The 7th
CIRP Conference on Assembly Technologies and Systems

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

PROGRAM

Hosted by
School of Mechanical Engineering
Tianjin University

Conference Sponsors

National Natural Science Foundation of China
Tianjin Municipal Science and Technology Commission

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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Phone: 86-22-2877 6520
Fax: 86-22-2877 6520

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 Belin, Germany
Chenhui Shao  University of Illinois, USA
He Tang  Eastern Michigan University, USA
Hui Wang  Florida State University, USA
Yanhui Wang  Tianjin University, China
# Conference at a Glance

<table>
<thead>
<tr>
<th>Time</th>
<th>Thursday (May 10th)</th>
<th>Friday (May 11th)</th>
<th>Saturday (May 12th)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:00 a.m.</td>
<td>Opening Ceremony CENTURY</td>
<td>Keynote: Mr. W. Yao WASHINGTON</td>
<td>8:00 a.m.</td>
</tr>
<tr>
<td>9:00 a.m.</td>
<td>Keynote: Prof. B. Duan CENTURY</td>
<td>Keynote: Prof. Y. Zhong WASHINGTON</td>
<td>9:00 a.m.</td>
</tr>
<tr>
<td>10:00 a.m.</td>
<td>Registration</td>
<td>Keynote: Prof. J. Krüger CENTURY</td>
<td>Tea Break</td>
</tr>
<tr>
<td>11:00 a.m.</td>
<td>Accommodation Center Lobby</td>
<td>Technical Sessions</td>
<td>11:00 a.m.</td>
</tr>
<tr>
<td>12:00 p.m.</td>
<td>Lunch (Buffet) 1st Floor Dining Room</td>
<td>Lunch (Buffet) 1st Floor Dining Room</td>
<td>12:00 p.m.</td>
</tr>
<tr>
<td>1:00 p.m.</td>
<td>Technical Sessions IRT- HONGKONG VRT- MACAU</td>
<td>Technical Sessions HRC1- HONGKONG HRC2- MACAU</td>
<td>1:00 p.m.</td>
</tr>
<tr>
<td>2:00 p.m.</td>
<td>Technical Sessions APT1- HONGKONG APT2- MACAU</td>
<td>Technical Sessions AS1- HONGKONG AS2- MACAU</td>
<td>2:00 p.m.</td>
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<tr>
<td>3:00 p.m.</td>
<td>Tea Break</td>
<td>Tea Break</td>
<td>3:00 p.m.</td>
</tr>
<tr>
<td>4:00 p.m.</td>
<td>Technical Sessions APT3- HONGKONG APT4- MACAU</td>
<td>Technical Sessions</td>
<td>4:00 pm</td>
</tr>
<tr>
<td>5:00 p.m.</td>
<td>Closing Ceremony WASHINGTON</td>
<td>Dinner (Buffet) 1st Floor Dining Room</td>
<td>5:00 pm</td>
</tr>
<tr>
<td>6:00 p.m.</td>
<td>Welcome Reception 1st Floor Dining Room, Accommodation Center</td>
<td>Conference Banquet CENTURY</td>
<td>6:00 pm</td>
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<td>7:00 p.m.</td>
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<td>9:00 p.m.</td>
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## 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
The 7th CIRP Conference on Assembly Technologies and Systems

**Session**: Affordance Based Approach to Automatic Program Generation for Industrial Robots in Manufacturing
**Location**: CENTURY, 1st Floor, Conference Center
**Session Chair**: Prof. Peihua Gu
**Hosted by**: Prof. Peihua Gu, 1st Floor, Conference Center

**VRT-1. Industrial Image Processing Applications as Orchestration of Web Services**
**Location**: MACAU, 1st Floor, Conference Center
**Session Chair**: Dr. Chaoyang Shi

**VRT-2. Industrial Robot Control with Object Recognition based on Deep Learning**
**Location**: MACAU, 1st Floor, Conference Center
**Session Chair**: Prof. Mihaela Banu

**VRT-3. Intuitive Robot Programming Using Augmented Reality**
**Location**: MACAU, 1st Floor, Conference Center
**Session Chair**: Prof. Mihaela Banu

**VRT-4. Intuitive robot programming through environment perception, augmented reality simulation and automated program verification**
**Location**: MACAU, 1st Floor, Conference Center
**Session Chair**: Prof. Mihaela Banu

**3:30 p.m. – 4:00 p.m.**
**Tea Break**

**4:00 p.m. – 6:30 p.m.**
**APT1: Assembly Processes and Technologies 1**
**Location**: HONGKONG, 1st Floor, Conference Center
**Session Chair**: Prof. Bogdan I. Epureanu

**APT-1. Simulation-Based Determination of Disassembly Forces**
**Location**: HONGKONG, 1st Floor, Conference Center
**Session Chair**: Prof. Bogdan I. Epureanu

**APT-2. Surrogate Model Based Uncertainty Analysis and Key Process Parameter Determination for Product Reliability in Assembling Process**
**Location**: HONGKONG, 1st Floor, Conference Center
**Session Chair**: Prof. Bogdan I. Epureanu

**APT-3. Simulation-based Planning of a Kind of Complex Product General Assembly Line**
**Location**: HONGKONG, 1st Floor, Conference Center
**Session Chair**: Prof. Bogdan I. Epureanu

**APT-4. Decision Tool for Designing Derivative Products for Supporting Assembly Planning of Large-volume Assembly groups**
**Location**: HONGKONG, 1st Floor, Conference Center
**Session Chair**: Prof. Bogdan I. Epureanu

**APT-5. Application of Design Principles for Assembly Instructions - evaluation of practitioner use**
**Location**: HONGKONG, 1st Floor, Conference Center
**Session Chair**: Prof. Bogdan I. Epureanu

**APT-6. Affordance Based Approach to Automatic Program Generation for Industrial Robots in Manufacturing**
**Location**: HONGKONG, 1st Floor, Conference Center
**Session Chair**: Prof. Bogdan I. Epureanu

**APT-7. Inductive Robot Programming Using Augmented Reality**
**Location**: HONGKONG, 1st Floor, Conference Center
**Session Chair**: Prof. Bogdan I. Epureanu

**APT-8. Intuitive Robot Programming through Environment Perception, Augmented Reality Simulation and Automated Program Verification**
**Location**: HONGKONG, 1st Floor, Conference Center
**Session Chair**: Prof. Bogdan I. Epureanu

**3:30 p.m. – 4:00 p.m.**
**Tea Break**

**4:00 p.m. – 6:30 p.m.**
**APT2: Assembly Processes and Technologies 2**
**Location**: HONGKONG, 1st Floor, Conference Center
**Session Chair**: Prof. Mihaela Banu

**APT-9. Modelling and Evaluating the Heat Transfer of Molten Thermoplastic Fibres in Automated Handling Processes**
**Location**: HONGKONG, 1st Floor, Conference Center
**Session Chair**: Prof. Mihaela Banu

**APT-10. An Artificial Neural Network Model for Predicting Joint Performance in Ultrasonic Welding of Composites**
**Location**: HONGKONG, 1st Floor, Conference Center
**Session Chair**: Prof. Mihaela Banu

**APT-11. Nonlinear Dynamic Analysis of Ultrasonic Metal Welding Using a Harmonic Balance Method**
**Location**: HONGKONG, 1st Floor, Conference Center
**Session Chair**: Prof. Mihaela Banu

**APT-12. Simulation method for precision bonding structure with micron scale adhesive layer**
**Location**: HONGKONG, 1st Floor, Conference Center
**Session Chair**: Prof. Mihaela Banu

**APT-13. Evaluation and Numerical Calculation of Entropy based on Contact Strain-Energy**
**Location**: HONGKONG, 1st Floor, Conference Center
**Session Chair**: Prof. Mihaela Banu

**7:00 p.m. – 9:00 p.m.**
**Conference Banquet**
**Hosted by**: Prof. Peihua Gu, Shantou University, China
**Location**: CENTURY, 1st Floor, Conference Center
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, Zhongqiang 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

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 Hügel, 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

Martin J. Rosenstrauch, Tessa J. Pannen, Jörg Krüger
Fraunhofer Institute for Production Systems and Design Technology, Germany

APT4: Assembly Processes and Technologies 4
Session Chair: Prof. Junfeng Wang
Location: MACAU, 1st Floor, Conference Center

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, ZhouHongbin
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

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HRC2: Human-Robot Collaboration 2
Session Chair: Prof. Yuhong Liu
Location: MACAU, 1st Floor, Conference Center

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

Patrick Rückert, Johannes Adam, Björn Papenberg, Henning Paulus, Kirsten Tracht
University of Bremen, Germany

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

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

Shun Yang, Nikolay Boev, Benjamin Haefner, Gisela Lanza
Karlsruhe Institute of Technology, Germany

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