CIRP CATS 2024

24 - 26 April 2024
Karlsruhe, Germany

10th CIRP Conference on Assembly Technology and Systems

Conference Programme

Programme Overview

	23 April 2024	24 April 2024	25 April 2024	26 April 2024
08:30		**Arrival & Registration** Senate Hall | KIT	Keynote	Keynote
09:00			Session 1	Session 1
09:20		Opening (*9.30 am*)	Session 2	Session 2
09:40		Keynote (*10 am*)	Session 3	Session 3
10:00			*Coffee Break*	*Coffee Break*
10:20		*Break (10.30 am)*	Session 4	Session 4
10:40		Session 1	Session 5	Session 5
11:00		Session 2	Session 6	Session 6
11:20		Session 3	Session 7	*Coffee Break*
11:40		*Coffee Break*	*Coffee Break*	Session 7
12:00		Session 4	Session 8	Session 8
12:20		Session 5	Session 9	Session 9
12:40		Session 6	Session 10	Closing & Goodbye
13:00		*Lunch Break*	*Lunch Break*	
13:40		Session 7	Session 11	
14:00		Session 8	Session 12	
14:20		Session 9	Session 13	
14:40		*Coffee Break*	*Coffee Break*	
15:00		Session 10	Session 14	
15:20		Session 11	Session 15	
15:40		Session 12	Session 16	
16:00		*Coffee Break*	*Coffee Break*	
16:20		Session 13	Session 17	
16:40		Session 14	Session 18	
17:00		Session 15	Session 19	
17:20		Closing	Closing	
17:40				
18:00				
18:30	**Welcome Reception** Karlsruhe Research Factory 6 pm		**Conference Dinner** Karlsruhe Palace 6.30 pm	

Wednesday | 24 April 2024

08:30	**Arrival & Registration** Senate Hall | KIT		
09:30	Opening (Thomas Hirth, Vice President KIT & Jürgen Fleischer, Conference Chair)		
10:00	**Keynote 1 - Modular Configurable Assembly Technology** (Jürgen Fleischer, Conference Chair)		
10:30	*Break*		
10:40	Session 1	**Jeroen Cramer** KU Leuven	A user-friendly toolkit to select and design multi-purpose grippers for modular robotic systems
11:00	Session 2	**Johannes Gerner** KIT	Additively manufactured vacuum grippers for the flexible handling and assembly of hairpin coils in electric motor production
11:20	Session 3	**Weimin Zhang** Tongji University	In-line measuring and feature similarity-based group and pairing assembly for metallic BPPs
11:40	*Coffee Break*		
12:00	Session 4	**Christopher Ehrmann** Tongji University	Highly flexible robotic manufacturing cell based on holistic real-time model-based control
12:20	Session 5	**Lukas Bergs** RWTH Aachen	Edge Computing Framework for Enhanced Robotic Adaptivity in Line-Less Mobile Assembly Systems
12:40	Session 6	**Paul Hubert Haas** ZeMA	Development of an Adaptive Human-centered Work Station for Fuel Cell Stack Assembly
13:00	*Lunch Break*		
13:40	Session 7	**Aline Kluge-Wilkes** RWTH Aachen	Evaluating task executability of mobile robots with performance maps
14:00	Session 8	**Rolf Wiemann** LU Hannover	Towards Autonomous Programming of Micro-Assembly Robotics
14:20	Session 9	**Apostolis Papavasileiou** University of Patras	Empowering Precision-Guided Automotive Assembly Operations: A Flexible Robot Vision Framework
14:40	*Coffee Break*		
15:00	Session 10	**Martijn Cramer** KU Leuven	APLAN: open assembly planning framework in FreeCAD
15:20	Session 11	**Jan Pfister** ZeMA	Software Architecture for adaptable assembly systems
15:40	Session 12	**Francesco Pilati** University of Trento	Safe assembly in Industry 5.0: digital architecture for the Ergonomic Assembly Worksheet
16:00	*Coffee Break*		
16:20	Session 13	**Arne Wagner** TU Braunschweig	Screen printing approach for high throughput and flexible adhesive deposition in graphite bipolar plate production
16:40	Session 14	**Ling Ma** KIT	Development and Evaluation of the Joining Process of Gas Diffusion Layer and Membrane Electrode Assembly for PEM Fuel Cells
17:00	Session 15	**Christian Wacker** TU Braunschweig	Enhanced deposition accuracy for battery electrodes in a novel high-speed stacking process
17:20	Closing Day 1		

Thursday | 25 April 2024 – AM

08:30	**Keynote 2 - Artificial Intelligence in Assembly** (Jörg Krüger, Conference Chair)		
09:00	Session 1	**Torge Kolditz** LU Hannover	Workpiece Pose Classification Framework for Flexible Part Feeding Systems Using Machine Learning and Synthetic Datasets
09:20	Session 2	**Xiaomei Xu** ZeMA	A robot-system for picking parts from unstructured bins – A practical Approach
09:40	Session 3	**Tristan Fogt** TU Berlin	Camera-less Approach for Random Bin Picking Tasks
10:00	*Coffee Break*		
10:20	Session 4	**Arturo Bastidas Cruz** Fraunhofer IPK	Development and Validation of a Screw Interlock Recognition Method based on Logistic Regression
10:40	Session 5	**Florian Oexle** KIT	Jacobian-Sensitivity Approach for Identifying Machine Dynamic Model Parameters of Robots with Flexible Joints
11:00	Session 6	**Imanuel Heider** KIT	Towards a Testing Framework for Machine Learning Model Deployment in Manufacturing Systems
11:20	Session 7	**Min Zhang** Beijing Institute of Technology	A knowledge-driven framework and methodology for precision assembly process decision making
11:40	*Coffee Break*		
12:00	Session 8	**Lorenz Fink** TU Wien	Make some Noise: Acoustic Classification of Manual Work Steps Towards Adaptive Assistance Systems
12:20	Session 9	**Alexander Moriz** RWTH Aachen	Recognition of Hand Activities for Automatic Generation of Assembly Instructions
12:40	Session 10	**Apostolis Papavasileiou** University of Patras	Towards utilising Artificial Intelligence for advanced reasoning and adaptability in human-robot collaborative workstations
13:00	*Lunch Break*		
13:40	PM Sessions		

Thursday | 25 April 2024 – PM

13:00	*Lunch Break*		
13:40	Session 11	**Xiao Chen** Beijing Institute of Technology	Reflective optical mirror group assembly process optimization method based on accurate digital twin
14:00	Session 12	**Xiao Chen** Beijing Institute of Technology	A Geometric Digital Twin Modeling Method for Thin-Walled Microstructures Considering Laterally Distributed Error
14:20	Session 13	**Xiaohao Liu** Beijing Institute of Technology	Optimizing HRG assembly through mathematical modeling of pose adjustment
14:40	*Coffee Break*		
15:00	Session 14	**Min Zhang** Beijing Institute of Technology	Modeling of End Face Perpendicularity Error and Its Influence Mechanism on Thread Assembly Clamping Force
15:20	Session 15	**De Shan Xu** Beijing Institute of Technology	An Optimization Method of Assembly Process for Bolt Flange Connection Structure with Manufacturing Characteristics
15:40	Session 16	**Erbo Li** Beijing Institute of Technology	A Multilayer Nested Space Ray Telescope Assembly and Adjustment System Based on Online Monitoring Feedback
16:00	*Coffee Break*		
16:20	Session 17	**Ann-Kathrin Wurba** KIT	Approach to evaluate handling processes of polyethylene oxide (PEO)-based composite cathodes
16:40	Session 18	**Erbo Li** Beijing Institute of Technology	A High-Precision and Efficient Adaptive Alignment Method for Cassegrain Dual Mirror Optical System based on Machine Learning Algorithms
17:00	Session 19	**Taiyu Su** Beijing Institute of Technology	Sub-micron Assembly Alignment Detection Method and System Based on Optical Diffraction
17:20	Closing Day 2		
18:30 22:00	**Conference Dinner** Karlsruhe Palace		

Friday | 26 April 2024

08:30	**Keynote 3 - Disassembly and Remanufacturing** (Annika Raatz, Scientific Committee)		
09:00	Session 1	**Stefano Puttero** Politecnico di Torino	Automatic object detection for disassembly and recycling of electronic board components
09:20	Session 2	**Yuhao Xue** Hefei University of Technology	Information Entropy Evaluation Method for the Disassemblability of Smartphones
09:40	Session 3	**Sven Oldewurtel** Fraunhofer IST	Disassembly technologies for PEMFC stacks in heavy-duty applications
10:00	*Coffee Break*		
10:20	Session 4	**Kevin Gleich** KIT	An Asset Administration Shell-Based Digital Product Passport As A Gaia-X Service
10:40	Session 5	**Helena Wexel** KIT	High-Speed DED-LB: Analysis of Process Control Variables as Enabler for Remanufacturing of Unique Products
11:00	Session 6	**Marina Baucks** KIT	Information Models for Automated Electric Vehicle Battery Disassembly: Integrating Domain Knowledge through a Multi-Faceted Data-Driven Approach
11:20	*Coffee Break*		
11:40	Session 7	**Matteo Fervorari** Politecnico di Milano	In-depth analysis of electric vehicles battery pack structure and disassembly procedure for the application of circular economy strategies.
12:00	Session 8	**Timo Hölter** TU Braunschweig	Experiment-based conceptualization of an automated disassembly process chain for the recycling of lithium-ion battery modules
12:20	Session 9	**Shubiao Wu** TU Braunschweig	Advancing Material Separation Efficiency Through Extended Disassembly Depth in Pretreatment Processes for Lithium-ion Batteries Recycling
12:40	Closing Day 3 & Goodbye		

Locations

Karlsruhe Research Factory | KIT Campus East

The CIRP CATS 2024 welcome reception will take place at the Karlsruhe Research Factory. Accompanied by drinks and snacks, the conference participants can exchange ideas and network in an informal setting. Additionally, there will be guided tours of the research factory, where research topics relating to AI-integrated production, production robotics, electromobility and agile production systems will be presented and demonstrated.

Address: Karlsruher Forschungsfabrik, Rintheimer Querallee 2, 76131 Karlsruhe (Google Maps)

Arrival: by car or by tram – see directions on the next page
On request, we offer a shuttle service that departs from KIT Campus South at 5.45 pm.

Senate Hall | KIT Campus South

The conference sessions will take place on the KIT's main campus in the centre of Karlsruhe. The top floor of the Presidium building houses both the Senate Hall, where the sessions are held, and a lounge area including a roof terrace as the venue for coffee and lunch breaks as well as for networking and socialising.

Address:
KIT Presidium (3rd floor), Building 11.30, Engelbert-Arnold-Straße 2, 76131 Karlsruhe (Google Maps)

Karlsruhe Palace

Karlsruhe Palace forms the centre of Karlsruhe's "fan-shaped city", which bears this nickname due to its layout. In addition, the former residence of the margraves and grand dukes of Baden is the most famous sight in Karlsruhe. The conference dinner will take place in the marvellous garden hall of the baroque Karlsruhe Palace. The evening will begin at 6.30 pm with a welcome reception and drinks. Afterwards, guests can expect a wide selection of Baden specialities. The evening will be accompanied by music from the jazz duo Peter Klein.

Address:
Garden Hall („Gartensaal") of the Karlsruhe Palace, Schloßbezirk 10, 76131 Karlsruhe (Google Maps)

Locations

Directions to Karlsruhe Research Factory

Visitor address:

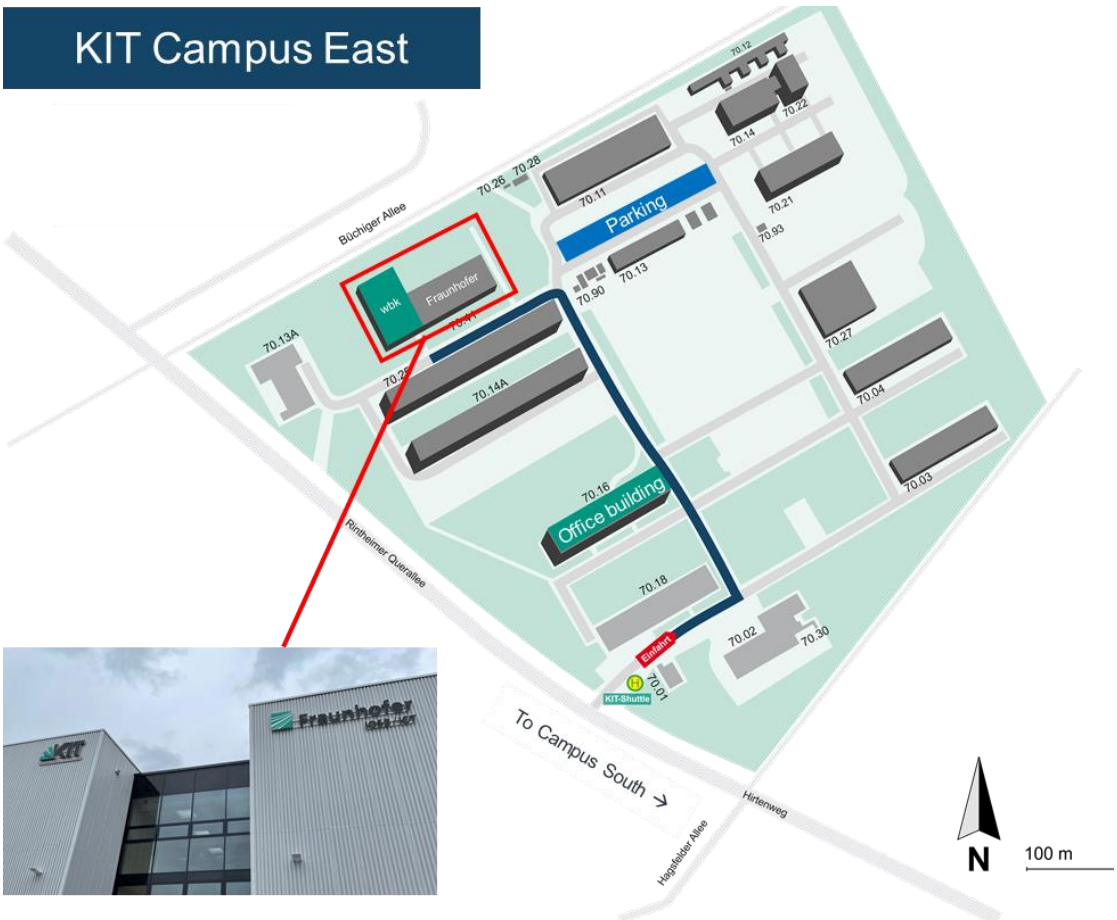
Karlsruhe Institute of Technology (KIT)
wbk Institute of Production Science
Rintheimer Querallee 2
Building 70.41
(Karlsruher Forschungsfabrik)
76131 Karlsruhe

Next station of public transport:

Hirtenweg/ Technologiepark
Footpath to Forschungsfabrik: 1,3 km
(approx. 16 min)

Shuttle Service (only on request):

Carpool Bench („Mitfahrerbank“)
Engesserstraße | KIT Campus South
opposite of the KIT library
76131 Karlsruhe
Google Maps



CIRP CATS 2024

What to do in Karlsruhe

Dining & Drinks

BREWERIES & BEER GARDENS

Hoepfner Burghof
The Hoepfner Burghof is located in the historical building of the private Hoepfner brewery and offers its guests a fine traditional Baden cuisine with tasty beers from the private Hoepfner brewery.

Badisch Brauhaus
The Badisch Brauhaus presents four levels of gastronomic variety from a rustic medieval banquet in the vaulted cellar, good home cooking in the Boulevard restaurant or fine cocktails in the ALLVITALIS Cocktail bar.

Vogelbräu
Vogelbräu with locations in Karlsruhe, Durlach and Ettlingen offers home-brewed unfiltered beers such as Pils, light wheat beer and Sonnenwendbier (Kölsch) as well as hearty Baden cuisine. In the beer gardens there are comfortable places to sit outside.

SOPHISTICATED REGIONAL CUISINE

Oberländer Weinstube
The small secluded courtyard with a Mediterranean flair is one of the most beautiful places to relax from the hustle and bustle of the city. The wine bar's cuisine is modern and creative, however also inspired by regional specialities. The seasonal menu is changed regularly according to season.

EigenArt
This slightly different restaurant presents itself with lots of art and culture, above all however with a real love of food – completely according to the Slow Food movement. The regularly changing menu offers unusual creations and small, but exquisite set menus.

Alte Bank Karlsruhe
The varied fresh offer ranges from home-made Bircher muesli (Swiss muesli) to fine cakes, homemade Quiche Lorraine (vegetable), Maultaschen' (Swabian raviolis), Tarte Flambée and seasonal delicacies to evening specials. The bar invites you for a relaxed dinner or to a cool long drink or a delicious cocktail.

BARS

Carlos Cocktailbar
Small but perfectly designed: Carlos Cocktailbar is stylishly furnished and has a great atmosphere. Previously it was mainly just for the „In-Crowd", but today the bar is wellknown and very popular. With a smoking area.

KofferRaum
It's not only the notorious classics which are served in the KofferRaum cocktail bar, but also the newest creations in the cocktail world. They are further improved by the use of fresh juices, homemade syrups and liqueurs beyond the ordinary.

Santo's Cocktailbar
In Hotel Santo's cocktail bar you can enjoy the impressive selection of high quality spirits and cocktails in a cosy atmosphere. There's happy hour on Wednesdays and Fridays from 07:00 pm to 10:30 pm with approximately 150 cocktail creations at half the price.

Guts & Glory
No guts, no glory – nothing ventured nothing gained! The counter is the real highlight here, intended to resemble a boxing ring. Apart from an indispensable range of cocktail classics, many varying seasonal creations unique to the bar can be found on the menu, the composition of which takes patrons on an exciting journey through whole new worlds of taste.

What to do in Karlsruhe

Karlsruhe Sightseeing

For more information on Karlsruhe‘s attractions and further recommendations, please take a look at the information brochure "Karlsruhe at a glance“, which you can find here or by scanning the QR code below.