Charles Wang

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Education

University of Pennsylvania *May 2026*
School of Engineering & Applied Science *Philadelphia, PA*
Bachelor of Science in Engineering

Major: Digital Media Design (Computer Graphics) **Minor:** Design **GPA:** 3.69/4.00

Experience

TikTok *May 2024 — present*
Intelligent Camera Effects Software Engineer Intern

- Work on the SDK that combines generative AI models and detection algorithms with an in-house graphics rendering engine that powers TikTok's interactive effects and filters
- Revitalized a critical internal effect creation software used across numerous teams after 7+ months of inactivity, integrating the newest SDK version with C++ and CMake, enhancing performance and stability
- Investigate, prototype, and implement a more efficient rendering architecture to enable better coherence and interplay between layered effects in the processing pipeline

Penn Engineering *August 2023 — April 2024*
Undergraduate Research Assistant, Full Stack Developer

- Built a full stack web platform for Scallop, a neurosymbolic programming language written in Rust that is optimized for logical tasks. Made in a team of three
- Architected RESTful API routes that handle communication between the Next.js frontend, Flask backend, and MySQL database. Uses tRPC and Prisma for middleware
- Implemented OAuth user authentication as well as auth-protected procedures of saving, loading, and publishing of custom user projects from the database

Leadership

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

- Manage and collaborate with 30+ club members on the development of multiple games, including a minigame collection and a semester-long final project
- Organize events such as a school-wide game jam, annual PAX trip, and guest speakers
- Develop and maintain the brand identity, design, and assets of the club. Manage social media and outreach. Built the club website, pennupgrade.com

Projects

Monte Carlo Path Tracer
Offline physically-based raytracer utilizing numerous sampling methods, including cosine-weighted sampling, BSDF-based sampling, direct light sampling, MIS, and environment map sampling. Supports dielectric materials and Trowbridge-Reitz microfacets.

Mini Minecraft
Voxel C++ game engine made with OpenGL. Uses Qt for context creation. Made in a team of three. I implemented chunking, efficient rendering, block face culling, texturing, day/night sky system, flood fill lighting, inventory system, GUI and text rendering.

Mini Maya
OBJ mesh editor, inspired by Autodesk Maya. Uses a half-edge data structure to internally store meshes and supports mesh operations like Catmull-Clark subdivision, face triangulation, edge splitting, and skinning via a custom joint skeleton format.

Rasterizer
CPU-based OBJ renderer written in C++. Uses the Qt platform for UI and window management. Renders to a 512px square image. Supports up to 16x antialiasing and two shading models (Lambertian/diffuse, Blinn-Phong).

Technical Skills

Languages
C++, GLSL, C#, JavaScript/ TypeScript, Python, Java

Platforms + Tools
Git, GitHub, CMake, Unity, Figma, Adobe Illustrator & Photoshop, Linux, command line

Libraries + Frameworks
OpenGL, GLFW, GLM, ImGUI, Qt, React, Node.js

Relevant Coursework

- Interactive Computer Graphics
- Offline & Real-time Rendering
- Data Structures & Algorithms
- Computer Architecture
- Computational Linear Algebra

Interests

Open source, UI/UX, design, making games, building websites, functional programming

Running, making playlists, bass guitar, subway systems