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COMPUTATIONAL MODELING IN MECHANOBIOLOGY AND TISSUE ENGINEERING

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ABSTRACT

Biomechanics represents the broad interplay between biological systems and mechanics and foster integration of scientific knowledge between related basic and applied subdisciplines.

The rational principles of solid mechanics have an unveiled potential in understanding, diagnosing and treating pathologies that manifest by tissue consistency changes. A multidisciplinary effort may allow a better understanding of the questions implied in physiology, pathology and physics from the sub-cellular level to the organ-level, in a unified way. Biological tissues are not static structures, but evolutionary (due to development, mantenace, adaptation and healing) as a response to external stimuli. Mechanobiology is aimed at determining how they evolve in respond to mechanical factors.

In parallel to mechanobiology, tissue engineering / regenerative medicine has gained great attention in the last decade. It is a multidisciplinary field involving biology, medicine, and engineering that is likely to revolutionize the ways. Mathematical models are being developed, aiming at predicting and supporting the in vitro production process of different tissue types (e.g. large cartilage and bone constructs).

In this spirit, our session aims to foster the exchange of new ideas by gathering the state-of-the-art developments pertaining to biomechanics and computational mechanics. It aims to include, but is not limited to, the computational, mathematical and physical treatment of problems such as

- Scaffold Design and Characterization
- Tissue regeneration and remodelling
- Computer-aided tissue engineering
- Cellular mechanobiology
- Interaction cell-tissue-biomaterial
- Cell attachment, proliferation and differentiation.
- Cardiovascular biomechanics - arterial/valvular/stents/hemodynamics/respiratory
- Cellular/subcellular biomechanics
- Probabilistic mechanics of evolutionary properties
- Hard Tissue - Bone/Dental
- Imaging
- Implants/orthotics/prosthetics
- Joint biomechanics- ankle/knee/hip/hand/shoulder/other
- Soft Tissue- skin/ligaments-tendons/cartilage/other
- Tissue Engineering
- Materiomics
- Multiscale biomechanics

Prospective authors are encouraged to submit papers through the site http://www.dem.ist.utl.pt/cmn2015 indicating session number/name. For any further request, please contact the congress Secretariat cmn2015@dem.ist.utl.pt