



Digital Twin International Conference

DigiTwin 2025

October 14-18 · 2025

Garmisch-Partenkirchen · Germany

Proceedings

Edited by Fei Tao and Stefan Pickl

Welcome Address

„When the wind of change blows, some people build walls, others build windmills.“

Chinese Wisdom

From China via Italy to Garmisch ...

The DigiTwin conferences started in China.

Via Italy in 2024 it reaches now the Bavarian mountains close to the Partnach Klamm.

This symbolizes the variety and special spirit of the DigiTwin Conference series where simulation-based optimization in realtime is the umbrella of prescriptive analytics and data-driven optimization.

We see a digital twin as a virtual representation of a real-world object or system used to digitally analyze performance, identify anomalies, and design optimal solutions.

From mountain to sea and many different lands
we welcome You to DigiTwin2025.

Fei Tao & Stefan Pickl



Stefan Pickl



Fei Tao

*„I cannot understand why people are frightened of new ideas.
I'm frightened of the old ones.“*

John Cage

Session List

Onsite Sessions

Abbrs.	Topic	Venue	Date
GP	DigiTwin2025 Main Venue	Garmisch-Partenkirchen, Germany	Oct 15-18
BJ	DigiTwin2025 Sub-Venue	Beijing, China	Oct 16

Online Sessions

Abbrs.	Topic	München Time	Beijing Time	New York Time	Meeting ID	Date
D	Digital Twin Design	10:30-13:00	16:30-19:00	04:30-07:00	Zoom ID: 429-822-0869	Oct 15
SM	Digital Twin Smart Manufacturing	08:00-11:00	14:00-17:00	02:00-05:00	Teams ID:382-563-194-253 Password: pN6Pu24k	Oct 15
C	Digital Twin Construction & City	14:30-18:30	20:30-00:30	08:30-12:30+1	Zoom ID: 605-394-2399 Password: 000666	Oct 15-17
OE I	Digital Twin Ocean Engineering I	13:00-14:45	19:00-20:45	07:00-08:45	Tencent ID: 679-899-434 Password: 000668	Oct 16
OE II	Digital Twin Ocean Engineering II	10:30-13:00	16:30-19:00	04:30-07:00	Tencent ID: 653-274-574	Oct 17
R	Digital Twin Reliability	11:30-15:00	17:30-21:00	05:30-09:00	Tencent ID: 821-245-802	Oct 16
N	Digital Twin Networks	13:00-15:30	19:00-21:30	07:00-09:30	Tencent ID: 373-271-294	Oct 16
IF	Digital twin Interdisciplinary Frontier	09:00-11:40	15:00-17:40	03:00-05:40	Tencent ID:104-951-760	Oct 16
L	Digital Twin Logistics	14:00-16:30	20:40-22:30	08:40-10:30	Tencent ID: 538-963-057	Oct 16
ETV	Digital Experiment, Testing & Validation	09:00-10:40	15:00-16:40	03:00-04:40	Tencent ID: 866-689-019 Passcode: 2025	Oct 16
SD	Digital Twin Standards	08:00-11:00	14:00-17:00	02:00-05:00	Tencent ID: 480-499-199	Oct 16
PI	Digital Twin for Process Industry	13:00-15:00	19:00-21:00	07:00-09:00	Tencent ID: 876-945-116	Oct 15
AE	Digital Twin AeroEngine	08:00-11:30	14:00-17:30	02:00-05:30	Tencent ID:140-107-819	Oct 16
HR	Digital Twin Healthcare and Robotics	14:00-16:30	20:00-22:30	08:00-10:30	Zoom ID:870-5896-2023	Oct 15
MT	Digital Twin Machine Tool	10:40-12:20	16:40-18:20	04:40-06:20	Tencent ID: 885-996-132	Oct 16
IS	Digital Twin Industrial Software	09:30-13:30	15:30-19:30	03:30-07:30	Zoom ID: 833-4427-0765 Password: 251017	Oct 17
ED	Engineering Digital Twin	TBC	TBC	TBC	TBC	Oct 17

Program

Main Venue (GP)

Wednesday October 15th 2025

Day 1

08:30-14:00	Excursion „BMW Welt“		
08:30-14:00	Room „München“		
14:00-14:30	Opening Ceremony Welcome Address from DigiTwin2025 General Chair - <i>Stefan Pickl</i> Digital Twin International Advisory Committee (DTIAC) Address - <i>Nabil Anwer</i> Introduction to the Digital Twin (Int. Journal) - <i>Taylor & Francis</i> Introduction to the Digital Engineering (Int. Journal) - <i>Monaz Mehta, Elsiver</i> Welcome Address from DigiTwin2025 General Chair - <i>Fei Tao</i>		
14:30-15:15	Keynote: Fei Tao Keynote: Bernhard Hämmerli		
15:20-16:00	Honorary Lecture Dieter Budde		
16:00-16:30	Coffee Break		
	Room „München“	Room „Garmisch“	Room „Starnberg“
16:30-17:00	Transfer Learning for Predictive Maintenance in Milling: An Investigation into Domain Adaptation Challenges <i>Patrick Ruedinger-Flore</i>	PINN-based Adaptive Toolpath Planning for Freeform Parts in Multi-Axis Machining <i>Dong He</i>	Optimal Sensor Placement for Predicting the Load-Carrying Capacity of Composite Laminates with Delamination <i>Bo Gao</i>
17:00-17:30	Digital Twin-Enabled Two-Stage Scheduling of Workforce and Cycle Time in Aircraft Assembly <i>Jun Xu</i>	Multi-Layered Knowledge Graphs as Enabler for Simultaneous Engineering: An Application for Suspension Systems in the Automotive Industry <i>Julian Gebhard</i>	Digital Twin Method for High-Accuracy Structural Strength Assessment <i>Kuo Tian / Ziyu Xu</i>
17:30-18:00	From Simulation to Interaction: Enhancing Digital Twins of Production Systems with LLM Agents <i>Merlin Korth</i>	Study on a gradient algorithm-based method for alignment of ship blocks and virtual blocks in augmented reality <i>Youngsu Kim, Kyungho Lee, Youngsoo Han, Youngwook Nam, Hyunsoo Kim</i>	Development of an Experimental Validation System for Digital Twins of Thermal Protection Structures under Service-Relevant Conditions <i>Boyi Wang</i>
18:00-18:30	Metatwin: Emergent Architectures for Convergent Cyber-Physical Intelligence <i>Jinsong Bao</i>	A Hybrid Digital Twin–Simulation Framework for Real-Time Resilience in Distributed Manufacturing Networks <i>Ramona Dogea</i>	Digital Twin for Full-field Deformation Monitoring Under Dynamic Load <i>Tianhe Gao</i>
18:30-19:00	Engineering of Industrial Digital Twin, JN1 methodological framework and open-source platform <i>Stephen Creff</i>	A Study on MWD Data Mapping for XR-Based Ship Maintenance Training Content <i>Youngwook Nam, Kyungho Lee, Youngsoo Han, Youngsu Kim</i>	Research and Prospect on Key Technologies of highly robust intelligent human machine cooperation system <i>Wenqiang Zhang</i>
19:30	Dinner Dinner Speech Bernhard Hämmerli		

Thursday October 16th 2025

Day 2

	Room „München“		
08:30-09:30	Keynote: Thomas Lukasiewicz		
	Room „München“	Room „Garmisch“	Room „Starnberg“
09:30-10:00	LLM Agents for operations and digital twins in manufacturing <i>Marvin May</i>	Dynamic Decision-Making and Cooperative Optimization for Multi-Station Shipbuilding Systems Driven by Digital Models <i>Jinfeng Liu</i>	In-situ mechanical property identification and delamination growth prediction of laminates based on a digital twin-enabled framework <i>Tongxiang Deng</i>
10:00-10:30	Trusted Data Space for Digitalized Logistics and Supply Chain <i>Dianjun Fang</i>	Explainable Reinforcement Learning for Robotic Digital Twins <i>Rudy Milani</i>	Flight parameter-load-life digital twin modeling approach <i>Lei Huang</i>
10:30-11:00	Digital Twins for Critical Infrastructure Analysis <i>Maximilian Moll</i>	Microservice-based digital twin system towards smart manufacturing <i>Hanbo Yang</i>	Research on Temperature Prediction for Thermal Protection Systems Based on Dynamic Data-Driven Approaches <i>Ke Li</i>
11:00-11:15	Coffee Break		
11:15-11:45	Modular based flexible digital twin for distribution center <i>Ning Zhao</i>	A Conceptual Framework for Uncertainty Management in Industrial Digital Twins to Enhance Reliability, Robustness and Resilience <i>Bouthayna El BouzaidiTiali</i>	Digital Twin in Action: Case Studies of Operational Platforms for Packaging and Printing Firms <i>Xiaorong Huang</i>
11:45-12:15	Comparison of Metaheuristic Algorithms for Solving Facility Layout Optimization Problems <i>Dirk Rechkemmer</i>	Digital twin-enabled fault diagnosis for advanced quality control in semiconductor manufacturing <i>Wenhan Fu</i>	makeTwin: A reference architecture for digital twin software platform <i>Danning Sun</i>
12:15-12:45	JNI Program: Towards Digital Twins for the Industry of the Future <i>Achraf Kallel</i>	From Infrastructure to Insight: Digital Twins as Strategic Management Support Ecosystems in Higher Education <i>Ané Wheeler</i>	Success criteria for value-oriented digital twin development and implementation: insights from an industry case study <i>Christian Kober</i>
12:45-14:00	Lunch		
	Room „München“		
14:00-15:30	Keynote: NabilAnwer Keynote: Gülsüm Üsümez		
15:30-18:30	Group Photo Excursion		
18:30	Meeting at „Klammhaus“		
19:00	Dinner Dinner Speech Robert de Souza		

Friday October 17th 2025

Day 3

	Room „München“		
08:30-09:30	Keynote: Andrea Matta		
	Room „München“	Room „Garmisch“	Room „Starnberg“
09:30-10:00	Digital twin shop-floor and its cyber-physical fusion <i>Qinglin Qi</i>	Efficient Heuristic Generation of Representative Mission Profiles from Field Data <i>Xiao Ma</i>	Digital Twin Based Human-Machine Collaboration <i>Tianyi Sun</i>
10:00-10:30	Generative Digital Twin Network: AI-Built Relationships between Digital Twins for Automated Driving <i>Ritu Ahmed</i>	Digital twin-enabled urban construction and demolition waste trading <i>Shuaiming Su</i>	A quantum annealing approach to energy-efficient scheduling in flexible job shop manufacturing systems coupled with renewable energy generation system <i>Xiangqian Wu</i>
10:30-11:00	Digital Twin based contour error prediction and compensation for machine tool and robotics <i>Shuai Ji</i>	A Study on Constructing Indoor Digital Twins by Merging Multiple Local Point Clouds Captured with LiDAR-Equipped Mobile Devices <i>Ryō Komiya</i>	On-line monitoring and process optimization for aircraft wing-fuselage docking based on traceable digital twin model <i>Guanyu Sun</i>
11:00-11:15	Coffee Break		
11:15-11:45	Physics-Informed Generative Adversarial Networks for Thermal Simulation and Anomaly Detection in Laser-Based Powder Bed Fusion <i>Shradha Gansiyal</i>	Digital Twin-Enabled Spatial-Temporal Coordination Framework for Supply-Transport-Assembly Synchronization in Modular Integrated Construction <i>Yi Li</i>	The V-shaped digital twin modeling paradigm for aircraft assembly systems <i>Ruihao Kang</i>
11:45-12:15	Digital Twin-Based Intelligent Operation and Maintenance for Green Manufacturing <i>Yuchen Liang</i>	A Fundamental Study on Detecting Changes in Road Features Using MMS and LiDAR Point Clouds Acquired at Different Times <i>Jin Yamamoto</i>	Digital twin-driven design and application paradigm for assembly accuracy performance prototype <i>Feng Lv</i>
12:15-12:45	Next-Generation Failure Analysis: Integrating NLP into Semiconductor Digital Twin Ecosystems <i>Zhiqiang Wang</i>	Evaluating the Effectiveness of Pattern Projection in SfM-MVS for Measuring the Wear on Train Pantographs <i>Kota Shoji</i>	Motor Fault Digital Twin Modeling and Data Generation <i>Shangyu Li, Laifa Tao</i>
12:45-13:15	Towards Human-centric Smart Manufacturing <i>Baicun Wang</i>	Towards digital twin based process planning of crankshaft machining through multiple Objective Optimization <i>Wei Wang</i>	Application and development of digital twinning in oil and gas exploitation and production: a focus on China and global perspectives <i>Shuangshuang Ren</i>
13:15-14:00	Lunch		

Friday October 17th 2025

Day 3

	Room „München“		
14:00-15:00	Keynote: Christopher Gibbins		
	Room „München“	Room „Garmisch“	Room „Starnberg“
15:00-15:30	Digital Twins in CNC manufacturing <i>Daniel Krueger</i>	Digital Twin Framework to Enhance Risk-Based Inspection in Lithium-Brine Pipelines for Sustainable Energy Systems <i>Christian Barahona</i>	Analysis and Control of Manufacturing Service Collaboration Networks Failure under Intentional Attacks <i>Cong Cheng, Feng Xiang</i>
15:30-16:00	Full Spatiotemporal Evolution Digital Twin Early Warning and Disaster Control Optimization for Coal Mine Dynamic Disasters <i>Yuanyuan Pu</i>	Technical Integration of Digital Twins into Dataspace-enabled Marketplaces: Leveraging AAS, Ontologies, and Eclipse DataspaceComponents <i>Martin Rudolph</i>	A Multi-objective Optimization Decision-making Method for Information Reorganization Schemes of End-of-Life Mechanical Products <i>Aojie Xi, Lei Wang</i>
16:00-16:30	Coffee Break		
16:30-17:00	Approach to Digital Twin Design for a Thermal Hydraulic System <i>Osimone Imhogiemhe</i>	A Semantic-driven Marketplace for Digital Twins in Energy Data Ecosystems: Architecture, Implementation, Lessons Learned, and Practical Insights <i>Anna-Lena Peh</i>	Industrial small-target Defect Detection Based on Dual-Domain GAN Data Augmentation <i>Changxin Zheng</i>
17:00-17:30	Digital Twins and Sustainability: A Systematic Review of Literature from 2015 to 2025 on Research Gaps, and Future Directions <i>Atefeh Aali</i>	The Case of improving operational efficiency through the Digital Twin to Energy industry <i>Myung-kyu Kim</i>	A Full-Information Fusion Method for Remanufacturing of Used Mechanical Parts <i>Shiming Zhang</i>
17:30-18:00	Bidirectional graphics-based digital twin (BiGBDT): concept and implementation in post-earthquake structural assessment <i>Guanghao Zhai</i>	Large Language Model Agents Meet Manufacturing: Towards Cognitive and Actionable Digital Twins <i>Dachuan Shi</i>	A Study on Splash Suppression in Laser-Dispersed Molten Pools: An Analytical Method Based on Dynamic Thermal Flow Characteristics <i>Binglei Xu, Zelin Zhang</i>
	Room „München“		
18:00-19:00	Award Session & Closing Ceremony Introduction of award selection process for DigiTwin 2025 - <i>Xiaojun Liu / Li Yi</i> Announcement of award recipients - <i>Nabil Anwer</i> Introduction of DigiTwin 2026 (UK) - <i>Zehua Cheng</i> Introduction of EU COST CA23157 MultiViewLCSA - <i>Wei Wang</i> Acknowledgement - <i>Stefan Pickl</i>		
19:30	Dinner Dinner Speech Christian Despres		

Saturday October 18th 2025		Day 4
08:30-14:00	Excursion	
	Closed Meetings (By Invitation Only)	
14:00-15:00	DigiTwin 2026 Planning Committee	
15:00-16:00	IDEA Association Constituent Meeting	

Sub Venue (BJ)

Chaired by Qinglin QI - Beihang University
 Weiran Liu - Beihang University
 He Zhang - Beihang University

Thursday October 16th 2025

Beijing Time	Agenda
09:00-11:30	Digital twin-based satellite mass assembly: theory, technologies and system <i>Weiran Liu</i>
	Why do we need standards for digital twins? <i>Xin Ma</i>
	Fault Diagnosis and Prediction of Rotating Machinery Driven by Data-Model Fusion <i>Yonghuai Zhu</i>
	Artificial Intelligence-Enhanced Digital Twin Systems Engineering Towards the Industrial Metaverse in the Era of Industry 5.0 <i>He Zhang</i>
	A digital twin shop-floor construction method towards seamless and resilient control <i>Chenyuan Zhang</i>
	Deep Reinforcement Learning Based Clock Synchronization Method for Digital-physical Networks under Complex Dynamic Testing Circumstances <i>Yanlong Wang</i>
	Deep learning enhanced multi-dimensional digital-physical fusion modeling method for aerospace equipment testing <i>Pengfei Gao</i>
11:30-14:00	Lunch
14:00-16:30	Cyber-Physical Factor Fusion for Assembly Error Modeling and Testing of Solenoid Pilot Valves <i>Jiankang Zhang</i>
	A Data-Driven Fusion Method for Service Performance Analysis in Digital Twin Machine Tools <i>Yilin Li</i>
	A Knowledge Graph-based Operational Data Representation Method of 3C Digital Twin Shop-floor <i>Yuanzhe Zhu</i>
	Prediction method of surface roughness for milling aviation surface parts based on graph neural network <i>Yida An</i>
	Process industrial production quality prediction between different types of products based on transfer learning <i>Tianyi Gao</i>
	Digital-Twin-Enhanced Immersive Teleoperation Platform for Embodied Intelligent Robots Based on Haptic and Multimodal Perceptual Interaction <i>Yifan Wei</i>
	Configurable Modeling and Simulation Methods and Systems for Production Logistics Digital Twins <i>Mingyang Gao</i>

Online Sessions

Digital Twin Design (D)

Chaired by Ang Liu -University of New South Wales

Wednesday, October 15th 2025

Zoom Meeting ID:429 822 0869



München Time	Beijing Time	New York Time	Agenda
10:30-11:00	16:30-17:00	04:30-05:00	Industrial Metaverse challenges, opportunities, and the impact on sustainability <i>Dimitris Mourtzis</i>
11:00-11:30	17:00-17:30	05:00-05:30	Digital Twin for Human-in-the-loop systems <i>Ziting Wang</i>
11:30-12:00	17:30-18:00	05:30-06:00	Customization and personalization of large language models for engineering design <i>Zhoumingju Jiang</i>
12:00-12:30	18:00-18:30	06:00-06:30	Digital Twin for early-stage fault detection in a Hybrid Manufacturing Cell <i>Dimitris Tsakalos</i>
12:30-13:00	18:30-19:00	06:30-07:00	Human-centric Digital Twin for Human-in-the-Loop Collaborative Manufacturing Systems <i>Xing Wang</i>

Digital Twin Smart Manufacturing (SM)

Chaired by Tianliang Hu - Shandong University
 Giovanni Lugaresi - KU Leuven
 Songhua Ma - Shandong University

Wednesday, October 15th 2025			
Teams Meeting: 382 563 194 253		Passcode: pN6Pu24k	▶
Tencent Meeting ID: 855-320-91		Passcode: 2025	▶
München Time	Beijing Time	New York Time	Agenda
08:00-08:20	14:00-14:20	02:00-02:20	Digital Twin Technology and Applications for Optimizing Machining Processes <i>Caixu YUE</i>
08:20-08:40	14:20-14:40	02:20-02:40	Modeling and Intelligent Optimization of Manufacturing Processes Driven by Industrial Foundation Models and Digital Twins <i>Haisong HUANG</i>
08:40-09:00	14:40-15:00	02:40-03:00	Digital Twin for Manufacturing Execution Management and Control of Discrete Manufacturing Systems <i>Yu ZHENG</i>
09:00-09:20	15:00-15:20	03:00-03:20	Online inference of residual stress field in large-scale components based on deformation force monitoring data <i>Changqing LIU</i>
09:20-09:40	15:20-15:40	03:20-03:40	Shape-performance multi-feature sensing technology for the assembly process supports aero-engine digital twin <i>Xiaokai MU</i>
09:40-10:00	15:40-16:00	03:40-04:00	Digital Twin-Enabled Coupled Error Modeling and Predictive Analysis for Assembly Processes <i>Huaqiu DING</i>
10:00-10:20	16:00-16:20	04:00-04:20	Graph-model Based Online Calibration of Production System Digital Twins <i>Bohan Leng</i>
10:20-10:40	16:20-16:40	04:20-04:40	Optimizing Digital Twin parameters to reduce virtual-physical system response errors during condition monitoring solutions development <i>Himanshu Gupta</i>

Digital Twin Construction & City (C)

Chaired by Ray Y. ZHONG - University of Hong Kong
 Qiancheng Wang - City University of Hong Kong
 Yishuo Jiang - Cornell University
 Xuan Liu - Eindhoven University of Technology
 Jürgen Hackl - Princeton University,

Wednesday, October 15th 2025			Day 1
Zoom Meeting ID: 605 394 2399 Password: 000666			
München Time	Beijing Time	New York Time	Agenda
14:30-15:00	20:30-21:00	08:30-09:00	Building the Post-disaster Digital Twin: Large-scale Damage Detection with AI and Remote Sensing Chang Liu
15:00-15:30	21:00-21:30	09:00-09:30	AI-enhanced risk forecasting for power transmission systems You Wu
15:30-16:00	21:30-22:00	09:30-10:00	AI-Driven Digital Twinning Buildings with Window View Semantics for Housing, Planning and Urban Health Maosu Li
16:00-16:30	22:00-22:30	10:00-10:30	Using Digital Twin for Inventory Management of Hydrogen Refueling Stations Alexis Pengfei Zhao
16:30-17:00	22:30-23:00	10:30-11:00	Leveraging Digital Twins and Semantic Technologies to Support Circular Decision-Making in the Life Phase of Buildings Arghavan Akbarieh
17:00-17:30	23:00-23:30	11:00-11:30	Real-World Data-Driven Insights into Cold Climate Impacts on Battery Electric Transit Buses Jintao Gu
17:30-18:00	23:30-00:00	11:30-12:00	Using Air Drone to Stop Wildfire: A Predict-then-optimize Approach Shijie Pan

Digital Twin Construction & City (C)

Thursday, October 16th 2025			Day 2
Zoom Meeting ID: 605 394 2399 Password: 000666			
München Time	Beijing Time	New York Time	Agenda
14:30-15:00	20:30-21:00	08:30-09:00	Uncovering the activity-based gender segregation and its association with crime <i>Xuan Luo</i>
15:00-15:30	21:00-21:30	09:00-09:30	Multi-Stage Collaborative Optimization: A Key to Minimizing Relocation Rate in Smart Container Terminals <i>Peixiang Wang</i>
15:30-16:00	21:30-22:00	09:30-10:00	Digital Twin Representation of Foliage Through Computer Vision, Aerial Image Analysis and Machine Learning Techniques to Enhance the Network Planning and Deployment <i>Hashim Shaik</i>
16:00-16:30	22:00-22:30	10:00-10:30	The Feasibility of iOS-based Automated Construction Progress Monitoring and the Adoption Perceptions of the Technology <i>Yanquan Zhang</i>
16:30-17:00	22:30-23:00	10:30-11:00	Towards Next-Generation Urban Mobility Modeling with Human-Centered Big Data Mining <i>Songhua Hu</i>
17:00-17:30	23:00-23:30	11:00-11:30	How new working pattern reshapes space-time behavior: An ontological framework for assessing activity pattern shifts and spatial consequences in UK <i>Kexin Zhang</i>
17:30-18:00	23:30-00:00	11:30-12:00	Towards Self-Sufficient and Self-Aware Infrastructure Systems: Model Interoperability and Model Selection in Digital Twin Framework <i>Zhichen Wang</i>
18:00-18:30	00:00-00:30	12:00-12:30	A mini-review of human-centered ontology in city digital twins: From individual behavior to social dynamics <i>Zhaorong Feng</i>

Friday, October 17th 2025			Day 3
Zoom Meeting ID: 605 394 2399 Password: 000666			
München Time	Beijing Time	New York Time	Agenda
14:30-15:00	20:30-21:00	08:30-09:00	Intelligent design of shear wall layout based on diffusion models <i>Yi Gu</i>
15:00-15:30	21:00-21:30	09:00-09:30	Scalable Health Sensing for Construction Digital Twins: A Data-Driven Framework Based on Fixed PM Monitoring and Activity Context <i>Xingyue Fang</i>
15:30-16:00	21:30-22:00	09:30-10:00	Data-driven digital twins for enhancing regional disaster resilience under climate change <i>Xin Li</i>
16:00-16:30	22:00-22:30	10:00-10:30	Digital Twins for Intelligent Intersections: Merging Real-World Data, Probabilistic Modeling, and Monte Carlo Simulations to Improve Safety <i>Alben Bagabaldo</i>
16:30-17:00	22:30-23:00	10:30-11:00	Intelligent Planning with Deep Reinforcement Learning and Urban Simulation <i>Yu Zheng</i>
17:00-17:30	23:00-23:30	11:00-11:30	Smart Digital Twin System for Fire Evacuation Safety Management <i>Yifei Ding</i>
17:30-18:00	23:30-0:00	11:30-12:00	Maintaining Geometric Building Digital Twins <i>Zhiqi Hu</i>
18:00-18:30	00:00-00:30	12:00-12:30	Digital twin-based spatiotemporal global reconstruction for industrial temperature field: a case study of the snap curing oven <i>Benedict Jun Ma</i>

Digital Twin Ocean Engineering I (OE I)

Chaired by Jinfeng Liu - Jiangsu University of Science and Technology
 Xuwen Jing - Jiangsu University of Science and Technology
 Honggen Zhou - Jiangsu University of Science and Technology
 Vsevolod V. Koryanov - Moscow State Bauman Technical University

Thursday, October 16th 2025

Tencent Meeting ID: 679-899-434 Password: 000668



München Time	Beijing Time	New York Time	Agenda
13:00-13:15	19:00-19:15	07:00-07:15	Exploration of the Application of Digital Twin Technology in Shipbuilding <i>Caijun SONG</i>
13:15-13:30	19:15-19:30	07:15-07:30	Digital twin technology in the shipbuilding industry: research based on platform load inversion <i>Bo ZHOU</i>
13:30-13:45	19:30-19:45	07:30-07:45	Optimal Design of Fixture Layout for Compliant Part with Application in Ship Hull Assembly Process <i>Changhui LIU</i>
13:45-14:00	19:45-20:00	07:45-08:00	Numerical calculation research on high frequency induction heating suitable for curved hull plate <i>Shun WANG</i>
14:00-14:15	20:00-20:15	08:00-08:15	Data-Model Hybrid Driven Low Carbon Dynamic Optimization in Laser Welding Processes <i>Jianzhao WU</i>
14:15-14:30	20:15-20:30	08:15-08:30	Digital Twins for Modeling Flight Environment Processes in Aerospace Spacecraft Design <i>Vsevolod V. Koryanov</i>
14:30-14:45	20:30-20:45	08:30-08:45	Risk-Sensitive Mining Truck Scheduling: A Bayesian DQN and Thompson <i>Xiaolei XIANG</i>

Digital Twin for Ocean Engineering II (OE II)

Chaired by Yanjun Liu - Shandong University
 Hongda Shi - Ocean University of China

Friday, October 17th 2025

Tencent Meeting ID: 653-274-574



München Time	Beijing Time	New York Time	Agenda
10:30-10:45	16:30-16:45	04:30-04:45	Frontier Design of Transition Metal Oxides: A New Paradigm for Efficient Hydrogen Conversion <i>Ning Han</i>
10:45-11:00	16:45-17:00	04:45-05:00	Energy-harvesting performance of a fully-passive coupled-pitching hydrofoil: A numerical study <i>Xinyu Song</i>
11:00-11:15	17:00-17:15	05:00-05:15	Comprehensive Assessment Method of Tidal Current Energy Resources <i>Tian Zou</i>
11:15-11:30	17:15-17:30	05:15-05:30	Optimization of wave energy converter arrays employing a self-knowledge guided genetic algorithm with regression analysis <i>Dengshuai Wang</i>
11:30-11:45	17:30-17:45	05:30-05:45	A Heave-Attitude Self-Sustaining Design for Enhanced Wave Energy Conversion: An Experimental and Numerical Study <i>Mingqi Yu</i>
11:45-12:00	17:45-18:00	05:45-06:00	Hydrodynamic Performance of a Floating Oscillating Water Column Breakwater under the Combined Action of Waves and Currents <i>Kailong Rui</i>
12:00-12:15	18:00-18:15	06:00-06:15	Hydrodynamic performance of a land-based multi-chamber OWC wave energy converter <i>Lei Fu</i>
12:15-12:30	18:15-18:30	06:15-06:30	Hydrodynamic and Energy Capture Analysis of OWC Arrays with Shared Mooring under Concentrated Wave Action by Parabolic Breakwater <i>Changdong Wei</i>
12:30-12:45	18:30-18:45	06:30-06:45	Performance analysis and experimental study of the ocean thermal energy conversion ejector thermodynamic cycle system <i>Jinzhou Song</i>
12:45-13:00	18:45-19:00	06:45-07:00	Modeling and Motion Control Research of Bionic Fish with Hybrid Actuators <i>Fagang Bai</i>

Digital Twin Reliability (R)

Chaired by Yi Ren - Beihang University
 Cheng Qian - Beihang University
 He Li - University of Lisbon
 Sifeng Bi - Beihang University

Thursday, October 16th 2025

Tencent Meeting ID: 821-245-802



München Time	Beijing Time	New York Time	Agenda
11:30-12:00	17:30-18:00	05:30-06:00	A recursive inference method based on normalizing flow for multi-level model updating using video monitoring data <i>Jice Zeng</i>
12:00-12:30	18:00-18:30	06:00-06:30	A Physics-Enhanced Machine Learning Perspective on Digital Twinning for Reliability Engineering <i>Alice Cicirello</i>
12:30-13:00	18:30-19:00	06:30-07:00	Bayesian Model Inference with Complex Posteriors <i>Pengfei Wei</i>
13:00-13:30	19:00-19:30	07:00-07:30	The role of digital twins in certification by simulation <i>Peter Hristov</i>
13:30-14:00	19:30-20:00	07:30-08:00	Digital twin assisted sintering technology in automotive and power Electronics <i>Jiajie Fan</i>
14:00-14:30	20:00-20:30	08:00-08:30	Predictive Control for Operation and Maintenance in Smart Manufacturing Systems Driven by Digital Twin <i>Yue Zhang</i>

Digital Twin Networks (N)

Chaired by Tao SUN - China Mobile Research Institute, China
Diego Lopez - Telefonica I+D, Spain
Stephen Terrill - Ericsson, Sweden

Thursday, October 16th 2025

Tencent Meeting ID: 373-271-294



München Time	Beijing Time	New York Time	Agenda
13:00-13:30	19:00-19:30	07:00-07:30	Realizing network digital twin with simulation and verification <i>Peng Zhang</i>
13:30-14:00	19:30-20:00	07:30-08:00	Network Digital Twins as a Service: Federated Intelligence for Future Autonomous Networks <i>Simone Bizzarri</i>
14:00-14:30	20:00-20:30	08:00-08:30	Vulcan: Automated Network Protocol Testing with Multi-Agent LLMs <i>Xiaohui Xie</i>
14:30-15:00	20:30-21:00	08:30-09:00	Network Digital Twin in standards: an overview <i>Andrey Silva</i>
15:00-15:30	21:00-21:30	09:00-09:30	DTN Platform-Simulation Capabilities and Scenario Application <i>Zhidong Ren</i>

Digital Twin Interdisciplinary Frontier (IF)

Chaired by Yupeng Wei - Beihang University

Alessandro Simeone - The Polytechnic University of Turin

Thursday, October 16th 2025

Tencent Meeting ID: 104-951-760



München Time	Beijing Time	New York Time	Agenda
9:00-9:20	15:00-15:20	03:00-03:20	Atomic-Scale Defect Engineering and Intelligent Design <i>Pengru Huang</i>
9:20-9:40	15:20-15:40	03:20-03:40	Human-robot collaboration for intelligent disassembly towards end-of-life product <i>Jinhua Xiao</i>
9:40-10:00	15:40-16:00	03:40-04:00	A digital thread for design-to-print in wire laser additive manufacturing: a gear study case Long Ye
10:00-10:20	16:00-16:20	04:00-04:20	Conceptualization of a Platform Architecture for the Rapid Development of Digital Twins in Manufacturing <i>Luis Felipe Villegas</i>
10:20-10:40	16:20-16:40	04:20-04:40	Digital Twin based on semantic model as supporting tool for Printed Circuit Boards Disassembly <i>Laila El Warraqi</i>
10:40-11:00	16:40-17:00	04:40-05:00	Smart Locomotive: Digital Twin for predictive maintenance and performance optimization <i>Sreedhanya.L.R</i>
11:00-11:20	17:00-17:20	05:00-05:20	A Digital-Twin-Based Monitoring System for Aero-engine Blade Machining Workshops Haijun Zhang
11:20-11:40	17:20-17:40	05:20-05:40	Cascading failure tolerance of manufacturing services collaboration network toward industrial internet platforms Pei Li

Digital Twin Logistics (L)

Chaired by Ning Zhao - University of Science and Technology
 Dianjun Fang - Tongji University
 Wenfeng Li - Wuhan University of Technology

Thursday, October 16th 2025			
Tencent Meeting ID: 538-963-057			
München Time	Beijing Time	New York Time	Agenda
14:00-14:30	20:00-20:30	08:00-08:30	Machine Learning–Based Congestion Detection for Urban Logistics Using Large-Scale Traffic Sensor Data <i>Shady Salama</i>
14:30-15:00	20:30-21:00	08:30-09:00	Digital Twin-Enabled Forward Environmental Perception System for Enhancing Rail Safety and Operational Capacity <i>Ning Zhao</i>
15:00-15:30	21:00-21:30	09:00-09:30	Scalable Multi-AMR Material Handling System with Configurable Task Orchestration: From Development to Real-World Testing <i>Peng Guo</i>
15:30-16:00	21:30-22:00	09:30-10:00	Mirror the Mind of Crew: Simulation-Based Ship Driving Risk Analysis with Crew's Cognitive Processes in a Human Digital Twin <i>Tengfei Wang</i>
16:00-16:30	22:00-22:30	10:00-10:30	Siemens Digital Twin Smart Manufacturing Practice and Insights <i>Zhu Yi</i>

Digital Experiment, Testing & Verification (ETV)

Chaired by Kuo Tian - Dalian University of Technology
 Qiang Yang - Harbin Institute of Technology
 Jianshen Feng - Sun Yat-Sen University

Thursday, October 16th 2025

Tencent Meeting ID: 866-689-019

Passcode: 2025



München Time	Beijing Time	New York Time	Agenda
09:00-09:20	15:00-15:20	03:00-03:20	Dynamic Vision-Enabled Intelligent Vibration Sensing and Fault Diagnosis of Mechanical Systems <i>Xiang Li</i>
09:20-09:40	15:20-15:40	03:20-03:40	Digital Twin Modeling Method for the Real-time Temperature Field Reconstruction of Thermal Protection Structures <i>Qiang Chen</i>
09:40-10:00	15:40-16:00	03:40-04:00	Intelligent Structural Strength Monitoring Method Using Dynamic Evolving Digital Twin Model <i>Chenjun Ni</i>
10:00-10:20	16:00-16:20	04:00-04:20	Towards Physically-Consistent and Interpretable Fault Diagnosis: A Hybrid GNN Framework for Mechatronic Systems <i>Fanyu Qi</i>
10:20-10:40	16:20-16:40	04:20-04:40	A digital twin modeling method for structural heat conduction based on stochastic finite element analysis and Bayesian inference <i>Xinye Hao</i>

Digital Twin Standards (SD)

Chaired by Xin Ma - Beihang University
 Magnanini Maria Chiara - Politecnico di Milano
 Xiaolin Ma - China Electronics Standardization Institute East China Branch

Thursday, October 16th 2025

Tencent Meeting ID: 480-499-199



München Time	Beijing Time	New York Time	Agenda
08:00-08:30	14:00-14:30	02:00-02:30	Research on the Application and Standardization of Digital Twin-Based Biomimetic Manufacturing Technology <i>Shaopeng Zheng</i>
08:30-09:00	14:30-15:00	02:30-03:00	Interpretation of Maturity Model of Information Technology Digital Twin Capability <i>Li Han</i>
09:00-09:30	15:00-15:30	03:00-03:30	Research on Technology and Standards of Massive personalized customization <i>Yu Wang</i>
09:30-10:00	15:30-16:00	03:30-04:00	Introduction to the Standard: Information technology Digital twin for workshop-Reference architecture <i>Jia Li</i>
10:00-10:30	16:00-16:30	04:00-04:30	Application Practice of Construction Machinery Based on the National Digital-Twin Standard <i>Yangguang Lu</i>
10:30-11:00	16:30-17:00	04:30-05:00	Practical Cases of Digital Twins in the Industrial Manufacturing field <i>XiaoXu Song</i>

Digital Twin for Process Industry (PI)

Chaired by Rachele Bertolini - University of Padua
 Gongzhuang Peng - Beihang University

Wednesday, October 15th 2025			
Tencent Meeting ID: 876-945-116			
München Time	Beijing Time	New York Time	Agenda
13:00-13:20	19:00-19:20	7:00-7:20	Networked data analytics in cyber manufacturing systems <i>Xiaoyu Chen</i>
13:20-13:40	19:20-19:40	7:20-7:40	Digital Twin for the Solidification Process of Single-Crystal Blades <i>Haijie Zhang</i>
13:40-14:00	19:40-20:00	7:40-8:00	Machine Learning assisted Design of High Entropy Alloys <i>Ling Qiao</i>
14:00-14:20	20:00-20:20	8:00-8:20	Digital Twin-Driven Scheduling Optimization for Steelmaking and Continuous Casting Workshop <i>Shenglong Jiang</i>
14:20-14:40	20:20-20:40	8:20-8:40	Digital Twin and Scheduling of Parallel Walking Beam Reheating Furnaces <i>Shixin Liu</i>
14:40-15:00	20:40-21:00	8:40-9:00	Industrial time-series data generation <i>Hanwen Zhang</i>

Digital Twin AeroEngine (AE)

Chaired by Juan Du - University of Chinese Academy of Sciences
 He Zhang - Beihang University
 Lu-Kai Song - Beihang University

Thursday, October 16th 2025

Tencent Meeting ID: 140-107-819



München Time	Beijing Time	New York Time	Agenda
8:00-8:30	14:00-14:30	2:00-2:30	To be confirmed <i>Juan Du</i>
8:30-9:00	14:30-15:00	2:30-3:00	Reliability analysis and design optimization of aeroengine structures based on failure possibility under fuzzy uncertainty <i>Pan Wang</i>
9:00-9:30	15:00-15:30	3:00-3:30	Digital Transformation in Aeroengine Operation and Maintenance <i>Al He</i>
9:30-10:00	15:30-16:00	3:30-4:00	Bayesian inversion for parameter calibration in presence of mixed uncertainty <i>Le-Chang Yang</i>
10:00-10:30	16:00-16:30	4:00-4:30	A Digital-Twin approach for evaluation of the manufactured imperfection on the fatigue life <i>Yi Shi</i>
10:30-11:00	16:30-17:00	4:30-5:00	Data-driven modeling method for Aero-engine vibration under complex loads and variable conditions <i>Zhefu Yang</i>

Digital Twin Healthcare and Robotics (HR)

Chaired by Zhonghai Li - First Affiliated Hospital of Dalian Medical University
Shuai Zhang - Beihang University
Lei Huang - Massachusetts General Hospital/Harvard Medical School

Wednesday, October 15th 2025			
Zoom Meeting ID: 870 5896 2023			
München Time	Beijing Time	New York Time	Agenda
14:00-14:20	20:00-20:20	8:00-8:20	Human Body Enhancement and Rehabilitation Robot <i>Yixuan Guo</i>
14:20-14:40	20:20-20:40	8:20-8:40	Health Digital Twins: Discrete Digital Twins for Training and Precision Medicine <i>Adithya Balasubramanyam</i>
14:40-15:00	20:40-21:00	8:40-9:00	Digital Twins in Healthcare: Charting New Frontiers in Precision Medicine <i>Xin Chen</i>
15:00-15:20	21:00-21:20	9:00-9:20	Development and application of embodied intelligent robots <i>Zhiwei Cui</i>
15:20-15:40	21:20-21:40	9:20-9:40	Generative Artificial Intelligence in Digital Medicine and Healthcare <i>Lei Huang</i>
15:40-16:00	21:40-22:00	9:40-10:00	Objective and Automated Psychiatric Assessment with Gaze-Tracking Robotics <i>Zhiguo Wang</i>
16:00-16:20	22:00-22:20	10:00-10:20	The Human Spine Digital Twin: Construction and Application <i>Zhonghai Li</i>

Digital Twin Machine Tool (MT)

Chaired by Ying Zuo - Beihang University
 Yongping Zhang - Beihang University
 Maria Grazia Guerra - Politecnico di Bari

Thursday, October 16th 2025

Tencent Meeting ID: 885-996-132



München Time	Beijing Time	New York Time	Agenda
10:40-11:00	16:40-17:00	4:40-5:00	Key Technologies for Data Enablement in Intelligent Machining <i>Haibo Liu</i>
11:00-11:20	17:00-17:20	5:00-5:20	Deep learning enhances digital twin of machine tools: a case study on improving grinding accuracy <i>Dong Wang</i>
11:20-11:40	17:20-17:40	5:20-5:40	A Digital Twin-Based Monitoring System for Five-Axis CNC Machining Process <i>Xianyin Duan</i>
11:40-12:00	17:40-18:00	5:40-6:00	Implementation of precision machine tool thermal error compensation in digital twin system <i>Chi Ma</i>
12:00-12:20	18:00-18:20	6:00-6:20	Rapid Construction of Digital Twin Models and System Development for Discrete Manufacturing Workshops <i>Yueze Zhang</i>

Digital Twin Industrial Software (IS)

Chaired by Jiangfeng Cheng - Beihang University
 Claudio Gomes - Aarhus University

Friday, October 17 2025

Zoom Meeting ID: 833 4427 0765

Password: 251017



München Time	Beijing Time	New York Time	Agenda
09:30-10:00	15:30-16:00	3:30-4:00	Towards Reliable and Reusable Digital Twins: Interfaces, Contracts, and Formal Methods <i>Claudio Gomes</i>
10:00-10:30	16:00-16:30	4:00-4:30	Advancing Industrial Digital Twins: Towards an Open Platform Aligned with Standards <i>Abdelhadi BELFADEL</i>
10:30-11:00	16:30-17:00	4:30-5:00	Digital Twin Enabled Flight Control System Testing: Framework, Method, and Implementation <i>Cheng Ren</i>
11:00-11:30	17:00-17:30	5:00-5:30	Digital Twin and IoT synergy for smart building energy optimization: the Badevel village case study <i>AMGHAR Mohamed</i>
11:30-12:00	17:30-18:00	5:30-6:00	Digital Twin-Enabled Hybrid Additive Manufacturing: Bridging Process Integration and Intelligent Control <i>Zhe Li</i>
12:00-12:30	18:00-18:30	6:00-6:30	Toward Autonomic Digital Twin Orchestration and Management Systems <i>Luis Felipe Rivera</i>
12:30-13:00	18:30-19:00	6:30-7:00	Graphics-based modular digital twin software framework for production lines <i>Linlin Ou</i>
13:00-13:30	19:00-19:30	7:00-7:30	A Comparative Analysis of Digital Twin Platforms For Industrial Application and Case Study of Plug and Play Digital Twin Platform for NetZero Manufacturing <i>Dattatraya Parle</i>

Keynotes

Five-Dimensional Digital Twin Model: From Theory to Industrial Applications

Fei Tao

Editor-in-Chief of Digital Twin
Beihang University (China)

About the speaker



Dr. Fei Tao is a Professor at the School of Automation Science and Electrical Engineering and the Dean of the International Institute for Interdisciplinary and Frontiers at Beihang University, Beijing, China. His research focuses on smart manufacturing and digital twins. He has served as PI for over 30 national research and industry projects. He has published seven

books and over 100 peer-reviewed journal articles as the first/ corresponding author in Nature, CIRP Annals, and IEEE/ASME Transactions, with over 30 of them being ESI highly cited papers. His publications have over 50,000 citations. He was elected as the Global Highly Cited Researcher (2019-2024) and one of the 20 Most Influential Academics in Smart Manufacturing by SME in 2021. He is currently the Associate Editor of Robotics and Computer-Integrated Manufacturing (RCIM), CIRP Associate Member and IEEE Senior Member. He is the founding Editor-in-Chief of Digital Twin in Taylor & Francis Group and Digital Engineering in Elsevier; and he also initiated the Digital Twin Global Forum (DTGF) and the Digital Twin International Conferences (DigiTwin).

Abstract

Digital twin, a crucial technology for integrating physical and virtual spaces, have gained significant attention from both academia and industry over the past few years. To further broaden the applications of digital twin, this talk will introduce a series of related works we have conducted. First, the five-dimensional digital twin model is presented, encapsulating five key dimensions: physical entity, digital twin model, digital twin data, service, and their connections. Second, based on this model, a series of theoretical methods (including theories of digital twin modelling, digital twin data, digital twin connection and interaction), along with enabling technologies, essential tools, and standard systems for digital twin, are discussed. Third, two international journals (Digital Twin and Digital Engineering) and one international conference (Digital Twin International Conference) have been initiated to promote global collaboration in this field. Moreover, a digital twin software platform, named makeTwin, has been developed to address the lack of related software and platforms for practical applications. Finally, several industrial applications enabled by makeTwin will be briefly presented, particularly in smart manufacturing, aerospace, textile logistics, city management, and other sectors.

Digital Twin - Resilience- Ethics

Dieter Budde

Universität der Bundeswehr München

Abstract

The presentation will cover the essential aspects of digital twins, resilience, ethics, and morality. The presentation will first discuss the conditions for action and the development and application of digital twins. To this end, the prerequisites of different forms of government and economic systems will be outlined. It will then examine the fundamentals, risks, artificial intelligence, and elements of strengthening resilience. The analysis and evaluation of resilience will be presented using the example of technical resilience. The philosophical and faith-based foundations of ethics and morals are discussed, with reference to different cultures. Furthermore, reference is made to the responsibility involved in the development and application of digital twins. It is concluded that the design of digital twins in accordance with human values and norms is an indispensable prerequisite for contributing to progress that can be described as fair, safe, and sustainable.

About the speaker

Prof. Dr. Dr. Dieter Budde is an honorary professor at UniBw Munich and a retired major general of the German Armed Forces. He holds a degree in political science, a master's degree in governance, and a master's degree in philosophy. He also holds doctorates in political and social sciences, and in philosophy. He teaches in the departments of computer science, aeronautical engineering, and business administration. His research and teaching focus on leadership, management, strategy, decision theory, hybrid warfare, cyber, AI, resilience, critical infrastructure, aviation, and ethics.



Digital Transformation of manufacturing companies - Seco Tools as cutting tool supplier

Gülsüm Üsümez

General Manager
Seco Tools (Switzerland)

About the speaker



Dr.-Ing. Gülsüm Üsümez serves as the General Manager of Seco Tools Switzerland. She finished her master's degree in Industrial Engineering from the Technical University of Braunschweig. After then, she earned her doctorate in Mechanical Engineering from the Technical University

of Kaiserslautern in collaboration with the University of California, Davis, specializing in product-service systems with a focus on sustainability. She has been working at the globally operating Sandvik Group – which also includes Seco – since 2019, and at Seco since 2021. Most recently, as Regional Manager for Global Development Accounts Europe, she was responsible for collaborating with major European customers.

Abstract

Digital transformation in manufacturing companies represents a shift in how industrial operations are conceived, executed, and optimized. By integrating advanced technologies such as the Industrial Internet of Things (IIoT), artificial intelligence (AI), cloud computing, and data analytics, manufacturers are redefining productivity, agility, and customer-centricity. This transformation enables real-time decision-making, predictive maintenance, and enhanced supply chain visibility, while fostering innovation and sustainability. As global competition intensifies and market demands evolve, digital transformation is no longer a strategic option but a critical imperative for manufacturers seeking resilience, efficiency, and long-term growth. On the example with Seco Tools as a cutting tool supplier the digital transformation will be presented as a real case example.

Natural Language Explanations

Thomas Lukasiewicz

Vienna University of Technology (Austria)
University of Oxford (UK)

About the speaker

Thomas Lukasiewicz is Professor of Artificial Intelligence Techniques at the University of Oxford and TU Wien. He leads the Intelligent Systems Lab in AI and Machine Learning and is a Fellow of EurAI and AAIA, as well as a member of AIIA. His recognitions include the KR 2022 Test of Time Award, ACM PODS Test-of-Time Award, AIJ Prominent Paper Award, and IJCAI Distinguished Paper Award. He previously held a €1M AXA Chair on explainable AI in healthcare and a Turing Fellowship at the Alan Turing Institute. He was also awarded a Heisenberg Fellowship by the DFG and has led projects funded by the DFG, FWF, EPSRC, and the EU. He currently serves as associate editor for JAIR and area editor for ACM TOCL. His recent research focuses on explainable and neuro-symbolic AI, language models, computer vision, and recommender systems.



Abstract

This keynote surveys natural language explanations (NLEs) as a practical route to trustworthy AI. We motivate why accuracy alone is insufficient (e.g., spurious correlations, brittleness, and bias) and position NLEs alongside feature attributions and surrogate models. We distinguish correctness vs. faithfulness and review predict-then-explain and explain-then-predict designs. We cover core datasets and evaluations across text, vision-language, and medical imaging, including human and automatic scoring. To improve grounding, we pair extractive rationales with generated justifications, integrate knowledge sources, and probe models with adversarial consistency tests. We close with open questions: reliable faithfulness metrics (e.g., counterfactuals) and evidence that explanations improve model performance, user decision-making, and safety.

Generation of Graph-based Models for Digital Twins of Discrete Event Systems

Andrea Matta

Department of Mechanical Engineering
Politecnico di Milano (Italy)

Abstract

With the coming of the Industry 4.0 wave, digital representations of production systems have been promoted from marginal to central. Digital twins are not simply conceived as simulation models of their physical counterparts for offline what-if analysis, differently they are developed as self-adaptable and empowered decision-makers timely aligned with the dynamics of the real system. Enriched by these new features, digital twins are widely recognized as the key enablers for the implementation of optimal control of smart manufacturing systems. Graphs are well recognized as the mathematical structures representing the common denominator of engineering activities in manufacturing. They are the unifying language in industrial engineering, underpinning, for example, toolpaths, process plans, workflows, and system topologies. This talk will present methods for automatically generating graphs from real process gathered data to represent physical entities in a digital twin scenario. Further, generative approaches based on discrete diffusion will be discussed in relation to model tuning, control, and optimization.

About the speaker

Andrea Matta is Full Professor of Manufacturing and Production Systems at Department of Mechanical Engineering of Politecnico di Milano and Guest Professor at Shanghai Jiao Tong University. He graduated in Industrial Engineering at Politecnico di Milano where he develops his teaching and research activities since 1998. He was Distinguished Professor at the School of Mechanical Engineering of Shanghai Jiao Tong University from 2014 to 2016. He has been visiting professor at Ecole Centrale Paris (France), University of California at Berkeley (USA), and Tongji University (China). He is scientific responsible of the Research Area Design and Management of Manufacturing Systems at MUSP (Laboratory for Machine Tools and Production Systems). His research area includes analysis, design and management of manufacturing and health care systems. He has published 130+ scientific papers on international and national journals/conference proceedings.



Using environmental digital twins to support flood assessment and planning in Malaysia

Christopher Gibbins

University of Nottingham

About the speaker

Professor Chris Gibbins is an academic based at the University of Nottingham Malaysia. He has worked in Malaysia for 9 years, and during this time has served as Head of the School of Environmental and Geographical Sciences, Associate Dean for Research and Knowledge Exchange in the Faculty of Science and Engineering, and Vice Provost for Research and Knowledge Exchange. Prior to this he was based at the University of Aberdeen, Scotland, where he was based for 20 years. He works at the interface of hydrology and ecology, with projects that involve developing sustainable approaches to river and catchment management. His projects include environmental flows, river restoration, and green river engineering. He works with a variety of stakeholders, including the private sector, government, and NGOs.



Abstract

Many countries in tropical Southeast Asia are experiencing increased flood frequency and severity due to the combined effects of climate and landcover change. These floods have serious consequences for lives, livelihoods, and national economies. Both urban and rural areas are affected, though the nature and scale of impacts differ between them. This presentation will outline the impacts of flooding in the region and reviews traditional approaches used to predict when and where floods are likely to occur. It demonstrates how hydrological models can help assess how landcover change influences runoff and flood risk, as well as the sensitivity of different catchment areas to flooding. It considers some of the limitations of hydrological models, particularly for helping economically marginalized communities living in remote areas. The presentation introduces a digital twin currently being developed to visualise flood propagation in an area of Kuala Lumpur, Malaysia. This tool integrates satellite and drone-based datasets with novel water-level sensors to enhance flood modelling and support real-time community responses, including the planning of safe evacuation routes.

Shaping the Digital Twin Paradigm in Engineering Design: A CIRP Perspective

Nabil Anwer
Deputy Director of LURPA
Paris-Saclay University (French)

About the speaker

Professor Nabil Anwer is a Full Professor in the Department of Mechanical and Manufacturing Engineering at Paris-Saclay University, France. His research focuses on tolerancing, form metrology, geometric modeling, and digital manufacturing. He is a fellow of several prestigious societies, including ASME and CIRP. Professor Anwer has led numerous nationally-funded research projects and has an extensive publication record of over 200 articles, contributing significantly to advancements in precision engineering and cyber-physical production systems.



Abstract

Digital twins (DTs) are reshaping the landscape of production engineering, offering a dynamic, data-rich bridge between physical assets and their virtual counterparts throughout the product lifecycle. This keynote, reflecting the International Academy for Production Engineering (CIRP) perspective, will explore the evolution, foundational concepts, and state-of-the-art methodologies that underpin digital twin development and deployment in manufacturing and engineering design. The presentation will clarify the fundamental building blocks and architectures of DTs, such as the integration of accurate digital models, robust data flows, and synchronous interaction with physical entities. Emphasis will be placed on the rapidly growing ecosystem of DT software platforms, tools, and standards and their critical impact on interoperability and lifecycle integration. The keynote will also address open challenges, including standardization gaps, fidelity of virtual representations, and managing data complexity. With insights drawn from CIRP research and practical implementations, future research directions will be addressed, demonstrating how CIRP and the international community are contributing to the development and adoption of the digital twin paradigm in engineering design.

Prof. Dr. Stefan Wolfgang Pickl

Chair for Operations Research
Universität der Bundeswehr München

Stefan Wolfgang Pickl was born in Darmstadt, Germany on 29th September, 1967. He studied mathematics, electrical engineering and philosophy at the Technical University of Darmstadt (Diploma in 1993; ERASMUS-scholarship at the EPF Lausanne); doctor's degree at the TU Darmstadt in 1998, followed by his habilitation at the University of Cologne in 2005.



From the years 2000 to 2005 Mr Pickl was scientific assistant and project manager at the Center for applied Computer Sciences in Cologne (ZAIK); among various other functions he was holding main responsibility in the field of “Modelling, simulation and optimizing conflicts involving resources - analysis of complex systems”. Since July 2005 Mr Pickl holds a chair for Operations Research at the UBW Munich.

In 2000 Mr. Pickl received the phd-thesis award by the German Society for Operations Research; followed by international “best-paper awards” in the years 2003, 2005, 2007 and 2015. He is co-leading the working group “Simulation and Optimization of Complex Systems” of the German Society for Operations Research (GOR).

He is counsellor to the “Center for the Advanced Studies of Algorithms (CASA)” at the University of Nevada, Las Vegas, to the “Center for Applied Optimization (CAO)” at University of Florida, as well as an associated member of the “Center for Network Innovation and Experimentation (CENETIX)” of the Naval Postgraduate School Monterey, CA (USA).

During the years 2004 to 2024 Mr. Pickl was invited for assignments as visiting- professor in the States, Asia and Europe such as with the Center for Homeland Defense and Security, CHDS. As a guest scientist Mr Pickl was a “Visiting Scientist” in Los Alamos National Labs, in the SANDIA Laboratory, at the MIT as well as at the Santa Fe Institute for complex systems. Mr Pickl was one of the first mathematicians who developed a model for the simulation and optimization of the CO₂ -conflict.

Respectively Mr Pickl was a member of the Excellence-Cluster “Energy” at the RWTH Aachen. He released more than 300 publications.

Since 2008 Mr Pickl is Vice-Chair of the international Committee for Controlling Theory in the range of IFAC (International Federation on Optimal Control Section: Technical Committee on Optimal Control). Since 2010 he is chair of the advisory board of the German Society for Operations Research.

Furthermore he is Honorary Professor at University of Nottingham Malaysia Campus.

Since 2019, Mr Pickl is Vice-President of the German Committee for Disaster Reduction DKKV. He is member of the counselling-board of the BBK in Germany.

Since 2022 he is PI of the Topic Leadership Circle TLC in cooperation with Peter Drucker Forum. In 2023 he was nominated as honorary member of the German Society for Operations Research. Since 2024 he is member of the German Academy of Technology acatech. In 2025 he was nominated as member of the Club of Rome.

Garmisch - Partenkirchen

Garmisch-Partenkirchen is a German ski resort in Bavaria. The city consists of two places that were united in 1935.

Garmisch-Partenkirchen is a popular destination for skiers, ice skaters and hikers. The city is located near the Zugspitze, at 2,962 m the highest mountain in Germany. The summit can be reached with the Zugspitzbahn and a cable car.

Garmisch is considered a more elegant district, Partenkirchen with its cobblestone streets exudes a traditional Bavarian ambience.



The City of Garmisch-Partenkirchen



**The Eibsee, in the background
the Zugspitze**

The Partnach Gorge near the Zugspitz town of Garmisch-Partenkirchen is a mountain gorge cut deep into the mountains.

The gorge is up to 80 m deep and 700 m long. The loudly bubbling water of the Partnach rushes through the narrow gorge into the valley. Holidaymakers can walk along the edge of the cliffs on a jetty and marvel at the enormous masses of water below. The walls of the Partnachklamm are sometimes only a few meters apart, so that hardly a ray of sunshine penetrates the narrow Alpine gorge.

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