

## Special Issue on Real-Time Computing in Cyborg and Bionic Systems

# CALL FOR PAPERS

Cyborg and bionic systems (CBS) integrate biological and artificial components to restore or advance the natural functionality and attributes of living organisms. To achieve these goals, CBS combines biohybrid mechatronic, sensing, and transduction elements with computing and control elements to create seamless interfaces between the biological, physical, and cyber domains.

Recent technological advances in the engineering of bioinspired and biocompatible materials, sensing and transduction mechanisms, and biomechanical systems, alongside the growth in available computational resources, have evolved the capabilities of CBS. Previously limited to performing simple hardwired tasks, such as stimulating neural activity at fixed rates, CBS can now accurately perceive biological changes in order to accomplish complicated tasks, including the autonomous navigation of bioinspired insect robots.

To soften the boundaries between the biological and physical domains, next-generation CBS need to perform complex computations in resource-constrained environments with minimum latency. To meet this goal, the challenges that accompany the integration and interaction of CBS with breakthrough state-of-the-art real-time computing technologies, such as resource-efficient computing, context awareness, and multisensor integration, must be addressed.

This special issue therefore aims to showcase novel real-time computing approaches in CBS. We encourage original research articles and review articles that consider the design, analysis, and validation of theoretical or applied algorithms, methods, and hardware that advance the real-time computing capabilities of CBS.

Potential topics include but are not limited to the following:

- ▶ Artificial intelligence in closed-loop brain-computer/neural interfaces (e.g., processing and classifying brain activities; motor imaginary interpretation)
- ▶ Computing approaches for cooperative machine and biological intelligence (e.g., hippocampal memory prosthesis; hybrid brain-computer interfaces)
- ▶ Multimodal sensor and information fusion for developing perception and behavior in CBS
- ▶ Artificial intelligence in rehabilitation and assistive technologies
- ▶ Activity recognition and prediction in wearable exoskeleton systems
- ▶ Task, motion, and path planning in bioinspired robots
- ▶ Lightweight computing for intelligent/self-sensing materials to combine sensing, actuation, and communication (e.g., pneumatic muscles; smart fabrics)

Authors can submit their manuscripts through the Manuscript Tracking System at <https://mts.hindawi.com/submit/journals/abb/rtcir/>.

Papers are published upon acceptance, regardless of the Special Issue publication date.

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