I  Keynote Papers

Towards the Cognitive Factory
Professor Michael Zaeh
Institute for Machine Tools and Industrial Management - iwb (Germany)

Focused Flexibility and Production System Evolution
Professor Tullio Tolio
Politecnico di Milano-Dipartimento di Meccanica (Italy)

Knowledge-based Approach for Changeability Management
Professor Alain Bernard
IRCCyN - Ecole Centrale de Nantes (France)

Research & Development Activities of Machine Tools
Dr. Makoto Fujishima
Mori Seiki - The Machine Tool Company (Japan)

The Evolution of CNC Technology from Automated Manufacture to Global Interoperable Manufacturing
Professor Stephen T. Newman
University of Bath - Department of Mechanical Engineering (UK)

II  Manufacturing Systems Paradigms

II.1  Manufacturing System Design and Planning

Adaptive Logistics: Information Management for Planning and Control of Small Series Assembly
G. Schuh, S. Gottschalk, C. Narr, T. Hohne (Germany)

Dimensions of the Concept of Mobile Manufacturing
C. Stillström, M. Jackson (Sweden)
Integrative Factory, Technology, and Product Road Mapping  
P. Nyhuis, B. Denkena, S. Wulf, P. Blümel (Germany)

The Synergistic Problem Solving Approach based on TRIZ and AD  
R.A. Shirwaiker, G.E. Okudan (USA)

Effectiveness of Digital Factory for Simple Repetitive Task Simulation in Medium-small Enterprises  
A. Lambiase, F. Lambiase, F. Palumbo (Italy)

II.2 Manufacturing Agility and Flexibility

Integrating Product-Process-Production Flexibility, Agility and Evolution  
L. Laperrière (Canada)

On Planning and Evaluating Capacity Flexibilities in Uncertain Markets  
M.F. Zaeh, N. Mueller (Germany)

Assessment of Operational Flexibility in a Make-To-Order Assembly System  
R. Calvo, R. Domingo, M.A. Sebastian (Spain)

Limits of Agility in Automotive Manufacturing  
J. Kuhn (UK)

Production System Maturity Model  
G. Britton, P. Huhtala, M. Koho, S. Torvinen (Finland)

II.3 Performance Metrics and Evaluation Methodologies

Flexibility Metrics for Dynamic FMS Capability and Capacity Conditions  
P. Hassanzadeh, V. Maier-Speredelozzi (USA)

A Code-Based Compatibility Analysis of Different Machine Configurations  
J. Urbanic, H. ElMaraghy, W. ElMaraghy (Canada)

Framework for Evaluating and Improving Manufacturing Systems  
M. Koho, S. Torvinen (Finland)

Adequate and Economic Factory Transformability – Result of a Benchmarking  
P. Nyhuis, M. Kolakowski, T. Heinen (Germany)

Enterprise Processes Performance Analysis based on Value Chain Modeling and Simulation  
M. Mauchand, A. Bernard, A. Siadat, N. Perry (France)

III Cost and Risk Management

III.1 Economics and Justification

Economic and Strategic Justification of RMS Investments  
O. Kuzgunkaya, H.A. ElMaraghy (Canada)

Set Standard Hours with Ingenuity and Creativity  
M. Thomas Jr. (USA)
The Need for Reconfigurable Robotic Systems
M. Hedelind, M. Jackson (Sweden)

Economic Statistical Design of a Multivariate Bayesian Control Chart
Z. Yin, V. Makis (Canada)

IV Enterprise Design and Knowledge Management

IV.1 Life Cycle Management of Products and Systems

Automotive Lifecycle Management through OMG PLM Services
A. Enns, E. Freiter, R. Burkert (Germany)

Closed-Loop Engineering in Adaptable Design and Manufacturing Systems
A. Barari, R. Pop-Iliev (Canada)

Tool Planning on a Lights Out Manufacturing System
M. Noël, M.S. Sodhi, B.F. Lamond (Canada)

Implementation of RFID Technology in Disassembly Systems
M. Lazarevic, G. Ostojic, V. Jovanovic, S. Stankovski (Serbia)

IV.2 Distributed Manufacturing and Network Logistics

A Two-phase Method for the Dynamic Generation of SME Production and Logistics Networks in Cooperation Frameworks
J. Lässig, S. Heinrich, H. Dürr (Germany)

Requirement Analysis Integration to a Function-driven Production Model for Flexible Manufacturing
S. Stanev, H. Krappe, J. Ovtcharova (Germany)

Decentralized, Collaborative Planning of Demand and Capacity in Automotive Production Networks
T. Hegmanns, B. Hellingrath (Germany)

An Analytical Approach to Determine the Quantity of Material Handling Equipment
D. Raman, S. Nagalingam, B. Gurd (Australia)

IV.3 Distributed Production and Supply Management

Dynamic Organizational Model for Quality Management in Globally Distributed Production Chains
J.P. Wulfsberg, J.H. Erasmus (Germany)

Real-time, Cooperative Enterprises for Customized Mass Production
L. Monostori, T. Kis, J. Váncza, B. Kádár, G. Erdős (Hungary)

Changeability in Supply Management
M.F. Zaeh, M. von Bredow (Germany)

Configuring a Supply Network in the Presence of Volume Discounts
L. Ma, G. Zhang (Canada)
Generating, Planning and Control of Cross-company Cooperation in Production and Supply Chain Networks  
S. Heinrich, J. Lässig, H. Dürr (Germany)

An Analytical Model for Manufacturing Service Supply Contracts  
N. Akbarzadeh, Z.J. Pasek (Canada)

**IV.4 Collaborative Production Systems**

An Approach for Building Intercultural and Cross-domain Virtual Organizations  
A. Mahl, A. Semenenko, J. Ovtcharova (Germany)

The Power of Small Structures: Overcome Limits of Organizational Growth by Means of Axiomatic Designed Networks of Core Competence Cells  
D.T. Matt (Italy)

Process-oriented Cooperation Assistance System for Collaborative Networks of Micro-Businesses  
E. Müller, H. Baum, J. Schütze (Germany)

Work assignment abroad – Study about subtasks included in the preparation?  
K. Kisko, A. Reiman, S. Uusipaavalniemi (Finland)

**V Factory Planning**

**V.1 Adaptable Factories And Supply Chain Design**

Design of Resilient Supply Chains: Effective Use of Influence Matrices for Disruption Preparedness  
S. Cho, J.H. Buitrago, E. Iakovou (USA)

Development of a Modular Manufacturing System with High Adaptability  
H.S. Park, D.A. Do, G.B. Lee (S. Korea)

MIS: A Proposed Manufacturing System for Small to Medium Size Manufacturing Businesses  
M.A. Gadalla (USA)

Numerically Controlled Driving of Sheet Metal as a Flexible Manufacturing Method for Individualized Products  
H. Hoffmann, R. Golle, D. Scherer, R. Petry (Germany)

New Bifurcated Semi-finished Products for a Flexible Manufacturing of Structure Elements  
P. Groche, D. Vucic (Germany)

**V.2 Modelling and Simulation**

Simulating the Manufacturing Execution System: Interactions with Workers and Managers  
D. Karnok, B. Kádár, L. Monostori (Hungary)

Evolvable Production Systems: Enabling Research Domains  
J. Barata, M. Onori, R. Frei, P. Leitão (Portugal)
Effective Methods for “Virtual Commissioning”  
G. Reinhart, T. Hensel, G. Wünsch (Germany)

Simulation and Optimization of Mixed-Model Assembly Lines Using Software Agents  
H. Xie, W. Shen, J. Neelamkavil, Q. Hao (Canada)

Construction of Constrained Open Multi-Body Subsystems for Dynamic Simulation of Closed Systems  
X. Huang, H. Xue, P. Woodard, J. Dickinson (Canada)

V.3 Logistics, Material Flow and Storage
Application of Methods of Nonlinear Dynamics for the Control of Networks of Production and Logistics  
B. Scholz-Reiter, U. Hinrichs, R. Donner (Germany)

Analysing the Dynamics Caused by Autonomously Controlled Logistic Objects  
B. Scholz-Reiter, M. Freitag, C. de Beer, T. Jagalski (Germany)

Inter-arrival Time Distributions in Reconfigurable Manufacturing Systems with Main and Side Loops  
H.A. ElMaraghy, M. Manns (Canada)

An Algorithm for the Analytical Solution to Deterministic Serial Transfer Line Productivity with Multiple Consecutive Machine Failure States  
T. Freiheit (Canada)

A Structured Approach for Implementing RFID Systems in Small and Medium-sized Enterprises  
G. Reinhart, M. Ostgathe, M. Wiesbeck (Germany)

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H. Gsell, N. Homburg (Germany)

Process Model for the Determination of a Company Specific Conception for the Implementation of the Digital Factory  
J. Gausemeier, G. Stollt, S. Tackenberg (Germany)

Influence of the Software Models’ Intelligence on their Flexibility, Reconfigurability and Agility  
N. Avgoustinov, H. Bley, L. Weyand (Germany)

Offer Specification Process in a Customized Order Processing  
G. Reinhart, M. Wiedemann, C. Rimpau (Germany)

Knowledge Management as a Supporting Function in Lean Production System Implementation  
U. Dombrowski, S. Schmidt, I. Crespo (Germany)

An Information System for One-of-a-Kind Production  
P.R. Dean, Y.L. Tu, D. Xue (Canada)
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Cataloging a Digital Models of Reconfigurable Systems with Manual Workcells
V. Jovanovic, M.M. Tomovic, I. Cosic, G. Ostojic (USA)

Computer Aided Lean Production for Mass Customization
Y.L. Tu, D. Xue, H.J. Song, G. Hong (Canada)

Data Mining of Systems State Spaces
A. Lobov, J.L. Martinez Lastra (Finland)

The Logical Square of Goals
K. Erlach (Germany)

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VI.1  Reconfigurable And Changeable Production Planning

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A. Matta, M. Tomasella, A. Valente (Italy)

An Approach for Faster Reconfigurability in Cell Layout Based on VS Induction Method
J. Trujillo, Z. Pasek, E. Baeyens (Spain)

A Review of the Impact of Assembly Sequencing on the Product Family Design Outcomes
H.U. Artar, G.E. Okudan (USA)

An Insertion Heuristic for the Deadlock-free Reactive Scheduling of Flexible Job Shops
S.A. Fahmy, T.Y. ElMekkawy, S. Balakrishnan (Canada)

Fuzzy-logic Based Logistic- and Technology-Oriented Utilisation Planning of Heat Treatment Systems
A. Kruse, S. Reinsch (Germany)

VI.2  Intelligent Process Planning

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M.K. Yeung, P. Orban, Z. Gui, Y.F. Zhang (Canada)

Dynamic Analysis of Process Chains as an Enabler for the Adaptive Process Planning
B. Denkena, K. Tracht, A. Battino (Germany)

Framework for Feature-based Hybrid Inspection Planning for Complex Mechanical Parts
A. Mohib, H. ElMaraghy (Canada)

A Methodology for Managing Change When Reconfiguring a Manufacturing System
R. Hedrick, J. Urbanic (Canada)

Optimal Path Planning for Flame Cutting of Sheet Metals
X. Huang, J. Xi, J. Li, Z. Zhong (China)
VI.3 Virtual and Agile Product Development

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M. Mengoni, M. Germani, F. Mandorli (Italy)

Supporting Feedback Processes in a Virtual Product Development Environment
C. Fortin, G. Huet, S. Gagné, G. McSorley (Canada)

Matrix Based Automated Method for Maintaining Product Configuration Knowledge
J. Nummela, S. Torviren, G. Britton (Finland)

Development of Methodology for Virtual Planning and Evaluation of Process Chains in Roll-Forming Technology
U. Bracht, D. Enge (Germany)

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F. Mantwill (Germany)

VI.4 Virtual Reality Modeling in the Digital Factory

VR Enabled Motion Tracking for Intelligent Assembly Process Planning and Training
X. Yang, S. Kruithof, S.Y.T. Lang (Canada)

Making Virtual the Reality: A Factory Planning across an integrated Ergonomic-digital Factory approach
C. Di Martino, F. Fruggiero, A. Lambiase, F. Lambiase (Italy)

Design for Six Sigma – A Systems Approach for Virtual Product Development
M.A. Ashraf, B. Sobhi-Najafabadi, Z. Qureshi, Y. Amer (Australia)

Virtual Reconfiguration of Manufacturing Systems
H. Nylund, P. Andersson, M. Hokkanen, K. Salminen (Finland)

Decision-making Aid for the Design of Reconfigurable Machine Tools
Th. Lorenzer, S. Weikert, K. Wegener (Switzerland)

VI.5 Reconfigurable Machines and Tool Design

Design and Control of Reconfigurable Parallel Kinematic Machine Tools
D. Zhang, Z. Bi (Canada)

An Approach for Shim-Less Tooling Using Robot Guided Reconfiguration Systems
W. Fritz, I. Kovač (Austria)

Cognitive Driving as a Prospective Manufacturing Method for Individualized Sheet Metal Products
H. Hoffmann, M. Golle, D. Scherer, B. Lohmann, Z. Yang, T.C. Lueth, S. Weber, M. Markert (Germany)

Application of DACE-Methods for Cutting Tap Optimization
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VI.6 Industrial Service Operations

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A. Minkus, A. Nobs, M. Schnetzler (Switzerland)
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I. Lange, M. Schnetzler, O. Schneider, P. Osadsky (Switzerland)

Measuring the Customer Benefit in Industrial Service Operations
O. Schneider, I. Lange, T. Baer, M. Schnetzler (Switzerland)

Improve Collaboration and Coordination in Service - Supply Chain Operations: The InCoCo-S Approach
M. Gerosa, M. Montorio, M. Taisch, J. Cassina (Italy)

Prerequisites for Information Integration in Small Logistics Service Provider Companies
S. Uusipaavalniemi, H. Kilpala, P. Iskanius (Finland)

VII Factory And Manufacturing Systems Control

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A Unified Reconfigurable Robots Jacobian
A. Djuric; W. ElMaraghy (Canada)

Optimal Reconfigurable Control Design for Reconfigurable Robotic Manipulators
H. ElMaraghy, A. Azab, B. Minaker (Canada)

Meta-Modelling Techniques Applied to the Design of Reconfigurable Control Applications
L. Ferrarini, G. Fogliazza, C. Veber (Italy)

A Comparison Study of Automatic Logic Control Generation Tools for Industrial Manufacturing Control Systems
M. Ang, J. Lee, L. Lee, S. Lee, D. Tilbury (USA)

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C. Martin (Canada)

VII.2 Control Of Reconfigurable Robots

Development and Characterization of a Modular and Reconfigurable Robot
Z. Li, W. Melek, C. Clark (Canada)

Task-based Configuration Optimization of Modular and Reconfigurable Robots using a Multi-solution Inverse Kinematics Solver
S. Tabandeh, C. Clark, W. Melek (Canada)

Analysis of Flexible Modules for Reconfigurable Robots
R.P. Mohamed, F. Xi (Canada)

Automation Islands – Requirements and Solutions for a Highly Flexible Concept of Robotic Systems
T. Salmi, K. Haataja, M. Sallinen, J. Göös, P. Voho (Finland)

Reconfigurable Forward Kinematics of General Stewart Platforms with Planar Bases
A. Wang, W.H. ElMaraghy (Canada)
VII.3 Production Planning and Control in Changeable Manufacturing

Deciding on Capacity Scalability in RMS: An Integrated Approach
A. Deif, W. ElMaraghy (Canada)

Modeling Dynamic Workflows in Production Control
G. Reinhart, T. Gyger, C. Lau (Germany)

Change Management for the Production of the Future – A Framework for Integrating Flexibility Measures into Change Management Processes
H. Abul Ola, S. Rogalski, K. Krahtov, J. Ovtcharova (Germany)

Dynamic Setup Dispatching and Execution Monitoring Using Function Blocks
L. Wang, N. Cai, H-Y. Feng (Canada)

Sensing and Responding to Changes in Reconfigurable Manufacturing
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VII.4 Systems And Products Quality

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N. Shukla, M.K. Tiwari, D. Ceglarek (India)

On the Need for Flexible Automated Inspection: Two Machine Vision Examples
J. Killing, B.W. Surgenor, K. Yang, G. Bone (Canada)

Variable Volume Metrology with Multiple Scale Scanners
J. Jamshidi, G.W. Owen, P.G. Maropoulos, A. R. Mileham (UK)

Optimal Maintenance Policy for a Multi-State, Deteriorating System with Several Failure Modes Under General Repair
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VII.5 Applications

Optimisation of Process Chains in the Sheet Metal Forming Industry by Performance Indicators
P. Lau, A. Kruse, S. Reinsch (Germany)

Knowledge Management Framework for Mold Design
M. Kang, K.H. Eum (S. Korea)

Tool Segments Built with Rapid-Tooling for Sheet Metal Forming – Their Forming-accuracy and the Prediction of their Wear-behavior
G. Herrmann, K. Ersoy, G. Nuernberg, H. Hoffmann (Germany)

The Effect of Process Interruption and Scrap on Production Simulation Models
T. Ilar, J. Powell, A. Kaplan (Sweden)