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 (OCTO), 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**