



Call for Papers SS03 - Capability- and Skill-based Engineering of Manufacturing Systems

Organized and Co-Chaired by

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❖ **FOCUS.** As customer requirements change more frequently, pursuing flexible and adaptive automation approaches becomes necessary. Such approaches demand an explicit description of a production system's functionality and the products to be manufactured. Recent research has introduced approaches based on capabilities and skills using holistic data models (i.e., ontologies, DSLs, variability models ...). While capabilities are understood as an abstract description of (manufacturing) processes a system can perform, skills are often described as their executable counterparts (i.e., modelling an invocation interface such as OPC UA). To find solutions for customer requirements automatically, required tasks and domain-specific constraints must be matched with capabilities provided by automation components. This can be achieved by various techniques such as AI planning or knowledge graph exploration and reasoning. Process plans can then be orchestrated by combining skills related to capabilities found in the previous step. Finally, simulation and optimization of such process plans can be performed before executing them.

❖ TOPICS

- ❖ Modeling of capabilities, skills and services: Data Modeling, Modeling Languages, Knowledge Graphs, Rule Engines, Knowledge-based Systems, Asset Administration Shell
- ❖ Algorithms to find matching capabilities: Planning, Artificial intelligence, Capability-task-matching, Knowledge Graph Exploration
- ❖ Skill-based production: Generation/Modeling of process plans, Orchestration, Execution, Optimization
- ❖ Simulation of a proposed plan: Optimization, simulation techniques for skills
- ❖ Engineering methods: Automated code generation, model-based programming, automated generation of models
- ❖ Organization of marketplaces and supply chains via services

❖ **AIM.** The aim of the Special Session is to bring active researchers and practitioners from the academia and industry together to study the emerging area of skill-based systems engineering from different angles and present related phenomena in real-world applications and systems. Therefore, the Special Session provides a platform to report on recent advances and developments, exchange new ideas, and foster future research collaborations and synergies.

❖ **CONFERENCE FORMAT.** The conference will comprise multi-track sessions for regular papers, to present significant and novel research results with a prospect for a tangible impact on the research area and potential implementations, as well as work-in-progress (WiP) and industry practice sessions.

❖ AUTHOR'S SCHEDULE (2023)

❖ Regular and special sessions papers

Submission deadline March 31
Acceptance notification May 5
Deadline for final manuscripts June 16

❖ Work-in-progress/Industry practice papers

Submission deadline May 12
Acceptance notification June 9
Deadline for final manuscripts June 16

