Title:

Advanced Modeling and Simulation in Biomechanics:
from Molecules to Tissues

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Abstract:

This invited session focuses on the use of computational techniques to better understand the biomechanical and mechanobiological behavior of tissues, cells and molecules. The underlying biomechanics and mechanobiology is characterized by a rather complex nonlinear behavior that involves viscoelasticity, poroelasticity, damage, and biological processes such as growth, remodeling, adaptation, and repair. This invited session aims to discuss recent advances in these areas, where the focus is put on modeling methodologies that specifically consider the mechanics that regulates biological processes at the molecular, cellular and tissue levels. Specially interesting would be those models that investigate the interaction across the spatio-temporal scales and connect the mechanical behavior of molecules, cells and tissues.

Topics of interest for this invited session are:

- Nonlinear material properties of molecules, cells and tissues
- Multi-scale models of molecules, cell and tissue dynamics
- Particle-based models: from cell mechanics to tissue morphogenesis
- Mechanical models for living cells and tissues