IEEE International Conference on Industrial Informatics (INDIN 2023): Technical Program

Monday, 17.07.2023
Industry Forum: *Sustainability – Special Challenges in Industry*

10:00 – 11:00		
10:00 – 11:00	**Registration / Welcome Coffee**	CIIT-Atrium
11:00 – 11:30		
11:00 – 11:30	Welcome ***Jürgen Jasperneite, Lukasz Wisniewski***	CIIT II-Atrium
11:30 – 12:00		
11:30 – 12:00	Industrie.Zero – Approaches and Solutions for Sustainable Industry from the Leading-Edge Cluster it's OWL ***Günter Korder, CEO, it's OWL Clustermanagement***	CIIT II-Atrium
12:00 – 12:30		
12:00 – 12:30	On the Way to a Climate-neutral Company ***Markus Fleuter, Vice President, GEA Group***	CIIT II-Atrium
12:30 – 13:00		
12:30 – 13:00	5G and TSN for Factory Automation ***Junaid Ansari, Ericsson Research***	CIIT II-Atrium
13:00 – 13:40		
13:00 – 13:40	**Network Lunch**	CIIT-Atrium
13:40 – 14:10		
13:40 – 14:10	Decarbonization of Chemical Industry – Challenges and Solution Approaches ***Martin Hoffmann, Research Team Manager, German ABB Research Center***	CIIT II-Atrium
14:10 – 14:40		
14:10 – 14:40	Digital Twins as a Basis for Sustainabilty in Industry ***Florian Pethig, Group Manager Big Data Platforms, Fraunhofer IOSB-INA***	CIIT II-Atrium
14:40 – 15:10		
14:40 – 15:10	Digital Twins Support Sustainability in the Plant Lifecycle ***Domenic Schäffer, CEO, Digital Twin Factory***	CIIT II-Atrium
15:10 – 15:30		
15:10 – 15:30	**Coffee Break**	CIIT-Atrium

Monday, 17.07.2023
Industry Forum: *Sustainability – Special Challenges in Industry*

15:30 – 16:00

15:30 – 16:00	Data-driven Optimization for Sustainable Shopfloors ***Tom Hammerbacher, System Manager, PHOENIX CONTACT Electronics***	CIIT II-Atrium

16:00 – 16:30

16:00 – 16:30	Digitalisation and Industrial IoT as a Strategic Pillar for the Energy Transition ***Dirk Bauerkämper, Head of Global Market Management New Energy, Weidmüller***	CIIT II-Atrium

16:30 – 17:00

16:30 – 17:00	Sustainable Manufacturing in a Networked Plastics Production ***Nissrin Arbesun Perez, Innovation Manager, Fraunhofer IOSB-INA***	CIIT II-Atrium

17:00 – 18:00

17:00 – 18:00	**Guided Tour of the Future Food Factory**	Future Food Factory

Monday, 17.07.2023
Tutorials

09:00 – 09:30

09:00 – 09:30	**Tutorials Welcome Coffee**	CIIT-Atrium

09:30 – 11:00

	Slot 1: Tutorials		**Room**
09:30 – 11:00	BaSyx: Enabling Industry 4.0 with Eclipse BaSyx	*Frank Schnicke (Fraunhofer IESE), Daniel Espen (Fraunhofer IESE)*	1.376
09:30 – 11:00	ABM CPS: Information Processing for Industrial Cyber-physical Systems - A Complex Systems Science Approach with Agent-Based Models	*Pedro H. J. Nardelli (Lapeenranta-Lahti University of Technology), Daniel G. Rojas (Lapeenranta-Lahti University of Technology) et al.*	1.341
09:30 – 11:00	DSB: Data Science Basics – From Sensors Data Evaluation to Graphical Visualization	*Sebastian Braun (FH Aachen), Jessica Ullmer (FH Aachen), Prof. Jörg Wollert (FH Aachen)*	1.248

11:00 – 11:30

11:00 – 11:30	**Welcome Coffee**	CIIT-Atrium

11:30 – 13:00

	Slot 2: Tutorials		**Room**
11:30 – 13:00	BaSyx: Enabling Industry 4.0 with Eclipse BaSyx	*Frank Schnicke (Fraunhofer IESE), Daniel Espen (Fraunhofer IESE)*	1.376
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11:30 – 13:00	AMiRo: Hands-on – Building Processing Pipelines with the ml4proflow Framework Using Autonomous Robot Platform AMiRo	*Christian Klarhorst (Uni Bielefeld), Dennis Quirin (Uni Bielefeld)*	1.278

13:00 – 13:40

13:00 – 13:40	**Lunch Break**	

Monday, 17.07.2023
Tutorials

13:40 – 15:10

	Slot 3: Tutorials		Room
13:40 – 15:10	BaSyx: Enabling Industry 4.0 with Eclipse BaSyx	*Frank Schnicke (Fraunhofer IESE), Daniel Espen (Fraunhofer IESE)*	1.376
13:40 – 15:10	ABM CPS: Information Processing for Industrial Cyber-physical Systems - A Complex Systems Science Approach with Agent-Based Models	*Pedro H. J. Nardelli (Lapeenranta-Lahti University of Technology), Daniel G. Rojas (Lapeenranta-Lahti University of Technology) et al.*	1.341
13:40 – 15:10	DSB: Data Science Basics – From Sensors Data Evaluation to Graphical Visualization	*Sebastian Braun (FH Aachen), Jessica Ullmer (FH Aachen), Prof. Jörg Wollert (FH Aachen)*	1.248
13:40 – 15:10	AMiRo: Hands-on – Building Processing Pipelines with the ml4proflow Framework Using Autonomous Robot Platform AMiRo	*Christian Klarhorst (Uni Bielefeld), Dennis Quirin (Uni Bielefeld)*	1.278
13:40 – 15:10	TwinERGY: Digital Tools for the Intelligent Integration of Prosumers in Local Energy Markets. The TwinERGY paradigm.	*Stylianos Karatzas (University of Patras), Johannes Üpping (TH OWL), Sam Gunner (University of Bristol) et al.*	1.377

15:10 – 15:30

15:10 – 15:30	**Coffee Break**	CIIT-Atrium

15:30 – 17:00

	Slot 4: Tutorials		Room
15:30 – 17:00	BaSyx: Enabling Industry 4.0 with Eclipse BaSyx	*Frank Schnicke (Fraunhofer IESE), Daniel Espen (Fraunhofer IESE)*	1.376
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17:00 – 18:00

17:00 – 18:00	**Guided Tour of the Future Food Factory**	Future Food Factory

Tuesday, 18.07.2023

08:30 – 09:00

08:30 – 09:00	**Registration Open**	TH OWL–2nd floor

09:00 – 09:30

09:00 – 09:30	**Welcome Ceremony**	1.204

09:30 – 10:30

09:30 – 10:30	**Keynote:** "All Electric Society" **Roland Bent (Phoenix Contact GmbH & Co. KG)**	1.204

10:30 – 11:00

10:30 – 11:00	**Coffee Break**	TH OWL–2nd floor

11:00 – 13:00
Parallel Sessions

TT02	**Artificial Intelligence in Industrial Applications (Part I: Anomaly and Fault Detection)** ***Session Chairs***		**Room 1.247**
11:00 – 11:20	INDIN23-000016	Discussion of Features for Acoustic Anomaly Detection under Industrial Disturbing Noise in an End-of-Line Test of Geared Motors	Peter Wißbrock
11:20 – 11:40	INDIN23-000031	Using Differential Equation Inspired Machine Learning for Valve Faults Prediction	Benjamin Uhrich
11:40 – 12:00	INDIN23-000048	Counterfactual Root Cause Analysis via Anomaly Detection and Causal Graphs	Josephine Rehak
12:00 – 12:20	INDIN23-000080	AI-based Cavitation Detection in Process Valves	Marisa Ehemann
12:20 – 12:40	INDIN23-000192	Anomaly Detection for Hydroelectric Power Plants: a Machine Learning-based Approach	Mattia Fanan
12:40 – 13:00	INDIN23-000229	Domain Transfer for Surface Defect Detection using Few-Shot Learning on Scarce Data	Felix Gerschner

TT03	**Safety and Security in Industrial Applications (Part I)** ***Session Chairs: Bhosale Pushparaj Rajaram, TU Wien (Austria) and Axel Sikora, HS Offenburg (Germany)***		**Room 1.276**
11:00 – 11:20	INDIN23-000019	Trust Management System for Hybrid Industrial Blockchains	Fatemeh Stodt
11:20 – 11:40	INDIN23-000076	Protocol-Agnostic Detection of Stealth Attacks on Networked Control Systems	Hauke Heseding
11:40 – 12:00	INDIN23-000089	PROFINET Security: A Look on Selected Concepts for Secure Communication in the Automation Domain	Andreas Walz
12:00 – 12:20	INDIN23-000098	An FPGA-based Unidirectional Gateway Proposal for OT-IT Network Separation to Secure Industrial Automation Systems	Song Son Ha
12:20 – 12:40	INDIN23-000115	Integrated Safety-Security Risk Assessment for Production Systems: A Use Case Using Bayesian Belief Networks	Pushparaj Bhosale
12:40 – 13:00	INDIN23-000147	Safety and Security: A Field of Tension in Industrial Practice	Siegfried Hollerer

Tuesday, 18.07.2023

11:00 – 13:00
Parallel Sessions

TT10	**Technologies, Infrastructures and Applications for Smart Grids, Buildings and Cities (Part I: Enabling technologies and infrastructures towards smart and sustainable energy distribution and living)** ***Session Chairs: Dennis Sprute, Fraunhofer IOSB-INA (Germany)***		**Room 1.277**
11:00 – 11:20	INDIN23-000044	E-VarifocalNet: A Lightweight Model to Detect Insulators and Their Defects under Power Grid Surveillance (ONLINE)	Chao Ouyang
11:20 – 11:40	INDIN23-000135	Privacy in Local Energy Markets: A Framework for a Self-Sovereign Identity based P2P-Trading Authentication System	Moritz Volkmann
11:40 – 12:00	INDIN23-000191	A multi-output LSTM-CNN learning scheme for power disaggregation within a NILM framework	Yacine Belguermi
12:00 – 12:20	INDIN23-000033	Application of the Interoperability Score in the home and building domain	Markus Reinke
12:40 – 13:00	INDIN23-000110	Understanding the Role of Solar PV and Battery Energy Storage in a Snack Bar: A Case Study in Madeira Island	Lucas Pereira

SS11	**Open Automation Architecture and the Module Type Package** ***Session Chairs: Andreas Stutz, Siemens AG (Germany) and Michelle Blumenstein, HSU Hamburg (Germany)***		**Room 1.278**
11:00 – 11:20	INDIN23-000117	Communication of Energy Data in Modular Production	Leif-Thore Reiche
11:20 – 11:40	INDIN23-000139	Automation Service Choreographies using Decentralized Orchestration to Integrate Non-Choreography-Enabled Equipment Assemblies	Andreas Stutz
11:40 – 12:00	INDIN23-000119	Automated Generation of MTP Skeletons Based on Ontologies	Artan Markaj
12:00 – 12:20	INDIN23-000142	Integration of Flexible Transport Systems into Modular Production-Related Logistics Areas	Michelle Blumenstein
12:20 – 12:40	INDIN23-000181	Security Analysis of the Module Type Package Concept	Marwin Madsen

13:00 – 14:30

13:00 – 14:30	**Lunch**	TH OWL–2nd floor

14:30 – 16:30
Parallel Sessions

TT03	**Safety and Security in Industrial Applications (Part II)** ***Session Chairs: Marco Ehrlich, TH OWL (Germany) and Ilaria Matteucci, CNR-IIT (Italy)***		**Room 1.276**
14:30 – 14:50	INDIN23-000151	Determining the Target Security Level for Automated Security Risk Assessments	Marco Ehrlich
15:10 – 15:30	INDIN23-000215	Watermark Based Sensor Data Protection System for Wireless Sensor Network	Akash Reddy Kondapuram
15:30 – 15:50	INDIN23-000219	From Functional to Software-Defined Vehicle and its Security Issues	Marco De Vincenzi
15:50 – 16:10	INDIN23-000220	Generation of Synthetic Data to Improve Security Monitoring for Cyber-Physical Production Systems	Felix Specht

Tuesday, 18.07.2023

14:30 – 16:30
Parallel Sessions

TT02	**Artificial Intelligence in Industrial Applications (Part II: Emerging AI Applications)** ***Session Chairs: Anton Pfeiffer, TH OWL (Germany)***		**Room 1.247**
14:30 – 14:50	INDIN23-000023	Comparison of Different Natural Language Processing Models to Achieve Semantic Interoperability of Heterogeneous Asset Administration Shells	Jo Beermann
14:50 – 15:10	INDIN23-000093	External Magnetic Interference Classification in Magnetostrictive Position Sensors using Neuro-Symbolic AI with Log-Likelihood Ratios	Aimal Khan
15:10 – 15:30	INDIN23-000114	A Prototype for Lab-Based System Testing of Cyber Physical Systems for Smart Farming	Aluko Tunde Oluwayemi
15:30 – 15:50	INDIN23-000178	Key Indicators for the Discrimination of Wines by Electronic Noses	Julius Wörner
15:50 – 16:10	INDIN23-000179	Systematic Preprocessing of Dielectric Spectroscopy Data and Estimating Viable Cell Densities	Selina Ramm
16:10 – 16:30	INDIN23-000218	Infrared Hyperspectral Analysis for Non-invasive, Inline Fat Content Determination in Bakery Products	Arne De Temmermann

TT10	**Technologies, Infrastructures and Applications for Smart Grids, Buildings and Cities (Part II: Enabling Technologies and Infrastructures for the Smart City and Smart Transportation/Mobility Paradigms)** ***Session Chairs***		**Room 1.277**
14:30 – 14:50	INDIN23-000131	Open Data Platform Tools for Energy Service Ecosystem in Urban Superblocks	Mikael Filppula
14:50 – 15:10	INDIN23-000159	Modelling with NGSI-LD: The VALLPASS Project Case Study	Tiago Ribeiro
15:10 – 15:30	INDIN23-000024	3D-LiDAR-based Pedestrian Detection for Demand-Oriented Traffic Light Control	Dennis Sprute
15:30 – 15:50	INDIN23-000155	Outdoor Field Test of 5G-based V2X Communication for Real-Time Monitoring and Remote Control of a Monorail Vehicle	Denis Gustin
15:50 – 16:10	INDIN23-000165	Detection and Mitigation of GPS Attack via Cooperative Localization (ONLINE)	Zhuang Wang
16:10 – 16:30	INDIN23-000242	Deep Reinforcement Learning for Energy-Efficient Task Offloading in Cooperative Vehicular Edge Networks	Paul Agbaje

SS12	**Resource Awareness in Industrial Informatics** ***Session Chairs: Arne Noyer, Ostfalia University of Applied Sciences (Germany) and Tiago Carvalho, School of Engineering of the Polytechnic Institute of Porto – ISEP (Portugal)***		**Room 1.278**
14:30 – 14:50	INDIN23-000071	Efficient Production Scheduling by Exploiting Repetitive Product Configurations	Niels Grüttemeier
14:50 – 15:10	INDIN23-000127	Illimani Memory Profiler at Work: Identifying Object Allocation Sites	Sebastian Jordan Montaño
15:10 – 15:30	INDIN23-000184	A Scalable Clustered Architecture for Cyber-Physical Systems	Luis Ferreira
15:30 – 15:50	INDIN23-000186	Integration of Machine Learning Safety Functions in the Onthology of Functional Safety	Michael Kieviet
15:50 – 16:10	INDIN23-000187	Framework for the Analysis and Configuration of Real-Time OpenMP Applications	Tiago Carvalho
16:10 – 16:30	INDIN23-000222	A Chatbot Assistant for Reducing Risk in Machinery Design	Padma Iyenghar

Tuesday, 18.07.2023

16:30 – 17:00

16:30 – 17:00	**Coffee Break**	TH OWL–2nd floor

17:00 – 18:20
Parallel Sessions

TT02	**Artificial Intelligence in Industrial Applications (Part III: Reinforcement Learning)** ***Session Chairs: Gabriele Formis, CNR-IEIIT (Italy)***		**Room 1.247**
17:00 – 17:20	INDIN23-000022	Integration of Reinforcement Learning into Fluid Control Systems	Moritz Allmendinger
17:20 – 17:40	INDIN23-000070	A Mini Review on the Utilization of Reinforcement Learning with OPC UA	Simon Schindler
17:40 – 18:00	INDIN23-000111	Individualized Clustered Cooperative Communication Units in Automated Electrical Routing in 3D CAD	Tizian Dagner
18:00 – 18:20	INDIN23-000225	Enhancing Crane Handling Safety: A Deep Deterministic Policy Gradient Approach to Collision-Free Path Planning	Rafaela Machado

TT12	**Industrial Informatics Tools** ***Session Chairs***		**Room 1.276**
17:00 – 17:20	INDIN23-000010	Model-driven Engineering of flexible Production Systems with the RAMI Toolbox	Christoph Binder
17:20 – 17:40	INDIN23-000030	Development of a CAD-based Automated Worker Guidance System	Alexander Rommel
17:40 – 18:00	INDIN23-000059	An Adaptation Framework for Industry 4.0 Responsive Production Systems	Mohammed M. Mabkhot
18:00 – 18:20	INDIN23-000094	A Comparative Analysis of Federated Learning Techniques on On-Demand Platform in Supporting Modern Web Browsers Applications	Muhammad Senoyodha Brennaf

TT14	**Smart Health Technologies** ***Session Chairs: Michael Condry, ClinicAI (USA)***		**Room 1.278**
17:00 – 17:20	INDIN23-000037	Non-Interventional Precise TC Assessment for Enhancing Consumer Energy Flexibility	Ioannis Gialelis
17:20 – 17:40	INDIN23-000063	A Prototype Body-powered Prosthetic Hand Using Self-weight for Upper Limb Amputees in Return to Work	Rihito Ogura
17:40 – 18:00	INDIN23-000123	A Deep Learning Model for Mobility Change Prediction Based on National Prevention and Control Policy	Shifeng Li
18:00 – 18:20	INDIN23-000124	Small and Medium Scale Automation in iPS cell Culture utilizing AI Based Learning and Machine Vision	Lucas Artmann

Tuesday, 18.07.2023

17:00 – 18:20
Parallel Sessions

SS02	**Explainable and Interactive Machine Learning for Industrial Applications** ***Session Chairs: Gianluca Manca, ABB Corporate Research Center (Germany) and Marcel Dix, ABB Corporate Research Center (Germany)***		**Room 1.277**
17:00 – 17:20	INDIN23-000013	Measuring the Robustness of ML Models Against Data Quality Issues in Industrial Time Series Data	Deepti Maduskar
17:20 – 17:40	INDIN23-000035	Automatic Generation of Visual Concept-based Explanations for Pest Recognition	Zhipeng Yuan
17:40 – 18:00	INDIN23-000162	Motivational Exploration of Explanations in Industrial Analytics	Valentin Grimm
18:00 – 18:20	INDIN23-000170	Adaptive Real-Time Exploration and Optimization of Safety-Critical Industrial Systems with Ensemble Learning	Buse Sibel Korkmaz

18:20 – 21:00

18:20 – 19:20	**Keynote:** „Staying Ahead of the Innovation Curve: Google Insights" **Manuel Greisinger (Google)**	Innovation Spin

18:20 – 21:00	**Welcome Reception**	Innovation Spin

Wednesday, 19.07.2023

09:00 – 11:00
Parallel Sessions

TT02	**Artificial Intelligence in Industrial Applications (Part IV: Deep Learning and Neural Networks)** ***Session Chairs: Jörn Tebbe, TH OWL (Germany) and Lisa Gebauer, TH OWL (Germany)***		**Room 1.247**
09:00 – 09:20	INDIN23-000086	Improving Online Non-destructive Moisture Content Estimation using Data Augmentation by Feature Space Interpolation with Variational Autoencoders	Christian Wewer
09:20 – 09:40	INDIN23-000113	An Autonomous Inspection Method for Pitting Detection Using Deep Learning	Luciane Soares
09:40 – 10:00	INDIN23-000190	Predictive Maintenance in the Industry: A Comparative Study on Deep Learning-based Remaining Useful Life Estimation	Yao Yang
10:00 – 10:20	INDIN23-000193	Graph Neural Network-Based Measurement Inference on Irregular Sensor Geometries	Martin ben Ahmed
10:20 – 10:40	INDIN23-000194	Chemical Property-Guided Neural Networks for Naphtha Composition Prediction	Jeondong Kim
10:40 – 11:00	INDIN23-000239	Experimentation on NN Models for Hazard Identification in Machinery Functional Safety	Padma Iyenghar

TT04	**Industrial System and Software Engineering, Runtime Intelligence (Part I)** ***Session Chairs: Christoph Binder, FH Salzburg (Austria) and Marvin Schieseck, HSU Hamburg (Germany)***		**Room 1.276**
09:00 – 09:20	INDIN23-000011	Towards Flexible Production Systems Engineering According to RAMI 4.0 by Utilizing PPR Notation	Christoph Binder
09:20 – 09:40	INDIN23-000046	A Graphical Modeling Language for Artificial Intelligence Applications in Automation Systems	Marvin Schieseck
09:40 – 10:00	INDIN23-000090	BPMN4CARS: A Car-Tailored Workflow Engine	Simone König
10:00 – 10:20	INDIN23-000097	Formalization of a Product-Process-Resource Model within Aircraft Component Maintenance, Repair, and Overhaul	Maximilian Rappl
10:20 – 10:40	INDIN23-000100	A Control Flow based Static Analysis of GRAFCET using Abstract Interpretation	Aron Schnakenbeck
10:40 – 11:00	INDIN23-000103	GRAFCET Reduction Techniques for Model Checking	Robin Mroß

TT09	**Industrial Real-Time, Networked Embedded Systems and IoT Technologies** ***Session Chairs: Axel Sikora, HS Offenburg (Germany)***		**Room 1.277**
09:00 – 09:20	INDIN23-000012	Measurement Methods for Software Execution Time on Heterogeneous Edge Devices	Bernhard Rupprecht
09:20 – 09:40	INDIN23-000185	Automated Physical TestBeds (APTB 2.0): Enabling Reliable and Efficient Testing of Wireless Communication Networks for IoT and Industry 4.0	Jubin Sebastian
09:40 – 10:00	INDIN23-000234	A Conceptual Architecture for Scalable Multi-Application Support in Blockchain-based IoT Environments	Akin Eker
10:00 – 10:20	INDIN23-000188	Secure Real-Time Industrial IoT Communications in Smart Grids Using Named Data Networking	Henry Hui
10:20 – 10:40	INDIN23-000120	TRUST: Transparent Redundancy for UDP STreams	Felix Neumeister
10:40 – 11:00	INDIN23-000199	Methodology and Implementation for Monitoring Precise Time Synchronisation in TSN	Kedar Naik

Wednesday, 19.07.2023

11:00 – 11:30

11:00 – 11:30	**Coffee Break**	TH OWL–2nd floor

11:30 – 13:30
Parallel Sessions

TT02	**Artificial Intelligence in Industrial Applications (Part V: Industrial Applications of AI)** ***Session Chairs***		**Room 1.247**
11:30 – 11:50	INDIN23-000020	Imitation Learning from Operator Experiences for a Real-time CNC Machine Controller	Hoa Nguyen
11:50 – 12:10	INDIN23-000043	Edge Intelligence for Detecting Deviations in Batch-based Industrial Processes	Alexander Keusch
12:10 – 12:30	INDIN23-000060	Cut Interruption Detection in the Laser Cutting Process Using ROCKET on Audio Signals	Kathrin Leiner
12:30 – 12:50	INDIN23-000164	Optimization of a High Storage System with two Cranes per Aisle	Niels Grüttemeier
12:50 – 13:10	INDIN23-000168	A Novel Spectroscopic Approach for Vaseline Quality Discrimination	Niels Hendrik Fliedner
13:10 – 13:30	INDIN23-000231	Learning the Automated Setup of Profile Wrapping Lines for New Products from Few Past Setups	Steven Koppert

TT04	**Industrial System and Software Engineering, Runtime Intelligence (Part II)** ***Session Chairs: Kathrin Land,Technical University of Munich (Germany) and Alexander Fay, HSU Hamburg (Germany)***		**Room 1.276**
11:30 – 11:50	INDIN23-000105	An OPC UA-based Industrial Big Data Architecture	Eduard Hirsch
11:50 – 12:10	INDIN23-000203	Execution Time Oriented Design of an Adaptive Controller for Mobile Machines	Marius Krüger
12:10 – 12:30	INDIN23-000206	Concept of a Causality-driven Fault Diagnosis System for Cyber-Physical Production Systems	Carl Willy Mehling
12:30 – 12:50	INDIN23-000208	A Methodical Approach to Hybrid Modelling for Contextual Anomaly Detection on Time-Series Data	Cederic Lenz
12:50 – 13:10	INDIN23-000233	Managing Technical Debt in Automation: Best Practices and Cross-Life-Cycle Strategies	Fandi Bi
13:10 – 13:30	INDIN23-000249	Integration of ABB Robot Manipulators and Robot Operating System for Industrial Automation	Mochammad Rizky Diprasetya

SS07	**Wireless Communications for Industry 4.0** ***Session Cha*****irs: Lisa Underberg, ifak (Germany) and Nick Schwarzenberg, TU Dresden (Germany)**		**Room 1.277**
11:30 – 11:50	INDIN23-000054	5G Packet Delay Considerations for Different 5G-TSN Communication Scenarios	Niklas Ambrosy
11:50 – 12:10	INDIN23-000088	Entity Component System Architecture for Scalable, Modular, and Power-Efficient IoT-Brokers	Franc Pouhela
12:10 – 12:30	INDIN23-000154	Extended Reference Broadcast Infrastructure Synchronization Protocol in 5G and Beyond	Michael Gundall
12:30 – 12:50	INDIN23-000213	A Container-based Architecture to Provide Services from SDR Devices	Ederson Ribas Machado
12:50 – 13:10	INDIN23-000236	Towards the 5G-Enabled Factories of the Future	Melisa López

Wednesday, 19.07.2023

11:30 – 13:30
IES-SYPA Student Forum

11:30 – 11:35	**Opening**		1.375
11:35 – 11:55	**Keynote:** „Importance of Practice-Oriented Studies and International Research Collaborations for Academic Careers in Engineering" **Maxim Friesen (inIT / TH OWL)**		1.375
	Presentations by the Student Award Winners		1.375
11:55 – 12:00	INDIN23-000101	Thermal Digital Twin of a Multi-Domain System for Discovering Mechanical Faulty Behaviors	Francesco Tosoni
12:00 – 12:05	INDIN23-000102	Hybrid Computational Framework for Early Fault Detection in Coil Winding Manufacturing Process Using Knowledge Distillation	Izhar Oswaldo Escudero Ornelas
12:05 – 12:10	INDIN23-000181	Security Analysis of the Module Type Package Concept	Marwin Madsen
12:10 – 12:15	INDIN23-000200	Network Pruning and Fine-tuning for Few-shot Industrial Image Anomaly Detection	Jie Zhang
12:15 – 12:20	INDIN23-000075	Linear Combination of Exponential Moving Averages for Wireless Channel Prediction	Gabriele Formis
12:20 – 12:40	**Keynote:** „A PhD topic between Theory and Application: Reconfiguration of Hybrid Systems" **Kaja Balzereit (Fraunhofer IOSB-INA)**		1.375
12:40 – 13:00	**Keynote:** „Bridging the Gap: Industrial Doctorate Programs and the Transfer of Research to Real-Life Applications" **Peter Wissbrock (Lenze)**		1.375
13:00 – 13:30	**Discussions, Interactions and Socialising**		1.375

Wednesday, 19.07.2023

13:30 – 14:30

13:30 – 14:30	**Lunch**	TH OWL–2nd floor

14:30 – 15:30

14:30 – 15:30	**Keynote:** "First 5G and now 6G – What will Industrial Automation Benefit from it and what are the Key Challenges?" **Mikael Gidlund (Mid Sweden University)**	1.204

15:30 – 16:00

15:30 – 16:00	**Coffee Break**	TH OWL–2nd floor

16:00 – 17:20
Parallel Sessions

TT02	**Artificial Intelligence in Industrial Applications (Part VI: Time-series Analysis)** ***Session Chairs***		**Room 1.247**
16:00 – 16:20	INDIN23-000008	Supervised Time Series Segmentation as Enabler of Multi-Phased Time Series Classification: A Study on Hydraulic End-of-Line Testing	Stefan Gaugel
16:20 – 16:40	INDIN23-000075	Linear Combination of Exponential Moving Averages for Wireless Channel Prediction	Gabriele Formis
16:40 – 17:00	INDIN23-000176	A Comparison of Statistical and Machine Learning Approaches for Time Series Forecasting in a Demand Management Scenario	Anton Pfeifer

TT01 / TT08	**Industrial Cyber-Physical Systems, Industrial Agents and Applications, Human, Computer and Machine Interaction** ***Session Chairs: Valerio Frascolla, Intel (Germany) and Carsten Roecker, TH OWL (Germany)***		**Room 1.276**
16:00 – 16:20	INDIN23-000133	Communication-Control Co-design for Robotic Manipulation in 5G Industrial IoT	Arvind Merwaday
16:20 – 16:40	INDIN23-000196	Increasing Robustness of Agents' Decision-Making in Production Automation using Sanctioning	Kathrin Land
16:40 – 17:00	INDIN23-000211	Holistic Optimization of a Dynamic Cross-Flow Filtration Process Towards a Cyber-physical System	Jörn Tebbe
17:00 – 17:20	INDIN23-000173	Adaptive Navigation Method for Mobile Robots in Various Environments using Multiple Control Policies	Kanako Amano

SS01	**Fault Diagnosis and Attack Detection for Industrial Cyber-Physical Systems** ***Session Chairs: Sebastian Kropatschek, Austrian Center for Digital Production (Austria) and Izhar Oswaldo Escudero Ornelas, University of Sheffield (UK)***		**Room 1.278**
16:00 – 16:20	INDIN23-000025	Deep Autoencoder With Orthogonal Features for Process Monitoring	Chao Yang
16:20 – 16:40	INDIN23-000051	Non-singular Terminal Sliding Mode Tracking Control with Synchronization in the Cable Space for Cable-Driven Parallel Robots	Yanqi Lu
16:40 – 17:00	INDIN23-000102	Hybrid Computational Framework for Early Fault Detection in Coil Winding Manufacturing Process Using Knowledge Distillation	Izhar Oswaldo Escudero Ornelas
17:00 – 17:20	INDIN23-000250	Combining Models for Safety and Security Concerns in Automating Digital Production	Sebastian Kropatschek

Wednesday, 19.07.2023

16:00 – 17:20
Parallel Sessions

SS02	**Explainable and Interactive Machine Learning for Industrial Applications** ***Session Chairs: Gianluca Manca, ABB Corporate Research Center (Germany) and Marcel Dix, ABB Corporate Research Center (Germany)***		**Room 1.277**
16:00 – 16:20	INDIN23-000195	Semi-supervised Variational Autoencoders for Regression: Application to Soft Sensors	Yilin Zhuang
16:20 – 16:40	INDIN23-000205	Using Prior Knowledge to Improve Adaptive Real Time Exploration and Optimization	Bill Tubbs
16:40 – 17:00	INDIN23-000207	Explaining Deep Neural Networks for Bearing Fault Detection with Vibration Concepts	Thomas Decker

17:20 – 18:00

17:20 – 18:00	**Visit to the SmartFactoryOWL**	Smart Factory

19:00 – 23:00

19:00 – 23:00	**Conference Dinner**	Brake Castle

Thursday, 20.07.2023

09:00 – 10:00

09:00 – 10:00	**Keynote:** „Including Humans in Decision Making through Computational Learning and Knowledge Integration" **Jie Wang (Stanford University)**	1.204

10:00 – 10:30

10:00 – 10:30	**Coffee Break**	TH OWL–2nd floor

10:30 – 12:30
Parallel Sessions

TT02	**Artificial Intelligence in Industrial Applications (Part VII: Computer Vision)** ***Session Chairs***		**Room 1.247**
10:30 – 10:50	INDIN23-000015	Burrs Edge and Sharp Edge Detection Using CNN Method of Metal Workpiece for Intelligent Manufacturing Application	Kirana Astari Pranoto
10:50 – 11:10	INDIN23-000039	Recognition of Defective Mineral Wool Using Pruned ResNet Models	Mehdi Rafiei
11:10 – 11:30	INDIN23-000049	Self-supervised Learning with Temporary Exact Solutions: Linear Projection	Qiang Li
11:30 – 11:50	INDIN23-000180	An end-to-end workflow for synthetic data generation for robust object detection	Johannes Metzler
11:50 – 12:10	INDIN23-000200	Network Pruning and Fine-tuning for Few-shot Industrial Image Anomaly Detection	Zhang Jie
12:10 – 12:30	INDIN23-000217	HAB detection within Aquaculture Industry: A Case Study in the Atlantic Area	Bruna Guterres

TT06	**Factory Communications, Control and Automation Systems** ***Session Chairs: Marlon Löppenberg, Fachhochschule Südwestfalen (Germany) and Janis Albrecht, Fraunhofer IOSB-INA (Germany)***		**Room 1.276**
10:30 – 10:50	INDIN23-000057	Model-based Automation of TSN Configuration for Industrial Distributed Systems	Brendan J. Mackenzie
10:50 – 11:10	INDIN23-000157	Increasing Ethernet TSN Multi-Protocol Interoperability by Algorithmic Configuration Merge	Janis Albrecht
11:10 – 11:30	INDIN23-000128	Self Optimisation and Automatic Code Generation by Evolutionary Algorithms in PLC based Controlling Processes	Marlon Löppenberg
11:30 – 11:50	INDIN23-000216	High Availability for virtualized Programmable Logic Controllers with Hard Real-Time Requirements on Cloud Infrastructures	Thomas Kampa
11:50 – 12:10	INDIN23-000172	Robot Control Offloading in 5G Network Using Real-Time Trajectory Interpolation	David Ginthoer

TT07	**Industrial Digitalization, Digital Twins in Industrial Applications (Part I)** ***Session Chairs: Alexander Fay, HSU Hamburg (Germany) and Wolfgang Kastner, TU Wien (Austria)***		**Room 1.277**
10:30 – 10:50	INDIN23-000053	Architecture for the Shared Production Leveraging the Asset Administration Shell and Gaia-X	Simon Jungbluth
10:50 – 11:10	INDIN23-000055	Standardized Integration of Source Systems into Asset Administration Shell Realizations	Torben Miny
11:10 – 11:30	INDIN23-000132	Generation of digital twins for information exchange between partners in the Industrie 4.0 value chain	Nico Braunisch
11:30 – 11:50	INDIN23-000201	Reusing OPC UA Information Models in the Asset Administration Shell	Arno Weiß
11:50 – 12:10	INDIN23-000109	A Microservices-based Architecture for Data and Software Management of Heavy Equipment Digital Twins	Victor Zhidchenko

Thursday, 20.07.2023

10:30 – 12:30
Parallel Sessions

TT11	**Education in Engineering and Industrial Informatics** ***Session Chairs***		**Room 1.278**
10:30 – 10:50	INDIN23-000032	DeLMS: A Decentralized Learning Management System using Ethereum Smart Contracts and IPFS	Midhun Xavier
10:50 – 11:10	INDIN23-000095	Remote Lab of Robotic Manipulators through an Open Access ROS-based Platform	Bruno Stefanuto
11:10 – 11:30	INDIN23-000096	Learning Emergent Digital Technologies: The Experience in the Internet of Things Course Unit	Paulo Leitao
11:30 – 11:50	INDIN23-000161	KIAAA: An AI Assistant for Teaching Programming in the Field of Automation	Leon Wehmeier
11:50 – 12:10	INDIN23-000198	Introducing a Group-based Remote Laboratory for Embedded Education	Christopher Beck

12:30 – 14:00

12:30 – 14:00	**Lunch**	TH OWL–2nd floor

14:00 – 15:20
Parallel Sessions

TT05	**Robotics and Mechatronics in Industrial Applications (Part I)** ***Session Chairs: Victor Zhidchenko, LUT University (Finland) and Omar Ismail, HSU Hamburg (Germany)***		**Room 1.276**
14:00 – 14:20	INDIN23-000068	A Method for Planning the Trajectory of Mobile Hydraulic Crane Booms with a Focus on Energy Efficiency	Victor Zhidchenko
14:20 – 14:40	INDIN23-000122	Optimizing Virtual Commissioning of a Robotic System using Process Mining and Footprints Conformance Checking	Omar Ismail
14:40 – 15:00	INDIN23-000136	Designing Redundant Cable-Driven Parallel Robots for Additive Manufacturing using End-Effector Compliance Index	Burhan Kara
15:00 – 15:20	INDIN23-000197	EValueAction: A Proposal for Policy Evaluation in Simulation to Support Interactive Imitation Learning	Fiorella Sibona

TT13	**Intelligent Finance Technologies and Applications** ***Session Chairs***		**Room 1.278**
14:00 – 14:20	INDIN23-000014	Multi-step prediction of commodity futures basis based on PSO-ELM model	Yuxue Zhang
14:20 – 14:40	INDIN23-000082	Deep Learning-Based Prediction of Chinese Private Equity Funds	Zihan Jiang
14:40 – 15:00	INDIN23-000085	Multiple Neural Networks for High-Frequency Stock Factor Mining	Wen Jiawei
15:00 – 15:20	INDIN23-000175	Detection of Financial Statement Fraud Based on Deep Learning	Yuhui Zhou

Thursday, 20.07.2023

14:00 – 15:20
Parallel Sessions

TT07	**Industrial Digitalization, Digital Twins in Industrial Applications (Part II)** ***Session Chairs: Wolfgang Kastner, TU Wien (Austria) and Aron Schnakenbeck, HSU Hamburg (Germany)***		**Room 1.277**
14:00 – 14:20	INDIN23-00009	Digital Twins of Business Processes as Enablers for IT / OT Integration	Hannes Waclawek
14:20 – 14:40	INDIN23-00140	An Information Model for Modernizing Brownfield Plants in the Process Industry	Dorothea Pantfoerder
14:40 – 15:00	INDIN23-00182	Standards for Information Models considering Knowledge Distribution in Modular Plants	Amy Koch
15:00 – 15:20	INDIN23-00101	Thermal Digital Twin of a Multi-Domain System for Discovering Mechanical Faulty Behaviors	Francesco Tosoni

SS09	**Edge Computing-Based Pervasive Artificial Intelligence Towards Industry 5.0** ***Session Chairs: Hao Ran Chi, Instituto de Telecomunicações and Universidade de Aveiro (Portugal) and Jimmy Li, Hong Kong Metropolitan University (Hong Kong)***		**Room 1.247**
14:00 – 14:20	INDIN23-000028	Full-Decentralized Federated Learning-Based Edge Computing Peer Offloading Towards Industry 5.0	Hao Ran Chi
14:20 – 14:40	INDIN23-000047	A Review of 5G Building Management Technologies and Applications in Smart Campus	Li Jimmy
14:40 – 15:00	INDIN23-000244	Training Set Design via Discarding the Samples with the Small Estimated Errors	Jiahui Chen
15:00 – 15:20	INDIN23-000251	A Standardized Edge Computing Infrastructure of LoRaWAN Using IEEE 2668	Zhifu Zhang

15:20 – 15:50

15:20 – 15:50	**Coffee Break**	TH OWL–2nd floor

15:50 – 17:10
Parallel Sessions

TT05	**Robotics and Mechatronics in Industrial Applications (Part II)** ***Session Chairs: Raphael Hanselle, TH OWL (Germany) and Fiorella Sibona, Politecnico di Torino (Italy)***		**Room 1.276**
15:50 – 16:10	INDIN23-000073	Preview Control-based Jumping and Spot-Jogging Trajectory Generation for Quadruped Robots	Burak Ozkaynak
16:10 – 16:30	INDIN23-000163	HIL Simulation of the Positioning Control for an Automated Driving Monorail Vehicle	Raphael Hanselle
16:30 – 16:50	INDIN23-000189	Multi-scenario Learning MPC for Automated Driving in Unknown and Changing Environments (ONLINE)	Yu Yue

Thursday, 20.07.2023

15:50 – 17:10
Parallel Sessions

TT07	**Industrial Digitalization, Digital Twins in Industrial Applications (Part II: Digitalization, Big Data and Advanced Analytics for Industrial Process Optimization)** ***Session Chairs: Wolfgang Kastner, TU Wien (Austria) and Aron Schnakenbeck, HSU Hamburg (Germany)***		**Room 1.277**
15:50 – 16:10	INDIN23-00143	A Design Approach and Prototype Implementation for Factory Monitoring Based on Virtual and Augmented Reality at the Edge of Industry 4.0	Christos Anagnostopoulos
16:10 – 16:30	INDIN23-00072	FAIR Sensor Ecosystem: Long-Term (Re-)Usability of FAIR Sensor Data through Contextualization	Matthias Bodenbenner
16:30 – 16:50	INDIN23-00099	Low-Threshold Retrofit Strategy for CNC Machines: A New Process Data Acquisition Approach	Bastian Schulte
16:50 – 17:10	INDIN23-00104	A Novel Blade Crack Detection Method based on Diffusion Model with Acoustic-vibration Fusion	Xun Zhao

SS10	**Engineering of AI-Based Systems in Industrial Automation** ***Session Chairs: Julius Pfrommer, Fraunhofer IOSB (Germany) and Jürgen Beyerer, Fraunhofer IOSB (Germany)***		**Room 1.247**
15:50 – 16:10	INDIN23-000034	Technical Debt Management in Industrial ML - State of Practice and Management Model Proposal	Xiaofei Wang
16:10 – 16:30	INDIN23-000041	Design Requirements for the Concept of an Industrial Surface Defect Detection System for Machined, Metal Drivetrain Workpieces in the Automotive Industry	Marco Wagenstetter
16:30 – 16:50	INDIN23-000116	Reduce the Handicap: Performance Estimation for AI Systems Safety Certification	Julius Pfrommer
16:50 – 17:10	INDIN23-000144	SiD²Re – A Novel Simulation Framework for Drifting Regression Data	Constanze Hasterok

17:10 – 17:30

17:10 – 17:30	**Closing Session**	1.204

18:30 – 21:00

18:30 – 21:00	**Optional: Visit to Brewery Strate**	Detmold