

# **12th CIRP Global Web Conference (CIRPe 2024)**

Procedia CIRP Volume 132

Online  
22-23 October 2024

ISBN: 979-8-3313-1505-4

**Printed from e-media with permission by:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571



**Some format issues inherent in the e-media version may also appear in this print version.**

Copyright© by Elsevier B.V.  
All rights reserved.

Printed with permission by Curran Associates, Inc. (2025)

For permission requests, please contact Elsevier B.V.  
at the address below.

Elsevier B.V.  
Radarweg 29  
Amsterdam 1043 NX  
The Netherlands

Phone: +31 20 485 3911  
Fax: +31 20 485 2457

<http://www.elsevierpublishingsolutions.com/contact.asp>

**Additional copies of this publication are available from:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571 USA  
Phone: 845-758-0400  
Fax: 845-758-2633  
Email: [curran@proceedings.com](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

## TABLE OF CONTENTS

### **REVIEW PAPERS**

Generative AI in Manufacturing: A Literature Review of Recent Applications and Future Prospects .....	1
<i>Sara Shafiee</i>	
Assessing Manufacturing Agility: An Updated State-Of-The-Art and Operational Insights.....	7
<i>Asmae Bakry, Nicolas Sauzeat, Khaled Medini</i>	
A Review of Quality Improvement Framework for Industry 4.0 .....	13
<i>Ricardo Baiochi, Mauro Lizot, Eduardo Alves Portela Santos</i>	
Uncovering the Potential and Pitfalls of Process Mining in Manufacturing .....	19
<i>Júlia Villwock Gomes De Oliveira, Eduardo Alves Portela Santos, Silvana Pereira Detro</i>	
Explainable Reinforcement Learning in Job-Shop Scheduling: A Systematic Literature Review .....	25
<i>Fabian Erlenbusch, Nicole Stricker</i>	

### **PRECISION ENGINEERING**

Study on the Electron Dynamics of MoS2 Under Ultraviolet Femtosecond Laser Irradiation .....	31
<i>Huimin Qi, Jinshi Wang</i>	
Long-Pulse Fibre Laser Micro-Hole Drilling of Nickel Superalloy .....	37
<i>Mitchell Leering, Chris Ellis, Annie Kerwin, Sundar Marimuthu</i>	
Study of Liquid Nitrogen Cooled Micro-Milling of PEEK .....	43
<i>Ni Chen, Yibo Jia, Xiang Li, Xingzhi Xiao, Ning He</i>	
Image Processing with Deep-Learning and Transfer Learning for Cutting Tool Degradation Monitoring.....	50
<i>Lorenzo Colantonio, Lucas Equeter, Hugo Giovannelli, Pierre Dehombreux, François Ducobu</i>	
Methodologies for Connecting an External Signal-Processing Unit for Adaptive Control in Machining Systems .....	56
<i>P. Georgi, M. Richter, T. Reeber, K. Güzel, H.-C. Möhring</i>	
Research on Internal Surface Finishing of Multi-Cross Channels.....	62
<i>Jiang Guo, Qikai Li, Liang Wang, Pu Qin, Chao Wang</i>	
Static Stiffness Analysis of an Electronically Preloaded Rack and Pinion Feed Drive System.....	68
<i>Oier Franco, Xavier Beudaert, Ibai Ulacia, Kaan Erkorkmaz, Jokin Munoa</i>	
An Advanced Method to Assess Mechanical Filtering Effect of Tactile Coordinate-Measuring System in Dimensional Measurement of Additive Manufacturing Parts.....	74
<i>Weidong Liu, Xiao Chen, Wenhan Zeng, Dawei Tang, Shan Lou</i>	

## **ADDITIVE MANUFACTURING**

Lithography-Based Additive Manufacturing of Steel Metamaterials: Effect of Sintering Temperature on Shape Distortion, Microstructure and Mechanical Properties .....	80
<i>Ruslan Melentiev, Ahmed Wagih, Gilles Lubineau, Carlos A. Grande</i>	
Toward Overall Indicators for Comparing Dimensional and Geometrical Performance of Material Extrusion Printers with Adaptive GBTA Design .....	86
<i>Laurent Spitaels, Valentin Damby, Édouard Rivière-Lorhèvre, François Ducobu</i>	
Reference Geometries and Indicators for the Process Window Development of Wire Directed Energy Deposition .....	92
<i>Konstantinos Tzimanis, Nikolas Porevopoulos, Nikolas Bourlesas, Panagiotis Stavropoulos</i>	
Continuous Carbon Fiber Reinforced Filaments Manufactured by a Cost-Effective and Two-Step Impregnation Approach .....	98
<i>Jianling Lu, Rui Hong, Yuxin Zhang, Yunzhi Zhong, Nanya Li</i>	
Sintering-Based Lithography Metal Additive Manufacturing of Chiral Mechanical Metamaterials with a Twist .....	104
<i>Ruslan Melentiev, Ahmed Wagih, Bram Van Der Heijden, Gilles Lubineau, Carlos A. Grande</i>	

## **DIGITAL MANUFACTURING**

Development of a Concept for the Design of User-Friendly Simulation Models.....	110
<i>Dirk Rechkemmer, Merlin Korth, Marvin Carl May, Gisela Lanza</i>	
A Framework for Digital Assembly Instructions as a Step Towards Manufacturing Inclusiveness .....	116
<i>Yuchen Fan, Alessandro Simeone, Dario Antonelli, Alessandra Caggiano, Luca Settineri</i>	
On a Heuristic Evaluation System for Industry 5.0 with Respect to Interventions: The Case of Training in Businesses.....	122
<i>Alexios Papacharalampopoulos, Olga Maria Karagianni, Panagiotis Stavropoulos, Unai Ziarso, Unai Elorza</i>	
Generative Assistant for Digital Twin Simulations .....	129
<i>Pedro Antonio Boareto, Eduardo De Freitas Rocha Loures, Eduardo Alves Portela Santos, Fernando Deschamps</i>	
Development of an Engineering Drawing Detection and Extraction Algorithm for Quality Inspection Using Deep Neural Networks .....	135
<i>Madania Mahira Agritania, Mohammad Mi'Radji Isnaini</i>	
Neural Network- Driven Optimization of Injection Moulding Parameters for Enhanced Recycling .....	141
<i>Nicole Stricker, Sankeerth Desapogu, Marius Schach, Iman Taha</i>	
Application of Generative AI Technologies to Engineering Design.....	147
<i>Daniel Byrne, Vincent Hargaden, Nikolaos Papakostas</i>	
Design Model for Digital Shadows to Support Reconfiguration Decisions in Manufacturing.....	153
<i>Michael Riesener, Eric Rebentisch, Alexander Keuper, Aileen Blondrath, Günther Schuh</i>	

## **MANUFACTURING SYSTEMS**

Application of the PM <sup>2</sup> Methodology in the Analysis of Assembly Processes.....	159
<i>Adenilson Furquim Dos Santos, Eduardo De F. Rocha Loures, Eduardo A. Portela Santos</i>	
Remaining Time Prediction in Manufacturing Systems: An Approach Based on ML and Process Mining .....	165
<i>João Gabriel Santin Botelho, Eduardo Alves Portela Santos, Alexandre Checoli Choueiri, José Eduardo Pécora Junior</i>	
Unlocking Digitalization in the Spool Fabrication Industry: Analysis of Roadblocks Using the IMF- SWARA Integrated TFBM .....	171
<i>Kiran Sankar M. S., Sumit Gupta, Sunil Luthra</i>	
The Applications of Joint Communication and Sensing in Manufacturing: A 6G Technology .....	178
<i>Marius Schmitz, Jan Mertes, Daniel Lindenschmitt, Matthias Klar, Jan C. Aurich</i>	
Multi-Criteria Decision Making in Evaluating Digital Retrofitting Solutions: Utilising AHP and TOPSIS.....	184
<i>Abdulrahman Algoud, Jelena Milisavljevic-Syed, Konstantinos Salonitis</i>	
Prediction of Task Occurrence Distribution for Automated Shop Floor Planning Using Multi- Output Support Vector Regressor .....	191
<i>Unais Sait, Marco Frego, Antonella De Angeli, Angelika Peer</i>	

## **SUSTAINABLE MANUFACTURING**

Assessing the Impact of Qualitative and Quantitative Parameters on Additive Manufacturing Carbon Emissions.....	197
<i>Aikaterini Paraskevopoulou, Vasiliki C. Panagiotopoulou, Panagiotis Stavropoulos</i>	
Sustainable Manufacturing Measures in Practice: Insights from Leading German Manufacturing Companies .....	203
<i>Sebastian Beiner</i>	
Framework for Monitoring Electric Vehicle Battery Second Life Health and Estimating Remaining Useful Life.....	209
<i>Mohammad Rajabzadeh, Vincent Hargaden, Pezhman Ghadimi, Christoph F. Strnadl, Nikolaos Papakostas</i>	
Integrating Blockchain with Digital Product Passports for Managing Reverse Supply Chain.....	215
<i>Hanbing Xia, Jiahong Li, Qian (Jan) Li, Jelena Milisavljevic-Syed, Konstantinos Salonitis</i>	
Digital Product Passport Enabled Production Control in the Context of Circular Economy.....	221
<i>Yannik Hermann, Christian Patlakis, Moritz Hörger, Marvin Carl May, Gisela Lanza</i>	
Integrative Inspection Methodology for Enhanced PCB Remanufacturing Using Artificial Intelligence .....	227
<i>Florian Stamer, Rouven Jachemich, Stefano Puttero, Elisa Verna, Maurizio Galeotto</i>	

## **Author Index**