New Special Issue "Mechanics of cells, tissues and biomaterials"

The paramount role of mechanics in life has recently been the center of attention of many researchers. This special issue will therefore be focusing on the role of mechanics in the life of cells and tissues and their interactions with biomaterials.

Due to the highly hierarchical structure of tissues, the consequences of the mechanical forces and motions are transferred back and forth along several time and spatial scales. As a result, the mechanical behavior of tissues needs to be studied not only at the tissue scale but also in relation with cells and proteins in a multi-scale modeling scheme.

The environment in which cells and tissues live also plays an important role. The mechanical interactions between cells and tissues and their surrounding living entities (other cells and tissues) and/or synthetic biomaterials need to be considered as well. The synthetic biomaterials may have been used for replacement of some of the tissues (implants) or regeneration of tissues in the laboratory (scaffolds, etc.).

The topics of interest include (but are not limited to):

Tissue Mechanics

- Bone and cartilage mechanics;
- Soft tissue mechanics;
- Bone tissue adaptation and fracture healing;
- Tissue growth, adaptation, and differentiation including the mechanics of morphogenesis;
- Patient-specific finite element modeling of tissues;
- Characterization of soft and hard tissues including computational models developed for nanoindentation, scanning acoustic microscopy, etc.;
- Fracture of bone and other biological materials.

Cell Mechanics

- Cytoskeletal mechanics;
- Cell-biomaterial interactions;
- Multi-scale models.

Mechanics of Biomaterials

- The mechanics of tissue-implant complexes;
- Optimal design of biomaterials and implants;
- Mechanical characterization of biomaterials (static, fatigue, permeability, etc);
- Bio-adhesives, bio-interfaces, and their mechanical performance;
- Mechanics of active biomaterials.