Comprehensive Research Experience for Medical Students
Summer Research Program 2021
Supervisor/Project Information Form

Due February 24, 2021 by email to crems.programs@utoronto.ca

Supervisor 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

Project Title: Development of kidney stone fragment evacuation device

Hospital/Research Institution: St. Michael's Hospital

Email: monica.farcas@unityhealth.to

Field of Research (2 keywords): surgery, medical devices

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

School of Graduate Studies Appointment (IMS, LMP, IHPME etc)? Yes/No: no

Brief Project Description (<300 words):
Ureteroscopy is a minimally invasive endoscopic surgery used in the treatment of kidney stones. In fact, ureteroscopy, along with laser lithotripsy, has now become the most common surgery used to treat kidney stones. During this surgery, a very small caliber, flexible ureteroscope is used to navigate the ureter and a Holmium laser fiber is used to fragment kidney stones. Larger stone fragments are then removed down the ureter using nitinol baskets. However, small fragments and sand cannot be removed. The hope is that the patient will pass these spontaneously after surgery. However, these small fragments/sand can collect in the dependent part of the kidney (the lower pole) and remain in situ. They then serve as a nitis for further stone formation and growth. This project is aimed at developing a novel device that can be used as an adjunct during ureteroscopy to clear these fragments intraoperatively. The project will involve building upon, improving, testing, and potentially re-designing an already proposed prototype of the device.

The student wishing to pursue this project will have the opportunity to do the work completely remotely. To this end, he/she will be provided with all necessary equipment to complete the study remotely. However, the student will be fully integrated within our team. This team is comprised of surgeons, engineers, and surgical residents and fellows. He/she will participate in weekly Zoom lab meetings. In addition, he/she will have one-on-one mentoring from a staff surgeon and a research engineer to help advancement of their project. At the completion of the project he/she will have the opportunity to compete in innovation competitions, if desired.