Benjamin **Quach**

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Technical Skills

Languages: C++, C, Javascript, Python, GLSL, HLSL
Development Areas: 3D Graphics and Rendering, GPU Architectures, Systems Programming, Embedded Software
Libraries And APIs: Vulkan, OpenGL, DirectX11, WebGL, Win32, POSIX, Unity, Unreal Engine 4

Experience

Graphics Developer Technology Engineer, Samsung Electronics *April 2020 - Present*

- Implement code for modern game engines such as Unreal Engine to aid in performance analysis on specific graphics hardware.
- Analyze Vulkan API calls of game engines and applications to understand their graphics pipelines as well as the implementation of specific effects.
- In charge of Image Based Lighting analysis and research for the purposes of improving performance on mobile GPUs.

Graphics Software Engineer, Samsung Electronics *February 2018 - April 2020*

- Engineer on the Vulkan Driver team, developing Vulkan API implementations and user mode driver optimizations for rendering in mobile GPUs in C++.
- Implemented Vulkan synchronization objects for mobile GPU architectures, such as Pipeline Barriers and Fences.
- Improved GPU occupancy by improving performance for primitive rendering in tile based renderers.
- Worked with multiple teams to understand and implement correct hardware state in the driver, as well as update HW ABI in the driver.
- Led efforts to improve software infrastructure to ensure driver correctness with changing hardware requirements.
- Analyzed Vulkan application state on our hardwar in order to debug and analyze areas to improve GPU performance.
- Mentored junior employees to help them understand GPU architecture, as well as improve code quality through code reviews.

Software Engineer, Autodesk *July 2016 - February 2018*

- Software engineer on the graphics team for the AutoCAD engine in C++ with a codebase of over 15 million lines.
- Helped port and architect parts of the graphics stack and developed new code with DirectX11.
- Created graphics calls and networking architecture for a server side rendering prototype.
- Developed AutoCAD web performance benchmarking tools in Javascript.

Software Engineering Intern, Autodesk *June 2015 - August 2015*

- Intern on the AutoCAD 360 team, improved performance and maintainability by restructuring the Java/GWT based CAD engine through changing event systems and fattening class hierarchies.

Game Developer, University of California, Riverside Brain Game Center *September 2014 - June 2015*

- Worked on the development of gameplay and level generation in Unity for an audio training game under Dr. Victor Zordan.
- Uses research from the UCR neuroscience department to improve brain and auditory functionality.

Extracurricular Activity

President, Association of Computing Machinery at UCR *September 2015 - June 2016*

- I organized and ran events, such as a career paths program and HackNights to ensure that students at UCR are getting the engineering opportunities they need. Also treasurer of the organization last year.

Technical Projects

Deferred Physically Based Renderer https://github.com/benquach16/OpenGL-Rendering-Engine

- Deferred renderer that implements graphics effects such as Cook-Torrance, SSAO, Bloom, and FXAA with OpenGL.
- Implemented rendering framework to make it easy to develop and add multiple passes as well as setup framebuffer dependencies.

Planetary Renderer https://github.com/benquach16/bgfx-PlanetShader

- Developed a planetary rendering program in C++ using a low level rendering API called bgfx, implementing raymarch scattering effects for atmospheric scattering

Education

University of California, Riverside, B.S. in Computer Science - 3.3/4.0 *2012 - 2016*