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## **Novel AI Solutions for Process Monitoring and Optimization**

The landscape of industrial data mining is rapidly evolving, opening new opportunities to transform production systems from merely instrumented to truly intelligent. This talk explores innovative AI-driven solutions that go beyond traditional data-driven approaches, encompassing generative AI—including GANs and diffusion models—and transfer learning, to support a new generation of smart manufacturing systems. Through selected examples drawn from additive manufacturing and bioprinting, we discuss how these methodologies can enable adaptive process monitoring and optimization, moving production systems toward greater autonomy.

### **Special/ Invited session**

Session Bridging AI and Statistics / Bart De Ketelaere

### **Classification**

Both methodology and application

### **Keywords**

AI, GEN AI, Statistical process monitoring, adaptive optimization, Additive manufacturing, bioprinting

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