

Kelvin Ly

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UNIVERSITY OF CENTRAL FLORIDA

Cummulative GPA: 3.944

MS, COMPUTER ENGINEERING

2016-2018

UNIVERSITY OF CENTRAL FLORIDA

Cummulative GPA: 3.905, Magna Cum Laude

BS, ELECTRICAL ENGINEERING

2011-2015

OBJECTIVES

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

SKILLS

- Professional experience in electronics design (mostly **mixed signal/digital**, a little RF), **PCB layout** (KiCad, Altium Designer)
- Some experience with **low-noise analog/mixed-signal design**, **analog filter design**, **digital signal processing**, **image processing** (CUDA interoperating with **OpenCV**)
- Hobbyist level **PCB assembly**, **reflow**, and **rework**, **SPICE circuit modeling**, and reverse engineering (hardware and firmware)
- 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**, **AMBA/AXI**, **DDR1**, **SPI Flash**, **Bluetooth Low Energy**, **USB 1.0**
- Familiarity with **nRF52**, **MSP430**, **PIC12**, **ATTiny/ATMega**, **SAM D09** microcontrollers
- Implemented **I2C**, **SPI**, **UART**, **PWM**, **VGA**, **Ethernet RMII**, **Wishbone** interfaces on FPGA logic
- 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**, **TCL**

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

- 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

Project	Software/FPGA	Analog/RF	DSP/Control	Power/Misc
Reflow oven from toaster (WIP)	PID controller using MSP430 MCU	Temperature reading using thermocouple	-	Mains isolation from controller, zero-crossing gate driver, housing design with emphasis on thermal insulation and even heating
Guitar looper effects pedal (WIP)	FPGA logic for communicating with DDR1 DRAM, custom ADC and DAC	Simple passive filtering, discrete ADC design	Second order $\Sigma - \Delta$ ADC design, simple FIR filtering, DAC implemented on FPGA using PDM (pulse density modulation)	-
915 MHz 1 Mbps discrete RF transceiver (WIP)	Signal processing on FPGA	Half duplex IQ modulation/demodulation using discrete diode ring mixer, multiple VGA stages, discrete power amplifier design	Error correction, AGC, packet decoding implemented on FPGA	Multi-board design
Capacitive linear encoder (rev. 3, WIP)	Bare metal ARM coded in C for Microchip SAM D09	Common mode noise reduction using differential signal along with 5th order Butterworth active filter	Same as before	Use of cheaper op amps based on better noise analysis
Sensorless brushless DC motor driver for RC plane (WIP)	FOC using Lattice iCE40 FPGA driving TI DRV8353 gate driver	-	State observer and FOC implemented on FPGA	Layout designed for high current, space for heatsinking for MOSFETs
Visible light transmitter and receiver	Bare metal ARM coded in C, using USB peripheral for data transfer, MSP430-based transmitter, signal processing code written in Python	Transimpedance photodiode front end with several stages of variable gain amplifiers and bandpass filtering	Cortas phase locking loop, software-controlled AGC, BPSK demodulation with CRC checksum, PID-based automatic gain control	Space-constrained, low power transmitter design with capacitive-touch buttons, IMU for position sensing
RF broadband attenuator blocks	-	RF layout, routing taper design to transition from SMA connector to coplanar waveguide on two-layer FR4	-	(WIP) Aluminum housing to reduce RF emissions
144 MHz Yagi-Uda antenna with discrete LNA	LNA designed using Jupyter Notebook, implemented noise calculation code for scikit-rf	Infineon BFU520 based LNA, L-matching networks designed using VNA measurements, antenna tuning and characterization using modified TinyVNA	-	Modified TinyVNA to have lower output power to avoid saturating BFU520 during measurements
Universal motor controller board	-	-	-	Four half H-bridges using DI DGD0506A MOSFET gate drivers
Capacitive linear encoder (rev. 1/2)	Bare metal ARM coded in C	High impedance front end followed by cascaded active low pass filters into ADC driver	Computationally efficient digital filtering to remove harmonics and calculate phase using CORDIC	-
Lunar Knights robotics team software lead (UCF) for NASA Mars Rover Competition	Software written in C++ using ROS framework using Jetson TX2, autonomous navigation and teleoperation	-	PID tuning for wheels and digging arm	Mitigated noise on digging arm position potentiometers, wrote code to interface with CAN-based motor controller
Mind-controlled wheelchair (UCF)	Wheelchair controls implemented on Raspberry Pi 3	-	Feature extraction from electrodes on scalp, based on steady state visually evoked potential (SSVEP)	Designed laser cut joystick gimbal