Charles Wang

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Education

University of Pennsylvania, School of Engineering & Applied Science *Philadelphia, PA*
B.S.E. in Digital Media Design *May 2026*
M.S.E. in Computer Graphics & Game Technology (Accelerated) *May 2026*

- ➔ Relevant undergraduate coursework: Data Structures & Algorithms, Computer Architecture, Linear Algebra
- ➔ Relevant graduate coursework: Interactive Computer Graphics, Procedural Graphics, Offline & Real-time Rendering, Computer Animation, 3D Modeling
- ➔ GPA: 3.69/4.00

Relevant Experience

Penn Engineering *Philadelphia, PA*
CIS 4600 Teaching Assistant *August 2024 — present*

- ➔ Answer questions regarding C++, OpenGL, Qt, and general computer graphics concepts including rasterization, the rendering pipeline, reflection models, coordinate transformations, and mesh data structures
- ➔ Grade homeworks and assist students in office hours on projects like a scene graph implementation, CPU rasterizer, half-edge mesh editor, and a voxel game engine

TikTok *San Jose, CA*
Intelligent Camera Effects Software Engineer Intern *May 2024 — August 2024*

- ➔ Contributed 1 new feature 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
- ➔ Revitalized a Unity-like effect creation tool used across internal teams after 7+ months of inactivity by writing C++ and CMake to integrate the newest SDK version, fixing 8 critical bugs and eliminating 3 crashes
- ➔ Prototyped an architecture that enables greater interplay between layered effects in the pipeline with JavaScript

Leadership

UPenn Game Research and Development Environment Club (UPGRADE)
Co-President *January 2023 — present*

- ➔ Collaborate with 40+ members to foster an inclusive environment for UPenn students interested in making games
- ➔ Initiated and lead the development of 7 Unity game projects including multiple minigame collections and game jams, all produced using a mix of Unity, Maya, and Figma

Projects

Monte Carlo Path Tracer
Offline physically-based renderer supporting cosine-weighted sampling, BSDF-based sampling, direct light sampling, MIS, and environment map lighting. Renders dielectric materials and Trowbridge-Reitz microfacet surfaces.

Mini Minecraft
Voxel game engine made with C++ and OpenGL in a team of three. My contributions are terrain chunking, efficient rendering (block face culling), block texturing, day/night system, skybox, celestial objects (moon, stars, clouds), flood fill lighting, inventory system, GUI, and text rendering.

Real-time Physically-based Renderer
Implements "Real Shading in Unreal Engine 4" from SIGGRAPH 2013 in GLSL. Frag shader utilizes a microfacet surface model using Cook-Torrance BRDF. Performs importance sampling from environment maps for image-based lighting.

CelesteWFC
Procedural tilemap generator using wave function collapse algorithm, inspired by platformer game *Celeste* (2018). Built in Unity with C#. Includes a level editor for zooming/panning and selecting tiles for manual placement/constraint.

Technical Skills & Interests

Languages: C++, C#, GLSL, HLSL, TypeScript/JavaScript, Python, Java, HTML/CSS
Software & Tools: Unity, Visual Studio, Maya, Houdini, Qt, Figma, Adobe CC (Photoshop, Illustrator), Linux, Git, CMake
Interests: Open source, UI/UX, making games, going running, bass guitar, making playlists, subway systems