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TMS 2018
147th Annual Meeting & Exhibition

MARCH 11 – 15, 2018
PHOENIX, ARIZONA

SUBMIT AN ABSTRACT TO:

MATERIALS DESIGN

DESIGN FOR MECHANICAL BEHAVIOR OF ARCHITECTURED MATERIALS VIA TOPOLOGY OPTIMIZATION

The architectured strategy for designing materials and structures introduces a scale for materials organization between the microstructure and the macroscopic shape. In this "meso-scale" regime, spatial heterogeneity is prescribed through arranging combinations of materials, or of materials and space, in configurations and with connectivities or topologies that target enhanced mechanical performance. Topology optimization offers a mathematical framework to determine the most efficient material layout for prescribed constraints and loading conditions, and often leads to significant light-weighting at the structural scale. Topology optimization also offers a framework for accessing unexplored and previously unachievable areas of material-property space. There is enormous potential to design meso-scale materials, in two and three dimensions, with controlled microarchitecture, topology, and new mechanical and multiphysics properties. For example, design approaches may include lattice structures or repeating unit cell homogenization.

This symposium will feature leading strategies for using various topology optimization techniques in the design of the mechanical behavior of architectured materials. Potential topics of interest include:

- Multi-objective and/or multiphysics optimization targeting extremal mechanical properties
- Optimization considering process parameter relations to architected material design
- Multi-scale design of hierarchical materials
- Optimization of functionally graded materials
- Optimization under material and processing uncertainty

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ABSTRACT DEADLINE IS JULY 1, 2017. SUBMIT ONLINE AT www.programmaster.org/TMS2018.
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