Kelvin Ly

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University of Central Florida — MS, Computer Engineering
Cummulative GPA: 3.944 — 2016-2018

University of Central Florida — BS, Electrical Engineering
Cummulative GPA: 3.905, Magna Cum Laude — 2011-2015

Objectives

To begin and pursue a career in electronics engineering or firmware engineering

Skills

- Professional experience in electronics design (mostly **mixed signal/digital**, a little RF), **PCB layout** (KiCad, Altium Designer)
- Hobbyist level **PCB assembly and soldering**, **SPICE circuit modeling**, and reverse engineering
- Some familiarity with **I2C**, **SPI**, **UART**, **CAN**, **SDIO**, **Ethernet**(10BASE-T), **on-off keying**, **PCM**, **802.11a/b**, **MIPI CSI**, **parallel camera interface**, **JESD204**, **SerDes**
- Implemented **I2C**, **SPI**, **UART**, **PWM**, **VGA**, **Ethernet RMII** communication using FPGA logic (from scratch, clean room implementations from standards)
- Fluent in **C99**, **C++14**, **Python 2/3**, **Go**, **Verilog**
- Working knowledge of **x86/x64/MIPS/MSP430** assembly, **Java**, **LaTeX**, **MATLAB**, **Multisim**, **Xilinx ISE/Vivado**, **VHDL**, **Linux** (scripting and low-level userland programming, some kernel module programming), **JTAG/SWD**

Professional Experience

STERIS IMS Electrical Engineer, Cooper City FL — May 2018 - present

- Created **PCB designs**, **layouts**, sourced parts, and **assembled and tested** PCBs to create reproducible and manufacturable designs, including some **flexible PCBs**
- Developed **firmware** and **support software** for devices and prototype designs as needed, including work in **image processing** using **OpenCV**, and **IMU sensor fusion** using industry-standard **Madgwick filter**
- Tested devices to ensure compliance with **IEC60601** and other standards

Cassina Technologies Software Engineer, Cooper City FL — October 2018 - present

- Developed **firmware** for Bluetooth LE-based device and designed **Bluetooth LE application level communication protocols** to use in device
- Developed **Android app** to interface with and to control Bluetooth LE-based device

Fluorometric Instruments Design Engineer, Orlando FL — September 2017 - present

- **Designed PCBs** part time for oxygen sensors, allowing client to test manufacturable products
- Created **designs**, **layouts**, sourced parts, and **assembled and tested** PCBs to create reproducible and manufacturable designs
- Developed **firmware** and **support software** for devices as needed

University of Central Florida Undergraduate/Graduate Researcher, Orlando Fl — November 2015 - May 2018

- Researched defenses and attack mitigations for the **Internet of Things**, producing four publications and one book chapter
- **Designed and assembled PCBs** for the lab, producing tools and prototypes for a wide variety of projects
  - Built mixed-signal or digital designs incorporating **Texas Instruments**, **Expressif**, and **Atmel** microcontrollers
  - Designed **architecture and IP cores** for **Nexys 4 Artix-7 FPGA** to **transceive Ethernet packets** and **crack homomorphic encryption** as part of our second place entry in **NYU CSAW ESC '15**
  - Designed IP cores in **Verilog** to patch **OpenRISC processor core** as part of our winning entry in **NYU CSAW ESC '16**

University of Central Florida Undergraduate Researcher, Orlando FL — December 2014 - March 2015

- Studied **feature extraction** from EEG data, implementing **SSVEP frequency detection** that was later used in senior design project
- Maintained and repaired **RAVEN II** medical robot running on **ROS robotics framework**, restoring it to operation and allowing its use under a new team in current research projects

Internships

IBM Extreme Blue Intern, RTP NC — May 2015 - August 2015

- Developed **on-disk encryption** for **IBM Connections**, creating a roadmap of design pitfalls for IBM's teams to work off of
- Implemented project in **JavaScript and Node.js**, with patches to existing **Java** and **Python** code and libraries, successfully providing encrypted context access and search indexing

Google Software Engineer Intern, Chapel Hill NC — May 2014 - August 2014

- Patched existing benchmarking code for Skia rendering engine, allowing collection of gigabytes of data per day into a single database
- Contributed code in **C++**, **Python** and **Go** to create actionable visualizations of benchmarking data, fulfilling Skia team's recommendations

Notable Projects

- **UCF Lunar Knights** project, Software team lead Fall 2017-Spring 2018, member since 2015 (Martian robotic mining competition)
  - **Troubleshot and debugged** previous year competition robots, tuning and refining PID controller values to allow responsive robot movement and prevent physical damage to robot frame
  - Designed **CAN interfacing board** with **high density connectors** to mate with Nvidia's Jetson TX2, allowing native **CAN bus** access
  - Developing software for **robot simulation and testing** using **ROS** and **gazebo**, allowing parallel development of autonomy and robot assembly
  - Developing software systems for **robotic autonomous navigation** and teleoperation, allowing robot functionality for all years of competition
- Senior design project (mind-controlled wheelchair)
  - Led high-level hardware system design
  - Designed and layed out circuits for all high-level modules using **KiCAD** EDA software
  - Research into **signal processing** for **feature extraction** with respect to applications in **brain-computer interfaces**
- Capacitance-based linear encoder (`https://github.com/cactorium/linear-sensors`)
  - Designed low-noise electronics to amplify and filter weak capacitively coupled signal capable of repeatable measurements to within approximately 0.01 mm
  - Developed **bare metal ARM firmware** to **digitally process** signal to capture phase information using **CORDIC**-based algorithms
- Light-based transmitter and receiver pair (part of in progress project)
  - Designed wireless communication using **BPSK** using white LED as transmitter and visible light photodiode as receiver on custom PCBs
  - Developed low noise **transimpedance amplifier** and op amp gain stages to amplify and filter light signal
  - Developed **bare metal ARM firmware** to **digitally process** signal to recover data and send to host across custom implementation of **CDC-ACM USB interface**
  - Developed **low power bare metal MSP430 firmware** to activate based on **capacitive touch sensing** and transmit encoded IMU data across the light-based wireless channel
- Custom universal **motor controller** board, capable of driving brushed DC, BLDC, and stepper motors at 12-18 V, using DI DGD0506A MOSFET **gate driver** with integrate high-side gate bootstrap (part of in progress project)
- 915 MHz 1 Mbps discrete RF transceiver (in progress)
  - Designed transmitter and receiver pair using **discrete radio frequency components**, including discrete **LNA** and **PA transistor stages**
  - Developing **FPGA logic** for **Lattice ICE40 LP FPGA** to **package and encode/decode data** into/out of wireless packets, interfacing with custom discrete high-speed DAC and ADC