Special Issue

Advances in Smart Materials-Based Actuators

Message from the Guest Editors

Smart material-based actuators possess the advantages of high precision, high stability, and high reliability, and are thus widely employed in the field of advanced equipment manufacturing. Smart material-based actuators, such as piezoelectric actuators, shape memory alloy-based actuators, and dielectric elastomer actuators, are facilitating the development of robotics, bio-operation devices, and other fields. With the aim of enabling these actuators to be effective, new challenges are presented to the researchers; these include creating an actuator design that is applicable to multi-application scenarios (ultra-precision resolution, large stroke, etc.); establishing modes to describe actuator characteristics; and designing intelligent control methods to achieve the high-quality control performance of smart material actuators, among others. The aim of this Special Issue is to collect theoretical results related to actuator fabrication, modeling and control, as well as experimental studies related to their practical applications.

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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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