

# ANNOUNCEMENT

## Chemical Engineering Seminar

When: *Wednesday, March 6, 2013 at 5:30 PM*

Where: **LMC 101**

### “Functional Tissue Engineering: Converting Fat to Bone and Cartilage”

#### Elizabeth G. Lobo

Associate Professor and Associate Chair  
Joint Department of Biomedical Engineering  
at UNC-Chapel Hill and NC State University  
Associate Professor, Materials Science & Engineering  
Department at NC State University  
Director, Cell Mechanics Laboratory

Functional tissue engineering uses physical stimulation to direct cell populations to produce tissue with anatomically and physiologically correct structures and with material properties similar to native tissue. Adipose-derived stem cells (ASC) are a particularly promising cell source for functional tissue engineering applications due to their multilineage differentiation potential and their abundance and ease of harvest relative to many other cell types. However, mechanobiological understanding of human ASC (hASC) is still emerging and many questions remain to be answered. Approaches and mechanisms associated with physical stimuli-induced hASC lineage specification and functional tissue formation comprise an increasingly active area of investigation and much remains to be learned. A primary objective of the Lobo lab is to understand and elucidate the role of physical stimuli on the mechanobiology of hASC and attempt to optimize these effects for functional tissue engineering using hASC. Both computational and empirical approaches are utilized in our investigations of hASC mechanobiology for tissue regeneration. Methods include: 1) application of external physical stimuli via use of custom bioreactor systems that mimic *in vivo* physical stimuli; 2) finite element analyses of cell-seeded constructs exposed to mechanical load to determine local stresses and strains associated with global strain applications; 3) investigations of mechanotransduction mechanisms associated with hASC response to physical stimuli; and 4) creation of biomimetic 3D scaffolds to induce hASC proliferation and controlled differentiation. By understanding and elucidating mechanical and material environments *in vivo*, we build and utilize custom bioreactors and three-dimensional culture systems that better replicate these environments; and, promote desired hASC lineage specification and functional tissue engineering *in vitro*.

Information: Professor Gregory B. McKenna  
greg.mckenna@ttu.edu