

Public Abstract**First Name:**Srikanth**Middle Name:**Reddy**Last Name:**Ella**Adviser's First Name:**Michael**Adviser's Last Name:**Hill**Co-Adviser's First Name:**Michael**Co-Adviser's Last Name:**Davis**Graduation Term:**SS 2007**Department:**Biological Engineering**Degree:**MS**Title:**DEVELOPMENT OF A FLEXIBLE IMAGE-BASED APPROACH FOR STUDYING SIGNAL TRANSDUCTION IN ISOLATED ARTERIOLES

Arterioles form an important control element of the circulation. Through a phenomenon called the myogenic response they adjust their diameter according to the local perfusion pressure. Thus an arteriole constricts in response to an increase in intraluminal pressure or conversely dilates in response to pressure reduction. These responses are initiated by changes in the electrical potential, and the distribution of ions across the membrane of muscle cells in the vessel wall. These events are, however, not completely understood. The barrier in resolving this issue is a limitation of existing biological methods to measure the signaling events. Therefore the current project aimed to develop a microscope-based imaging system to measure electrical potential (E_m), ionic concentrations and diameter in isolated arterioles. A FRET approach was proposed for E_m sensing, and the fluorophores involved in the process were proven to have no effect on the functionality of the cells and arterioles. A microscope with specific optical filter units was developed and is ready for use in studies of signaling mechanisms in intact arterioles.