

# DEPARTMENT OF MECHANICAL ENGINEERING

## WILLIAM MAXWELL REED SEMINAR SERIES

### “Biomechanics and Inflammation in Cardiovascular Disease”

Matthew R. Bersi, Ph.D.

Vanderbilt University

**Abstract:** Cardiovascular disease (CVD) remains the leading cause of death worldwide. Increasing evidence suggests the initiation and progression of CVD results from interactions between resident cells and immune cells recruited to specific sites of injury throughout the cardiovascular system. Inflammation-mediated changes in the local mechanical environment can subsequently lead to progressive tissue remodeling, altered macroscopic properties, and impaired cardiovascular function. My research is focused on better understanding the multiscale mechanisms underlying how inflammation acts at a cellular level to promote CVD, and how subsequent macroscopic alterations in biomechanical properties exacerbate pathologic remodeling of cardiovascular tissue. In this talk I will discuss recent and ongoing work focused on quantifying the relationship between biomechanics, inflammation, and tissue remodeling in multiple cardiovascular diseases including hypertension, aortic aneurysm, myocardial infarction, and arterial injury. Using a combination of techniques ranging from mechanical testing of cells and tissues to cardiovascular biology, we seek to identify the time course of mechanobiological and immunological changes that drive CVD progression following tissue injury. Insights into such processes can serve as a first step toward the development of disease and tissue-specific immunotherapies and rationally designed treatment strategies intended to mitigate pathological cardiovascular remodeling.

**Bio:** Matthew R. Bersi, PhD is currently a postdoctoral fellow in lab of W. David Merryman, PhD at Vanderbilt University where he is studying the impact of targeting specific cell-cell adhesion proteins on the progression of cardiac fibrosis and vascular injury. Prior to his current appointment, Dr. Bersi received his BS in Biomedical Engineering from Texas A&M University and completed his PhD in the lab of Jay D. Humphrey, PhD at Yale University where he studied the role of immune cell infiltration on hypertensive vascular remodeling and aided in the development of novel optical mechanical testing approaches for the assessment of complex vascular lesions, such as aortic aneurysms. Dr. Bersi's research interests are focused on using experimental and computational approaches to better understand the multiscale relationship between biomechanics and inflammation with the goal of rationally designing disease and tissue-specific immunotherapeutic treatment strategies for cardiovascular disease.

**Date:** Friday, January 25<sup>th</sup>

**Place:** CB 118

**Time:** 3PM

**Contact:** Dr. Alexandre Martin 257-4462

Meet the speaker and have refreshments  
Attendance open to all interested persons