

# HyukChe (Luke) Kwon

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## 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.
- Created a procedural skybox using 3D Worley noise to generate stars and 3D Perlin noise-based FBM for nebulae.

**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, Gaussian blur, and the Sobel filter, as well as a custom deformation shader that interpolates geometry into a sphere while distorting UVs to create a rippling color effect.
- Created post-process shaders that produce crystallized Worley noise and animated Perlin noise distortion effects.

**FK-IK Animation & Behavior Controller** | C++, Eigen

Oct. 2025

- Built FK, limb-based IK, CCD, and foot IK systems to animate skeletal rigs using 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 and feature matching papers including 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.

## Volunteering

**ACM SIGGRAPH Student Volunteer** 2025 *Vancouver, 2024 Tokyo*

Aug. 2025, Dec. 2024