

SATURDAY, AUGUST 10**4:00 p.m. – 6:00 p.m.**IFPR Executive Board
*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

Zurich A

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 Mesa 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

Zurich B

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

Isabella 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 São Paulo, Brazil); Cláudia Machado (Universidade de São Paulo, Brazil); Cristiano Martins Monteiro (Universidade Federal de Minas Gerais, Brazil); Fernando Berssaneti (University of Sao Paulo, Brazil); José Quintanilha (Universidade de São Paulo, Brazil)

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 Berssaneti (University of Sao Paulo, Brazil); Clodoveu A. Davis Jr. (Federal University of Minas Gerais, Brazil); José Quintanilha (Universidade de São Paulo, Brazil)

M1030-V1: DIGITAL AND CYBER MANUFACTURING 1

Chair: Agostino Villa, Politecnico di Torino, Italy

Zurich C

Proposed Approach to Measure the Degree of Readiness to Implement Industry 4.0

Wagner Lucato and Athos Pacchini (Universidade Nove de Julho - UNINOVE, Brazil); Giovanni Mummolo and Francesco Facchini (Polytechnic University of Bari, Italy)

Practical Insights on Augmented Reality Support for Shop-Floor Tasks

Philipp Url, 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 Klapper (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*

10:30 a.m. – 12:00 p.m.

**CONCURRENT TECHNICAL
SESSIONS**

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

** denotes presentation only*

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

Ajeseun Jimo and Christos Braziotis (Nottingham University Business School, United Kingdom (Great Britain)); Helen Rogers (Technische Hochschule Nürnberg, Germany); Kulwant Pawar (University of Nottingham, United Kingdom (Great Britain))

M1030-V3: IE & OR - SCHEDULING

Chair: Katsumi Morikawa, Hiroshima University, Japan

Zurich F

Job Shop Scheduling by Branch and Bound Using Genetic Programming

Katsumi Morikawa, Keisuke Nagasawa and Katsuhiko Takahashi (Hiroshima University, Japan)

Column Generation Algorithms for a Single Machine Problem with Deteriorating Jobs and Deterioration Maintenance Activities

Young-Bin Woo and Ilkyeong Moon (Seoul National University, Korea); Byung Soo Kim (Incheon National University, Korea)

Using Open Access Data to Model a Technician Routing and Scheduling Problem in a Congested Urban Setting

Fabián Castaño (Pontifical Xavierian University, Colombia); Andrés Felipe Gutierrez Bonilla, Nubia Velasco and Ciro Amaya (University of los Andes, Colombia)

A Genetic Algorithm Approach for Multi Objective Cross Dock Scheduling in Supply Chains

Siwaphong Kusolpuchong, Krerkkiat 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, Wenqing 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

Wenqing 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, USAPresentation 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 SocietyFei 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 2Chair: 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**Shuojiang 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 Wakamatsu (Osaka
University, Japan); Akira Tsumaya (Kobe University, Japan); Tatsuo Inoue (Formerly,
Daifuku Co., Ltd., Japan); Koji Iwamura (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**Matthias 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)

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

* denotes presentation only

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 Veiga (Pontifical 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 Lentens 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 SM&Es?

Djerdj 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 Ozkapici (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 Toghyani and Sami Matthews (LUT University, Finland)

Effect of Lattice Structures on Natural Frequency of SLA Fabricated Parts

Ali Murat Kayıran 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 Liou (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 Liou (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 (Pontifical Catholic University of Parana, Brazil); Sergio E. Gouvea da Costa (Pontifical Catholic University of Parana & Federal University of Technology - Parana, Brazil); Eduardo Loures (PUC-Pr, Brazil); Edson Pinheiro de Lima (Pontifical 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

4:45 p.m. – 5:00 p.m.

STRETCH BREAK

Concurrent Technical Sessions | Monday 3:30 p.m. – 4:45 p.m.

* denotes presentation only

M1530-G1: INDUSTRIAL LOGISTICS 1

Chair: Stefan Minner, Technical University of Munich, Germany

Zurich A

SME Innovation and Development in the Context of Industry 4.0

Teresa Taurino and Agostino Villa (Polytechnic University of 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 Naeem (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

Zurich B

A Survey on Sustainable Product Development

Pedro Marques (Universidade Lusófona, Portugal); M. Janeiro 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 Lentz (Fraunhofer Institute for Industrial Engineering IAO, Germany); Nikolas Zimmermann (Fraunhofer-Institute for Industrial Engineering IAO, Germany); Maik Siee (Fraunhofer IPA, Germany)

Adding Sustainability to Lean Product Development

João Paulo Estevam de Souza (University of Glasgow & Instituto Nacional de Pesquisas Espaciais, Brazil); Rob Dekkers (University of Glasgow, United Kingdom (Great Britain))

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 Berssaneti, and Denise Dantas (University of Sao Paulo, Brazil)

M1530-V1: DIGITAL AND CYBER MANUFACTURING 3

Chair: Bastian Pokorini, Fraunhofer Institute for Industrial Engineering, Germany

Zurich C

Bidirectional Interoperability of Product Engineering and Manufacturing Enhancing Mass Customization

Anna Sakowski (University of Stuttgart IAT, Germany); Manfred Dangelmaier and Dieter Spath (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); Maurizio 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 Findeisen (University of Stuttgart, Germany); Laura Körting, Simon Schmacher and Tobias Eusterwiemann (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)

Concurrent Technical Sessions | Monday 3:30 p.m. – 4:45 p.m.

* denotes presentation only

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. Gouvea 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 Ulutas (Eskisehir 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. 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)

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 Warsing (North Carolina State University, USA)

Tool Path Planning Optimization for Multi-Tool Additive Manufacturing

Hieu Bui, Harry Pierson, 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 Lentz (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

Qihao 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 Kizilay (Yasar University, Turkey); M. Fatih Tasgetiren (Istinye University, Turkey & Huazhong University of Science and Technology, P.R. China); Quan-Ke Pan (Huazhong University of Science and Technology, P.R. China); Gürsel Süer (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 Öztop (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

Concurrent Technical Sessions | Monday 5:00 p.m. – 6:00 p.m.

** denotes presentation only***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

Iliia 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, Université 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 Lan 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)

Concurrent Technical Sessions | Monday 5:00 p.m. – 6:00 p.m.

* denotes presentation only

M1700-V2: HYBRID & CELLULAR MANUFACTURING 1

Chair: Venkataramanaiah Saddikuti, Indian Institute of Management, India

Zurich E

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)

M1700-V3: ADDITIVE MANUFACTURING – QUALITY

Chair: Harry Pierson, University of Arkansas, USA

Zurich F

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**

Zhaohui 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 Al_xCrCuFeNi₂ High-Entropy Alloys Coatings by Laser Metal Deposition

Wenyuan Cui, Lan Li, Xinchang Zhang, Yitao Chen, Tan Pan and Frank Liou (Missouri University of Science and Technology, USA)

M1700-V4: ENERGY EFFICIENT SCHEDULING 2

Chair: Lara Waltersmann, Fraunhofer Institute for Manufacturing Engineering and Automation, Germany

Zurich G

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 (Tunghai 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 Arkopaul 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 Lentjes**, 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 Tamaki (Aoyama Gakuin University, Japan); Masahiro Arakawa (Nagoya
Institute of Technology, Japan); Maki Arame (Polytechnic University, Japan);
Yoshiyuki Ono (AOYAMA Human Innovation Consulting, Inc., Japan)**Certification of Openness - Corner Stone of an Agile PLM
Strategy**Michael Hertwig and Joachim Lentjes (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 Bogojevic, 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**Illhoe 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)

Michael Giuliano, Consultant, USA

Gursel Suer, Professor, Ohio University, USA

10:00 a.m. – 10:30 a.m.

REFRESHMENT BREAK

10:30 a.m. – 12:00 p.m.

CONCURRENT TECHNICAL SESSIONS

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

* denotes presentation only

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)

*A Geometrically-Intelligent Non-Dominated Sorting Algorithm for Efficient Cyber-Physical System Optimization Processes

Samuel A. Vanfossen (Missouri University of Science and Technology, USA)

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); Jan Goos (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))

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

Notthamon 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

Kititoshi 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)

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

Zurich A**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-Pr, Brazil); Edson Pinheiro de Lima (Pontifical Catholic University of Parana & Federal University of Technology - Parana, 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 Aghezaf and Johannes Cottyn (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

Zurich C**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)

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-V2: HYBRID & CELLULAR MANUFACTURING 3

Chair: Yong Yin, Doshisha University, Japan

Zurich E**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, Roohollah Younes Sinaki 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**

Dongni Li, Yaoxin Zhang, Yong Yin, Yin Gai and Jiafu Tang (Doshisha University, Japan)

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

* denotes presentation only

T1330-V3: IE & OR – SUPPLY CHAIN AND LOGISTICS

Chair: Golany Boaz, Israel Institute of Technology, Israel

Zurich F

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

Chih-Yuan Chu and Gul Kremer (Iowa State University, USA); Kijung Park (Incheon National University, Korea)

***Scalable Heuristics for P-Median Problem on Real Road Networks**

Saeed Ghanbartehrani and Mahnoush Samadi Dinani (Ohio University, USA)

Traveling Salesman Problem with Hotel Selection: Comparative Study of the Alternative Mathematical Formulations

Cemal Aykut Gencil and Baris Kececi (Baskent University, Turkey)

T1330-V4: SUSTAINABLE SUPPLY CHAIN 2

Chair: Ruwen Qin, Missouri University of Science and Technology, USA

Zurich G

Adaptive Storage Reassignment in Order Picking Systems to Picker Learning and Change of Demand

Ayumi Ogasawara, Aya 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 (Hiroshima 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)

Linear Physical Programming Iteration Method of Multi-Player Multi-Objective Decision Making in Supply Chain

Tomoaki 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 Hirotsu (Prefectural University of Hiroshima, Japan)

T1330-G2: TUTORIAL

Zurich B

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)

Scheduling is one of the important and complex combinatorial optimization models in where it can have a major impact on the productivity of a manufacturing process. The most models of scheduling problems are confirmed as a NP-hard or NP-complete. Genetic algorithm is one of the most efficient methods among metaheuristics for solving the real-world scheduling problems and we can enhance it with some methods in Machine Learning (ML) and/or Graphical Processing Unit (GPU). In this talk, the following successful case studies in various scheduling problems under the limited waiting times and various resources will be deeply introduced:

- 1) Hybrid Genetic Algorithms with Machine Learning and GPU,
- 2) Human Profiles and Multi-person multi-criteria scheduling by Island-based GA
- 3) DE-Math Model and Hybrid Solution for Order Picking in Warehouse Operations
- 4) Hard Disk Device Manufacturing Scheduling by Local Search and Fuzzy Logic Controller
- 5) Module Assembly Scheduling in Panel Devices (TFT-LCD) by MoHGA with FLC & TOPSIS,
- 6) Semiconductor Final Testing Scheduling by Cooperative EDA with Machine Learning,
- 7) Train Scheduling with Machine Learning & GPU Units

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?

Concurrent Technical Sessions | Tuesday 3:30 p.m. – 5:00 p.m.

* denotes presentation only

T1530-G1: DATA ANALYTICS 1

Chair: Joanna Oleskow-Szlapka, 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 Olesków Szlapka, Roman Domański 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 Shaurya, Pankhuri Arora and Weihong (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)

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)

A 3D Convolutional Neural Network for Volumetric Image Semantic Segmentation

Hongya Lu, Haifeng Wang, Qianqian Zhang, 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-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 Yunfang 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 (Eskisehir 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)

Concurrent Technical Sessions | Tuesday 3:30 p.m. – 5:00 p.m.

* denotes presentation only

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 Schleinkofer (Fraunhofer Institute for Manufacturing Engineering and Automation IPA, Germany); Thorsten Herrmann, Ina Maier and Daniel Roth (University of Stuttgart, Germany); Thomas Bauernhansl (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

Günther 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 Sihm (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 OCEPAR, Brazil

Oldair Roberto Giasson, Edson Pinheiro de Lima, and Sergio Eduardo Gouvea da Costa (Federal University of Technology, Parana & Pontifical Catholic University of Parana, Brazil) Gilson Adamczuk Oliveira and Abdinardo Moreira Barreto de Oliveira (Federal University of Technology, Parana, Brazil)

T1530-G1: TUTORIAL

Zurich B

Digital Transformation in Manufacturing – Industry Practice Case**Presenter:**

Illhoee 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**Concurrent Technical Sessions | Wednesday 10:30 a.m. – 12:00 p.m.**** denotes presentation only***W1030-G1: DATA ANALYTICS 2****Chair:** Veikko 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 Mezzogori 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 Mangement 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 Haifeng 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

Iranokht Parvizioman, 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 Iranokht Parvizioman (Binghamton University, USA); Haeyong Yang (Koh Young Technology America, USA)

Collaboration Requirement Planning Protocol for HUB-CI in Factories of the Future

Puwadol Oak Dusadeerungsikul, Maitreya Sreeram 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); SooChan 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, Roohollah Younes Sinaki and Gursel Suer (Ohio University, USA); Can Celikbilek (DoubleDown Interactive, USA)

The Importance of Supply Chain Resilience: An Empirical Investigation

Fahd 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

10:00 a.m. – 10:30 a.m.

Refreshment Break – *Preconvene*

10:30 a.m. – 12:00 p.m.

CONCURRENT TECHNICAL SESSIONS

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

** denotes presentation only*

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 Faezizad (Ferdowsi University of Mashhad, Iran)

Maturity Models in Industrial Internet: a Review

Massimo Bertolini, 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 Gamberi, 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.

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**

1:30 p.m. – 3:00 p.m.**CONCURRENT TECHNICAL
SESSIONS****3:00 p.m. – 3:30 p.m.**Refreshment Break –
*Preconvene***Concurrent Technical Sessions | Wednesday 1:30 p.m. – 3:00 p.m.**** denotes presentation only***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-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-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 Furuhashi (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 (Windsheim University of Applied Sciences, The Netherlands)

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

* denotes presentation only

W1330-V3: IE & OR – INDUSTRY 4.0 NEW TECHNOLOGIES

Chair: Djerdj Horvat, Fraunhofer Institute for Systems and Innovation Research, Germany

Zurich F

Development of a Procedure Model for Human-Centered Industry 4.0 Projects

Wilhelm Bauer and Sven Schuler (Fraunhofer Institute for Industrial Engineering IAO, 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 Tobal Berrsaneti (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 Paraná, 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-V4: MANUFACTURING SUSTAINABILITY 3

Chair: Francesco Gabriele Galizia, University of Padova, Italy

Zurich G

Towards Optimum Energy Utilization by Using the Inverters for Industrial Production

Marco Bortolini (University of Bologna, Italy); Maurizio Faccio, Francesco Gabriele Galizia and Mojtaba Nedaei (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 Mieke and Johannes Full (Fraunhofer IPA, Germany); Patrick Scholz and Axel Demmer (Fraunhofer IPT, Germany); Thomas Bauernhansl and Guenther Schuh (Fraunhofer Institute for Manufacturing Engineering and Automation IPA, Germany); Alexander Sauer (Fraunhofer IPA, Germany)

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.

WEDNESDAY, AUGUST 14

3:30 p.m. – 5:00 p.m.

CONCURRENT TECHNICAL
SESSIONS

5:00 p.m. – 5:30 p.m.

General Session –
Wrap Up – Zurich D

Conference Adjourns

Concurrent Technical Sessions | Wednesday 3:30 p.m. – 5:00 p.m.

* denotes presentation only

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

Oluwabusayo Aworunse, Huirmin Zhou, Jia Deng and Changqing 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

Puwadol Oak Dusadeerungsikul (PRISM 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 (Chemnitz University of Technology, Germany)

A Model of Economic Evaluation for the Acquisition of Flexible Manufacturing Technologies

Pedro Palominos, Luis 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

Agnieszka Stachowiak and Natalia Pawlak (Poznan University of Technology, Poland); Przemysław Niewiadomski (University of Zielona Góra, Poland)

Simulation Analysis of Alternative Personnel Structures in the Shipping Division of a Tinplate Manufacturer

Gert Zülch (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 Emilio 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

An-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, Moritz Hämmerle and Sven Schuler (Fraunhofer Institute for Industrial Engineering IAO, Germany)