

CLF 2026 PROGRAMME 5-7 MAY

TUESDAY, 5/05

9:00–11:30

NOI TECHPARK AND LAB TOURS (all CLF delegates)

📍 [NOI Techpark Water Tower](#)

11:30–12:00

Arrival of IALF GA participants to Laimburg

📍 [Foyer, Faculty of Engineering](#)

12:00–14:00

Laimburg tour and lunch/wine-tasting for IALF GA participants

📍 [Provincial Winery Laimburg](#)

14:00–17:30

GENERAL ASSEMBLY IALF 2026 (only for registered IALF members). In parallel free time for all other CLF delegates

📍 [Provincial Winery Laimburg](#)

17:30–18:00

Bus for IALF GA participants from Laimburg to the Faculty of Engineering

18:00–22:00

WELCOME RECEPTION (all CLF delegates)

📍 [Foyer, Faculty of Engineering](#)

WEDNESDAY, 6/05

8:15–9:00

REGISTRATION

📍 [Foyer, Faculty of Engineering](#)

9:00–9:10

OPENING AND WELCOME
Conference Chair, Erwin

Rauch and IALF President, Sebastian Thiede

📍 Aula Magna,
Faculty of Engineering

9:10–9:20

WELCOME ADDRESS

Dean of the Faculty of Engineering, Andrea Gasparella

📍 Aula Magna,
Faculty of Engineering

9:20–9:50

KEYNOTE SPEAKER

Torbjørn Netland

Experienced Learning: Education Engineered for the Next Industrial Age

📍 Aula Magna,
Faculty of Engineering

9:50–10:20

KEYNOTE SPEAKER

Vincent Mauroit, Executive MBA NOI Techpark Innovation Ecosystem: Bridging Research and Industry in South Tyrol

📍 Aula Magna,
Faculty of Engineering

10:20–10:50

KEYNOTE SPEAKER

Florian Schupp

Developing a NextGen Digital Manufacturing Supplyverse

📍 Aula Magna,
Faculty of Engineering

10:50–11:10

Coffee break

11:10–12:00

INDUSTRY SESSION – PANEL DISCUSSION

Skill Gap in Industry and the Role of Learning Factories

📍 Aula Magna,
Faculty of Engineering

PARALLEL SESSION 1

📍 **Ground Floor – Aula Magna**

Enabling Technologies Related to Learning Factories

Session Chair: Carlos Vazquez

Hurtado, Tecnológico de

Monterrey

12:00–12:20

Nº 1.1 / Paper ID 101

Visual Intelligence for Assisted Disassembly and Circular Economy

Christian Ramsauer, Graz University of Technology
(*Authors: Rüdele, Kai; Eder, Heike; Ramsauer, Christian*)

12:20–12:40

Nº 1.2 — Paper ID 102

The Future of Quality Management: Educational Implications in the Age of AI

Heike Eder, Graz University of Technology
(*Authors: Eder, Heike; Rüdele, Kai; Ramsauer, Christian*)

12:40–13:00

Nº 1.3 / Paper ID 104

Beyond One Size Fits All – A Checklist-Based Framework for Evaluating Inclusivity in Learning Factories

Utkarsh Savkare, University of Twente
(*Authors: Savkare, Utkarsh; Kolla, Sri; Thiede, Sebastian*)

PARALLEL SESSION 2

📍 **2nd Floor – Room B1.2.14**

Learning Factory

Operation – Business Models and Cooperation

Session Chair: Bojan

Jovanoski, Ss. Cyril and

Methodius University

12:00 12:20

Nº 2.1 / Paper ID 185

Operational Decision Support In Learning Factories Through Autonomous Data Analytics And Large Language Models

Zhenkai Yang, University of Twente
(*Authors: Yang, Zhenkai; Ghafoorpoor Yazdi, Poorya; Thiede, Sebastian*)

12:20–12:40

Nº 2.2 / Paper ID 242

Integrating Smart Learning Factories in Fire Truck

Manufacturing: A Framework for Enhancing Skills and Industry 4.0 Adoption

Eriyeti Murena, Tshwane University of Technology
(Authors: Murena, Eriyeti; Nenzhelele, Tshifhiwa; Mpofu, Khumbulani)

12:40–13:00

Nº 2.3 / Paper ID 239

Role of Artificial Intelligence Enabled Internet of Things (IoT) in Learning Factories: Opportunities and Challenges in Rail Manufacturing

Dakalo Malada, Tshwane University of Technology
(Authors: Malada, Dakalo; Mpofu, Khumbulani; Adenuga, Olukorede; Murena, Eriyeti)

PARALLEL SESSION 3

📍 2nd Floor – Room B1.2.15

Engineering Education – Didactic Processes Related to Learning Factories

Session Chair: Louis Louw, Stellenbosch University

12:00–12:20

Nº 3.1 / Paper ID 107

Assessing Value Creation in Learning Communities: Broadening the Learning Factory Paradigm

Immy Voet, University of Applied Science NHL Stenden
(Authors: van den Eijnde, Wilbert; Voet, Immy; Nap, Jan)

12:20–12:40

Nº 3.2 / Paper ID 131

Enhancing Engineering Curricula with Industry 4.0 Technologies: A Case Study on Semi-Automated Assembly and MES/ERP Integration in a Learning Factory environment

Erick Ramírez-Cedillo, Tecnológico de Monterrey
(Authors: Alarcón López, Ángel Mario; Siller Lobo, Sergio; Ramírez-Cedillo, Erick; Bradley, Russel; Antony, Brian W.)

12:40–13:00

Nº 3.3 / Paper ID 227

Implementing PCF Calculation in a Learning Factory Based on Synthetic ERP Data

Stefan Seyfried, Technical University of Darmstadt
(Authors: Seyfried, Stefan; Ozen, Oskay; Weigold, Matthias)

PARALLEL SESSION 4

📍 2nd Floor – Room B1.2.16

Short Paper I

Session Chair: Marwa Ben Ali, unibz

12:00–12:20

Nº 4.1 / Paper ID 109

Developing a Web-Based Digital Twin for an Agile Production Simulation System as a Learning Factory Platform

Fahmi Bellalouna, University of Applied Sciences Karlsruhe
(Authors: Bellalouna, Fahmi; Walter, Jürgen; Daub, Maximilian; Jabs, David; Vitkin, Philipp; Schneider, Maximilian)

12:20–12:40

Nº 4.2 / Paper ID 110

Immersive Virtual Commissioning with Digital Twins: Implementation of a Robot-Based Automated Storage System in a Project-Based Course

Fahmi Bellalouna, University of Applied Sciences Karlsruhe
(Authors: Bellalouna, Fahmi; Reuter, Florian)

12:40–13:00

Nº 4.3 / Paper ID 140

Designing Learning Factories for Vocational and Higher Education: Fostering Interdisciplinary Learning Groups With Authentic Business Processes

Sophie Leidl, Technische Universität Ilmenau
(Authors: Leidl, Sophie; Girkes, Florian; Block, Johannes; Bergmann, Jean Pierre)

13:00–14:00

Lunch

Parallel Session 5

📍 Ground Floor – Aula Magna
Enabling Technologies Related to Learning Factories Session
Session Chair: Fazel Ansari, TU Wien and Fraunhofer Austria

14:00–14:20

Nº 5.1 / Paper ID 105

Leveraging Virtual Reality to Enhance Industrial Cobot Programming

James Clarke, Stellenbosch University
(Authors: Groenwald, Tian; Steed, Clint Alex; Clarke, James)

14:20–14:40

Nº 5.2 / Paper ID 111

Data-Driven Learning Factories: Integrating Tulip MES for Smart Manufacturing Education

Erick Ramírez-Cedillo, Tecnológico de Monterrey
(Authors: Andrade Flores, Leonardo; Peña Zuñiga, Gabriela Lizeth; Ortiz Maldonado, Christopher; Ramírez-Cedillo, Erick; Ortiz Espinosa, Alexandro; Bradley, Russel; Anthony, Brian W.)

14:40–15:00

Nº 5.3 / Paper ID 188

Dynamic Ambient Sensor Data Mapping System with LoRa-based Wireless Sensor Network in Learning Factories

Leicai Xiao, Universiteit Twente
(Authors: Xiao, Leicai; Ghafoorpoor Yazdi, Poorya; Thiede, Sebastian)

15:00–15:20

Nº 5.4 / Paper ID 114

FrEDie: An AI- and AR-Powered Virtual Assistant to Reduce Down-time and Foster Competence Development in Learning Factories

Alexandro Antonio Ortiz-Espinoza, Tecnológico de Monterrey (*Authors: Ortiz-Espinoza, Alexandro Antonio; Andrade Flores, Leonardo; Herrera García, Daniela; Tovar Mendoza, Hector; Ramírez-Cedillo, Erick; Cantú Cavada, César; Ponce-Cruz, Pedro*)

PARALLEL SESSION 6

📍 2nd Floor – Room B1.2.14

Next Gen Agile Learning Factories for Navigating Uncertainties

Session Chair: Patrick Dallasega, unibz

14:00–14:20
№ 6.1 / Paper ID 133
Developing Next Gen Learning Factories for Industrial Requirements and Environment
Maximilian Dommermuth, Bosch Rexroth AG
(*Authors: Dommermuth, Maximilian; Guedria, Mohamed; Schmitt, Jörg*)

14:20–14:40
№ 6.2 / Paper ID 121
An Explainable AI Training Module for Teaching Condition Monitoring in Next-Generation Learning Factories
Christopher Ehrmann, Tongji University (*Authors: Zhang, Hao; Wang, Xianfeng; Ehrmann, Christopher; Zhang, Weimin; Jia, Ziwei; Xue, Feng; Shen, Mulin*)

14:40–15:00
№ 6.3 / Paper ID 182
Applying the 10P Model Cycle for Success to the Green Hydroponics Learning Factory: A Case Study
Rafiq Ahmad, University of Alberta (*Authors: Ahmad, Rafiq; Dutta, Souravik*)

15:00–15:20
№ 6.4 / Paper ID 164
Application of Chaos Engineering in Learning Factories

to Strengthen Resilience
Leonie Meldt, Technical University of Darmstadt (*Authors: Meldt, Leonie; Doan, Anh Minh Augustino; Barth, Jonas; Pohl, Hans Niklas; Jung, Daniele; Schleich, Benjamin; Weigold, Matthias; Metternich, Joachim*)

PARALLEL SESSION 7

📍 2nd Floor – Room B1.2.15

Engineering Education – Didactic Processes Related to Learning Factories

Session Chair: Matthias Wolf, TU Graz

14:00–14:20
№ 7.1 / Paper ID 116
Bridging the Haptic-Digital Gap: A Simulation-Ready Learning Factory Approach
Julian Grzywaczyk, Hochschule Ruhr West
(*Authors: Morlock, Friedrich; Grzywaczyk, Julian*)

14:20–14:40
№ 7.2 / Paper ID 179
A Didactic GUI Framework for Teaching Robot-Based Sequencing Logic in Learning Factories
Maurice Engels, KIT (*Authors: Geiser, Alexander; Dorian, Leon; Engels, Maurice; Benfer, Martin; Lanza, Gisela*)

14:40–15:00
№ 7.3 / Paper ID 113
Improving Vocational Training Through Competence-Oriented Selection Of Learning Formats
Michael Geis, Technische Universität Darmstadt
(*Authors: Geis, Michael; Barth, Jonas; Metternich, Joachim*)

15:00–15:20
№ 7.4 / Paper ID 186
A Competence-Oriented Framework for Virtual Induction and Automated Assessment in Engineering

Learning Factories
Olugbenga Adegbeemisola Aderoba, Tshwane University of Technology (*Authors: Aderoba, Olugbenga Adegbeemisola; Swanepoel, Jan Adriaan; Nenzhelele, Tshifhiwa*)

PARALLEL SESSION 8

📍 2nd Floor – Room B1.2.16

Short Paper II

Session Chair: Matteo De Marchi, unibz

14:00–14:20
№ 8.1 / Paper ID 161
Implementation of Edge to Cloud Manufacturing Execution Systems in the Context of Connected Learning Factories
Thomas Dietmüller, DHBW Ravensburg (*Authors: Wengle, Markus; Dietmüller, Thomas; Hamzic, Edvin; Hörner, Philip; Schließmann, Alexander*)

14:20–14:40
№ 8.2 / Paper ID 171
Engineering Learning Factory – Transforming Engineering Education through an Interdisciplinary Experimental Learning Environment
Walburga Kerschbaumer, unibz (*Authors: Kerschbaumer, Walburga; Rauch, Erwin; Matt, Dominik*)

14:40–15:00
№ 8.3 / Paper ID 183
Who Doesn't Make a Learning Factory for Sustainability? The Domain Differences that Imped Interdisciplinarity
Christian Poulsen, Erhvervsakademi København
(*Authors: Bjørnsten, Thomas Bøgelund; Christiansen, Lasse; Cortsen, Jens; Liu, Cong; Nybye, Nicolai Nørtoft; Poulsen, Christian*)

15:00–15:20
№ 8.4 / Paper ID 187
An IoT-Enabled Learning Management System Frame-

work for Learning Factories

Ione Ituarte, TKNIKA (Authors: Ituarte, Ione; Otaño, Aitor)

15:20–15:40

Coffee break

PARALLEL SESSION 9

📍 Ground Floor – Aula Magna

Enabling Technologies Related to Learning Factories

Session Chair: Bernd

Kuhlenkötter, Ruhr University Bochum

15:40–16:00

Nº 9.1 / Paper ID 112

Teaching Industry 4.0: An Open-Source Framework for Cooperative Robotics in the Learning Factory

Carlos Vazquez-Hurtado, Instituto Tecnológico y de Estudios Superiores de Monterrey (Authors: Bento, Antonio Carlos; Vazquez-Hurtado, Carlos; Rodriguez-Padilla, Consuelo; Ocampo-Silva, Ixchel; Cabrera-López, Manuel Gabriel; Medina-Carvajal, Jorge Eduardo; Arguelles-Ramirez, Hiram; González-Domínguez, Carlos Eric)

16:00–16:20

Nº 9.2 / Paper ID 118

Comparison of Virtual Reality and Video Instruction Effectiveness for Manufacturing Assembly Training

James Clarke, Stellenbosch University (Authors: Clarke, James; Steed, Clint; Greonwald, Tian)

16:20–16:40

Nº 9.3 / Paper ID 124

From Novice To Expert: Establishing an Adaptive Digital Assistant for Learning Metrology in a Learning Factory Setting

Christian Köhler, Saarland University of Applied Sciences (htw saar) (Authors: Lang, Lukas; Schwinn, Aileen; Köhler, Christian)

16:40–17:00

Nº 9.4 / Paper ID 127

Multimodal Retrieval-Augmented-Generation for Deviation Management with Video Preprocessing

Evrin Cicek, Technical University of Darmstadt (Authors: Wang, Yuxi; Chen, Zhaoguo; Cicek, Evrim; Seubert, Niko; Metternich, Joachim)

17:00–17:20

Nº 9.5 / Paper ID 176

Integrating Six Sigma and Data Science in Learning Factories: Developing Problem-Solving Competencies Through Experiential Education

Jochen Deuse, TU Dortmund University (Authors: Deuse, Jochen; Schulte, Lukas; Stemann, Dietmar)

Parallel Session 10

📍 2nd Floor – Room B1.2.14

Learning Factory

Operation – Business Models and Cooperation

Session Chair: Davide Don, Fraunhofer Italia

15:40–16:00

Nº 10.1 / Paper ID 263

A Systematic Analysis of Learning Factories at Universities of Applied Sciences in North Rhine-Westphalia, Germany: Bridging Education, Research, and Industrial Practice

Li Feng, Hochschule Bielefeld (Author: Feng, Li)

16:00–16:20

Nº 10.2 / Paper ID 272

Smart Production Lab: Transforming a Lean Learning Factory into a Digital, Circular and Robotic Production Laboratory

Caroline Colmsan, Technical University of Munich (Authors: Bernhard, Olivia; Streibel, Lasse; Rammo, Jan-Philipp;

Geng, Paul; Stang, Julian; Wegmann, Marc; Lindholm, Niklas; Klages, Björn; Wagner, Sarah; Colmsan, Caroline; Bauer, Johannes; Sippl, Fabian; Gärtner, Quirin; Kröger, Sebastian; Brunnenkannt, Finn-Augustin; Göbel, Laura; Eichmann, Moritz; Stöver, Jannik; Reuter, Christina)

16:20–16:40

Nº 10.3 / Paper ID 292

Integrating Learning Factory Principles into Engineering Lab Redesign: A Guideline-Driven Case Study

Mohammad Hossein Dehbozorgi, Politecnico di Milano (Authors: Dehbozorgi, Mohammad Hossein; Rossi, Monica; Sullivan, Brendan Patrick; Terzi, Sergio)

16:40–17:00

Nº 10.4 / Paper ID 184

What Should They Learn? Stakeholder Engagement in Learning Factory Development

Lasse Christiansen, University College of Northern Denmark (Authors: Bennyson, Rene; Bjørnsten, Thomas Bøgelund; Christiansen, Lasse; Højen, Karina Finding; Lindkvist, Rickard; Mikkelsen, Lars Christian Lindegaard; Poulsen, Christian)

17:00–17:20

Nº 10.5 / Paper ID 190

Technical Skills Development through Hands-On Collaborative Assembly and Installation of Cobots in Learning Factories

Olugbenga Adegbeemisola Aderoba, Tshwane University of Technology (Authors: Aderoba, Olugbenga Adegbeemisola; Swanepoel, Jan Adriaan; Nenzhelele, Tshifhiwa)

PARALLEL SESSION 11

📍 2nd Floor – Room B1.2.15

Engineering Education –

Didactic Processes Related to Learning Factories
Session Chair: Zsolt Kemény, HUN-REN SZTAKI

15:40–16:00

Nº 11.1 / Paper ID 141

Conceptualizing ShopFloor Competencies for the Circular Economy: A Competence requirement Mapping for Learning Factories

Mark Meiertöns, Leibniz University Hannover
(Authors: Meiertöns, Mark; Schmidt, Matthias)

16:00–16:20

Nº 11.2 / Paper ID 144

Gamification in the Learning Factory: Development and Validation of an Escape Room on Sustainability for Engineering Education

Carsten Wohlgemuth, TH Köln
(Authors: Wohlgemuth, Carsten; Keller, Tom; Permin, Eike; Potthoff, Leonie)

16:20–16:40

Nº 11.3 / Paper ID 145

An Agile Learning Factory for a Modular Vertical Farm Design

Jose Miguel Figarola, University of Alberta
(Authors: Figarola, Jose Miguel; Vazquez, Carlos; Ahmad, Rafiq)

16:40–17:00

Nº 11.4 / Paper ID 148

LoopingBricks: Serious Gaming in Learning Factories to Align Business Models for Circular Economy

Mark Mennenga, Technische Universität Braunschweig
(Authors: Dormeier, Christopher; Ghazanfarpour, Zahra; Süß, Sandro; Mennenga, Mark)

17:00–17:20

Nº 11.5 / Paper ID 136

Design and Training of Robust Business Processes Using Serious Games

Annika Lange, Fraunhofer IPK
(Authors: Lange, Annika; Knothe, Thomas)

PARALLEL SESSION 12

📍 2nd Floor – Room B1.2.16

Short Paper III

Session Chair: Sergio

Salimbeni, USAL – Universidad del Salvador

15:40–16:00

Nº 12.1 / Paper ID 189

Design and Implementation of the Reconfigurable Cobot Workstation into the Learning Factory Environment

Marko Mladineo, FESB, University of Split
(Authors: Mladineo, Marko; Veza, Ivica; Gjeldum, Nikola; Crnjac Zizic, Marina; Aljinovic Mestrovic, Amanda; Bilic, Bozenko; Basic, Andrej)

16:00–16:20

Nº 12.2 / Paper ID 191

Designing An Industrial Metaverse-Enabled Net-Zero Smart Learning Factory

Gökhan Cenk, University of Applied Sciences Neu-Ulm
(Authors: John, Jessel; Cenk, Gökhan; Engel, Tobias)

16:20–16:40

Nº 12.3 / Paper ID 195

Learning Factory from the First Year of Engineering: Experiences in a University of Applied Sciences

Fernando S. Pacheco, Häme University of Applied Sciences
(Authors: Pacheco, Fernando S.; Hernandez, Ernesto)

16:40–17:00

Nº 12.4 / Paper ID 215

AI for Problem Solving in Quality Management: An Experiential Learning Approach in the i-FAB Learning Factory

Stefano Marazzini, Carlo Cattaneo, LIUC University
(Authors: Marazzini, Stefano;

Pozzi, Rossella; Rossi, Tommaso; Saporiti, Nicolò; Strozzi, Fernanda; Pirola, Fabiana; Rossi, Monica)

17:30–17:30

CLOSE OF DAY 2

18:30–23:00

CONFERENCE DINNER

📍 [Maretsch Castle, Bozen-Bolzano](#)

THURSDAY, 7/05

8:00–8:30

LATE REGISTRATION

PARALLEL SESSION 13

📍 Ground Floor – Aula Magna

Enabling Technologies Related to Learning Factories

Session Chair: Carlo Caiazzo, unibz

8:30–8:50

Nº 13.1 / Paper ID 130

Designing for Flexibility: Training Students in Low-Code Interfaces and Smart Manufacturing Integration

Erick Ramírez-Cedillo, Tecnológico de Monterrey
(Authors: De la Cruz Rangel, María Fernanda; Salazar González, Adrián Oswaldo; Peña Zuñiga, Gabriela Lizeth; Reyna Vargas, Diego Fernando; Villareal De la Garza, Alfonso; Ramírez-Cedillo, Erick)

08:50–09:10

13.2 / Paper ID 132

Agentic LLM-System for Gamified Adaptive Competence Development in Production

Evrin Cicek, Technical University of Darmstadt, Institute PTW
(Authors: Cicek, Evrim; Henschel, Simon; Na, Daeyeop; Park, Yeseul; Metternich, Joachim)

09:10–09:30

Nº 13.3 / Paper ID 135

Digital Twin-Based Energy Assessment in a Human-Robot Collaborative Workstation for Experiential Learning

Chiara Nezzi, unibz (Authors: Nezzi, Chiara; Bonello, Amberlynn; Emer, Asja; Francalanza, Emmanuel; Rauch, Erwin)

09:30–09:50

Nº 13.4 / Paper ID 142

Leveraging Building Information Modeling for Sustainability: A Use-Stage Evaluation Approach for Learning Factories

Asja Emer, unibz (Authors: Emer, Asja; Revolti, Andrea; Rauch, Erwin; Dallasega, Patrick; Matt, Dominik)

09:50–10:10

Nº 13.5 / Paper ID 146

Design and Simulation-Based Optimisation of a Virtual Learning Factory for Structural Steel Prefabrication

Rafiq Ahmad, University of Alberta (Authors: Valenzuela Robles, Denisse; Dutta, Souravik; Ahmad, Rafiq)

10:10–10:30

Nº 13.6 / Paper ID 200

5G Applications in Manufacturing: Systematic Literature Review and Case Applications in Learning Factories

Gabriel Rodrigues Santos, University of São Paulo (Authors: de Oliveira Marinho, Francielly; Iqbal, Laiba; Rodrigues Santos, Gabriel; de A. F. Romeral, Pedro Antonio; Tavares de Sousa Zomer, Thayla; Schützer, Klaus; Zancul, Eduardo)

PARALLEL SESSION 14

📍 2nd Floor – Room B1.2.14

Enabling Technologies Related to Learning Factories

Session Chair: Klaus Schützer, University of São Paulo

08:30–08:50

Nº 14.1 / Paper ID 274

A Neuroadaptive Human–AI Co-Learning Model for Navigating Operational Uncertainties

Emmanuel Francalanza, University of Malta (Authors: Abela, Edward; Aruvali, Tanel; Francalanza, Emmanuel)

08:50–09:10

Nº 14.2 / Paper ID 108

How Can Learning Factories Advance the Green Transition and Build Regional Competences in the Swedish Arctic?

Mohamed Elnourani, Luleå University of Technology (Authors: Elnourani, Mohamed; Rönnbäck, Anna Öhrwall; Vahlne, Tobias; Johansson, Petter)

09:10–09:30

Nº 14.3 / Paper ID 134

Tackle Industrial Skill Shortage with New Learning Factory Operation and Collaboration Models

Jörg Schmitt, Bosch Rexroth AG (Authors: Dommermuth, Maximilian; Schmitt, Jörg; Schild, Philipp)

09:30–09:50

Nº 14.4 / Paper ID 156

Disassembly Use Case for Teaching, Training, and Method Validation in Circular Production Learning Factories

Finn-Augustin Brunnenkant, Technical University of Munich (Authors: Streibel, Lasse; Brunnenkant, Finn-Augustin; Eichmann, Moritz; Lindholm, Niklas; Jordan, Patrick; Bernhard, Olivia; Wegmann, Marc; Reuter, Christina)

09:50–10:10

Nº 14.5 / Paper ID 196

From Pilot Projects in the Learning Factory to Industry Toolbox: Advancing the Digital Transformation of

the Automotive Industry

Clemens Faller, Bochum UAS (Authors: Faller, Clemens; Weissert, Britta)

10:10–10:30

Nº 14.6 / Paper ID 197

Robotic Forming in Learning Factory: A Didactic Approach Combining Design, Simulation, and Experiment

Yanrong Zhang, Tongji University (Authors: Zhang, Yanrong; Li, Yirou; Deng, Shuyue; Tu, Qiansi; Mo, Jiao; Zhang, Weimin; Möllensiep, Dennis; Prinz, Christopher; Kuhlentötter, Bernd; Min, Junying)

PARALLEL SESSION 15

📍 2nd Floor – Room B1.2.15

Engineering Education – Didactic Processes Related to Learning Factories

Session Chair: Christian

Köhler, HTW Saar

08:30–08:50

Nº 15.1 / Paper ID 150

The WI-Brewing-Cellar. A Craft-based Creative BA for Developing Research Competencies

Virginie Lettkemann, University of Potsdam (Authors: Teichmann, Malte; Ritterbusch, Georg; Kurtz, Gila; Lettkemann, Virginie; Schummel, Philip; Gronau, Norbert)

08:50–09:10

Nº 15.2 / Paper ID 151

Gamified Learning Factories: Bridging Physical and Digital Simulation for Teaching Industry 5.0 with a Focus on Occupational Safety

Radim Hercík, VSB – Technical University of Ostrava (Authors: Hercík, Radim; Spitzhirn, Michael; Laciok, Vendula; Zemánek, Jan)

09:10–09:30

Nº 15.3 / Paper ID 153

Human-Centric Teaching &

Learning Factories: Inclusive Design Strategies for Vulnerable Learners

Panagiotis Stavropoulos, Laboratory for Manufacturing Systems and Automation (Authors: Papacharalampopoulos, Alexios; Karagianni, Olga Maria; Van Landuyt, Davy; Stavropoulos, Panagiotis)

09:30–09:50

Nº 15.4 / Paper ID 163

Assisting a Manufacturing SME in Advancing its Industry 4.0 Maturity Level: A Learning Factory Case in Kit Assembly

Ana Luisa Montero Navarro, Tecnológico de Monterrey (Authors: Montero Navarro, Ana Luisa; Cisneros Gonzalez, Jessica Janeth; Sandoval Padilla, Saul; Galaviz Jimenez, Gerardo; Rios Robledo, Daniel; Roman Flores, Armando)

09:50–10:10

Nº 15.5 / Paper ID 165

Training Factory Transformation: Achieving Multi-Level Development based on a Maturity Guide

Sam Groot Roessink, University of Twente (Authors: Groot Roessink, Sam; Massa, Janneke; Lutters, Eric)

10:10–10:30

Nº 15.6 / Paper ID 166

Designing Learning Factory Education: A Methodology for Deliberate Didactic Design

Janneke Massa, University of Twente (Authors: Massa, Janneke; Lutters, Eric)

PARALLEL SESSION 16

📍 2nd Floor – Room B1.2.16

Short Paper IV

Session Chair: Walburga

Kerschbaumer, unibz

08:30–08:50

Nº 16.1 / Paper ID 226

Die Lernfabrik – Learning

Factory for Sustainable, Circular, and Digital Production

Sandro Süß, Technische Universität Braunschweig (Authors: Süß, Sandro; Wojahn, Olaf; Ventura Silva, Gabriela; Geffers, Gordon; Kohn, Sophia; Effner, Benjamin; Hansemann, Maik; Mennenga, Mark; Herrmann, Christoph)

08:50–09:10

Nº 16.2 / Paper ID 236

Design Implementations in a Learning Factory Focused on IoT and Industry 4.0 Technologies

Ishwar Singh, McMaster University (Authors: Centea, Dan; Wanyama, Tom; Mehrtash, Moein; Singh, Ishwar)

09:10–09:30

Nº 16.3 / Paper ID 241

Using Spatial Computing to Program a Programmable Logic Controller for Didactic Approaches in a Learning Factory Context

Jens Cortsen, Business Academy Copenhagen (Author: Cortsen, Jens)

09:30–09:50

Nº 16.4 / Paper ID 244

Learning Factories as a Catalyst for Innovation in Southern African Engineering Education

Eriyeti Murena, Tshwane University of Technology (Authors: Ndiyamba, David; Murena, Eriyeti; Kasukusa, Stephen; Mafuratidze, Francis; Nemzhele, Tshifhiwa; Mpofu, Khumbulani; Mapindu, Innocent)

10:30–10:50

Coffee break

PARALLEL SESSION 17

📍 Ground Floor – Aula Magna
Enabling Technologies Related to Learning Factories

Session Chair: Erwin Rauch,
unibz

10:50–11:10

Nº 17.1 / Paper ID 147

Link Data to Products: Lessons Learned from Digital Product Passport Application in a Learning Factory Environment

Matthias Wolf, Graz University of Technology (Authors: Wolf, Matthias; Kirschner, Christoph; Langer, Matteo; Foivos, Psarommatis; Ragu, Athinarayanan; David, Cochran; Christian, Ramsauer)

11:10–11:30

Nº 17.2 / Paper ID 154

Mixed-Reality Framework For Learning Factories: A Modular And Multi-Platform Approach

Benjamin Effner, Technische Universität Braunschweig (Authors: Effner, Benjamin; Ventura Silva, Gabriela; Lindner, Marija; Herrmann, Christoph)

11:30–11:50

Nº 17.3 / Paper ID 155

Increasing Efficiency in MTM Training: A Comparison of VR-Based and Manual Analysis

Peter Kuhlmann, MTM ASSOCIATION e. V. (Authors: Benter, Martin; Neumann, Maria; Kuhlmann, Peter)

11:50–12:10

Nº 17.4 / Paper ID 175

Augmented Reality in Intralogistics: Impact of System Design on Users' Learning Curves

Hendrik Stern, BIBA – Bremer Institut für Produktion und Logistik (Authors: Stern, Hendrik; Kreutz, Markus; Quandt, Moritz; Freitag, Michael)

12:10–12:30

Nº 17.5 / Paper ID 177

Method for Continuously Updating Holistic Digital Factory Models in Learning Factory Operation

Annemarie Raber, Fraunhofer-

Institut für Gießerei-, Composite- und Verarbeitungstechnik IGCV (Authors: Raber, Annemarie; Bermpohl, Fabian; Böck, Julian; Chaudhari, Kunal; Gonnermann, Clemens; Bednarz, Martin; Daub, Rüdiger)

PARALLEL SESSION 18

📍 2nd Floor – Room B1.2.14

Enabling Technologies Related to Learning Factories

Session Chair: Sergio

Salimbeni, USAL – Universidad del Salvador

10:50–11:10

Nº 18.1 / Paper ID 214

Startups Development in Learning Factories: A Case Study within a University Innovation Ecosystem

Gabriel Rodrigues Santos, University of São Paulo (Authors: Esposito Vieira, Renan; Tavares de Sousa Zomer, Thayla; Zancul, Eduardo)

11:10–11:30

Nº 18.2 / Paper ID 247

Development and Implementation of an IIoT-Enabled Manufacturing Execution System Using Low-Code/No-Code Platforms for Smart Learning Factory

Russel Bradley, Massachusetts Institute of Technology (Authors: Bradley, Russel; Valadez Arámburo, Diego Alejandro; Salim, Stanley S.; Ha, Emily S.; Reynolds, Mathew J.; Jagdessi, Sashlin; Ng, Yong; Zhao, Wenjian; Cooper, Renne; Levy, Rebecca; Alarcón López, Ángel Mario; Mendoza Quevedo, André Mauricio; Ramírez-Cedillo, Erick; Anthony, Brian W.)

11:30–11:50

Nº 18.3 / Paper ID 205

From Signals to Decisions: A Pedagogical Pipeline for Tool-Wear Prediction Using Few-Shot Learning

Qian Jun Beh, Agency for Science, Technology and

Research (A*STAR) (Authors: Beh, Qian Jun; Pugalenth, Karkulali; Zhang, Leyuan; Nam, Doan Ngoc Chi; Siew, Tan Puay; Lian, Ong Chun)

11:50–12:10

Nº 18.4 / Paper ID 218

Integrating Virtual Reality in Robotics Training: A Project-Based Learning Approach

Muhammad Afnan Khan, University of Alberta (Authors: Khan, Muhammad Afnan; Castaneda, Jennifer Cardenas; Roman, Armando; Ahmad, Rafiq)

12:10–12:30

Nº 18.5 / Paper ID 237

Bridging Real and Simulated Production Data for Eco-Design: Experiencing the Impact of Factory Settings on LCA Data Quality

Jens Pottebaum, Paderborn University (Authors: Graessler, Iris; Pottebaum, Jens; Rarbach, Sven; Vollenkemper, Felix)

PARALLEL SESSION 19

📍 2nd Floor – Room B1.2.15

Enabling Technologies Related to Learning Factories

Session Chair: Joachim

Metternich, Darmstadt University

10:50–11:10

Nº 19.1 / Paper ID 169

Experience Platform to Enhance AI Competences in SMEs

Nadine Kaltschmidt, University of Applied Sciences Magdeburg-Stendal (Authors: Behrendt, Fabian; Timm, Patrick; Menschulin, Daniel; Kaltschmidt, Nadine)

11:10–11:30

Nº 19.2 / Paper ID 170

Smart Factory Planning – A Learning Concept

Martin Adam, University of Applied Science Kufstein/Tyrol (Authors: Adam, Martin; Spitzhirn, Michael; Kammermeier, Matthias)

11:30–11:50

Nº 19.3 / Paper ID 172

Between Feasibility and Responsibility: Technological and Ethical Limits of Innovation

Christian Köhler, Saarland University of Applied Sciences (Authors: Köhler, Christian; Schwinn, Aileen; Lang, Lukas)

11:50–12:10

Nº 19.4 / Paper ID 173

Developing AI Competences in Quality Control: A Modular and Target Group-Specific Qualification Concept in Learning Factories

Alexander Apfeld, Ruhr-Universität Bochum (Authors: Apfeld, Alexander; Kröll, Martin; Burova-Keßler, Kristina; Prinz, Christopher; Kuhlenkötter, Bernd)

12:10–12:30

Nº 19.5 / Paper ID 128

Exploring Knowledge Governance in Mixed Reality (MR) Engineering Education in Higher Education Institutions (HEIs)

Emmanuel Francalanza, University of Malta (Authors: Zammit, Joseph; Francalanza, Emmanuel; Li, Chang-Tsun; Mckenzie, Sophie; Anwar, Adnan; Teh, Je Sen)

PARALLEL SESSION 20

📍 2nd Floor – Room B1.2.16

Short Paper V

Session Chair: Luca Gualtieri, unibz

10:50–11:10

Nº 20.1 / Paper ID 275

Next-Generation Learning Factory Center: Concepts and Infrastructure

Adirek Baisukhan, Chiang Mai University (Authors: Baisukhan, Adirek; Nakkiew, Wasawat)

11:10–11:30

Nº 20.2 / Paper ID 251

Enriching a Collaborative Assembly Cell With Visual Perception in a Learning Factory Environment

Zsolt Kemény, HUN-REN

Institute for Computer

Science and Control (*Authors:*

Nacsá, János; Kemény, Zsolt;

Godó, Gábor; Kovács, Gábor)

11:30–11:50

Nº 20.3 / Paper ID 261

Integration of Digital Twins and Data Analytics in the BO Smart Factory Using XR

Marcus Kröger, Bochum

University of Applied Sciences

(*Authors:* *Kröger, Marcus;*

Kneissler, Andreas; Schilberg,

Daniel)

11:50–12:10

Nº 20.4 / Paper ID 143

Student-Driven Innovation Loops: Integration of Next-Gen Technologies into an Existing Lean Learning Factory

Leonie Potthoff, University

of Applied Sciences and Arts

Dortmund (*Authors:* *Potthoff,*

Leonie; Wenderoth, Niklas;

Wohlgemuth, Carsten)

12:10–12:30

Nº 20.5 / Paper ID 248

Competency and Cognitive Engineering in Learning Factories: A Quasi-Experimental Evaluation of Tinkercad Simulator for Digital Electronics and Embedded Manufacturing Systems

Moses Oluwafemi Oyesola,

Tshwane University of Technology

(*Authors:* *Oyesola, Moses*

Oluwafemi; Nenzhelele, Gift)

12:30–13:30

Lunch

PARALLEL SESSION 21

📍 **Ground Floor – Aula Magna**

Enabling Technologies Related

to Learning Factories

Session Chair: Matteo De

Marchi, unibz

13:40–14:00

Nº 21.1 / Paper ID 203

Competency-Oriented Requirements for Learning Factories in Circular Battery Cell Production

Gabriela Ventura Silva, Technische

Universität Braunschweig

(*Authors:* *Ventura Silva, Gabriela;*

Kohn, Sophia; Süß, Sandro;

Effner, Benjamin; Herrmann,

Christoph)

14:00–14:20

Nº 21.2 / Paper ID 204

From Reality Capture to Industrial Metaverse: First Steps Towards a Self-Learning Manufacturing System

Fabian Fichtl, Institute for

Production and Informatics

(IPI) Sonthofen, University of

Applied Sciences Kempten

(*Authors:* *Romero Escobedo,*

Libia; Fichtl, Fabian; Bär, Thomas;

Pfeifer, Denis; Schemminger,

Florentin; Lüdemann-Ravit,

Bernd; Zürn, Julian; Thalappully,

Rashik)

14:20–14:40

Nº 21.3 / Paper ID 220

Integrating AI Assistance and Human-Machine Collaboration in Learning Factories for Industry 5.0

Carlos Vazquez Hurtado,

Monterrey Institute of Technology

and Higher Education

Campus Monterrey (*Authors:*

Vazquez Hurtado, Carlos; Alberto

Romero Wells, Ivan; Malagamba

Montejo, Gilberto; Fregoso

Jimenez, Gerardo; Santiago

Benvenuto Valerdi, Luis)

14:40–15:00

Nº 21.4 / Paper ID 222

From Raw Material to Finished Product: Leveraging Learning Factories for End-to-End Product Traceability

Raquel Tejeda-Alejandre,

Tecnologico de Monterrey

(*Authors:* *Uribe-Hernandez,*

Hiram; Vazquez-Hurtado, Carlos;

Monsivais-Mancilla, Mario;

Mijares-Menchaca, Samuel;

Lopez-Suarez, Oscar; Tejeda-

Alejandre, Raquel)

15:00–15:20

Nº 21.5 / Paper ID 199

From MES Core to MES Minimal: Lessons from Developing and Piloting Open-Source MES Platforms in a Learning Factory

Tom Wanyama, McMaster

University (*Authors:* *Barasa,*

Paul Wanyama; Wanyama, Tom)

PARALLEL SESSION 22

📍 **2nd Floor – Room B1.2.14**

Enabling Technologies Related to Learning Factories

Session Chair: Matthias Wolf,

TU Graz

13:40–14:00

Nº 22.1 / Paper ID 269

Seeing Less, Learning More: Compressed Sensing as a Framework for Data-Efficient Vision in Learning Factories

Braulio Cardenas Benitez,

Tecnologico de Monterrey

(*Authors:* *Cardenas Benitez,*

Braulio; Vazquez-Hurtado,

Carlos)

14:00–14:20

Nº 22.2 / Paper ID 271

NeuroSymbolic AI for Core Assessment of Domestic Appliances in a Learning Factory

Fabio Daniele, SUPSI

(*Authors:* *Daniele, Fabio; Conti,*

Lorenzo; Pedrazzoli, Paolo;

Gambardella, Luca Maria)

14:20–14:40

Nº 22.3 / Paper ID 262

Learning Factories: Design of an Embedded Intelligent Agent for Climate Monitoring Systems

Sergio Salimbeni, USAL –
Universidad del Salvador
(Authors: De 'Sterna-Primerano,
Fabrizio; Medina-Brito, Lucas;
Nicolet, Santiago; Salimbeni,
Sergio)

14:40–15:00
Nº 22.4 / Paper ID 289
**Agentic AI for Humanistic
Learning in Engineering
Education: A Conceptual
Framework for Learning
Factory Environments**

Günter Bitsch, Reutlingen
University
(Authors: Bitsch, Günter)

15:00–15:20
Nº 22.5 / Paper ID 290
**Empowering Engineering
Education with Augmented
Reality: An Assembly Task
Case Study**

Carlo Iob, unibz (Authors: Iob,
Carlo; Lanzzone, Marco; Gualtieri,
Luca; Dallasega, Patrick)

PARALLEL SESSION 23

📍 2nd Floor – Room B1.2.15

**Engineering Education –
Didactic Processes related to
Learning Factories**

**Session Chair: Eric Lutters,
University of Twente**

13:40–14:00
Nº 23.1 / Paper ID 193
**Motivating ERP Learning
through Gamification:
A Didactic Concept for
Next-Generation Learning
Factories**

Alexander Kühn, Technical
University of Applied Sciences
Rosenheim (Authors: Kühn,
Alexander; Krüger, Andreas;
Fleischmann, Carolin; Deistler,
Nico)

14:00–14:20
Nº 23.2 / Paper ID 228
**Blended Pedagogies in
Learning Factories: Advanc-
ing Practical Competencies
in the Automotive Industry**

Eriyeti Murena, Tshwane
University of Technology
(Authors: Murena, Eriyeti;
Nenzhelele, Tshifhiwa; Mpofo,
Khumbulani; Malada, Dakalo)

14:20–14:40
Nº 23.3 / Paper ID 229
**Digital Twin–Driven Laser
Engraving Learning Factory**
Prakruthi Hareesh, BITS
Pilani, WILP (Authors: Hareesh,
Prakruthi; Tangaraj, Arunkarthik;
C Jayaram, Robin)

14:40–15:00
Nº 23.4 / Paper ID 231
**Inclusivity Assessment in
Manufacturing: Design and
Evaluation of an LLM-Based
Chatbot Agent in a Learning
Factory Industry 4.0**
Fazel Ansari, TU Wien
(Authors: Karbasi, Atieh;
Ruthofer, Isabella; Ansari, Fazel)

15:00–15:20
Nº 23.5 / Paper ID 233
**Embedding Lean 4.0 in
Learning Factories: Pathways
to Adoption with AI-Enhanced
Assistance Systems**
Fazel Ansari, TU Wien
(Authors: Karbasi, Atieh;
Jovanoski, Bojan; Argilovski,
Aleksandar; Ansari, Fazel)

PARALLEL SESSION 24

📍 2nd Floor – Room B1.2.16

**Learning Factory Concepts
and Infrastructure**

**Session Chair: Christopher
Prinz, Ruhr-University
Bochum, Germany**

13:40–14:00
Nº 24.1 / Paper ID 210
**Gamifying the Smart
Learning Factory – Skopje:
A Modular Methodology
for Lean Manufacturing
Education and Industrial
Training**
Bojan Jovanoski, Ss. Cyril
and Methodius University
(Authors: Nikolovska, Blagica;

Minovski, Robert; Argilovski,
Aleksandar; Jovanoski, Bojan)

14:00–14:20
Nº 24.2 / Paper ID 211
**Closing the Loop Between
Training and Shop-Floor
Performance in Industrial
Setups**
Konstantina Salagianni, Lab-
oratory for Manufacturing
Systems & Automation (LMS)
(Authors: Salagianni, Konstantina;
Dimosthenopoulos, Dimosthenis;
Kaipi, Maria; Gkournelos,
Christos; Aivaliotis, Panagiotis;
Makris, Sotiris)

14:20–14:40
Nº 24.3 / Paper ID 213
**Development and Empirical
Validation of an IoT-Enabled
Smart Teaching Factory
Framework for Enhancing
In-dustry 4.0 Competencies**
Mohd Haidiezul Jamal Ab Hadi,
Universiti Malaysia Perlis
(Authors: Ab Hadi, Mohd
Haidiezul Jamal; Wan Ab Rahim,
Wan Mohd Faizal; Abu Bakar,
Faizah; Mohd Hanid, Mohd
Hazwan; Misbah, Muhammad
Nur; Zakaria, Sakinah; Waran,
M.Yoges; Seng Tat, Lim)

14:40–15:00
Nº 24.4 / Paper ID 224
**Planning and Design of
Learning Factories Fostering
Circular Production: Applica-
tion on a Hybrid Manufac-
turing/Remanufacturing System**
Sandro Süß, Technische
Universität Braunschweig
(Authors: Süß, Sandro; Mennenga,
Mark; Herrmann, Christoph)

15:00–15:20
Nº 24.5 / Paper ID 235
**Real-Time Production Data
Processing Using Edge Com-
puting – A Learning Module
on Advanced Machining Ana-
lytics and Quality Control**
Michael Gfoellner, Graz
University of Technology

(Authors: Gfoellner, Michael; Feichtinger, Matthias; Koerner, Stefan; Haas, Franz; Pichler, Rudolf)

15:20–15:40
Coffee break

PARALLEL SESSION 25

📍 **Ground Floor – Aula Magna**
Enabling Technologies Related to Learning Factories
Session Chair: Sebastian Thiede, University of Twente

15:40–16:00
№ 25.1 / Paper ID 250
A Comprehensive Survey of Robotic Applications in Learning Factories
Zsolt Kemény, HUN-REN Institute for Computer Science and Control (Authors: Kemény, Zsolt; Ahmad, Rafiq; Caiazzo, Carlo; Dimosthenopoulos, Dimosthenis; Gkournelos, Christos; Gualtieri, Luca; Kuhlenkötter, Bernd; Kumar, Atal Anil; Makris, Sotiris; Miro, Michael; Nacsá, János; Paniti, Imre; Rauch, Erwin)

16:00–16:20
№ 25.2 / Paper ID 257
Framework For Designing VR Training Sessions Towards Resilient Operator Upskilling
Konstantina Salagianni, Laboratory for Manufacturing Systems & Automation (LMS) (Authors: Toghias, Theodoros; Topalidis, Georgios; Michalos, George; Aivaliotis, Panagiotis; Makris, Sotiris)

16:20–16:40
№ 25.3 / Paper ID 260
Design and Evaluation of an AI-Based Assistant to Enhance Learning and Operator Support in a Learning Factory Assembly Environment
Louis Louw, Stellenbosch University (Authors: Louw, Louis; Van der Merwe, Christine)

16:40–17:00
№ 25.4 / Paper ID 273
Integrating LLM-Based Multi-Agent Systems into Learning Factories for Intralogistics and Experiential Learning
Daniel Palm, Stellenbosch University (Authors: Renner, Daniel; Künster, Nils; Palm, Daniel; Louw, Louis)

17:00–17:20
№ 25.5 / Paper ID 223
Smart Maintenance in Learning Factories: Harnessing Data for Predictive Insights
Raquel Tejeda-Alejandre, Tecnológico de Monterrey (Authors: Arenas-Zavala, Iris; Uribe-Hernandez, Hiram; Sanchez-Olvera, Raul; Mijares-Menchaca, Samuel; Monsivais-Mancilla, Mario; Lopez-Suarez, Oscar; Ruiz-Huerta, Leopoldo; Caballero-Ruiz, Alberto; Rodriguez-Gonzalez, Ciro; Tejeda-Alejandre, Raquel)

PARALLEL SESSION 26

📍 **2nd Floor – Room B1.2.14**
Theme: Learning Factory Operation – Business Models and Cooperation
Session Chair: Clemens Faller, Bochum UAS

15:40–16:00
№ 26.1 / Paper ID 243
Interactive eLearning through an Adaptive Simulator: Developing PLC Competency in Engineering Education and Manufacturing
Moses Oluwafemi Oyesola, Tshwane University of Technology (Authors: Oyesola, Moses Oluwafemi; Nenzhelele, Gift)

16:00–16:20
№ 26.2 / Paper ID 255
A Replicable Framework for International Collaborative Learning Factories: Competency Development in the FrED Factory MIT–Tec Model
Russel Bradley, Massachu-

setts Institute of Technology (Authors: Bradley, Russel; Nájera Aponte, Naomi; Ramírez-Cedillo, Erick; Ortiz-Espinoza, Alexandro; Cantu-Cavada, Cesar; Ponce, Pedro; Pacheco, Jose J.; Vargas-Martínez, Adriana; Anthony, Brian W.)

16:20–16:40
№ 26.3 / Paper ID 249
Driving Global Learning: The Cyber-Physical Mobility Lab as a Next-Generation Learning Factory
Damian Mooney and Ann Lourens, Nelson Mandela University (Authors: Mooney, Damian; Lourens, Ann; Reddy, Kumeshan)

16:40–17:00
№ 26.4 / Paper ID 198
Teaching IoT–PLC Integration Using Real-Time Material Monitoring
Tom Wanyama, McMaster University (Authors: Wanyama, Tom; Barsan, Kafuko Martha; Centea, Dan; Singh, Ishwar)

17:00–17:20
26.5 / Paper ID 201
Integrating Life Cycle Management into Digitalised Learning Factories: A Pedagogical and Experiential Approach to Sustainability Education
Olugbenga Adegbeemisola Aderoba, Tshwane University of Technology (Authors: Aderoba, Olugbenga Adegbeemisola; Swanepoel, Jan Adriaan; Nenzhelele, Tshifhiwa)

PARALLEL SESSION 27

📍 **2nd Floor – Room B1.2.15**
Engineering Education – Didactic Processes related to Learning Factories
Session Chair: Emmanuel Francalanza, University of Malta

15:40–16:00

Nº 27.1 / Paper ID 238

Teaching Safety-First Automation: An Industry–Academia Collaboration for a Hazardous Manufacturing Process

Cesar Cantu, Tecnologico de Monterrey (Authors: Cantu, Cesar; Ortiz-Espinoza, Alexandro Antonio; Hernandez Calderon, Irene; Ramirez-Cedillo, Erick)

16:00–16:20

Nº 27.2 / Paper ID 245

From Linear to Circular Value Creation: Integrating Research, Education, and Industry in Werk150

Jan Schuhmacher, Reutlingen University (Authors: Schuhmacher, Jan; Hummel, Vera)

16:20–16:40

Nº 27.3 / Paper ID 246

Learning Module on the Improvement of Intralogistics Processes using Smart Glove and Smart Glasses technologies

Jan Schuhmacher, Reutlingen University (Authors: Hamid, Muhammad; Schuhmacher, Jan; Hummel, Vera)

16:40–17:00

Nº 27.4 / Paper ID 264

A Learning Factory Model for Cross-Fertilization in Industry 5.0

Carlos Vazquez-Hurtado, Itesm (Authors: Vazquez-Hurtado, Carlos; Gomez-Quinones, Jose Isabel; Swain-Oropeza, Ricardo; Galvan-Galvan, José Alfredo; Ahmad, Rafiq; Roman-Flores, Armando)

17:00–17:20

Nº 27.5 / Paper ID 288

Learning Factory Quality Control Teaching System Based on Digital Twin: A Case Study of 2D Bending Forming Process for Flat

Wire Motor Stator Windings

Christopher Ehrmann, Tongji University (Authors: Xu, Hongtao; Wang, Xianfeng; Ehrmann, Christopher; Zhang, Weimin; Jia, Ziwei; Xue, Feng; Shen, Mulin)

PARALLEL SESSION 28

2nd Floor – Room B1.2.16

Learning Factory Concepts and Infrastructure

Session Chair: Rafiq Ahmad, University of Alberta

15:40–16:00

Nº 28.1 / Paper ID 125

Advancing Remanufacturing in Learning Factories – A Configuration Approach for Remodeling

Jonas Barth, Technical University Darmstadt (Authors: Barth, Jonas; Sandner, Sophie; Rosemeyer, Jannik; Metternich, Joachim)

16:00–16:20

Nº 28.2 / Paper ID 192

Advancing Learning Factory Implementation: Approaches to Latin America

Humberto Alejandro Barrero-Arciniegas, unibz (Authors: Barrero-Arciniegas, Humberto Alejandro; Rodrigues Santos, Gabriel; Zomer, Thayla; Meisel Donoso, Carlos Antonio; Zancul, Eduardo; Schützer, Klaus; Rauch, Erwin)

16:20–16:40

Nº 28.3 / Paper ID 160

A Flexible Learning Factory Based on Production Control by Collaborative Digital Twins

Sven Völker, Technische Hochschule Ulm (Authors: Völker, Sven; Weber, Jakob; Baumgärtel, Hartwig)

17:25–17:45

CLOSURE CEREMONY: summary CLF 2026; preview of industry visits and next CLF 2027 Conference

📍 Aula Magna

18:00–20:30

BOZEN-BOLZANO CITY TOUR

📍 [Waltherplatz – Piazza Walther at 18:30](#)

FRIDAY, 8/05

08:00–08:30

Meeting point for Industry Tours

📍 [Foyer, Faculty of Engineering](#)

08:45–09:00

Departure Bus towards Alpitronic (15 min)

09:00–11:00

ALPITRONIC FRUBONA VISIT

📍 [Sigmundskronerstrasse – Via Castel Firmiano 5, Bozen-Bolzano](#)

08:30–09:00

Departure Bus towards Würth Italia and Roen (30 min) – Group 1

09:00–11:00

WÜRTH ITALIA AND FRUIT COOPERATIVE ROEN VISIT

📍 [Bahnhofstrasse, Neumarkt](#)

12:00–13:00

Lunch at NOI Techpark Bolzano Restaurants

13:45–18:00

LAKE TOUR

📍 Faculty of Engineering

13:45–18:00

MOUNTAIN TOUR

📍 Faculty of Engineering