**Jeff Niu**

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**work experience Apple** *Winter 2019*

*Intern, Silicon Validation Software (GPU)*

**-** Expanded **GPU hardware coverage** by exercising special GPU blocks and data paths

**-** Developed shader algorithms to stress GPU memory buses, thrash multilevel caches and

validate coherency, drive GPU+SoC power and bandwidth, and stress SoC-level caches

**-** Participated in F2F discussions with GPU architects and designers to enhance test roadmap

**-** Developed efficient algorithms to **defeat hardware optimizations** and enhance coverage

**-** Implemented **Philox 2x3210** PRNG and developed an **O(1) time+memory**

[non-repeating PRNG](https://github.com/Mogball/qr-rng/blob/master/rng.cpp) based on quadratic residues in **GPU assembly**

**-** Created a **power virus** that reaches 99% GPU power and bandwidth

**CoreAVI** *Summer 2018*

*Intern, Embedded Graphics Developer*

**-** Implemented [EGL Compositor](https://www.khronos.org/registry/EGL/extensions/EXT/EGL_EXT_compositor.txt) Extension in ArgusSC **OpenGL driver**

**-** Added **VxWorks** 6.x/7 real-time process and multi-thread support to Argus

**-** Developed a generic VxWorks **kernel-mode driver** and added RS-343A support

**-** Ported Argus **OpenCL** driver to **64-bit** Yocto embedded **Linux**

**Yahoo!**  *Fall 2017*

*Intern, Software Engineer (Data)*

**-** Contributed data visualizations and SQL/Druid query optimizations to Apache Superset

**-** Built [a production tool](https://github.com/yahoo/sherlock) for real-time anomaly detection on Druid streams

**-** Created [ember-localforage](https://www.npmjs.com/package/ember-localforage), an EmberJS Data adapter that persists to browser cache

**-** Developed a [Bullet sprout](https://github.com/bullet-db/bullet-storm) to query in real-time the Twitter Firehose

**teams Team Waterloop** – Canada’s Hyperloop Team *Sep 2016*

*Lead, Software to Dec 2018*

**-** Created [WLib](https://github.com/wloop), a collection of C++ libraries optimized for **embedded** systems,

including an STL, JSON library, and a **constant-time** memory allocator

**-** Designed a **fail-safe** software infrastructure based on CAN and distributed hubs

**-** Developed [Wio](https://github.com/wio/wio), a fully-featured build tool and **package manager** for C/C++

supporting native and embedded environments (AVR/ARM) built with **Go**

UW **Nano Robotics Group**  *Sep 2016*

*Technical Lead, Controls to Apr 2019*

**-** Used **OpenCV** to develop an occupancy grid localization algorithm that

tracks the microbot, nearby objects, and walls in C++

**-** Applied a modified A\* procedure and 2D game physics to create a microbot AI

that can autonomously push an object through a maze

**-** Main developer of [Minotaur](https://github.com/uwnrg/minotaur-cpp), UWNRG’s controls software built in **Qt**

**projects Cerpent**

*A Basic C-language interpreter*

**-** Leverages **clang**’s libraries to generate line-by-line ASTs parsed by Cerpent

**-** Uses LLVM **just-in-time compilation** for run-time functions definitions

**Fraktals**

**-** Mandelbrot, Julia, and -brot fractal explorer up to 2e+20 magnification

**-** Hardware accelerated rendering with **Nvidia CUDA** up to 4K resolution

**GA Trusser**

**- Genetic algorithm**-based 2D truss optimizer using **Eigen** and OpenBEAGLE

**education** University of Waterloo

B.A.Sc. in Mechatronics Engineering (*Expected Spring 2021)*

GPA 4.0 (Rank 1, 97%)

**languages C++, C, Go, Java, Python, ARM ASM, JavaScript, HTML/CSS**

**tools Git, Unix, Vim, GDB, Tmux, IntelliJ, Eclipse, Visual Studio**