2009-2010

Graduate Seminar Series

The Department of Mechanical Engineering – Engineering Mechanics

Proudly Presents

Professor Silvia Salinas Blemker
University of Virginia

Silvia Salinas Blemker joined the University of Virginia faculty in January of 2006. She obtained her B.S. and M.S. degrees in Biomedical Engineering from Northwestern University and her Ph.D. degree in Mechanical Engineering from Stanford University. Before joining the faculty at UVa, Dr. Blemker worked as a post-doctoral Research Associate at Stanford University's National Center for Biomedical Computation.

Dr. Blemker leads the Multi-scale Muscle Mechanics Lab at the University of Virginia. The goal of Dr. Blemker's research is to identify the principles of skeletal muscle design by characterizing the relationships between muscle structure, mechanical properties, biology, and function. Her lab group is currently applying these findings to variety of areas, such as to improving the treatments for musculoskeletal impairments associated with movement disorders and to understanding the mechanisms underlying skeletal muscle injury.

Thursday, Feb. 18, 2010 3:00 – 4:00 p.m. Room 112, ME-EM Bldg.

Multi-scale modeling as a framework for uncovering the relationships between skeletal muscle structure, function, and injury

Skeletal muscle has a beautiful hierarchical structure that enables thousands of muscle cells to work in concert and actuate movement. In my presentation, I will describe our computational framework for analyzing muscle structure and function at multiple levels of this hierarchy, including fibers, fascicles, and whole muscle. The framework combines modeling efforts in several areas, including the development of a constitutive model for describing the nonlinear, active, anisotropic behavior of muscle tissue, the application of micromechanical modeling methods for deriving muscle tissue properties, and the implementation of image-based modeling techniques for creating and validating subject-specific muscle models. This modeling framework can be used to explore how the structure and properties of muscle fibers, muscle fascicles, muscle tissue, tendons, and whole muscle affects function. For example, we are creating models to (i) understand how fiber and fascicle geometry affect muscle tissue properties and force-generating ability, and (ii) explore the effects of internal muscle-tendon morphology on muscle injury susceptibility.

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