



The 7th

CIRP Conference on Assembly Technologies and Systems

May 10-12, 2018
Hengda at Dongli, Tianjin
China

Conference Sponsors



National Natural Science Foundation of China

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PROGRAM

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Hosted by
School of Mechanical Engineering
Tianjin University

Chinese Precision Assembly Institute
(CPI-CMES)

Conference Chairs:

Professor Shuxin Wang Tianjin University, China
Professor S. Jack Hu The University of Michigan, USA

Organizing Committee:

Dr. Zhiliang Wu Tianjin University, China
Ms. Liu Ma Tianjin University, China
Mr. Liang Zuo Tianjin University, China
Mr. Liming Zhu Tianjin University, China

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General Information:

Conference Venue & Accommodation

Henda Hotel at Dongli, Tianjin
Address: 1037 Dongli Avenue, Dongli Lake Resort, Tianjin

Website: <http://tjdlh.hengdahotels.com/en/>

Please contact Ms. Chunling Liu for hotel reservation
(cell phone: +86 1582 2275 456; Email: 345615686@qq.com)

Transportation

During the conference (May 8 – May 13), buses will be provided for transportation to and from Beijing Airport, Tianjin Airport, and Tianjin Railway Station.

(Please provide flight/train information to the Organizing Committee.)

Registration

Conference on-site registration will be located at the lobby of the Accommodation Center at Hengda Hotel. Registration will be available during the conference:

8:00 a.m. – 6:00 p.m., May 10-11, 2018
8:00 a.m. – 12:00 noon, May 12, 2018

Scientific Committee:

| | |
|-----------------|---|
| Mihaela Banu | University of Michigan, USA |
| Wayne Cai | General Motor Co., USA |
| Haseung Chung | Michigan State University, USA |
| Peihua Gu | Shantou University, China |
| Baiyan He | Tianjin University, China |
| Tian Huang | Tianjin University, China |
| Xiaoning Jin | Northeastern University, USA |
| Jeonghan Ko | Ajou University, Korea |
| Xinmin Lai | Shanghai Jiao Tong University, China |
| Jingjing Li | Penn State University, USA |
| Gunther Seliger | Technical University of Berlin, Germany |
| Chenhui Shao | University of Illinois, USA |
| Moshe Shpitalni | Israel Institute of Technology, Israel |
| He Tang | Eastern Michigan University, USA |
| Hui Wang | Florida State University, USA |
| Yanhui Wang | Tianjin University, China |

Conference at a Glance

| | Thursday May 10th | Friday May 11th | Saturday May 12th | | |
|------------|--|--|--|--|------------|
| 8:00 a.m. | | | | 8:00 a.m. | |
| 9:00 a.m. | Registration Accommodation Center Lobby | Opening Ceremony CENTURY | Keynote: Mr. W. Yao WASHINGTON | 9:00 a.m. | |
| 10:00 a.m. | | Keynote: Prof. B. Duan CENTURY | Keynote: Prof. Y. Zhong WASHINGTON | 10:00 a.m. | |
| 11:00 a.m. | | Tea Break | Tea Break | 11:00 a.m. | |
| 12:00 p.m. | | Keynote: Prof. J. Krüger CENTURY | Technical Sessions APT ₃ - HONGKONG APT ₄ - MACAU | | 12:00 p.m. |
| 1:00 p.m. | | | Lunch (Buffet) 1st Floor Dining Room Accommodation Center | Lunch (Buffet) 1st Floor Dining Room Accommodation Center | 1:00 p.m. |
| 2:00 p.m. | | Airbus Factory & TJU Campus Tours (Bus will be provided) | Technical Sessions IRT- HONGKONG VRT- MACAU | Technical Sessions HRC ₁ - HONGKONG HRC ₂ - MACAU | 2:00 p.m. |
| 3:00 p.m. | | | | 3:00 pm | |
| 4:00 p.m. | Tea Break | | Tea Break | 4:00 pm | |
| 5:00 p.m. | Technical Sessions APT ₁ - HONGKONG APT ₂ - MACAU | | Technical Sessions AS ₁ - HONGKONG AS ₂ - MACAU | 5:00 pm | |
| 6:00 p.m. | | | Closing Ceremony WASHINGTON | 6:00 pm | |
| 7:00 p.m. | | | | Dinner (Buffet) 1st Floor Dining Room Accommodation Center | 7:00 pm |
| 8:00 p.m. | Welcome Reception 1st Floor Dining Room, Accommodation Center | Conference Banquet CENTURY | | 8:00 pm | |
| 9:00 p.m. | | | | 9:00 p.m. | |

Social Activities:

1. Tianjin Downtown Tour (May 11, 2018)
The Five Avenues & China House & Traditional Culture Street
2. Huangyaguan Great Wall Tour (May 12, 2018)

Thursday, May 10, 2018

8:00 a.m. – 6:00 p.m.

Registration

Location: Accommodation Center Lobby

1:30 p.m. – 6:30 p.m.

Airbus Factory Tour &

Tianjin University Campus / Lab Tour

(Bus will be provided in front of the Accommodation Center)

7:00 p.m. – 9:00 p.m.

Welcome Reception

Location: 1st Floor Dining Room, Accommodation Center

Friday, May 11, 2018

8:00 a.m. – 6:00 p.m.

Registration

Location: Accommodation Center Lobby

8:00 a.m. – 9:00 a.m.

Opening Ceremony

Welcome: Prof. Shuxin Wang, Tianjin University, China
Prof. Moshe Shpitalni, Israel Institute of
Technology, Israel

Location: CENTURY, 1st Floor, Conference Center

Photographing

Location: Accommodation Center

9:00 a.m. – 10:00 a.m.

Keynote Speech 1

Chair: Prof. S. Jack Hu, University of Michigan, USA
Location: CENTURY, 1st Floor, Conference Center

Prof. Baoyan Duan, Xidian University, China

10:00 a.m. – 10:30 a.m. **Tea Break**

10:30 a.m. – 11:30 a.m.

Keynote Speech 2

Chair: Prof. S. Jack Hu, University of Michigan, USA
Location: CENTURY, 1st Floor, Conference Center

Adaptation of human cognitive and sensory-motor skills to robots and their potential for flexible assembly automation

Prof. Jörg Krüger, Technical University Berlin, Germany

12:00 p.m. – 1:30 p.m. **Lunch (Buffet)**

Location: 1st Floor Dining Room, Accommodation Center

1:30 p.m. – 3:30 p.m.

IRT: Industrial Robot Technologies

Session Chair: Prof. Karel Kellens

Location: HONGKONG, 1st Floor, Conference Center

IRT-1. Distributed Motion Planning for Industrial Random Bin Picking

*Vojtech Vonasek, Axel Vick, Jörg Krüger
Fraunhofer Institute for Production Systems and
Design Technology, Germany*

- IRT-2. Exploring the potential of magnetorheology in robotic grippers**
Jeroen Cramer, Martijn Cramer, Eric Demeester, Karel Kellens
KU Leuven, Belgium
- IRT-3. Affordance Based Approach to Automatic Program Generation for Industrial Robots in Manufacturing**
Oliver Heimann, Jörg Krüger
Fraunhofer IPK, Germany
- IRT-4. An approach for implementing power and force limiting in sensorless industrial robots**
Konstantinos Kokkalis, George Michalos, Panagiotis Aivaliotis, Sotiris Makris
University of Patras, Greece

VRT: Vision-based Robot Technologies

Session Chair: Dr. Chaoyang Shi

Location: MACAU, 1st Floor, Conference Center

- VRT-1. Industrial Image Processing Applications as Orchestration of Web Services**
Martin Rudorfer, Jörg Krüger
TU Berlin, Germany
- VRT-2. Industrial Robot Control with Object Recognition based on Deep Learning**
Xi Chen, Jan Guhl
Fraunhofer IPA, Germany
- VRT-3. Intuitive Robot Programming Using Augmented Reality**
Sebastian Blankemeyer, Rolf Wiemann, Lukas Posniak, Christoph Pregizer, Annika Raatz
Leibniz Universität Hannover, Germany
- VRT-4. Intuitive robot programming through environment perception, augmented reality simulation and automated program verification**
Jonas Wassermann, Axel Vick, Jörg Krüger
Technische Universität Berlin, Germany

3:30 p.m. – 4:00 p.m. **Tea Break**

4:00 p.m. – 6:30 p.m.

APT1: Assembly Processes and Technologies 1

Session Chair: Prof. Bogdan I. Epureanu

Location: HONGKONG, 1st Floor, Conference Center

- APT-1. Simulation-Based Determination of Disassembly Forces**
Julius Wolff, Torge Kolditz, Yangyang Fei, Annika Raatz
Leibniz Universität Hannover, Germany
- APT-2. Surrogate Model Based Uncertainty Analysis and Key Process Parameter Determination for Product Reliability in Assembling Process**

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Y. Li, F.P. Zhang, Y. Yan, J.H. Zhou
Beijing Institute of Technology, China

- APT-3. Simulation-based Planning of a Kind of Complex Product General Assembly Line**
Wei Zhou, Shiqi Li, Yaqin Huang, Junfeng Wang
Huazhong University of Science and Technology, China
- APT-4. Decision Tool for Designing Derivative Products for Supporting Assembly Planning of Large-volume Assembly groups**
Katharina Gebert, Alexander Bader, Kirsten Tracht
University of Bremen, Germany
- APT-5. Application of Design Principles for Assembly Instructions - evaluation of practitioner use**
Sandra Mattsson, Dan Li and Åsa Fast-Berglund
Chalmers University of Technology, Sweden

APT2: Assembly Processes and Technologies 2

Session Chair: Prof. Mihaela Banu

Location: MACAU, 1st Floor, Conference Center

- APT-9. Modelling and Evaluating the Heat Transfer of Molten Thermoplastic Fabrics in Automated Handling Processes**
Christopher Bruns, Jan-Christoph Tielking, Harald Kuolt, Annika Raatz
Leibniz Universität Hannover, Germany
- APT-10. An Artificial Neural Network Model for Predicting Joint Performance in Ultrasonic Welding of Composites**
Yang Li, Tae Hwa Lee, Chun Wang, Kaifeng Wang, Changbai Tan, Mihaela Banu, S. Jack Hu
University of Michigan, USA
- APT-11. Nonlinear Dynamic Analysis of Ultrasonic Metal Welding Using a Harmonic Balance Method**
Zhiwei Liu, Elijah Kannatey-Asibu, Yuefang Wang, Bogdan I. Epureanu
University of Michigan
- APT-12. Simulation method for precision bonding structure with micron scale adhesive layer**
Xiao Chen, Zhijing Zhang, Xin Jin, Muzheng Xiao, Huan Guo, and Zhaoli Ma
Beijing Institute of Technology, China
- APT-13. Evaluation and Numerical Calculation of Entropy based on Contact Strain-Energy**
Huan Guo, Xin Jin, Zhijing Zhang
Beijing Institute of Technology, China

7:00 p.m. – 9:00 p.m.

Conference Banquet

Hosted by Prof. Peihua Gu, Shantou University, China

Location: CENTURY, 1st Floor, Conference Center

The 7th CIRP Conference on Assembly Technologies and Systems

Saturday, May 12, 2018

8:00 a.m. – 12:00 p.m.

Registration**Location: Accommodation Center Lobby**

8:00 a.m. – 9:00 a.m.

Keynote Speech 3**Chair: Prof. Tian Huang**, Tianjin University, China**Location: WASHINGTON, 2nd Floor, Conference Center***Mr. Weibing Yao, MINO Automotive Equipment, China*

9:00 a.m. – 10:00 a.m.

Keynote Speech 4**Chair: Prof. Tian Huang**, Tianjin University, China**Location: WASHINGTON, 2nd Floor, Conference Center****Origami Engineering Structures***Prof. Zhong You, University of Oxford, UK*10:00 a.m. – 10:30 a.m. **Tea Break**

10:30 a.m. – 12:00 p.m.

APT3: Assembly Processes and Technologies 3**Session Chair: Prof. Olga Battaia****Location: HONGKONG, 1st Floor, Conference Center****APT-6. Laser Scanning Confocal Image Alignment Assists Sub-micron Accuracy Micro-assembly***Xin Ye, Feifei Wu, Zhijing Zhang, Bile Wan, and Yijin Zhao**Beijing Institute of Technology, China***APT-7. An Evaluation Method for Spatial Distribution Uniformity of Plane Form Error for Precision Assembly***Qiushuang Zhang, Xin Jin, Zhongqing Zhang, Zhijing Zhang, Zhihua Liu**Beijing Institute of Technology, China***APT-8. Operator Assignment Problem in Aircraft Assembly Lines: A New Planning Approach Taking into Account Economic and Ergonomic Constraints***Dmitry Arkhipov, Olga Battaia, Julien Cegarra, Alexander Lazarev**Universite de Toulouse, France***APT4: Assembly Processes and Technologies 4****Session Chair: Prof. Junfeng Wang****Location: MACAU, 1st Floor, Conference Center****APT-14. Measurement and Control Method for Miniature Fastener Tension in Precision Instrument***Zifu Wang, Zhijing Zhang, Can Cui*
*Beijing Institute of Technology, China***APT-15. Research on Virtual-real Biaxial Real-time Error Compensation Based on Fuzzy Control Theory***SunHongchang, ZhangZhijing, JinXin, Lilina, ZhengZhongpeng, Zhou Hongbin*
*Beijing Institute of Technology, China***APT-16. Numerical Analysis of Magnesium to Aluminum Joints in Friction Stir Blind Riveting***Weiming Wang, Kaifeng Wang, Haris Ali Khan, Jingjing Li, Scott Miller*
*Pennsylvania State University, USA*12:00 p.m. – 1:30 p.m. **Lunch (Buffet)****Location: 1st Floor Dining Room, Accommodation Center**

1:30 p.m. – 3:30 p.m.

HRC1: Human-Robot Collaboration 1**Session Chair: Dr. George Michalos****Location: HONGKONG, 1st Floor, Conference Center****HRC-1. Enabling Human-Robot-Interaction via Virtual and Augmented Reality in Distributed Control Systems***Jan Guhl, Johannes Hügle, Jörg Krüger*
*Technische Universität Berlin, Germany***HRC-2. A Method to Distinguish Potential Workplaces for Human-Robot-Collaboration***Sebastian Blankemeyer, Tobias Recker, Tobias Stuke, Jens Brokmann, Markus Geese, Michael Reiniger, Dennis Pischke, Assem Oubari, Annika Raatz*
*Leibniz Universität Hannover, Germany***HRC-3. Application of Wearable Devices for Supporting Operators in Human-robot Cooperative Assembly Tasks***Christos Gkournelos, Panagiotis Karagiannis, Niki Kousi, George Michalos, Spyridon Koukas, Sotiris Makris*
*University of Patras, Greece***HRC-4. Human Robot Collaboration - Using Kinect V2 for ISO/TS 15066 Speed and Separation Monitoring***Martin J. Rosenstrauch, Tessa J. Pannen, Jörg Krüger*
Fraunhofer Institute for Production Systems and Design Technology, Germany

HRC2: Human-Robot Collaboration 2

Session Chair: Prof. Yuhong Liu

Location: MACAU, 1st Floor, Conference Center

HRC-5. A Machine Learning-Enhanced Digital Twin Approach for Human-Robot-Collaboration*Klaus Dröder, Paul Bobka, Tomas Germann, Felix Gabriel, Franz Dietrich
TU Braunschweig, Germany***HRC-6. A Data Fusion System for Controlling The Execution Status in Human-robot Collaborative Cells***Angelos Argyrou, Christos Giannoulis, Andreas Sardelis, Panagiotis Karagiannis, George Michalos, Sotiris Makris
University of Patras, Greece***HRC-7. Calibration of A Modular Assembly System for Personalized and Adaptive Human Robot Collaboration***Patrick Rückert, Jannes Adam, Björn Papenberg, Henning Paulus, Kirsten Tracht
University of Bremen, Germany***HRC-8. Action Recognition in Assembly for Human-Robot-Collaboration using Hidden Markov Models***Julia Berg, Tim Reckordt, Christoph Richter, Gunther Reinhart
Fraunhofer IGCV, Germany*3:30 p.m. – 4:00 p.m. **Tea Break**

4:00 p.m. – 5:30 p.m.

AS1: Assembly Systems 1

Session Chair: Prof. He Tang

Location: HONGKONG, 1st Floor, Conference Center

AS-1. An Integrated Product-Process Hierarchical Modeling Method for Development of Complex Assembly Manufacturing Systems*He Tang
Eastern Michigan University, USA***AS-2. Creation of Configurations for An Assembly System with A Scalable Level of Automation***Tom Stähr, Lucas Englisch, Gisela Lanza
Karlsruhe Institute of Technology, Germany***AS-3. Method for Developing an Implementation Strategy of Cyber-Physical Production Systems for Small and Medium-sized Enterprises in China***Shun Yang, Nikolay Boev, Benjamin Haefner, Gisela Lanza
Karlsruhe Institute of Technology, Germany***AS2: Assembly Systems 2**

Session Chair: Prof. Zhijing Zhang

Location: MACAU, 1st Floor, Conference Center

AS-4. Virtual Factory Layouts from 3D Laser Scanning - A Novel Framework to Define Solid Model Requirements*Alexander Eriksson, Erik Sedelius, Jonatan Berglund, Björn Johansson
Chalmers University of Technology, Sweden***AS-5. Modular Design and Optimization for Precision Intelligent Assembly System***Chao Shao, Zhi-jing Zhang, Xin Ye, Yi-Jin Zhao, and Hong-chang Sun
Beijing Institute of Technology, China***AS-6. Optimal Configuration Design of Open Architecture Products Considering Product Adaptability and Diversity of Modules***Yongliang Chen, Hengli Lin, Deshuai Liu
Tianjin University, China*

5:30 p.m. – 6:00 p.m.

Closing Ceremony

Hosted by Prof. S. Jack Hu / Prof. Shuxin Wang

Location: WASHINGTON, 2nd Floor, Conference Center

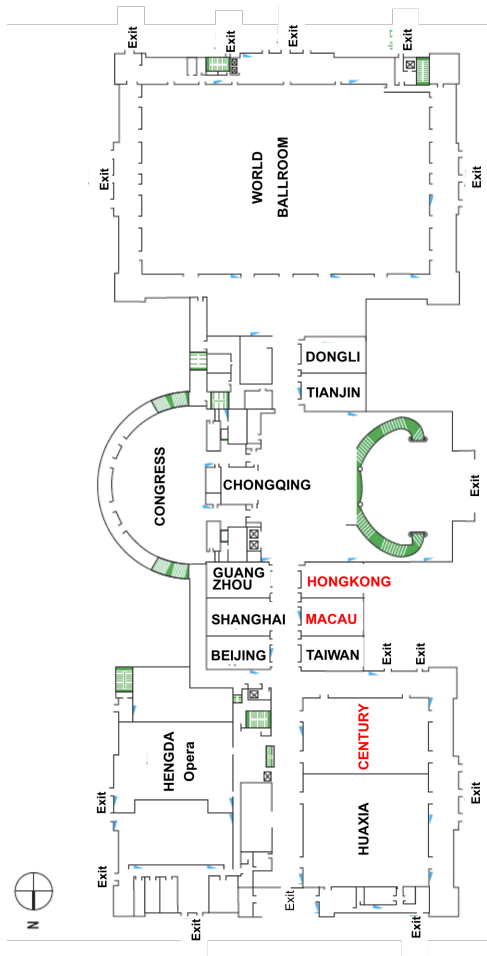
6:00 p.m. – 8:00 p.m. **Dinner (Buffet)**

Location: 1st Floor Dining Room, Accommodation Center

Floor Plan

Conference Center

1st floor



SEE YOU IN GREECE AT CATS 2020

2nd Floor

