



## Thesis Project Form

**Title (tentative):** TourniCheck - A portable device to assist lay rescuers in the case of a massive limb hemorrhage

**Thesis advisor(s):** Ricci Serena

**E-mail:** serena.ricci@unige.it

**Address:**

**Phone:**

### Description

#### Motivation and application domain

Hemorrhage is one of the main causes of potentially preventable death in trauma. Anti-hemorrhagic devices such as tourniquet can allow the patient to reach the hospital alive. Traditionally, tourniquets have been used in military settings; however, there is evidence supporting their use by non-medical personnel. For this reason, it is crucial for individuals without a medical background to learn how to properly and use an anti-hemorrhagic device.

#### General objectives and main activities

The goal of this project is to design and develop an instrument which provides real time feedback about the tourniquet positioning. Starting from a proof-of-concept of a portable setup designed for the training of nonprofessional lay rescuers, the student will be required to design and develop a portable device to detect the pressure applied by the tourniquet and provide an appropriate feedback. The system should meet the following requirements: small dimensions and flexibility to be inserted between the injured limb and the tourniquet, simple feedback understandable by nonprofessional rescuer, plug and play and wireless. In detail, the student is required to (i) design the system such that it meets the basic requirements; (ii) choose the most appropriate electronic components to be used, (iii) implement the proof of concept of the device; (iv) test the system.

#### Training Objectives (technical/analytical tools, experimental methodologies)

The student will learn to:

- Understand how to select and use sensors and microcontrollers
- Define a hardware/software architecture, including sensors, and communication
- Assembly/manufacture the hardware components
- Design and develop a system for medical training
- Understand how to convert an idea into a prototype
- Work with a multidisciplinary team made of clinicians and engineers

**Place(s) where the thesis work will be carried out:** : Joint lab for emerging technologies in simulation at SimAv

### Additional information

**Maximum number of students:** 1