# Modeling and Data Analytics for Zero Defect Manufacturing

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**Abstract:**
Manufacturing companies are continuously facing the challenge of operating their manufacturing processes and systems in order to deliver the required production rates of high quality products, while minimizing the use of resources. "Zero Defect Manufacturing" is a recent paradigm aiming at going beyond traditional six-sigma methods in highly changeable and dynamic production contexts through knowledge-based approaches supported by advanced modeling and data analytics. Innovative and integrated product, process and system design, management and control methods have a key role in achieving the overall "Zero Defect Manufacturing" goal. Efficiently handling these challenges is a hot topic in both academic and industrial communities.

The session aims at collecting new results in the development of models and methods for zero-defect manufacturing, including data gathering and management in complex production environments, data analytics for root cause analysis and pattern extraction, advanced quality-oriented modeling, analysis and optimization, at process and system level. In the session we welcome papers addressing how the generation of defects can be reduced by knowledge-based approaches as well as how defects propagation throughout the system stages can be smoothed by properly scaled defect management policies.

Specific topics of interest include, but are not limited to:

- Integrated quality, production logistics and maintenance modeling and analysis of manufacturing systems.
- Inspection allocation and planning in multi-stage manufacturing systems.
- Data analytics and knowledge extraction for root cause analysis.
- Cyber-physical systems for zero-defect manufacturing.
- Manufacturing strategies for defect propagation avoidance in multi-stage systems.
- Part variation modeling in multi-stage manufacturing systems.
- Digital platforms for multi-sensor, heterogeneous data management in manufacturing systems.

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