



## Call for Papers

# SS04 - Capability- and Skill-based Engineering of Manufacturing Systems

### Organized and 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 specifications of (manufacturing) functions a system can perform, skills are considered to be their executable counterparts (i.e., implementations of functions with an interface using a technology 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 and match 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 academia and industry together to study the emerging area of skill-based manufacturing 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.

### SOLICITED PAPERS

- ◆ Original Research (Regular) ◆ Surveys ◆ Industry practice ◆ Work-in-progress

The working language of the conference is English, For submission rules, please refer to the Author's Instruction on the conference website.

### PAPER ACCEPTANCE

Accepted, registered, and presented papers will be copyrighted by IEEE and published in the conference proceedings. The proceedings will be available in the IEEE Xplore® Digital Library. The final manuscript must be accompanied by a registration form and a registration fee payment proof and it is mandatory that at least one author attends and presents the paper at the conference. Failure to adhere to these guidelines may result in paper exclusion from post-conference distribution via IEEE Xplore by the ETFA 2024 Organizing Committee. All conference attendees must pay the conference registration fee and cover their own personal expenses for travel and accommodations.

### AUTHOR'S SCHEDULE 2024

#### ❖ Regular and special sessions papers

Submission deadline ..... **April 28<sup>th</sup>**  
 Acceptance notification ..... **May 31<sup>st</sup>**  
 Deadline for final manuscripts ..... **July 1<sup>st</sup>**

#### ❖ Work-in-progress/ Industry practice papers

Submission deadline ..... **May 26<sup>th</sup>**  
 Acceptance notification ..... **June 17<sup>th</sup>**  
 Deadline for final manuscripts ..... **July 1<sup>st</sup>**