Andrew Knowles

(631) 316-0130 • ajknowles21@gmail.com • ajknowles11.github.io • github.com/ajknowles11

EDUCATION

B.S., Mathematical Sciences, Discrete Math and Logic Concentration Graduating May 2024

Carnegie Mellon University, Pittsburgh, PA

Minor in Game Design

Relevant coursework: Computer Graphics, Intro to Computer Systems, Linear Algebra, Data Structures and Algorithms, Principals of Functional Programming, Advanced Game Studio; Computer Game Programming (currently enrolled)

TECHNICAL SKILLS

Programming: C, C++, C#, Java, Python, OpenGL, OpenXR **Game Development:** Unity, Unreal, Godot
Mathematics: Discrete Math, Linear Algebra, Multidimensional Calculus
Additional Experience: 3D Modeling (Blender), Web Dev (HTML, CSS), Video Editing (Davinci Resolve)

WORK EXPERIENCE

Mixed Reality Research Assistant June 2023 - November 2023

Embodied Computations Lab, Carnegie Mellon School of Design

- Developed custom application for in situ welding training and guidance in Unity, C# for use with Meta Quest Pro, Quest 3
- Collaborated with Design graduate students to design and construct custom welding helmets with VR headset mounts
- Wrote custom shaders to integrate UI assets for overlay visuals, enabling fast iteration on designs via parameters
- Reverse-engineered and modified Java plugin to collect additional sensor data through headset USB-C port
- Conducted workshops with on-site demos for local industrial design students, incorporating feedback in new iterations

PROJECT EXPERIENCE

C++ Programmer, Graphics Programmer (OpenGL), Game Designer August 2023 - November 2023

CMU 15-466 Computer Game Programming

- Created 6 small games in 6 weeks, and 1 large game in 2 months, programming gameplay, graphics using C++, OpenGL
- Developed custom asset pipelines in Python supporting 2D sprites, 3D scenes with animated textures, colliders, and portals
- Programmed custom 3D physics engine supporting sphere and box collisions in mini-golf game
- Designed and implemented custom stencil-buffer-based portal system for non-euclidean puzzle game

Android AR Software Developer January 2023 - May 2023

CMU 53-472 Advanced Game Studio

- Developed "Cyber Sleuth", a geospatial AR game for Android with Niantic's Lightship ARDK using Unity and C#
- Utilized Lightship Visual Positioning System to place characters and objects in real-world locations at CMU
- Prototyped tool for designers to place story and background objects via AR for use in editor
- Designed flexible dialogue and progression system for story-driven gameplay

Virtual Reality Game Developer January 2023 - May 2023

CMU Game Creation Society

- Developed "Project Horus", a VR boss-fighting game with sword-based combat using Unreal Engine, Blueprints
- Designed and implemented enemy AI, integrated with directional VR combat system
- Collaborated with animators to design and implement custom enemy attacks

3D Graphics Engineer January 2023 - May 2023

CMU 15-462 Computer Graphics

- Completed algorithms in rasterization and raytracing pipelines in CMU's educational graphics package using C++
- Implemented local and global mesh geometry operations with low time complexity
- Programmed algorithms for skeletal animations, via forward and inverse kinematics

Unreal Game Developer, Lead Programmer August 2022 - December 2022

CMU Game Creation Society

- Developed "Panarctica", a linear first-person shooter game on frozen airships using Unreal Engine, Blueprints and C++
- Programmed full and semi-automatic hitscan weapons, with animations for firing and reloading
- Designed and programmed enemy AI for detecting player, moving, and firing weapons
- Developed custom recoil system for weapons with automatic camera adjustment