

Mohammad Riahi

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SUMMARY

Biomedical Engineer alumnus from NC State University with hands-on experience developing various low-power biomedical electronics projects from the ground up. My strengths span from various microcontroller programming, (with NFC and Bluetooth functionality), circuit design, PCB design, device optimization, and 3D design.

EDUCATION

North Carolina State University

PhD in Electrical and Computer Engineering

- Cumulative GPA: 4.0

B.S.c in Biomedical Engineering

- Cumulative GPA: 3.88/4

Raleigh, NC

Expected Graduation: May 2027

May 2022

EXPERIENCE

Research Assistant in Guardado's lab (Lab Manager)

Jan 2023 - Present

NC State University, Raleigh, NC

- Developed, assembled, and programmed implantable PCBs utilizing NFC technology to deliver optical pulses to voles mice for a social behavioral study, in collaboration with Northwestern University.
- Engineered, fabricated, and coded a custom Bluetooth Low Energy PCB using the nRF52844 microcontroller for an electrochemistry application performing square wave voltammetry.
- Designed, built, and implemented a custom Bluetooth Low Energy PCB around the CC2640 microcontroller for detecting heart failure biomarkers in awake animals, in collaboration with Northwestern University.
- Trained and mentored over ten undergraduate and one master's student on similar projects as above for their poster presentations.

Teaching Assistant in BME 207 - Biomedical Electronics

January 2021 - May 2021

NC State University, Raleigh, NC

- Hosted over 40 hours of weekly lab meetings for two lab sections. Taught students how to understand circuits using simulations and basic electronics knowledge. Facilitated electronics learning by showing students over 10 examples of how the concepts they learned are applied in real research and projects.

COURSE PROJECTS

Topic in Advanced Computer Design - ECE 785

Optimized color-matching algorithm on a Raspberry Pi 4, improving object detection speed by 10x. Enhanced algorithm efficiency through scalar optimizations and vectorization using NEON SIMD. Used profiling tools like perf and Ghidra to identify bottlenecks and guide performance improvements, enabling the system to handle real-time image processing with increased accuracy and responsiveness.

Infant Vital Sign Monitoring, SmartSwaddle (Senior Design)

Designed, fabricated, and tested a double-sided PCB for an infant vital signs monitor that records heart rate, blood oxygen saturation, body temperature, respiratory rate, lung sounds, and body orientation in bed for SIDS prevention. Created an efficient algorithm for encoding and decoding data in Bluetooth communication. Lastly, I programmed an interactive MATLAB GUI to display the interpretation of the sensor data.

AWARDS AND ACHIEVEMENTS

- Provost's Doctoral Fellowship (\$31,200) **2022-2023**
- Undergraduate Research Award winner by Undergraduate Research Office at NCSU **Spring 2022**
- Graduated Summa Cum Laude **May 2022**
- Named to the Dean's List nine out of 10 times **Fall 2017 - May 2022**
- Silver medal winner of the 31st National Mathematics Olympiad **Iran 2014**

TECHNICAL SKILLS

Software: VS Code, CCS, Fusion 360, SPICE Simulation, Solidworks, Arduino IDE, MDK-ARM IDE
Programming: C, MATLAB
Microcontroller: nrf5284x family, MSP430FR69xx, Arduino, ATTINY84, CC2640R2F, KL25 Sub-Family (NXP KL25Z128), Raspberry Pi

RELATED COURSEWORK

Embedded System Design, Microcontrollers and C Programming Language (MSP430), Wearable Biosensors and Microsystems, Biomedical Signal Processing, Medical Instrumentation, Bioelectricity, Advanced Computational Modeling of Biomedical Devices, Microcontroller Application.