# Context and importance of production scheduling

* Production scheduling sparks the interest of academia and industry because of its challenges and the benefits
* Production scheduling is a bridge between academic research and industrial application
* Academia
  + Algorithms for complex problems
  + Interdisciplinary
* Industry
  + Efficiency and productivity increase
    - Optimal resource utilization and reduction of production costs

Problems

* Complexity of real-world systems
  + Dynamic and unpredictable events
    - Real-world systems are subject to frequent disruptions
  + High dimensionality
    - Scheduling involves managing numerous variables which leads to intensive problems
* Integration challenges
  + Legacy systems
  + Data silos
* Cost and resource constraints
  + Implementation costs
  + Resource limitations
* Resistance to change
* Technological limitations
* Lack of standardization
* Emerging complexity in Industry 4.0
  + Interoperability issues

Requirements

* Real-time data integration
* Decentralized decision making
* Flexiblity and adaptability
* Integration of production processes
* Predictive maintenance
* Scalability and interoperability
* Sustainability consideratiosn