BRYCE JOSEPH

brycejo.com • github.com/brycej217 • linkedin.com/in/brycejoseph • brycej217@gmail.com • (650) 452-0002

EDUCATION

University of Pennsylvania, Philadelphia, PA — Aug 2025 - May 2027
Master of Science in Engineering, Computer Graphics and Game Technology | GPA: 3.6
Relevant Coursework: GPU Programming & Architecture, Computer Animation, Adv Topics in Computer Graphics

New York University, New York, NY — Jan 2023 - May 2025
Bachelor of Arts, Computer Science and Mathematics | GPA: 3.5
Relevant Coursework: Parallel Computing, Differential Geometry, Topology, Numerical Analysis, Linear Algebra

TECHNICAL SKILLS

Languages:	C++, C, Python, C#, GLSL, HLSL, Slang
Graphics & Compute:	Vulkan, DX12, WebGPU, OpenGL, CUDA, OpenCL
Tools:	Nsight, RenderDoc, PIX, Git

EXPERIENCE

GPU Programming & Architecture TA: ***University of Pennsylvania,*** Philadelphia, PA — Aug 2026 - Present
- Teach GPU architecture fundamentals, including warp efficiency and memory coalescing.
- Lead students in debugging and optimizing CUDA, Vulkan, and WebGPU projects using Nsight.

ETL Intern: ***Orbitax*****,** San Francisco, CA — Jun 2022 - Aug 2022
- Built a production ETL pipeline in Azure Data Factory and Python, automating JSON ingestion and transformation for downstream analytics.

PROJECTS

glRemix (DX12, HLSL, C++) — Nov 2025 - Dec 2025
DX12 platform that remasters legacy OpenGL games with real-time path tracing, without source access.
- Developed the **OpenGL-to-DX12 driver**, translating OpenGL command streams into DXR path-tracing resources and operations, enabling titles like *Half-Life* and *Unreal Tournament* to run path traced at **up to 72 FPS**.
- Implemented hash-based mesh deduplication and lifetime tracking, keying immediate-mode geometry by vertex signature to **reuse cached meshes** across frames and evict stale ones.

NPTracer (Vulkan, Slang, C++) — Feb 2026 - May 2026
Vulkan path tracer enabling simultaneous PBR and NPR stylization in a single scene.
- Built hardware ray tracing backend on **Vulkan's RT** extensions, managing BLAS/TLAS resources, GPU synchronization, and storage image compositing to the swapchain.
- Authored path-tracing shaders in **Slang** (**BSDF evaluation**, direct lighting) and implemented 5 NPR stylization functions applied to surface color using per-hit data cached along the ray path.

CUDA Path Tracer (CUDA, C++) — Sep 2025
GPU-accelerated Monte Carlo path tracer implemented entirely in CUDA.
- Optimized performance with **BVH traversal**, path termination, and memory coalescing, achieving **1300% speedup** on complex scenes.
- Added **physically-based rendering** features such as diffuse and specular BRDF sampling, normal and roughness mapping, depth of field, and environment mapping to achieve photorealistic global illumination.

Clustered Forward and Deferred Renderer (WebGPU, WGSL, TypeScript) — Oct 2025
Real-time WebGPU renderer supporting large-scale dynamic lighting.
- Built **Forward+ and Clustered Deferred lighting** pipelines for large-scale dynamic lighting.
- Implemented compute-based depth clustering, G-buffer generation, and deferred shading pipeline, sustaining **30+ FPS with 30K lights**.