Xulun Luo, Software Engineer

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PROFILE

Software engineer with a dual background in film and computer science, specializing in entertainment technology, game design pipelines, and immersive virtual environments. Experienced in virtual production R&D, sensor fusion, and real-time systems integration, as well as Unity-based prototyping and gameplay mechanics.

EDUCATION

Sep 2021 — May 2025 Bachelor of Arts, New York University New York, NY
Double Major Cinema Studies, Computer Science

Aug 2025 — May 2027 Master of Entertainment Technology, Carnegie Mellon University(CMU) Pittsburgh, PA

EXPERIENCE

Feb 2025 — May 2025 Software R&D Intern | WLab Virtual Production – Madwell LLC New York, NY

- Prototyped UWB-assisted camera-tracking pipeline to augment OptiTrack under occlusion; streams 6-DoF pose at 25Hz over UDP with sequence IDs and jitter-tolerant buffering.
- Fused UWB + IMU data with error-state Kalman filter and per-rig extrinsics calibration to stabilize position tracking.
- Built Python LTC frame-sync system for sensors, cameras, and LED-wall renders; eliminated parallax jitter through rate/buffer tuning. Standardized schemas, calibration procedures, and logging tools for synchronized datasets.
- Deployed internally for active dataset generation supporting model training.

Jun 2025 — Sep 2025 Visiting Researcher | AirLab – CMU Pittsburgh, PA

- Built UE4 + AirSim research pipeline for 3D reconstruction benchmarking in dynamic scenes with novel view, featuring automated scene packaging, OctoMap navigation, and covisibility-guided evaluation with ground truth validation.
- Implemented dynamic-scene framework with moving actors, static occupancy mapping, and collision-safe path planning, generating synchronized GT outputs (RGB, depth, optical flow) for reconstruction evaluation.
- Integrated Fast-Planner for global planning and EGO-Planner for real-time obstacle-aware trajectory refinement.
- Created UE4 testbed with scripted dynamic objects for planner benchmarking and virtual-drone avoidance testing.

PROJECTS

Aug 2025 — Sep 2025 Programmer | Gasoline Transportation Ally | Unity 3D Game ETC | CMU, Pittsburgh, PA

- Co-designed custom physical controller integrating Xbox Adaptive Controller with pressure sensors and gyroscope mechanics for accessible gameplay.
- Architected scalable game system with modular entity management, real-time resource tracking, and state-based logic handling concurrent multi-vehicle interactions.
- Implemented collision detection, timer mechanics, and priority-based target systems using optimized algorithms and design patterns for maintainable code.

Sep 2025 — Oct 2025 Programmer | The Nightcap Bar | Unity 3D VR Game ETC | CMU, Pittsburgh, PA

- Built complete VR bartending simulation for Meta Quest 3, integrating custom shader programming, liquid pouring mechanics, and event-driven narrative system.
- Implemented complete drink-making mechanics including shaker physics (shake/blend detection), garnish placement, and disposal system.
- Designed intuitive VR interactions enabling first-time VR users to complete the full mystery narrative gameplay without assistance, confirmed by playtesting.

SKILLS & LANGUAGES

Unreal Engine 4/5 | Unity 3D | C++ | C# | C | Python | Java | Virtual Production | VR/XR Interaction | Real-Time Systems | Raspberry Pi 4/5 | Arduino Nano | Camera Tracking | Sensor Fusion | UDP Networking | Timecode / LTC Sync | Linux | Shell Scripting | Git | Adobe Creative Suite | Avid Media Composer