Special Issue Focus

Mechanics and Physics of Active Materials and Systems

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Theocharis Baxevanis

Dimitris C. Lagoudas

Ibrahim Karaman

Active materials and systems are stimuli-responsive, capable of converting energy applied by a non-mechanical field to mechanical work and *vice versa* by a direct coupling between the energy modes. As such, they offer unprecedented opportunities to reduce complexity, weight, and cost of products for actuation and energy absorption applications in the oil and gas, aerospace, and medical industries. The related research field has matured over the last few decades due to vast interdisciplinary efforts across engineering and science disciplines from researchers in universities, government, and industry.

Continuous improvement on the stability and controllability of active materials, development of novel materials/structures, and of high-fidelity models for design, optimization, and performance evaluation purposes are required to keep the pace with the ever-increasing drive to innovation stemming from expectations and needs for engineering applications. The purpose of the special issue

Mechanics and Physics of Active Materials and Systems of the *Shape Memory and Superelasticity* journal is to provide a timely update on the latest breakthroughs and advances on a wide range of related topics, from a scientific understanding of the processes of deformation and mechanical failure to the structural and functional effectiveness and reliability of active materials and systems.

The received collection of papers by world experts in the field, published in two rounds, represents research (i) on the underlying physical mechanisms that govern the deformation response in such materials, specifically shape memory alloys, their characterization, and impact on the hysteresis width and damping capacity, (ii) the characterization and modeling of their macro-scale response targeting specific applications, (iii) the experimental investigation of their fracture and fatigue behavior, and (iv) the design and performance evaluation of novel structures. The published research covers binary, ternary,

and high-entropy alloys, including high-temperature and Ni-free shape memory alloys, and novel structures, such as twisted shape memory alloy microfilament yarns.

With the hope that the issue will interest the readers, the guest editors would like to acknowledge all contributing authors for presenting their latest work in this special issue and the anonymous referees for their diligent work, valuable suggestions, and constructive comments, which ensure the high quality of this issue.

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Guest Editors

Theocharis Baxevanis

Department of Mechanical Engineering
University of Houston

Houston, TX, USA
tbaxevanis@uh.edu

Dimitris C. Lagoudas

Departments of Aerospace Engineering and Materials
Science and Engineering
Texas A&M University
College Station, TX, USA
lagoudas@tamu.edu

Ibrahim Karaman

Department of Materials Science and Engineering
Texas A&M University
College Station, TX, USA
ikaraman@tamu.edu

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