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Joint Special Issue on Design and Control of Responsive Robots

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Joint Special Issue on Design and Control of Responsive Robots

Robots are complex, controlled, dynamical systems that interact with their environments. Novel robot concepts were developed in recent years, such as cable-driven platforms, agile parallel manipulators, lightweight robots, and inherently compliant manipulators, with applications ranging from medical devices, cobots and exoskeletons to machine tools, autonomous platforms for inspection and maintenance, and space robots. Future robots need to be responsive; they must (inter)act safely, minimize the use of resources (energy, material, process-, development-, and commissioning-time), and adapt to variations in demands and environmental conditions. The key to a reliable design of such robotic systems is holistic design approaches embracing kinematic synthesis, dynamic analysis, control, sensory perception, and adaptability.

The mechanical embodiment, as the starting point of any robot design, must be designed together with control, actuation, and sensory components. Novel mechanical design principles combining high-fidelity kinematic and dynamic models with data-driven methods are applied along with model-free machine learning (ML) and artificial intelligence (AI) methods. The foundation is a synergetic combination of research in mechanism theory and dynamical systems and control.

This Joint Special Issue (published over two volumes, one in each sponsoring journal) aims to bridge these research fields and bring together the latest research on robot kinematics and dynamics as well as intelligent control and data-driven methods for perception, planning, model identification and control.

Topic Areas

- Holistic approaches to design, analysis, and control of mechanisms and robots
- Physical human-robot interaction (pHRI)
- Industrial robots, Cable-driven robots and platforms
- Legged and humanoid robots
- Robots equipped with series-elastic actuators (SEA)
- Intrinsic and extrinsic sensors for compliant robots
- Soft and continuum robots
- Embodied and mechanical intelligence
- Model-based and robust control
- Physics-based AI, data-driven and combined approaches to robot dynamics and control

Publication Target Dates

Paper Submission Deadline	**April 30, 2022**
Initial Review Completed	**June 5, 2022**
Decisions Due	**August 1, 2022**
Joint Special Issue Publication Date	**December 2022**

Submission Instructions

Papers should be submitted electronically to the journals at **journaltool.asme.org**. If you already have an account, log in as author and select **Submit Paper** at the bottom of the page. If you do not have an account, select **Submissions** and follow the steps. In either case, at the **Paper Submittal** page, select the **ASME *Journal of Computational and Nonlinear Dynamics*** or the **ASME *Journal of Mechanisms and Robotics*** and then select the Joint Special Issue **Design and Control of Responsive Robots.** Please note that in order to balance the Joint Special Issue between journals, Editors-in-Chief may recommend that a paper be transferred from one journal to the other. Final decisions about any transfer will be made in consultation with the Corresponding Author.

Papers received after the deadline or papers not selected for inclusion in the Joint Special Issue may be accepted for publication in a regular issue.

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