About the Intelligent and Embedded Systems Research Laboratory (IES-Lab)

At IES, Drs. Ahmad Patooghy and Olcay Kursun currently work on the design and implementation of artificial intelligent embedded systems for tactile processing. Our long term goals are 1) design and implementation of wearable tactile processing systems which are able to work in real-time as fast as human figure tips. Such systems may help to build smarter prosthetics, and 2) obtaining better understanding about how human/animal brains deal with the tactile processing through our collaborations with University of North Carolina (UNC), and University of Arkansas for Medical Sciences (UAMS).

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**Position 1) Undergraduate research student for Embedded System Security**

Nowadays, most of medical embedded systems have been connected to the Internet as IoT devices such that doctors are now able to remotely monitor their patients. However, ensuring the privacy of patient’s data in such devices is a big challenge. The problem is that medical embedded systems do not use powerful processors, so complicated data protection mechanisms like encryption algorithms and hash functions cannot be run on these devices. In this project, we use some simple artificial intelligence methods to obfuscate software component of medical embedded devices and thereby guarantee the privacy of patient’s data. We will conduct this project on a pilot medical embedded devices which are implemented on Arduino and Raspberry boards to collect health data. In this position you will be asked to implement algorithms on C and compile them for run on Arduino/Raspberry boards. This is Fall-2019 position (up to 200 hours in total, $10/h) starting on October 1st 2019.

**What you can learn in this project** You will learn about machine learning, embedded systems, programming for embedded systems. In addition to developing these systems, you may also take part in the research activities: writing research papers for a journal/conference and developing research grants for the extensions of the work.

**Required skills & qualifications** Sophomore, or Junior standing with GPA over 3.50 and good knowledge of C programming language.

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**Position 2) Graduate/undergraduate research student for ML-enabled Embedded System Design**

We need a graduate student to do research in the design of light-weight ML algorithms to do code obfuscation for security guarantee of medical embedded systems that collect/process/send data through available sensors. We provide the sensors, required Raspberry board (help will be provided if needed) and other required tool set. This is Fall-2019 position (up to 400 hours in total, $10/h) starting on October 1st 2019.

**What you can learn in this project** You will learn about embedded systems, programming for embedded systems, data sampling, writing driver programs. In addition to developing these systems, you may also take part in the research activities: writing research papers for a journal/conference and developing research grants for the extensions of the work.

**Required skills & qualifications** Graduate students, sophomore, or senior undergraduate students (with GPA over 3.50) interested to do research and good knowledge of C programming language. Some experience in computer hardware.

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**How to apply**

Send your CV and a letter of interest to apatooghy@uca.edu.