

Spencer Melnick

Software Engineer
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Professional Experience

[Fortnite Battle Royale \(Epic Games, Inc.\)](#)

2020-2021

Gameplay Programming Intern

- Developed new features to help ship several high profile cosmetics, including integrations with iconic third-party IP
- Collaborated with international teams specializing in a variety of disciplines such as art, design, quality assurance, and production
- Assessed, tested, and fixed numerous high-impact bugs in a breadth of gameplay systems
- Improved and created editor tools to facilitate faster development, based on designer specifications
- Learned the ins-and-outs of game development on one of the most well-known and fastest evolving games in the world

Skills

- **Gameplay Programming:** 3D mathematics, object hierarchies, memory management, collision, physics, asset management, networking, multithreading, data structures, UI
- **Graphics Programming:** Volumetric raymarching, 3D noise generation, Blinn-Phong shading, normal mapping, compute shader programming, post processing, general graphics pipeline, realtime fast-fourier transformations
- **Programming Languages:**
 - **Advanced:** C++, C, HLSL, GLSL
 - **Proficient:** Python, Java, Javascript, C#, HTML, CSS
- **Development Tools:** Visual Studio, Perforce Helix Core, Jira, Git, CMake
- **Game Engines:** Unreal Engine 4, Unity 3D, Godot

Personal Projects

[GPU Ocean Wave Simulation \(Unreal Engine\)](#)

2020

Solo Developer

- Researched academic papers on various techniques for computing wave displacement data
- Researched different algorithms for fast-fourier transformations
- Developed proof-of-concept project in Python before porting to engine and compute shader code
- Analyzed complex engine code to utilize cutting-edge/undocumented Unreal Engine features
- Developed custom method for precomputing butterfly operations, while minimizing memory cost
- Parallelized algorithm to take full advantage of GPU processing power

Volumetric Cloud Renderer (Unity 3D)

2019

Solo Developer

- Studied technical presentations by developers to understand emerging rendering techniques
- Developed external plugin for 3D Perlin and Worley noise generation to improve iteration time
- Implemented volumetric raymarcher as a material shader in HLSL
- Created custom depth blend function to enable early exit on half/quarter resolution rendering

Global Game Jam 2020 Entry - Meritocracy Train (Unity 3D)

2020

Gameplay Programmer

- Worked with artists, musicians, designers, and programmers to determine minimal viable product
- Programmed main input system with keyboard and multiple gamepad support
- Developed platforming character dynamics with finely tuned collision resolution, acceleration, friction, variable air control, and jump extension to ensure core controls were fun and responsive
- Trained new team members on version control principles and resolved catastrophic merge failures
- Programmed state machines to drive character animation based on gameplay data

Global Game Jam 2019 Entry - Hearth (Godot Engine)

2019

Lead Programmer

- Programmed main character controls and core heat and health systems
- Programmed animations, particle effects, lighting effects, and sound effects
- Trained other programmers on how to develop games with the Godot Engine

Temple Robotics Frontend Mission Control Software

2018

Lead Programmer

- Programmed simple OpenGL renderer for 3D visualization of telemetry data
- Created basic Blinn-Phong lighting system in GLSL
- Created custom .OBJ model importer
- Developed protocol for control and telemetry data with limited bandwidth on top of TCP/UDP
- Utilized multithreading to ensure other subsystems would not interfere with robot control
- Created cross-platform build process using CMake

Education

Temple University

2015-2020

BSE in Electrical Engineering (Computer Engineering Concentration)