Andrew Knowles

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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 Game Programming, Computer Graphics, Intro to Computer Systems, Linear Algebra,
Data Structures and Algorithms, Principals of Functional Programming, Advanced Game Studio

TECHNICAL SKILLS

Programming: C, C++, C#, Java, Python, OpenGL　　　**Game Engines:** 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 - December 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
 • Integrated 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 - December 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, Blender add-ons in Python, facilitating level iteration and scripting for interactables
 • Programmed custom 3D physics engine supporting sphere and box collisions in mini-golf game
 • Designed and implemented custom recursive 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