

International Workshop on Software Engineering for Smart Cyber-Physical Systems (SEsCPS)

Collocated with ICSE 2015, May 16-24, Firenze, Italy

<http://d3s.mff.cuni.cz/conferences/sescps/>

IMPORTANT DATES

Paper submissions: Jan 23, 2015
Notification of authors: Feb 18, 2015
Camera-ready copies: Feb 27, 2015
Workshop date: May 17, 2015

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TENTATIVE PROGRAM

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INTRODUCTION

NSF describes Cyber-Physical Systems (CPS) as “engineered systems that are built from, and depend upon, the seamless integration of computational and physical components.” H2020 refers to CPS as “the next generation embedded ICT systems that are interconnected and collaborating providing citizens and businesses with a wide range of innovative applications and services”. With the proliferation of smart embedded and mobile devices, CPS are becoming large-scale software intensive and pervasive systems. These systems combine various data sources to control real-world ecosystems (e.g., buildings, traffic, energy). To meet the market needs, modern CPS have to become “smarter” – they have to take on a significant role in their own reaction and evolution to unforeseen situations. Engineering this class of systems, called “smart CPS” (sCPS), demands for new strategies, methods, and processes to appropriately carry out the composition and conjunction of the computational and physical components in CPS in order to deal with uncertainty, heterogeneity, autonomy, and emergent behavior of CPSs. Although there are approaches in software engineering (SE) that individually meet the above requirements of sCPS, their synergy remains an open challenge.

GOALS

SEsCPS aims to bring together academics and practitioners with the objective: (i) to increase the understanding of problems of SE for sCPS, (ii) to study the underlying foundational principles for engineering sCPS (e.g., reasoning about uncertainty, dealing with emergent behavior, distributed control), and (iii) to identify promising SE solutions for sCPS (e.g., models at design time and runtime, continuous V&V, engineering processes). Based on these goals, the workshop aims to formulate a research agenda for SE of sCPS.

WORKSHOP STRUCTURE AND PLANNED OUTCOMES

The workshop will be set up in a highly interactive way, involving participants with and without accepted paper. The workshop will center presentations and group discussions around the following three general research questions: (1) What are the principles and specifics that underlie sCPS? (2) What are the distinct challenges for software engineers of sCPS? (3) What are the promising SE solutions that reflect (and possibly take advantage of) the specifics of sCPS?

After the workshop, we will consolidate the results from the workshop in terms of the research agenda and prepare a joint report to be submitted to Software Engineering Notes. A formal follow-up publication will be considered in which interested attendees can be involved.

TOPICS

SEsCPS will focus on (but not limit itself to) the following topics:

- Engineering principles of sCPS
- Computational models for sCPS
- Integration of cyber and physical components in sCPS
- Stakeholders and requirements for sCPS
- Architectures and design approaches for sCPS
- Blending design and runtime models
- Distributed algorithms, monitoring and control
- Integration of system and software architecture in sCPS
- Synergy between monitoring and adaptation techniques for sCPS
- Verification and validation of sCPS
- Timing aspects and timing analysis of sCPS
- Handling emergent behavior in sCPS
- Handling uncertainty in sCPS environments
- Communication paradigms and middleware for sCPS
- Learning techniques for sCPS
- Modeling and simulation of sCPS
- Model-driven development of sCPS
- Development lifecycle management of sCPS
- Legacy versus greenfield development of sCPS
- Dependability of sCPS
- Scalability and evolvability of sCPS
- Safety and security of sCPS
- Eco-systems and systems of systems of sCPS
- Applications areas for sCPS
- Case studies and experience reports in building large-scale sCPS.

PAPER SUBMISSION

We solicit two types of submissions:

1. Full papers reporting innovative and original research results, industrial case studies, experiments, and experiences with particular synergies in SE practices, methods or techniques for building sCPS. Full papers are limited to 7 pages.
2. Position and future-trends papers describing ongoing research, new results, and future emerging trends. Position papers are limited to 4 pages.

Every paper submission will be peer-reviewed by at least three reviewers. Emphasis will be given on originality, usefulness, practicality, and overall quality.

Papers must not have been previously published or be currently submitted elsewhere. If accepted, the paper must be personally presented at the workshop by one of the authors.

Workshop papers must follow the ICSE 2015 Format and Submission Guidelines. Accepted papers will be published in the ICSE companion volume. Selected and extended papers will be considered for publication in a special issue of a high-impact journal.