Charles Wang

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Education

University of Pennsylvania *Philadelphia, PA*
School of Engineering & Applied Science *May 2026*
Bachelor of Science in Engineering, Major in Digital Media Design, Minor in Design

- ➔ Relevant coursework: Interactive Computer Graphics, Offline & Real-time Rendering, Data Structures & Algorithms, Computer Architecture, Discrete Mathematics, Computational Linear Algebra
- ➔ GPA: 3.69/4.00

Work Experience

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

- ➔ Maintain the 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 by numerous internal teams after 7+ months of inactivity by writing C++ and CMake to integrate the newest SDK version, fixing 8 critical bugs, and enhancing performance
- ➔ Prototype an architecture that enables greater interplay between layered effects in the processing pipeline

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

- ➔ Designed and shipped a web platform for Scallop, a neurosymbolic language written in Rust, with two other students
- ➔ Architected RESTful API routes that handle communication between a Next.js frontend, Flask backend, and MySQL database, using tRPC and Prisma as middleware
- ➔ Implemented OAuth user authentication as well as auth-protected procedures of saving, loading, and publishing of custom user projects to and from the online playground

Leadership

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

- ➔ Collaborate with 30+ club members and lead the development of semester-long game projects like Minigame Collection and Galaxy Gacha, fostering a learning environment for anyone interested in the game industry
- ➔ Organize annual club events: a school-wide game jam, annual PAX East trip, guest speakers, and tool workshops
- ➔ Develop and enforce the brand identity and design assets of the club via social media, marketing materials, and the club website, pennupgrade.com

Projects

Monte Carlo Path Tracer
Offline physically-based renderer that supports cosine-weighted sampling, BSDF-based sampling, direct light sampling, MIS, and environment map lighting. Can render dielectric materials and Trowbridge-Reitz microfacets.

Mini Minecraft
Voxel game engine made with C++ and OpenGL in a team of three. Uses Qt for window and context creation. 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.

RCW
Endless Unity game about matching colors and text together, largely inspired by the Stroop effect in psychology. The UI was designed and exported from Figma. Playable from the browser via WebGL at aczw.itch.io/rcw.

Technical Skills

Languages: C++, GLSL, C#, JavaScript/TypeScript, Python, Java
Platforms and tools: Git, GitHub, CMake, Unity, Figma, Illustrator, Photoshop, Linux, command line
Libraries and frameworks: OpenGL, GLFW, GLM, ImGui, Qt, React, Node.js