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## Alan J. Grodzinsky

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### Curriculum Vitae

#### Education

S.B., S.M. in Electrical Engineering, Massachusetts Institute of Technology, 1971

Sc.D. in Electrical Engineering, Massachusetts Institute of Technology, 1974.

#### Research Interests

Our group studies problems motivated by diseases of the musculoskeletal system including arthritis, connective tissue pathologies and, more generally, the nanomechanics and molecular biology of the extracellular matrix. Post-traumatic joint injury causes cartilage degeneration and arthritis, but the mechanisms governing cellular responses to mechanical overload are not known. Group members use genomic and proteomic tools to identify key intracellular and extracellular pathways associated with tissue injury, inflammation, and degradation. AFM and related biophysical tools are used to image and probe structure and nanomechanical behavior of single extracellular matrix molecules synthesized by connective tissue cells in health and disease. The objective is to discover molecular determinants underlying tissue pathology. Complementary projects focus on chondrogenesis of stem cells seeded into novel self-assembling peptide hydrogel scaffolds for repair of degraded or osteoarthritic cartilage. The molecular structure of stem cell-synthesized extracellular matrix molecules and the anabolic/catabolic responses of these stem cells to physiological loading during and after differentiation are studied in vitro; studies in vivo using small and large animal models are ongoing.

#### Teaching Interests

Molecular, cellular, and tissue biomechanics; Forces, fields, and flows in biological systems.

#### Honors and Awards

Goodwin Medal, MIT, 1973; President, Society for Physical Regulation in Biology & Medicine, 1986; Giovanni Borelli Award of the American Society of Biomechanics, 1987; Chairman Orthopaedics Gordon Research Conference, 1990; Kappa Delta Award of the American Academy of Orthopaedic Surgeons, 1993; Founding Fellow of the American Institute of Medical and Biological



#### People

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EMERITUS FACULTY  
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TECHNICAL STAFF  
SUPPORT STAFF  
POSTDOCS  
VISITORS  
FACULTY CLOUD

Engineering, 1993; NIH Merit Award, 1994; Melville Medal of the ASME for best original paper in all areas of Mechanical Engineering, 1997; MIT Class of 1960 Innovation in Education Award, 1999; President, International Cartilage repair Society, 2000; IEEE/ACM Award for best undergraduate advisor in EECS, 2005; Honorary Fellow of International Cartilage Repair Society, 2007; President, Orthopaedic Research Society, 2008; Honorary Doctorate, University of Montreal, 2008; Institute for Advanced Studies Award, University of Western Australia, 2010.

**Memberships**

American Society of Biomechanics; American Society for Matrix Biology;