



Computer Models in Biomechanics: From Nano to Macro

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This book contains a collection of papers that were presented at the IUTAM Symposium

on “Computer Models in Biomechanics: From Nano to Macro” held at Stanford University, California, USA, from August 29 to September 2, 2011.

It contains state-of-the-art papers on:

- *Protein and Cell Mechanics*: coarse-grained model for unfolded proteins, collagen-proteoglycan structural interactions in the cornea, simulations of cell behavior on substrates
- *Muscle Mechanics*: modeling approaches for Ca^{2+} -regulated smooth muscle contraction, smooth muscle modeling using continuum thermodynamical frameworks, cross-bridge model describing the mechanoenergetics of actomyosin interaction, multiscale skeletal muscle modeling
- *Cardiovascular Mechanics*: multiscale modeling of arterial adaptations by incorporating molecular mechanisms, cardiovascular tissue damage, dissection properties of aortic aneurysms, intracranial aneurysms, electromechanics of the heart, hemodynamic alterations associated with arterial remodeling following aortic coarctation, patient-specific surgery planning for the Fontan procedure
- *Multiphasic Models*: solutes in hydrated biological tissues, reformulation of mixture theory-based poroelasticity for interstitial tissue growth, tumor therapies of brain tissue, remodeling of microcirculation in liver lobes, reactions, mass transport and mechanics of tumor growth, water transport modeling in the brain, crack modeling of swelling porous media
- *Morphogenesis, Biological Tissues and Organs*: mechanisms of brain morphogenesis, micromechanical modeling of anterior cruciate ligaments, mechanical characterization of the human liver, in vivo validation of predictive models for bone remodeling and mechanobiology, bridging scales in respiratory mechanics

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