HyukChe (Luke) Kwon

(215) 667-1068 | lukekwon@seas.upenn.edu | linkedin.com/in/hyukchekwon | lukekwon98.github.io

Education

University of Pennsylvania | Philadelphia, PA — Aug. 2025 - Present

Master of Science in Engineering, Computer Graphics and Game Technology

Sogang University | Seoul, South Korea — Mar. 2018 - Aug. 2024

Bachelor of Science in Engineering, Computer Science and Engineering — Magna Cum Laude, Major GPA: 3.92

Programming Skills

Languages: C, C++, GLSL, Python, F#

Tools/Frameworks: OpenGL, RenderDoc, GLM, Autodesk Maya, Blender, Houdini, Git, Visual Studio, QT Creator

Projects

Planet Minecraft | C++, OpenGL, GLSL, RenderDoc — Dec. 2025

- Collaborated with two teammates to create a spherical minecraft world in C++, using OpenGL.
- Implemented player physics by incorporating raymarching to support collision detection on a curved environment.
- Sampled 3D Perlin noise for cave systems, and built a post-processing pipeline using framebuffers for underwater effects.

OpenGL Post-Process Renderer | C++, OpenGL, GLSL, QT — Oct. 2025

- Implemented a real-time renderer in OpenGL that supports post-processing, and a polar spherical camera model.
- Wrote various shaders including Blinn-Phong, Matcap, and a custom deformation shader that interpolates a model's geometry to a sphere, while distorting UV coordinates to create a rippling color effect.
- Created post-process shaders including Gaussian blur and Sobel filters, and custom noise-based shaders that generate a crystalized screen effect using Worley noise and deform a model's geometry into Perlin noise over time.

FK-IK Animation & Behavior Controller | C++, Eigen — Oct. 2025

- Built FK, limb-based IK, CCD and foot IK systems to animate skeletal rigs with quaternion and position spline data.
- Computed agent dynamics with PD-based force and torque computations and 2nd order Runge–Kutta integration.
- Implemented physics-driven steering behaviors including obstacle avoidance, separation, alignment, and flocking by computing desired velocities for individual and group motion.

CPU Rasterizer | C++, GLM — Sep. 2025

- Developed a real-time 3D rasterizer by performing optimized row-intersection tests on triangulated mesh faces.
- Incorporated perspective-correct interpolation for accurate texture mapping, z-buffering, and normal calculations.
- Added support for Lambertian and Toon reflection models, and a wireframe mode using Bresenham's algorithm.
- Improved image quality using 4x4 supersampling anti-aliasing, and added interactive camera controls.

Experience

Undergraduate Research Assistant | *Visual Computing Lab, Sogang University* — Apr. - June 2024

- Coordinated with a supervising professor to deliver weekly research presentations on view-synthesis papers such as SIFT, NeRF, 3D Gaussian Splatting, and Scaffold-GS.

Teaching Assistant | *Introduction to AI Programming, Visual Media Programming, Sogang University* — Sep. - Dec. 2023

- Assisted in teaching graphics programming topics including matrix transformations, image processing, and rasterization.
- Held office hours to answer conceptual questions and assist assignment debugging in Python.

Extracurricular Activities

ACM SIGGRAPH Student Volunteer *2025 Vancouver, 2024 Tokyo* — Aug. 2025, Dec. 2024