

# Scope and Mission

Submitted by [akarns](#) on Tue, 11/03/2015 - 7:14pm

## Technical Committee on Cybernetics for Cyber-Physical Systems (CCPS)

### Scope

The Technical Committee on Cybernetics for Cyber-Physical Systems (CCPS) aims at promoting interdisciplinary research and education in the field of CPS. CCPS addresses the close interactions and feedback loop between the cyber components such as embedded computing systems and the physical components such as varying environment and mechanical systems. The exemplary CPS research areas include the engineering foundation of the cyber-physical interactions, the design and verification of embedded computing systems in CPS, the collection, and the application of CPS methodologies in various domains such as the development of smart home, community and city.

The design, implementation and operation of embedded systems in CPS needs the consideration of multiple aspects such as computational constraints, performance, energy, security, reliability, fault tolerance, flexibility and extensibility. To build optimal and reliable CPS, there is a great need for computational intelligence techniques such as large-scale analytical modeling, complex stochastic optimization, formal methods and verification, and real-time intelligent systems control. It is highly desirable to develop innovative computational intelligence techniques that can address unique CPS challenges such as the fast increase of system scale and complexity, the close interactions with dynamic physical environment, and the significant uncertainties in sensor readings.

### Motivation

Our target is to establish a community consisting of CPS research experts and computational intelligence research experts. Due to the criticality of the novel computational intelligence technique in CPS research, the fusion of these two research fields has the potential to greatly advance the science and engineering of CPS research. This proposed TC will present the state-of-the-art research results in CPS, stimulate the SMC society researchers to participate in the interdisciplinary CPS research and contribute to breaking the existing barriers among various research communities related to CPS.

The proposed TC will involve senior and junior researchers and engineers. Senior researchers are well established and more experienced, who can help promote the proposed TC through organizing journal special issues and conference special sessions. Young researchers represent the future of the field, and thus

encouraging and developing them is certainly critical. Some example activities could be establishing best student research awards for graduate students and early-career research awards for junior faculty and junior industrial researchers.

#### Societies

