

DANIEL ELWELL

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Graphics & rendering engineer - real-time and neural GPU rendering, both web and native (WebGPU/Vulkan/CUDA).

EXPERIENCE

Founding Engineer

September 2024 - Present

Outpaint.com - YC W21

New York, NY

- Built a voxel-video decoder with WebGPU, ~3x faster than the prior WebAssembly decoder. Implemented a block-parallel entropy decoder and work-efficient prefix sum to hit 10B voxels/s in-browser on consumer laptops.
- Developed a CUDA differentiable renderer to train 4D Gaussian splats with custom attributes, enabling time-constrained splats with polynomial motion. Trained 5x smaller models compared to per-frame 3DGS.
- Shipped two WebGPU voxel video renderers (raycasting-based; splatting-based for transparent voxels), rendering up to 1B voxels at 60fps (1080p, M4 MacBook). Powered the interactive investor demos used in the seed raise.
- Created a WebGL depth-video renderer & WebXR viewer, using WebCodecs for frame-accurate depth/color sync.
- Designed a spatial-photo format (using Apple's ml-sharp) that re-represents splat output as mesh + atlas geometry - >99% smaller and natively rasterizable, avoiding per-frame splat sorting.

Software Engineer Intern

June 2024 - August 2024

TikTok

San Jose, CA

- Wrote OpenGL ES rendering routines in C++ (via JNI) for HDR photo editing & export; ported to iOS with Metal.
- Reduced HDR gainmap capture time 70% with a custom C++ capture path; landed 2 company patents.

Research Assistant

September 2023 - August 2024

Rutgers University

New Brunswick, NJ

- Cut data-preprocessing runtime >80% with memory-mapped I/O, madvise access hints, and multiprocessing across cores (DLRM training pipeline). Won a university CS research award for results and presentation.

PROJECTS

Cubed (Real-Time Rendering Engine)

January 2024 - Present

C, Vulkan

[Video Devlogs](#)

- Raytracing pipeline on Vulkan hardware RT with a compute-shader software fallback and a BVH accelerator.
- Multiple voxel data structures such as 64-trees and brickmaps. Wrote custom intersection shaders, profiled with Nsight to find cache misses, then improved memory layout, cutting frame times ~20%.
- Indirect dispatch to construct a dynamic world-space octree forest with constrained memory, backed by a custom Vulkan allocator. Powers infinite-bounce global illumination with screen-space-constant probe sizing.

Terra Toy (Commercial Video Game)

September 2022 - October 2023

C++, OpenGL

[Steam Release](#)

- Raytracing engine capable of 5ms/frame (1080p, RTX 3050 Mobile) with dynamic global illumination.
- Released commercially on Steam marketplace, received 93% positive reviews and built an active community.

EDUCATION

Rutgers University - New Brunswick

August 2022 - May 2025

Bachelor of Science in Computer Science and Math

New Brunswick, NJ

- **GPA:** 4.0; **Honors:** Honors College, Novielli Award (undergraduate CS award).

SKILLS

Graphics/GPU: WebGPU, Vulkan, OpenGL / OpenGL ES, WebGL, Metal, Nsight Graphics

Techniques: Real-time raytracing, Global illumination, Gaussian splatting, Differentiable/neural rendering, WebXR, WebAssembly, BVH, Compute shaders

Languages: C, C++, CUDA, Python / PyTorch, Typescript / Javascript, Swift, Java, GLSL, HLSL, WGSL, MSL