

Trevor Berninger

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EXPERIENCE

Director, Interactive Software | Light Field Lab | San Jose, CA | December 2021 – July 2025

- Directed, managed, and hired software engineers for the development of custom holographic rendering engines and plugins targeting custom in-house 10 gigapixel holographic light field displays.
- Managed team and architected redesign of display calibration pipelines to a distributed workflow by focusing on render farm compatibility. Brought processing of hundreds of gigabytes of geometric and color calibration data down from a multi-day process to a few hours. Created test charts to evaluate pixel-level accuracy of 3D video-wall calibrations.
- Created specifications and worked with server hardware vendors to develop and validate a million-dollar data center solution optimized for distributed GPU and storage bandwidths exceeding 1.2TB/s of image data across 30 servers for 120 GPUs before finalizing hardware acquisition.
- Partnered with AAA game studios to increase compatibility of real-world Unreal Engine content within our real-time light field rendering software plugins.
- Used Open Sound Control to bridge live mo-cap performance interactions in Unreal Engine to synchronized physical lighting and audio systems on a theme-park style theatrical set. Abstracted physical-world actions into Blueprint nodes.
- Stand-in actor for live scripted performances combining mo-cap, voice acting, and improvisation during key technology demonstrations.

Lead Engineer | Light Field Lab | San Jose, CA | July 2019 – December 2021

- Designed and maintained a from-scratch real-time distributed rendering engine specifically optimized for ray traced light field rendering on video walls developed in Rust using the Vulkan rendering API.
- Created a distributed video player optimized for custom light field video formats using Vulkan with NVMe DMA optimizations. Later migrated custom Linux exFAT driver-based DMA code to nvidia-fs with ext4 and RDMA over fiber support.
- Maintained internal fork of Blender adding GPU and CPU optimized support for fast direct-to-light-field rendering instead of extremely slow camera rig based solutions used by other companies and products.
- Trained Intel Open Image Denoise AI models on custom light field image datasets and integrated results into render farm pipelines, greatly reducing overall render times for highest-quality light field renders.
- Architected and implemented audio hardware setup and game engine technology to facilitate live-performance demonstrations of body and face tracking inside light field rendering systems.
- Participated in physically deploying and troubleshooting demo technology at customer's location.

Software Engineer (Real-Time) | Light Field Lab | San Jose, CA | April 2018 – July 2019

- Ported existing full light field renderer from Nuke to Unity and Unreal Engine 4 to bring down render times from 1 day to a few minutes.
- Created prototype 60fps Unity-based GPU-accelerated light field video playback system.
- Developed novel real-time multi-axis light field approximation renderer within Unity using normal rasterization pipelines enhanced with ray tracing within compute and fragment shaders.
- Integrated hand tracking into real-time light field rendering games and demonstrations.
- Setup and maintained Arch and Ubuntu Linux video-wall servers, software, and Nvidia driver settings and optimizations.

EXPERIENCE (Continued)

Software Engineer | Lytro (Acquired by Google) | Mountain View, CA | December 2017 - March 2018

- Collaborated with post production teams to integrate light field data into Unreal and Unity game engines.
- Developed techniques for cross-platform, including mobile, AR rendering of custom compressed point cloud data from light field videos.

Engineer | Limitless Ltd (Acquired by Lytro) | Bellevue, WA | May 2016 - December 2017

- Architected and implemented a fully VR interactive experience content development platform in partnership with a major Hollywood studio. Featured at SIGGRAPH 2017 Real-Time Live! in which an interactive VR experience was created live on stage within 6 minutes.
- Responsible for PS4 port of Cinequest award winning VR game Gary the Gull for show at SIGGRAPH 2016 Real-Time Live!.
- Utilized Google Cloud Platform for storing analytics data, save files, and other user-account data.
- Created and managed a load balanced and auto-scaled speech recognition streaming service based on Google services with built-in analytics for use via a thin client library built for Unreal Engine 4 using experimental gRPC C++ integrations.
- Released a Unity VR keyboard plugin with English word suggestions, support for German and other languages through configurable keyboard layouts, and full Japanese support including Kanji.
- Designed and integrated a JavaScript based branching narrative framework for High Fidelity, Inc.

PATENTS

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- Light field display system for video games and electronic sports | US11938398B2 | **Granted** | 2019
 - Scan line refresh for modular display systems | US20220277684A1 | Pending | 2020

PROJECTS

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- Docker-alternative workflow based on systemd portable services and nspawn. Including tools to convert Docker (OCI) images into snapshotable file system subvolumes managed and run via systemd's isolated runtime facilities.
 - VSLFS - Virtual Symbolic Link (FUSE) File System. Exposes customizable user-defined symlinks which resolve dynamically based on either the availability of external resources or the requesting process's environment.
 - TrevOS - Fork of Arkane Linux, the immutable Arch-based distribution, containing extra logic for the creation of systemd containers, future-proofed host key migration, and Nvidia GSP firmware support in disk-encrypted deployments.

EDUCATION

Bachelor of Video Game Programming | University of Advancing Technology | Tempe, AZ | 2013 - 2016

SKILLS

Languages: Rust, C, C++, C#, Python, Lua, JavaScript, PHP, GLSL, HLSL, SQL, Shell

Platforms: Linux, Android, PS4, PS2, Windows, macOS, iOS

Architectures: AVR, 6502, ARMv4, i386, TIS-100

Rendering APIs: Vulkan, OpenGL

Content Creation: Blender, Unity, Unreal, Godot, Fyrox, Maya, Octane

Web Technologies: Cloudflare, Google Cloud, Caddy, nginx, Apache, HTML, CSS, IPv6 networking, mTLS

Linux Distributions: Arch, NixOS, Fedora, Debian, Ubuntu, Alpine

Linux Packaging: PKGBUILD, AppImage, Nix

Containers: systemd-nspawn, systemd-portabled, Docker

Human Languages: English (native), toki pona (proficient), Japanese (<=N5)