

Special Issue

Bioinspired Intelligence for Soft Actuators: Learning, Control, and Embodied Design

Message from the Guest Editors

Soft robotic systems increasingly depend on intelligent actuation, the tight coupling of compliant actuators, embedded sensing, and control and learning algorithms to achieve robust performance under nonlinearities such as hysteresis, drift, viscoelasticity, and environmental disturbances. Inspired by biological intelligence, including reflex loops, central pattern generators, adaptive muscle recruitment, and morphological computation, recent advances in machine learning and bioinspired algorithms provide powerful tools to model, optimize, and control soft actuators and actuator-driven robots with improved autonomy and reliability. We encourage studies that report clear performance metrics, rigorous comparisons to baseline methods, and sufficient implementation details to support reproducibility.

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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