Special Issue

Intelligent Actuation and Control Systems for Electrified Mobility and Robotics

Message from the Guest Editors

The ongoing electrification of transportation, robotics, and industrial automation is catalyzing rapid innovation in actuator and control technologies. Today's intelligent actuators combine high-efficiency electric machines, wide-bandgap (WBG) power electronics, advanced control algorithms, and AI-assisted design methodologies to achieve superior energy utilization, fault tolerance, and precision.

For this Special Issue, we welcome contributions spanning modern motor and actuator topologies—such as IPMSM, SynRM, axial-/radial-flux machines, and magnetic levitation systems—together with data-driven and AI-enhanced control, etc. Works on high-voltage power supplies, microwave/high-power pulsed technologies, and protection/insulation coordination are of particular interest, as are integrated diagnostics and tolerance control for EV/UAM propulsion and industrial robotic actuation. We invite the submission of original research articles, authoritative reviews, and rigorously validated application studies from academia and industry to foster cross-disciplinary collaboration across electrical machinery, energy conversion, and intelligent systems.

Guest Editors

Dr. Ho-joon Lee

Prof. Dr. Changhyun Kim

Dr. Dongwoo Lee

Dr. Hyunjong Park

Prof. Dr. Kun A. Lee

Deadline for manuscript submissions

31 August 2026

Actuators

an Open Access Journal by MDPI

Impact Factor 2.3
CiteScore 4.3

mdpi.com/si/259626

Actuators
Editorial Office
MDPI, Grosspeteranlage 5
4052 Basel, Switzerland
Tel: +41 61 683 77 34
actuators@mdpi.com

mdpi.com/journal/actuators

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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.

Editors-in-Chief

Prof. Dr. Kenji Uchino
Emeritus Academy Institute, The Pennsylvania State University, University Park, PA 16802, USA

Prof. Dr. Norman M. Wereley
Department of Aerospace Engineering, University of Maryland, 3179J Martin Hall, College Park, MD 20742, USA

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