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# Call for Papers

## IET *Cyber-Physical Systems: Theory & Applications*

**Editors-in-Chief:** Shiyun Hu, Michigan Technological University, USA  
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### Special Issue:

Cyber-Physical Systems for Medical and Life Sciences Applications



Applied research in cyber-physical systems (CPS), which integrates engineering and the physical sciences with the life sciences, has the potential to advance both basic research and medical care. New innovations have the potential to reduce or eliminate costly and time-consuming bottlenecks in the translational research pipeline that can speed the delivery of new drugs, diagnostics, and medical devices to healthcare providers and patients.

Cyber-physical systems for medical and life sciences applications, for example, may enable timely delivery of healthcare improvements at a cost much lower than existing systems today. Moreover, such systems will generate significant amounts of new data that will require development of new technologies to analyze the data in real-time. This could support the much-needed transformation of modern healthcare away from reactive and hospital-centered patient care toward preventive, proactive, evidence-based, person-centered healthcare, which emphasizes overall well-being rather than curing disease. Concurrently, we are rapidly witnessing the development of the related interdisciplinary field of synthetic biology, which emphasizes the artificial design and engineering of biological cyber-physical systems, which can improve both biological research and industrial applications. Thus, such systems are expected to bring many challenges and opportunities for design, biological and medical communities to collaborate, bridge the gap and spawn an outpouring of creativity. This special issue seeks papers that contribute to knowledge of cyber-physical systems in a biological and/or medical context.

#### A non-exhaustive set of relevant topics in the field of medical cyber-physical systems and biological design include:

- Microfluidics and laboratory-on-a-chip technology
- Laboratory automation technologies
- Robotic-assisted surgery
- Prototypical closed-loop cyber-physical systems, such as artificial organs or continuous monitoring systems
- Challenges in medical device interoperability
- Human-system integration and human-in-the-loop cyber-physical systems
- Cyber-physical medical prosthetic devices for continuous capture, storage, and transmission of physiological state
- Cyber-physical wearable computing devices that offer capabilities such as context and situation awareness, augmented reality, sensory augmentation, motion detection, and activity recognition
- Real-time "Big Data" analysis techniques for biological and medical cyber-physical systems
- Simulation and modeling methods and tools to aid in design and evaluation of cyber-physical medical devices and their interaction with medical information systems in the clinic, at home, and on the patient
- Standardization of cyber-physical biological components, including automated assembly techniques and data exchange standards
- Computer-aided modeling, abstraction techniques, and engineering methods for biological cyber-physical systems

All submissions are subject to the journal's peer-review procedures. The authors should follow the journal's Author Guide at <http://digital-library.theiet.org/journals/author-guide> when preparing papers for submission to the Special Issue.

### Important dates:

**Submission deadline:**  
Feb 28 2017

**Publication Date:**  
Q4 2017

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