BCEE Graduate Seminar Title: “Designing ACL Reconstructions to Get Knees Back on Track”
Speaker: Rebecca Nesbitt, PhD Candidate, Biomedical Engineering, University of Cincinnati
Date: March 28, 2014
Time: 12:20 - 1:15 pm
Venue: Baldwin Hall 544

Abstract:

There comes a time in every person’s life when they realize that their knees just aren’t what they used to be. As the protective cartilage between our bones wears away over time, our joints begin to degenerate. Without this cushion, moving around becomes extremely painful. Unfortunately for many people, this process is accelerated by trauma which can disrupt the normal, smooth knee motions. This is especially detrimental for athletes, many of whom have come to expect knee injury, with injury typically occurring at a young age. For this demographic, the main culprit is often a tear in the anterior cruciate ligament (ACL). Although tears and ruptures are often “repaired” and may only keep an athlete off the field for a few months, the slight changes in knee motion still wear away the same amount of cartilage as an unrepaired knee. Why is that? To better understand this problem, researchers are using robotics to study how each part of the joint works together to keep it moving smoothly. By programming a robot to reproduce activities of daily living, we can precisely measure how much force must pass through the knee during simulations of natural motion. By measuring the magnitudes and directions of these forces in each structure, we can identify the biomechanical interactions of the knee governing native ACL function. Testing current reconstruction techniques has revealed that these reconstruction methods are falling short in restoring native knee motions. This talk will discuss how our lab is working towards new ACL reconstruction designs, which better match the function of healthy knees to avoid premature cartilage wear in patients.

Bio:
Rebecca Nesbitt is a PhD Candidate in the Biomedical Engineering program at the University of Cincinnati, working in the tissue engineering/biomechanics group led by Dr. Jason Shearn. She specializes in biomechanics and robotic technology and has previous experience in product development at Procter & Gamble. Ms. Nesbitt is a co-author of several papers in refereed journals, is listed as an editor in DeLee and Drez: Orthopaedic Sports Medicine, 4e, and is a member of ASME. She is a recipient of the Choose Ohio First scholarship and participates in several graduate mentorship programs. She is currently working towards defending her thesis and expects to earn her PhD later this year.