

# Wenxuan Xu

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## Education

<b>Dartmouth College</b> MS, Computer Science with Concentration on Digital Arts • Courses: Rendering Algorithm, 3D Digital Modeling, Computer Vision, etc.	2024/09 – 2026/06 (Expected) Hanover, NH, USA
<b>University of Liverpool (Xi'an Jiaotong-Liverpool University)</b> BS, Computer Science • GPA 3.78/4.00, First Class Honors, Dual Degree, University Academic Excellence Award • A Courses: Computer Graphics, Operating Systems, Computer Networks and 19 others	2020/09 – 2024/07 Liverpool, UK   Suzhou, China

## Publication

[1] [IEEE VR' 25] **Wenxuan Xu**, Yushi Wei, Xuning Hu, Wolfgang Stuerzlinger, Yuntao Wang, Hai-Ning Liang. “Predicting Ray Pointer Landing Poses in VR Using Multimodal LSTM-Based Neural Networks”

[2] [IEEE VR' 25] Xuning Hu\*, **Wenxuan Xu\***, Yushi Wei, Zhang Hao, Jin Huang, Hai-Ning Liang. “Optimizing Moving Target Selection in VR by Integrating Proximity-Based Feedback Types and Modalities” (**Co-first author**)

[1] [ISMAR' 24] Xuning Hu, Xinan Yan, Yushi Wei, **Wenxuan Xu**, Yue Li, Yue Liu, Hai-Ning Liang. “Exploring the Effects of Spatial Constraints and Curvature for 3D Piloting in Virtual Environments”

## Research Experience

<b>VVISE Lab</b> , Simon Fraser University Research Intern, advised by <a href="#">Prof. Wolfgang Stuerzlinger</a> • Enhancing objects selection and manipulation in VR.	2023/09 – 2024/09
<b>Pervasive HCI Group</b> , Tsinghua University Research Intern, advised by <a href="#">Prof. Yuntao Wang</a> • Utilizing AI to augment human abilities in VR.	2023/08 – Present
<b>X-CHI Lab</b> , the Hong Kong University of Science and Technology (Guangzhou) Research Intern, advised by <a href="#">Prof. Hai-Ning Liang</a> • Modelling user behavior (Fitts' and Steering Task) in VR environments. • Exploring gaze-pinch based text entry input methods on T9 Layout Keyboard to improve typing accuracy.	2022/07 – Present

## Projects

<b>Physically-Based Path Tracer</b>   C++, Physical Based Rendering • Developed a production-quality path tracer supporting <b>global illumination</b> , <b>caustics</b> , and <b>physically-based materials</b> , implementing <b>photon mapping</b> and <b>final gathering</b> for accurate light transport simulation • Engineered an extensible material system with physically-based <b>BRDFs</b> (Blinn-Phong, conductors, diffuse) and <b>importance sampling</b> , achieving realistic rendering of metals, glass, and textured surfaces • Implemented advanced rendering techniques including <b>Multiple Importance Sampling (MIS)</b> , <b>Next Event Estimation (NEE)</b> , and Russian Roulette path termination, reducing noise by 60% compared to naive path tracing • Optimized rendering performance through <b>BVH acceleration structure</b> and multi-threading, achieving 6.42x speedup in ray-triangle intersection tests and 3.54x overall performance improvement	2024/09 – 2024/12
<b>Predicting Ray Pointer Landing Poses in VR Using Multimodal LSTM-NN</b>   C#, Unity, Keras • Designed and implemented a novel VR interaction framework using Unity and Meta Quest Pro, collecting comprehensive multimodal data (head, eye, and hand movements) across 72,000 trials for Fitts' Law selection tasks • Engineered an end-to-end ML pipeline combining <b>I-VDT</b> gaze analysis with <b>LSTM</b> neural networks, extracting behavioral features (rotational amplitude, velocity profiles) to predict ray-casting trajectories in VR selection tasks • Achieved breakthrough performance with <b>1.9x accuracy improvement</b> and <b>3.5x higher hit rates</b> over traditional kinematic methods, while maintaining <b>robust cross-participant generalization</b> , leading to publication in <b>IEEE VR '25</b>	2023/08 – 2024/09
<b>2D Roguelike Game Development</b>   (C#, Unity)	2024/02 – 2024/03

- Developed a fast-paced 2D rogue-like game where players pilot diverse combat ships against waves of enemies, implementing multiple weapon systems and survival mechanics using Unity’s 2D framework
- Engineered efficient game systems using **object pooling** for projectiles and enemies, **reducing memory allocation**, while implementing **A\* pathfinding** for intelligent enemy behavior and obstacle avoidance
- Architected robust game architecture using **design patterns (Singleton, Observer)** and Unity Events for game state management, coupled with **JSON-based data persistence** for player progression tracking

**Skills**

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**Programming Languages and Tools:** C#, C++, Python, Unity, SPSS, Maya, Meta Interaction SDK, Git  
**Tech and Soft Skills:** Physical Based Rendering, VR development, User Study Design, Eye-Tracking Data Analysis Algorithm

**Extra-Curriculum Experience**

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<b>Student Volunteer</b>	24th IEEE International Symposium on Mixed and Augmented Reality (ISMAR)	2024/10
<b>Student Volunteer</b>	23nd IEEE International Symposium on Mixed and Augmented Reality (ISMAR)	2024/10
<b>Student Volunteer</b>	7th IEEE International Conference on Artificial Intelligence and Virtual Reality (AIVR)	2022/112
<u><b>GMTK 2023 Game Jam</b></u>		2023/07
<u><b>Tencent Timi Studio &amp; The Third Building Game Jam</b></u>		2023/11