Faculty Name:

Dr. Gerard Ateshian

Faculty Email:

ateshian@columbia.edu

Lab:

Musculoskeletal Biomechanics Laboratory

Project Title:

Evaluation of the Mechanism of Fatigue Failure in Bovine Articular Cartilage

Description:

This study will involve using custom built frictional testers to evaluate the mechanisms of fatigue failure due to migrating contact area (MCA) configurations in bovine articular cartilage. The first aim of the project will compare type II collagen network stability in mature and immature bovine cartilage tissue through mechanical and biochemical analysis. The appointed student will conduct an experiment using the frictional testers to evaluate the cycles to failure in both mature and immature types of bovine cartilage. They will then evaluate the amount of collagen damaged using an alpha-chymotrypsin digestion and subsequent OHP biochemical analysis to look at the collagen content in the tissue. The second aim of the project will look at synovial fluid lubrication during frictional sliding. The student will use the frictional testers to evaluate the cycles to failure for immature bovine tissue in synovial fluid baths. This data will be compared to un-lubricated tests in phosphate buffer saline. Through analysis of the two proposed aims, the student will research how collagen maturity affects failure mechanisms in cartilage as well as how lubrication can slow down the process of fatigue failure.

Location of Research:

On-Site

# of hrs/week:

35

Department/Program:

Mechcanical Engineering

Eligibility:

MS

To apply, please contact:

cvs2132@columbia.edu