected Projects

Modeling the Impact of Eye-Tracking Accuracy and Precision on Gaze-Based Steering Tasks 2024/10 – 2025/01
Advisor: Prof. Wolfgang Stuerzlinger

- Developed a gaze-based steering system and investigated how varying path parameters and eye-tracking quality influence user performance. Reconstructed the classical Steering Law to account for instability and length-insensitivity issues typical of gaze input, improving prediction accuracy.
- Collected users' **spatial precision and spatial accuracy errors** from eye tracking as baseline noise, simulating precision with fixed offsets and accuracy with white Gaussian noise.
- Quantified how different spatial error types affect task performance, fitted a modified steering model to **improve interaction robustness under degraded tracking quality**.

Optimizing Moving Target Selection in VR with Proximity-Based Feedback 2024/07 – 2024/10
Advisor: Prof. Jin Huang

- Proposed the use of the **forward-forward** strategy for moving target selection in VR and introduced a novel feedback mechanism, which provides users with proximity cues during approach and confirmation cues prior to selection.
- Designed a **3 (modality: visual, auditory, haptic) × 3 (feedback type: binary, continuous, partial)** matrix of feedback techniques, drawing from prior literature to ensure modality-appropriate implementation.
- In **Study 1**, we explored the impact of feedback types and feedback mechanisms on the selection of moving objects across different modalities, using metrics such as time, error rate, UEQ ranking, and interviews. In **Study 2**, we further investigated the effects of different modality combinations on the selection task.

Technical Skills

Programming and Tools: C#, C, C++, Java, Python, Matlab, Unity, Meta Interaction SDK, Hololens, Vicon, SPSS
Tech and Soft Skills: Motion Capture, XR development, Modeling User Behavior, User Study Design, Eye-Tracking Data Analysis Algorithm, LLM pipeline development

Extra-Curriculum Experience

Poster Presentation 2025 ACM CHI Conference on Human Factors in Computing Systems (CHI) 2025/03
Oral Presentation 32nd IEEE Conference on Virtual Reality and 3D User Interfaces (VR) 2025/03
Oral Presentation 24nd IEEE International Symposium on Mixed and Augmented Reality (ISMAR) 2024/10
Student Volunteer 23nd IEEE International Symposium on Mixed and Augmented Reality (ISMAR) 2023/10
China Undergraduate Mathematical Contest in Modelling 2023/09
RoboMaster Robotics Competition : National Second prize in RoboMaster 2023 2023/03