Invited Session on **"Data-Driven Optimization Under Uncertainty"**

for 11th IFAC Conference on Manufacturing Modelling, Management and Control

Trondheim, Norway, 30 June - 3 July 2025

Invited Session Identification Code: **884ev**

Organized by:

Prof. Dr. Lars Magnus Hvattum	Molde University College, Norway	lars.m.hvattum@himolde.no
Prof. Dr. Alexandra Brintrup	University of Cambridge, United Kingdom	ab702@cam.ac.uk
Dr. Hossein Arshad	NTNU, Norway	hossein.arshad@ntnu.no

Session Overview:

The increasing complexity and volatility in modern manufacturing and logistics systems necessitate advanced optimization techniques that can adapt to uncertainty in real-time. Data-driven approaches, combined with uncertainty modeling techniques, such as robust and stochastic optimization approaches, can be practical for making informed decisions that balance efficiency, cost, and risk. This session will explore innovative methods, frameworks, and applications of data-driven optimization techniques specifically designed to handle uncertainty in energy, manufacturing, logistics, and supply chain systems.

Key Topics to be Covered:

This session invites theoretical contributions and real-world applications of data-driven optimization under uncertainty, including (but not limited to):

- Stochastic, robust, and fuzzy optimization:

Techniques to model and handle uncertainty in production planning, maintenance, supply chain management, and scheduling.

- Simulation-based optimization:

Approaches that combine data analytics with simulation techniques to optimize under uncertain conditions in areas such as energy modeling and production scheduling.

- Machine learning for predictive optimization:

Using machine learning to model uncertainties and improve decision-making in dynamic manufacturing environments in areas such as predictive maintenance, demand forecasting, and inventory optimization.

- **Real-time decision making:**

Adjustable and data-driven methods to adjust manufacturing and logistics operations in response to real-time data and unpredictable changes, such as logistics route adjustment and energy supply to production lines affecting production quality.

- **Applications of uncertainty quantification:**

Quantifying uncertainty in decision-making processes in areas such as energy, inventory management, resource allocation, and human-robot collaboration.

Submission:

For author guidelines, please refer to www.ifac-control.org. All papers must be submitted electronically using https://ifac.papercept.net/ and must follow the two-column format in accordance with the IFAC manuscript style. Please use the official IFAC instructions and template to prepare your contribution as a full-length draft paper (6 pages).

Submission details are available on the symposium website. There is the possibility to submit discussion papers (limited to 4 pages) that are published in the preprints only. All submissions must be written in English. All articles that comply with the submission guidelines will be peer-reviewed by IPC members. The corresponding author submits the paper online (PDF format) as an open-invitation session paper.

Key Points for Submission Consideration:

- Submission as an invited paper requires the invited session code: XXXX.
- Accepted papers will be published open access in Elsevier's IFAC-PapersOnLine.
- Special issues of MIM 2025 Conference are planned in IFAC and other high-ranking journals.

Important Dates:

Full paper submission deadline: 30/11/2024

Notification to acceptance: 30/01/2025

Final paper submission deadline: 28/02/2025

IFAC MIM 2025 Conference date: 30/06/2025 – 03/07/2025