

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
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

April 2017 - April 2020

Senior Software Engineer in the self-driving car and mapping space.

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