

2022 IEEE 5th International Conference on Industrial Cyber-Physical Systems

Tuesday, 24 May 2022	
09:00-09:20	Room 1 Opening Ceremony
09:20-10:00	Room 1 Keynote talk - Prof. Alan Norbury "Adoption of Digitalisation in Practice" Chairs: Robert Harrison, Bilal Ahmad
10:00-12:10	Room 2 Industry Forum Session I
11:30-13:00	Plenary Tutorial: Monitoring, Fault-Tolerant and Cyber-Resilient Control of Renewable Microgrids
13:30-16:30	Plenary Tutorial: Ensuring Safety and Establishing Trust for AI enabled Cyber-Physical Systems through Explainability
13:30-16:40	Room 2 Industry Forum Session II
Wednesday, 25 May 2022	
09:00-10:00	Plenary Keynote - Prof. Christian Diedrich "Interoperability, semantics and digital twin in industrial cyber physical systems"
10:30-12:00	Room 2 S02 - TT - ICPS Applications - I Chairs: Antonio Luque, Duc Pham Fast Person Detector with Efficient Multi-level Contextual Block for Supporting Assistive Robot <i>Muhamad Dwisnanto Putro</i> Bringing the new class of cable-driven parallel robots to the world of industrial cyber-physical systems based on RAMI 4.0 <i>Jonas Walter, Simon Grau, Tobias Raczok, Sebastian Reitelshöfer, Jörg Franke</i> Simulation-based Design and Locomotion Control Implementation for a Lower Body Exoskeleton <i>Mustafa Derman, Ahmed Fahmy Soliman, Alihan Kuru, Suleyman Can Çevik, Ramazan Unal, Ozkan Bebek, Barkan Ugurlu</i> Development of a Leaf-Sweeping Robot <i>Wei-chen Lee, Wei-hsun Chiang</i> Coarse-to-fine defect detection of heritage 3D models using a CNN learning approach <i>Gerasimos Arvanitis, Stavros Nousias, Aris Lalos, Konstantinos Moustakas</i> A SDN Based Method for Blocking Malicious Attacks on Digital Substations Communication <i>Santiago Sanchez, Salvatore D'Arco</i>
	Room 1

Wednesday, 25 May 2022

S01 - TT - ICPS Theory and Technologies

Chairs: Xianqiang Yang, Bugra Alkan

Anomaly detection based on time series data from industrial automatic sewing machines *Daniel Vranjes, Oliver Niggemann*

Adaptive N-Step Technique for Real-Time Anomaly Detection in Smart Manufacturing *Dattaprasad Shetve, Raju Imandi, Raja Vara Prasad, Ramona Trestian, Huan Nguyen, Hrishikesh Venkataraman*

Quality-aware scheduling of on-board and off-board data analysis in vehicle development *Lena Oden*

Global Resource Management in the ELASTIC Architecture *Rita Sousa, Luis Nogueira, Fátima Rodrigues, Luis Miguel Pinho*

Radio Resource Efficient UWB Measurement System Design and Performance Analysis for TWR-based Ranging *Gergely Hollosi, Csaba Lukovszki, Máté Bancsics*

Event-triggering in Distributed MPC of Decoupled Nonlinear Systems against DoS Attacks *Jicheng Chen, Zhifeng Sun, Hui Zhang*

13:00-14:30

Room 2

S04 - SS - Diagnosis and Automated Repair

Chairs: Maria Krantz, Lukas Moddemann

Off-Line Analysis of Dynamic Causal Dependencies in Evolving Industrial Alarm Floods *Gianluca Manca, Alexander Fay*

ServiceNavigator - A Bayesian Assistance System for Diagnosing Industrial Production Systems *Alexander Diedrich, Patrick Deutschmann, Caroline Junker*

Anomaly Detection with Autoencoders as a Tool for Detecting Sensor Malfunctions *Artur Liebert, Oliver Niggemann*

Integration of Pre-machining Geometries for Repair Application by Cold Spray *Marcel Lewke, Hongjian Wu, Alexander List, Frank Gärtner, Thomas Klassen, Alexander Fay*

Mobile Refurbishment by Robot-Based Additive Manufacturing *Julian Ulrich Weber, Malte Buhr, Bohdan Vykhtar, André Fischer, Karl Gritz, Peter Schlüter*

A Two-stage H.264 based Video Compression Method for Automotive Cameras *Yiting Wang, Pak Hung Chan, Valentina Donzella*

Room 1

S03 - TT - ICPS Modeling and Optimization

Chairs: Mingxi Liu, Shen Chao

A Model Annotation Approach for the Support of Software Energy Properties Management using AMALTHEA *Ricardo Gomes, Tiago Carvalho, António Barros, Luis Miguel Pinho*

A Computational Framework for Generalized Constrained Inverse Problems *Dimitar Ninevski, Paul O'Leary*

Predicting Muscle Excitations of the Hand from Kinematic Data *Callum Thornton, Michael Chappell, Neil Evans, Joseph Hardwicke*

Observer-Based Robust Adaptive Control of Uncertain Robot Manipulator *Abdul Rehan Khan Mohammed, JIAYI ZHANG, Bilal Ahmad*

Predictive Maintenance in electrical machines: An edge computing approach *Javier de las Morenas, Francisco Moya-Fernández*

Diagnosis Electromechanical System by Means CNN and SAE: An Interpretable-Learning Study *Francisco Arellano-Espitia, Miguel Delgado-Prieto, Víctor Martínez-Viol, Roque-Alfredo Osornio-Rios, Juan-Jose*

Wednesday, 25 May 2022

Saucedo-Dorantes

15:00-16:30

Room 2

S06 - TT - ICPS Applications - II

Chairs: Antonio Luque, Tiberiu Seceleanu

NMPC Design for AUV Dynamic Positioning Control with Incremental Input Constraints *Chao Shen, Yang Shi*

Vision-based Ergonomic and Fatigue Analyses for Advanced Manufacturing *Manuela Kunz, Chang Shu, Michel Picard, Daniel Vera, Peter Hopkinson, Pengcheng Xi*

A Diagnosis Method of Inverter Anomalies under DoS Attack Based on Interval Sliding Mode Observer *Jin Li, Youmin Zhang*

Generating Causal Hypotheses for Explaining Black-Box Industrial Processes *Kaja Balzereit, Alexander Diedrich, Daniel Kubus, Jonas Ginster, Andreas Bunte*

A Research Agenda for AI Planning in the Field of Flexible Production Systems *Aljosha Koecher, René Heesch, Niklas Widulle, Anna Nordhausen, Julian Putzke, Alexander Windmann, Oliver Niggemann*

Analysis of interventions to optimize a pumping process in food production *Michael Colombo, Philipp Jell, Philipp Theumer, Albert Heim*

Room 1

S05 - TT - ICPS Education and Social Aspects

Chairs: Aniko Costa, Claudia-Melania Chituc

Towards a Process Model to Enable Domain Experts to Become Citizen Data Scientists for Industrial Applications *Silke Merkelbach, Sebastian von Enzberg, Arno Kühn, Roman Dumitrescu*

Hands-on Learning Modules for Upskilling in Industry 4.0

Technologies *Alexandre de Oliveira Júnior, Heitor Assumpção, Jonas Queiroz, Luis Piardi, Javier Parra, Paulo Leitao*

A Data-driven Multi-fidelity Physics-informed Learning Framework for Smart Manufacturing: A Composites Processing Case Study *Milad Ramezankhani, Amir Nazemi, Apurva Narayan, Heinz Voggenreiter, Mehrtash Harandi, Rudolf Seethaler, Abbas S. Milani*

CyPhyTest: Cyber Physical Interaction Aware Test Case Generation to Identify Operational Changes *Ayan Banerjee, Aranyak Maity, Imane Lamrani, Sandeep Gupta*

The emergence of ethics engineering in Industrial Cyber-Physical Systems *Paulo Leitao, Stamatis Karnouskos*

Sarsa-based Model Predictive Control with Improved Performance and Computational Complexity *Tianxiang Lu, Kunwu Zhang, Yang Shi*

Thursday, 26 May 2022

09:30-11:00

Room 2

S08 - TT - ICPS Engineering - I

Chairs: Stamatis Karnouskos, Kim Fung Tsang

Context Aware Site-visit Scheduling for Asset Management in Oil & Gas Sector *Ravi Shankar, Sasirekha GVK, Chandrashekhar Ramanathan, Jyotsna Bapat*

From intentions to services in modular process plants *Artan Markaj, Katharina Stark, Nicolai Schoch, Mario Hoernicke, Alexander Fay*

On automatic generation of OPC UA connections in IEC 61499

Thursday, 26 May 2022

	<p>automation systems <i>Tuojian Lyu, Udayanto Atmojo, Valeriy Vyatkin</i> OPC UA Service Discovery and Binding in a Service-Oriented Architecture <i>Aparajita Tripathy, Jan van Deventer, Cristina Paniagua, Jerker Delsing</i> Seamlessly Interfacing Automation Systems with Simulation Models <i>Andrej Kurtovic, Gernot Steindl, Wolfgang Kastner</i> Automation Software Architecture in CPPS – Definition, Challenges and Research Potentials <i>Birgit Vogel-Heuser, Eva-Maria Neumann, Juliane Fischer, Marga Marcos, Elisabet Estévez Estévez, Giacomo Barbieri, Lisa Sonnleithner, Rick Rabiser</i></p>
	<p>Room 1</p> <p>S07 - SS- Sensing and perception for unmanned, automated and intelligent vehicles Chairs: Valentina Donzella, Martina Sciola</p> <p>Status-preserving, Seamless Relocation of Processes in Orchestrated Networks such as Organic 6G <i>Dennis Krummacker, Hans Dieter Schotten</i> AutoSCOOP: Automated Road-Side Sensor Coverage Optimization for Robotic Vehicles on Proving Grounds <i>David Hermann, Alois Knoll, Clara Marina Martinez, Gereon Hinz, Frank Sayer</i> Machine Learning for Soft Robot Sensing and Control: A Tutorial Study <i>Huijiang Wang, Thomas George Thuruthel, Kieran Gilday, Arsen Abdulali, Fumiya Iida</i> Robust Lateral and Longitudinal Tire Force Estimation Based on Robust PMI Observer for Intelligent Vehicle <i>Xiaochen Dong, Siyou Tao, Hui Zhang</i> A Comparative Study of Vision-based Road Surface Classification Methods for Dataset From Different Cities <i>huan liang, Hui Zhang, Zhifeng Sun</i> KerubLess - Design of a Driverless Formula SAE Vehicle <i>Gabriele Baris, Michael Mugnai, Rambod Rahmani, Carlo Alberto Avizzano, Marco Gabiccini</i></p>
11:30-12:30	<p>Plenary</p> <p>Keynote - John Whitbread "Looking forward with lessons from the past"</p>
13:00-14:30	<p>Room 2</p> <p>S10 - TT - ICPS Architectures Chairs: Jan Haase, Maz Ahmad</p> <p>Use Case Driven Digital Twin Generation <i>Denis Göllner, Tobias Klausmann, Rik Rasor, Roman Dumitrescu</i> Real-time Dynamic Reconfiguration for IEC 61499 <i>Laurin Prenzel, Simon Hofmann, Sebastian Steinhorst</i> Implementing a PLC-Service bus with IEC 61499 <i>Virendra Ashiwal, Antonio Manuel Gutierrez, Alois Zoitl</i> Wire Grasping by Using Proximity and Tactile Sensors <i>Gianluca Laudante, Salvatore Pirozzi, Andrea Cirillo</i> An approach for the bimanual manipulation of a deformable linear object using a dual-arm industrial robot: cable routing use case <i>Pablo Malvido Fresnillo, Saigopal Vasudevan, Wael Mohammed</i> Cable Detection and Manipulation for DLO-in-Hole Assembly Tasks <i>Kevin Galassi, Alessio Caporali, Gianluca Palli</i></p>

Thursday, 26 May 2022

Room 1

S09 - SS- IoT Automation tools and toolchains - I

Chairs: Federico Montori, Pál Varga

Distributed Decision Making Enabled by the Arrowhead

Framework *Carlos Bocanegra Gallardo, Patrick Moder, Hans Ehm*

Improving wafer map classification in Industry 4.0 *Michael Scheiber,*

Clement Nartey, Anja Zernig, Andre Kaestner

An IoT Solution for Condition Monitoring of a Lithography Coater Tool

in a Semiconductor Fab *Yvonne Bergmann, Michael Leippert, Juergen*

Kuehnle, Johannes Kristan, Sven Erik Jeroschewski, Lukas Roemer, Paul

Knaus, Axel Wogawa

Towards CBDC-supported Smart Contracts for Industrial

Stakeholders *Attila Frankó, Bence Oláh, Zoltán Sass, Csaba Heged*

OPál

ThreatGet: Ensuring the Implementation of Defense-in-Depth Strategy

for IIoT based on IEC 62443 *Christoph Schmittner, Abdelkader Shaaban,*

Georg Macher

Building Experimental Laboratory for Digital Twin in Service Oriented

Architecture *Hoa Nguyen, Øystein Haugen*

15:00-16:30

Room 2

S12 - TT - ICPS Engineering - II

Chairs: Daniel Vera, Valeriy Vyatkin

Towards Configurable Conformance Checks of PLC Software with

Company-specific Guidelines *Juliane Fischer, Birgit Vogel-Heuser, Fabian*

Haben, Luca Beuggert, Eva-Maria Neumann

Inferring Mechanical Fault Models from the Electrical Domain *Nicola*

Dall'Ora, Francesco Tosoni, Enrico Fraccaroli, Franco Fummi

Symbolic Encoding of Reliability for the Design of Redundant

Architectures *Antonio Tierno, Giuliano Turri, Alessandro Cimatti, Roberto*

Passerone

Contextual Bandit Guided Data Farming for Deep Neural Networks in

Manufacturing Industrial Internet *Yingyan Zeng, Parshin Shojaee, Syed*

Hasib Akhter Faruqui, Adel Alaeddini, Ran Jin

Model-Based Engineering of CPPS Functions and Code Generation for

Skills *Aljoshia Koecher, Alexander Hayward, Alexander Fay*

SysMD: Towards "Inclusive" Systems Engineering *Sandor Dalecke,*

Christoph Grimm, Johannes Koch, Axel Ratzke, Khushnood Adil Rafique

Room 1

S11 - SS - IoT Automation tools and toolchains - II

Chairs: Pál Varga, Federico Montori

Discovering traces between textual requirements and logical models

in the functional design of Printed Circuit Boards *Eduardo Cibrián,*

JOSE MARÍA ALVAREZ, Roy Mendieta, Juan Llorens

Interoperability Between ROS and OPC UA: A Local Cloud-Based

Approach *Aparajita Tripathy, Jan van Deventer, Cristina Paniagua, Jerker*

Delsing

Cloud-based Collaborative Learning (CCL) for the Automated

Condition Monitoring of Wind Farms *saleha Javed, Salman Javed, Jan*

van Deventer, Fredrik Sandin, Jerker Delsing, Marcus Liwicki, Sergio Martin

Del Campo Barraza

Joint Power Control and Structural Health Monitoring in Industry 4.0

Scenarios using Eclipse Arrowhead and Web of Things *Carlo Puliafito,*

Thursday, 26 May 2022

	<p><i>Lorenzo Gigli, Ivan Zyrianoff, Federico Montori, Antonio Viridis, Stefano Di Pascoli, Enzo Mingozzi, Marco Di Felice</i></p> <p>Management platform for data translators supported by semantic annotations <i>Gonçalo Adelino, Rogerio Campos-Rebelo, Filipe Moutinho, Pedro Maló</i></p> <p>Trust Model Experimental Validation to Improve the Digital Twin Recommendation System <i>Flávia Pires, Bilal Ahmad, Antonio Paulo Moreira, Paulo Leitao</i></p>
17:00-18:00	<p>Plenary</p> <p>Closing Ceremony</p>