Comprehensive Research Experience for Medical Students (CREMS)
2022 Supervisor and Project Information Form

Please complete and return via email ONLY to crems.programs@utoronto.ca by February 18, 2022.

Supervisor Information

NOTE: CREMS will not support pre-determined pairings of students and supervisors. Supervisors must agree to open their projects to all students and interview all that are interested.

Name: Dr. Monica Farcas
BEng, MEng, MD, FRCSC
Assistant Professor, Department of Surgery, Division of Urology, University of Toronto
Staff Urologist, St. Michael's Hospital
Specializing in laparoscopic/robotic surgery, endourology, and kidney transplantation

Email: monica.farcas@unityhealth.to

Department: Department of Surgery, Division of Urology, St. Michael's Hospital, University of Toronto

Hospital/Research Institution: St. Michael's Hospital

SGS Department(s) (if applicable):
Click or tap here to enter text.

ORCID ID (see https://orcid.org/ - if you do not have an ORCID ID we encourage you to sign up for one):
Click or tap here to enter text.

Location of Work:
St. Michael's Hospital and Dr. Farcas Lab (193 Yonge St. – associated with St. Michael's Hospital)

Field of Research (up to 4 keywords):
Surgery, device development, innovation

Student contact time (number of hours per week YOU are available to the student for any concerns or to review progress):
10+ hours
**Project Information**

*NOTE: If this project is selected, this information will be posted on CREMS website for interested student applicants to view research opportunities.*

**PROJECT TITLE:**
Surgical ureteroscopy tool testing and re-design

**PROJECT DESCRIPTION:**
Including background, aim(s), method(s) and significance of the project. *Maximum 300 words.*

Ureteroscopy is a minimally invasive surgical technique used to treat kidney stones. This procedure is performed with a ureteroscope (a small diameter flexible scope navigated up the ureter and into the kidney). Once a stone is visualized, a laser fiber is used to fragment the stone, and a 1.4 Fr basket is used to physically remove stone fragments down the ureter and into the bladder. These instruments are advanced through the ureteroscope working channel though a special port adapter (such as the Tuohy Borst). This project focuses on this port adapter connection, identifying and testing its current design flaws and limitations. Already identified flaws include leak of pressurized irrigation leading to contamination of the surgical field, damage of the seal due to overtightening, and poorly designed attachment mechanism to the scope. The student will be expected to test a number of commercially available adapters using a set of standard criteria (such as: seal quality under pressure, ease of use, damage to instruments, etc.). At the same time, using the engineering expertise in our lab, the student will be guided though the design and prototyping of a new connector, which aims to address the shortcomings identified in the first part of the project.

This project will have many potential benefits for a medical student:
1) it is a small, well defined project that can completed over the course of the summer
2) the student will be given the opportunity to present their project at the Urology Robson Research day, and to submit abstracts to the Canadian and American Urological Association meetings and the World Congress of Endourology, and to prepare a manuscript for publication
3) the student will have the opportunity to come to the OR to observe ureteroscopy to better understand and conceptualize their project (contingent on COVID restrictions)

**Is this project remote-capable (in case of new restrictions) or have an alternative remote option?**
☑ Yes, alternate remote option. Please specify (100 words max): The setup and equipment required to run the project is small scale, portable, and can be easy performed in the comfort of one’s home (should COVID restrictions necessitate)

**If human subjects are involved, have the appropriate Research Ethics Board approvals been obtained?**
☑ Not Applicable

**If yes, please list the application submission date:**

**Do you expect this work will be published?**
☑ Yes

Version date: 2022 01 18
Research Environment and Student Roles and Responsibilities

Please be specific as possible. Please describe the research environment, including availability of required facilities/equipment/expertise, supervisor’s experience and mentorship plans. Please clearly outline the student role(s) and responsibilities related to the project, potential educational value, and indicate who will serve as the student’s direct report for daily oversight (PI, PHD student, technician, etc.). **Maximum 300 words.**

As a Surgeon Investigator at St. Michael’s Hospital and the University of Toronto I run a multidisciplinary lab focused on innovation in surgery (particularly surgical devices) and surgical simulation. The lab is physically situated at 193 Yonge Street, with some additional facilities within the main hospital. Within my lab, I supervise students at various stages of training. I have mentored many medical students (some though the CREMS program and others through KRSS), I supervise three graduate students, as well as multiple surgical resident and fellow projects. Some of our lab members have an engineering background, while others are purely clinical to allow for maximal collaboration. The CREMS student will be fully integrated within our team. The student will participate in weekly lab meetings (via Zoom, or in person, should restrictions allow). In addition, the student will have one-on-one mentoring and supervision from me, with additional access to a senior engineer for the design part of the project. The student will be provided with all the equipment necessary to complete the project. For this project, the equipment is small and portable and includes (pressure iv bags, a pressure gauge, various connectors, laser fibers/baskets for benchtop mechanical fatigue testing). The testing setup can be easily transitioned to a home environment, should COVID restrictions dictate a need. At the completion of the project the student will also have the opportunity to compete in innovation competitions, if desired.