

# Workshop on Software Engineering in Cyber-Physical Production Systems (SECPPS'21)

Rick Rabiser,<sup>1</sup> Birgit Vogel-Heuser,<sup>2</sup> Manuel Wimmer,<sup>3</sup> Alois Zoitl<sup>1</sup>

**Abstract:** This workshop focuses on Software Engineering in Cyber-Physical Production Systems. It is an interactive workshop opened by keynotes and statements by participants, followed by extensive discussions in break-out groups. The output of the workshop is a research roadmap as well as concrete networking activities to further establish a community in this interdisciplinary field.

**Keywords:** Software engineering; cyber-physical production systems; workshop

## 1 Motivation

Software is playing an increasingly important role in assuring effective and efficient operation of industrial automation engineering systems. However, software engineering methods applied in this field lag behind the conventional software engineering methods, where tremendous progress has been made in the last years.

Particularly, we are currently facing a dramatically increasing complexity in the development and operation of systems with the emergence of Cyber-Physical Production Systems (CPPS). This demands for more comprehensive and systematic views on all aspects of systems (e.g., mechanics, electronics, software, and network) not only in the engineering process, but in the operation process as well. Moreover, flexible approaches are needed to adapt the systems' behavior to ever-changing requirements and tasks, unexpected conditions, as well as structural transformations [Mo14].

The aim of this workshop is to discuss new approaches and methods for the design of software for use in the production systems domain, which follows the latest trends from the software engineering domain. Additionally, the workshop addresses the challenges (see [Vo15] as well as <http://www.dfg-spp1593.de/> and <https://www.sfb.tum.de/768/>) in adopting state-of-the-art software engineering tools and techniques to the automation domain and discusses various approaches to tackle the issues.

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<sup>1</sup> Christian Doppler Lab VaSiCS, LIT CPS Lab, Johannes Kepler University Linz, Altenberger Str. 69, 4040 Linz, Austria, rick.rabiser@jku.at

<sup>2</sup> AIS, TU Munich, Boltzmannstr. 15, 85748 Garching bei München, Germany vogel-heuser@tum.de

<sup>3</sup> Christian Doppler Lab MINT, SE, Johannes Kepler University Linz, Altenberger Str. 69, 4040 Linz, Austria, manuel.wimmer@jku.at

## 2 Program, Format, and Topics

The workshop has an interactive format to stimulate group discussions which potentially lead to further activities such as joint publications, projects, and networks.

To reach this goal, two keynote speakers, one from the SE community as well as one from the CPPS community, enlighten the audience with concrete experiences and thoughts from both fields in order to set the stage. These keynotes are followed by statements by invited participants. From each statement, questions, challenges, and provocative statements are collected to be potentially discussed in break-out groups.

The collected statements from the morning sessions are clustered and the participants can vote for topics to be discussed in break-out groups. The results of the break-out groups are presented (by the break-out group leaders) and discussed in the large audience to come up with a collaborative research roadmap and networks to identify potential collaborations.

For discussions we foresee the following initial list of topics:

- Engineering Process (Requirements, Design, Implementation, Testing, ...)
- Operation and Evolution (Data-driven, Continuous Integration, DevOps, Agile, ...)
- Languages (DSLs, GPLs, Standards, ...)
- Modeling (MDD, MDE, Transformations, Interoperability, Code Generation ...)
- Teaching (How to train SE in other Disciplines, Open Courseware, ...)
- Management (Variability, Modularization, Configuration, ...)
- Usability and SE Tools (Adoption, User Interactions, ...)
- Emerging technologies (Cloud, AI, IoT, ...)
- Intelligent organization (Multi-Agent Systems, Flexible Architectures, ..)
- Interdisciplinary collaboration (Interfaces, Conflict Management, Optimization, ...)

The workshop is concluded with setting up a collaborative space to document the results and help with future activities of the workshop.

## 3 Website and Further Information

See <https://rickrabiser.github.io/secpps-ws/> for more information.

### Bibliography

- [Mo14] Monostori, László: Cyber-physical production systems: Roots, expectations and R&D challenges. *Procedia CIRP*, 17:9–13, 2014.
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