
Materials Research Science and Engineering Center
(MRSEC)
Summer 2000 Participant



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Observation of Microstructural Alteration in Biological Tissues

Little is known about the relationship between macroscopic deformation and microstructure in soft biological tissues. Our research group has developed a relatively fast method for determining the orientation of collagen fibers in a stationary tissue sample using polarized light microscopy. The technique is currently being modified to allow for system portability and coordination with existing mechanical testing machines. Development is focused on using a PC to control image acquisition in coordination with quarter wave plate rotation, which changes the polarization of incident light on a biological tissue. Images will be acquired rapidly during mechanical testing and later processed to obtain collagen orientation. This new acquisition system will allow for characterization of the time-dependent microstructural alterations of stressed and unstressed tissues. The overall goal of this project is to correlate orientation of these fibers to the macroscopic load-displacement behavior of the tissue.