
Jim Susinno

Graphics Programmer

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SUMMARY

Driven and capable software engineer with over 15 years industry experience delivering high performance, quality software across a variety of domains. Highly skilled in 3D graphics, virtual reality, volumetric rendering, real-time interfaces, hardware accelerated compute, architecture, integration, documentation, workflow, process, and more.

Comfortable with several languages, platforms, stacks and methodologies. Effective in teams large and small, in leadership or contributor roles. Eager to apply design and engineering skills on unimaginably powerful modern hardware to create products that improve lives.

Permanent US resident.

EXPERIENCE

Verizon, Boston MA - *Principal Engineer-Full Stack*

NOVEMBER 2016 - PRESENT

Developing streaming hybrid rendering MMO engine tech for VR and 5G. Implemented a networked hybrid rendering system for offloading expensive computations to GPU-equipped servers on the edge for minimal latency. The renderer is accessible via web portal for localized deployments and provides rich statistics on video stream round-trip time for profiling and optimization.

Implemented several features across the engine including graphical unit tests, particle systems, textures, shading, skeletal animation, text rendering, user profile pictures, input handling. Integrated native WebRTC library builds in engine on Windows, OSX, Linux and Android for audio and video transmission for video compression and audio echo cancellation.

Applied the engine technology to several apps and POCs, including BlueJeans Spaces - a networked 3D multi-user collaborative office environment.

Spaces demo reel: <https://www.youtube.com/watch?v=s9Au41ukyn4>

Handled the regular merge process, ensured portability across platforms. Enhanced and maintained automated build system, developed and deployed server processes.

Active participation in design, strategy, code reviews, mentoring, merging, documentation, etc.

Windows, Linux, OSX, Android, CMake, C++, STL, Git, OpenGL, GLES, GLSL, Docker

Geophysical Survey Systems, Inc., Nashua NH - *Senior UI Design Engineer*

APRIL 2013 - NOVEMBER 2016

Created prototype AR display app using Vuforia to display radar datasets live and in-situ beneath the surface of the medium they were taken from using an Android phone or GearVR.

Used commercially available 3D positioning systems to track radar antennas in space, while live-streaming data into a 3D reconstruction. Implemented accelerated volumetric migration using 3D textures and OpenGL compute shaders for MIMO and SAR radar imaging.

Designed and implemented the UI software layer on embedded GPU for a custom hardware radar control device used for scanning subterranean volumes. Wrote the display code for horizontal slices of radar data, innovating new colormap customization options using GLSL shaders. Designed and wrote a novel 3D dataset slicing UI, showing blended strips of radar data in 3D space, switchable by control knob and running at 60 fps.

Windows 7,8,CE, Android L,M, Android Studio, Visual Studio 2008-2013, TFS, Subversion, Git, C++, STL, OpenGL, OpenGL ES, GLSL

Advanced Micro Devices, Boxborough MA - *Senior Software Engineer*

APRIL 2011 - APRIL 2013

Direct3D Driver Development: maintenance and feature addition to User-Mode Windows graphics driver, debugging, instrumenting, profiling driver code. Added DWARF debugging format support to IL translator for use in shader debugging. Tests and scripts, build system maintenance.

Windows 7,8, Visual Studio 2008, Perforce, C++, WinDbg, DxPanel

D4D Technologies, Richardson TX - *Senior Software Engineer*

DECEMBER 2008 - APRIL 2011

Designed and built Compass, a comprehensive app for dental implant surgery. The app used a GUI to align high-precision intra-oral optical scans with volumetric CBCT ingested from Schein i-CAT for dental implant surgical planning. Dentists propose an implant placement site and immediately see any collisions with critical patient anatomy, then update the proposal accordingly with instant graphical feedback. The app received FDA 510(k) regulatory approval and a US patent was granted for the 3D textured shading technique.

Wrote GLSL shaders and accelerated OpenGL display code for Dental CAD/CAM, and accelerated image and geometry processing in CUDA.

Windows XP, Visual Studio 2005, Perforce, C++, STL, C#, OpenGL, GLSL, CUDA, DICOM

In-Three Inc., Westlake Village CA - *Software Engineer*

OCTOBER 2005 - NOVEMBER 2008

Stereo post-production: proposed, architected, developed and documented "Intrigue", the world's most comprehensive and efficient stereoscopic 3D conversion tool of the time.

After enhancing and maintaining the original "dimensionalization" software, began a full rewrite to take full advantage of GPU acceleration using OpenGL, starting with a read-only viewer to load and display our existing data files. This allowed our users to see copious continuity errors

for the first time, thanks to the ability to scrub between frames in memory. The viewer then grew into a full-blown editor with advanced GUI controls for manipulating stereo 3D frames directly, multiplying artists' productivity.

Acted as project owner and leader of a team of developers and artists. Intrigue was in exclusive use in-house on major motion pictures such as Disney's G-Force.

Windows XP, Visual Studio 2005, Visio, Trac, SVN, C++, STL, MFC, OpenGL

Kollins Communications, Mahwah NJ - *Software Engineer*

NOVEMBER 2004 - OCTOBER 2005

Web Development: dynamic web applications including content management systems, flash games, interactive product showcases and event registration systems. Brought functionality and animation to static HTML and Flash templates. Lead Developer for Sony Xplod autosound site.

ActionScript 2.0, PHP, MySQL, HTML, CVS, Tomcat, JSP, JSTL

Internal Drive Tech Camps, Princeton NJ - *Instructor*

JUNE 2004 - AUGUST 2004

Game Design Instruction: taught 3D animation and game design course in Conitec 3D GameStudio. Used BSP editors to design interactive environments, polygonal mesh and bone animation to design characters, and Conitec C-Script to control game logic.

EDUCATION

Johns Hopkins University, Baltimore, MD - *M.S. in Computer Science*

SEPTEMBER 1997 - JUNE 2003

3D Graphics Concentration. Final project: Citygen, a system for creating large city datasets using grammars. Also wrote Animatrix, a modeling and keyframe animation system hand-coded in C++ and OpenGL. 3D rendered display for several class projects: genetic algorithms, neural networks, random walk graph traversal.

Made games for Dreamcast on the side using KallistiOS, a graphical library similar to OpenGL.

PATENTS

US10657662B2 - *Graphically Aligning Optical and CT Datasets*

Display method and system for enabling an operator to visualize and correct alignment errors in imaged data sets

Describes a 3D rendering technique for visually depicting errors in alignment between two types of scans of a patient's teeth. The optical scan is precise to about 10 microns, but only captures the surface of the teeth and gums. The head CT is less precise at about 1mm voxel resolution, but captures the entirety of the patient's anatomy below the surface. The two datasets need to be aligned correctly to one another for the treatment plan to succeed. By projecting the volumetric texture data of the CT scan onto the polygonal surface of the optical scan and

modulating color through a transfer function shader, the operator can visually see when both the gum and tooth areas of the optical scan are colored correctly, indicating alignment.

US11395027B2, US20220312063A1 - *Hybrid Rendering at the Edge*

Methods and Systems for Graphics Rendering Assistance by a Multi-Access Server

Describes a server rendering system for use in Mobile Edge Computing(MEC). A render request is broken down into render passes which may be dependent on data resources like images or models, or on previous render passes. The request is described in JSON format and sent to the server, which performs rendering to the client's specification and sends streaming results back to the client. Streams are available for subscription to other clients and detailed performance data is available for profiling.

The system is designed for render workloads that are too heavy for mobile devices such as shadows, reflections, hair, subsurface scattering, image-based lighting, etc. The server can also take live input from a video stream such as a 360 camera and merge the real and virtual worlds by applying real world lighting data on virtual objects.

PROJECTS

RiftRay

<https://github.com/jimbo00000/RiftRay>

Shadertoy Implementation for Oculus Rift, featuring UI panes for live parameter adjustment. Dynamic render target resolution and vertical FOV scaling allow for fast frame rates on devices with limited capabilities, increasing the sense of immersion. Presented at @party 2014 in MIT's Stata Center.

Jouleplating

<https://bitbucket.org/jimbo00000/opengl-with-luajit/src/master/>

Game and visualization engine implemented entirely in Luajit. Adapted for use in several programming applications including VR, demo productions, presentations, and a libretro core running smoothly on Raspberry Pi and other SBCs. Scenes are composable and can be included in other scenes

Foguete

<https://github.com/jimbo00000/foguete>

Luajit implementation of the GNU Rocket protocol, a sequencer used for choreographing events over a socket connection. Used for creating demoscene productions, something akin to a live-rendered art film festival.

Everything Is Made Of Atoms

<http://jimbomania.com/atoms/atoms.html>

Interactive digital art installation, using Kinect and high-performance fluid simulation on the gpu. Video of the users is captured and mapped onto thousands of tiny shards that swirl in the wind created by the motion of the users' arms, then persist on the floor indefinitely.

Musical Instrument Creation

Rewired old kids' toys getting a new life as true musical instruments!

Cheap AA battery powered toy instruments (including guitar hero controllers) get rewired to ARM-equipped STM32 Nucleo microcontroller boards performing real-time audio synthesis. Several patches or voices are available, coded in portable C++ and prototyped in custom cross-platform desktop software. The DAC on the Nucleo is then wired to an output jack and a small amplifier powering the built-in speaker. Custom analog controls can also be added with direct high-speed analog reads using the STM HAL. Fingering schemes are fully customizable in software, and there's even an instruction manual with over 200 transcribed songs, run through a python translation system to convert to tablature for any given instrument.

MEETUP ORGANIZING

BostonVR - *Organizer*

JANUARY 2014 - APRIL 2016

Created and organized the local VR meetup group, now grown to over 6000 members. Arranged venue, speakers, and demos.

Khronos Boston - *Organizer*

APRIL 2016 - PRESENT

Arrange venues, presentations and events, and act as liaison to the Khronos group.

HOBBIES

Music production and performance, improvisation, songwriting, arrangement, recording, mixing

Instruments: guitar, bass, trumpet, vocals, rhythm sequencing, sampling

Sports: ping pong, soccer, baseball, rock climbing, hiking, surfing, skiing, ice skating