Comprehensive Research Experience for Medical Students
Summer Research Program 2019

Supervisor/Project Information Form

Due February 20 2019 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 Anatomically Accurate Kidney Model to Aid in Ureteroscopy Simulation Teaching

Hospital/Research Institution: St. Michael's Hospital

Email: FarcasM@smh.ca

Field of Research (2 keywords): surgery, simulation

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 If YES, please name:

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With the recent rising trends in kidney stone disease, endoscopic surgery, in the form of ureteroscopy, has become the procedure of choice for the treatment of both ureteric as well as small renal stones. Flexible ureteroscopy, however, has a long learning curve. In fact, despite the common use of ureteroscopy in the treatment of kidney stones, many current community urologists will refer patients with more complex renal anatomies to tertiary stone centres such as St. Michael's Hospital. Similarly, current trainees often struggle with particular aspects of flexible ureteroscopy. These include: acute infindibulopelvic angles limiting access to lower pole stones, and visualization of complex calyceal anatomy, bifid collecting systems, and systems with long spidery infindibula. Additional challenges that trainees face include handing and navigation of the flexible ureteroscope (particularly fiberoptic scopes which require specific orientation of the camera), and techniques for basketing stone fragments (i.e advance and close techniques, basketing stones tucked behind prominent papillae or when sharp angulation of the scope is required). While other more high fidelity ureteroscopy simulators do exist, these do not specifically address these anatomical challenges and typically do not use an existing physical scope. The purpose of this project will be to work in a team of surgeons, engineers, and radiologists to help develop a physical kidney/ureter simulator for ureteroscopy that integrates the difficult anatomies described above. The model will be a physical 3-D printed model obtained from CT urogram images. The aim of this research is to improve surgical training in ureteroscopy with dedicated time-intensive instruction and practice for trainees in a safe simulation setting.