SATURDAY, AUGUST 10
4:00 p.m. – 6:00 p.m.
IFPR Executive Board Meeting
invitation only – Geneva

7:30 p.m. – 9:00 p.m.
Dinner – Geneva

SUNDAY, AUGUST 11
9:30 a.m. – 5:00 p.m.
IFPR Board Meeting and Lunch – invitation only – Geneva

7:00 p.m. – 9:00 p.m.
Conference Reception – Zurich ABC

MONDAY, AUGUST 12
7:00 a.m.
Registration Opens and Continental Breakfast – Preconvene

8:00 a.m. – 10:00 a.m.
OPENING PLENARY SESSION – Zurich D

Concurrent Technical Sessions | Monday 10:30 a.m. – 12:00 p.m.  
* denotes presentation only

**M1030-G1: INNOVATIONS IN WAREHOUSE OPERATIONS 1**
Chair: Manjeet Singh, DHL Supply Chain, USA

- **Order Batching Optimization for Warehouses with Cluster-Picking**
  Aaya Aboelfotoh and Gursel Suer (Ohio University, USA); Manjeet Singh (DHL Supply Chain, USA)

- **A Two-Phase Algorithm to Solve a 3-Dimensional Pallet Loading Problem**
  Manjeet Singh (DHL Supply Chain, USA); Najat Almasarwah, NE. and Gursel Suer (Ohio University, USA)

- **Improving the Efficiency of Click and Collect with Vertical Lift Module (VLM)**
  Akhilesh Mea and Dale Masel (Ohio University, USA)

- **Novel Heuristics to Optimize Slotting for Improving Pick and Replenishment Productivities in Warehouses**
  Benjamin Fryman and Gursel Suer (Ohio University, USA); Manjeet Singh (DHL Supply Chain, USA)

**M1030-G2: SMART CITY**
Chair: Gonzalo Mejia, Universidad de La Sabana, Colombia

- **Information Technology Acceptance in Public Safety in Smart Sustainable Cities: A Qualitative Analysis**
  Vanessa Alves Tonete Oliveira and Gilson D Santos (Federal Technological University of Parana, Brazil)

- **Public Safety Decision-Making in the Context of Smart and Sustainable Cities**
  Marcos Colla and Gilson D Santos (Federal Technological University of Parana, Brazil)

- **Delivery of Perishable Export Products in Smart Cities: A Case Study in Bogotá (Colombia)**
  Gonzalo Mejia, William Guerrero, Alfonso Sarmiento, Nathalia Serrano, Margarita Sarmiento and Denny Camila Sánchez (Universidad de La Sabana, Colombia)

- **Local Accelerator Programs Towards Increasing Innovation Within Smart Cities**
  Isabellia Jesemann and Alanus von Radecki (Fraunhofer IAO, Germany)

- **Location Suitable for the Implementation of Carsharing in the City of São Paulo**
  Mariana Lage (Universidade de Sao Paulo, Brazil); Cláudia Machado (Universidade de São Paulo, Brazil); Cristiano Martins Monteiro (Universidade Federal de Minas Gerais, Brazil); Fernando Bersanetii (University of Sao Paulo, Brazil); José Quintanilha (Universidade de Sao Paulo, Brazil)

**M1030-V1: DIGITAL AND CYBER MANUFACTURING 1**
Chair: Agostino Villa, Politecnico di Torino, Italy

- **Maximizing Carsharing Profits: An Optimization Model to Support the Carsharing Planning**
  Cristiano Martins Monteiro (Universidade Federal de Minas Gerais, Brazil); Cláudia Machado (Universidade de São Paulo, Brazil); Mariana Lage (Universidade de São Paulo & USP, Brazil); Fernando Bersanetti (University of Sao Paulo, Brazil); Clodoveu A. Davis Jr. (Federal University of Minas Gerais, Brazil); José Quintanilha (Universidade de Sao Paulo, Brazil)

- **Proposed Approach to Measure the Degree of Readiness to Implement Industry 4.0**
  Wagner Lucto and Athos Pacchini (Universidade Nove de Julho - UNINOVE, Brazil); Giovanni Mummmolo and Francesco Facchini (Polytechnic University of Bari, Italy)

- **Practical Insights on Augmented Reality Support for Shop-Floor Tasks**
  Philipp Uriel, Wolfgang Vorraber and Johannes Gasser (Graz University of Technology, Austria)

- **Fostering Additive Manufacturing of Special Parts with Augmented-Reality On-Site Visualization**
  Dominik Kutej and Wolfgang Vorraber (Graz University of Technology, Austria)

- **Virtual Reality Enabled Manufacturing of Challenging Workpieces**
  Sakari Penttilä, Hannu Lund and Juho Ratava (LUT University, Finland); Mika Lohtander (Lappeenranta University of Technology, Finland); Paul Kah and Juha Varis (LUT University, Finland)

- **Smart Maintenance Solution with Augmented Reality (AR) and Mixed Reality (MR)**
  Hyunsuk Baek and Young Jae Jang (Korea Advanced Institute of Science and Technology, Korea)

- **A Potential Analysis and Evaluation of Cognitive Assistance Systems in the Context of Digitalization**
  Jessica Klappe (University of Stuttgart, Germany); Bastian Pokorni and Moritz Hämmerle (Fraunhofer Institute for Industrial Engineering IAO, Germany)
Keynote Speakers:
Albert Jones,
Scientific Advisor National Institute of Standards and Technology (NIST), USA

Presentation Title: Smart Manufacturing: Yesterday, Today and Tomorrow

Oliver Riedel,
Director Fraunhofer IAO, Germany

Presentation Title: Trends Toward Engineering and Manufacturing Excellence

10:00 a.m. – 10:30 a.m.
Refreshment Break – Preconvene

M1030-V1: MANUFACTURING STRATEGY 1
Chair: Sergio e. Gouvea da Costa, Pontifical Catholic University of Parana & Federal University of Technology, Brazil

Zurich E

Track Keynote Speaker:
R&D Opportunities for Ensuring Manufacturing Competitiveness
Ronald G. Askin, Industrial Engineering, Arizona State University (USA)

Efficiency Frontier Identification on the Context of Operations Strategy - A Study on Representative Constructs and Variables
Gabriela Veiga (Pontifical Catholic University of Paraná, Brazil); Edson Pinheiro de Lima and Sergio E. Gouvea da Costa (Federal University of Technology - Parana, Brazil); Eileen Van Aken (Virginia Tech, USA)

Evaluation of the Productive and Environmental Potential of Closed-Loop Manufacturing Processes
Flavio Numata, Jr. (Universidade NOVA de Lisboa & Faculdade de Ciência e Tecnologia - FCT, Brazil); Helena Navas (Universidade NOVA de Lisboa, Portugal)

Agile Shopfloor Organization Design for Industry 4.0 Manufacturing
Steffen Bader, Teresa Barth, Philipp Krohn, Rahel Ruchser, Lars Storch and Linda Wagner (ESB Business School University of Reutlingen, Germany); Stefanie Findeisen and Bastian Pokorni (Fraunhofer Institute for Industrial Engineering, Germany); Anja Braun (ESB Business School University of Reutlingen, Germany); Peter Ohlhausen (Fraunhofer Institute for Industrial Engineering, Germany); Daniel Palm (ESB Business School University of Reutlingen, Germany)

Traditional Vs Additive Manufacturing Supply Chain Configurations: A Comparative Case Study
Ajaseun Jimo and Christos Baziotes (Nottingham University Business School, United Kingdom (Great Britain)); Helen Rogers (Technische Hochschule Nürnberg, Germany); Kulwant Pawar (University of Nottingham, United Kingdom (Great Britain))

A Genetic Algorithm Approach for Multi Objective Cross Dock Scheduling in Supply Chains
Siwapong Kusolpuchong, Kerkkit Chusap, Omar Alhawari and Gursel Suer (Ohio University, USA)

Sugarcane Harvest Scheduling Using a Distributed Control Approach
Francisco Munoz (Purdue University, USA & Pontifical Xavierian University Cali, Columbia); Seokcheon Lee (Purdue University, USA)

M1030-V4: ENERGY MANAGEMENT I
Chair: Zeyi Sun, Missouri University of Science and Technology, USA

Zurich G

Track Keynote Speaker:
Adding Sustainability to Lean Product Development: Searching for a Holistic Approach
Joao Paulo Estevam de Souza, Nacional de Pesquisas Espaciais (Brazil) – IFPR Early Career Researchers Mentoring Awardee

A Framework of Integrating Manufacturing Plants in Smart Grid Operation: Manufacturing Flexible Load Identification
Md Monirul Islam, Zeyi Sun, Wening Hu and Cihan H Dagli (Missouri University of Science and Technology, USA)

Joint Manufacturing and Onsite Microgrid System Control Using Markov Decision Process and Neural Network Integrated Reinforcement Learning
Wening Hu, Zeyi Sun, Yunchao Zhang and Yu Li (Missouri University of Science and Technology, USA)

Optimization of the TOU Pricing for the Utility with the Consumers in the Manufacturing Sector
Weiwei Cui and Yujie Yang (Shanghai University, P. R. China)

Application of the Proknow-C Methodology in the Search of Literature on Performance Indicators for Energy Management in Manufacturing and Industry 4.0
Everton Vieira (Pontifical Catholic University of Paraná, Brazil); Sergio E. Gouvea da Costa (Pontifical Catholic University of Parana & Federal University of Technology - Parana, Brazil); Edson Pinheiro de Lima (Pontifical Catholic University of Parana & Federal University of Technology - Parana, Brazil); Caio Ferreira (Pontifical Catholic University of Parana, Brazil)
MONDAY, AUGUST 12
12:00 p.m. – 1:30 p.m.
Lunch – provided – Zurich D

Luncheon Speaker:
Adrian Kumar,
Vice President, Solutions Design North America
DHL, USA

Presentation Title: Super-Fast Fulfillment

1:30 p.m. – 3:00 p.m.
CONCURRENT TECHNICAL SESSIONS

3:00 p.m. – 3:30 p.m.
REFRESHMENT BREAK

Concurrent Technical Sessions | Monday 1:30 p.m. – 3:00 p.m. * denotes presentation only

M1330-G1: INNOVATIONS IN WAREHOUSE OPERATIONS 2
Chair: Daniela Popescu, Technical University of Cluj-Napoca, Romania
Zurich A

*Carton Set Optimization in E-commerce Warehouses
Manjeet Singh (DHL Supply Chain, USA); Ehsan Ardjmand (Ohio University, USA)

Evaluation of Alternative Labor Levels to Minimize Average Flowtime at Distribution Centers
Tianhui Wang and Gursel Suer (Ohio University, USA); Manjeet Singh (DHL Supply Chain, USA)

*Inventory Control Accuracy A Measure of Good Work Ethics
Bolaji Ishola (PrimeLine & University of Bridgeport, USA)

The Study of Evolution Among Logistic Service Quality, Service Compensation and Long-Term Cooperation Commitment
Wen-Hsiang Yu (University of Feng Chia, Taiwan & Tunghai University, Taiwan & The Global Logistics & Commerce Council of Taiwan, Taiwan); Shih-Kuan Chiub (Feng Chia University, Taiwan)

*Dynamic Decision Transportation Optimization Suite
Manjeet Singh (DHL Supply Chain, USA)

M1330-G2: GLOBAL ECONOMY
Chair: Jiahua Weng, Waseda University, Japan
Zurich B

Self-excited Vibration in Production, Economy and Society
Fei Xu and Yumin Shi (University of Science and Technology of China, P.R. China); Zhihua Feng (University of Science and Technology of China, P.R. China); Ming Li (University of Science and Technology of China, P.R. China)

*Operations Sustainability Under Higher Tariffs in a Global Supply Chain
Omar Alhawari (OHIO, USA); Gursel Suer (Ohio University, USA)

Profit Allocation in the Global Supply Chain with Transfer Pricing and Exchange Rate
Qian Huang, Jiahua Weng, Shunichi Ohmori and Kazuho Yoshimoto (Waseda University, Japan)

Alternative Strategies for Dealing with Idle Capacity in Global Supply Chains
Benjamin Fryman, Gursel Suer and Jue Jiang (Ohio University, USA)

M1330-V1: DIGITAL AND CYBER MANUFACTURING 2
Chair: Athakorn Kengpol, King Mongkut’s University of Technology North Bangkok, Thailand
Zurich C

Forecasting Medical Device Demand with Online Search Queries: A Big Data and Machine Learning Approach
Shuojian Xu and Hing Kai Chan (University of Nottingham Ningbo China, P.R. China)

The Development of Cyber-Physical Framework for Classifying Health Beverage Flavor for the Ageing Society
Athakorn Kengpol and Jakkarin Klunngien (King Mongkut’s University of Technology North Bangkok, Thailand)

A Study on Highly-Distributed Manufacturing System Simulation
Eiji Morinaga, Daiki Yasuda, Yudai Imagawa and Hidefumi Wamatsu (Osaka University, Japan); Akira Tsumaya (Kobe University, Japan); Tatsu Inoue (Formerly, Daifuku Co., Ltd., Japan); Koji Iwasu (Osaka Prefecture University, Japan); Motohiro Ishibashi (Denso Corporation, Japan); Nobutada Fujii (Kobe University, Japan); Eiji Arai (Osaka University, Japan); Susumu Fujii (Kobe University, Japan)

Digital Twins of Exoskeleton-Centered Workplaces: Challenges and Development Methodology
Carmen Constantinescu (Fraunhofer IAO, Germany); Daniela Popescu (Technical University of Cluj-Napoca, Romania); Rares Rus and Claudiu-Alin Rusu (Fraunhofer IAO, TUC-N, Germany & Technical University of Cluj-Napoca, Romania)

Virtual Commissioning of Industrial Control Systems - a 3D Digital Model Approach
Mathias Schamp, Lauren Van De Ginste, Steven Hoedt and Arno Claeys, El-Houssaine Aghezzaf and Johannes Cottyn (Ghent University & Flanders Make, Belgium)

Inferring Human Intent in Remote-Control Scenarios
Sigal Berman, Gil Baron, Nissim Abuhazira and Noam Peles (Ben-Gurion University of the Negev, Israel)
M1330-V2: MANUFACTURING STRATEGY 2
Chair: Luis Ernesto Quezada, University of Santiago, Chile
Zurich E

Efficiency Frontier Identification Based on Operations Strategy - A Retrospective Analysis of Leading Authors
Gabriela Vega (Pontificial Catholic University of Paraná, Brazil); Edson Pinheiro de Lima and Sergio E. Gouvea da Costa (Federal University of Technology - Parana, Brazil)

Measuring Performance Using Swot Analysis and Balanced Scorecard
Luis Ernesto Quezada, Eduardo Reinao, Pedro Palominos and Astrid Oddershede (University of Santiago of Chile, Chile)

Analyses of Outcomes That Use Simulation Modelling Towards Building Theory
Kamil Erkan Kabak (Izmir University of Economics, Turkey); Rob Dekkers (University of Glasgow, United Kingdom (Great Britain)); Johannes Hinckeldeyn (Hamburg University of Applied Science, Germany)

Towards Ultra-Efficient Industrial Areas
Joachim Lenics and Michael Hertwig (Fraunhofer-institute for Industrial Engineering IAO, Germany)

Throughput Analysis of Manufacturing Systems with Buffers Considering Reliability and Cycle Time Using DES and DOE
Jad Imseitif and He Tang (Eastern Michigan University, USA); Mike G Smith (Magna International, USA)

Why and How to Implement Strategic Competence Management in Manufacturing SMEs?
Djerdi Horvat, Nadia Weidner and Cornelius Moll (Fraunhofer Institute for Systems and Innovation Research ISI, Germany)

M1330-V3: ADDITIVE MANUFACTURING – MATERIALS
Chair: Wenyuan Cui, Missouri University of Science and Technology, USA
Zurich F

Modelling Topologically Optimized Parts with Microstructures
Damla Oktakci (Middle East Technical University & ASELSAN, Turkey); Ulas Yaman (Middle East Technical University, Turkey)

Embedding QR Codes on the Interior Surfaces of FFF Fabricated Parts
Sinan Gültekin, Ahmet Ural and Ulas Yaman (Middle East Technical University, Turkey)

Cutting Repeatability of an Extruded Wood Plastic Composite in a Post-Production Process
Juha Varis, Amir Tohyani and Sami Matthews (LUT University, Finland)

Effect of Lattice Structures on Natural Frequency of SLA Fabricated Parts
Ali Murat Kayran and Ulas Yaman (Middle East Technical University, Turkey)

Predictive Model for Thermal and Stress Field in Selective Laser Melting Process - Part I
Lan Li, Lei Yan, Wenyuan Cui, Yitao Chen, Tan Pan, Xinchang Zhang, Aaron Flood and Frank Liu (Missouri University of Science and Technology, USA)

Predictive Model for Thermal and Stress Field in Selective Laser Melting Process - Part II
Lan Li, Lei Yan, Yitao Chen, Tan Pan, Xinchang Zhang, Wenyuan Cui, Aaron Flood and Frank Liu (Missouri University of Science and Technology, USA)

M1330-V4: ENERGY MANAGEMENT 2
Chair: Weiwei Cui, Shanghai University, P.R. China
Zurich G

Techno-economic Design of Wind Farms: A Methodology and Multi-Scenario Application
Marco Bortolini, Emilio Ferrari and Mauro Gamberi (University of Bologna, Italy); Maurizio Faccio and Mojtaba Nedaei (University of Padova, Italy)

Triple-Coil Inductive Debris Sensor with Special Shielded Coils for Depressing Interference of Dielectric Components
Min Qian, Guofeng Zhao, Yijun Ren, Weidong Diao, Zhihua Feng and Ming Li (University of Science and Technology of China, China)

Application of MCDM Method for Technologies Selection to Support Energy Management
Caio Ferreira and Everton Vieira (Pontificial Catholic University of Parana, Brazil); Sergio E. Gouvea da Costa (Pontificial Catholic University of Parana & Federal University of Technology - Parana, Brazil); Eduardo Loures (PUC-Pr, Brazil); Edson Pinheiro de Lima (Pontificial Catholic University of Parana & Federal University of Technology - Parana, Brazil)

Impacts of Energy Flexibility on Energy Efficiency of Hybrid and Bivalent Facilities
Ekrem Köse (University of Stuttgart, Germany); Alexander Sauer (Fraunhofer Institute of Manufacturing and Automation IPA, Germany)
MONDAY, AUGUST 12
3:30 p.m. – 4:45 p.m.
CONCURRENT TECHNICAL SESSIONS

**M1530-G1: INDUSTRIAL LOGISTICS 1**
Chair: Stefan Minner, Technical University of Munich, Germany

- SME Innovation and Development in the Context of Industry 4.0
  Teresa Taurino and Agostino Villa (Politecnico di Turin, Italy)

- Integrating Capacity and Logistics of Large Additive Manufacturing Networks
  Nicola Mastrandrea, Massimo de Falco and Luigi Rarità (University of Salerno, Italy)

- The Response Latency in the Global Production and Logistics A Trade-Off Between Robotization and Globalization of a Chain
  David Bogataj, Daria Battini, Martina Calzavara and Alessandro Persona (University of Padova, Italy)

- Assessment of Isometric Pulls Strength of Industrial Cart Pullers - An Electromyography Study from an Apparel Manufacturing Industry
  Zahid Rashid, Muhammad Shafiq, Muhammad Awais Aslam, Neelum Iqbal and Haji Bahader Khan (University of Engineering & Technology, Pakistan); Marialuisa Menanno and Pasquale Ragno (University of Sannio, Italy)

- Productivity Improvement Through Time Study Approach: A Case Study from an Apparel Manufacturing Industry of Pakistan
  Ateeq ur Rehman, Muhammad Babar Ramzan, Abher Rasheed, Muhammad Salman Naeeem (National Textile University, Pakistan); Muhammad Shafiq (University of Engineering and Technology Taxila, Pakistan); Matteo Savino (University of Sannio, Italy)

**M1530-G2: PRODUCT DEVELOPMENT 1**
Chair: Christopher O’Brien, Nottingham University, UK

- A Survey on Sustainable Product Development
  Pedro Marques (Universidade Lusófona, Portugal); M. Januario Charmier (DREAMS, Portugal); José Oliveira Santos (Universidade Lusófona, Portugal)

- Crowd-Engineering - Approach for Smart and Agile Product Development in Networks
  Frauke Adam (University of Stuttgart, Germany); Michael Hertwig (Fraunhofer-Institute for Industrial Engineering IAO, Germany); Adrian Barwasser (University of Stuttgart, Germany); Joachim Lentes (Fraunhofer Institute for Industrial Engineering IAO, Germany); Nikolaus Zimmermann (Fraunhofer-Institute for Industrial Engineering IAO, Germany); Maik Siew (Fraunhofer IPA, Germany)

- Adding Sustainability to Lean Product Development
  João Paulo Esteves de Souza (University of Glasgow & Instituto Nacional de Pesquisas Espaciais, Brazil); Rob Dekkers (University of Glasgow, United Kingdom (Great Britain))

**M1530-V1: DIGITAL AND CYBER MANUFACTURING 3**
Chair: Bastian Pokorni, Fraunhofer Institute for Industrial Engineering, Germany

- Effect of Supplier Selection Regulations on New Product Design
  Elif Gunay (Sakarya University, Turkey); Gul Kremer (Iowa State, USA); Kijung Park (Incheon National University, Korea)

- The Front-End of Product Development as Systems Thinking and Predictive Learning
  Charles Yamamura, Celma Ribeiro, Jose Quintanilha, Fernando Bersanetti, and Denise Dantas (University of Sao Paulo, Brazil)

- Bidirectional Interoperability of Product Engineering and Manufacturing Enhancing Mass Customization
  Anna Sakowski (University of Stuttgart IAT, Germany); Manfred Dangelmaier and Dieter Spalt (University of Stuttgart, Germany & Fraunhofer IAO, Germany); Michael Hertwig (Fraunhofer-Institute for Industrial Engineering IAO, Germany)

- Toward a Real-Time Reconfiguration of Self-Adaptive Smart Assembly Systems
  Marco Bortolini, Riccardo Accorsi and Francesco Pilati (University of Bologna, Italy); Mauro Faccio and Francesco Gabriele Galizia (University of Padova, Italy)

- Generating Smooth Trajectories in Local Path Planning for Automated Guided Vehicles in Production
  Tonja Heinemann, Armin Lechler and Oliver H. Riedel (University of Stuttgart, Germany)

- Classification Approach for Use Cases Within a Demonstration Factory Environment
  Stefanie Tindel (University of Stuttgart, Germany); Laura Köting, Simon Schmacher and Tobias Eusterwienmann (Fraunhofer Institute for Manufacturing Engineering and Automation, Germany); Moritz Hämmerle and Bastian Pokorni (Fraunhofer Institute for Industrial Engineering IAO, Germany)

- The Development of a Remote Real-time HMI for a Motion Control System
  Youqiu You and Jesus Pagan (Ohio University, USA)
M1530-V2: MANUFACTURING STRATEGY 3
Chair: Veli Matti Virolainen, Lappeenranta University of Technology, Finland

Zurich E

A Content Analysis on Efficiency Frontier Identification and Operations Strategy
Gabriela Veiga (Pontifical Catholic University of Paraná, Brazil); Edson Pinheiro de Lima and Sergio E. Gouveia da Costa (Federal University of Technology - Parana, Brazil)

Formulation of a Manufacturing Strategy Using the House of Quality
Astrid Oddershede, Luis Ernesto Quezada, Juan Valenzuela and Pedro Palominos (University of Santiago of Chile, Chile); Hector Lopez-Ospina (Universidad del Norte, Colombia)

A Method for Smart Manufacturing Capabilities and Performance Measurement
Qing Xia, Chuan Yang, Chunxu Jiang, Xuesong Zheng, Xu Pan, Yong Shuai and Shengjun Yuan (Chongqing CEPREI Industrial Technology Research Institute, P.R. China)

Sustainability Versus Efficiency of Manufacturing Process: Structured Comparison of Two High Precision Fine Grinding Processes
Max Radetzky, Lars Grams and Stefan Bracke (University of Wuppertal, Germany); Berna Ulutur (Eksisehir Osmangazi University, Turkey)

A Proposal for the Support of Demand Required from Production Through the Alignment of Production Planning and Control Strategies and Maintenance Planning and Control: An Analytical Approach
Alexandre Sanches (Pontifical Catholic University of Paraná - PUCPR & Federal Institute of Paraná - IFPR, Brazil); Lourival Souza (Pontifical Catholic University of Paraná, Brazil); Sergio E. Gouveia da Costa (Pontifical Catholic University of Paraná & Federal University of Technology - Parana, Brazil); Edson Pinheiro de Lima (Pontifical Catholic University of Parana & Federal University of Technology - Parana, Brazil)

M1530-V3: ADDITIVE MANUFACTURING – SCHEDULING & PROCESSES
Chair: Ibrahim Tansel, Florida International University, USA

Zurich F

3D Printer Scheduling for Shortest Time Production of Weapon Parts
Soo Chan Kim, Minsu Kim and Namsu Ahn (Korea Military Academy, Korea)

Impact of Scheduling Policies on the Performance of an Additive Manufacturing Production System
Maaz Saleem Kapadia, Binil Starly, Alec Thomas, Reha Uzsoy, and Donald Wasing (North Carolina State University, USA)

Tool Path Planning Optimization for Multi-Tool Additive Manufacturing
Hieu Bui, Harry Pieterson, Sarah Nurre and Kelly Sullivan (University of Arkansas, USA)

Compressive Force Location Estimation with SuRE Method for Additively Manufactured Parts
Ahmed Fathy Mohamed, Kumar Y Shah and Ibrahim Tansel (Florida International University, USA)

Analysis of Requirements Potentials and Risks Caused by Using Additive Manufacturing
Nikolas Zimmermann and Joachim Lentes (Fraunhofer Institute for Industrial Engineering IAO, Germany); Andreas Werner (University of Stuttgart IAT, Germany)

M1530-V4: ENERGY EFFICIENT SCHEDULING 1
Chair: M. Fatih Tasgetiren, Istinye University, Turkey

Zurich G

An Artificial Bee Colony Algorithm for Distributed Hybrid Flowshop Scheduling Problem
Yingli Li, Fan Li, Liang Gao (Huazhong University of Science and Technology, China) Quan-Ke Pan (Shanghai University, China) M. Fatih Tasgetiren (Istinye University, Turkey)

Multi-Objective Flexible Job Shop Scheduling Problem Considering Machine Switching Off-On Operation
Qiuhao Liu, Liang Gao and Xinyu Li (Huazhong University of Science and Technology, P.R. China); Quan-Ke Pan (Shanghai University, P.R. China)

An Ensemble of Meta-Heuristics for the Energy-Efficient Blocking Flowshop Scheduling Problem
Damla Kızılay (Yasar University, Turkey); M. Fatih Tasgetiren (Istinye University, Turkey & Huazhong University of Science and Technology, China); Hande Ğzıp (Yasar University, Turkey); Liang Gao and Xinyu Li (Huazhong University of Science and Technology, P.R. China); Gürsel Sier (Ohio University, USA)

A Variable Iterated Local Search Algorithm for Energy-Efficient No-Idle Flowshop Scheduling Problem
M. Fatih Tasgetiren (Istinye University, Turkey & Huazhong University of Science and Technology, China); Hande Ğzıp (Yasar University, Turkey); Liang Gao and Xinyu Li (Huazhong University of Science and Technology, P.R. China); Quan-Ke Pan (Shanghai University, P.R. China)
MONDAY, AUGUST 12
5:00 p.m. – 6:00 p.m.
CONCURRENT TECHNICAL SESSIONS

**M1700-G1: INDUSTRIAL LOGISTICS 2**
Chair: Ilenia Zennaro, University of Padua, Italy

- **Zurich A**
  - Analysis of Possible Discrepancies Between the Public Transport Offer and Customers’ Expectations
    Grzegorz Gramza, Monika Kosacka (Poznan University of Technology, Poland)
  - Part Feeding Optimization for Fixed-Position Assembly Systems of Big Size Products
    Ilenia Zennaro, Martina Calzavara, Serena Finco, Daria Battini and Alessandro Persona (University of Padua, Italy)
  - Period-Aggregated Resource Leveling Problem with Flexible Human Resource Usage and Variable Job Duration
    Ilia Tarasov (ISAE-SUPAERO, University of Toulouse, France & V.A. Trapeznikov Institute of Control Sciences of Russian Academy of Sciences, Russia); Alain Hait and Olga Battaia (ISAE-SUPAERO, Universite de Toulouse, France)
  - Age Management of Industrial Workers Based on the Multiple Decrement Modelling
    Barbara Grah, Vlado Dimovski and Simon Colnar (University of Ljubljana, Slovenia); David Bogataj (University of Padova, Italy)

**M1700-G2: PRODUCT DEVELOPMENT 2**
Chair: Gul Kremer, Iowa State, USA

- **Zurich B**
  - Proposing the Law of Continuous Innovation
    Rob Dekkers (University of Glasgow, United Kingdom (Great Britain)); Eduardo Gomes Salgado (Federal University of Alfenas, Brazil)
  - Development of a Strategic Business Model Framework for Multi-Sided Platforms to Ensure Sustainable Innovation in Small and Medium-Sized Enterprises
    Kira Daxhammer and Maximilian Doerr (Fraunhofer Institute for Manufacturing Engineering and Automation IPA, Germany); Michael Luckert and Thomas Bauernhansl (Fraunhofer Institute for Manufacturing Engineering and Automation IPA, Germany & Institute of Industrial Manufacturing and Management IFF, Germany)
  - Strategic Elements in Product Innovation in Industrial Firms
    Cristina Feniser and Daniela Popescu (Technical University of Cluj-Napoca, Romania); Arik Sadeh (HIT Holon Institute of Technology, Israel)

**M1700-V1: CYBER PHYSICAL SYSTEMS 1**
Chair: He (Herman) Tang, Eastern Michigan University, USA

- **Zurich C**
  - Armor PLC: A Platform for Cyber Security Threats Assessments for PLCs
    Wenhui Zhang, Srivatsa Srinivassa, Asmit De, Swaroop Ghosh, Peng Liu (Pennsylvania State University, USA); Yizheng Jiao (University of North Carolina at Chapel Hill, USA); Dazhong Wu (University of Central Florida, USA)
  - Linking Cyber Security Improvement Actions in Healthcare Systems to Their Strategic Improvement Needs
    Miryam Barad (Tel Aviv University, Israel)
  - A Realization of Cyber-Physical Manufacturing Control Systems Through Industrial Internet of Things
    Yu-Ju Lin, Ci-Bin Lin and Chin-Yin Huang (Tunghai University, Taiwan)
  - Using Cyber PLC to Link Physical Operations with Cyber Control Decisions
    Yu-Ju Lin, Yao-Hsiang Lin and Chin-Yin Huang (Tunghai University, Taiwan)
**M1700-V2: HYBRID & CELLULAR MANUFACTURING 1**
Chair: Venkataramanaiah Saddikuti, Indian Institute of Management, India

**Flexible Flowshop Design in Cellular Manufacturing Systems**
Najat Almasarwah and Gursel Suer (Ohio University, USA)

**NSGA Based Algorithm for Energy Efficient Scheduling in Cellular Manufacturing**
Venkataramanaiah Saddikuti (Indian Institute of Management, Lucknow, India); Vigneshwar Pesaru (FICO-Bangalore, India)

**Mitigating the Effects of Bottlenecks in Wagon Manufacturing**
Furkan Uludag, Yahya Olabi and Elif Gunay (Sakarya University, Turkey); Gul Kremer (Iowa State, USA)

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**M1700-V3: ADDITIVE MANUFACTURING – QUALITY**
Chair: Harry Pierson, University of Arkansas, USA

**Automatic Feature-Based Point Cloud Alignment and Inspection**
Yu Jin, Harry Pierson and Haitao Liao (University of Arkansas, USA)

**Additively Manufactured Multi-Material Parts with Defect Detection Capabilities**
Kumar Y Shah, Ahmed Fathy Mohamed, Ibrahim Tansel (Florida International University, USA)

**Volumetric Data Analysis for Inspection of 3D Printed Parts**
Zhao Hui Geng and Bopaya Bidanda (University of Pittsburgh, USA)

**The Potential of Reusing Technical Plastics**
Juha Varis, Vardaan Chauhan and Timo Kärki (LUT University, Finland)

**Fabrication and Characterization of AlxCrCuFeNi2 High-Entropy Alloys Coatings by Laser Metal Deposition**
Wenyuan Cui, Lan Li, Xinchang Zhang, Yitao Chen, Tan Fan and Frank Liu (Missouri University of Science and Technology, USA)

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**M1700-V4: ENERGY EFFICIENT SCHEDULING 2**
Chair: Lara Waltersmann, Fraunhofer Institute for Manufacturing Engineering and Automation, Germany

**An Effective Multi-Objective Artificial Bee Colony Algorithm for Energy Efficient Distributed Job Shop Scheduling**
Jin Xie, Liang Gao and Quan-ke Pan (Huazhong University of Science and Technology, P.R. China); M. Fatih Tasgetiren (Istinye University, Turkey)

**The Biological Transformation of Energy Supply and Storage – Technologies and Scenarios for Biointelligent Value Creation**
Johannes Full, Robert Miehe, Thomas Bauernhansl, Alexander Sauer and Steffen Kiemel (Fraunhofer Institute for Manufacturing Engineering and Automation IPA, Germany)

**A Memetic Algorithm for the Bi-Objective Quadratic Assignment Problem**
Cemre Cubukcuoglu (Delft University of Technology & Yasar University, Turkey); M. Fatih Tasgetiren (Istinye University, Turkey & Huazhong University of Science and Technology, P.R. China); I. Sevil Sariyildiz (Delft University of Technology, The Netherlands); Liang Gao (Huazhong University of Science and Technology, P.R. China); Murat Kucukvar (Qatar University, Turkey)

**A Discrete Artificial Bee Colony Algorithm for the Energy-Efficient No-Wait Flowshop Scheduling Problem**
M. Fatih Tasgetiren (Istinye University, Turkey & Huazhong University of Science and Technology, P.R. China); Damla Yüksel (Yasar University, Turkey); Liang Gao and Peigen Li (Huazhong University of Science and Technology, P.R. China); Quan-Ke Pan (Shanghai University, P.R. China)
TUESDAY, AUGUST 13

7:00 a.m.
Registration Opens and Continental Breakfast – Preconvene

8:00 a.m. – 10:00 a.m.
OPENING PLENARY SESSION

Keynote Speakers:
Anthony Schiml, Production Program Senior Manager, F-35 Wing, Lockheed Martin Aeronautics, USA
Don A. Kinard, Sr. Fellow, Production Operations, Lockheed Martin Aeronautics, USA

Presentation Title: The Future of the Digital Thread

PANEL – Future of the Manufacturing World
Panelist:
Lex Tisdale, Director of Engineering Manufacturing, Kenworth, USA
Ronald Askin, Professor, Arizona State University, USA
Fatih Tasgetiren, Professor, Istinye University, Turkey

Concurrent Technical Sessions | Tuesday 10:30 a.m. – 12:00 p.m. * denotes presentation only

T1030-G1: SEMANTIC INTEGRATION AND KB SYSTEMS 1
Chair: Biao Yang, University of Sussex Business School, United Kingdom
Zurich A

Knowledge Reasoning for Intelligent Manufacturing Control System
Yu-Ju Lin, Zheng-Xian Chen and Chin-Yin Huang (Tunghua University, Taiwan)

Optimal Assembly Line Feeding Mode Selection: A Machine Learning Approach
Francesco Zangaro (Technical University of Munich, Germany & University of Padua, Italy), Stefan Minner (Technical University of Munich, Germany), Daria Battini (University of Padua, Italy)

Ontology Model for Process Level Capabilities of Manufacturing Resources
Dusan N Sormaz and Arkapaul Sarkar (Ohio University, USA)

*Measuring the Usage of a Manufacturing Ontology
David Koonce (Ohio University, USA)

Dissemination and Communication of Lessons Learned for Project-Based Business with the Applications of Information Technology a Case Study with a British Manufacturer
Ying Yang and Gina Brosch (University of Newcastle, United Kingdom (Great Britain)), Biao Yang (University of Sussex, United Kingdom (Great Britain))

T1030-G2: PRODUCT DEVELOPMENT 3
Chair: Joachim Lentes, Fraunhofer Institute for Industrial Engineering, Germany
Zurich B

Comparison of the Influence of Self-Driving Technology Brand Name on Purchase Intention Between Japan and the US
Takumi Kato (Honda Motor Co., Ltd., Japan)

Development of Educational Programs for System Creators and Business Producers in Future Strategy Design in Action Project Group Activities Through Industry-University Cooperation
Kinya Yamaki (Aoyama Gakuin University, Japan); Masahiro Arakawa (Nagoya Institute of Technology, Japan); Maki Arame (Polytechnic University, Japan); Yoshiyuki Ono (AOTAMA Human Innovation Consulting, Inc., Japan)

Certification of Openness - Corner Stone of an Agile PLM Strategy
Michael Hertwig and Joachim Lentes (Fraunhofer Institute for Industrial Engineering IAO, Germany); Dietmar Trippner (drei Consult GbR, Germany)

Applied Description of Steel Properties for Improved Component Function - Foundation for Commercial Value Assessment
Claes Lowgren and Veikko Orpana (Lappeenranta University of Technology Finland)

The Impact of Inter-Organizational Cooperation on R&D Expenditure of Manufacturing Companies
Bojan Lalic, Tanja Todorovic, Nenad Medic, Branislav Bogoejevic, Danijela Ciric and Uglješa Marjanović (University of Novi Sad, Faculty of Technical Sciences, Serbia)

Agile vs. Traditional Approach in Project Management: Strategies, Challenges and Reasons to Introduce Agile
Danijela Ciric, Bojan Lalic, Danijela Gracanin, Milan Delic, Nemanja Tasic and Nenad Medic (University of Novi Sad, Serbia)

T1030-V1: CYBER PHYSICAL SYSTEMS 2
Chair: Shimon Nof, Purdue University, USA
Zurich C

Movable Unmanned Aerial System Optimization of System Resource Design and Drone Routing
Byung Duk Song (Kyung Hee University, Korea), Ho Young Jeong, Sungbum Jun and Seokcheon Lee (Purdue University, USA)

Optimization of Vehicle-Carrier Routing Mathematical Model and Comparison with Related Routing Models
Ho Young Jeong and Seokcheon Lee (Purdue University, USA)

Vehicle Routing Problem with Drones Last Mile Delivery
Patchara Kitjacharoenchai and Seokcheon Lee (Purdue University, USA)

*Massive Vehicle Fleet Control for Mass Customizable Production Line with Artificial Intelligence (AI) and Cyber Physical System (CPS) Technologies
Ilho Hwang, Sang Pyo Hong and Young Jae Jang (Korea Advanced Institute of Science and Technology, Korea)

Optimal Path Planning for Image Based Visual Servoing
Mark Allen, Ethan Wescoat, and Laine Mears (Clemson University, USA)

Advancing Cyber-Physical Systems Resilience: The Effects of Evolving Disruptions
Win Nguyen (Purdue University & PRISM Center, USA); Ashwin Nair and Shimon Nof (Purdue University, USA)
### T1030-V2: HYBRID & CELLULAR MANUFACTURING 2
Chair: Mariana Dias, Universidade do Minho, Portugal

**Zurich E**

- Development of ICT and IoT System Aiming at Promotion of Productivity and Product Quality in Multiple Handling Skilled Works
  - Masahiro Arakawa and Yoshihiro Matsuda (Nagoya Institute of Technology, Japan); Tomohiro Kawai (Murata Manufacturing Company, Japan)
- Comparative Analysis of Cell Formation Algorithms with Alternative Routings
  - Dusan N Sormaz and Nayan Chakrabarty (Ohio University, USA)
- Reusing Equipment in Cells Reconfiguration for a Lean and Sustainable Production
  - Mariana Dias and Maria Inês Araújo (Bosch company, Portugal); Anabela Alves, Isabel Lopes and Senhorinha Teixeira (University of Minho, Portugal)
- Modified P-Median Model with Minimum Threshold for Average Family Similarity
  - Omar Alhawari and Gursel Suer (Ohio University, USA)

* denotes presentation only

### T1030-V3: IE & OR
Chair: Jaakko Peltokorpi, Aalto University, Finland

**Zurich F**

- Optimization via Computer Simulation of a Mixed Assembly Line of Wooden Furniture – A Case Study
  - Karim Nouri and Georges Abdul-Nour (Université du Québec À Trois-Rivières, Canada)
- Analysis of the Effects of Group Size and Learning on Manual Assembly Performance
  - Jaakko Peltokorpi and Esko Niemi (Aalto University, Finland)
- Defining Flexibility of Assembly Workstations Through the Underlying Dimensions and Impacting Drivers
  - Lauren Van De Ginste, Matthias Schamp, Arno Claeyts, Steven Hoedt, Karel Bauters, Alessandro Biondi, El-Houssaine Aghezzaf, Johannes Cottyn (Ghent University & Flanders Make, Belgium); Ian Goens (Flanders Make, Belgium)
- The Effect of Job Similarity on Forgetting in Multi-Task Production
  - Steven Hoedt, Arno Claeyts, Matthias Schamp, Lauren Van De Ginste, El-Houssaine Aghezzaf and Johannes Cottyn (Ghent University & Flanders Make, Belgium)
- Saturation and the Case Study Methodology: How Many Cases Do You Need?
  - Rob Dekkers (University of Glasgow, United Kingdom (Great Britain)); Christian Hicks (Newcastle University, United Kingdom (Great Britain))

* denotes presentation only

### T1030-V4: SUSTAINABLE SUPPLY CHAIN 1
Chair: Kenichi Nakashima, Waseda University, Japan

**Zurich G**

- Determination of Shipping Timing in Logistics Warehouse Considering Shortage and Disposal in Textile Industry
  - Rina Tanaka, Aya Ishigaki and Tomomichi Suzuki (Tokyo University of Science, Japan); Masato Hamada and Wataru Kawai (Data-Chef Co., Ltd., Japan)
- Sustainable Implementation Success Factors of AGVs in the Brazilian Industry Supply Chain Management
  - Guilherme Teixeira Aguiar and Gilson Adamczuk Oliveira (Universidade Tecnológica Federal do Paraná, Brazil); Nikolai Kazantsev (Alliance Manchester Business School University of Manchester, United Kingdom); Dalmarino Setti (Universidade Tecnológica Federal do Paraná, Brazil); Kim Hua Tan (Nottingham University Business School, University of Nottingham, United Kingdom)
- Enhancing the Competitiveness of Container Seaports Through Sustainability: A Case Study of Thailand
  - Nothamon Kannika, Kim Hua Tan and Kulwant Pawar (University of Nottingham, United Kingdom (Great Britain))
- Problem of Disassembly-To-Order System for Recycling Rate and Profit Using Linear Physical Programming
  - Yuki Kinoshita and Tetsuo Yamada (The University of Electro-Communications, Japan); S Gupta (Northeastern University, USA)
- An Optimization Problem in a Closed-Loop Manufacturing System with Stochastic Variability
  - Kimitoshi Sato and Zheng Cong (Kanagawa University, Japan); Kenichi Nakashima (Waseda University, Japan)
- Multi-Period Supply Planning Problem Under a Dynamic Demand, Stochastic Lead Time and a Supplier Selection
  - Oussama Ben-Ammar (IMT Atlantique & LS2N, France); Belgacem Bettayeb (LINEACT CESI, France); Alexandre Dolgui (IMT Atlantique & LS2N, France)

* denotes presentation only
### TUESDAY, AUGUST 13

**12:00 p.m. – 1:30 p.m.**
Lunch – on your own

**1:30 p.m. – 3:00 p.m.**
CONCURRENT TECHNICAL SESSIONS

**3:00 p.m. – 3:30 p.m.**
REFRESHMENT BREAK

#### Concurrent Technical Sessions | Tuesday 1:30 p.m. – 3:00 p.m.  
* denotes presentation only

**T1330-G1: SEMANTIC INTEGRATION AND KB SYSTEMS 2**  
Chair: Chin-Yin Huang, Tunghai University, Taiwan  

- **Ontology-based Manufacturing Control Systems (MCS)**  
  Yu-Ju Lin, Yao-Yu Hsieh and Chin-Yin Huang (Tunghai University, Taiwan)

- **Role of Ontologies in Development of Smart Manufacturing Systems for Industry 4.0**  
  Dusan N Sormaz and Arkopaul Sarkar (Ohio University, USA)

- **Use of Promethee Method for Decision Making in Bus Fleet Maintenance Proposal of Framework**  
  Alexandre Sanches (Pontifical Catholic University of Paraná - PUCPR & Federal Institute of Paraná - IFPR, Brazil); Eduardo Loures (Pontifical Catholic University of Paraná, Brazil); Edson Pinheiro de Lima (Pontifical Catholic University of Paraná & Federal University of Technology - Paraná, Brazil)

- **Intelligent Authoring and Management System for Assembly Instructions**  
  Arno Claeys, Steven Hoedt, Lauren Van De Ginste and Matthias Schamp (Ghent University & Industrial Systems Engineering Flanders Make, Belgium); Georges Verpoorten (ProductionS Core Lab Flanders Make, Belgium); El-Houssaine Agherzaf and Johannes Cotyn (Ghent University & Industrial Systems Engineering Flanders Make, Belgium)

**T1330-V1: CYBER PHYSICAL SYSTEMS 3**  
Chair: Qianqian Zhang, State University of New York at Binghamton, USA  

- **Model Predictive Control of Blood Glucose for Type 1 Diabetic Rats in a Cyber-Physical System**  
  Hoo Sang Ko, Guney Uzun, Felix Lee and Guim Kwon (Southern Illinois University Edwardsville, USA); Ramin Balouchzadeh (Washington University in St. Louis, USA); Sarah Park (Duke University, USA)

- **3D Medical Image Classification with Depthwise Separable Networks**  
  Haifeng Wang, Qianqian Zhang and Hongya Lu, Daehan Won, and Sang Won Yoon (State University of New York at Binghamton, USA)

- **Development of Classification Models for Assessment of Endotracheal Intubation Training by a Cyber-Physical System**  
  Chiho Lim, Hoo Sang Ko and Sohyung Cho (Southern Illinois University Edwardsville, USA); Ikechukwu Ohu and Babatunde Jimmy (Gannon University, USA); Henry Wang (University of Texas Health Science Center at Houston, USA); Jordan Felice (Lake Erie College of Osteopathic Medicine, USA); Russell Griffin (American Heart Association, USA); Jestin Carlson (Gannon University, USA)

- **Lung Nodule Diagnosis on 3D Computed Tomography Images Using Deep Convolutional Neural Networks**  
  Qianqian Zhang, Haifeng Wang, Sang Won Yoon, Daehan Won, and Krishnaswami Srihari (State University of New York at Binghamton, USA)

**T1330-V2: HYBRID & CELLULAR MANUFACTURING 3**  
Chair: Yong Yin, Doshisha University, Japan  

- **Development of Optimal Algorithm to Decide the Operation Order for Parts Assembly in Order to Minimize Work Difficulty**  
  Masahiro Arakawa (Nagoya Institute of Technology, Japan); Yukiko Kanbara (Aisin AW, Japan)

- **A Hierarchical Hybrid Heuristic-Optimization Approach for Multi-Product Assembly Line Design Problem**  
  Gursel Suer, Rooollah Younes Sinaiki and Azadeh Sadeghi (Ohio University, USA)

- **Towards Designing Smart Manufacturing Systems for Industry 4.0 Considering Reconfiguration**  
  Ibrahim Garbie (Helwan University, Egypt)

- **A Dynamic Switching Policy with Thresholds of Inventory Level and Waiting Orders for MTS/MTO Hybrid Production Systems**  
  Katsuhiko Takahashi, Shuhei Yano, Keisuke Nagasawa and Katsumi Morikawa (Hiroshima University, Japan)

- **How to Achieve Maximum Throughput for a Divisional Seru**  
  Donggu Li, Yaoxin Zhang, Yong Yin, Yin Gai and Jiafu Tang (Doshisha University, Japan)

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**Data-Driven Simulation Model of Operating Rooms in Hospital**  
Dusan N Sormaz and Mandvi Malik (Ohio University, USA)

**A Demand-to-Supply Enterprise Robot and Its ODICS II Type for Convenience Store Application**  
Masayuki Matsui and Nobuaki Ishii (Kanagawa University, Japan)
T1330-V3: IE & OR – SUPPLY CHAIN AND LOGISTICS
Chair: Golany Boaz, Israel Institute of Technology, Israel

Supply Planning and Inventory Control of Perishable Products Under Lead-Time Uncertainty and Service Level Constraints
Sandra Transchel and Ole Hansen (Kuehne Logistics University, Germany)

Optimizing Spares in a Multiple Location Facility with Periodic Review
Yahel Giat and Michael Dreyfuss (Jerusalem College of Technology, Israel)

Optimizing Retrieving Performance of an Automated Warehouse for Unconventional Stock Keeping Units
Massimo Bertolini, Giovanni Esposito, Davide Mezzogori and Mattia Neroni (University of Parma, Italy)

Applying Text-mining Techniques to Global Supply Chain Region Selection: Considering Geographic Differences
Chii-Yuan Chu and Gui Kremer (Iowa State University, USA); Kijung Park (Incheon National University, Korea)

*Scalable Heuristics for P-Median Problem on Real Road Networks
Saeed Ghanbarfahrani and Mahnoush Samadi Dinani (Ohio University, USA)

Traveling Salesman Problem with Hotel Selection: Comparative Study of the Alternative Mathematical Formulations
Cemal Aykut Gencel and Baris Keceli (Baskent University, Turkey)

T1330-V4: SUSTAINABLE SUPPLY CHAIN 2
Chair: Ruwen Qin, Missouri University of Science and Technology, USA

Adaptive Storage Reassignment in Order Picking Systems to Picker Learning and Change of Demand
Ayumi Ogasawara, Ayako Ishigaki and Seiichi Yasui (Tokyo University of Science, Japan)

Strategic Human Resource Management Simulation Considering Work Elements, Skills, Learning and Forgetting
Takayuki Kataoka (Kindai University, Japan); Katsumi Morikawa and Katsuhiko Takahashi (Hirosima University, Japan)

A Study on the Effect of Defect Shape on Defect Detection in Visual Inspection
Ryosuke Nakajima (The University of Electro-Communications, Japan); Riho Yamamoto, Takuya Hida and Toshiyuki Matsumoto (Aoyama Gakuin University, Japan)

T1330-G2: TUTORIAL

Enhancing Hybrid Genetic Algorithms with ML & GPU for Scheduling Problems: Case Studies

Presenters:
Mitsuo Gen, Tokyo University of Science and Fussy Logic Systems Institute (Japan)
Gursel Suer, Ohio University (USA)

Linear Physical Programming Iteration Method of Multi-Player Multi-Objective Decision Making in Supply Chain
Tomoochi Yatsuka and Aya Ishigaki (Tokyo University of Science, Japan); Yuki Kinoshita and Tetsuo Yamada (The University of Electro-Communications, Japan); Masato Inoue (Meiji University, Japan)

Sustainability and Corporate Social Responsibility in Closed Loop Supply Chain
Keisuke Nagasawa, Katsumi Morikawa and Katsuhiko Takahashi (Hiroshima University, Japan); Daisuke Hirotani (Prefectural University of Hiroshima, Japan)
**TUESDAY, AUGUST 13**

**3:30 p.m. – 5:00 p.m.**
CONCURRENT TECHNICAL SESSIONS

**6:00 p.m. – 6:30 p.m.**
Pre Dinner Social Bar

**6:30 p.m. – 9:00 p.m.**
Conference Banquet and Awards

Banquet Speaker:
Barry Smith,
Professor, SUNY Buffalo, USA

Presentation Title: What is a Cyber-Physical System?

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**T1530-G1: DATA ANALYTICS 1**
Chair: Joanna Oleśków-Sząpka, Poznan University of Technology, Poland

Zurich A

- **Logistics 4.0 Maturity Levels Assessed Based on GDM (Grey Decision Model) and Artificial Intelligence in Logistics 4.0 - Trends and Future Perspective**
  Joanna Oleśków-Sząpka, Roman Domanski and Hubert Wojciechowski (Poznan University of Technology, Poland)

- **Approach for a Holistic Predictive Maintenance Strategy by Incorporating a Digital Twin**
  Andreas Werner (University of Stuttgart IAT, Institute of Human Factors and Technology Management, Germany); Nikolas Zimmermann and Joachim Lentes (Fraunhofer Institute for Industrial Engineering IAO, Germany)

- **A Fuzzy Model of Selecting Supplier Based on Process Quality with Consideration of Imprecise Data**
  Kuen-Suan Chen (National Chin-Yi University of Technology, Taiwan); Tsang-Chuan Chang (National Taichung University of Science and Technology, Taiwan)

- **Multivariate Data Analytics in Surface Topography Assessments Case Study High Precision Fine Grinding Processes**
  Stefan Bracke, Sebastian Sochacki and Max Radetzky (University of Wuppertal, Germany)

- **Simulation and Analysis of Preventive Maintenance Scheduling Techniques for Fruit-Roll Packaging Line**
  Ragini Waman Joshi, Animek Shauriya, Pankhuri Arora and Wei Hong (Grace) Guo (Rutgers, the State University of New Jersey, USA); Qi Tian (Rutgers, the State University of New Jersey, USA and Dalian University of Technology, China)

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**T1530-V1: CYBER PHYSICAL SYSTEMS 4**
Chair: Win Nguyen, Purdue University, USA

Zurich C

- **Intelligent Manufacturing Control Systems: The Core of Smart Factory**
  Yu-Ju Lin, Shih-Hsuan Wei and Chin-Yin Huang (Tunghai University, Taiwan)

- **Integration of Logic Controller with IoT to Form a Manufacturing Edge Computing Environment: A Premise**
  Yu-Ju Lin, Chih-Fan Tan and Chin-Yin Huang (Tunghai University, Taiwan)

- **Hybrid Robotic Reinforcement Learning for Inspection/Correction Tasks**
  Hoda Nasereddin and Gerald Knapp (Louisiana State University, USA)

- **The HUB-CI Model for Networked Telerobotics in Greenhouse Monitoring**
  Ashwin Nair and Shimon Nof (Purdue University, USA); Avital Bechar (The Institute of Agriculture Engineering, Israel); Yang Tao (Bio-Imaging and Machine Vision Lab, University of Maryland, USA)

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**T1530-V2: SERU PRODUCTION SYSTEM**
Chair: Ikou Kaku, Tokyo City University & Association of Asian Management Science & Applications, Japan

Zurich E

- **A Novel S-F Seru Production Scheme**
  Ikou Kaku (Tokyo City University, Japan)

- **Impact of Layered Design on Seru and Assembly Line**
  Azadeh Sadeghi and Gursel Suer (Ohio University, USA); Yong Yin (Doshisha University, Japan); Ikou Kaku (Tokyo City University & Association of Asian Management Science and Applications, Japan)

- **Case Studies on Design for Seru Manufacturing**
  Jian Wang, Nana Ye and Yantian Peng (Shanghai University, P.R. China)

- **Considering Product Life Cycle Stages and Worker Skill Level in Seru Production Systems**
  Gursel Suer (Ohio University, USA); Berna Ulutas (Eskişehir Osmangazi University, Turkey); Ikou Kaku (Tokyo City University, Japan); Yong Yin (Doshisha University, Japan)

- **Research Opportunities for Seru Production Systems**
  Yong Yin (Doshisha University, Japan)

- **Indoor Flow Line Measurement Method Based on Radio Waves and Ultrasonic Sensors**
  XiaoWen Zhao, Shuyu Liang, Yasuhiro Kajihara and Hisashi Yamamoto (Tokyo Metropolitan University, Japan)

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**T1530-V3: AI AND MANUFACTURING SYSTEMS**
Chair: Win Nguyen, Purdue University, USA

Zurich D

- **A 3D Convolutional Neural Network for Volumetric Image Semantic Segmentation**
  Hongya Lu, Hai Feng Wang, Qiang Tian, Sang Won Yoon, Daehan Won (Binghamton University, USA)

- **Collaborative Response to Disruption Propagation with Established Lines of Collaboration (CRDP/ESLOC) in Cyber-Physical Systems: Informatics for Decision Support**
  Win Nguyen and Shimon Nof (Purdue University & PRISM Center, USA)
T1530-V3: IE & OR – PRODUCTION SYSTEMS
Chair: Tanja Nemeth, Fraunhofer Austria Research GmbH, Austria
Zurich F
Development and Evaluation of a Design Thinking Process Adapted to Frugal Production Systems for Emerging Markets
Uwe Schleinkefro (Fraunhofer Institute for Manufacturing Engineering and Automation IPA, Germany); Thorsten Herrmann, Ina Maier and Daniel Roth (University of Stuttgart, Germany); Thomas Bauernhanel (Fraunhofer Institute for Manufacturing Engineering and Automation IPA & University of Stuttgart, Germany) Dieter Spath (University of Stuttgart & Fraunhofer Institute for Industrial Engineering IAO, Germany)
Optimizing Mean and Variance of Multiresponse in a Multistage Manufacturing Process Using a Patient Rule Induction Method
Dong-Hee Lee (Hanyang University, Korea); Kwang-Jae Kim (Pohang University of Science and Technology, Korea)
Fixed Cost Management as an Enabler for Agile Manufacturing Networks
Günter Schuh, Jan-Philipp Prote, Andreas Guetzlaff, Julian Ays and Angelina Donner (RWTH Aachen University, Germany)
Progressive Die Cost Estimation Based on Lamination Design and Production Scenario in the Electric Traction Motor Application
Jing Zhang (CR/RTC2-Ap Bosch, China & Graduate School of Excellence Advanced Manufacturing Engineering, Germany); Dieter Spath (University of Stuttgart, Germany)
A Maturity Assessment Procedure Model for Realizing Knowledge-Based Maintenance Strategies in Smart Manufacturing Enterprises
Tanja Nemeth (Fraunhofer Austria Research GmbH, Austria); Fazel Ansari and Wilfried Sihn (Vienna University of Technology & Fraunhofer Austria, Austria)
Implementation of Bayesian Belief Network in Productivity Benchmarking of Manufacturing Industry
Bolun Liang and Guoqing Zhang (University of Windsor, Canada); Golam Kabir (University of Regina, Canada)

T1530-V4: MANUFACTURING SUSTAINABILITY 1
Chair: Gokhan Egilmez, University of New Haven, USA
Zurich G
*Manufacturing Sustainability Readiness of Emerging Economies for Industry 4.0
Bulent Erenay (Wilkes University, USA); Gokhan Egilmez (University of New Haven, USA)
DC Micro Grid for Energy Efficient and Flexible Production
Sebastian Weckmann (Universität Stuttgart, Germany); Alexander Sauer (Fraunhofer IPA, Germany)
Homogeneity Aspects on Sustainability Disclosure: A Study on OCEPÄR, Brazil
Oldair Roberto Giasson, Edson Pinheiro de Lima, and Sergio Eduardo Gouveia da Costa (Federal University of Technology, Paraná & Federal University of Technology of Paraná, Brazil) Gislon Adamczuk Oliveira and Abdinando Moreira Barreto de Oliveira (Federal University of Technology, Paraná, Brazil)

T1530-G1: TUTORIAL
Zurich B
Digital Transformation in Manufacturing – Industry Practice Case
Presenter: Illhoe Hwang, Korea Advanced Institute of Science and Technology (Korea)
The team of KAIST recently work with a global automated material handling systems (AMHS) manufacturers and jointly develop Digital Transformation (DT) solutions in Manufacturing. In this tutorial, two key development projects are presented. The first project is developing an AI based AMHS system and the second is developing Mixed Reality (MR) solution for maintenance operation.
First, the Overhead Hoist System (OHT) in the semiconductor FAB consists of OHT vehicles (in short, vehicles) and an OHT track (in short, track), as shown in Figure 1. In the modern large scale FABs, 700-1,000 vehicles operate on tracks. The route guidance for the vehicles is the key feature of the OHT system operation because it determines the overall performance of the system, especially for FABs. Due to the large number of vehicles and manufacturing uncertainty, the vehicles can interfere with each other in unpredictable ways. The team of KAIST recently developed a reinforcement learning-based dynamic routing algorithm called QLBWR, which consists of a dynamic Boltzmann softmax policy and reward shaping on a Q-learning method. The proposed algorithm uses real-time information to effectively guide each vehicle so that it avoids congestion and finds its optimal path. The algorithm is also designed such that the computational burden to find its optimal route is significantly low enough to serve hundreds of vehicles in real time. The performance of the proposed algorithm is compared with various static and dynamic algorithms with simulation analyses on an actual FAB layout. The results show that the algorithm outperforms and is superior to the other benchmarking algorithms.
The Mixed Reality (MR) is a mix of reality and virtual reality, encompassing both augmented reality (AR) and augmented virtuality. The goal of research is to develop a maintenance solution and platform with the MR technology particularly for manufacturing industry. The MR maintenance solution visualizes maintenance processes and detailed instructions with three-dimensional (3D) holographic images with MR device so that field maintenance engineers effectively understand the job processes.
This tutorial introduces the maintenance platform and data architecture for the MR technology and the decision optimization solution developed on the platform. An actual case study performed with an industry partner is also presented.
**Wednesday, August 14**

7:00 a.m.
Registration Opens and Continental Breakfast – Preconvene

8:00 a.m. – 10:00 a.m.
OPENING PLENARY SESSION – Zurich D

**Keynote Speaker:**
Emily Jerger,
Project Engineer, MxD, the Digital Manufacturing Institute, USA

**Presentation Title:**
From Pilot to Production

**EDITORIAL PANEL –**
Panelist:
Dr. Rob Dekkers,
IFPR Editorial Panel
Dr. Chin-Yin Huang,
IFPR Editorial Panel
Dr. Alexandre Dolgui,
International Journal of Production Research

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**Concurrent Technical Sessions | Wednesday 10:30 a.m. – 12:00 p.m.**

* denotes presentation only

**W1030-G1: DATA ANALYTICS 2**
Chair: Velikko Orpana, Lappeenranta University of Technology Finland, Sweden

**Zurich A**

Manufacturing Pharmaceutical Medicines in a Regulated Environment - an Auditors Perspective
Ian Flawn Orpana (Goethe-University Frankfurt, Germany and Verto Pharama AB, Sweden)

Simulation-based Analysis of Train Speed for Single-Track Railway Scheduling
Vidita Gawade and Weihong Guo (Rutgers, the State University of New Jersey, USA); Qi Tian (Rutgers, the State University of New Jersey, USA and Dalian University of Technology, China)

Local Recurrence Rates with Automatic Time Windows for Discord Search in Multivariate Time Series
Chao-Lung Yang, Darwin Frederik and Hendri Sutrisno (National Taiwan University of Science and Technology, Taiwan)

Study on Travel Frequency Patterns of Public Bike Systems and Bike Sharing Systems
Lingyu Meng (Texas State University, USA); Zhiyuan Liu (Southeast University, P.R. China); Zhijie Dong (Texas State University, USA)

An Entity Embeddings Deep Learning Approach for Demand Forecast of Highly Differentiated Products
Davide Mezzogorgi and Francesco Zammori (University of Parma, Italy)

**W1030-V1: CLOUD-BASED MANUFACTURING**
Chair: Mohsen Moghaddam, Northeastern University, USA

**Zurich C**

Challenges and Opportunities for Publishing IIoT Data in Manufacturing as a Service Business
Joaquin Ordieres-Meré (Universidad Politécnica de Madrid, Spain); Javier Villalba-Diez (Universidad Politécnica de Madrid, Spain and Fakultät für Management und Vertrieb, Campus Schwäbisch-Hall, Hochschule Heilbronn, Germany); Xiaochen Zheng (Universidad Politécnica de Madrid, Spain)

Design of Marketplaces for Smart Manufacturing Services
Mohsen Moghaddam (Northeastern University, USA); Albert Jones (National Institute of Standards & Technology, USA); Thorsten Wuest (West Virginia University, USA)

*Real-time Prediction Modeling of Stencil Printing Process Using Multi-layer Online Sequential Extreme Learning Machine*
Sang Won Yoon, Hongya Lu and Hai Feng Wang (State University of New York at Binghamton, USA); Daehan Won (Binghamton University, USA)

Optimization of Passive Chip Components Placement with Self-Alignment Effect for Advanced Surface Mounting Technology
Irandokht Parviziomran, Shun Cao, Seungbae Park and Daehan Won (Binghamton University, USA); Haeyong Yang (Koh Young Technology America, USA)

**Prediction of Component Shifts in Pick and Place Process of Surface Mount Technology Using Support Vector Regression**
Daehan Won, Shun Cao, Seungbae Park and Irandokht Parviziomran (Binghamton University, USA); Haeyong Yang (Koh Young Technology America, USA)

**Collaboration Requirement Planning Protocol for HUB-CI in Factories of the Future**
Puwadu Oak Dasadenurungskul, Maitreyee Sreeaam and Xiang He (PRISM Center and Purdue University, USA); Ashwin Nair, Karthik Ramani, Alexander J. Quinn and Shimon Nof (Purdue University, USA)

**W1030-V2: SUPPLY CHAIN 1**
Chair: Jukka Hallikas, Lappeenranta University of Technology, Finland

**Zurich E**

A Method of Supply Chain Evaluation Based on the Structure of an Information Network
Nobuaki Ishii (Kanagawa University, Japan); Masaaki Ohba (Nihon University, Japan)

Study of Rifle Maintenance and Parts Supply via 3D Printing Technology During Wartime
Minsu Kim (Korea Military Academy, Korea & Seoul National University, Korea); Soo Chan Kim and Namsu Ahn (Korea Military Academy, Korea)

Fuzzy Bi-Objective Model for a Supply Chain Network Design Problem Considering Stochastic Transportation Lead Time
Azadeh Sadeghi, Roochollah Younes Sinaki and Gursel Suer (Ohio University, USA); Can Celikbilek (DoubleDown Interactive, USA)

The Importance of Supply Chain Resilience: An Empirical Investigation
Fahid Alfarsi (Newcastle University Business School, United Kingdom (Great Britain)); Fred Lemke (Vlerick Business School, Belgium); Ying Yang (University of Newcastle, United Kingdom (Great Britain))

Assessing Benefits of Information Process Integration in Supply Chains
Jukka Hallikas, Kari Korpela, Jyri Vilko and Sirpa Multaharju (Lappeenranta University of Technology, Finland)

Scenario Development for Collaborative Financial Supply Chain Management in Automotive Industry
Veli Matti Virolainen, Miia Pirttila and Timo Karri (Lappeenranta University of Technology, Finland); Lotta Lind (ABB Oy, Finland)
Dr. Stefan Minner,  
International Journal of Production Economics

Dr. Andrew Kusiak,  
Journal of Intelligent Manufacturing

Dr. Yong Yin,  
Asian Journal of Management Science and Application

**W1030-V3: IE & OR – INFORMATION AND ARTIFICIAL INTELLIGENCE**  
Chair: Thomas Sobottka, Fraunhofer Austria Research GmbH & TU, Austria

**Zurich F**

*Robust, Evidence-Based Data Fusion*  
Mohammad Amin Javadi and Brian L Huff (The University of Texas at Arlington, USA)

*Potential for Machine Learning in Optimized Production Planning with Hybrid Simulation*  
Thomas Sobottka, Felix Kamhuber and Wilfried Sihn (Fraunhofer Austria Research GmbH & TU Vienna, Austria); Mohammadali Faezirad ( Ferdowsi University of Mashhad, Iran)

*Maturity Models in Industrial Internet: a Review*  
Massimo Bartolini, Giovanni Esposito, Mattia Neroni and Giovanni Romagnoli (University of Parma, Italy)

*A Based-Bee Algorithm Approach for the Multi-Mode Project Scheduling Problem*  
Karen Yineth Niño and Jorge Peña Carrillo ( Universidad Militar Nueva Granada, Colombia)

*Integrated Strategies to an Improved Genetic Algorithm for Allocating and Scheduling Multi-Task in Cloud Manufacturing Environment*  
Abdelrahman Elgendy, Jihong Yan and Mingyang Zhang (Harbin Institute of Technology, P.R. China)

**W1030-V4: MANUFACTURING SUSTAINABILITY 2**  
Chair: Alexandre Dolgui, IMT Atlantique & LS2N, France

**Zurich G**

*The Role of Internal Quality Relations in Driving Sustainability Performance*  
Ahmed Al Sawafi ( University of Newcastle, United Kingdom (Great Britain)); Fred Lemke ( Vlerick Business School, Belgium); Ying Yang ( University of Newcastle, United Kingdom (Great Britain))

*Benchmarking Holistic Optimization Potentials in the Manufacturing Industry - A Concept to Derive Specific Sustainability Recommendations for Companies*  
Lara Waltersmann, Steffen Kiemel, Ivan Bogdanov and Johanna Lettgen, Robert Miehe, Joerg Mandel and Alexander Sauer ( Fraunhofer Institute for Manufacturing Engineering and Automation, Germany)

*The Relationships Between Human Capital, Quality Management and Corporate Social Performance: A Bayesian SEM Approach*  
Hiroki Iwamoto and Hideo Suzuki (Keio University, Japan)

*Optimal Operations Management of Hybrid Energy Systems Through Short-Term Atmospheric and Demand Forecasts*  
Francesca Calabrese, Mauro Gambier, Riccardo Manzini, Francesco Pilati, Alberto Regattieri and Giovanni Lelli (University of Bologna, Italy)

**W1030-G2: TUTORIAL**  
Zurich B

*Hybrid Manufacturing System Design Considerations and Flexibility in the Advanced Manufacturing Era*  
Presenter:  
Gursel Suer, Ohio University (USA)

In this tutorial, first manufacturing systems and assembly lines will be classified and then their integration will be reviewed. Next, flexibility issues both in manufacturing systems and assembly lines will be discussed considering layered system approach. In the final segment of the tutorial, the influence of recent developments in the advanced manufacturing and industry 4.0 (particularly additive manufacturing, collaborative robots, flexible cells, connectivity, augmented reality, worker and task assignments, wearable robots) on the hybrid manufacturing system design will be elaborated.

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**Schedule**

10:00 a.m. – 10:30 a.m.  
Refreshment Break – Preconvene

10:30 a.m. – 12:00 p.m.  
CONCURRENT TECHNICAL SESSIONS

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**Concurrent Technical Sessions | Wednesday 10:30 a.m. – 12:00 p.m.**  
*denotes presentation only
**WEDNESDAY, AUGUST 14**

**12:00 p.m. – 1:30 p.m.**
Lunch – provided – Zurich D

**Luncheon Speaker:**
**Yong Yin,** Professor, Doshisha University, Japan

**Presentation Title:** Seru Production: A Potential Production System for Industry 4.0

**3:00 p.m. – 3:30 p.m.**
Refreshment Break – Preconvene

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### Concurrent Technical Sessions | Wednesday 1:30 p.m. – 3:00 p.m.

#### W1330-G1: DATA ANALYTICS 3
**Chair:** Anthony Chiu, De La Salle University, Philippines

- **Zurich A**
  - A Study of Statistical Forecasting Method Concerning Water Demand
    Yukio Maruyama (Nippon Institute of Technology, Japan); Hisashi Yamamoto (Tokyo Metropolitan University, Japan)
  - Application of Clustering Analysis for Investigation of Food Accessibility
    Rahul Sucharitha and Seokcheon Lee (Purdue University, USA)
  - Machine Learning Driven Image Analysis of Fine Grinded Knife Blade Surface Topographies
    Marcin Hinz, Max Radetzky, Lea Hannah Guenther, Pit Fiur and Stefan Bracke (University of Wuppertal, Germany)
  - Green Outsourcer Fuzzy Selection Model by Taguchi Capability Index
    Kuen-Suan Chen and Ching-Hsin Wang (National Chin-Yi University of Technology, Taiwan); Anthony Chiu (De La Salle University, Philippines)
  - Predicting Student Retention Using Support Vector Machines
    Tatiana A Cardona and Elizabeth Cudney (Missouri University of Science and Technology, USA)

#### W1330-V2: SUPPLY CHAIN 2
**Chair:** Yasutaka Kainuma, Tokyo Metropolitan University, Japan

- **Zurich E**
  - Methodological Proposal to Evaluate the Alternative of Outsourcing the Transportation Fleet of a Company
    Cecilia Montt and Eduardo Baeza (Pontifical Catholic University of Valparaiso, Chile); Luis Quezada (University of Santiago of Chile, Chile)
  - Investigation of Global Supply Chain Network Redesign
    Yasutaka Kainuma (Tokyo Metropolitan University, Japan); Noriyuki Suyama (Bunka Gakuen University, Japan); Tetsuma Furuhata (Takachiho University, Japan); Yacob Khojasteh (Sophia University, Japan)
  - A Weighted Multi-Objective Mathematical Model for Cell Scheduling and Environmentally Sustainable Supply Chain Network
    Azadeh Sadeghi, Roohollah Younes Sinaki and Gursel Suer (Ohio University, USA); Can Celikbilek (DoubleDown Interactive, USA)
  - New Service Development Across the Logistics and Financial Industries
    Luca Gelsomino, Christiaan de Goeij and Michiel Steeman (Windesheim University of Applied Sciences, The Netherlands)

#### W1330-V1: INTERNET OF THINGS
**Chair:** Koichi Murata, Nihon University, Japan

- **Zurich C**
  - On the Role of Visual Management in the Era of Digital Innovation
    Koichi Murata (Nihon University, Japan)
  - Cyber-enabled Product Lifecycle Management A Multi-agent Framework
    Vishwa Kumar (Illinois Institute of Technology, USA); Avimanyu Sahoo (Oklahoma State University, USA); Frank Liou (Missouri University of Science and Technology, USA)
  - System of Systems (SoS) Architecture for Digital Manufacturing Cybersecurity
    Lirim Ashiku and Cihan H Dagli (Missouri University of Science and Technology, USA)
  - Evaluation of Wearable Visual Assistance System for Manual Automotive Assembly
    Adithya Baburaj, Ravi Garimella, Gopi Pillai, Vignesh Eswar, Matthew Krugh and Laine Mears (Clemson University, USA)
W1330-V3: IE & OR – INDUSTRY 4.0 NEW TECHNOLOGIES
Chair: Djerdj Horvat, Fraunhofer Institute for Systems and Innovation Research, Germany

Development of a Procedure Model for Human-Centered Industry 4.0 Projects
Wilhelm Bauer and Sven Schuler (Fraunhofer Institute for Industrial Engineering IAQ, Germany); Tim Hornung (University of Stuttgart, Germany); Jacob Decker (Festo AG & Co. KG, Germany)

Researching the Effects of Automation and Digitalization on Manufacturing Companies’ Productivity in the Early Stage of Industry 4.0
Djerdj Horvat, Henning Kroll and Angela Jäger (Fraunhofer Institute for Systems and Innovation Research ISI, Germany)

Critical Success Factors of Risk Management with the Advent of ISO 31000 2018 – Descriptive and Content Analyzes
Gabriel Rampini and Fernando Tobias Berssantei (University of Sao Paulo, Brazil); Harmi Takia (Municipality São Paulo, Brazil)

Analyzing the Implications of New Technologies to the Management of Operations - Protocol Proposal and Application Illustration
Fernando Deschamps (Pontifical Catholic University of Parana & Federal University of Parana, Brazil); Cassiano Beller (Pontifical Catholic University of Parana - Brazil, Brazil); Paulo Henrique Brunheroto (Federal University of Parana, Brazil)

Guidelines for a More Agile, Productive and Integrated New Technologies Employment
Cassiano Beller (Pontifical Catholic University of Parana - Brazil, Brazil); Fernando Deschamps (Pontifical Catholic University of Parana & Universidade Federal do Parana, Brazil); Edson Pinheiro de Lima (Pontifical Catholic University of Parana & Federal University of Technology - Parana, Brazil); Eduardo Loures (PUC-Pr, Brazil); Rosemary Francisco (PUCPR, Brazil)

W1330-G2: TUTORIAL
Zurich B

Knowledge and Agent-based Framework for Manufacturing Planning in Industry 4.0
Presenter: Dusan Sormaz, Professor, Ohio University (USA)

This tutorial will provide an overview of tools and methods for knowledge-based manufacturing planning using distributed (agent-based) applications for product development cycle (from design to manufacturing execution). Product development and manufacturing cycle starts with a product design in CAD software then continues through PLM, ERP and MES applications. The overview of the intelligent manufacturing planning procedure and IMPlanner prototype will be provided with a focus on resulting flexible plans which enable real-time adjustments in Industry 4.0. Then we proceed to explain how this procedure and prototype were converted into distributed application with intelligent agents – called IMPlanner-MAS, capable of using real-time sensory data in order to provide feedback to planning process. The last section of the tutorial will address model and procedures which allow ontology-based semantic interoperability and integration of various data sources in industrial environment. Prototypes and procedures will be demonstrated on sample parts of industrial complexity.

W1330-V4: MANUFACTURING SUSTAINABILITY 3
Chair: Francesco Gabriele Galizia, University of Padova, Italy

Towards Optimum Energy Utilization by Using the Inverters for Industrial Production
Marco Bortolini (University of Bologna, Italy); Maurizio Faccio, Francesco Gabriele Galizia and Mojtaba Nedaee (University of Padova, Italy); Francesco Pilati (University of Bologna, Italy)

Handling Waste in Manufacturing: Encouraging Re-Manufacturing, Recycling and Re-Using in America
Bolaji Ishola (University of Bridgeport, USA)

A Method of Collaborative Inspection Planning by Integrating a Production Planning System
Hiroshi Shiokawa and Nobuaki Ishii (Kanagawa University, Japan)

The Biological Transformation of Industrial Manufacturing – Future Fields of Action in Bioinspired and Bio-based Production Technologies and Organization
Robert Miehe and Johannes Full (Fraunhofer IPA, Germany); Patrick Scholz and Axel Demmer (Fraunhofer IPT, Germany); Thomas Bauerhansl and Guenther Schuh (Fraunhofer Institute for Manufacturing Engineering and Automation IPA, Germany); Alexander Sauer (Fraunhofer IPA, Germany)
**W1530-G1: INTELLIGENT SYSTEMS**
Chair: Walter Mayrhofer, Technische Universität Wien, Austria

**Zurich A**

One-Fits-All vs. Tailor-Made User-Centered Workstations for Field Assembly with an Application in Aircraft Parts Manufacturing
Walter Mayrhofer, Sebastian Schlund and Patrick Rupprecht (Vienna University of Technology, Austria)

Action Recognition in Manufacturing Assembly Using Multimodal Sensor Fusion
Md. Al-Amin, Wenjin Tao, David Doell, Lingard Ravon, Zhaozheng Yin, Ming Leu and Ruwen Qin (Missouri University of Science and Technology, USA)

A Region-Based Deep Learning Algorithm for Detecting and Tracking Objects in Manufacturing Plants
Muhammad Monjurul Karim, David Doell, Lingard Ravon, Zhaozheng Yin, Ming Leu and Ruwen Qin (Missouri University of Science and Technology, USA)

Image Decomposition Accelerates Dynamic Network Modeling for in Situ Monitoring of Bio-mimic Wing Printing Processes
Oluwabasayo Aworunse, Huimin Zhou, Jia Deng and Chaoqiang Cheng (Binghamton University, USA)

**W1530-V1: CLOUD-BASED MANUFACTURING AND INTERNET OF THINGS**
Chair: Jaime Garcia, Lulea University of Technology, Sweden

**Zurich C**

Autonomous Production Workstation Operation, Reconfiguration and Synchronisation
Jaime Garcia and Jerker Delsing (Lulea University of Technology, Sweden)

Collaborative Control Protocol for Agricultural Cyber-Physical System
Pawel Domaszkiewicz (Prysm Center and Purdue University, USA); Shimon Nof (Purdue University, USA); Avital Bechar (The Institute of Agriculture Engineering, Israel); Yang Tao (University of Maryland, USA)

Framework for Customized, Machine Learning Driven Condition Monitoring System for Manufacturing
Marcin Hinz, Dominik Brueggemann and Stefan Bracke (University of Wuppertal, Germany)

Associate Finger Engagement During Manual Assembly in Automotive Production for Smart Wearable Systems
Matthew Krugh (Clemson University International Center for Automotive Research, USA); Rishabh Vedant, Ravi Garimella, Adithya Baburaj and Ethan Wescoat (Clemson University, USA); Laine Mears (Clemson University; International Center for Automotive Research, USA)

Prognostic Health Management of Production Systems. New Proposed Approach and Experimental Evidences
Francesca Calabrese, Alberto Regattieri (University of Bologna, Italy); Lucia Botti (University of Modena and Reggio Emilia, Italy); Francesco Gabriele Galizia (University of Padova, Italy)

**W1530-V2: MANUFACTURING**
Chair: Pedro Palominos, University of Santiago of Chile, Chile

**Zurich E**

Influences Between Design Characteristics of Lean Manufacturing Systems and Implications for the Design Process
Michael Feldmeth and Egon Müller (Chernitz University of Technology, Germany)

A Model of Economic Evaluation for the Acquisition of Flexible Manufacturing Technologies
Pedro Palominos, Lilo Ernesto Quezada, Javier Donoso Oyarzún (University of Santiago Of Chile, Chile); Miguel Gonzalez (University of Andres Bello, Chile)

Knowledge of IT Tools Based on AI Maturity - Industry 4.0 Perspective
Agnesiska Stachowiak and Natalia Pawlak (Poznan University of Technology, Poland); Przemyslaw Niewiadomski (University of Zielona Gora, Poland)

Simulation Analysis of Alternative Personnel Structures in the Shipping Division of a Tinplate Manufacturer
Gert Zulch (Karlsruhe Institute of Technology, Germany); Michael Leupold (PROTEMA Unternehmensberatung GmbH, Germany); Mario van Hall and Klaus Höfer (Thyssenkrupp Rasselstein GmbH, Germany)

Implementation of Reconfigurable Manufacturing in the Italian Context State-Of-The-Art and Trends
Marco Bortolini and Emililo Ferrari (University of Bologna, Italy); Francesco Gabriele Galizia (University of Padua, Italy); Cristina Mora (University of Bologna, Italy)

On Advanced Topics for Reinforcing Leanized Management
Hiroshi Katayama (Waseda University, Japan); Koichi Murata (Nihon University, Japan); Deok-joo Lee (Seoul National University, Korea)

**W1530-V3: IE & OR – CASE STUDIES AND APPLICATION**
Chair: TBA

**Zurich F**

Performance Management Systems for Project Management Offices: A Case-Based Study
Rafael Duarte (Universidade Positivo & Pontifical Catholic University of Parana, Brazil); Fernando Deschamps (Pontifical Catholic University of Parana & Federal University of Parana, Brazil); Edson Pinheiro de Lima (Pontifical Catholic University of Parana & Federal University of Technology - Parana, Brazil); Andre Pepino and René Clavijo (Pontifical Catholic University of Parana, Brazil)

Operations Management in Emergency Medical Services Response Time in a Brazilian Mobile Emergency Care Service
Marcos Colla and Gilson Adamczuk Oliveira, and Gilson D Santos (Federal Technological University of Panama, Brazil)

Effect of Occupational Exposure to Noise on the Health of Factory Workers
Ant-Ju Lai (Tunghai University, Taiwan & Taiwan HonChuan Enterprise Co., LTD) Chin-Yin Huang (Tunghai University, Taiwan)

Patterns for Analysis of Human Resource Flexibility in Manufacturing
Stefan Gerlach, Mortiz Hämerle and Sven Schuler (Fraunhofer Institute for Industrial Engineering IAO, Germany)