IFAC INTERNATIONAL FEDERATION OF AUTOMATIC CONTROL

TU WIEN TECHNISCHE UNIVERSITÄT WIEN

Fraunhofer AUSTRIA

18th IFAC Symposium on Information Control Problems in Manufacturing

August 28-30th, 2024 | Vienna, Austria

INCOM 2024

Conference Booklet

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Keynote of Prof. Dr. Torbjørn H. Netland

Wednesday, August 28, 2024

Prof. Dr. Torbjørn H. Netland is Full Professor and the Head of Chair of Production and Operations Management (POM) at ETH Zurich: www.pom.ethz.ch

Title:

Augmented Intelligence for Next-Level Manufacturing Excellence

Abstarct:
In this keynote, Prof. Netland presents his lab's research on how innovative technologies drive transformative improvements in leading manufacturing firms. His talk highlights the crucial synergy between data and human expertise, showcasing the journey toward human-centric, sustainable, and highly autonomous manufacturing systems. A transformative technology is the Manufacturing Analytics System (MAS), a proposed new class of software for manufacturing companies. Prof. Netland explores real-world examples and insights into how augmented intelligence via MAS is reshaping the future of production management. This keynote relates to SDG 8, Decent Work and Economic Growth, and SDG 12, Responsible Consumption and Production.

Keynote of Prof. Dr. Dmitry Ivanov

Thursday, August 29, 2024

Prof. Dr. Dr. habil. Dmitry Ivanov is Professor of Supply Chain and Operations Management, director of the Digital-AI Supply Chain Lab, and faculty director M.A. Global Supply Chain and Operations Management at the Berlin School of Economics and Law.

Title:

The future of supply chain simulation and digital twins

Abstarct:
This talk is devoted to outlining industry and academic developments in supply chain simulation and digital twins. We will discuss digital supply chain twins, the integration of simulation and AI, resilience and supply chain stress testing, and Metaverse supply chains. Practical implementations will be illustrated using anyLogistix supply chain simulation and optimization software. In particular, we discuss an intelligent digital twin (iDT) framework. New digital technologies and artificial intelligence are enabling novel approaches and tools, allowing us to move from isolated simulation models to intelligent decision-support systems. An iDT is a system that combines human intelligence with AI to create a digital representation of physical supply chains, use cognitive AI capabilities and create new knowledge about the system through mutual feedbacks between human and artificial intelligence. The iDT collects and processes data, employs analytics, mimics human decision-making, and develops new knowledge and decision-making algorithms through human-AI collaboration.

Panel Discussion of Caroline Viarouge

Thursday, August 29, 2024

Caroline Viarouge is Chief Executive Officer of EIT Manufacturing, who brings a strong leadership and transformational track record, broad background in the industry and passion for manufacturing in Europe.

Title:

How European manufacturing is shaping our greener and digital future.

Abstarct:

The manufacturing industry is a global base for prosperity and key to Europe's economic, social and environmental sustainability, acting as the main driver of industrial innovation, job creation and growth for the European society.

The European manufacturing sector is currently undergoing green and digital transitions to become more sustainable, adopting circular economy principles to transform Europe into the first climate neutral continent by 2050. Going through these major transformations, the industry strives to retain leadership in a competitive global landscape, accelerating innovation and attracting investments.

On this journey, it is critical for European manufacturers to embrace digitalisation to achieve leaner operations and boost profitability and competitiveness. The lack of workers with the right skills, however, is one of the biggest constraints to the successful green and digital transitions. It is therefore equally important to train the sector's workforce and develop their skills and competences to match the industry's current and future needs.

As a public-private partnership, co-funded by the European Union, EIT Manufacturing has a clear purpose to improve people's lives through sustainable manufacturing. This purpose is accompanied by the mission to connect manufacturing players by promoting talent and entrepreneurship to accelerate sustainable innovation in Europe.

During this presentation, CEO Caroline Viarouge will elaborate how EIT Manufacturing stimulates manufacturing ecosystems and supports European manufacturing companies, research institutions and universities with various instruments and activities, including talent reskilling and upskilling via educational programmes, as well as supporting startups through various calls, Access-to-Market and Access-to-Finance services, co-investment opportunities, and coaching and support in commercial expansion.

Gala Dinner Keynote of Prof. Dr. Alexandre Dolgui

Thursday, August 29, 2024

Prof. Alexandre Dolgui is an IISE Fellow, Distinguished Professor, and the Head of Automation, Production and Computer Sciences Department at the IMT Atlantique (former Ecole des Mines de Nantes and Telecom Bretagne), France.

Title:

Information control problems in manufacturing: history of IFAC INCOM symposium

Abstarct:
Prof. Dr. Alexandre Dolgui, Fellow of IISE and Head of Department Automation, Production and Computer Sciences at IMT Atlantique, campus in Nantes, France, the Editor in Chief of the International Journal of Production Research (IJPR) and the General/IPC Chair of IFAC symposiums INCOM 2006, INCOM 2009, INCOM 2012 and INCOM 2015, formed chair of IFAC TC 5.2 (currently vice-chair) will present the history of INCOM symposiums, the specific place of INCOM in our scientific community, relations with IJPR and other journals, evolution of topics over the time, main current tendencies, new challenges and cutting edge problems in Manufacturing System and Supply Chain Engineering.

Keynote of Prof. Dr. Andreas Kugi

Friday, August 30, 2024

Andreas Kugi has been the Scientific Director of the AIT Austrian Institute of Technology since 07/2023 and a full professor for complex dynamical systems at Technische Universität Wien, Austria, since 2007.

Title:

Advanced Control for Sustainable Autonomous Manufacturing

Abstarct:
Modern automation technologies and artificial intelligence (AI) have enormous transformative potential, particularly also in manufacturing. While classical automation is organized in (hierarchical) control loops, which typically perform the sequential steps to sense, analyse, calculate, and finally act on the system, modern methods in AI, machine learning, sensor fusion, and real-time optimization raise this traditional sensing-action feedback loop to a higher level where whole situations are perceived, analysed, and understood, and decisions are made at the cognitive level. The degree of maturity and sophistication of these AI-enabled automation loops determines how much the system achieves a certain level of autonomy. New automation architectures containing high-performance industrial edge computing and networking platforms pave the way for including more control intelligence in the production process to optimize the resources (energy, raw material, water), minimize scrap, improve the product quality and cost efficiency, and help to mitigate the shortage of skilled personnel.
Mathematical models of the underlying manufacturing process and product are crucial in developing advanced control, estimation, learning, and optimization strategies. We focus on hybrid modelling approaches combining first principles and data-driven techniques. The models considered are hyper-real-time capable, i.e., they can be executed more than ten times faster than in real time to enable online prediction and optimization. Manufacturing processes usually have many sensor systems for various quantities, providing multi-modal observations with different spatial distributions on different temporal scales. However, the quantities of interest, like the final product properties, often cannot be measured inline but only after the last production step. There is a huge potential to combine physics-based models with statistical/machine learning methods to fuse all the information available to predict these desired quantities dynamically during the manufacturing process. This is also the basis for designing advanced control concepts that can adaptively correct deviations in real time and account for parameter variations of the raw material or disturbances in the upstream process steps. For this, we propose methods for advanced process control incorporating flexible learning and optimization features and transferring existing knowledge of sensor fusion to the process control domain.
This talk will discuss several advanced control concepts based on different industrial examples from the manufacturing industry.

Wednesday, August 28, 2024 - Julius Raab Saal

9:00-9:30	**WeOS	Opening Session and Honorary Speeches** Video Welcome Message ***Leonore Gewessler*** Federal Minister for Climate Action, Environment, Energy, Mobility, Innovation and Technology Welcome Message – ***Jens Schneider, Rector of TU Wien*** Welcome NOC Chairs: ***Fazel Ansari and Sebastian Schlund***
9:30-10:15	**WeKN	Keynote of Torbjørn H. Netland** ***Augmented Intelligence for Next-Level Manufacturing Excellence*** ETH Zurich Moderator: ***Fazel Ansari***
10:45-12:30	**WeAT0	Smart Supply Chains for Sustainable Manufacturing** Chair: ***Guoqing Zhang*** - University of Windsor **10:45 - WeAT0.1	Collaborative Reconfiguration of Supply Networks Based on GNN and ALC (I)** Hai-nan Huang; Ting Qu; Xiao-hui Qiu; Lin Ma; Zhong-fei Zhang **11:05 - WeAT0.2	Optimal Supply Network with Vendor Managed Inventory in a Healthcare System with RFID (I)** Mohammed Rasol Almanaseer; Guoqing Zhang; Zuqing Huang **11:25 - WeAT0.3	Resource Assignment and Performance Optimisation in Intelligent Supply Chain (I)** Oleg Zaikin; Natalia Bakhtadze **11:45 - WeAT0.4	Robot Base Placement Optimization for Pick-And-Place Sequences in Industrial Environments (I)** Alexander Wachter; Christian Hartl-Nesic; Andreas Kugi **12:05 - WeAT0.5	An Overview on the Disassembly Line Balancing under Uncertainty (I)** Oumayma Laouini; Ilhem Slama; Faicel Hnaien; Zied Jemai
12:30-13:30	**WeLU_TC	IFAC Internal – Technical Committee Meetings** **TC 5.2** - Management and Control in Manufacturing and Logistics (***Chair Fabio Sgarbossa***)
13:30-15:15	**WeBT0	Industry 5.0 - Human-Centered Production and Logistics Systems - Part I** Chair: ***Eric Grosse*** - Saarland University Co-Chair: ***Fabio Sgarbossa*** - Norwegian University of Science and Technology - NTNU **13:30 - WeBT0.1	What Makes Order Picking so Physically Demanding? – Ergonomic Evidence from a Large-Scale Lab Experiment Using Subjective Metrics (I)** Thomas De Lombaert; Kris Braekers; René B.M. De Koster; Katrien Ramaekers **13:50 - WeBT0.2	Development of Fine-Tuned Retrieval Augmented Language Model Specialized to Manual Books on Machine Tools (I)** Seongwoo Cho; Jongsu Park; Jumyung Um **14:10 - WeBT0.3	Human Beings Influencing Assembly Line Performance: A Comparison of Job Rotation Strategies (I)** Francesca Catalano; Alessandro Persona; Ilenia Zennaro **14:30 - WeBT0.4	How to Model Human–Robot Collaborative Logistics Systems: Systematic Literature Review and Future Perspectives (I)** Minqi Zhang; Eric Grosse **14:50 - WeBT0.5	Distribution of Physical Workload with an Ergonomic Order Assignment (I)** Linda Maria Wings; Hermann Foot; Patrick Taschner; Veronika Kretschmer; Martin Riester

Wednesday, August 28, 2024 - Julius Raab Saal

15:30-17:15	**WeCT0 | Industry 5.0 - Human-Centered Production and Logistics Systems - Part II** Chair: ***Eric Grosse*** - Saarland University Co-Chair: ***Fabio Sgarbossa*** - Norwegian University of Science and Technology - NTNU **15:30 - WeCT0.1 | Introducing Assistance Systems in Production - Comparing Management and Operator's Perspectives (I)** Jessica Horn; Thomas Bohné **15:50 - WeCT0.2 | Aging in Industry 5.0: Enhancing Human–Robot Synergy in Manufacturing and Logistics (I)** Thilini Ranasinghe; Eric Grosse; Tone Lerher **16:10 - WeCT0.3 | Dynamic Optimization of a Reconfigurable Manufacturing System under Risk and Human Factors (I)** Maryam Esmaeiliqeshlaqi; Reza Tavakkoli-Moghaddam; Ali Siadat **16:30 - WeCT0.4 | Investigating the Productivity in Different Assembly System Configurations for a Better Inclusion of Disabled Workers (I)** Serena Finco; W. Patrick Neumann; Azin Setayesh
17:30-19:15	**WeDT0 | Human Work and Skills Advances Related to Smart Manufacturing** Chair: ***Yuval Cohen*** - Afeka Tel Aviv College of Engineering **17:30 - WeDT0.1 | The Future of Green Skills for the Manufacturing Sector (I)** Alexandra Lagorio; Beatrice Colombo; Chiara Cimini; Paolo Gaiardelli **17:50 - WeDT0.2 | Exploring the Effects of Industry 4.0/5.0 on Human Factors: A Preliminary Systematic Literature Review (I)** Esma Yahia; Florian Magnani; Laurent Joblot; Robert Pellerin; Mario Passalacqua **18:10 - WeDT0.3 | Digital, Technological and AI Skills for Smart Production Work Environment (I)** Yuval Cohen; Hila Chalutz-Ben Gal **18:30 - WeDT0.4 | Enhancing Human-Centricity for Strategic Alignment: The Value of Coaching in Digital Transformation (I)** Michael C. Bauer; Eric Grosse **18:50 - WeDT0.5 | Manufacturing Workers Fatigue: Exploratory Study on Predictive Machine Learning and Cross-Subject Generalisation with Implications for Work Design (I)** Christos Emmanouilidis; Vincenzo Cutrona; Elias Montini; Joze Rozanec

Wednesday, August 28, 2024 - Saal 1

10:45-12:30	**WeAT1 | Artificial Intelligence, Machine Learning, and Reinforcement Learning Approaches to Intralogistics Systems** Chair: ***Uday Venkatadri*** - Dalhousie University Co-Chair: ***Anike Murrenhoff*** - Fraunhofer-Institute for Material Flow and Logistics IML **10:45 - WeAT1.1 | Planning Assistant for Medium-Term Capacity Management Using Deep Reinforcement Learning (I)** Florian Kulmer; Matthias Wolf; Christian Ramsauer **11:05 - WeAT1.2 | Towards a Framework for AI Applications in Intralogistics (I)** Uday Venkatadri; Anike Murrenhoff **11:25 - WeAT1.3 | Efficient Milling Quality Prediction with Explainable Machine Learning (I)** Dennis Gross; Arnaud Gotlieb; Mohamed El Mansori; Ricardo Knoblauch; Helge Spieker **11:45 - WeAT1.4 | A Dynamic Multi-Objective Scheduling Approach for Gradient-Based Reinforcement Learning (I)** Katharina Hengel; Achim Wagner; Martin Ruskowski **12:05 - WeAT1.5 | Comparative Study of Reinforcement Learning Algorithms to Solve Reconfigurable Facilities Layout Problem (I)** Amine Chiboub; Thecle Alix; Julien Francois; Rémy Dupas
13:30-15:15	**WeBT1 | Complexity in Control of Circular Supply Chains and Distributed Production - Part I** Chair: ***Oliver Antons*** - Otto-Von-Guericke-Universität Co-Chair: ***Julia Arlinghaus*** - Otto-Von-Guericke University Magdeburg **13:30 - WeBT1.1 | Exploring the Challenges of Circular Economy Adoption: A Supply Chain Perspective (I)** Anna-Kristin Behnert; Oliver Antons; Julia Arlinghaus **13:50 - WeBT1.2 | On the Verification of Distributed Control for Multi Job Shop Assignment Problem in Smart Manufacturing System (I)** Andrea Somma; Oliver Antons; Alberto Petrillo; Stefania Santini; Teresa Murino **14:10 - WeBT1.3 | Comprehensive Equipment Behaviour Description in Production Lifecycle Using Digital Twin Concepts and ISO Standards of Equipment Behaviour Catalogues (I)** René Wöstmann; Hardy Krappe; Roman Möhle; Jochen Deuse **14:30 - WeBT1.4 | From Analogue to Digital Product Passports in the Furniture Industry (I)** Arko Steinwender; Viola Gallina; Olga Litvyak; Thomas Lampoltshammer; Daniel Bachlechner; Sebastian Schlund **14:50 - WeBT1.5 | Realizing Closed-Loop Supply Chain Networks Based on Dataspaces and Manufacturing Marketplaces (I)** Leonhard Kunz; Manuel Reif; Teresa Petzsche; Anne Schmallenbach; Christiane Plociennik; Martin Ruskowski

Wednesday, August 28, 2024 - Saal 1

15:30-17:15	**WeCT1 |Complexity in Control of Circular Supply Chains and Distributed Production - Part II** Chair: ***Oliver Antons*** - Otto-Von-Guericke-Universität Co-Chair: ***Julia Arlinghaus*** - Otto-Von-Guericke University Magdeburg **15:30 - WeCT1.1 | Measuring the Impact of Strategic Decisions on the Sustainability of Short Food Supply Chains – a Simulation-Based Approach (I)** Bilgesu Bayir; Aurelie Charles; Yacine Ouzrout **15:50 - WeCT1.2 | Towards "transformative" Resilience for the Sustainability of Industry 4.0 (I)** Emmanuel Caillaud; Virginie Goepp; Lamia Berrah **16:10 - WeCT1.3 | A Fisher-Based Framework for the Circular Integration of Product Development and Supply Chain Design (I)** Sobhan Mostafayi Darmian; Fabio Sgarbossa; Torgeir Welo **16:30 - WeCT1.4 | Collaborative Logistics 4.0 Operations among Small and Medium-Sized Enterprises in Rural Areas (I)** Sahar Moazzeni; Julio C. Goez; Fabio Sgarbossa **16:50 - WeCT1.5 | Digital Twins and Their Implications for Business Models: Overview and Potentials (I)** Rodrigo Torres Adelsberger; Oliver Antons; Julia Arlinghaus
17:30-19:15	**WeDT1 | Extended Reality and Metaverse to Address the Social Challenges of Manufacturing and Healthcare in the Industry 5.0** Chair: ***Josefa Mula*** - Universitat Politècnica De València **17:30 - WeDT1.1 | How to Transform Implicit Personal Knowledge into Explicit Organizational Knowledge in the Era of Industry 5.0 Manufacturing Systems (I)** Xingyu Sima; Baudelaire Ismael Tankeu Nguekeu; Thierry Coudert; Laurent Geneste; Aymeric De Valroger **17:50 - WeDT1.2 | SUN Accessibility Pilot: Extended Reality for People with Serious Mobility and Verbal Communication Diseases (I)** Luca Greci; Vincenzo Croce; Leonardo Corsano; Ferdinando Bosco **18:10 - WeDT1.3 | Extended Reality and Metaverse Technologies for Industrial Training, Safety and Social Interaction (I)** Josefa Mula; Raquel Sanchis; Rocío de la Torre; Pablo Becerra **18:30 - WeDT1.4 | An Augmented Reality Interface for Safer Human-Robot Interaction in Manufacturing (I)** Igor Rybalskii; Karl Kruusamäe; Arun Singh; Sebastian Schlund **18:50 - WeDT1.5 | Unsupervised Anthropometric Measurements from 3D Scans Using Automated Template Registration (I)** Alessandro Inguglia; Giuseppe Vitucci; Ioannis Paraskevopoulos

Wednesday, August 28, 2024 - Saal 2

10:45-12:30	**WeAT2 | Human-Centric Digital Twins for Human-Centred Manufacturing - Part I** Chair: ***Alexandra Lagorio*** - University of Bergamo Co-Chair: ***Chiara Cimini*** - University of Bergamo **10:45 - WeAT2.1 | Workers Fatigue Monitoring for Well-Being Improvement in Manufacturing (I)** Michel Rosselli; Vincenzo Cutrona; Samuele Dell'Oca; Elias Montini; Joze Rozanec; Giuseppe Landolfi; Christos Emmanouilidis; Andrea Bettoni **11:05 - WeAT2.2 | Human-Centered Task Allocation_ a Simulation Based Case Study (I)** Zahra Safari Dehnavi; Sebastian Schlund; Janos Abonyi; Tamás Ruppert **11:25 - WeAT2.3 | Design and Test of a Human-Machine Interface for Assembly Lines in a Learning Factory (I)** Chiara Cimini; Enrico Freti; Alexandra Lagorio **11:45 - WeAT2.4 | Manual Data Collection in Assembly Lines: A Case Study on the Human Factor in Data Accuracy (I)** Jan Thurnheer; Jannick Fiedler; Lasse Plümke; Torbjørn Netland **12:05 - WeAT2.5 | Exploring the Rationales and Controversies behind the Shift from Industry 4.0 to Industry 5.0: A Review and Conceptual Analysis (I)** Md Monir Hossain; Gregory Purdy
13:30-15:15	**WeBT2 | Human-Centric Digital Twins for Human-Centred Manufacturing - Part II** Chair: ***Alexandra Lagorio*** - University of Bergamo Co-Chair: ***Chiara Cimini*** - University of Bergamo **13:30 - WeBT2.1 | May I Have Your Attention?! Exploring Multitasking in Human-Robot Collaboration (I)** Abdulrahman K. Eesee; David Kostolani; Taeho Kang; Sebastian Schlund; Tibor Medvegy; Janos Abonyi; Tamás Ruppert **13:50 - WeBT2.2 | Human Robot-Interaction: A Conceptual Framework for Task Performance Analysis (I)** Valentina Di Pasquale; Paola Farina; Marcello Fera; Salvatore Gerbino; Salvatore Miranda; Marta Rinaldi **14:10 - WeBT2.3 | Enhancing Industrial Operator Training through BIM-Enriched Virtual Reality Scenes (I)** Valentina Di Pasquale; Ivan Ferretti; Andrea Lucchese; Antonio Padovano; Chiara Sammarco; Javier Ernesto Suárez Savigne **14:30 - WeBT2.4 | Mixed Integer Programming for Patient Admission Scheduling in Hospital Network (I)** Rihab Chaouch; Jihene Tounsi; Issam Nouaouri; Sabeur Elkosantini **14:50 - WeBT2.5 | Safe Operator 5.0 Digital Architecture: Towards Resilient Human-Centric Manufacturing Systems (I)** Andrea Sbaragli; Federica Tomelleri; Francesco Picariello; Enrico Picariello; Francesco Pilati

Wednesday, August 28, 2024 - Saal 2

15:30-17:15	**WeCT2 | Modelling and Optimization of Deteriorating Inventories - Part I** Chair: ***Christoph Glock*** - Technische Universität Darmstadt Co-Chair: ***Hamid Afshari*** - Dalhousie University **15:30 - WeCT2.1 | Optimizing Truck Transportation by Introducing Discount for Shipping Fees (I)** Koichi Nakade; Akane Maeoka **15:50 - WeCT2.2 | Supervisory Multi-Model Control for Supply Chains with Large Uncertainty on the Perishability Rate (I)** Valentina Orsini; Beatrice Ietto **16:10 - WeCT2.3 | Joint Discount and Replenishment Parametric Policies for Perishable Products (I)** Edoardo Fadda; Daniele Giovanni Gioia; Paolo Brandimarte; Francesca Maggioni **16:30 - WeCT2.4 | Pricing Optimization for Perishable Primary and Ancillary Items with Time-Dependent Inventory Drawdown (I)** John Wilson; Feryaal Fatemah Ahmed **16:50 - WeCT2.5 | Inventory Management for Aging Products with Supply Chain Finance: The Warehouse Financing Option (I)** Beatrice Marchi; Lucio Enrico Zavanella; Simone Zanoni
17:30-19:15	**WeDT2 | Modelling and Optimization of Deteriorating Inventories - Part II** Chair: ***Christoph Glock*** - Technische Universität Darmstadt Co-Chair: ***Hamid Afshari*** - Dalhousie University **17:30 - WeDT2.1 | Impact of the Discount Policies on the Purchasing Behaviour of Perishable Items (I)** Natalya Lysova; Federico Solari; Eleonora Bottani; Roberto Montanari **17:50 - WeDT2.2 | Comparative Study of Centralized and Decentralized Systems for Hydrogen Hubs (I)** Henrique G. Nunes; Mohammad Asghari; Hamid Afshari; Mohamad Y. Jaber **18:10 - WeDT2.3 | Production and Inventory Dynamics in the Mining Supply Chain: The Impact of Extraction Routings (I)** Bassma Azzamouri; Ahlam Azzamouri **18:30 - WeDT2.4 | A Log-Linearization of the P-Median Fortification Problem for Healthcare System (I)** Isaline Baret; Yassine Ouazene; Nhan-Quy Nguyen; Farouk Yalaoui

Wednesday, August 28, 2024 - Saal 3

17:30-19:15	**EU Project X-HuLog4.0** Chair: **Sgarbossa, Fabio**

Wednesday, August 28, 2024 - Saal 4

10:45-12:30	**WeAT4 | Reconfigurable, Flexible or Agile Manufacturing Systems to Deal with a VUCA World - Part I** Chair: ***Xavier Delorme*** - Mines Saint-Etienne **10:45 - WeAT4.1 | Optimizing of the Convertibility of Reconfigurable Manufacturing Systems (I)** Mari Chaikovskaia; Audrey Cerqueus; Alexandre Dolgui **11:05 - WeAT4.2 | An Adversarial Approach for the Mixed-Model Assembly Line Design with New Product Variants in Production Generations (I)** S. Ehsan Hashemi-Petroodi; Yosra Mezghani; Simon Thevenin; Alexandre Dolgui **11:25 - WeAT4.3 | Decision Making under Uncertainty for Reconfigurable Manufacturing Systems: A Framework for Uncertainty Representation (I)** Rafael Leite Patrão; Alessia Napoleone **11:45 - WeAT4.4 | Augmented Weighted Tchebycheff-Based Approach for Sustainable Multi-Objective Workforce and Process Planning in Reconfigurable Manufacturing Environment (I)** Alireza Ostovari; Lyes Benyoucef; Hichem Haddou Benderbal; Xavier Delorme **12:05 - WeAT4.5 | Data-Driven Control Approach for Scalability Enhancements in Reconfigurable Manufacturing Systems (I)** Abdelhak Dahmani; Lyes Benyoucef
13:30-15:15	**WeBT4 | Technologies for Circular Economy and Sustainability in Industry - Part I** Chair: ***Giuseppe Vignali*** - University of Parma Co-Chair: ***Eleonora Bottani*** - University of Parma, Department of Engineering and Architecture **13:30 - WeBT4.1 | Towards Human-Centric Digital Simulation: Guidelines to Simulate Operators Skills Acquisition and Health in Circular Manufacturing Systems (I)** Maxence Denu; Pierre David; Fabien Mangione; Aurélie Landry **13:50 - WeBT4.2 | Life Cycle Assessment of Reusable Plastic Containers Throughout the Fruit and Vegetables Supply Chain (I)** Giacomo Lupi; Riccardo Accorsi; Ilaria Battarra; Riccardo Manzini **14:10 - WeBT4.3 | Packaging Stretch Film Alternatives in a Circular Economy Perspective: Comparison of Three Scenarios with a Life Cycle Assessment Approach (I)** Roberta Stefanini; Arianna Paini; Moreno Busti; Marco Archetti; Alberto Buffoli; Vincenzo Cangiano **14:30 - WeBT4.4 | Analyzing Forklift and Drone Applications in Sustainable Logistics: A Bibliometric Review (I)** Saverio Ferraro; Leonardo Leoni; Alessandra Cantini; Filippo De Carlo **14:50 - WeBT4.5 | The Recycling Technologies of Mono-Material and Multilayer Plastic Film: A Descriptive Literature Review (I)** Maria Vittoria Rizzo; Giovanni Paolo Carlo Tancredi; Giuseppe Vignali

Wednesday, August 28, 2024 - Saal 4

15:30-17:15	**WeCT4 | Reconfigurable, Flexible or Agile Manufacturing Systems to Deal with a VUCA World - Part II** **Chair: *Xavier Delorme* - Mines Saint-Etienne** **15:30 - WeCT4.1 | An Energy-Efficient Multi Objectives MILP Model for Integrated Process Planing and Scheduling in RMS (I)** **Zeren Zhang; Lyes Benyoucef; Ali Siadat** **15:50 - WeCT4.2 | Differentially Private and Fair Machine Learning: A Benchmark Study (I)** Gulnara Smirnova; Rustem Sabitov; Shamil Sabitov; Alexander Eponeshnikov; Natalia Bakhtadze **16:10 - WeCT4.3 | Integrated Use of Expert Systems and Dynamic Models in the Intellectualized Operator Information Support System for NPP (I)** Elena Jharko; Kirill Chernyshov; Ekaterina Abdulova **16:30 - WeCT4.4 | Requirements Structure for System Requirements Formal Modelling, Verification and Validation (I)** Cyril Bacquet; Pascale Marange; Eric Bonjour; Alain Kerbrat **16:50 - WeCT4.5 | Robust Optimization for Technician and Resource Management in Reconfigurable Assembly Lines (I)** Tourandokht Karimi; Simon Thevenin; Hichem Haddou Benderbal
17:30-19:15	**WeDT4 | Digital Transformation in SMEs: Industrial Practices, State of the Art, Challenges and Issues - Part I** Chair: ***Taha Arbaoui*** - INSA De Lyon **17:30 - WeDT4.1 | Towards a Time Data Library to Enable Process Optimization in Engineer-To-Order Industries: The Case of Control and Switchgear Manufacturing (I)** Micha Stoidner; Patrick Bründl; Huong Giang Nguyen; Ahmad Abrass; Jörg Franke **17:50 - WeDT4.2 | Progress towards Low-Cost Industrial Digitalisation for SMEs (I)** Duncan Campbell McFarlane; Gregory Hawkridge; Jan Kaiser; Anandarup Mukherjee; German Terrazas **18:10 - WeDT4.3 | Manufacturing Analytics System: A New IT Category Enabling Next-Level Operational Excellence (I)** Julian Senoner; Bernhard Kratzwald; Roland Philippsen; Torbjørn Netland **18:30 - WeDT4.4 | Sustainability in SMEs: A Comparative Study to Assess Current Status and Setting Targets for Action (I)** Lars Jakobs; Angie Katherin Salamanca Cano; Erwin Rauch **18:50 - WeDT4.5 | Measuring Environmental Performance in Digital Transformation within SMEs (I)** Jérémy Fortier; Sébastien Gamache; Cécile Fonrouge

Wednesday, August 28, 2024 - Saal 5

10:45-12:30	**WeAT5 | LARG (Lean, Agile, Resilient, Green) Supply Chains and Manufacturing Systems - Part I** Chair: ***Eleonora Bottani*** - University of Parma, Department of Engineering and Architecture Co-Chair: ***Marta Rinaldi*** - University of Campania **10:45 - WeAT5.1 | Identification of the Benefits from the Use of Digital Product Passport in a Value Chain and Single Organizations (I)** Foivos Psarommatis; Fotios Konstantinidis; Victor Azamfirei; Gökan May **11:05 - WeAT5.2 | Optimizing Gate Queuing at Container Terminals to Facilitate Green Operations (I)** Heshan Abeysooriya; Buddhi Chathumal Alwis Weerasinghe; Niles Perera **11:25 - WeAT5.3 | Supply Chain Modelling and LARG Performance Evaluation under Severe Disruptions: The Case of the Fast-Food Industry (I)** Marta Rinaldi; Vincenzo Petrillo; Marcello Fera; Mario Caterino; Eleonora Bottani; Roberto Macchiaroli **11:45 - WeAT5.4 | Energy-Efficient Flexible Flow Shop Scheduling under Time-Of-Use Rates with Renewable Energy Sources (I)** Joyce Mhanna; Hajar Nouinou; Simon Caillard; David Baudry **12:05 - WeAT5.5 | Resource-Efficient Condition Determination through Discrete Production System Monitoring (I)** Anton Zitnikov; Abdullah Al Noman; Aaron Heuermann; Klaus-Dieter Thoben
13:30-15:15	**WeBT5 | Big Data Analytics Adoption in Enhancing the Resilience of Manufacturing and Distribution Systems: Incentive, Implementation, and Impact** Chair: ***Yong He*** - Southeast University Co-Chair: ***Shanshan Li*** - Nanjing Audit University **13:30 - WeBT5.1 | Towards Optimization Methods for Order Data Management: A Case Study of a Medium-Sized Special Purpose Machinery Manufacturer (I)** Kevin Hansch; Arndt Lüder; David Hoffmann **13:50 - WeBT5.2 | A Dynamic Pricing Strategy for Agri-Products in an Online Advance Selling System (I)** Shanshan Li; Jingwen Wang; Ruojing Huang; Yong He **14:10 - WeBT5.3 | Inventory Decisions under Stochastic Demand Scenario with High Inflation Rate – Machine Learning Approach (I)** Vinu Siriwardena; Dilina Kosgoda; Niles Perera; Izabela Nielsen **14:30 - WeBT5.4 | Machine Learning-Driven Maintenance Order Generation in Assembly Lines (I)** Gábor Princz; Masoud Shaloo; Fabian Reisacher; Selim Erol **14:50 - WeBT5.5 | Robust Ordering Policies with Limited Information on Stochastic Lead Time (I)** Shibo Jin; Yong He

Wednesday, August 28, 2024 - Saal 5

15:30-17:15	**WeCT5 | LARG (Lean, Agile, Resilient, Green) Supply Chains and Manufacturing Systems - Part II** Chair: ***Eleonora Bottani*** - University of Parma, Department of Engineering and Architecture Co-Chair: ***Marta Rinaldi*** - University of Campania **15:30 - WeAC5.1 | Energy-Optimized Truck Door Assignment Problem (TDA): Scalability and Capacity Analysis (I)** Amna Altaf; Adnen El Amraoui; François Delmotte; Christophe Lecoutre **15:50 - WeAC5.2 | Distributed Ledger Technology Selection for Digital Battery Passport: A BWM-TOPSIS Approach (I)** Alessandro Neri; Maria Angela Butturi; Henrique Luis Sauer Oliveira; Francesco Lolli; Rita Gamberini; Miguel Sellitto **16:10 - WeAC5.3 | Obsolescence Risk Assesment: Key Challenges and Practical Lessons (I)** Amel Souifi; Marc Zolghadri **16:30 - WeAC5.4 | Obsolescence Management : Criteria Related to Its Context and Its Mitigation Techniques (I)** Salah Mokraoui; Mariem Besbes; Marc Zolghadri; Claude Baron **16:50 - WeAC5.5 | Bi-Objective Sustainable Crowdshipping with Multi Types of Occasional Drivers (I)** Daniel Sanchez Pineda; Audrey Cerqueus; Muhammad Khoirul Khakim Habibi; Alexandre Dolgui
17:30-19:15	**WeDT5 | Sustainable and Circular Manufacturing in the Digitized World** Chair: ***Maroua Nouiri*** - LS2N - Nantes Université, France Co-Chair: ***Yasamin Eslami*** - Ecole Centrale De Nantes **17:30 - WeAD5.1 | Digital Twins in Manufacturing: A Three-Layer Heat-Map Analysis (I)** Luis Felipe Villegas Torres; Marco Macchi; Adalberto Polenghi **17:50 - WeAD5.2 | Integrated Genetic Algorithm with Dispatching Rules to Solve the Flexible Job Shop Scheduling Problem under Multi-AMR Transportation Constraints (I)** Akrem Ben Haj Mouldi; Maroua Nouiri **18:10 - WeAD5.3 | Pure Data-Driven Machine Learning Challenges for pFMEA: A Case Study (I)** Mahdi Mokhtarzadeh; Jorge Rodríguez-Echeverría; Zafer Zeren; Johan Van Noten; Sidharta Gautama **18:30 - WeAD5.4 | Balancing and Scheduling of Sustainable Flexible Transfer Lines (I)** Amir Nourmohammadi; Pedram Beldar; Masood Fathi; Ehsan Mahmoodi **18:50 - WeAD5.5 | Digital Twin Creation for Circular Manufacturing: A Behavioral Modeling Approach (I)** Maria Gabriela Juarez Juarez; Adriana Giret; Vicent Botti

Wednesday, August 28, 2024 - Saal 6

10:45-12:30	**WeAT6 | Digital Twin in Intelligent Manufacturing and Logistics Systems - Part I** Chair: ***Serena Finco*** - Università Degli Studi Di Padova Co-Chair: ***Micro Peron*** - NEOMA Business School **10:45 - WeAT6.1 | Integrating Production and Maintenance Planning in Process Industries Using Digital Twin: A Literature Review (I)** Giulia Fede; Fabio Sgarbossa; Nicola Paltrinieri **11:05 - WeAT6.1 | Model Based Systems Engineering Applied to Digital Twin Engineering: Why and How To? (I)** Clarissa Gregory; Rindra Mbolamananamalala; Souad Rabah; Vincent Chapurlat **11:25 - WeAT6.1 | A Digital Twin and Data Spaces Framework towards Resilient Manufacturing Value Chains (I)** Emmanouil Bakopoulos; Kostantinos Sipsas; Nikolaos Nikolakis; Kosmas Alexopoulos **11:45 - WeAT6.1 | Human-Centered Problem Solving in Manufacturing: The Digital Triplet Approach (I)** Shinsuke Kondoh; Leon Akiyama; Jumpei Goto; Yasushi Umeda; Hideaki Takeda **12:05 - WeAT6.1 | Exploring Digital Twin Dynamics: An Analysis of Structure Configurations (I)** Victoria Melo; José Barbosa; Flavia Pires; Fernando De la Prieta; Paulo Leitão
13:30-15:15	**WeBT6 | Digital Twin in Intelligent Manufacturing and Logistics Systems - Part II** Chair: ***Serena Finco*** - Università Degli Studi Di Padova Co-Chair: ***Micro Peron*** - NEOMA Business School **13:30 - WeBT6.1 | Systematic Development of a Virtual Commissioning Architecture for an Automated Production System (I)** Omar Ismail; Lasse Beers; Felix Gehlhoff; Nihar Hasmukhbhai Shah; Alexander Fay **13:50 - WeBT6.2 | MODAPTO: Modular Manufacturing and Distrubuted Control Via Interoperable Digital Twins (I)** Pavlos Eirinakis; Benoît Iung; Ioannis Mourtos; Stathis Plitsos; Ljiljana Stojanovic; George Triantafyllou; Alexandre Voisin **14:10 - WeBT6.3 | Modeling the Integrated Flexible Job-Shop and Operator Scheduling in Flexible Manufacturing Systems (I)** Reza Ghorbani Saber; Pieter Leyman; El-Houssaine Aghezzaf **14:30 - WeBT6.4 | A Methodological Framework Addressing Challenges and Opportunities in Supply Chain AI (I)** Lydia Novoszel; Isabell Claus **14:50 - WeBT6.5 | Designing the Operator of the Future: The Architecture of Human Digital Twin Systems (I)** Daria Battini; Nicola Berti; Christian Cella; Marco Faroni; Paolo Garza; Mattia Guidolin; Sandro Moos; Elena Carlotta Olivetti; Monica Reggiani; Emilio Sardini; Sarah Tonello

Wednesday, August 28, 2024 - Saal 6

15:30-17:15	**WeCT6 | Engineering AI in Manufacturing. Technologies, Challenges, Results and Impact** Chair: ***Alexandre Voisin*** - Nancy-University Co-Chair: ***George Triantafyllou*** - Athens Technology Center **15:30 - WeCT6.1 | Dynamic Grouping in Maintenance Planning and Optimization: An Industrial Application (I)** Van-Thai Nguyen; Phuc Do; Chiara Franciosi; Alexandre Voisin; Benoît Iung; Li Li **15:50 - WeCT6.2 | Early Concurrent Engineering in the Aerospace Industry Supported by a Digital Thread Framework (I)** Eliott Duverger; Alexis Aubry; Eric Levrat; Rebeca Arista Rangel **16:10 - WeCT6.3 | A Flow Formulation for the Rolling Stock Maintenance Scheduling Problem (I)** Pietro Folco; Enrico Malaguti; Abderrahim Sahli; Sana Belmokhtar-Berraf; Laurent Bouillaut **16:30 - WeCT6.4 | Towards Minimizing Domain Gap When Using Synthetic Data in Automotive Vision Control Applications (I)** Mohamed Slim Werda; Hamza Taibi; Khalid Kouiss; Ahmed Chebak; Saif Ben Halima; Michael Decottignies; Carey Dilliott **16:50 - WeCT6.5 | Human-Robot Collaborative Reinforcement Learning in Semi-Automated Manufacturing Operations (I)** Praditya Ajidarma; Shimon Y. Nof
17:30-19:15	**WeDT6 | Physical Internet in Modern Logistics and Supply Chain Management** Chair: ***Shenle Pan*** - MINES Paris, PSL University **17:30 - WeDT6.1 | Resilience Analysis of Multi-Modal Logistics Service Network through Robust Optimization with Budget-Of-Uncertainty (I)** Yaxin Pang; Shenle Pan; Eric Ballot **17:50 - WeDT6.2 | Improving the Environmental Impact of Empty Containers in Water-Road Hubs: A Physical Internet Approach (I)** Monica-Juliana Perez; Tarik Chargui; Damien Trentesaux **18:10 - WeDT6.3 | Enhancing Supply Chain Efficiency with Blockchain: Addressing Information Sensitivity for Increased Manufacturer Profitability (I)** Prerna Jain; Nitin Mishra **18:30 - WeDT6.4 | A Collaboration Design Method for Facilitating SME Inclusion in Global Supply Chains (I)** Nikolai Kazantsev; Iain Duncan Stalker; Pedro Sampaio; Nikolay Mehandjiev **18:50 - WeDT6.5 | Sustainable Multi-Objective Truck Scheduling in a Rail-Road Physical Internet Cross-Docking Hub with Internal Storage (I)** Soukaina Aberka; Marouan Aghrod; Ettaki Wafae; Zakaria Natiji; Tarik Chargui; Sondes Chaabane

Thursday, August 29, 2024 - Julius Raab Saal

9:00-9:45	**ThKN | Keynote of Dmitry Ivanov** ***The future of supply chain simulation and digital twins*** Berlin School of Economics and Law, Germany Moderator: ***Sebastian Schlund***
10:15-12:00	**ThAT0 | Industry 5.0 - Human-Centered Production and Logistics Systems - Part III** Chair: ***Eric Grosse*** - Saarland University Co-Chair: ***Fabio Sgarbossa*** - Norwegian University of Science and Technology - NTNU **10:15 - ThAT0.1 | Human Factors in Healthcare Operations: A Case Study in Italian Emergency Rooms (I)** Claudia Piffari, Alexandra Lagorio, Chiara Cimini, Roberto Pinto **10:35 - ThAT0.2 | Balancing Physical Workload During Workforce Scheduling for Fair Task Assignment in a Manual Warehouse (I)** Alexander Lunin **10:55 - ThAT0.3 | Leadership Impact on Employee Well-Being: The Order Picker's Voice (I)** Ilse Cretskens, Katrien Ramaekers, An Caris, Koen Van Laer **11:15 - ThAT0.4 | Performance Differences in the Ageing Workforce Era: An Experimental Study with Industry 4.0 Assistive Technologies (I)** Andrea Lucchese, Sotirios Panagou, Fabio Sgarbossa **11:35 - ThAT0.5 | A New Kinect-Enabled Motion Analysis Approach for Warehouse Materials Handling Activities (I)** Ting Zheng, Constantin Wildt, Minqi Zhang, Christoph Glock, Felix Weidinger, Eric Grosse
12:00-13:00	**ThLU_TC1 | IFAC Internal – Technical Committee Meetings** **TC 5.1** - Manufacturing Plant Control (**Chair Marco Macchi**)
13:00-14:45	**ThBT0 | Panel Discussion on Smart and Sustainable Manufacturing** Title: **How European manufacturing is shaping our greener and digital future** Moderator: ***Sebastian Schlund*** Keynote Speaker: ***Caroline Viarouge*** *(CEO of EIT Manufacturing)* Discussant: ***Daniel Valtiner*** *(Infineon Technologies Austria AG, FH Kärnten)*, ***Ana Paula Nishio de Sousa*** *(UNIDO, Head of Division of Digital Transformation and Artificial Intelligence)*, ***Enzo Frazzon*** *(Federal University of Santa Catarina)*, ***Dmitry Ivanov*** *(Berlin School of Economics and Law)*

Thursday, August 29, 2024 - Julius Raab Saal

15:15-17:20	**ThCT0 | Industry 5.0 - Human-Centered Production and Logistics Systems - Part IV** Chair: ***Eric Grosse*** - Saarland University Co-Chair: ***Fabio Sgarbossa*** - Norwegian University of Science and Technology - NTNU **15:15 - ThCT0.1 | The Variance Learning Curve in Retail Order Picking (I)** Dominic Loske, Matthias Klumpp **15:35 - ThCT0.2 | Industry 5.0 and Supply Chain Management: Coevolution and Future Research Directions (I)** Aluthkumbura Mudiyanselage Amila Shanaka Mahinda Bandara, Amila Indunil Thibbotuwawa Gamage, Niles Perera, Peter Nielsen **15:55 - ThCT0.3 | Human Factors on the Road: Truck Drivers' Heterogeneity in Distribution (I)** Maria Keil, Dominic Loske, Tiziana Modica, Matthias Klumpp **16:15 - ThCT0.4 | Selection of Motion Capture Technologies for Industry 5.0 Production Systems: A Structured Literature Review (I)** Erik Harnau, Stephan Breiter, Julia Arlinghaus

Thursday, August 29, 2024 - Saal 1

10:15-12:00	**ThAT1 | Advances Toward Smart Digitized Shopfloors** Chair: ***Yuval Cohen*** - Afeka Tel Aviv College of Engineering Co-Chair: ***Marco Macchi*** - Politecnico Di Milano **10:15 - ThAT1.1 | Information Flow in Digital Twin for "Detection to Repair" of Defects Using Additive Manufacturing (I)** Dylan Bender, Jordan Anderson, Mike Gilbert, Ahmad Barari **10:35 - ThAT1.2 | Proposal of a Human-In-The-Loop-Based Framework for Advancing Maintenance Applications for Collaborative Robots (I)** Adalberto Polenghi, Marco Macchi **10:55 - ThAT1.3 | Generative Shopfloor Layout Design: Challenges and Proposed Modelling Approach (I)** Yuval Cohen, Yehudit Aperstein **11:15 - ThAT1.4 | Automation of Operations in Assembly of Battery Modules in Electric Vehicles (I)** Milad Ashourpour **11:35 - ThAT1.5 | How Does the Application of Augmented Reality Affect the Mental Workload of Human Workers? a Collection of Preliminary Results (I)** Leonardo Maretto, Daria Battini, Maurizio Faccio, Irene Granata, Mohamad Y. Jaber
15:15-17:20	**ThCT1 | Challenges and Opportunities in Applying Additive Manufacturing for Operations and Supply Chain Management** Chair: ***Micro Peron*** - NEOMA Business School Co-Chair: ***Serena Finco*** - Università Degli Studi Di Padova **15:15 - ThCT1.1 | A Framework to Assess the Impact of Recycled or Reused Metal Powder on Circular Additive Manufacturing (I)** Enes Demiralay, Fabio Sgarbossa, Nima Razavi **15:35 - ThCT1.2 | A Production Scheduling Case Study Solved for Electron Beam Powder Bed Fusion (I)** Erica Pastore, Manuela Galati, Arianna Alfieri, Luca Iuliano **15:55 - ThCT1.3 | Examining Replacement Part Supply Chain Links with Intellectual Property Issues When Using Additive Manufacturing (I)** Kwaku Adu-Amankwa, Athanasios Rentizelas, Jonathan Corney, Andrew Wodehouse **16:15 - ThCT1.4 | Potentials and Challenges of Hybrid Manufacturing for Sustainable Production (I)** Vishnu Parameswaran Nair, Eduardo Guerra, Egger Georg, Kayvan Darvishifard, Mathias Brandstötter **16:35 - ThCT1.5 | Impact of Additive Manufacturing and Parametric Design on the Structure and Economic Efficiency of Construction Supply Chains (I)** Konrad Schneidenbach, Carsten Feldmann **16:55 - ThCT1.6 | Numerical Analysis of a Spare Parts Supply Chain with Additive Manufacturing (I)** Joris van Oers, Ipek Tanil, Rob Basten

Thursday, August 29, 2024 - Saal 2

10:15-12:00	**ThAT2 | CHAllenges to Human-machine Collaboration for SUstainable Production (CHASUP'24) - Part I** Chair: ***Justyna Patalas-Maliszewska*** - University of Zielona Góra Co-Chair: ***Izabela Nielsen*** - Aalborg University **10:15 - ThAT2.1 | PCA Analysis of Resource Availability As One of the Inputs in the Process of Estimating the Length of Assembly Time for Complex Products (I)** Jolanta Brzozowska, Monika Kulisz, Arkadiusz Gola **10:35 - ThAT2.2 | Challenges to Sustainable Production: A Case Study of Machining Process (I)** Justyna Patalas-Maliszewska, Hanna Łosyk, Matthias Rehm **10:55 - ThAT2.3 | Preventive and Proactive Planning of PaaS Maintenance Service Teams (I)** Eryk Szwarc, Grzegorz Bocewicz, Arkadiusz Gola, Robert Wójcik, Zbigniew Banaszak **11:15 - ThAT2.4 | Modelling Smart Machining Process towards Intelligent Manufacturing - a Case Study (I)** Dineshkumar Musalekar, Justyna Patalas-Maliszewska
15:15-17:20	**ThCT2 | CHAllenges to Human–machine Collaboration for SUstainable Production (CHASUP'24) - Part II** Chair: ***Justyna Patalas-Maliszewska*** - University of Zielona Góra Co-Chair: ***Izabela Nielsen*** - Aalborg University **15:15 - ThCT2.1 | Review of Methods for Developing and Integration of a Digital Twin in NC-Based Production Systems (I)** Manuel Norberger, Matthias Rehm, Holger Schlegel, Martin Dix, Justyna Patalas-Maliszewska **15:35 - ThCT2.2 | Study of the Use of Robotic Process Automation in Supporting Customer Order Process (I)** Jacek Krzywy, Karol Dorofiejczuk, Filip Nowak, Malgorzata Jasiulewicz-Kaczmarek **15:55 - ThCT2.3 | Efficiency Analysis of Deep Learning-Based Object Detection for Safe Human Robot Collaboration (I)** Adam Dudek, Justyna Patalas-Maliszewska, Krzysztof Rokosz **16:15 - ThCT2.4 | The Relation between Cognitive and Organizational Factors in the Production Environment (I)** Vincent Sahyoun, Jelena Petronijevic, Alain Etienne, António Brandão Moniz, Bettina-Johanna Krings, Ali Siadat **16:35 - ThCT2.5 | A Digital Twin for Detecting Liquid-Liquid Interface in Containers (I)** Agesinaldo M. Silva Jr, Naser Tanabi, Ahmad Barari, Luiz Octavio Vieira Pereira, Flavio Buiochi, Marcos de Sales Guerra Tsuzuki

Thursday, August 29, 2024 - Saal 3

10:15-12:00	**ThAT3 | Supply Chain Resilience and Viability** Chair: ***Martina Calzavara*** - University of Padua Co-Chair: ***Alexandre Dolgui*** - IMT Atlantique **10:15 - ThAT3.1 | Network Science Indicators and Their Relationship with Performance During Disruptions: A Case Study (I)** Michele Martignago, Phu Nguyen, Niloofar Katiraee, Martina Calzavara, Dmitry Ivanov **10:35 - ThAT3.2 | Viability and Resilience in the Personal Protective Equipment Supply Chain: The Impacts of Covid-19 (I)** Giulia Caggia, Julien Fondrevelle, Anna Corinna Cagliano **10:55 - ThAT3.3 | Increasing Supply Network Resilience by Collaborative Negotiation Protocols (I)** Frederik Weber, Shimon Y. Nof **11:15 - ThAT3.4 | Commission-Rate vs. Fixed-Fee Contract in a Supply Chain of Mobile Apps Involving Risk (I)** Tal Avinadav, Priel Levy **11:35 - ThAT3.5 | Challenges in Healthcare Supply Chain Resilience Management: A Conceptual Framework (I)** Claudia Piffari, Alexandra Lagorio, Roberto Pinto
15:15-17:20	**MARIE SKŁODOWSKA-CURIE ACTIONS Program, Staff Exchanges (SE) Call: HORIZON-MSCA-SE-2021, PART B2 - "DEMO**

Thursday, August 29, 2024 - Saal 4

10:15-12:00	**ThAT4 | Technologies for Circular Economy and Sustainability in Industry - Part II** Chair: ***Giuseppe Vignali*** - University of Parma Co-Chair: ***Eleonora Bottani*** - University of Parma, Department of Engineering and Architecture **10:15 - ThAT4.1 | Sustainable Maintenance: What Are the Key Technology Drivers for Ensuring Positive Impacts of Manufacturing Industries? (I)** Theresa Madreiter, Borjan Trajanoski, Alberto Martinetti, Fazel Ansari **10:35 - ThAT4.2 | A Platform Architecture for Data and AI-Supported Human-Centred Zero Defect Manufacturing for Sustainable Production (I)** René Berndt, Doriana Cobârzan, Eva Eggeling **10:55 - ThAT4.3 | Influence-Based Analysis of Disruptions in an Energy Distribution Network Following a Main Channel Outage (I)** Eya Kalboussi, Nadia Ndhaief, Nidhal Rezg **11:15 - ThAT4.4 | Reducing Greenhouse Gas Emissions (GHG) in Civil Construction Using Topology Optimization and Additive Manufacturing (I)** Francisco Helio Alencar Oliveira, Renato Picelli, Emilio Carlos Nelli Silva, Ahmad Barari, Roberto Cesar de Oliveira Romano, Rafael Giuliano Pileggi, Marcos de Sales Guerra Tsuzuki **11:35 - ThAT4.5 | Sustainability in Servitization: A Review of Assessment Methodologies for the Steel Sector (I)** Mattia Galimberti, Chiara Cimini, Sergio Cavalieri
13:00-14:45	**ThBT4 | Digital Transformation in SMEs: Industrial Practices, State of the Art, Challenges and Issues - Part II** Chair: ***Taha Arbaoui*** - INSA De Lyon **13:00 - ThBT4.1 | Assessing Zero-Defect Manufacturing Maturity: A Review of the State of the Art (I)** Danusuya Pachimuthu, Marta Pinzone, Marco Taisch **13:20 - ThBT4.2 | Unveiling the Gap: The Misalignement of Digital Transformation Support Tools for Manufacturing SMEs (I)** Charles Bélanger, Sébastien Gamache **13:40 - ThBT4.3 | "Smart" Lead Time Prediction in SMEs Environments: A Theoretical Framework Proposal (I)** Valentina De Simone, Valentina Di Pasquale, Raffaele Iannone, Salvatore Miranda **14:00 - ThBT4.4 | Challenges and Solutions to Adopt Smart Maintenance in SMEs: A Literature Review and Research Agenda (I)** Majid Nasirinejad, Hamid Afshari, Srinivas Sampalli **14:20 - ThBT4.5 | A Literature Review of Maturity Models for Cyber-Physical Production Systems (I)** Sofia Abadia Bermeo, Oscar Avila, Virginie Goepp

Thursday, August 29, 2024 - Saal 4

15:15-17:20	**ThCT4 | SMART INTRALOGISTICS for WAREHOUSING and MATERIAL HANDLING in MANUFACTURING and DISTRIBUTION SYSTEMS - Part I** Chair: ***Martina Calzavara*** - University of Padua Co-Chair: ***Eric Grosse*** - Saarland University **15:15 - ThCT4.1 | Ergonomic Evaluation of Human–Robot Collaborative Order Picking: A Combined Laboratory and Simulation Study (I)** Minqi Zhang, Jakob Marolt, Primož Bencak, Tone Lerher, Eric Grosse **15:35 - ThCT4.2 | Warehouse Picking or Putting? a Preliminary Study to Understand Their Applicability to Fresh Products (I)** Martina Calzavara, Alessandro Persona, Ilenia Zennaro **15:55 - ThCT4.3 | Demand Driven Material Requirement Planning: Core Concepts and Analysis of Its Behavior on a Case Study (I)** Stephanie Bayard, Frédéric Grimaud, Xavier Delorme **16:15 - ThCT4.4 | Transition to Synchronization-Driven Smart Inbound Logistics: An Action Research-Oriented Study (I)** Tea Castellucci, Elena Tappia, Emilio Moretti, Marco Melacini **16:35 - ThCT4.5 | Cold Storage Order Picking Performance: Effects of Load Unit Utilization and Product Volume (I)** Thilini Ranasinghe, Dominic Loske, Eric Grosse

Thursday, August 29, 2024 - Saal 5

10:15-12:00	**ThAT5 | Simulation Modeling, Machine Learning and Optimization Algorithms to Support Decision Making in Production and Logistics - Part I** Chair: ***Tobias Reggelin*** - Otto Von Guericke University Magdeburg Co-Chair: ***Stefan Galka*** - OTH - Ostbayerische Technische Hochschule Regensburg **10:15 - ThAT5.1 | Simulation Study of a Multi-Level Shuttle System with In-Rack Picking Stations (I)** Andrea Ferrari, Alessandra Verso, Antonio Carlin, Carlo Rafele **10:35 - ThAT5.2 | Minimizing the Number of Mail Sorting Sessions As a Variant of Vector Bin-Packing: A Case Study at La Poste (I)** Emmanuelle Amann, Evgeny Gurevsky, Arnaud Laurent, Nasser Mebarki **10:55 - ThAT5.3 | Value Stream Management 4.0 - Simulating Improvement Measures and Implementing Them (I)** Tim Wollert, Raid Al-Aomar, Fabian Behrendt **11:15 - ThAT5.4 | Using Sentiment Analysis to Detect Disruptive Events in Supply Chains (I)** Kiran Katoor Vishnuthilak, Benjamin Rolf, Tobias Reggelin, Sebastian Lang **11:35 - ThAT5.5 | Rainbow versus Deep Q-Network: A Reinforcement Learning Comparison on the Flexible Job-Shop Problem (I)** Arthur Corrêa, Alexandre Jesus, Cristóvão Silva, Paulo Peças, Samuel Moniz
13:00-14:45	**ThBT5 | Simulation Modeling, Machine Learning and Optimization Algorithms to Support Decision Making in Production and Logistics - Part II** Chair: ***Tobias Reggelin*** - Otto Von Guericke University Magdeburg Co-Chair: ***Stefan Galka*** - OTH - Ostbayerische Technische Hochschule Regensburg **13:00 - ThBT5.1 | A Novel Personnel Planning Method to Improve Operations Management: Transferring Lessons Learned from Manufacturing to Healthcare (I)** Gaal Alexander, Wolfgang Dummer, Paul Lindorfer, Fazel Ansari **13:20 - ThBT5.2 | Virtual Commissioning of a 5-Axis Positioning System: A Case Study (I)** Matthias Schamp, Stijn Huysentruyt, Steven Hoedt, El-Houssaine Aghezzaf, Johannes Cottyn **13:40 - ThBT5.3 | Coupling Case-Based Reasoning (CBR) and Machine Learning for Manufacturing Time Estimation (I)** Abdourahim Sylla, Mostafa Hajj Chehade **14:00 - ThBT5.4 | Integrating Machine Learning and Operations Research Methods for Scheduling Problems: A Bibliometric Analysis and Literature Review (I)** Ayoub Ouhadi, Zakaria Yahouni, Maria Di Mascolo **14:20 - ThBT5.5 | Flexible Programming Model for Efficient Workload Control in the Car Sequencing Problem (I)** Sana Jalilvand, Mehdi Mahmoodjanloo, Armand Baboli

Thursday, August 29, 2024 - Saal 5

15:15-17:20	**ThCT5 | Simulation Modeling, Machine Learning and Optimization Algorithms to Support Decision Making in Production and Logistics - Part III** Chair: ***Tobias Reggelin*** - Otto Von Guericke University Magdeburg Co-Chair: ***Stefan Galka*** - OTH - Ostbayerische Technische Hochschule Regensburg **15:15 - ThCT5.1 | An Approach Based on a Multi-Agent System for Production Scheduling Problem under Uncertainty on Solar Power (I)** Mohamed Habib Jabeur, Sonia Mahjoub, Cyril Toublanc, Véronique Cariou **15:35 - ThCT5.2 | Dynamic Process Force Simulation Model for Multi-Axis Milling Processes (I)** Adrian Karl Rüppel, Patrick Ochudlo, Markus Meurer, Thomas Bergs, Sebastian Stemmler **15:55 - ThCT5.3 | Initialization of Simulation-Based Digital Twins for Internal Transport Systems (I)** Stefan Galka, Florian Schmid **16:15 - ThCT5.4 | The Flexible Job Shop Scheduling Problem with Setups and Operator Skills: An Application in the Textile Industry (I)** Tom Perroux, Taha Arbaoui, Leila Merghem Boulahia **16:35 - ThCT5.5 | Assessing External Wheat Supply Risk: Perspectives from a Low Middle-Income Country on Wheat Imports (I)** Praveena Somaweera, Dilina Kosgoda, Niles Perera

Thursday, August 29, 2024 - Saal 6

10:15-12:00	**ThAT6 | Intelligent Methods and Tools Supporting Decision Making in Manufacturing Systems and Supply Chains - Part I** Chair: ***Enzo Morosini Frazzon*** - Federal University of Santa Catarina Co-Chair: ***Michael Freitag*** - University of Bremen **10:15 - ThAT6.1 | A Method for Managing Metrology WIP Queues in an Adaptive Sampling and an Automated Context (I)** Allwell Dilosi, Alaa Hassan, Ali Siadat, Aymen Mili **10:35 - ThAT6.2 | Towards a Data-Driven Adaptive Approach for Integrated Inventory, Production and Maintenance Control (I)** Eike Broda, Satie Ledoux Takeda-Berger, Icaro Agostino, Enzo Morosini Frazzon, Michael Freitag **10:55 - ThAT6.3 | An Integrated Concept for Robust Supply Chain and Manufacturing System (I)** Chenghao Dai, Torsten Böhme, Sebastian Häberer **11:15 - ThAT6.4 | Trust and Reputation Systems for Production Networks (I)** Ádám Szaller, Sándor Bozóki, László Csató, Peter Egri, Zsombor Szádoczki, József Váncza
12:00-13:00	**ThLU_TC2 | IFAC Internal – Technical Committee Meetings** **TC 5.3** - Integration and Interoperability of Enterprise Systems (**Chair Qing Li)**
15:15-17:20	**ThCT6 | Intelligent Methods and Tools Supporting Decision Making in Manufacturing Systems and Supply Chains - Part II** Chair: ***Enzo Morosini Frazzon*** - Federal University of Santa Catarina Co-Chair: ***Michael Freitag*** - University of Bremen **15:15 - ThCT6.1 | Cognitive Assistance Systems in Intralogistics: A User Study on the Effects of Varying Levels of Customization (I)** Hendrik Stern, Rebecca Diedrich, Michael Freitag **15:35 - ThCT6.2 | New Visual Resource-Oriented Margins for the Resource Constrained Project Scheduling Problem (I)** Oussama Siwane, Robert Pellerin, Issmail El Hallaoui **15:55 - ThCT6.3 | A Financialized Model for a Risk-Focused Sales and Operations Planning (I)** Danielle Fakhry, Raphael Oger, Matthieu Lauras, Vincent Pellegrin **16:15 - ThCT6.4 | Process Control Systems Based on Real-Time Digital Predictive Models (I)** Natalia Bakhtadze, Alexey Chereshko, Denis Elpashev, Aleksandr Suleykin, Besarion Shanshiashvili

Gala Dinner Agenda

18th IFAC Symposium on Information Control Problem

18:00	**Guest Arrival**
18:30	**Welcome Address** Speaker: ***Peter Ertl***, Vice Rector Research, Innovation, International Affairs, TU Wien Moderator: ***Sebastian Schlund***
18:45	**Austrian Music Performance** Performed by: ***TU Orchestra***
19:00	**Gala Dinner Keynote** Speaker: ***Alexandre Dolgui*** Topic: ***Information Control Problems in Manufacturing: History of IFAC INCOM Symposium*** Moderator: ***Dmitry Ivanov***
19:45	**Dinner**

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9:00-9:45	**FrKN | Keynote of Andreas Kugi** ***Advanced Control for Sustainable Autonomous Manufacturing*** TU Wien & Scientific Director of the AIT Austrian Institute of Technology Moderator: ***Fazel Ansari***
10:30 12:00	**FrSS | CC5 Panel "Resilient, Digital and Sustainable Manufacturing and Supply Chains"** Chair: ***Dmitry Ivanov*** Co-Chair: ***Fabio Sgarbossa, Marco Macchi, Qing Li***
13:15-15:00	**FrAT0 | Challenges and Opportunities in Supply Chain AI** Chair: ***Liming Xu*** - University of Cambridge Co-Chair: ***Dmitry Ivanov*** - Berlin School of Economics and Law **13:15 - FrAT0.1 | Semantic Modelling of a Manufacturing Value Chain: Disruption Response Planning (I)** Basem Elshafei, Giovanna Martinez Arellano, Jack Christopher Chaplin, Svetan Ratchev **13:35 - FrAT0.2 | Multi-Agent Systems and Foundation Models Enable Autonomous Supply Chains: Opportunities and Challenges (I)** Liming Xu, Sara Almahri, Stephen Mak, Alexandra Brintrup **13:55 - FrAT0.3 | A Conversationally Enabled Decision Support System for Supply Chain Management: A Conceptual Framework (I)** Roberto Pinto, Alexandra Lagorio, Carlo Rafele, Giulio Mangano, Giovanni Zenezini, Claudia Ciceri **14:15 - FrAT0.4 | Evaluating Barriers to the Adoption of Blockchain for Enhancing Transparency in the Procurement Process within Apparel Supply Chains (I)** Madumali Sawani, Amila Indunil Thibbotuwawa Gamage, Saniuk Sebastian, Peter Nielsen **14:35 - FrAT0.5 | Artificial Intelligence Opportunities for Resilient Supply Chains (I)** Funlade Sunmola, George Baryannis
15:15-16:00	**FrAwC | Closing and Awards Ceremony** **Young Author Awards** – Selection Committee (***Sebastian Schlund, Julia Arlinghaus, Benoit Iung***) **Best Paper Award** – Selection Committee Chair: ***Fabio Sgarbossa*** **PhD Workshop Best Presentation Award - *Fabio Sgarbossa, Marco Macchi*** **Data Challenge Award - *Alexandra Brintrup, Liming Xu*** **Announcing INCOM 2027** – ***Dmitry Ivanov*** **Final Words** – ***Fazel Ansari and Sebastian Schlund***

Friday, August 30, 2024 - Saal 1

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13:15-15:00	**FrAT1 | AI in the Cognitive Cyber-Physical Enterprise** Chair: ***Hervé Panetto*** - CRAN, University of Lorraine, CNRS Co-Chair: ***Qing Li*** - Tsinghua University **13:15 - FrAT1.1 | Artificial Intelligence-Based Recommendation System for Detecting and Diagnosing Broken Bars in Induction Motors under Transient Operation (I)** Narco Afonso Ravazzoli Maciejewski, Roberto Zanetti Freire, Anderson Luis Szejka, Thiago Bazzo, Sofia M. A. Lopes, Rogério Andrade Flauzino **13:35 - FrAT1.2 | Knowledge-Data Driven for Cyber-Physical Production Systems in the Aerospace Industry: Current Issues and Emergent Technologies (I)** Murillo Skrzek, Anderson Luis Szejka, Fernando Mas, Maria Jose Escalona Cuaresma **13:55 - FrAT1.3 | A Double-Direction Cognitive Interaction Security Architecture for CPSS: A Case Study (I)** Mengjin Qu, Qing Li, Zhixiong Fang, Rui Liu **14:15 - FrAT1.4 | Optimization of Process, Knowledge, and Manufacturing Management in Customized Production: A Graph-Based Approach for Manufacturing Planning (I)** Patrick Bründl, Micha Stoidner, Huong Giang Nguyen, Ahmad Abrass, Jörg Franke **14:35 - FrAT1.5 | Cognitive Architectures for Cognitive Cyber-Physical Systems (I)** Jana Al Haj Ali, Mario Lezoche, Hervé Panetto, Yannick Naudet, Ben Gaffinet

Friday, August 30, 2024 - Saal 2

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13:15-15:00	**FrAT2 | Advanced Systems Engineering ASE to Enhance Sustainability and Circularity** Chair: ***Oliver Riedel*** - University of Stuttgart **13:15 - FrAT2.1 | The Digital Product Passport: Scenario-Based Recommendations for the Manufacturing Industry (I)** Adrian Barwasser, Frauke Schuseil, Andreas Werner, Nikolas Zimmermann, Moritz Jung **13:35 - FrAT2.2 | Exploring the Potentials of Advanced Systems Engineering and Frugal Innovation for Sustainable Product Development in German Industry (I)** Josip Zilic, Adrian Sins, Liza Wohlfart, Mehmet Kürümlüoglu **13:55 - FrAT2.3 | Linking Product Development's and Society's View on Sustainability to Enhance the Contextual Derivation and Validation of Requirements (I)** Fabian Romano Rusch, Wilke Willems, Niels Demke, Frank Mantwill **14:15 - FrAT2.4 | Information-Based Integration of Life Cycle Assessment into IT Landscapes of Manufacturing Companies (I)** Martin Perau, Niklas Laubach, Tobias Schröer, Wolfgang Boos, Günther Schuh **14:35 - FrAT2.5 | Approach for Linking System Architecture and Business Model Based on the Example of Circular Value** Benjamin Schneider, Helge Spindler, Mehmet Kürümlüoglu

Friday, August 30, 2024 - Saal 4

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13:15-15:00	**FrAT4 | SMART INTRALOGISTICS for WAREHOUSING and MATERIAL HANDLING in MANUFACTURING and DISTRIBUTION SYSTEMS - Part II** Chair: ***Martina Calzavara*** - University of Padua Co-Chair: ***Eric Grosse*** - Saarland University **13:15 - FrAT4.1 | A Design Framework for Shuttle-Based Automated Storage Systems (I)** Ilaria Battarra, Riccardo Accorsi, Giacomo Lupi, Riccardo Manzini **13:35 - FrAT4.2 | Workload Balancing and Scheduling in Picking Tower Systems Considering Different Storage Strategies (I)** Martina Calzavara, Serena Finco, Alessandro Persona, Ilenia Zennaro **13:55 - FrAT4.3 | Machine Learning Prediction Model for Dynamic Scheduling of Hybrid Flow-Shop Based on Metaheuristic (I)** Abdelhakim Ghiles Hamiti, Wassim Bouazza, Arnaud Laurent, Nasser Mebarki, Mohamed Kenani **14:15 - FrAT4.4 | Performance Analysis for Puzzle-Based Movable Racks System with Diagonal Movements (I)** Kasuni Vimasha Weerasinghe, Fabio Sgarbossa

Friday, August 30, 2024 - Saal 5

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13:15-15:00	**FrAT5 | Sustainable Manufacturing-Distribution Systems: Recent Advances in Reliability and Maintenance Modelling and Optimization** Chair: ***Abdelhakim Khatab*** - Lorraine University / National School of Engineering Co-Chair: ***Claver Diallo*** - Dalhousie University **13:15 - FrAT5.1 | Combination Warranty Optimization Model Using Reconditioned Parts under Age Uncertainty (I)** Shlok Mulye, Abdelhakim Khatab, Claver Diallo, Uday Venkatadri, Nidhal Rezg **13:35 - FrAT5.2 | Optimizing Multilevel Maintenance in Multi-Component Systems under S-Dependent Competing Risks (I)** Xiaoning Feng, Xiaohui Chen, Shunkang Zhao **13:55 - FrAT5.3 | Optimal Selective Maintenance for Complex Systems under Stochastic Maintenance and Break Durations (I)** Ryan Patrick O'Neil, Claver Diallo, Abdelhakim Khatab **14:15 - FrAT5.4 | Using a Minimalist Bi-LSTM for Multi-Faceted Bearing Fault Detection (I)** Alexandros Noussis, Ahmed Saif, Abdelhakim Khatab, Claver Diallo **14:35 - FrAT5.5 | Estimating Remaining Useful Life of Cutting Tools in Machining Using an Extended Kalman Filter (I)** Qian Yang, Debasish Mishra, Krishna R. Pattipati, George M. Bollas

Friday, August 30, 2024 - Saal 6

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13:15-15:00	**FrAT6 | Intelligent Methods and Tools Supporting Decision Making in Manufacturing Systems and Supply Chains - Part III** Chair: ***Enzo Morosini Frazzon*** - Federal University of Santa Catarina Co-Chair: ***Michael Freitag*** - University of Bremen **13:15 - FrAT6.1 | A Holistic Approach towards Digitized Audit Procedures in Manufacturing for Data Quality Assessment (I)** Jan Mayer, Lennart Frederik Müller-Stein, Robert Trevino, Anna M. Nowak-Meitinger, Stefan Wellsandt **13:35 - FrAT6.2 | Operator Role Classification in Human-Automation Interaction: A Systematic Review (I)** Jasper Wilhelm, Michael Freitag **13:55 - FrAT6.3 | Optimizing Perishable and Non-Perishable Product Assignment to Packaging Lines in a Sustainable Manufacturing System: An AUGMECON2VIKOR Algorithm (I)** Reza Shahabi-Shahmiri, Reza Tavakkoli-Moghaddam, Zdenek Hanzalek, Mohammad Ghasemi, Seyed Ali Mirnezami, Mohammad Rohani Nezhad **14:15 - FrAT6.4 | Operator-Integrated Cluster Analysis for Production Quality Control (I)** David Hoffmann, Arndt Lüder, Stefan Biffl

Location Map - Julius Raab Saal

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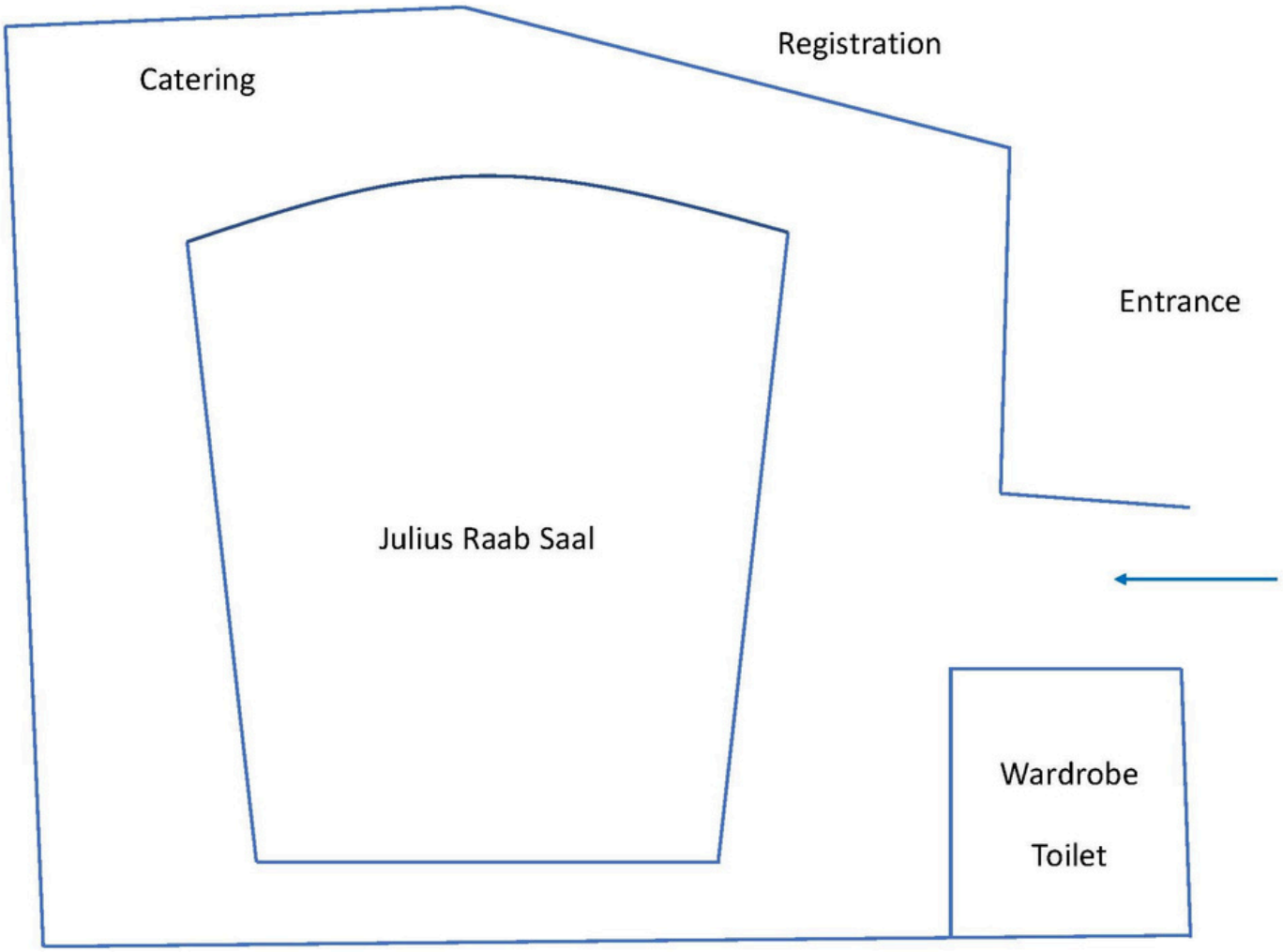

Location Map - Saal 1-6

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