Joint Department of

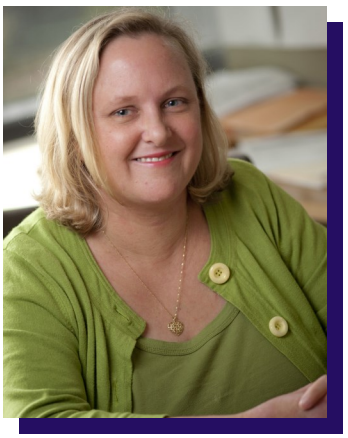
BIOMEDICAL ENGINEERING

UNC CHAPEL HILL | NC STATE UNIVERSITY

Coulter Seminar Series Presents

"Biophysically Faithful Biomaterial Platforms for Cardiovascular and Intestinal Mechanobiology"

K. Jane Grande-Allen, Ph.D.
Isabel C. Cameron Professor of Bioengineering
Rice University



Jane Grande-Allen is the Isabel Cameron Professor of Bioengineering at Rice University. Her research group investigates the structure-function-environment relationship of soft connective tissues through bioengineering analyses of the extracellular matrix and cell mechanobiology, with a focus on cardiovascular and intestinal diseases, as described in >140 peer-reviewed publications. Dr. Grande-Allen received a BA in Mathematics and Biology from Transylvania University in 1991 and a PhD in Bioengineering from the University of Washington in 1998. After performing postdoctoral research in Biomedical Engineering at the Cleveland Clinic, she joined Rice University in 2003 and was promoted to full professor in 2013. Dr. Grande-Allen is a Fellow of AIMBE, BMES, AAAS, AHA, and the Society for Experimental Mechanics. From 2009-2018, she served on the BMES Board of Directors and Executive Board. Dr. Grande-Allen is currently a Deputy Editor of Annals of Biomedical Engineering and serves on the science advisory committee for the American Heart Association.

ABSTRACT

The material behavior of many biological tissues is due to their unique microstructural arrangements of fibrous extracellular matrix (ECM) proteins, i.e., collagen and elastin, within the more amorphous matrix. The orientation of these fibers, and their segregation into discrete regions within the tissues, often gives rise to anisotropy and unique biological stress-strain behavior that enables the essential function of the tissues. Layered or segregated structuring allow hierarchical tissue organization in a manner designed to withstand external forces efficiently while protecting more delicate tissues and cells from damage. These structure-function relationships within biological tissues have been studied for decades but have not been widely translated into the creation of biomimetic scaffolds for use in tissue engineering and in vitro analyses of cell and tissue biology. The Grande-Allen research group has focused on integrating these structural and material characteristics into hydrogel and fibrous biomaterials using a range of fabrication techniques including molding, photolithography, electrospinning, and 3D printing. The majority of our investigations have addressed heart valve disease, which is widely prevalent in our society, with valve replacement or repair in almost 100,000 people in the United States and 275,000 people worldwide each year. More recently, we have translated our fabrication strategies to generate biomaterial platforms for investigating intestinal epithelial cell biology and enteric diseases.

Friday, November 13th
12:00 Noon

Seminar will be presented virtually via Zoom:
https://go.unc.edu/f3QHx