

2018 Bigelow Book Prize Recipient



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My doctoral research involves the development of a non-invasive multiparametric MRI method to quantify skeletal muscle oxygen consumption ($\dot{V}O_2$) in children with cystic fibrosis (CF), and pulmonary arterial hypertension (PAH). Both of these diseases are chronic, systemic cardiorespiratory diseases that result in severe exercise limitations. To investigate the major limitation to exercise capacity in these cohorts, participants perform exercise in the MRI while muscle blood flow, oxygenation, and high-energy phosphate metabolism are assessed. Skeletal muscle $\dot{V}O_2$ measurements obtained from MRI imaging are also compared with assessments of high-energy phosphate metabolism (ATP, phosphocreatine) in both the heart and the exercising muscles. The results of my research will be used to create exercise protocols tailored to specific aspects of exercise limitation unique to different cardiorespiratory diseases. Furthermore, we hope to use the results of this research in longitudinal studies as outcome variables in responses to pharmacological treatments or exercise interventions.