BME Seminar
Friday, September 16, 2016
UTEB 150 at Storrs & Videoconferenced to UCHC CG-079B
12:00-12:50 pm

“Evaluating Lower Extremity Gait Pattern and Muscle Function Analysis: Deconstructing the Anterior Cruciate Ligament Injury Mechanism”

Presented by: Dr. Kristin Morgan, Assistant Professor of Biomedical Engineering at the University of Connecticut

Abstract: Anterior cruciate ligament (ACL) injuries cost the United States healthcare system billions of dollars annually in reconstructive and rehabilitation costs. While ACL surgery and rehabilitation aim to restore joint stability to those injured, quite often these individuals do not return to their previous functional and activity levels. In addition, these individuals are at an increased risk for secondary ACL injuries and for the early development of knee osteoarthritis. The elevated injury risk, despite rehabilitation, indicates that a greater understanding of the ACL injury mechanism is needed and this presents a unique opportunity for innovative approaches for assessing changes in joint and muscle function with respect to ACL injury.

In this talk I will utilize engineering and statistical analysis techniques to assess and quantify the dynamic stability in healthy individuals and in individuals suffering from an ACL injury. These techniques will focus on the frequency response and phase components of knee gait waveforms during walking and running tasks. I will also show how subject-specific simulations of individuals were developed to determine how muscles produce force to better stabilize the knee during athletic tasks. Developing an understanding of both the joint biomechanics and muscle function during dynamic tasks will enable us to better understand the injury mechanism and, in turn, help to develop more effective ACL training intervention programs.

Biography: Dr. Kristin Morgan is an Assistant Professor of Biomedical Engineering at the University of Connecticut. Her work focuses on investigating how changes in joint motion and muscle function relate to lower extremity injuries; such as anterior cruciate ligament (ACL) injuries and patellofemoral pain. In this research work she employed Nyquist and Bode stability analysis to quantify dynamic knee stability in individuals during walking and single-leg landing tasks. She has also used the OpenSim software to develop subject-specific simulations of individuals to assess how their muscles function during the performance of athletic activities. She was awarded a National Institutes of Health Program for Excellence & Equity in Research (PEER) fellowship in 2010 and a Whitaker Summer International Fellowship in 2012 to conduct research in Australia.

Prior to joining the faculty at the University of Connecticut, Kristin was a postdoctoral scholar at the University of Kentucky. She received her Ph.D. in Biomedical Engineering from the University of Tennessee in Knoxville in 2014, her Master’s degree in Biomedical Engineering from Virginia Commonwealth University in 2010 and her B.S. in Biomedical Engineering from Duke University in 2007.