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 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 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 for real-time anomaly detection on Druid streams
- Created ember-localforage, an EmberJS Data adapter that persists to browser cache
- Developed a Bullet sprout to query in real-time the Twitter Firehose

teams

TEAM WATERLOOP – CANADA'S HYPERLOOP TEAM *Sep 2016 to Dec 2018*
Lead, Software
- Created WLib, 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, 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 to Apr 2019*
Technical Lead, Controls
- 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, 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 *n*-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