Congpei Zhou

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Portfolio: https://bobhansky.github.io/portfolio/

Education

University of California San Diego Sep.2025 - Dec 2026

Computer Science (Master)

University of Minnesota Twin Cities Sep. 2021 - Aug. 2025

Computer Science (Bachelors) GPA *3.92/4*

Professional Experience

NetEase Games (Hangzhou, China) Sept. 2024 - Nov. 2024

Game Engine Development Engineer Intern

- Writing extension for **Python 3.12** (Cpython) with **C++ 17** to dump and load data with Msgpack format (**json-like**).
- Using shared resources mechanism to reduce memory usage when loading object from binary msgpack data to realtime game engine. Enable custom edit for the object whose data is shared while preserving the shared data unchanged.
- Using **RAII** mechanism wrapper class for PyObject* to prevent memory leaks.

University of Minnesota (Minneapolis) May 2023 - Sept. 2024

Research Assistant

- Building **Unity3D VR** projects, setting up gameplay logic (**C#**) with **Meta Oculus Quest2,** writing custom post-processing effects with built-in rendering pipeline. Debug experience in **Unity Frame Debugger, Unity OpenXR.**
- Experience with writing **shader** in **HLSL** to create a fixed fovea restrictor with peripheral post-processing effect to mitigate the cybersickness using **VR** headset.
- Conducting in-person VR experiment on 36 participants to collect real-time experiment data such as 3D motion tracking. Data collected by scripts **(C#)** written from scratch.

Projects (check my portfolio for more)

- **Monte Carlo Ray Tracing Renderer (C++, CMake, Git**) Jul. 2023 - Present

  Link: bobhansky/TutuRenderer: A CPU based Renderer for personal interest and education. (github.com)

  A CPU based offline **ray tracing renderer** built for personal interest and education. **C++** code completely written from scratch. It reads user configuration input file to read models and set the scene description, and then outputs a rendered image. The implemented state of the art integrator is **Bidirectional Path Tracing**. Features includes Microfacet Model, Multiple Importance Sampling, BVH, **Multithreading (std::thread)**, etc. Use Git as version control.

- **Drone Simulation (Uber-like) System (C++, HTML, Git, Docker)** Jan. 2023 - May 2023

  An uber-like web-based software to simulate a system where drones pick up users and drop them off at the destination chosen by users. Work with a development team of 4 and work on the base code (**HTML, CSS**) to implement moving features (**C++**), picking up & dropping off logics, notification features with **factory pattern**, **strategy pattern**, **observer pattern**, and **decorator pattern**. In each parts an adequate amount of unit tests is applied. Use Git as version control. Work under Windows with Docker.

Skills

- **C++, Python, Java, C#, SQL, Rendering, Vulkan, OpenGL, GLSL/HLSL, RenderDoc, Unity3D**
- Knowledge in Machine Learning, Multithread programming.
- Specialized in Computer Graphics, **Rendering**, GLSL, HLSL, **Ray Tracing,** real-time rendering performance bottleneck analysis and improvement.