Faculty of Engineering
Summer Research Program 2020-2021

Project Title: Development and Evaluation of a New Device for Treating Traumatic Injuries

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Objective
Falls, car accidents, and gunshot wounds; these are traumatic incidents where every second counts to improve the chance of survival. Therapies that reduce treatment time of the underlying trauma will improve survival outcomes. One such device is an endovascular balloon which can be inserted non-surgically into the leg, advanced to near the heart, and inflated to redirect blood flow to the brain and heart while the trauma is being treated. Our lab is developing a new high-tech endovascular balloon which allows for precision positioning and patient monitoring during trauma therapy. The objective of this project is to further develop and evaluate the endovascular balloon in a series of experimental test-rigs.

Project Details
The student will use benchtop cardiovascular simulators and anatomical phantoms to characterise the accuracy of the pressure, flow, and positioning sensors in the endovascular balloon. These experimental test rigs will be set to represent a wide variety of different patient types with different traumatic injuries. The outcomes from the student’s work will then serve as a benchmark against other end-users of the device (clinicians, engineers, paramedics) to understand inter-user variation before moving to the next stage in development.

Prerequisites
The student should be interested in experimental and practical work. Some background in experimental design and familiarity with SolidWorks will be useful, but not essential.

Additional Information
The project is offered at Monash University’s Cardio-Respiratory Engineering and Technology Laboratory, located at the Baker Heart and Diabetes Institute near the Alfred Hospital. The student will have the incredible opportunity to work with a variety of different engineering disciplines as well as medical doctors and supporting medical staff.