



- The International Academy for Production Engineering  
 - College International pour la Recherche en Productique  
 - Internationale Akademie für Produktionstechnik



## CIRP ICME '23 - 17<sup>th</sup> CIRP International Conference on



DICMAPI  
University of Naples  
Federico II

# INTELLIGENT COMPUTATION IN MANUFACTURING ENGINEERING

*Innovative and Cognitive Production Technology and Systems*

12 - 14 July 2023, Ischia (Gulf of Naples), Italy



Joint Laboratory of  
Excellence on Advanced  
Production Technology  
(Fh-IWU Chemnitz &  
DICMAPI-UniNaples  
Federico II)

### Tuesday, July 11 - Conference Registration and Welcome

18.00 - 19.00	Conference Registration at Hotel Continental Ischia, Via M. Mazzella 80, Ischia
19.30	Welcome Reception and Get Together at 19.30, Hotel Continental Ischia

### Wednesday, July 12 - Plenary Session: 9.15 - 11.00

#### CONFERENCE OPENING AND PLENARY SESSION

DAY 1			
08.00- 09.00	Late Registration		
09.15 - 11.00	<b>Conference Opening and Greetings</b> <i>R. Teti, CIRP ICME '23 Conference Chairman, Italy</i>  <b>Plenary Session Presentations</b> <i>S. Melkote (USA), Enabling Intelligent Manufacturing Systems: From Industrial Robotics to Future Cyber Manufacturing Services</i> <i>N. Nishino (Japan), From Optimisation to Equilibrium Concept in Production: An Emergent Synthesis Approach</i> <i>L. Nele, D. Santoro, A. Caggiano (Italy), Assembly &amp; Data Management Technologies for Factory Automation - R&amp;D TOP Project</i> <i>R. Teti (Italy), A Modular Framework for Designing and Producing Biohybrid Machines – BioMeld, EC Horizon Europe Project</i>		

#### Coffee Break

### Wednesday, July 12 - Morning Sessions: 11.30 - 13.15

DAY 1	SESSION A1	SESSION B1	SESSION C1
	Chairman: S. Melkote	Chairman: G. Bitsch	Chairman: M. Galetto
	Cutting Technologies I	Assembly I	Quality, Metrology & Testing I
11.30 - 11.45	Machining-Induced Distortion during Peripheral Milling of High Strength Aluminum Parts <i>Moritz M. Mayer, Michael Ott, Matthias Wimmer, Roman Hartl, Wolfram Volk, Michael F. Zaeh (Germany)</i>	Process Optimization in Process Planning using a Multidimensional Approach in the Automotive Assembly <i>Thomas Mayr, Marco F. Huber, Ralph Hensel, Mathias Keil (Germany)</i>	ML-Pipeline for the Quality Assessment of Screwdriving Processes <i>Martin Wende, Marcel Bender, Maik Frye, Dennis Grunert, Robert H. Schmitt (Germany)</i>
11.45 - 12.00	Cutting force estimation from machine learning and physics-inspired data-driven models utilizing accelerometer measurements <i>Gregory W. Vogl, Yongzhi Qu, Reese Eischens, Gregory Corson, Tony Schmitz, Jaydeep Karandikar, Scott Smith (USA)</i>	A human-centric preference-based workforce dispatching with Machine Learning using the example of an assembly process <i>Anja Kneissl, Günter Bitsch, Johannes L. Jooste (Germany)</i>	Development of Morphology to Support the Conception of Cognitive Assistance Systems for Quality Assurance in Product Audits <i>Dirk Schweers, Axel Börold, Michael Freitag (Germany)</i>
12.00 - 12.15	Active learning for the prediction of shape errors in milling <i>Berend Denkena, Marcel Wichmann, Markus Rokicki, Lukas Stürenburg (Germany)</i>	Development of a characterization and modeling method for Digital Twins in an assembly use case <i>Jan Molter, Sarah Zimmer, Lennard Margies, Martin Karkowski, Rainer Müller (Germany)</i>	Metrological integration and automation of surface topography measuring instruments on cobots <i>Giacomo Maculotti, Gianfranco Genta, Khurshid Aliev, Maurizio Galetto (Italy)</i>
12.15 - 12.30	Influence of a sub-zero metalworking fluid on the tribological behavior of CoCrMo alloys and WC-Co carbides <i>Kevin Gutzeit, Felix Grossmann, Benjamin Kirsch, Jan C. Aurich (Germany)</i>	Enhancing Manual Assembly Training using Mixed Reality and Virtual Sensors <i>Celia Redondo Verdú, Natalia Sempere Maciá, Mattias Strand, Magnus Holm, Bernard Schmidt, Jerry Olsson (Sweden)</i>	Evaluation Methodology for Interpretation Methods of Predictive Quality Models <i>Tobias Schulze, Daniel Buschmann, Robert H. Schmitt (Germany)</i>
12.30 - 12.45	A systematic approach for data acquisition for tool modelling and analysis of wear-dependent tool deflections during milling Inconel 718 <i>Nils Potthoff, Louisa Neumann, Petra Wiederkehr (Germany)</i>	Automatic Generation of Assembly Instructions by Analyzing Process Recordings – A Concept Overview <i>Peter Burggräf, Tobias Adlon, Fabian Steinberg, Florian Bröhl, Alexander Moriz, Carsten Engeln, Maximilian Schütz, Felix Jaworek (Germany)</i>	Geometric digital twins of long-living assets: uncertainty-aware 3D images from measurement and CAD data <i>Keno Moenck, Thorsten Schüppstuhl (Germany)</i>

12.45 – 13.00	Simulation-based collision detection for CNC machining using sensor-based image recognition <i>B. Denkena, M. Wichmann, T. Malek, R. Räger (Germany)</i>	Framework for Propagating Product Variability to Digital Assembly Instructions <i>Vasilios Zogopoulos, Dorothy Gors, Michiel Haemers, Nataliya Babych, Arno Claeys, Johannes Cottyn (Belgium)</i>	Creating Synthetic Datasets for Deep Learning used in Machine Vision <i>Iris Gräßler, Michael Hieb (Germany)</i>
13.00 – 13.15	Sensor-integrated clamping device for machining of AM components <i>Jan Liß, Petra Wiederkehr (Germany)</i>	Intelligent Order Release In Matrix-Structured Assembly Systems <i>Esben Schukat, Katharina Fughe, Jakob Amtmann, Felix Schönwasser, Tobias Adlon, Peter Burggräf (Germany)</i>	Structured-light 3D Scanning Performance in Offline and In-process Measurement of 3D Printed Parts <i>Moustapha Jadayel, Farbod Khameneifar (Canada)</i>
13.15 – 15.00	<b>Lunch</b>		

<b>DAY 1</b> <b>Wednesday, July 12 - Afternoon Sessions: 15.00 - 16.45</b>			
	<b>SESSION A2</b> <b>Chairman: A. Marzano</b>	<b>SESSION B2</b> <b>Chairman: D. Antonelli</b>	<b>SESSION C2</b> <b>Chairman: G. Vogl</b>
	<b>Cutting Technologies II</b>	<b>Assembly II &amp; Additive Manufacturing I</b>	<b>Machine Tools &amp; Special Machinery</b>
15.00 - 15.15	Intuitive toolpath planning in computer-aided manufacturing systems using artificial intelligence in a virtual reality environment <i>Lionel Dantew, Philipp Ganser, Tommy Venek, Thomas Bergs (Germany)</i>	Assembly workshops in virtual reality as an integral part of the assembly planning process <i>Patrick Rückert, Ann-Kathrin Götsche, Kirsten Tracht (Germany)</i>	CNC Machine Tool Focused Edge Computing in Manufacturing <i>Lea Tonejca, Christoph Mayer, Thomas Trautner, Gernot Mauthner, Friedrich Bleicher (Austria)</i>
15.15 - 15.30	Deep Learning Approach for Enhanced Transferability and Learning Capacity in Tool Wear Estimation <i>Zongshuo Li, Markus Meurer, Thomas Bergs (Germany)</i>	Robotic assembly supported by feature-based vision system <i>Dario Antonelli, Khurshid Aliev (Italy)</i>	Multidimensional position-based monitoring of machining using references of multiple machine tools <i>Berend Denkena, Heinrich Klemme, Tobias H. Stiehl (Germany)</i>
15.30 – 15.45	Influence of illumination on the image-based classification accuracy of wear on milling tools <i>Björn Papenberg, Sebastian Hogreve, Thore Bochardt, Carmen Bornholdt, Tobias Heinrich, Kirsten Tracht (Germany)</i>	Computer-based design and development of a fully automated assembly of aircraft doors made of thermoplastic composite material <i>Rayk Fritzsche, Erik Jaeger (Germany)</i>	Methodology for the automated digitization and probing of workpieces in a machining center by combining optical and tactile measurements <i>Tobias Siebrecht, Melina Wenzel, Petra Wiederkehr (Germany)</i>
15.45 - 16.00	Improving dynamic process stability in finishing of thin-walled workpieces by optimal selection of stock shape <i>Pascal Kienast, L. Taner Tunç, Recep Koca, Ozan Ölgü, Philipp Ganser, Thomas Bergs (Germany)</i>	Assessing the Human Competence and Individual Support Level in Manual Assembly through Cognitive Assistance Systems <i>Klaus Fink, Anna Ziegler, C. Hårdtlein, C. Berger, Rüdiger Daub (Germany)</i>	Data-driven long-term condition-based maintenance using anomaly detection under concept drift: A case study of an ultrasonic sieve machine <i>Feng Zhu, Nicolas Jourdan, Beatriz Bretones Cassoli, Joachim Metternich (Germany)</i>
16.00 - 16.15	Finite element simulation of the mechanical loads during low frequency vibration-assisted drilling utilizing the CEL-method <i>L. Schumski, T. Tomm, L. Buss, J. Söter, U. Fritsching, B. Karpuschewski (Germany)</i>	In-source dynamic beam shaping of Al alloys processed via LPBF: effect of novel beam profiles on surface roughness and microstructure <i>Francesco Galbusera, Leonardo Caprio, Barbara Previtali, Ali Gökhan Demir (Italy)</i>	Conception of a predictive maintenance system for forest harvesters from multiple data sources <i>Lazlo Fauth, Andreas Ligocki (Germany)</i>
16.15 - 16.30	Layer-based information model for 5-axis milling processes using a GraphQL schema <i>Viktor Rudel, David Wichter, Sven Schiller, Georg Vinogradov, Aleksandra Müller, Philipp Ganser, Thomas Bergs (Germany)</i>	Handling of uncertainties in the design of sustainable Additive Manufacturing products by merging Design-for-X and Scenario-Technique <i>Iris Gräßler, Iryna Mozgova, Jens Pottebaum, Manuel Ott, Philipp Jung, Philipp Hesse (Germany)</i>	Generalizable AI Pipeline for the cost estimation of manufacturing system structures in special machine engineering <i>Max Eichenwald, Martin Karkowski, Rainer Müller (Germany)</i>
16.30 - 16.45	Development of a Linear Integer Programming for Solving Cutting Stock Problem in the Manufacturing Industry <i>Ilesanmi Daniyan, Khumbulani Mpofu, Adefemi Adeodu (South Africa)</i>	Low-temperature tensile properties of meta-stable $\beta$ titanium Ti-5Al-5V-5Mo-3Cr alloy fabricated by pulsed laser powder bed fusion <i>Akshay Ashok Benni, Francesco Galbusera, Ali Gökhan Demir, Barbara Previtali (Italy)</i>	Automated Configuration of Optimized Customer Specific Mechatronic Systems Using Behavior Models <i>Valentin Stegmaier, Tobias Eberhardt, Walter Schaaf, Nasser Jazdi, Michael Weyrich, Alexander Verl (Germany)</i>
20.00	<b>Garden Dinner at 20.00, Hotel Continental Ischia</b>		

<b>DAY 2</b>			
<i>Thursday, July 13 - Morning Sessions: 9.00 - 13.00</i>			
	<b>SESSION A3</b> <b>Chairman: A. Caggiano</b>	<b>SESSION B3</b> <b>Chairman: S. Bigot</b>	<b>SESSION C3</b> <b>Chairman: A. Papavasileiou</b>
	<b>Cutting Technologies III</b>	<b>Additive Manufacturing II</b>	<b>Robotics &amp; Human-Robot Collaboration II</b>
09.00 - 09.15	Quality Control Loop for Tool Wear Compensation in Milling Process using Different Optimization Methods <i>Ali Bilen, Jan-Philipp Kaiser, Daniel Gauder, Florian Stamer, Gisela Lanza (Germany)</i>	A method for the predictive and automated detection of the shrink line location during the powder bed fusion of metals using a laser beam <i>Dominik Goetz, Daniel Wolf, Lukas Spano, Michael F. Zaeh (Germany)</i>	Comparison of Safety Mechanisms for Human-Robot Collaboration in Assembly using a Top-View RGB-D Camera System <i>Burak Vur, Christoph Petzoldta, Michael Freitag (Germany)</i>
09.15 - 09.30	Cutting of structured surface on pure titanium <i>Hirofumi Suzuki, Akinori Yui (Japan)</i>	Developing Rapid Metal AM deformations Prediction using CNN <i>Léopold Le Roux, Anthony Soroka, Ze Ji, Samuel Bigot (UK)</i>	Consideration of handedness in human-robot collaboration <i>Patrick Rückert, Mareike Tamke, Tara Eisfeld, Marcel Gäer, Janis Grzeschik, Tabea Preuß, Kirsten Tracht (Germany)</i>
09.30 - 9.45	Tool Failure Detection in CFRP/Ti6Al4V hybrid stacks drilling using Discrete Wavelet Transform <i>C. Domínguez-Monferrer, A. Guerra-Sancho, A. Caggiano, L. Nele, M.H. Miguélez, J.L. Cantero (Spain, Italy)</i>	An exploratory analysis on laser polishing of components by laser powder directed energy deposition <i>Giuseppe Vecchi, Gabriele Piscopo, Eleonora Atzeni, Alessandro Salmi (Italy)</i>	A modular framework of robot gripping tools for human robot collaborative production lines <i>A. Papavasileiou, S. Aivaliotis, P. Mparis, P. Mantas, S. Makris (Greece)</i>
9.45 - 10.00	Utilizing orthogonal cutting models to predict the fraction of shear plane heat into the workpiece for milling and turning <i>Lars Langenhorst, J. Sölter (Germany)</i>	Toward the Rapid Manufacturing of Lightweight Parts by Laser Directed Energy Deposition <i>Avelino Zapata, M. Spreitler, X. Fan Zhao, C. Bernauer, M. F. Zaeh (Germany)</i>	An interactive Augmented Reality based framework assisting operators in human-robot collaborative assembly operations <i>S. Aivaliotis, A. Papavasileiou, C. Konstantinou, T. Anastasiou, C. Gkournelos, S.Koukas, S. Makris (Greece)</i>
10.0 - 10.15	LCA involving process planning <i>Valentina König, Shehab Saleh, Deborah Rogiers, Franziska Lange (Germany)</i>	Analytic evaluation of the thermal conductivity at the conditions of the powder bed fusion with electron beam (PBF-EB) additive manufacturing process <i>Giovanni Rizza, Manuela Galati, Paolo Antonioni, Luca Iuliano (Italy)</i>	XAI-driven digital twin for cobot dynamic error compensation <i>Abhilash Puthanveetil Madathil, Xichun Luo, Yi Qin (Germany)</i>
10.15 - 10.30	A new benchmark dataset for machine learning applications in discrete manufacturing: CiP-DMD <i>Nicolas Jourdan, Tobias Biegel, Beatriz Bretones Cassoli, Joachim Metternich (Germany)</i>	Overheating detection in the powder bed fusion of metals using a laser beam through local thermal resistance analysis <i>David L. Wenzler, Kai-Uwe Beuerlein, Dominik Goetz, Michael F. Zaeh (Germany)</i>	Energy-oriented optimization of the task allocation for mobile robots <i>Christian Härdtlein, Hans Stadlbauer, Rüdiger Daub (Germany)</i>
10.30 - 10.45	A meta-learning strategy based on deep ensemble learning for tool condition monitoring of machining processes <i>Jose Joaquin Peralta Abadia, Mikel Cuesta Zabaljauregui, Felix Larrinaga Barrenechea (Spain)</i>		Systematic literature review on the acceptance of human-robot collaboration among assembly workers <i>Thamilini Puspanathan, Günter Bitsch, Louis Louw (Germany)</i>
10.45 - 11.15	<b>Coffee Break</b>		

<b>DAY 2</b>			
	<b>SESSION A4</b> <b>Chairman: Y. Xu</b>	<b>SESSION B4</b> <b>Chairman: N. Nishino</b>	<b>SESSION C4</b> <b>Chairman: B. Engel</b>
	<b>Production Systems I</b>	<b>“IWES” Symposium</b>	<b>Forming, Welding &amp; Thermomechanical Processes</b>
11.15 - 11.30	Intelligent Scheduling based on Discrete-Time Simulation using Machine Learning <i>Günter Bitsch, Pascal Senjic (Germany)</i>	Analysis of Medical Data and Machine-Learning Algorithms from the Perspective of Public-Goods Models of Data-Provision Decision Making <i>Masanori Fujita, Zhongyue Cheng, Simdy Dayana Rico Lugo, Ayato Kitadai, Yuwen Dai, Yusuke Fukasawa, Nariaki Nishino (Japan)</i>	Development of a hybrid-linear bending kinematic and calculation method for the prediction of bending radii and angles in swivel bending <i>Michael Schiller, Wolfram Hochstrate, Peter Frohn-Sörensen, Bernd Engel (Germany)</i>
11.30 - 11.45	A Fuzzy Synthesis Approach for Hierarchical Decision Analysis Applied to Repair Technique Selection for Aero-Engines Components <i>Nasser Amaitik, Christopher Buckingham, Ming Zhang, Yuchun Xu (UK)</i>	Price competition for service provision with different bargaining abilities <i>Jianyong Teng, Ryuichiro Ishikawa (Japan)</i>	Numerical Analysis of Process Parameters and Tool Geometry in Friction Stir Back Extrusion of Pure Aluminum <i>Mauro Carta, Pasquale Buonadonna, Mohamad El Mehtedi (Italy)</i>
11.45 - 12.00	Modular Cell Design Technology for CPF Production Line <i>Toshihiro Morisawa, Takahiro Nakano, Daiki Kajita (Japan)</i>	Survey on Stakeholder Cooperative Behavior for Designing Voluntary Medical Data Provision Motivation Mechanisms <i>Masanori Fujita, Yuwen Dai, Ayato Kitadai, Simdy Dayana Rico Lugo, Zhongyue Cheng, Nariaki Nishino (Japan)</i>	Investigation of transfer learning with changing machine, mold and material combinations in injection molding <i>Dimitri Kvaktun, Felix Mueller, Reinhard Schiffers (Germany)</i>

12.00 - 12.15	Representing Process Variants based on the Maximal Network Plan – Introducing XOR Decisions <i>Peter Hein, Hendrik Folkerts, Jan Cetric Wagner, Roland Larek (Germany)</i>	Forecasting the number of customers visiting restaurants in COVID-19 <i>Takashi Tanizaki, Takeshi Shimmura, Takayuki Kataoka (Japan)</i>	Intelligent parameter determination and quality control of an injection molding process <i>Sina Nahvi, Marco Schumann, Martin Dix, Philipp Klimant (Germany)</i>
12.15 - 12.30	Metaheuristic comparison of a simulation-based multi-criteria optimization method for rolling production smoothing <i>Felix Kamhuber, Thomas Sobottka, Paul Lindorfer, Fazel Ansari (Austria)</i>	Analysis of excellent service systems from co-creation and emergent synthesis perspective <i>Takeshi Takenaka (Japan)</i>	Study on the explainability of deep learning models for time series analysis in sheet metal forming <i>Marco Becker, Philipp Niemietz, Thomas Bergs (Germany)</i>
12.30 – 12.45	Integration of Autonomous Driving Functionalities for End-of-Line Production Transport Scenarios <i>Peter Burggräf, Tobias Adlon, Luis A. Curiel-Ramirez, Vishwas Jain (Germany)</i>	Meta-heuristic scheduling auction applying distributed genetic algorithm <i>Shota Suginochi, Takuya Nagai, Hajime Mizuyama (Japan)</i>	Study on material-data-driven process parameterization in fine blanking <i>Lucia Ortjohann, Andreas Peters, Jens Gerhard, Marco Becker, Philipp Niemietz, Thomas Bergs (Germany)</i>
12.45 – 13.00	Performance Analysis of Different Reward Functions in Reinforcement Learning for the Scheduling of Modular Automotive Production Systems <i>Jan Markus Gelfgren, Eric Tillmann Bill, Tim Luther, Simon Hagemann, Sigrid Wenzel (Germany)</i>	The impact of characteristic function of Shapley value mechanism in distributed machine learning environment for equipment diagnosis <i>Keiji Beppu, Shota Suginochi, Hajime Mizuyama (Japan)</i>	Application of a concept for ML-driven closed-loop quality control in laser beam welding <i>Nik Weisbrod, Joachim Metternich (Germany)</i>
13.00 - 13.15	Transfer of synthesis, logistics, and recycling processes in nature to industrial processes <i>Oliver Christoph Schwarz, Edgar Antonio Gamero Fajardo (Germany)</i>	Automatic Measurement of Timber Diameter Using Image Processing <i>Ryo Yamaguchi, Ruriko Watanabe, Nobutada Fujii, Daisuke Kokuryo, Toshiya Kaihara, Yasuhiro Sunami (Japan)</i>	Analysis of the relationship between training data volume and model quality for surrogate models in physical simulations <i>Tom Röger, Ludwig Vogt, Tobias Friedrich, Johannes Schilp (Germany)</i>
13.15 – 15.00	<b>Lunch</b>		

<b>DAY 2</b>			
<b>Thursday, July 13 - Afternoon Sessions: 15.00 – 16.45</b>			
	<b>SESSION A5</b> <b>Chairman: M. Hassan</b>	<b>SESSION B5</b> <b>Chairman: A. Armani</b>	<b>SESSION C5</b> <b>Chairman: J. Berger</b>
	<b>Cutting Technologies IV</b>	<b>Additive Manufacturing III</b>	<b>Robotics &amp; Human-Robot Collaboration I</b>
15.00 - 15.15	Automatized, holistic use of information from milling processes <i>Kai Mecke, Knut Barghorn, Jens Wellhausen (Germany)</i>	Defect Detection and Closed-loop Feedback Using Machine Learning for Fused Filament Fabrication <i>Amaris De La Rosa, Amir Armani, Marcia Golmohamadi (USA)</i>	Programming Environment for cobots using MR technology <i>Natalia Sempere Maciá, Celia Redondo Verdú, Bernard Schmidt, Magnus Holm (Sweden)</i>
15.15 - 15.30	A Generalized Multi-Stage Deep Machine Learning Framework for Tool Wear Level Prediction in Milling Operations <i>Mahmoud Hassan, Ayman Mohamed, Helmi Attia (Canada)</i>	Investigation on different laser beam profiles in high-speed directed energy deposition <i>Jacques Platz, Marc Huber, Benjamin Kirsch, Jan C. Aurich (Germany)</i>	Toward safer Human-Robot collaboration in MR environment <i>Natalia Sempere Maciá, Celia Redondo Verdú, Bernard Schmidt, Magnus Holm (Sweden)</i>
15.30 - 15.45	Analysis of the workpiece orientation in a robot's workspace for milling operations <i>Maximilian Bryg, Thomas Bertram, Martin Kipfmüller, Jan Kotschenreuther Maximilian Bryg, Thomas Bertram, M. Kipfmüller, J. Kotschenreuther (Germany)</i>	Transferability of Bead Geometry Prediction Model in Wire Arc Additive Manufacturing <i>Marwin Gühr, Asif Rashid, Shreyes N. Melkote (USA)</i>	Preliminary comparison between manual assembly and intelligent human-robot collaborative assemblies in terms of quality and assembly time <i>Stefano Puttero, Elisa Verna, Gianfranco Genta, Maurizio Galetto (Italy)</i>
15.45 – 16.00	Investigations on chip breakability in lead-free brass alloy CW511L using different chip breaking geometries <i>Magdalena Susanne Müller, Knut Sørby (Norway)</i>	Selective Laser Melting and Mechanical Characterization of Superalloys Made from Recycled Parts <i>Hugo Tupac-Yupanqui, Amir Armani (USA)</i>	Situation specific tutorial development for the intervention of mobile robots <i>Julia Berger, Hannah-Luisa Ender, Shuang Lu (Germany)</i>
16.00 - 16.15	An assessment of monitoring signal quality acquired from an intelligent tool holder <i>Michal Demko, Marek Vrabel, Peter Ižol, Jozef Brindza, Ildikó Maňková (Slovakia)</i>	Technological simulation of the resulting bead geometry in the WAAM process using a machine learning model <i>B. Denkena, M. Wichmann, V. Böß, T. Malek (Germany)</i>	Method for the selection of an Intuitive Robotic Assistant to support Physically Challenged Employees <i>Albrecht Lottermoser, Gülsen Yücel, Julia Berger (Germany)</i>
16.15 - 16.30	Development of a Friction Model for Cutting Simulations of Lead-Free CuZn-Alloys <i>Kilian Brans, Nicklas Gerhard, Markus Meurer, Thomas Bergs (Germany)</i>	Optimal tool path for extrusion-based additive manufacturing to improve geometrical accuracy and productivity <i>Robert Ehlers, Amir Armani (USA)</i>	User-centered analysis for the implementation of industrial mobile robots <i>Julia Berger, Sonja Schumacher, Julia Mehrer, Shuang Lu (Germany)</i>
16.30 - 16.45	An improved Lagrange-based numerical model for machining Ti-6Al-4V alloy regarding tool cutting edge microgeometry <i>Cheng Hu, Kejia Zhuang, José Outeiro (France)</i>	Ballistic impact analysis on an auxetic panel realized by additive manufacturing <i>Carlo Giovanni Ferro, Paolo Maggiore, Stella Maria Gemma Marraccini, Alessandro Marchino (Italy)</i>	Control concept for coupled robots and stiffness analysis <i>Thomas Bertram, Maximilian Bryg, Martin Kipfmüller, Jan Kotschenreuther (Germany)</i>
20.00	<b>Official Dinner at 20.00, Hotel Continental Ischia</b>		

<b>DAY 3</b>		<b>Friday, July 14 - Morning Sessions: 9.00 – 13.00</b>		
	<b>SESSION A6</b> <b>Chairman: I. Shyha</b>	<b>SESSION B6</b> <b>Chairman: P. Aguiar</b>	<b>SESSION C6</b> <b>Chairman: G. Dini</b>	
	<b>Cutting Technologies V &amp; Non Traditional Machining</b>	<b>Additive Manufacturing IV</b>	<b>Battery Production</b>	
09.00 - 09.15	A Framework for Tool Condition Monitoring of Abrasive Waterjet Systems <i>Daniela Pietrow, J. Patrick A. Fairclough, Kevin Kerrigan (UK)</i>	Surface quality prediction for FDM-printed parts using in-process material flow data <i>Jan Mayer, Tra Bui Thi Thanh, Turgut Caglar, Hendrik Schulz, Omar Ben Lallahom, Dongxu Li, Max Niemella, Burak Toptas, Roland Jochem (Germany)</i>	Developing a concept for the implementation of predictive quality in battery production <i>A. Kampker, H. Heimes, Paul Lingohr, J. Schmied, H. Clever, B. Dorn (Germany)</i>	
09.15 - 09.30	A Study on Particulates Release when Machining Nano-structured Polymeric Composites <i>Islam Shyha, Michael Deary, Dehong Huo (UK)</i>	A Study on Acoustic Signals from an Electret Microphone in 3D Printing <i>Paulo Aguiar, Thiago Glissoi, Doriana Daddona, Reinaldo Gotz, Thiago Valle (Brasil)</i>	High-frequency eddy current measurement for the characterisation of graphite anode slurries in battery cell production <i>Henning Clever, D. Schmidt, M. Klein, B. Dorn, H. Heimes, A. Kampker (Germany)</i>	
09.30 – 09.45	In-process tool incidence identification based on temporal pyramid pooling and convolutional neural network <i>Jiduo Zhang, Robert Heinemann, Otto Jan Bakker, Menghui Zhu (UK)</i>	Selection and evaluation of a MES software for a 3D printing center at point of care <i>Philipp Url, Daniel Sudy, Wolfgang Vorraber (Austria)</i>	Data Mining for Early Cycle Life Prediction in Lithium-Ion Battery Production <i>Sandro Stock, Mahmoud Ahmed, Fabian Konwitschny, Ruediger Daub (Germany)</i>	
09.45 - 10.00	Numerical and Experimental Investigation of the Thermomechanical Loads on the machined SurRWTH Aachen Universityface when Cutting Inconel DA718 <i>Pascal Behrens</i> genannt Wäcken, Nicklas Gerhard, Markus Meurer, Thomas Bergs (Germany)	Multi-material additive manufacturing through electrostatic metal powder attraction and laser-induced forward transfer <i>Vegard Brøtan, Olav Åsebø Berg, Eivind Johannes Øvrelid, Alexander Rudenkov, Maksim Demesh, Thomas Léon Sebastian Reinery, Irina Sorokina (Norway)</i>	Holistic modeling of the electrolyte filling process to study the dosing and wetting behavior of lithium-ion batteries <i>Jan Hagemeister, Ahmed Elkhoshea, Yiping Hu, Ruediger Daub (Germany)</i>	
10.00 - 10.15	Evaluation of process stability in precise electrochemical machining using machine learning models based on extracted features <i>E. Tchoupe, L. Heidemanns, U. Küpper, A. Klink, T. Herrig, T. Bergs (Germany)</i>	In-situ acoustic signals correlation of process parameters in laser powder bed fusion <i>Levent Subasi, Soner Oren, Gokhan Dursun, Cagdas Sen, Akin Orhangul (Turkey)</i>	Diagnosis and remaining useful life prediction of end-of-life battery systems for second-life applications <i>Johannes Wanner, S. Singh, T. Nagel, A. Patel, S. Baazouzi, J. Grimm, K. Birke (Germany)</i>	
10.15 - 10.30	Surface Roughness Prediction in Hardturning (Finishing) of 16MnCr5 Using a Model Ensemble Approach <i>Jannis Jacob, Markus Meurer, Thomas Bergs (Germany)</i>	Effect of preheat in DED-LB/wire of Ni-base, Cu-base and Fe-base alloys <i>Trond Arne Hassel, Knut Sørby, Vegard Brøtan (Norway)</i>	Leveraging Industry 4.0 Solutions for Lithium-Ion Battery Manufacturing: A Gap Analysis of OPC UA Companion Specifications <i>A. Kampker, H. H. Heimes, B. Dorn, H. Clever, R. Ludwigs, RuiYan Li (Germany)</i>	
10.30 - 10.45	Developing a Modeling-Approach to represent Flexibility in Process Engineering for the Implementation of a Dynamic Scheduling for the Production of green PtX-Products <i>Nikola Mößner, Pascal Häbig, Kai Hufendiek (Germany)</i>	Decision Support Based on Digital Twin Simulation: A case study in Distillery Industry <i>Adelaide Marzano, Alessandra Caggiano (UK)</i>	Evaluation of Logistic Concepts for Flexible and Automated Electrode Production <i>Anja Munzke, C. Härdtlein, B. Stumper, C. Berger, Rüdiger Daub (Germany)</i>	
10.45 - 11.15	<b>Coffee Break</b>			

<b>DAY 3</b>		<b>SESSION A7</b> <b>Chairman: E. Francalanza</b>	<b>SESSION B7</b> <b>Chairman: A. Simeone</b>	<b>SESSION C7</b> <b>Chairman: D. D'Addona</b>
	<b>Production Systems II &amp; Cyber Physical Systems I</b>	<b>Sustainability in Manufacturing</b>	<b>Grinding &amp; Gear Manufacturing</b>	
11.15 - 11.30	Uncovering the behaviour of facility layout problem solutions in relation to factory design applications <i>Peter Burggräf, Tobias Adlon, Nils Lehde, Niklas Lindholm (Germany)</i>	A process-level LCA for evaluating the contribution of digitalization in the greening of a manufacturing system <i>Alexios Chaloulos, Paolo Catti, Nikolaos Nikolakis, Kosmas Alexopoulos (Greece)</i>	Intelligent dressing for continuous generating grinding with convolutional neural networks & knowledge distillation <i>Martin Boesler, Marco Schumann, Phyllipp Klimant, Martin Dix (Germany)</i>	
11.30 - 11.45	The influence of distance metrics on the facility layout problem <i>Marcel Öfele, David Rottenegger, Stefan Braunreuther (Germany)</i>	A Modular System Architecture for an Offshore Off-grid Platform for Climate neutral Power-to-X Production in H2Mare <i>Pascal Häbig, D. Dittler, M. Fey, T. Müller, N. Mößner, N. Jazdi, M. Weyrich, K. Hufendiek (Germany)</i>	Modeling of the process force induced deformation of elastically bonded honing rings <i>Maximilian Schrank, Mareike Solf, Thomas Bergs (Germany)</i>	
11.45 - 12.00	Evaluation of Clustering Approaches and Proximity Measures for Product Family Identification <i>Christian Urnauer, Leon Rudolph, Joachim Metternich (Germany)</i>	Impact of operator health and safety on manufacturing process risk management <i>G. Sansone, M. Anselmi, Alessandro Simeone, P.C. Priarone, L. Settineri (Italy)</i>	Process and tool design optimization for hypoid gears with help of manufacturing simulation BevelCut. <i>Melina Kamratowski, J. Mazak, J. Brimmers, T. Bergs (Germany)</i>	

12.00 – 12.15	A digital twin for SMEs in the context of Industry 5.0 <i>Matteo De Marchi, Amberlynn Bonello, Emmanuel Francalanza, Erwin Rauch (Malta)</i>	Development of stationary expert systems for improving energy efficiency in manufacturing <i>Borys Ioshchikhes, Matthias Weigold (Germany)</i>	Workpiece Quality Prediction for Gear Hobbing based on Sensor Data <i>Steffen Hendricks, Mareike Solf, Thomas Bergs (Germany)</i>
12.15 - 12.30	Towards Digital-Twin-Driven Factory Planning – A Systematic Review <i>Peter Burggräf, Tobias Adlon, Niklas Schäfer (Germany)</i>	How grey wolf optimization effects remanufacturing <i>Barna Gal, Christine Zeh, Ádám Szaller (Austria)</i>	Investigation of the manufacturability of topological modifications using adapted kinematics for gear skiving <i>Christopher Janssen, Stylianos Tsakiris, Mareike Solf, Thomas Bergs (Germany)</i>
12.30 – 12.45	Paving the way for automated factory planning – applying rule-based expert systems to capacity planning <i>Peter Burggräf, Tobias Adlon, Niklas Schäfer (Germany)</i>	Automated data-driven dimensioning and planning of modular large-scale electrolysis plants <i>Daniel Syniawa, Malte Jakschik, Alfred Hypka, Bernd Kuhlenkötter (Germany)</i>	Experimental validation of the plane-based penetration calculation for the gear skiving of internal gears <i>Charalampos Alexopoulos, Christopher Janßen, Mareike Solf, Thomas Bergs (Germany)</i>
12.45 – 13.00	A Digital Twin Platform for service-based Testing and Optimization <i>Shengjian Chen, Michael Neubauer, Alexander Verl (Germany)</i>	Automated pipe routing in context of large-scale electrolyzer plants <i>Malte Jakschik, Daniel Syniawa, Alfred Hypki, Bernd Kuhlenkötter (Germany)</i>	On the profile change of conical skiving tools after re-sharpening <i>Enea Olivoni, Rocco Vertechy, Vincenzo Parenti-Castelli (Italy)</i>
13.15 - 15.00	<b>Lunch</b>		

<b>DAY 3</b>		<b>Friday, July 14 - Afternoon Sessions: 15.00 – 16.45</b>	
	<b>SESSION A8</b> <b>Chairman: P. Refalo</b>	<b>SESSION B8</b> <b>Chairman: G. Putnik</b>	<b>SESSION C8</b> <b>Chairman: A. Marzano</b>
	<b>Cyber Physical Systems II</b>	<b>Biologicalisation, BioMeld &amp; Human Factors</b>	<b>Metrology, Quality &amp; Testing II</b>
15.00 - 15.15	Industrial Small Data: Definition and Techniques for Data Augmentation in Manufacturing <i>Benny Drescher, Christoph Rippe (Germany)</i>	Identifying intelligent data utilization in bioprocesses: overview of current research activities, opportunities and barriers <i>Arber Shoshi, Betül Gündüz, Robert Mieke (Germany)</i>	Mobile Web App for the Digitization and Annotation of Manual Visual Inspection Tasks <i>Julian Koch, Denis Jevremovic, Thorsten Schüppstuhl (Germany)</i>
15.15 - 15.30	Methods for evaluating and improving manual process data acquisition in one-of-a-kind productions <i>David Jericho, Konrad Jagusch, Jan Sender, Wilko Flügge (Germany)</i>	Biology-Technology Interfaces - Refining the Core Principle of Biointelligent Systems <i>Yannick Baumgarten, Arber Shoshi, A. Gaissler, M.P. Langner, J. Full, Thomas Bauernhansl, Robert Mieke (Germany)</i>	Performances of an in-line deep learning-based inspection system for surface defects of die-cast components for hybrid vehicles <i>Giorgio Cavaliere, Yuri Borgianni, Enrico Savio (Italy)</i>
15.30 - 15.45	The development of a generic IIOT framework for an industrial pneumatic system <i>Jasmine Mallia, Emmanuel Francalanza, Peter Xuereb, Paul Refalo (Malta)</i>	Assessment of novel biorefinery concepts for the production of biohydrogen and value-added products from industrial waste streams <i>Edgar Gamero, J. Full, Robert Mieke, Thomas Bauernhansl, A. Sauer (Germany)</i>	Simulation of micro-CT acquired geometry of additively manufactured open porosities. <i>Robert Otto, Uliana Soellner, Christoph Kiener, Stefan Boschert, Roland Wuechner, Knut Sörby (Germany)</i>
15.45 - 16.00	Fault Condition Indicators along the Demand Side of a Sustainable Compressed Air System <i>Massimo Borg, Paul Refalo, Emmanuel Francalanza (Malta)</i>	Bio-intelligent manufacturing cell (BIMC) development for biohybrid machines (BHM) fabrication within the EC Horizon Europe BioMeld project <i>Roberto Teti, Alessandra Caggiano (Italy)</i>	A Framework for Anomaly Classification and Segmentation in Remanufacturing using Autoencoders and Simulated Data <i>Jan-Philipp Kaiser, Carl-Leandro Enslin, Erik Tabuchi Barczak, Florian Stamer, M. Heizmann, Gisela Lanza (Germany)</i>
16.00 - 16.15	Enabling applications for variable vehicle configurations with Software-defined Vehicle and Service-oriented Architecture <i>Dirk Slama, Jens Lachenmaier (Germany)</i>	A Knowledge Graph-based Learning Assistance Systems for Industrial Maintenance <i>Linus Kohl, Fazel Ansari (Austria)</i>	Durability and Reliability of Sensors in Smart Steel IBCs: Results from the smart CONSERVE Project <i>P. Burggräf, T. Adlon, F. Steinberg, Jan Salzwedel, P. Nettesheim, H. Tschauder (Germany)</i>
16.15 - 16.30	Cyber-Physical Optimization of Production Processes Using Cascade AIs: A Robot-Guided MAG Welding Use-Case <i>Peter Burggräf, Fabian Steinberg, Philipp Nettesheim, Gerald Kolter (Germany)</i>	Application of OCR-based assistance solutions in engine maintenance <i>Sophie Sandner, Phillip Bausch, Nikolai Streck, Joachim Metternich (Germany)</i>	A statistical approach for characterizing the compressive stress of foams via computed tomography <i>Keanu Zenz, Clemens Sulz, Günther Poszvek, Friedrich Bleicher (Austria)</i>
16.30 - 16.45	Production Activity Control Framework for Make-To-Order Industry Utilizing Cyber-Physical Production System <i>Anas Ma'ruf, Doli Tri Dito (Indonesia)</i>	Implementing Virtuality in Social Network based Education <i>Goran Putnik, Catia Alves, Leonilde Varela, Luis Ferreira (Portugal)</i>	Applicability of control systems for predicting adjustments of body shop fixtures <i>Julian Schuetzenberger, Claus-Dieter Reiniger, Martin Manns (Germany)</i>
16.45 – 17.00	<b>CONFERENCE CLOSURE AND FAREWELL</b> <b>R. Teti, CIRP ICME '23 Conference Chairman</b>		

### ***Session of Video Presentation Papers***

Adaptive Design of Experiments guided by an active learning approach

*Christoph Kellermann, Joern Ostermann (Germany)*

Advanced procedures and scheduling for aircraft assembly processes: A systematic review approach.

*David Blanco, Eva M. Rubio, Beatriz Agustina, Marta M. Marín, Ana M. Camacho (Spain)*

Association Rule Mining for Dynamic Error Classification in the Automotive Manufacturing Industry

*Andreas Schoch, Robert Refflinghaus, Nina Schmitzberger, Alexander Wolters (Germany)*

Anomaly Detection of Wire Arc Additively Manufactured Parts via Surface Tension Transfer through Unsupervised Machine Learning Techniques

*Giulio Mattera, J. Polden, Alessandra Caggiano, P. Commins, Luigi Nele, Z. Pan (Italy)*

Study on influence of ink material properties on deposited filaments in direct ink writing based on numerical simulations

*Yongqiang Tu, Alaa Hassan, Ali Siadat, Gongliu Yang (PR China)*

Surface characteristic of Ti-6Al-4V alloy fabricated by Electron Beam Melting prepared by different surface post treatments

*Amir Behjat, Mohammad Hossein Mosallanejad, Morteza Shamanian, Aboozar Taherizadeh, Luca Iuliano, Abdollah Saboori (Italy)*

Streamlining LEGO® model design: an automated optimization approach

*Nengsheng Bao, Yongyi Zhang, Yuchen Fan, Alessandro Simeone (PR China)*

Health 4.0 architecture proposal for planning and management of a hospital emergency department

*Lucas Caldas Danelon Lopes, Clóvis Neumann, Michael Machado (Brazil)*

Intelligent robot assistants for the integration of neurodiverse operators in manufacturing industry

*Yuchen Fan, Dario Antonelli, Alessandro Simeone, Nengsheng Bao (Italy)*

Leveraging data to enhance rule-based order consolidation in logistics operations

*Klaudia Zeleny, Júlia Bergmann, Dávid Gyulai, Maik Frye, Robert H. Schmitt (Hungary)*

A model for the rapid prediction of small feature width producible by Metal AM

*Prospera Sonuo Sibanda, Michael Ryan, Samuel Bigot (UK)*