Alex Cordonnier

Experience

2017–present **Core OS Engineer**, *Apple*, Cupertino, CA.

I bring up new embedded devices and platforms, including iPhone, iPad, Apple Watch, and Vision Pro:

- Work cross-functionally with silicon and software teams to develop and support requirements
- Specify, implement, and validate secure boot ROMs for new SoCs
- Implement support for new products in the bootloader
- Write firmware and drivers for coprocessors

2016 **Core OS Intern**, *Apple*, Cupertino, CA.

- Developed significant portions of the secure boot ROM for a new SoC architecture

2015 **Core OS Intern**, *Apple*, Cupertino, CA.

- Ported a DMA engine to run on an off-the-shelf RTOS instead of its original firmware

2015–2017 **Course Assistant for Computer Architecture**, *University of Illinois*, Urbana, IL.

- Taught 11 labs and a discussion
- Proctored and graded exams
- Helped develop the end-of-semester MIPS assembly programming contest

2014–2015 **Web Development Intern**, *Midmark*, Versailles, OH.

- Developed a new HTML5 interactive design tool web app for the Medical division

2014 **Software Engineering Co-op**, *Midmark*, Versailles, OH.

- Wrote load cell sensor drivers for a new PCB to support patient weighing feature
- Fixed longstanding bugs and refactored code in USB interface
- Wrote unit tests and FDA-compliant test protocols to verify new software releases
- Documented software for a dental pano X-ray machine collaboratively with a subsidiary

2013–2014 **E-Marketing Intern**, *Midmark*, Versailles, OH.

- Developed a new HTML5 interactive design tool web app for the Dental division
- Rewrote 3 Flash web apps in HTML5, including deep mobile integration
- Rewrote 3 Flash web banners in HTML5

Education

2013–2017 **B.S. in Computer Science**, *University of Illinois*, Urbana, IL, With Honors.

GPA 3.66

Dean's List 2014, 2016–2017

James Scholar 2013–2017

Senior Thesis *An Investigation of Close-Range Localization using Bluetooth Low Energy*

Prototyped a system of coin-cell BLE beacons to determine the location of physical objects with centimeter-level accuracy

Technical Skills

Systems	C, C++	Architectures	ARM, MIPS, Z80
Scripting	Python	Source Control	Git
HDL	Verilog	EDA	Eagle, KiCad
Web Frontend	HTML, CSS, JS, jQuery	Web Backend	PHP
Databases	MySQL	Typesetting	LaTeX

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Selected Projects

KnightOS (contributor)

Floating point library for open source OS, *Z80 assembly*.

- Implemented decimal math library in Z80 assembly for graphing calculator OS
- Uses hardware-accelerated BCD arithmetic to maintain precision and speed
- Technical article published on knightos.org on August 19, 2017

Augmented Hide-and-Seek

Wearables platform for hide-and-seek, *mbed/C++, Java*.

- Worked on a hackathon team to provide RSSI proximity estimation for hiders and seekers
- Hiders wear nRF51822 BLE beacons which indicate seeker's proximity via LED color
- Seeker's smartphone app displays proximity to closest hider
- Demonstrated at HackIllinois 2017

Grand Piano

Giant interactive MIDI piano, *Arduino/C++*.

- Led design and construction of a musical keyboard played by stepping on the keys
- Force-sensitive keys light up when pressed and signal Arduino, which translates to MIDI
- Computer synthesizes MIDI and uses it as input to interactive rhythm game
- Demonstrated for SIGMusic at U. of Illinois' Engineering Open House 2017

Card Shark

Robot that plays Rummy, *Python, OpenCV*.

- Worked on a hackathon team to build a card game-playing robot
- Built a robotic arm with 3 stepper motors and a modified fish tank pump for suction
- Raspberry Pi picks up card using arm, reads it using camera, and decides game actions
- Demonstrated at Purdue BoilerMake 2017 hackathon

Aurora

Wirelessly networked RGB lights, *Arduino/C++, Python*.

- Led design and construction of RGB floodlight control systems and related software
- Version 1 used Arduino with Bluetooth module and Darlington pairs
- Version 2 uses custom PCB with ATmega328P, nRF24L01+, and MOSFETs
- Raspberry Pi base station manages network and runs Python websocket server for color input from visualization software
- Used in SIGMusic demos at U. of Illinois' Engineering Open House 2015–2017

The Clock Awakens

Futuristic clock with RGB LEDs and Wi-Fi, *Arduino/C++*.

- Repurposed a broken clock with NeoPixel LED strip and ESP8266 control module on a 3D-printed and laser cut frame
- Implemented NTP library, IP geolocation library, timezone/DST support, and LED gamma correction
- Web server for user configuration of color, auto brightness, and tick mode

Trick or Tweet

Jack-o-lantern selfie camera, *Python*.

- Worked on a hackathon team to build a jack-o-lantern that tweets selfies with Halloween stickers and puns
- Raspberry Pi senses taps using capacitive touch sensor, blinks indicator LED, snaps photo, and tweets to @PumpkinPiPics
- Demonstrated at Purdue BoilerMake 2015 hackathon
- Featured by WLFI on October 18, 2015; Purdue Science on October 21, 2015; and Hackaday on October 31, 2015

MCVerilog

Verilog to Minecraft redstone synthesizer, *Java, Verilog*.

- Worked on a hackathon team to write a Verilog synthesizer for Minecraft redstone
- Can input basic Verilog and lay out a redstone "circuit" in a Minecraft game world
- Demonstrated at Purdue BoilerMake 2014 hackathon

DMX-84

Running theater lights from a calculator, *Arduino/C++, Axe*.

- Built Arduino-based peripheral to enable graphing calculators to program and operate theater and DJ lights
- Designed and implemented link protocol, driver, and application interface
- Demonstrated at U. of Illinois' Engineering Open House 2014
- Featured by Hackaday on August 3, 2014

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