Spencer Lin

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Education

University of Southern California (2024-2025 Spring)
Master's: Computer Science (GPA 3.61)
University of Southern California (2020-2024)
Major: Computer Science (GPA 3.48)
Minor: Immersive Media

Relevant Coursework
Software Engineering | Affective Computing
NLP for Interactive AI | Introduction to Robotics
Deep Learning & its Applications | Algorithms
3D Graphics & Rendering | Multimodal ML

References

Scott Fisher	Director of Mobile & Environmental Media Lab at USC School of Cinematic Arts
Sharon Mozgai	Director of Virtual Human Therapeutics Lab at USC Institute for Creative Technologies
Mark Bolas	Professor of Interactive Media at USC School of Cinematic Arts
David Nelson	Director of Mixed Reality Lab at USC Institute for Creative Technologies
Benjamin Nye	Director of Learning Sciences Lab at USC Institute for Creative Technologies

Experience

Estuary* | Project Lead** ***September 2023 - Present

- Leading a multidisciplinary team of researchers to develop an open-source multimodal platform for building spatially-aware, embodied, off-cloud, real-time conversational AI
- First author on two publications accepted at CHI25 and IVA24
- Developed multiplayer AR semantically aware agents on the Apple Vision Pro that won the Best Use of Apple Vision Pro award at MIT Reality Hack 2025
- Integrated a fully streaming AI pipeline over websocket with VAD, STT, LLMs, and TTS that works over a cross-platform distributed computing architecture

USC Mobile & Environmental Media Lab* | Research Assistant & Visiting Researcher** ***June 2023 - Present

- Developer & presenter at SIGGRAPH 2023, AWE 2024, and IEEE AIxVR 2024 an Immersive Archive VR experience that digitizes and archives seminal works in XR history; built with OpenXR for cross-platform
- Developer on a WebXR 8th Wall experience and mobile AR app in partnership with LA Metro, The Huntington Library, and the LA Chinese Historical Society which utilizes geospatial data and visual positioning to superimpose old Chinatown in its original positions at LA Union Station and provide an educational experience
- Assisted in teaching and building a generative AI pipeline for creating immersive video + audio synthetic memories using VR, commercial AI tools, ComfyUI, and Stable Diffusion. Presented at Flux Festival 2024
- Trained Unity ML-Agents to work and evolve cooperatively via a multi-agent reinforcement learning algorithm, MA-POCA

USC Institute For Creative Technologies* | XR Development Intern & Research Assistant** ***April 2023 - May 2025

- Developing generative AI workflows for ComfyUI for controllable high fidelity videos of humans
- Researching new methodologies and pipelines to modernize the graphical fidelity of ICT's virtual humans
- Operates a Vicon motion capture stage to produce machine learning datasets
- Developed a mobile AR app to help train users with Synthetic Aperture Radar image interpretation which was accepted and presented at I/ITSEC 2024
- Developed a mobile AR app to teach maintenance of military vehicles to non-mechanic roles
- Ported an educational mobile AR app from Android to iOS

The Aerospace Corporation* | Software Engineering Intern** ***June 2023 - August 2023
May 2022 - August 2022

- Ported from PC to VR and demoed to the Program Office customer a space strategy simulator in 6DOF VR to enable users to navigate the battlefield from a "commander's point of view" and with the goal of extending the project into a novel collaborative decision-making environment that sharpens the tactical acumen of trainees
- Developed a collaborative AR terrestrial exploration application on the HoloLens 2 that features gps-enabled navigation and dynamic loading of photogrammetric UAV maps
- Prototyped a networked Desktop/AR to AR application for the HoloLens 2 that enables real time collaboration with digital assets specifically for use in environments without access to the world wide web such as in space
- Developed a VR application connected to a unified database that simulates concept satellite designs

USC NASA SUITS Team Aegis* | Team Lead** ***January 2022 - September 2023

- Collaborated with astronauts and NASA engineers to develop an AR HUD on the HoloLens 2 for lunar/martian EVAs to minimize cognitive load and improve safety through an off-cloud AI voice assistant, terrain hazard analysis using SLAM, and long-range pathfinding features
- Led a multidisciplinary team of 18 students across XR, AI, aeronautical engineering, and UI/UX disciplines
- Designed the system architecture and the augmented reality UI and UX

Publications

- [1] **Spencer L.**, et al. - "Optimizing SIA Development: A Case Study in User-Centered Design for Estuary, a Multimodal Socially Interactive Agent Framework" [**CHI 2025**]
- [2] Justin C., **Spencer L.**, et al. - "Can Vision Language Models Understand Mimed Actions?" [**ACL 2025**]
- [3] Bin H., Brian K., **Spencer L.**, Kaleen S. - "Can LLMs Generate Behaviors for Embodied Virtual Agents Based on Personality Prompting?" [**IVA 2025**]
- [4] Zeynep Abes, Nathan Fairchild, **Spencer L.**, et al. "The Immersive Archive: Archival Strategies for the Sensorama & Sutherland HMD" [**IEEE AIxVR 2025**]
- [5] Stanley Lin, Nathan Fairchild, **Spencer L.**, et al. "Optimizing 180° Stereoscopic Cinematography for the Apple Vision Pro" [**SMPTE Media Technology Summit 2025**]
- [6] Stanley Lin, Nathan Fairchild, **Spencer L.**, et al. "Bridging Cinema and VR: Practical Workflows for 180° Stereoscopic Filmmaking" [**SIGGRAPH Asia 2025 Under Review**]
- [7] **Spencer L.**, Basem R., Miru J., et al. - "Estuary: A Framework For Building Multimodal Low-Latency Real-Time Socially Interactive Agents" [**IVA 2024**]
- [8] Kimberly P., Benjamin F., Brent L., David N., Ben N., Rhys Y., **Spencer L.** - "See Like a Satellite: Adapting Human Vision to Complex Sensing Technologies with Adaptive Synthetic Aperture Radar Image Recognition Training (ASIRT)" [**I/ITSEC 2024**]

Awards

2025	**Best Use of Apple Vision Pro Award at MIT Reality Hack 2025**
2024	**Best in Show AWEsome AUGGIE Award at AWE 2024**
2024	**Niantic Time Capsule Challenge Grand Prize**
2018	**Alibaba Xin Philanthropy Conference Student Activist Award**

Skills

Coding Languages	Python, C#, C++, Java, Javascript, Typescript, A-Frame, HTML, CSS,
Software	Unity game engine, PyTorch, OpenXR, OpenCV, LangChain, LangGrah, ComfyUI, Websocket, React, Electron, Hugging Face, Meta XR SDK, Polyspatial, Unity AR Foundation, Unity ML-Agents, 8th Wall, Vuforia, MRTK, Blender
Hardware	Apple Vision Pro, Quest HMDs, HoloLens 2, SteamVR, Soldering, FDM & SLA 3D printing
Platforms	Windows, macOS, Linux
Other	Motion capture stage operation