

Aman Sachan

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Skills

Graphics: Vulkan, DirectX 11/12, GLSL/HLSL, USD, MaterialX, Threejs, CUDA, WebGL/OpenGL, Maya API

Programming: C/C++, Python, C#, Javascript, HTML/CSS, Java, MEL

Software: Unity, Unreal, Maya, Houdini, RenderDoc, Pix & other profilers

Experience

Software Engineer II, Office of the CTO, Microsoft

Feb, 2023 — Present

Software Engineer II, Synthetics, Microsoft

June, 2022 — Feb, 2023

- Developed powerful & scalable rendering pipelines for *synthetic data generation* on Microsoft Cloud across industries & use cases: People Safety, Object Tracking, Defect Detection, GeoSpatial, Entertainment;
- Migrated the engine to work with the Radeon Pro Renderer (RPR) instead of Arnold and ***saved ~20 (about \$496K annually)*** at that time) of our total simulation costs; *Managed the work and relationship with the RPR team*;
- Performed profiling and handled hardware performance & scaling decisions;
- Set up a Continuous Integration (CI) build; used combinatorics & patterning to greatly increase test coverage;
- Developed Arbitrary Output Variables (AOVs) for auto-exposure, shadow & background compositing, etc;

Intermediate Graphics Engineer, Obsidian Entertainment, Microsoft

Jan, 2021 — June, 2022

- Analysed, implemented, and optimised Rendering systems for **The Outer Worlds 2**, in a heavily modified fork of the Unreal Engine; primarily using C++, HLSL, and Unreal's **RDG (Render Graph) & RHI (Render Hardware Interface)** APIs;
- Specifically worked to improve static lighting systems (for baking massive open worlds), real-time lighting and shadowing systems, shading models, subsurface scattering, ambient lighting, and fog of war systems for PC and Xbox;
- Worked on game performance passes, as well as miscellaneous crashes and bugs;

Software Engineer II, Havok, Microsoft

March, 2020 — Jan, 2021

Software Engineer, Havok, Microsoft

Aug, 2018 — March, 2020

- Developed features & improvements across the Havok SDK suite focussing primarily on the **Visual Debugger (VDB)**, **Physics**, and **Havok Graphics (HKG)**; but also contributing to the **UE4 integration**, **Cloth**, and **AI**;
- Support developers by tracking & fixing bugs, implementing custom features, and identifying client errors
- Manage relations with clients; Identify risks & set expectations; use feedback to drive product roadmaps;
- Helped ship **multiple AAA titles** across many studios & game engines;

Teaching Assistant, University of Pennsylvania | Procedural Graphics (CIS 566)

Jan — May, 2018

Research Assistant, SIG Center for Computer Graphics | Under Dr. Stephen Lane

May — Aug, 2017

Education

University of Pennsylvania — MSE Computer Graphics & Game Technology | GPA: 3.57/4.0

May, 2018

Visvesvaraya Technological University — BE Electrical and Electronics Engineering

July, 2016

Projects (See more projects at amansachan.com)

Vulkan Cloudscape Rendering ♦ C++, Vulkan, GLSL, HLSL ♦ Group Project

Nov — Dec, 2017

- Realistic procedural cloud rendering in under **3ms/frame** on a notebook GTX 1070
- **Responsibilities:** Vulkan framework; 2D and 3D texture support; ray marching of cloud shapes; reprojection and cheap sampling optimizations; post-processing (god rays, tone mapping, temporal anti-aliasing);

Monte Carlo Path Tracer ♦ C++, CUDA, OpenGL

Feb — April, 2017

- **CUDA Optimised:** material sorting; stream compaction; first bounce caching; subsurface scattering; anti-aliasing
 - **CPU Generalised:** multiple importance sampling; volumetric rendering; BVH acceleration; multi-threading;
- micro-facet materials; fresnel reflectance model; realistic modelling of light sources; thin lens camera models;

Jello Simulator Using FEM ♦ C++, Houdini ♦ Group Project

March, 2018

- The simulation uses the **finite element method** with a **fixed corotated elastic model**
- Implemented collisions, fixed point constraints, in a **data driven architecture**

Clustered Deferred & Clustered Forward Plus Shading ♦ WebGL, Javascript, GLSL

Oct, 2017

- **Real-time (60+ FPS)** rendering of more than **2100 dynamic lights** in complex scenes using a compacted g-buffer

Hand Of God ♦ Unreal Engine 4 ♦ Group Project

Oct, 2017

- Asymmetric co-op endless runner game merging traditional **non-VR and VR gameplay**