Charles Wang

(301) 272-5740 ⊠ czw@seas.upenn.edu ⊠ linkedin.com/in/zwcharl ⊠ charleszw.com ⊠ github.com/aczw

Education

University of Pennsylvania, School of Engineering & Applied Science *Philadelphia, PA*

B.S.E. in Computer Science, major in Digital Media Design *May 2026*

- ➔ GPA: 3.78/4.00
- ➔ Relevant coursework: Data Structures & Algorithms, Operating Systems, Compilers, Discrete Mathematics, Linear Algebra, 3D Modeling, Drawing, UI/UX Design

M.S.E. in Computer Graphics & Game Technology *December 2026*

- ➔ Relevant coursework: GPU Programming and Architecture, Offline & Real-time Rendering

Relevant Experience

Snap, Inc. *Santa Monica, CA*

Game Engine Software Engineer Intern *May 2025 — August 2025*

- ➔ Independently authored features to the C++ rendering runtime that powers multiple Snap products in AR/XR and gaming, including Snapchat, Spectacles, and Camera Kit
- ➔ Overhauled text rendering system to efficiently source font families across macOS, Windows, Linux, Android and iOS
- ➔ Laid foundation for style-aware font drawing, providing billions of users new methods of self-expression

TikTok (ByteDance) *San Jose, CA*

Intelligent Camera Effects Software Engineer Intern *May 2024 — August 2024*

- ➔ Contributed updates to the C++ SDK that powers TikTok's interactive effects and filters, which combines an in-house graphics rendering engine with generative AI models and object detection algorithms
- ➔ Prototyped a modernized rendering architecture supporting multi-layered effects with JavaScript and C++
- ➔ Revitalized an internal Unity-like engine development tool after over 7 months of inactivity, fixing critical bugs and crashes in C++, CMake, and Python

UPGRADE *Philadelphia, PA*

Project Lead *January 2023 — present*

- ➔ Spearheaded the development of *Catanks* (2025), a 3D adventure tank shooter (with cats!) from pre-production to publication on Steam, overseeing a team of ~30 members regarding gameplay/design and art direction
- ➔ Managed the design teams of *Catanks* and *PennBoy* (2025) to wireframe and implement 15+ screens and UX flows, individually programming C# and HLSL shaders in Unity

Projects

RACECAR *C++, Vulkan, Slang, HLSL*

Real-time (100+ FPS) car renderer built in a team of four. Responsible for base engine data structures, custom wrappers over Vulkan API, and compute-based post-processing stack. Implemented dynamic physically-based atmosphere, pyramidal filter-based bloom, and *Gran Turismo 7*'s "physically based" tonemapping from SIGGRAPH 2025.

CUDA Path Tracer *CUDA, C++, glTF, OpenGL*

Renders Lambertian and perfectly specular dielectric BRDFs. The camera utilizes stochastic sampling and supports depth of field via thin lens approximation. Loads glTF meshes and performs intersection culling via BVH creation and traversal.

Mini Minecraft *C++, OpenGL, Qt*

Voxel game engine developed in a team of three. Contributed terrain chunking, efficient rendering via block face culling, texturing, day/night system, skybox, celestial objects (moon, stars, clouds), flood fill lighting, inventory system, and GUI.

Real-time Physically-based Renderer *GLSL, OpenGL, C++*

Implements the 2013 SIGGRAPH paper "Real Shading in Unreal Engine 4." Performs importance sampling from environment maps for image-based lighting. Renders geometry using a microfacet surface model via Cook-Torrance BRDF.

Technical Skills & Interests

Languages: C++, GLSL, HLSL, Slang, C#, TypeScript/JavaScript, Java, Python, HTML, CSS
Technologies: CUDA, OpenGL, Vulkan, WebGPU, Nsight Graphics, Nsight Compute, Unity, Unreal Engine, Git
Interests: Open source, UI/UX, game development, running, bass guitar, making song playlists, subway systems