Advances in experimental mechanics of tissues and biomaterials

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This session aims at providing an update overview of the most advanced experimental techniques that are being developed for the mechanical characterization of tissues and biomaterials.
Historically, laboratory testing has been developed with the aim to characterize the mechanical behavior of tissues and biomaterials in a suitably simulated physiological environment. Therefore, macroscopic testing with temperature and humidity controlled ambient are being considered as relevant. Further advancement in experimental apparatus have led to more refined characterization with higher spatial resolutions through the nanoindentation and Atomic Force Microscopy -AFM-based techniques. These advances have open the opportunity to explore the basic relationship between tissue or material spatial architecture and the relevant mechanical properties, allowing the disclosure of the specific role of the tissue basic components.
Today, Multiphysics experimental methods and in-situ integrated techniques are being developed providing deeper understanding of the tissue or material response under loading. To name a few: Digital Image Correlation exploits the full field displacement mapping to catch the inhomogeneous and localized strain distribution broadening the possibility of a reliable interpretation of deformation mechanisms in many mechanical testing configuration. In-situ testing with integrated mechanical and optical/physical information are developed by coupling mechanical testing to microscope observation. Confocal laser scanning, confocal fluorescence, multi-photon microscopy with second harmonic generation signals are some of the potential applications of in-situ testing with uniaxial as well as biaxial testing of materials and tissues.
Micro-CT based and in general X-ray based experimental techniques are also of interest for this session. These are non-destructive techniques able to provide detailed information on the architecture of cellular materials (foams or trabecular bone) and its evolution under loading conditions. Synchrotron light source is also a mean to get finer data through phase contrast techniques.
In view of a lively and stimulating meeting, all researchers who are willing to share their own experience on the development and or the use of advanced experimental techniques, not limited to the above quoted ones, are cordially invited to contribute to the session entitled "**Advances in experimental mechanics of tissues and biomaterials** "within the BIOM&M conference.

Keywords
Mechanical, Physical and chemical mapping;
Micromechanical characterization;
Nanoindentation-based techniques;
AFM-based characterization;
Integrated Mechanical and Spectroscopy techniques;
Ultrasound-based techniques;
Photoacoustic techniques.
Multi-physics experiments;
X-ray diffraction techniques;
Micro-CT based experiments;
Microstructural Imaging techniques;
Digital Image Correlation;