**METAMATERIALS ACROSS THE SCALES:**

 **MODELING, EXPERIMENT AND SIMULATION**

TRACK NUmber 1000 - ComPutational solid mechanics

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ABSTRACT

Properties of intelligent materials can be influenced by active control. Metamaterials are a class of smart composite materials made out of multiple phases (in the extreme case of cellular metamaterials, composed of a solid phase and void). In general, metamaterials are engineered media with periodic microstructure consisting of tailored architectures aimed at achieving exceptional bulk (or surface) properties that do not occur in "classical" materials. A major challenge in the field of mechanical metamaterials is the systematic design of specific microstructures to endow the metamaterials with desired functionalities.

This mini-symposium focuses on modeling and analysis of numerical methods for smart materials and metamaterials based on generalized continuum theories such as micropolar, couple stress, micromorphic, strain gradient, and nonlocal theories. Thus, the topics of the mini-symposium include (but are not limited to):

1) Single- and multi-scale modeling of smart and metamaterials,

2) Additive manufacturing (3d printing) and experimental testing,

3) Classical and generalized continuum theories,

4) Approaches to design specific microstructures for smart and metamaterials,

5) Discussion of macroscopic (effective) homogeneous models,

6) Analytical and computational homogenization of heterogeneous materials considering size effects/lack of scale separation.

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