dan.luu@gmail.com

EXPERIENCE

Recurse Center, Sabbatical **Summer 2017**

Microsoft, Engineer **2015 – 2017**

- ◇ BitFunnel search engine; near order of magnitude throughput/cost improvement *C++*
  - ○ Found an algorithmic simplification, reducing largest and most complicated part of the system to 30LOC
  - ○ Replaced poorly-understood ML config system with optimal mathematical formula; 2x perf improvement
  - ○ Many other improvements, e.g., reduced the number of hash collisions with improved re-hashing method
- ◇ SmartNIC; multiple order of magnitude tail latency improvement *SystemVerilog*
  - ○ Half the latency of Amazon "enhanced networking"

Google, Engineer **2013 – 2014**

- ◇ TPU (deep learning hardware accelerator)
  - ○ https://www.google.com/patents/WO2016186801A1
  - ○ https://www.google.com/patents/US20160342889

Recurse Center, Sabbatical **Spring 2013**

Centaur Technology (acquired by VIA), Member of Technical Staff **2005 – 2013**

- ◇ Here's one sample six-month project (adding an ARM front-end to our x86):
  - ○ Helped reverse engineer the ARMv7 ISA (this was pre-AArch64)
  - ○ Created architectural simulator and got Android running on it *C*
  - ○ Implemented 1/2 of the translator, and wrote associated microcode *Verilog / Templating language*
  - ○ Created test generator that found 90% of the first 1000 bugs on the project *F#*
- ◇ Other projects included adding fault tolerance to a distributed system, post-silicon debug, test tooling, etc.
  - ○ Improved job scheduling system, improving machine utilization from 60% to 92%

Ultrafast Optics and Fiber Communications Lab, Research Assistant **2003 – 2005**

- ◇ Lab work, included speeding up parallel (256 wavelength) polarimeter by 40x *MATLAB and C*

IBM, Intern; Austin, TX **Summer 2003**

- ◇ Semi-formal / constrained random POWER6 completion unit functional verification *VHDL*

Micron Technology, Intern; Boise, ID **Summer 2002**

- ◇ Flash product engineering / characterization. Automated previously manual tasks. *Perl*

Spatial Systems Research Laboratory, Research Assistant **2001**

EDUCATION

BS Math & CMPE (Wisconsin, '00-'03), MS EE (Purdue, '03-'05)

NON-WORK PROJECTS

- ◇ Randomized algorithms can beat LRU/pseudo-LRU caches: *https://danluu.com/2choices-eviction/*
- ◇ A fuzzer written in an hour that found ~20 bugs in Julia *https://github.com/danluu/Fuzz.jl*
- ◇ Web performance benchmarks for slow/flaky connections *https://danluu.com/web-bloat/*
- ◇ Formal verification of a secure hypervisor model *https://github.com/danluu/secvisor-formal-verification*
- ◇ Combining AFL and QuickCheck for directed fuzzing *https://danluu.com/testing/*
- ◇ Terminal latency *https://danluu.com/term-latency/*
- ◇ Sega system on FPGA *https://github.com/danluu/sega-system-for-fpga*
- ◇ Keyboard vs. mousing speed *https://danluu.com/keyboard-v-mouse/*
- ◇ See *https://github.com/danluu/* and *http://danluu.com* for more!

MISCELLANEOUS

- ◇ Work Authorization: U.S. Citizen