Congratulations to Dr. Philip Edgcumbe

On July 20th, 2017 Philip Edgcumbe successfully defended his PhD thesis. The title of his thesis was *Developing Surgical Navigation Tools for Minimally Invasive Surgery Using Ultrasound, Structured Light, Tissue Tracking and Augmented Reality*. Philip completed his PhD in the Biomedical Engineering program and the Engineers-in-Scrubs program under the co-supervision of Dr. Christopher Nguan (Surgeon-Scientist in the Department of Urological Sciences) and Dr. Robert Rohling (Department of Electrical Engineering and Department of Mechanical Engineering). Congratulations Philip.

The lay summary of Philip's thesis abstract is below:

The goal of this thesis is to improve cancer and surgical outcomes for the 50,000 Canadians that are diagnosed with liver, stomach, pancreatic, kidney, bladder or prostate cancer each year. This is achieved by developing surgical navigation tools and studying how these tools change the outcome of surgeries. The research in the thesis represents a bridge from the lab bench to the patient bedside because it brings important engineering and technological advances to surgeons in the operating rooms.

Philip's thesis committee – all smiles after the defense. From left to right: Dr. Doris Doudet, newly minted Dr. Philip Edgcumbe, Dr. Christopher Nguan, Dr. York Hsiang, Dr. Ezra Kwok and Dr. Robert Rohling.

Specifically, the tools developed in this thesis allow surgeons to look beneath the surface, see accurate 3D models of underlying cancer tumours, and better formulate a surgical plan. These tools were tested in over 30 simulated kidney cancer surgeries and resulted in statistically significant improvements in important surgical metrics. The navigation tools are built using ultrasound imaging, computer vision, augmented reality with direct graphic overlay and augmented reality via projection of light directly onto the patient.