

# Preface

Industrial engineering is a multi-disciplinary endeavor that is moving toward an interdisciplinary and information-driven approach in all application areas, including the engineering of *Cyber-Physical Production Systems* (CPPS). Engineers from several disciplines have to develop engineering results cooperatively by exchanging engineering information describing technical systems from different viewpoints and on various levels of detail. Within this interdisciplinary and information-driven approach, models of different kinds and their interrelations become key assets that should be treated as first-class citizens in the engineering process. Consequently, model-driven approaches envision improving engineering quality and reducing engineering efforts.

There is a growing community of engineers involved in the development of model-driven engineering approaches for product and production systems engineering in Europe and beyond, such as the members of the *AutomationML* association, the IEEE technical committees *Factory Automation*, *Industrial Agents*, *Industrial Cyber Physical Systems*, and *Industrial Informatics*. An overall goal of the research of these communities is to present a holistic view on CPPS from different research domains that address in some parts different viewpoints on the same topic but seem to act in isolation from related research groups in other communities. Challenges of CPPS can only be tackled by a cooperation of the relevant research communities.

Therefore, we provide this book to bridge the gap between the three scientific communities of multi-disciplinary engineering of products, production systems, and informatics with a focus on model-based software and information engineering with examples that should be relevant and understandable for members from all communities involved. To the best of our knowledge, this is the first book to cover the topic of *Multi-Disciplinary Engineering for Cyber-Physical Production Systems*, which has gained importance with the *Industrie 4.0* initiative. More flexible production systems require stronger integration of the models, methods, and tools across several engineering disciplines to reach the goal of automating automation. A major outcome of the research was that the later life-cycle phases of complex technical systems, i.e., operation, become more and more important. Engineering and modeling has to map run-time behavior adequately in advance. Real-time data

analytics in manifold ways increase the capabilities and efficiency of CPPS. CPPS-based Product Service Systems open new business opportunities.

Wien, Austria  
February 2017

Stefan Biffl  
Detlef Gerhard  
Arndt Lüder

Multi-Disciplinary Engineering for Cyber-Physical  
Production Systems

Data Models and Software Solutions for Handling  
Complex Engineering Projects

Biffi, S.; Lüder, A.; Gerhard, D. (Eds.)

2017, XII, 472 p. 138 illus., 82 illus. in color., Hardcover

ISBN: 978-3-319-56344-2