



PROGRAM

11:20 - 11:30 p.m. Pre-seminar/Intro (Pizza)
11:30 - 12:20 p.m. Lecture (typical)
12:20 - 12:30 p.m. Q&A and Discussion

Abstract

Tissues with mechanical functions, including bones, ligaments and cartilage, are nearly acellular and dominated by the extracellular matrix. Disruption of extracellular matrix material occurs in a variety of diseases and conditions, frequently compromising mechanical function in collagenous tissues. As such, although bone and allied mineralized tissues have been studied extensively in a fracture mechanics framework, very little research has considered the fracture of non-mineralized collagenous materials. Soft tissue fracture cannot be considered independent of considerations of time-dependent deformation behavior. In this talk, recently-developed methods are presented for quantification of soft tissue mechanical properties, including time-dependent indentation behavior and single edge-notch fracture resistance. The classification of mechanical deformation as elastic, viscoelastic, nonlinearly elastic or viscoelastic, poroelastic, or associated with bond disruption (fracture) are considered explicitly in an experimental and analytical framework. Varying tissue microstructures are examined including amniotic sac and tissue-engineered cartilage. Fracture resistance and viscous deformation are more sensitive than mechanical stiffness (maximum tangent 'elastic' modulus) to differences in tissue microstructure including collagen density and proteoglycan content. The results motivate further study of deformation and fracture mechanics in collagenous soft tissues.

SEMINAR TITLE **“Characterization of Time-Dependent Deformation and Fracture in Soft Tissues”**

SEMINAR SPEAKER

Dr. Michelle Oyen
Lecturer

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BIOGRAPHIC PROFILE

Michelle L. Oyen is a Lecturer in Mechanics of Biological Materials in the Mechanics and Materials Division and the Engineering for the Life Sciences group in the Cambridge University Department of Engineering. She holds a B.S. degree in Materials Science and Engineering and an M.S. Degree in Engineering Mechanics, both from Michigan State University and a Ph.D. degree in Biophysical Sciences and Medical Physics from the University of Minnesota. She joined Cambridge Engineering in 2006 following an appointment as Research Scientist at the University of Virginia Center for Applied Biomechanics. She is a member of the Materials Research Society and Bioengineering Division of ASME, a principal editor for the Journal of Materials Research and a moderator of IMechanica