

Special Issue on “Soft and Continuum Robotics: from Design to Control”

Abstract: Soft and continuum robotics represent a paradigm shift in robotic systems, moving away from traditional rigid-link architectures towards highly compliant, adaptable, and versatile structures. Inspired by biological systems such as elephant trunks, octopus arms, and snake bodies, these robots offer unparalleled dexterity, safety in human-robot interaction, and the ability to navigate unstructured or confined environments. Applications are rapidly expanding across domains including minimally invasive surgery, soft aerial vehicles, search and rescue, industrial inspection, wearable assistive devices, and agricultural automation. However, the very properties that make these robots so promising, such as infinite degrees of freedom, also introduce profound challenges for design, modeling, and control. Traditional mechatronic approaches based on rigid-body assumptions are insufficient, demanding new solutions that integrate advanced materials, novel actuation and sensing, and intelligent control strategies. This special issue aims to bring together the latest advancements in the mechatronics of soft and continuum robotics, bridging the gap between theoretical developments and experimental validation.

The objective of this special issue is to collect articles that report the most recent accomplishments and results in the area of soft robotics and continuum robotics. The special issue is an opportunity for researchers and practitioners to present the context or applications of their work, the challenges they face, and the scientific approaches they propose to address these challenges. Contributions from industry are also encouraged.

Potential topics include but are not limited to:

- Novel design methodologies, materials, fabrication, and actuation/sensing mechanisms for soft and continuum robots
- Kinematic and dynamic modeling for soft and continuum robots
- Model-based and learning-based control strategies for soft and continuum robots
- Embodied Intelligence for Soft and Continuum Robots
- Perception and state estimation for soft and continuum robots
- Human-robot interaction and safety in soft robotic systems
- System integration, experimental validation, and benchmarking for soft and continuum robots
- Applications involving soft aerial vehicles, medical robotics, inspection, search and rescue, and wearable technologies

Manuscript Preparation Papers must be prepared in accordance with Elsevier policy. Instructions and Guide for Authors are available online at: <https://www.elsevier.com/journals/mechatronics/0957-4158/guide-for-authors>.

Manuscript Submission: All contributions should be submitted at: <https://www.editorialmanager.com/mech/>. Each submission must be accompanied with a cover letter specifying that it is intended for the special issue on "Soft and Continuum Robotics: from Design to Control". All manuscripts will go through the peer review process. Articles submitted before deadlines will be processed earlier.

Important Deadlines

Initial submission: April 30, 2027

Submission of 1st revised paper: September 30, 2027

Submission of 2nd revised paper: December 31, 2027

Final manuscripts and Copyright forms: March 1, 2028

Completion of first review: July 31, 2027

Completion of second review: November 15, 2027

Completion of final review: February 15, 2028

Final publication: April 2028

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