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## **Unleashing the Potential of Data Modeling and Monitoring for a Sustainable and Digital Manufacturing Future: Challenges and Opportunities in the Era of Green Targets and Industry 4.0**

*Monday, 11 September 2023 16:35 (1 hour)*

The emergence of green targets is driving manufacturing to minimize environmental impact, optimize resource utilization, reduce waste, and achieve zero-net industries. On the other side, the emergence of Industry 4.0 and advancements in process technologies have led to the availability of complex and massive data sets in various industrial settings. This has sparked a new renaissance in digital manufacturing, as industries leverage emerging technologies such as additive manufacturing, micro-manufacturing, and bioprinting, coupled with advancements in sensing and computing capabilities.

In this evolving landscape, traditional approaches to quality data modeling, monitoring, and control, need to be reevaluated to address the unique challenges posed by this new paradigm shift. The talk discusses open challenges and opportunities provided by functional data monitoring, manifold learning, spatio-temporal modeling, multi-fidelity data analysis, and data reduction to unlock the potential of the green and digital twin transition to pave the way for a more sustainable and efficient manufacturing future.

### **Keywords**

Industry 4.0, Green transition, Quality data, Statistical process monitoring, Additive Manufacturing

### **Classification**

Mainly application

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**Session Classification:** Award Session: George Box Award