Jaap Suter

Contact

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Overview

Pragmatic software engineer with **25 years of professional experience** building **high performance games, graphics, computer-vision, and GPGPU systems**, deployed in more than **25 commercial products**.

Looking for **complex technical challenges**, preferably with a **games**, **graphics/gpgpu**, or **systems/performance** emphasis, as part of a team of highly-skilled **coworkers who challenge me** every day.

Experience

Principal Software Engineer June 2022 - Present
UrbanLogiq Vancouver, Canada

- Joined a friend's startup, building browser-based visualizations of large government datasets.
- Created a variety of new visualizations (with Mapbox, Deck.GL, and custom in-house WebGL) – and helped optimize existing ones to allow for larger datasets.
- Significantly refactored a 160k LOC Typescript/React codebase, removing swaths of impossible to debug hooks (useEffect, etc.), rewriting the map-engine state layer, and deleting over 30k LOC in the process.
- Learned that web-development is not for me, and that native (to the metal) development suits me more.

Senior Rendering Engineer July 2020 - May 2022
Roblox North Vancouver, Canada

- Many improvements to Roblox's particle effects, most notably a procedural emitter shape system, enhanced particle orientations, and flipbook support.
- Fixed the raymarch-based cloud system to be physically accurate for better integration with other rendering and simulation.
- Developed a procedural cloud system where multiple cloud layers evolve, driven by a dynamic weather map.
- Contributed numerous bugfixes, improvements for low-end mobile devices, and miscellaneous backlog items.

Senior R&D Engineer July 2016 - June 2020
DarkVision Technologies North Vancouver, Canada

DarkVision makes a variety of **robotic ultrasound probes** to do km-long inspections of high-pressure high-temp oil wells, underground.

- First software-engineering hire at the company. Helped grow the software group to 7 people, and hired my own boss (to allow my ongoing focus on R&D and engineering).
- Responsible for the architecture and development of:
  1. The post-capture data visualization software (DirectX 12 & CUDA), used to process, analyze and visualize large 500+ GB volumetric datasets.
  2. The on-probe software, running on embedded PetaLinux, interfacing with the ultrasound's FPGA, writing raw captured data to SD, and encoding a realtime low-res preview, sent to the surface over a 7 kB/s up and 200 B/s down (bytes per second) wireline connection.
  3. The field-operator control software to watch the preview stream, do on-the-fly sensor configuration during scans, and steer the 6-DOF robotic probe.

- Primary graphics engineer, wrote a high performance rendering engine, able to stream through huge volumetric datasets (512 x 384 x 5-million 16-bit slices), showing the data in several different ways (cross-sectional, unwarped, integrated, raymarched 3D-perspective, etc.) simultaneously at interactive frame rates.
- Responsible for a variety of compute-shaders to leverage the GPU for fast post-processing and filtering of the data. Wrote a DirectX-CUDA interop layer, and ported complicated DirectCompute shaders to CUDA kernels, still integrating seamlessly with the Direct3D renderer.
- Contributed significant amounts of R&D in numerous areas of data-processing, such as: volume-surface-extraction, automated anomaly detection, imaginary glint/reflection removal, ultrasound RF-data compression, etc.
- Wrote the path-planning software for our 6-DOF robotic probe, allowing for intuitive control by field-operators, converted to G-code and sent downhole for realtime robot movement.
- Developed the slice-assembly pipeline that integrates incoming 2D slices (at arbitrary position and angle) into a single cohesive 3D volume, giving field-operators real-time visibility on pipe anomalies, many kilometers underground.
- Set up the continuous-testing/integration system that allows for rapid iteration and a high-cadence/high-confidence release cycle of each piece of software, used by over 20 field-operators and data-analysts.

Senior Software Engineer - Contract November 2015 - June 2016
Phoenix Labs Burnaby, Canada

R&D for a *procedural level content pipeline*, used in Dauntless, an online multiplayer RPG.

Lead Rendering and Performance Engineer - Contract October 2014 - August 2015
Navigate Surgical Technologies Vancouver, Canada

Helped create a novel system for **camera-assisted dental implant surgery**.

- Single-handedly wrote a client-server rendering system (using DirectX 11), capable of displaying high resolution volumetric CT-scan datasets, integrating correctly with polygonal meshes, supporting multiple low-latency viewports simultaneously.
- Today in 2023, Navigate Surgical continues to use this rendering engine for actual patient surgery.
- Developed industry-novel support for high accuracy pixel-to-real-space unwarping of viewports along a cubic spline, enabling quicker and more reliable discovery and visualization of nerve canals in CT data.
- Created the company's automated testing infrastructure, and made continuous integration central to everyday development.
- Delivered an extensive test suite alongside the renderer, verifying overall robustness, relative accuracy, visual fidelity, and DICOM edge-cases. Also included several benchmarks for continuous detection of performance regressions (memory, latency, and frame-rate).
- Found major optimizations in the computer-vision pipeline, contributing a ten-fold reduction in worst-case latency, and a 200% speed-up on average.

Senior Performance and Concurrency Engineer - Contract July 2013 - June 2014
Capcom Burnaby, Canada

Joined the final stretch of Dead Rising 3 for Xbox One. Did a performance investigation deep dive and contributed significant optimizations; introducing a task manager to leverage multicore, raising awareness of concurrency, parallelizing large subsystems across both rendering and game-code, and speeding up numerous bottlenecks the old fashioned way – algorithmically.

Android Developer - Contract December 2012 - June 2013
AirG Vancouver, Canada

Client-side developer for Hookt, a mobile messaging application.

Happy Hobby Hacker — April 2011 - November 2012
Sabbatical — Vancouver, Canada

Built a Structured Light 3D Scanner, testing a novel camera calibration mechanism and tinkering with numerous other computer vision projects.

Technical Director — November 2005 - April 2011
Electronic Arts — Burnaby, Canada

- Headed the *Core and Infrastructure* group (11 people), building and maintaining foundational technology used by most EA games.
- Initiated and wrote large parts of *EASharp*, a project to allow C# programming for game consoles (PS3, X360, Wii) through a custom .NET runtime.
- Designed and implemented *Job Manager*; the company-wide solution for task parallelism, used by many EA studios.
- Drove the mobile strategy for EA's shared technology, porting base libraries and build infrastructures to new platforms (iOS, Android, etc.).

Senior Programmer - *Next Level Games* — 2004 - 2005 - Vancouver, Canada
Xbox SKU Lead and Generalist SE - *Electronic Arts* — 2002 - 2004 - Burnaby, Canada
Pocket-PC Developer - *Overloaded* — 2002 - Amsterdam, The Netherlands
R&D Graphics Engineer - *Davilex Games* — 1999 - 2002 - Houten, The Netherlands

Education

B.Sc. in Computer Science - *Twente University* — 1998 - 2002 - Enschede, The Netherlands

Skills

- Strong GPU programmer, be it for rendering, computer vision, and general compute (GPGPU). Great at debugging graphics problems, and optimizing rendering systems. Lots of experience with DirectX 11/12, HLSL, and CUDA.
- Strong C++ programmer, comfortable with C++ 11/14, STL, and Boost (past contributor).
- Experienced C programmer, enjoys close-to-the-metal programming for embedded devices.
- Good C# programmer, more than comfortable with Linq, RX, Async/Await, and the .NET runtime internals.
- Passionate about concurrency/parallelism, knows how to leverage heterogeneous multi-core architectures.
- Responsible performance engineer (no guesses, bottlenecks first, profiler-driven, and test-verified).
- Delivers solutions that are robust, accessible, elegant, and high performance.
- Strong advocate of test driven, agile, and (most importantly) pragmatic development.
- Comfortable managing logical and physical aspects of large multi-language cross-platform projects.
- Dabbled with, and happy in: Typescript/Javascript, Python, Ruby, Java/Xtend, Assembly (x86/64, ARM/Neon, Cell SPU).
- Platforms: Win32/64, Linux (Peta/Ubuntu), Xbox (360, One), PS3 (PPU/SPU), Android, iPhone, Wii, PS2, Gamecube, GBA

Publications

Suter J. (2003) - **Geometric Algebra Primer** - An introduction to Clifford Algebra
(available online at `http://www.jaapsuter.com/geometric-algebra.pdf`).