Theoretical and applied biomechanics for cardiovascular problems

Organizers:

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The biomechanical response of cardiovascular structures drives their physiological function and it is instrumental for the onset and progression of cardiovascular pathologies (e.g., atherosclerosis, aneurysms, hearth valve diseases). The proper understanding of the complex interplay occurring between living processes and mechanics in cardiovascular system involves a wide range of expertise within theoretical and applied mechanics: characterization and modelling of tissue constitutive properties; description of growth and remodelling mechanisms; computational structural mechanics; experimental and computational fluid dynamics; fluid-structure interaction problems; multiphysics and multiscale coupling of mechanics with biochemical mechanisms and electrical fields. Moreover, methods for incorporating patient-specific properties shall be conceived in order to support the development of in silico frameworks for clinical approaches in diagnosis and treatments.
This mini-symposium, organized under the auspices of the Italian Chapter of the European Society of Biomechanics (ESB-ITA, www.esb-ita.it), aims to gather the state-of-the-art developments in theoretical and applied mechanics for cardiovascular biomechanics, fostering a debate among complementary expertise. The topics to be discussed in the mini-symposium include (but are not limited to):

- experimental techniques for soft tissues mechanics;
- homogenization methods for constitutive descriptions;
- methods for visco-elasto-damage anisotropic behaviour;
- mathematical description of growth and remodelling;
- mixed-type finite element technologies;
- fluid mechanics and fluid-structure interaction;
- multiphysics analyses;
- medical devices for cardiovascular diagnosis and treatments;
- *in silico* approaches for clinics.