Special Issue

Mechanical, Optical, and Acoustic Metamaterials and Anisotropic Design for Dynamic Control in Actuators and Sensors

Message from the Guest Editors

This Special Issue aims to gather cutting-edge research on the design, modeling, fabrication, and application of mechanical metamaterials, anisotropic structures, and origami-inspired systems for dynamic control in actuators, sensors and soft robotics devices for next generation functional material integration with structures for realizing high value-added systems.

The primary focus is on how engineered periodic unit cells, graded lattices, nonlinear oscillators, and foldable structures enable the precise tuning of stiffness, vibration modes, and damping characteristics, leading to innovative dynamic functionalities.

To broaden the scope while maintaining a cohesive theme, contributions on any functional materials (such as piezoelectrical and shape memory materials), whether they be optical, acoustic, or micro/nano-fabricated metamaterials, that incorporate anisotropic design or dynamic vibration control principles are also welcome, provided they align with the central concept of dynamic property tuning through engineered structures.

Guest Editors

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About the Journal

Message from the Editorial Board

We are just entering the Next Wave of Technology (NWT) where actuators will play the same role as the computer chip did for computers/social media approximately four decades ago. Just in the U.S., production of $1 trillion year of electromechanical systems (vehicles, orthotics, manufacturing cells, freight trains, aircraft, etc.) will be impacted by the NWT, all driven by actuators. Five key trends can be found for the future perspectives: “Performance to Reliability”, “Hard to Soft”, “Macro to Nano”, “Homo to Hetero” and “Single to Multi functional”. We invite papers that primarily impact these economic sectors; those illustrating basic scientific principles are also welcome.

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