

Company	Duration	Development Environment
ToneStone	Contract 1 year	C#/Unity on Android Meta Quest 2
Chan Zuckerberg	Contract 9 months	Python/NumPy on Multi-platform
CARMERA	Full-time 3 years	Python on AWS/Linux, some C++
MVRSimulation	Full-time 8 years	C++ on DirectX/Windows
HHMI	Full-time 2.5 years	Python on Linux/Mac
Harmonix Music Systems	Full-time 2 years	C++ on PlayStation 2
SensAble Technologies	Full-time 4 years	C++ on OpenGL/Windows

TOBEVA SOFTWARE, LLC, Winchester, VA
My own consulting and contracting company.

April 2020 - Present

ToneStone, Boston, MA
VR game for Meta Quest 2 using C# and Unity.

February 2021 - March 2022

Helped finish the 2D prototype using Javascript with Umajin. Then worked on a team of five engineers to start the VR version with Unity. I collaborated with artists, designers, and other engineers to implement individual game features and help guide the emerging architecture. Mentored junior developers.

The Chan Zuckerberg Initiative, Redwood City, CA
Multi-dimensional image viewer. Using Python, NumPy, and Dask.

May 2020 - Dec 2020

I wrote a brand-new quadtree-based real-time rendering system for the tiled display of large images inside Napari, an existing open-source image viewer. The approach was very similar to Google Maps but for arbitrary scientific imagery.

CARMERA, Inc., Brooklyn, NY
Senior Software Engineer in the self-driving car and mapping space.

April 2017 - April 2020

Developed three generations of data pipelines in AWS. One pipeline processed LIDAR data and panoramic imagery, another system performed machine learning training with Tensorflow. We started with a non-cloud-native design and evolved towards cloud-native. We used many AWS Services such as Step Functions, Batch, Lambda, ECS, SNS/SQS, S3, EC2.

I also periodically contributed to the core task of one of the pipelines, a large C++ and Python codebase focused on computer vision and point cloud processing. Although most of my work was in Python, here I was able to use my extensive C++ background.

MVRSimulations (formerly MetaVR), Brookline, MA.

2011 – 2017

Lead Software Engineer in the simulation industry.

and 2006 – 2009

Lead a team of five engineers who together were responsible for three products: the main simulation and graphics engine, the scenario editor, and a terrain generation system. All team members were 100% remote. Core product used C++ and DirectX on Windows. Also Python and Javascript for tools.

Some individual contributions:

- A clustering system in C++ using a hierarchical round-earth spatial subdivision.
- Skinned Animation Feature allowed 1000+ characters on screen using GPU skinning
- Internal performance metrics and video review web service using Python, Javascript, jQuery, jQuery UI, and AWS. Wrote a “video diff” feature using structural similarity (SSIM).
- Debugging hard bugs and driving performance optimizations.

HOWARD HUGHES MEDICAL INSTITUTE, Ashburn, VA.

2009 – 2011

Senior Software Engineer in neuroscience research.

- Extended an existing interactive image-based tool to support arbitrarily large images.
- Python using OpenGL on Linux/Mac. Rendered at 60Hz with background paging.
- Used to view image stacks as large as 46000x43000x1700 (3TB).

HARMONIX MUSIC SYSTEMS, INC., Cambridge, MA.

2003 – 2006

Lead Programmer in AAA console games.

Guitar Hero, PlayStation 2 game published Fall 2005 by Red Octane

- Implemented 2D and 3D game elements using C++ and a proprietary graphics engine.
- Coordinated with game programmers, system programmers, QA, design, other leads.
- Guitar Hero franchise had over \$1B in sales by January 2008

EyeToy: Antigrav, PlayStation 2 game published Fall 2004 by Sony

- Wrote spatial sound effects, voice system, heads-up displays, tutorial, world editor.

Build and CI System using Python/web.

- Created a custom multi-project, multi-platform build system.

SENSABLE TECHNOLOGIES, INC., Woburn, MA.

1999 – 2003

Senior Software Engineer for haptic-enabled CAD software.

- Contributed to 5 product releases of FreeForm (V2 through V6) at a variety of levels
- Served on the 4-person Architecture Board; worked on an external API and plug-in architecture.
- Co-inventor on US Patent 6,671,651 3-D Selection and Manipulation with a Haptic Interface.
- The FreeForm application was C++ on OpenGL/Windows.

EDUCATION

B.S., Computer Science, HARVEY MUDD COLLEGE, Claremont, CA.

1991 – 1995