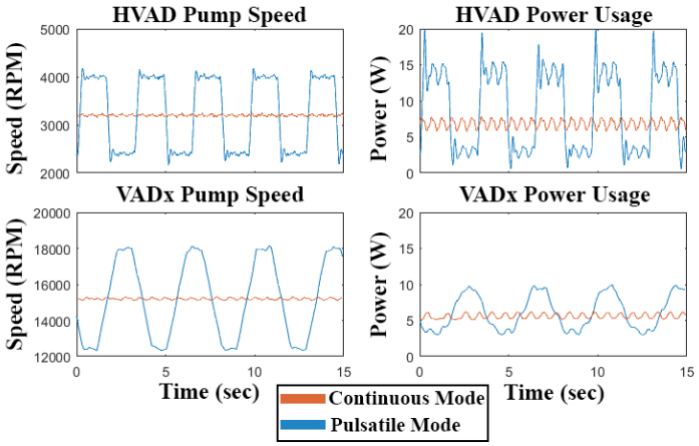
ROTARY PUMP SPEED MODULATION TO PRODUCE PULSATILE FLOW AND VENTRICULAR VOLUME UNLOADING

Friday, July 20th, 2018
9:00 to 10:00 am
Cardiovascular Innovation Institute (CII), Room 130/132



Connor Smith completed his B.S. in Bioengineering (BE) at the University of Louisville (UofL) in 2017. Connor has spent the past 3 years working with the Advanced Heart Failure Research (AHFR) program in the Cardiovascular Innovation Institute (CII) where he completed 3 undergraduate co-op semesters and independent graduate research in support of his MEng thesis under the mentorship of Dr. Gretel Monreal (CT Surgery) and Dr. Steven Koenig (BE). Upon graduating from UofL's Bioengineering Master's program, Connor will be matriculating into the UofL Medical School Class of 2022.

For his MEng thesis, Connor examined the feasibility of asynchronous pump speed modulation of continuous flow ventricular assist devices (CF-VADs) to provide phasic volume unloading and near physiologic aortic pulsatility while minimizing risk of additional blood damage. Current CF-VADs in clinical use have been associated with increased risk of adverse events compared to previous generation pulsatile flow VADs which has been hypothesized to be partially due to diminished vascular pulsatility and high shear stress associated with fixed speed CF-VAD operation. Previous studies have shown pulsatile modulation of pump speed to increase levels of pulsatility in rotary blood pumps. CF-VAD devices (HeartWare HVAD, n=3 and proprietary VADx, n=4) were implanted in 30-day chronic, healthy calves, and operated with asynchronous pump speed modulation to investigate the long-term effects of this operational mode. This study demonstrated that asynchronous modulation of HVAD and VADx devices produced near-physiologic aortic pulsatility and augmented LV unloading with minimal hemolysis and increased power consumption.