1048-92-255 **Mansoor A Haider*** (m_haider@ncsu.edu), Dept. of Mathematics. Box 8205, N.C. State University, Raleigh, NC 27695-8205, and **Eunjung Kim** and **Farshid Guilak**. *Continuum mixture models of cell-matrix mechanics in articular cartilage.*

Articular cartilage is the primary load-bearing soft tissue in diarthrodial joints such as the knee, shoulder and hip. Cartilage extracellular matrix (ECM) can be idealized as a biphasic continuum mixture of interstitial water and a solid ECM comprised of collagen fibers and proteoglycan macromolecules. The ECM is maintained by a sparse population of cells (chondrocytes) that are encapsulated by a thin, stiff layer called the pericellular matrix. Mechanical variables in the vicinity of the chondrocytes strongly influence cell metabolic activity and, in turn, the progression of matrix degradation due to osteoarthritis. We present multiscale computational models for characterization of cellular and pericellular biomechanics in cartilage. Models include finite element simulations of dynamic cell-matrix interactions under cyclic loading, and an inverse boundary element method for in situ characterization of cellular and pericellular mechanical properties in tissue explants. (Received February 09, 2009)