

# SRTP - Project Description Form #231

## PART I:

**Name of Schulich faculty member who will supervise the project** Tarek Loubani

**Supervisor's Schulich, Western, Hospital or Lawson Email** tlouban@uwo.ca

**Schulich Department** Medicine

## PART II - Project Description

**Title of Project** Validation of a 3D-printed tourniquet for austere environments

### Background

The War in Ukraine continues, with signs of deteriorating infrastructure and a dwindling supply chain due to international donor fatigue. Medical supplies and devices were always an issue, however are less available now than prior. Tourniquets are one device that is in constant high demand with very little supply due to quality issues, regulatory issues, and supply chain issues. For various reasons, 3D printing has not resulted in a durable solution and injection molded solutions have yet to materialize.

Glia's medical director, Dr. Tarek Loubani, is an emergency physician who was on the ground in Ukraine after the invasion to provide medical support in one of the frontier regions. Other members of the Glia team provided and continue to provide support in creating tourniquets inside Ukraine and in neighbouring countries such as Poland. While the tourniquets the Glia team has deployed and helped manufacture have been successful on the field, they have not been rigorously tested.

This project's goal is to consolidate the knowledge that the team has developed for wider use in Ukraine and other low-resource settings; to create and distribute resources for manufacturing tourniquets in other places; and to bench test and clinically test currently deployed tourniquet models.

### Hypothesis

1. That an open source tourniquet can be created and deployed on site in Ukraine and other low-resource settings
2. That the tourniquet's measurable characteristics and outcomes are equivalent to the gold standard tourniquets such as the Combat Application Tourniquet (CAT)

### Proposed Methodology

1. Information consolidation and publication: Due to the dynamic nature of the war in Ukraine, tourniquets were manufactured quickly. There is a need to consolidate information on how to manufacture and quality assure tourniquets; vet this information and de-duplicate it; and then publish it in an accessible format both in open access academic journals and through publicly available repositories of medical devices.
2. Bench testing will involve stressing tourniquets and their constituent materials in various ways to quantify the properties of Glia's tourniquet and also the commonly available commercial tourniquets.
3. Clinical testing will involve doppler testing of limbs to ensure successful loss of pulse when a tourniquet is applied, comparing commercially available tourniquets to the Glia design.

### Expected Outcomes

1. A complete and comprehensive manual on how to manufacture and test (quality assure) tourniquets in low-resource settings
2. All files related to manufacturing

3. Data from bench and clinical testing available as open access
4. Academic and non-academic publications comparing Glia's design to commercially available tourniquets such as the CAT tourniquet.

**Research Environment - Description of the number of research personnel, primary location of research, size of lab, etc**

Glia is an academic lab based in the Division of Emergency Medicine. As well, it has an incorporated non-profit component that manufactures devices and makes them widely available in Canada and in international low-resource settings. The Division of Emergency medicine's research personnel are a resource, as well as Glia's own research director, Dr. Melanie Columbus, who previously led the Division's research office. Successful candidates will work with approximately 5 full-time personnel and another 10 or so regular volunteers on the tourniquet project from various parts of the world, including Ukraine and the Gaza Strip in the Occupied Palestinian Territories.

**Names and titles of other individuals who will be involved with the research project?**

Dr. Melanie Columbus - Research director, Glia  
Kristine Van Aarsen - Research Coordinator, Division of Emergency Medicine  
Jennifer Wilson - Manufacturing director, Glia  
Victoria Jaqua - Project manager (Tourniquet), Open Source Medical Supplies  
Dr. Tarek Loubani - Medical director, Glia; Emergency physician  
Carrie Wakem - Executive Director, Glia  
Dr. Mohammed Al-Attar - Program Director, Emergency Medicine, Palestinian Ministry of Health  
Adam Popanda - Director, Glia Poland

**Can this project be done remotely?** No

**Duration of Project** Two Summers

**Expected Objectives/Accomplishments for Student for Year 1?**

1. Information consolidation and publication: Due to the dynamic nature of the war in Ukraine, tourniquets were manufactured quickly. There is a need to consolidate information on how to manufacture and quality assure tourniquets; vet this information and de-duplicate it; and then publish it in an accessible format both in open access academic journals and through publicly available repositories of medical devices.
2. Bench testing will involve stressing tourniquets and their constituent materials in various ways to quantify the properties of Glia's tourniquet and also the commonly available commercial tourniquets.

**Expected Objectives/Accomplishments for Student for Year 2?**

3. Clinical testing will involve doppler testing of limbs to ensure successful loss of pulse when a tourniquet is applied, comparing commercially available tourniquets to the Glia design.
4. Publication in academic journal of all findings

**PART III - Certifications**

**If the project will require any certification approvals from one or more of the following offices, please check the appropriate box below.**

**Human Ethics: If you have the protocol information, please enter it below (or enter the status of the approval).** revisions requested and will be submitted shortly.

**Note: certification approval should be obtained prior to the start of the summer. Projects without this approval will not be a priority for funding.**

