

Karim Sayed

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EXPERIENCE

Independent Graphics Programmer

July 2024 – Present

Beyond Engine: Custom fork of Hazel Engine with an advanced renderer

- Engineered a physically-based hardware accelerated path tracer in Vulkan for real-time ray tracing
- Built a Vulkan renderer supporting DLSS, RTXGI, and a real-time hardware path tracer
- Cut descriptor handling time from 1ms to 0.02ms using bindless descriptors
- Optimized CPU performance via shader metadata caching, reducing load times by 40%

CUDA Path Tracer

- Built a CUDA path tracer achieving sub-9ms on RTX 3080 using SAH BVH acceleration
- Minimized VRAM usage by fitting data into L1 cache via SoA layouts, yielding 99% L1 hit rate
- Reduced register pressure, minimized warp divergence, and applied math intrinsics for kernel-level optimization
- Eliminated virtual function calls using data-oriented design, achieving 92% branch efficiency
- Authored a detailed technical [article](#) on the implementation

The Forge Interactive Inc. | Graphics Programmer (Remote)

April 2024 - July 2024

- Maintained cross-platform framework for PlayStation, Xbox, Switch and other platforms
- Upgraded software ray-traced shadows to hardware-accelerated ray-traced shadows
- Worked with platform-specific graphics debuggers and improved testability and stability

Sensor Foundries Inc. | Graphics Programmer (Remote)

May 2022 - April 2024

- Transitioned multiple rendering features from Vulkan-based Hazel to OpenGL engine
- Implemented Planar Reflections and LTC area lights, enhancing realism in reflections and lighting
- Integrated WB-OIT transparency and Atlas-Based Shadow Maps to improve rendering efficiency
- Restructured core rendering and asset management systems, improving performance and maintainability

Studio Chernobyl | Rendering Engineer Contributor (Remote)

March 2021 - April 2022

- Developed tiled renderer enhancing lighting performance with depth prepass to reduce overdraw
- Implemented screen-space techniques including SSR with cone tracing, GTAO, and HBAO
- Integrated PCSS for point and spot lights, improving shadow softness and quality

SKILLS

Languages: C, C++, CUDA, GLSL, HLSL, Slang, intel x86 Assembly, Python, Java, JavaScript

Graphics & Compute: Vulkan, OpenGL, DX12, CUDA

Game Engines & Frameworks: Unreal, Unity, Godot, Hazel, The Forge

Profiling & Debugging Tools: RenderDoc, Nsight Graphics, Nsight Compute, Razor, PIX, VTune

Build & DevOps: Premake, CMake, Git, Jenkins, VCPKG

3D Tools: Blender, Autodesk Maya

Expertise: Real-time rendering, ray tracing, PBR BRDF/BSDF, shader development, GPU optimization, SIMD, multi-threading, Data-oriented design, Object-oriented design, Research & Implementation

EDUCATION

Bachelor of Computer Science (Hons.) | Multimedia University, Malaysia July 2018 – July 2021

Specialization: Software Engineering / CGPA: 3.11 / 4.00