Keerthi **Radhakrishnan**

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Education

University of Virginia — *Charlottesville, VA*

B.S. in Computer Engineering — *August 2016 - May 2020*

- **GPA:** 3.752
- **Relevant Coursework:** Hardware-Software Security, Advanced Embedded Systems, Digital Signal Processing, Digital Image Processing, Computer Architecture & Design, Embedded System Design, Operating Systems
- Got an Outstanding Teaching Assistant award for 2 years of service with the department and providing extra crucial help during COVID-19 crisis.
- Inducted into Eta Kappa Nu for exceptional department performance.

Skills

Languages	C · C++ · Assembly (MSP430, ARM, AVR) · Python · MATLAB
SDKs	ROS · Mongoose OS · PlatformIO
Development Tools	Atmel Studio · Code Composer Studio · PlatformIO
Debugging	GDB · BOSSA · OpenOCD · Oscilloscope · Multimeter
Protocols & Peripherals	I^2C · SPI · UART · DMA · ADC · DAC
Miscellaneous	Git · Bash · Heroku · TravisCI

Work Experience

NASA Big Idea Challenge Engineer — *March 2020 - Present*

University of Virginia — *Charlottesville, VA*

- Part of a 5-person embedded R & D team developing a long-range power beaming energy harvesting system for lunar polar crater exploration.
- Reverse engineered a laser galvanometer using an AD2 Discovery oscilloscope and a multimeter for external control by a microcontroller.
- Designed control circuitry to interface single-ended 3.3V microcontroller signals with bipolar 10V galvanometer interface.
- Wrote embedded C firmware for wireless rover control over BLE using CC2650MA shield.
- Designing rover energy harvesting system for laser power supply to charge multi-cell LiPo battery pack.

Sensenet Intern — *August 2019 - May 2020*

University of Virginia — *Charlottesville, VA*

- Designed micropower ATSAML21 evaluation board with USB and battery charging interface.
- Mapped SAML21 current consumption to register configurations by writing embedded C firmware in Atmel Studio and measuring with both the Atmel Power Debugger and a multimeter.
- Reconfigured and tested ArduinoCore SAMD21 bootloader for SAML21 MCU.
- Integrated embedded sensor nodes into The Things Network and MQTT backend.

Electrical Engineering Intern — *June 2019 - August 2019*

USC Information Sciences Institute — *Arlington, VA*

- Sole intern responsible for the design of a next generation nanowatt scale power management unit harvesting energy from a 50 nW supply using off-the-shelf components to power a BLE glucose monitor system.
- Designed and simulated electronics (power management unit & load circuits) in KiCad, prototyped system on breadboards, and extensively profiled power consumption with a Tektronix oscilloscope and a Keithley multimeter.
- Wrote embedded C firmware for BLE packet transmission and radio configuration and mapped current consumption data to BLE stack functions, verifying with a nRF51 BLE sniffer.
- Designed 4-layer PCB housing at least 200 SMD components, including RF antenna, with help from advisor.

Projects

MS-TOS — *April 2019 - Present*

- Designed preemptive RTOS for MSP430 and MSP430X ISA supporting all code and data models in C and assembly.
- Wrote and tested 16-bit optimized data structures in C for ultra low 100 µs kernel overhead and deterministic response times including red-black trees and deques.
- Implemented and tested VTRR, a deterministic fair-share scheduling algorithm for preemption as outlined in academic literature. Combined VTRR with a fixed-priority scheme to interleave real-time and non real-time threads.
- Profiled kernel performance using hardware timers and a Tektronix oscilloscope.
- Implemented kernel synchronization primitives and other kernel 'niceties' such as thread joining and killing, IPC, thread sleeping, dynamic memory allocation, tickless operation, and stack checking.

QRS Detector — *January 2020 - May 2020*

- Designed mixed-signal EKG heartbeat detection system using an MSP430G2553 microcontroller running the Pan-Tompkins algorithm and an EKG amplifier PCB.
- Wrote C firmware to configure microcontroller ADC for asynchronous, ultra low-power operation.
- Implemented and heavily optimized (MCU has no hardware multiplier, 512 bytes of RAM) the Pan-Tompkins QRS detection algorithm from academic literature.
- Implemented and optimized all digital filters and necessary ring buffers for 16-bit arithmetic.
- Designed 2-layer amplifier PCB with 55 through-hole components and leads for electrodes.
- Tested, debugged circuitry and profiled algorithm with an AD2 Discovery oscilloscope and a multimeter.