



# 2019 IEEE/RSJ International Conference on Intelligent Robots and Systems

November 4 - 8, 2019 | The Venetian Macao | Macau SAR, China



# **IROS 2019**

**2019 IEEE/RSJ International Conference  
on Intelligent Robots and Systems**

## **Conference Digest**

November 4 – 8, 2019  
The Venetian Macao  
Macao, China

[www.iros2019.org](http://www.iros2019.org)

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### IROS 2019 Conference App

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## 1. Welcome Message

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Welcome to Macau. We are honored to host the 2019 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS). We hope that you enjoy the technical excellence and innovation on display at IROS 2019.

For the first time, IROS is being held in Macau, which is a city that has clearly set its sights to become the world's leading conference, resort, and shopping destination. We are pleased to provide you with a forum to present and discuss state-of-the-art concepts for novel research results, original perspectives on future developments, and innovative applications relevant to intelligent robots and smart machines. IROS 2019 shall include plenary and keynote talks, technical sessions, workshops and tutorials, forums, pioneers' talks, and exhibits to enrich fruitful discussions among conference attendees.

For this year's conference, we received 2,513 papers, 180 late breaking results posters, and 44 workshop and tutorial submissions, with authors from 53 countries and regions. The final program shall include 1,127 papers for oral presentation, 148 late breaking news posters, and 41 workshops and tutorials.

We hereby express genuine appreciation to the Macau government and various sponsors for their support. We are likewise grateful to all individuals who have contributed in advancing the objectives and goals of this conference. Lastly, we offer our heartfelt appreciation to the authors, conference participants, and volunteers for the success of this event.

Once again, we welcome you to one of the major tourist attractions in Asia and in the world. Macau's unique history and locations definitely offer visitors with unforgettable experiences and memories. We are confident that we can provide all attendees with considerable opportunities to experience the exceptional and harmonious diversity of Macau while participating in our prestigious conference.



**Dong Sun**

City University of Hong Kong, China  
General Chair



**Fumihito Arai**

Nagoya University, Japan  
Program Chair

## 2. Program at a Glance



| WORKSHOPS & TUTORIALS                              | CONFERENCE                              | CONFERENCE  | CONFERENCE   | WORKSHOPS & TUTORIALS                   |  |
|--|---|---|--|---|--|
| 9:00 – 18:00<br>Workshops & Tutorials<br>(L1 & LG) | 9:00 – 18:00<br>Robot Competitions (L3) | 8:30 – 9:00<br>Opening Ceremony (L3)                                  | 9:00 – 10:00<br>Keynote Talks VII – XII<br>(L3)                        | 9:00 – 17:00<br>Exhibition (L1)         |  |
|  |   | 9:00 – 10:30<br>Plenary Talks I & II<br>(L3)                          | 10:00 – 10:30<br>Coffee Break  |   | 9:00 – 10:30<br>Plenary Talks III & IV<br>(L3)   |
|  |   | 10:30 – 11:00<br>Coffee Break   | 10:30 – 12:00<br>Technical Sessions<br>(L1 & LG)                       |   | 10:30 – 11:00<br>Coffee Break                    |
|  |   | 11:00 – 12:30<br>Technical Sessions & Cutting Edge Forum<br>(L1 & LG) | 11:00 – 12:30<br>Technical Sessions<br>Cutting Edge Forum<br>(L1 & LG) |   |  |
| 9:00 – 18:00<br>Workshops & Tutorials<br>(L1 & LG) | 9:00 – 18:00<br>Robot Competitions (L3) | 12:30 – 13:30<br>Lunch & Poster Session (L1)                          | 12:00 – 13:00<br>Lunch & Poster Session (L1)                           | 9:00 – 17:00<br>Special Forum<br>(LG)   |  |
|  |   | 13:30 – 14:30<br>Keynote Talks I – VI<br>(L3)                         | 13:00 – 14:30<br>Technical Sessions & Cutting Edge Forum<br>(L1 & LG)  |   | 12:40 – 14:30<br>Awards Luncheon<br>(L3)         |
|  |   | 14:45 – 16:15<br>Technical Sessions<br>(L1 & LG)                      | 14:45 – 16:15<br>Technical Sessions & Cutting Edge Forum<br>(L1 & LG)  |   | 14:45 – 16:15<br>Technical Sessions<br>(L1 & LG) |
|  |   | 16:15 – 16:45<br>Coffee Break   | 16:15 – 16:45<br>Coffee Break  |   | 16:15 – 16:45<br>Coffee Break                    |
| 18:30 – 20:30<br>Welcome Reception<br>(L3)         | 9:00 – 18:00<br>Robot Competitions (L3) | 16:45 – 18:15<br>Technical Sessions<br>(L1 & LG)                      | 16:45 – 18:15<br>Technical Sessions<br>(L1 & LG)                       | 18:30 – 20:30<br>Farewell Party<br>(L3) |  |
|  |   | 16:45 – 18:15<br>Technical Sessions<br>(L1 & LG)                      | 16:45 – 18:15<br>Technical Sessions<br>(L1 & LG)                       |   |  |
|  |   |   | 19:00 – 21:30<br>Banquet – A Night in Venice<br>(L3)                   |   |  |

## Parallel Sessions—Tuesday, Nov 5

| Tr# | 11:00-12:30   | 14:45-16:15  | 16:45-18:15  |
|-----|---|--|--|
|     |   | TuSF1 (L3-RA)<br><b>Industrial Forum I</b>                 |  |
|     |   | 14:45-16:30<br>TuSF2 (L3-RB)<br><b>CEO Forum</b>           |  |
|     |   |  | 16:00-18:00<br>TuSF3 (L3-RC)<br><b>Government Forum</b>  |
| 1   | TuAT1 (L1-R1)<br><b>Calibration and Identification</b>  | TuBT1 (L1-R1)<br><b>3D Vision and Pose Estimation</b>      | TuCT1 (L1-R1)<br><b>RGB-D Perception</b>                 |
| 2   | TuAT2 (L1-R2)<br><b>Deep Learning for Aerial System</b>   | TuBT2 (L1-R2)<br><b>Deep Learning for Computer Vision</b>  | TuCT2 (L1-R2)<br><b>Deep Learning for Grasping</b>       |
| 3   | TuAT3 (L1-R3)<br><b>Learning and Adaptive System I</b>  | TuBT3 (L1-R3)<br><b>Learning and Adaptive System II</b>    | TuCT3 (L1-R3)<br><b>Learning and Adaptive System III</b> |
| 4   | TuAT4 (L1-R4)<br><b>Award Session I</b>   | TuBT4 (L1-R4)<br><b>Award Session II</b>                   | TuCT4 (L1-R4)<br><b>Award Session IV</b>                 |
| 5   | TuAT5 (L1-R5)<br><b>Robot Safety</b>  | TuBT5 (L1-R5)<br><b>Award Session III</b>                  | TuCT5 (L1-R5)<br><b>Award Session V</b>                  |
| 6   | TuAT6 (L1-R6)<br><b>Aerial Robotics I</b>   | TuBT6 (L1-R6)<br><b>Aerial Robotics II</b>                 | TuCT6 (L1-R6)<br><b>Aerial Robotics III</b>              |
| 7   | TuAT7 (L1-R7)<br><b>Computer Vision and Application I</b>   | TuBT7 (L1-R7)<br><b>Computer Vision and Application II</b> | TuCT7 (L1-R7)<br><b>Computer Vision for Automation I</b> |
| 8   | TuAT8 (LG-R8)<br><b>Cutting Edge Forum: Autonomous Driving: Contributions from Intelligent Robotics, AI and ITS</b> | TuBT8 (LG-R8)<br><b>Autonomous Agents and Robots</b>       | TuCT8 (LG-R8)<br><b>Autonomous Vehicle Navigation I</b>  |

| Tr# | 11:00-12:30   | 14:45-16:15  | 16:45-18:15   |
|-----|---|--|---|
| 9   | TuAT9 (LG-R9)<br><b>Social Human-Robot Interaction I</b>    | TuBT9 (LG-R9)<br><b>Social Human-Robot interaction II</b>          | TuCT9 (LG-R9)<br><b>Social Human-Robot interaction III</b>          |
| 10  | TuAT10 (LG-R10)<br><b>SLAM I</b>                            | TuBT10 (LG-R10)<br><b>SLAM II</b>                                  | TuCT10 (LG-R10)<br><b>SLAM III</b>                                  |
| 11  | TuAT11 (LG-R11)<br><b>Medical Robot: Design</b>             | TuBT11 (LG-R11)<br><b>Medical Robot: Control</b>                   | TuCT11 (LG-R11)<br><b>Medical Robot: Continuum</b>                  |
| 12  | TuAT12 (LG-R12)<br><b>Human Detection and Tracking</b>      | TuBT12 (LG-R12)<br><b>Gesture Posture and Facial Expressions</b>   | TuCT12 (LG-R12)<br><b>Human Factor and Human-In-The-Loop I</b>      |
| 13  | TuAT13 (LG-R13)<br><b>Humanoid and Bipedal Locomotion I</b> | TuBT13 (LG-R13)<br><b>Humanoid and Bipedal Locomotion II</b>       | TuCT13 (LG-R13)<br><b>Humanoid and Bipedal Locomotion III</b>       |
| 14  | TuAT14 (LG-R14)<br><b>Space Robotics</b>                    | TuBT14 (LG-R14)<br><b>Climbing Robots</b>                          | TuCT14 (LG-R14)<br><b>Robotics in Construction</b>                  |
| 15  | TuAT15 (LG-R15)<br><b>Motion and Path Planning I</b>        | TuBT15 (LG-R15)<br><b>Motion and Path Planning II</b>              | TuCT15 (LG-R15)<br><b>Motion and Path Planning III</b>              |
| 16  | TuAT16 (LG-R16)<br><b>Grasping I</b>                        | TuBT16 (LG-R16)<br><b>Grasping II</b>                              | TuCT16 (LG-R16)<br><b>Grasping III</b>                              |
| 17  | TuAT17 (LG-R17)<br><b>Micro/ Nano Robots I</b>              | TuBT17 (LG-R17)<br><b>Micro/ Nano Robots II</b>                    | TuCT17 (LG-R17)<br><b>Micro/ Nano Robots III</b>                    |
| 18  | TuAT18 (LG-R18)<br><b>Localization I</b>                    | TuBT18 (LG-R18)<br><b>Localization II</b>                          | TuCT18 (LG-R18)<br><b>Localization III</b>                          |
| 19  | TuAT19 (LG-R19)<br><b>AI-Based Methods for Robotics</b>     | TuBT19 (LG-R19)<br><b>Planning, Scheduling, and Coordination I</b> | TuCT19 (LG-R19)<br><b>Planning, Scheduling, and Coordination II</b> |
| 20  | TuAT20 (LG-R20)<br><b>Biologically-Inspired Robots I</b>    | TuBT20 (LG-R20)<br><b>Biologically-Inspired Robots II</b>          | TuCT20 (LG-R20)<br><b>Biologically-Inspired Robots III</b>          |

## Technical Sessions—Wednesday, Nov 6

| Tr# | 10:30-12:00  | 13:00-14:30  | 14:45-16:15   | 16:45-18:15   |
|-----|--|--|---|---|
|     | WeSF1 (L3-RA)<br><b>Industrial Forum II</b>                      |  |   |   |
|     | WeAPT (L3-RB)<br><b>Pioneer's Talks</b>                          |  |   |   |
| 1   | WeAT1 (L1-R1)<br><b>Object Detection and Segmentation I</b>      | WeBT1 (L1-R1)<br><b>Object Detection and Segmentation II</b>                           | WeCT1 (L1-R1)<br><b>Semantic Scene Understanding I</b>                            | WeDT1 (L1-R1)<br><b>Semantic Scene Understanding II</b>         |
| 2   | WeAT2 (L1-R2)<br><b>Deep Learning from Demonstration</b>         | WeBT2 (L1-R2)<br><b>Deep Learning in Robotics and Automation I</b>                     | WeCT2 (L1-R2)<br><b>Deep Learning in Robotics and Automation II</b>               | WeDT2 (L1-R2)<br><b>Deep Learning of Autonomous Agents</b>      |
| 3   | WeAT3 (L1-R3)<br><b>Learning from Motion and Path Planning I</b> | WeBT3 (L1-R3)<br><b>Learning from Motion and Path Planning II</b>                      | WeCT3 (L1-R3)<br><b>Learning from Demonstration</b>                               | WeDT3 (L1-R3)<br><b>Learning from Human-Robot Interaction</b>   |
| 4   | WeAT4 (L1-R4)<br><b>Mechanism Design I</b>                       | WeBT4 (L1-R4)<br><b>Mechanism Design II</b>  | WeCT4 (L1-R4)<br><b>Mechanism Design III</b>                                      | WeDT4 (L1-R4)<br><b>Mechanism Design IV</b>                     |
| 5   | WeAT5 (L1-R5)<br><b>Telerobotics and Teleoperation I</b>         | WeBT5 (L1-R5)<br><b>Telerobotics and Teleoperation II</b>                              | WeCT5 (L1-R5)<br><b>Robot Control I</b>   | WeDT5 (L1-R5)<br><b>Robot Control II</b>                        |
| 6   | WeAT6 (L1-R6)<br><b>Aerial Robotics IV</b>                       | WeBT6 (L1-R6)<br><b>Aerial Robotics V</b>  | WeCT6 (L1-R6)<br><b>Aerial Robotics VI</b>  | WeDT6 (L1-R6)<br><b>Aerial Robotics VII</b>                     |
| 7   | WeAT7 (L1-R7)<br><b>Computer Vision for Automation II</b>        | WeBT7 (L1-R7)<br><b>Computer Vision and Visual Servoing I</b>                          | WeCT7 (L1-R7)<br><b>Computer Vision and Visual Servoing II</b>                    | WeDT7 (L1-R7)<br><b>Performance Evaluation and Benchmarking</b> |
| 8   | WeAT8 (LG-R8)<br><b>Autonomous Vehicle Navigation II</b>         | WeBT8 (LG-R8)<br><b>Autonomous Vehicle Navigation III</b>                              | WeCT8 (LG-R8)<br><b>Autonomous Vehicle Navigation IV</b>                          | WeDT8 (LG-R8)<br><b>Autonomous Vehicle Navigation V</b>         |
| 9   | WeAT9 (LG-R9)<br><b>Social Human-Robot interaction IV</b>        | WeBT9 (LG-R9)<br><b>Cutting Edge Forum: Human Interaction with Multi-Robot Systems</b> | WeCT9 (LG-R9)<br><b>Cutting Edge Forum: Cognitive Architectures for Humanoids</b> | WeDT9 (LG-R9)<br><b>Robot Audition</b>                          |

| Tr# | 10:30-12:00  | 13:00-14:30   | 14:45-16:15   | 16:45-18:15  |
|-----|--|---|---|--|
| 10  |  | WeBT10 (LG-R10)<br><b>SLAM IV</b>   | WeCT10 (LG-R10)<br><b>SLAM V</b>  | WeDT10 (LG-R10)<br><b>Visual SLAM I</b>                                  |
| 11  | WeAT11 (LG-R11)<br><b>Medical Robot:<br/>Endoscope</b>   | WeBT11 (LG-R11)<br><b>Cutting Edge Forum:<br/>Surgical Robotics with AI</b>                   |   | WeDT11 (LG-R11)<br><b>Medical Robot:<br/>Endovascular and<br/>Needle</b> |
| 12  | WeAT12 (LG-R12)<br><b>Human Factors<br/>and Human-In-<br/>The-Loop II</b>                      | WeBT12 (LG-R12)<br><b>Human-Centered<br/>Robotics I</b>                                       | WeCT12 (LG-R12)<br><b>Human-Centered<br/>Robotics II</b>                      | WeDT12 (LG-R12)<br><b>Service Robots</b>                                 |
| 13  | WeAT13 (LG-R13)<br><b>Humanoid Robots<br/>I</b>  | WeBT13 (LG-R13)<br><b>Humanoid Robots<br/>II</b>  | WeCT13 (LG-R13)<br><b>Legged Robots I</b>                                     | WeDT13 (LG-R13)<br><b>Legged Robots II</b>                               |
| 14  | WeAT14 (LG-R14)<br><b>Field Robots I</b>   | WeBT14 (LG-R14)<br><b>Field Robots II</b>   | WeCT14 (LG-R14)<br><b>Field Robots III</b>                                    | WeDT14 (LG-R14)<br><b>Agricultural<br/>Automation</b>                    |
| 15  | WeAT15 (LG-R15)<br><b>Motion and Path<br/>Planning: Aerial<br/>and Autonomous<br/>Vehicles</b> | WeBT15 (LG-R15)<br><b>Motion and Path<br/>Planning:<br/>Learning and<br/>Adaptive Systems</b> | WeCT15 (LG-R15)<br><b>Motion and Path<br/>Planning: Legged<br/>Robots</b>     | WeDT15 (LG-R15)<br><b>Motion and Path<br/>Planning:<br/>Manipulators</b> |
| 16  | WeAT16 (LG-R16)<br><b>Grasping and<br/>Manipulation</b>  | WeBT16 (LG-R16)<br><b>Perception for<br/>Grasping and<br/>Manipulation I</b>                  | WeCT16 (LG-R16)<br><b>Perception for<br/>Grasping and<br/>Manipulation II</b> | WeDT16 (LG-R16)<br><b>Grippers and<br/>Other End-<br/>Effectors</b>      |
| 17  | WeAT17 (LG-R17)<br><b>Virtual Reality<br/>and Interfaces</b>                                   | WeBT17 (LG-R17)<br><b>Wearable Robots</b>   | WeCT17 (LG-R17)<br><b>Physically<br/>Assistive Devices</b>                    | WeDT17 (LG-R17)<br><b>Rehabilitation<br/>Robotics I</b>                  |
| 18  | WeAT18 (LG-R18)<br><b>Localization IV</b>  | WeBT18 (LG-R18)<br><b>Swarm Robotics</b>  | WeCT18 (LG-R18)<br><b>Cellular and<br/>Modular Robots</b>                     | WeDT18 (LG-R18)<br><b>Dynamics</b>                                       |
| 19  | WeAT19 (LG-R19)<br><b>Path Planning for<br/>Multiple Robots I</b>                              | WeBT19 (LG-R19)<br><b>Path Planning for<br/>Multiple Robots II</b>                            | WeCT19 (LG-R19)<br><b>Reactive and<br/>Sensor-Based<br/>Planning</b>          | WeDT19 (LG-R19)<br><b>Sensing and<br/>Planning</b>                       |
| 20  | WeAT20 (LG-R20)<br><b>Biologically-<br/>Inspired Robots<br/>IV</b>                             | WeBT20 (LG-R20)<br><b>Neurorobotics</b>   | WeCT20 (LG-R20)<br><b>Soft Robot:<br/>Applications</b>                        | WeDT20 (LG-R20)<br><b>Soft Robot:<br/>Materials and<br/>Design</b>       |

## Technical Sessions—Thursday, Nov 7

| Tr# | 11:00-12:30  | 14:45-16:15   | 16:45-18:15  |
|-----|--|---|--|
| 1   | ThAT1 (L1-R1)<br><b>Sensor Fusion and<br/>Sensor-Based Control</b> | ThBT1 (L1-R1)<br><b>Sensor Fusion I</b>                           | ThCT1 (L1-R1)<br><b>Sensor Fusion II</b>                           |
| 2   | ThAT2 (L1-R2)<br><b>Deep Learning with<br/>Visual Methods</b>      | ThBT2 (L1-R2)<br><b>Learning for<br/>Localization</b>             | ThCT2 (L1-R2)<br><b>Learning for Mobile<br/>System</b>             |
| 3   | ThAT3 (L1-R3)<br><b>Physical Human-Robot<br/>Interaction I</b>     | ThBT3 (L1-R3)<br><b>Physical Human-Robot<br/>Interaction II</b>   | ThCT3 (L1-R3)<br><b>Physical Human-Robot<br/>Interaction III</b>   |
| 4   | ThAT4 (L1-R4)<br><b>Tendon/Wire<br/>Mechanism</b>                  | ThBT4 (L1-R4)<br><b>Parallel Robots</b>                           | ThCT4 (L1-R4)<br><b>Compliant Structures</b>                       |
| 5   | ThAT5 (L1-R5)<br><b>Compliance and<br/>Impedance Control</b>       | ThBT5 (L1-R5)<br><b>Optimal Control I</b>                         | ThCT5 (L1-R5)<br><b>Optimal Control II</b>                         |
| 6   | ThAT6 (L1-R6)<br><b>Aerial Robotics VIII</b>                       | ThBT6 (L1-R6)<br><b>Model Learning for<br/>Control I</b>          | ThCT6 (L1-R6)<br><b>Model Learning for<br/>Control II</b>          |
| 7   | ThAT7 (L1-R7)<br><b>Visual Learning</b>                            | ThBT7 (L1-R7)<br><b>Vision-Based<br/>Navigation I</b>             | ThCT7 (L1-R7)<br><b>Vision-Based<br/>Navigation II</b>             |
| 8   | ThAT8 (LG-R8)<br><b>Intelligent<br/>Transportation Systems</b>     | ThBT8 (LG-R8)<br><b>Simulation and<br/>Amination</b>              | ThCT8 (LG-R8)<br><b>Control and<br/>Programming</b>                |
| 9   | ThAT9 (LG-R9)<br><b>Cognitive Human-<br/>Robot interaction I</b>   | ThBT9 (LG-R9)<br><b>Cognitive Human-<br/>Robot interaction II</b> | ThCT9 (LG-R9)<br><b>Cognitive Human-<br/>Robot Interaction III</b> |
| 10  | ThAT10 (LG-R10)<br><b>Visual SLAM II</b>                           | ThBT10 (LG-R10)<br><b>Mapping I</b>                               | ThCT10 (LG-R10)<br><b>Mapping II</b>                               |
| 11  | ThAT11 (LG-R11)<br><b>Medical Robot:<br/>Laparoscopic</b>          | ThBT11 (LG-R11)<br><b>Medical Robot:<br/>Microsurgery</b>         | ThCT11 (LG-R11)<br><b>Medical Robot: Vision</b>                    |



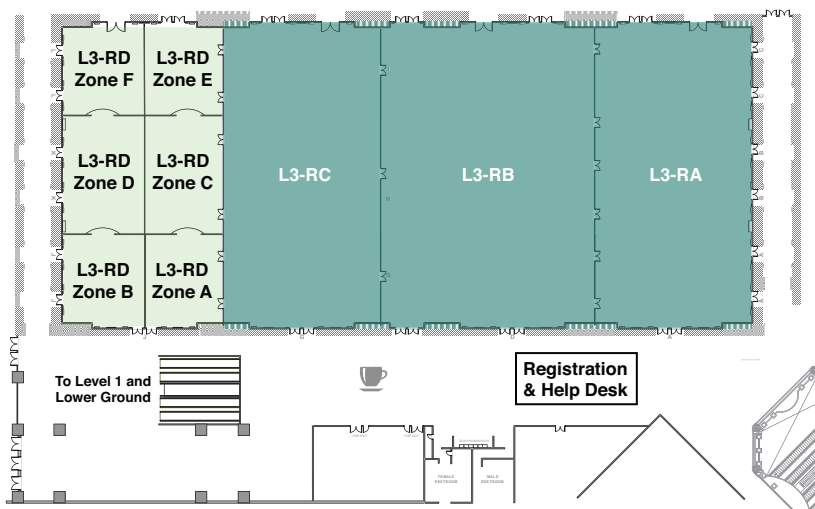
| Tr# | 11:00-12:30   | 14:45-16:15  | 16:45-18:15   |
|-----|---|--|---|
| 12  | ThAT12 (LG-R12)<br><b>Cutting Edge Forum:<br/>Human Movement<br/>Understanding for<br/>Intelligent Robots and<br/>Systems</b> | ThBT12 (LG-R12)<br><b>Force and Tactile<br/>Sensing I</b>    | ThCT12 (LG-R12)<br><b>Force and Tactile<br/>Sensing II</b>      |
| 13  | ThAT13 (LG-R13)<br><b>Legged Robots III</b>   | ThBT13 (LG-R13)<br><b>Hydraulic/Pneumatic<br/>Actuators</b>  | ThCT13 (LG-R13)<br><b>Industrial Robots &amp;<br/>Actuators</b> |
| 14  | ThAT14 (LG-R14)<br><b>Marine Robots I</b>   | ThBT14 (LG-R14)<br><b>Marine Robots II</b>                   | ThCT14 (LG-R14)<br><b>Marine Robots III</b>                     |
| 15  | ThAT15 (LG-R15)<br><b>Behavior-Based<br/>Systems</b>  | ThBT15 (LG-R15)<br><b>Collision Avoidance I</b>              | ThCT15 (LG-R15)<br><b>Collision Avoidance II</b>                |
| 16  | ThAT16 (LG-R16)<br><b>Grasping and Object<br/>Tracking</b>  | ThBT16 (LG-R16)<br><b>Haptics and Bio-<br/>Inspired</b>      | ThCT16 (LG-R16)<br><b>Haptics and Haptic<br/>Interfaces</b>     |
| 17  | ThAT17 (LG-R17)<br><b>Rehabilitation Robotics<br/>II</b>  | ThBT17 (LG-R17)<br><b>Prosthetics and<br/>Exoskeletons I</b> | ThCT17 (LG-R17)<br><b>Prosthetics and<br/>Exoskeletons II</b>   |
| 18  | ThAT18 (LG-R18)<br><b>Multi-Robot Systems I</b>   | ThBT18 (LG-R18)<br><b>Multi-Robot Systems II</b>             | ThCT18 (LG-R18)<br><b>Multi-Robot Systems III</b>               |
| 19  | ThAT19 (LG-R19)<br><b>Manipulation Planning<br/>I</b>   | ThBT19 (LG-R19)<br><b>Manipulation Planning<br/>II</b>       | ThCT19 (LG-R19)<br><b>Dexterous<br/>Manipulation</b>            |
| 20  | ThAT20 (LG-R20)<br><b>Soft Robot: Modelling,<br/>Control and Learning</b>   | ThBT20 (LG-R20)<br><b>Soft Sensors and<br/>Actuators I</b>   | ThCT20 (LG-R20)<br><b>Soft Sensors and<br/>Actuators II</b>     |

### 3. Floor Maps

#### The Venetian Macao – Entrance to Conference Venue (Level 1)

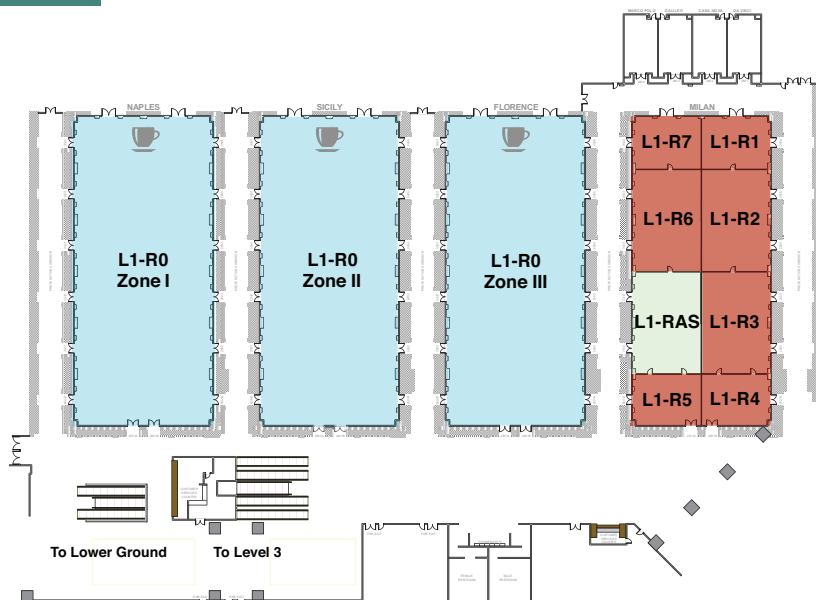


## Level 3



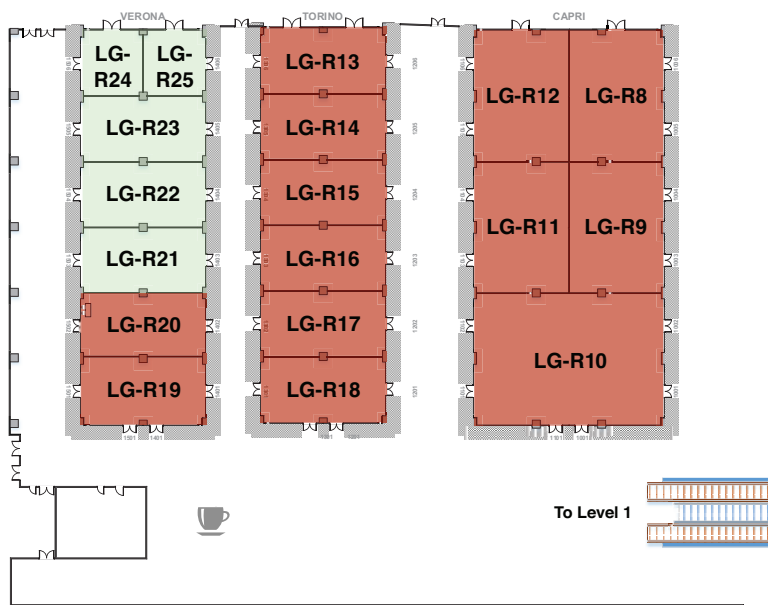
- Plenary Talks, Pioneer's Talks, Keynote Talks, Forums, Welcome Reception, Banquet, and Farewell Party
- Competitions
- Registration and Help Desk

## Level 1



- Technical Sessions and Workshops
- Exhibition (L1-R0) and Poster Sessions (L1-R0 Zone I)
- Others

## Lower Ground



- Technical Sessions, Cutting Edge Forums, Special Forum, and Workshops
- Others

## 4. Sponsors

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### Organizers



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<https://ubtrobot.com/?ls=en>



Established in March 2012, UBTECH ROBOTICS CORP LTD is a highly innovative software house, systems integrator and technology provider.

Aim to the final vision “bring smart robots to every family”, UBTECH not only focus on the technology research, development and application of AI and robotics, but also provide industry solutions in various fields, such as AI education, smart retail, security in industrial parks/campus.

With the robotics technology, UBTECH empowers different industries by providing one-stop service to customers and trying to build an intelligent robot ecosystem featuring “hardware, software, service and content”.

## Gold Sponsors

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<https://global.cainiao.com/en>



Cainiao Network is dedicated to meeting Alibaba Group's logistics vision of fulfilling consumer orders within 24 hours in China and within 72 hours anywhere else in the world. It adopts a platform approach to establish a nationwide fulfillment network that leverages the capacities and capabilities of logistics partners to offer domestic and international one-stop-shop logistics services and supply chain management solutions, fulfilling various logistics needs of merchants and consumers at scale. Cainiao Network is a business of Alibaba Group.

### Khalifa University

<https://www.ku.ac.ae/>



جامعة خليفة  
Khalifa University

The newly-established Khalifa University (KU) is a world-class, research-intensive institution based in Abu Dhabi, UAE. KU endeavors to be a leader among global universities, and has already gained international recognition. KU Centre for Robotics and Autonomous Systems (KUCARS) has a thriving robotics community, with over 50 researchers and state of the art lab facilities. KU organizes the biennial Mohamed Bin Zayed International Robotics Challenge (MBZIRC) addressing real world problems and pushing technological boundaries in robotics.

## Silver Sponsors

### INNFOSS

<http://www.innfos.com/>

INNFOSS®

The INNFOSS R&D team, founded in 2011, has been focusing on the development of underlying technologies for high performance robots. INNFOSS's self-developed SCA (Smart Compliant Actuator) features highly integrated servo system, super low cost and compliant control, which can be widely used in various fields.

### KUKA

<https://www.kuka.com/>

KUKA

KUKA is a global automation corporation with sales of around 3.2 billion euro and roughly 14,200 employees. As one of the world's leading suppliers of intelligent automation solutions, KUKA offers customers everything they need, from a robot to fully automated systems. The company is headquartered in Augsburg, Germany.

### Mech-Mind Robotics

<http://www.mech-mind.net/>





Aiming at putting intelligence into industrial robots, Mech-Mind was founded in October 2016.

With advanced technologies including deep learning and 3D vision, Mech-Mind provides cost-effective and high-performance 3D smart cameras for universities, institutes and academies.

We have already closed five rounds of funding from Intel and well-known VCs.

### Meituan

<https://about.meituan.com/en.html>



The mission of Meituan is “We help people eat better, live better”. As China’s leading e-commerce platform for services, Meituan operates well-known mobile apps in China, including Meituan, Dianping, Meituan Waimai, Meituan Bike and others. Meituan offers over 200 service categories, including catering, on-demand delivery, car-hailing, bike-sharing, hotel and travel booking, movie ticketing, and other entertainment and lifestyle services, and covers 2800 cities and counties across China.

### Scale AI

<https://scale.com/>



## Bronze Sponsors

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<https://accerion.tech/>



Accerion is a deep-tech company building advanced positioning technology for next-gen autonomous industrial robots and mobile platforms. Our technology is infrastructure-free yet boasts millimeter-level accuracy, even in dynamic environments.

### ATI Industrial Automation

<https://www.ati-ia.com/>



ATI INDUSTRIAL AUTOMATION is the leading engineering-based world developer of robotic end-effectors, and robot arm tooling, was founded in 1989. Sales and support offices in Michigan, China, Brazil, and Mexico.

### Autonomous Intelligent Driving GmbH

<https://aid-driving.eu/>



Based in Munich, AID is Volkswagen’s Group Center of Excellence for the development of a universal Level 4 self-driving system for urban environments.

### Baidu

<https://www.baidu.com/>



Baidu is the leading Chinese language Internet search provider and the largest Chinese website globally. Baidu aims to make the complicated world simpler through technology.

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<https://www.intelrealsense.com/>

Intel® RealSense™ technology is shaping the future of technology by equipping devices and machines with the ability to perceive their surroundings. An evolutionary advancement for computer and machine technology, this is a critical step in developing machines that can understand, interact with, and learn from their environment

### iRobot Corp



<https://www.irobot.com/>

iRobot is the leading global consumer robot company that empowers people to do more. iRobot is committed to fostering invention, discovery and technological exploration in the pursuit of practical and valuable robot products for the home.

### Krypto Labs



<https://kryptolabs.com/>

Krypto Labs, a global innovation hub, is the organizer of Drone X Challenge 2020, a US\$1.5+ million challenge pushing the frontiers of drone innovation.

### MathWorks



<https://www.mathworks.com>

The MATLAB and Simulink product families are fundamental applied math and computational tools adopted by more than 5000 universities and colleges. [mathworks.com](https://www.mathworks.com)

### Shenzhen Institute of Artificial Intelligence and Robotics for Society (AIRS)



<https://airs.cuhk.edu.cn/en>

AIRS, an institute for fundamental and applied researches in artificial intelligence and robotics, creates a new mode combining top university resources, international collaborations, industrial demands, investment support, and incubation motivations, etc.

### Tencent Robotics X



<https://ai.tencent.com/ailab/en/index>

Tencent Robotics X is a corporate-level research and application lab of robotics established in 2018, with a vision of exploring the next generation of evolving robots.

## Toyota Research Institute

<https://www.tri.global/>

Toyota Research Institute is developing active safety and automated driving technologies, robotics, and other human amplification capabilities for Toyota. For more information on U.S.-based TRI, visit <http://tri.global>.



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## 10. General Information



### On-site Registration and Help Desk

The counter for general information and on-site registration will be open at Pre-Function Area, Level 3 during:

|                  |  |
|------------------|--|
| Sunday, Nov 3    | 16:00 – 18:00                          |
| Monday, Nov 4    | 8:00 – 18:00                           |
| Tuesday, Nov 5   | 7:30 – 18:00                           |
| Wednesday, Nov 6 | 8:00 – 18:00                           |
| Thursday, Nov 7  | 8:30 – 17:00                           |
| Friday, Nov 8    | 8:30 – 13:00 (will be open on Level 1) |

### Internet Access

Free wifi is available during the conference at the entire congress center. The login details are:

SSID: FreeWiFi.MO by Sands Resort

Password not required.

SSID: IROS

Password: iros2019

### Instructions for Presenters

Papers are organized into 90-minute sessions of six papers. Each speaker is allocated 15 minutes for your talk, including the time for Q&A and for the changeover between speakers, so please aim for no more than 12 minutes for the presentation itself.

Please bring your slides on your own laptop and presentation remote. You need to meet the chair of your session at the podium 10 minutes before the start of the session and check that the laptop projects correctly. Each room has a projector (16:9) with VGA connector.

In Macau, the standard voltage is 220V and the standard frequency is 50Hz. Please bring your power plug adapter if necessary.

### Late Breaking Results Poster Sessions

|                                 |                             |
|---------------------------------|-----------------------------|
| Tuesday, Nov 5, 12:30 – 13:30   | Room L1-R0, Zone I, Level 1 |
| Wednesday, Nov 6, 12:00 – 13:00 | Room L1-R0, Zone I, Level 1 |

The poster sessions are intended to reach out to broader robotics research communities and address technological challenges in developing friendly robots that can work effectively with, for, and around people.

### Instructions for Poster Presenters

The poster format is paper posters of A0 size with portrait orientation. TV screens are NOT available.

On the day of your presentation, your poster must be ready by 9:00, before the first sessions start. Volunteers will be available to help you from 8:30 to 8:55 at Zone I, L1-R0, Level 1.

Your poster should stay up the entire day of your presentation slot to give it as much exposure as possible. Please take down your poster at the end of the day or 18:00.

**Exhibition**

IROS 2019 Exhibits are located at L1-R0, Zone I – III, Level 1. Exhibit hours are as follows:

|                  |              |
|------------------|--------------|
| Tuesday, Nov 5   | 8:30 – 18:00 |
| Wednesday, Nov 6 | 9:00 – 18:00 |
| Thursday, Nov 7  | 9:00 – 17:00 |

## 11. About Macau

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With the historical background of once being a colony of the Portuguese, Macau is full of colorful cultures while also contains different kinds of creativity. Various styles of churches could be found decorating the city and local artists innovate local music that flows around the city. Being near to Hong Kong, Macau also has a humid subtropical climate. The population of Macau is estimated at around 670,000 people, being the most densely populated region in the world. The official language of Macau are Portuguese and Chinese, however, people in Macau mainly speak in Cantonese due to regional factor.

### Districts

Geographically, Macau is divided into four regions: the Macau Peninsula attached to the mainland China, two islands of Taipa and Coloane, and the reclamation area between the two islands called Cotai. The Venetian Macao is located in the region of Cotai.

### Attractions

Macau develops itself into a quality international tourist destination. There are various attractions, from historical temples & churches to modern buildings, from culture & festive events to nightlife, from shopping malls to tranquil parks. One of the most famous scenic tourist spots must be 'The Ruins of St Paul'. It was a Catholic church in the 17th century, and is now listed as one of the World Heritage.

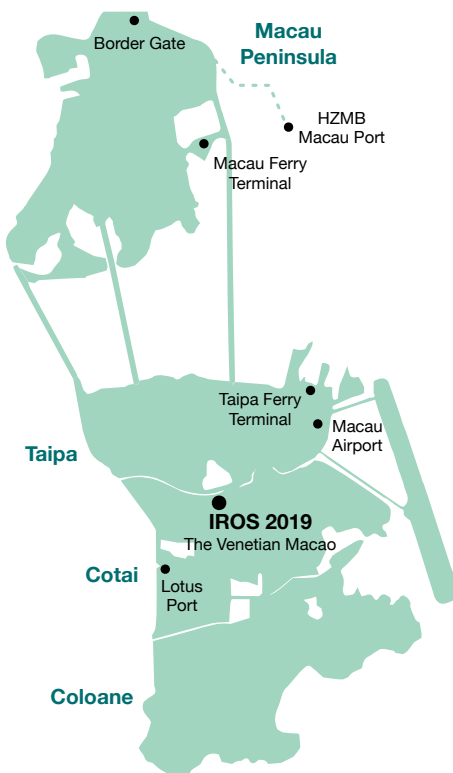
Macau has a lot of astonished shows, one of the famous shows is the "House of Dancing Water" hosted at City of Dreams. It features with water stunts, circus acrobatics, theater, Chinese and Western classical music, and some Kung Fu.

Moreover, Macau is well-known of her unique Macanese cuisine that combines the best of Chinese, Portuguese and Western ingredients and cooking. Thus, Rua du Cunha is a local street that you can't miss. It is a pedestrian street that provides you diverse traditional food, including Macanese egg tarts, almond cake and Macanese minchi, which are some of the well-known food that you must try in Macau.

### Currency

Macau's currency unit is Macanese Pataca (MOP\$). The Pataca is divided into 100 avos. There are banknotes and coins in the following denominations: 1,000, 500, 100, 50, 20, 10 banknotes, and 10, 5, 2, 1 Patacas and 50, 20, 10 avos coins. It is easy to buy MOP\$ at Hong Kong International Airport or Macau International Airport, hotels, or to use the ATMs available in Macao. Hong Kong dollars (HKD) are also accepted almost everywhere. The official exchange rate is MOP103.20 = HKD100.00.

## 12. Transportation



### To Macau

#### Via Macau International Airport

Macau International Airport operates 24 hours a day, you may take a direct or connecting flight to Macau International Airport. There are direct flights available from Taiwan, Japan and major China cities to Macau.

#### From Hong Kong International Airport

An airport ferry service is available for passengers travelling to Macau via Hong Kong International Airport. The ferry trip takes about 70 minutes. You can arrive in or depart from Macau via Hong Kong International Airport as a transit stop without having to pass through Hong Kong Customs and Immigration formalities and also without the inconvenience of carrying their luggage to the Ferry Terminal. Please tell the staff that your final destination is Macau and do not enter Hong Kong at the time of boarding procedures at the departing airport.

### From Hong Kong via Ferry

There are two major operators: Cotai Water Jet and Turbo Jet, that provide ferry service between Hong Kong and Macau. The frequency of departure for Cotai Water Jet and Turbo Jet are 30 minutes and 15 minutes respectively. Ferry terminals are located at

- Hong Kong International Airport (no need to go through Hong Kong Customs)
- Shun Tak Centre (Sheung Wan, Hong Kong)
- China Ferry Terminal (Tsim Sha Tsui, Hong Kong)
- Tuen Mun Ferry Terminal (New Territories, Hong Kong).

Advance reservation is available but not required. More information is available at the operators' websites:

<https://www.cotaiwaterjet.com>

<https://www.turbojet.com.hk>

### From Hong Kong via Hong Kong-Zhuhai-Macao Bridge (HZMB)

The 55-km bridge-tunnel system is the longest sea crossing in the world. Passengers may use the 24-hour HZMB shuttle bus service. The journey between the Hong Kong port and the Macau port takes approximately 40 mins. The Hong Kong port, located in the proximity of Hong Kong International airport, can be reached from Hong Kong by taxi or several airport buses including A11, A21, A22, A29, A31, A33X, A36, A41, and B4 routes.

Alternatively, there are direct shuttle buses from Hong Kong downtown to the Venetian Macao and The Parisian Macao from around 8:00am till 6:00pm daily. These buses depart from the shopping mall Elements and Jordan station. Please refer to <https://www.onebus.hk/en> for further information.

### To The Venetian Macao (conference venue)

Upon arrival in Macau, participants can use complementary shuttle bus service offered by The Venetian Macao Resort Hotel (VMRH) from the airport, ferry terminals and border gates.

| From                                | To                   | Hours         | Frequency |
|-------------------------------------|----------------------|---------------|-----------|
| Macau Ferry                         | VMRH                 | 09:00 – 00:00 | 5-15 mins |
| VMRH                                | Macau Ferry          | 09:00 – 00:00 | 5-15 mins |
| Taipa Ferry                         | VMRH (Porte Cochere) | 07:30 – 01:00 | 5-15 mins |
| VMRH (West Lobby)                   | Taipa Ferry          | 06:15 – 00:20 | 5-15 mins |
| Sands                               | VMRH                 | 10:00 – 00:00 | 5-15 mins |
| VMRH                                | Sands                | 10:00 – 00:00 | 5-15 mins |
| Border Gate<br>(Tour Coach Station) | VMRH                 | 09:00 – 01:00 | 5-15 mins |
| Border Gate                         | VMRH                 | 09:00 – 01:00 | 5-10 mins |

(Casino & Hotel  
Shuttle Bus Station)

|                            |  |               |            |
|----------------------------|--|---------------|------------|
| VMRH                       | Border Gate  | 09:30 – 00:30 | 5-10 mins  |
| Macau Int'l Airport        | VMRH (Porte Cochere)                                   | 10:00 – 22:30 | 15-20 mins |
| VMRH (Porte Cochere)       | Macau Int'l Airport                                    | 10:00 – 22:30 | 15-20 mins |
| VMRH<br>(Cotai Connection) | VMRH, Studio City,<br>SCC, COD, Wynn<br>Palace, Galaxy | 11:30 – 21:30 | 15-20 mins |
| VMRH (Cotai Express)       | Galaxy, Studio City                                    | 11:30 – 21:30 | 15-20 mins |
| Lotus Port                 | VMRH   | 09:30 – 20:00 | 15-20 mins |
| VMRH                       | Lotus Port   | 09:30 – 20:00 | 15-20 mins |

## Macau Local Transportation

In addition to complementary shuttle bus service, following public transports are available.

### Buses

A frequent bus service runs between the Macao Peninsula, Taipa and Coloane. Route information in Chinese and Portuguese is posted at every bus stop detailing destinations, itineraries and stops.

The bus fare is MOP6.00 and passengers should prepare adequate coins for the fare as no change is given on the buses, all of which are air-conditioned. Routes go to and from different spots in the Macao Peninsula, Taipa and Coloane including Macau International Airport. Some buses even traverse narrow streets and alleys in Macao. For route information, please visit: <http://www.dsat.gov.mo/bus>

### Taxis

The taxi in Macao is in black with a cream roof. The flag-fall charge is MOP19.00 for the first 1600 metres, with MOP2.00 added for every 240 metres thereafter. MOP2.00 is charged for waiting per minute at the passenger's request. There is a MOP3.00 surcharge for each item of luggage carried in the boot.

There is a MOP5.00 surcharge for boarding a taxi at Macau International Airport, the taxi station of Taipa Ferry Terminal, University of Macau, COTAI Frontier Post and the Hong Kong-Zhuhai-Macao Bridge Frontier Post at Macao Port or journeys from Macao to Coloane. From Taipa to Coloane, a MOP2.00 surcharge applies, while there is no surcharge from Macao to Taipa or from the islands to Macao.

## 13. Nearby Dining Options



### Dining in The Venetian Macao

There are numerous international dining options in the vicinity of the conference venue. In addition to restaurants located in The Venetian Macao listed below, there are also shops and restaurants in the Plaza Macao, Sands Cotai Central, and The Parisian Macao that are directly connected and easily accessible. For further information and directions in the area, you may download an app provided by the Sands Resorts Macao.



### Restaurants

| Restaurants                   | Style        | Price    | Location            |
|-------------------------------|--------------|----------|---------------------|
| North                         | Chinese      | \$\$     | Shop 1015, Level 1  |
| Mortan's Steak House          | Western      | \$\$\$\$ | Shop 1016, Level 1  |
| Canton                        | Chinese      | \$\$\$   | Shop 1018, Level 1  |
| Old Neptune Restaurant        | Chinese      | \$\$     | Shop 1032, Level 1  |
| Bambu                         | Seafood      | \$\$     | Shop 1033, Level 1  |
| Cafe Deco Macau               | Chinese      | \$\$\$   | Shop 1036, Level 1  |
| Golden Peacock                | Indian       | \$\$     | Shop 1037, Level 1  |
| McSorley's Ale House          | Western, Bar | \$\$     | Shop 1038, Level 1  |
| Portofino                     | Italian      | \$\$\$\$ | Shop 1039, Level 1  |
| Spirito Lounge                | Lounge, Bar  | \$\$\$   | Inside Portofino    |
| Tai Hing                      | Chinese      | \$\$     | Shop 1041, Level 1  |
| Imperial House Dim Sum        | Chinese      | \$\$     | Shop 1042, Level 1  |
| Red Dragon Noodles            | Chinese      | \$       | Shop 1043a, Level 1 |
| Dragon King Restaurant        | Chinese      | \$\$     | Shop 853, Level 3   |
| Edo Japanese Restaurant       | Japanese     | \$\$     | Shop 110, Level 3   |
| Old Hong Kong Tea House       | Chinese      | \$       | Shop 308, Level 3   |
| Shanghainese 456 Restaurant   | Chinese      | \$\$     | Shop 744, Level 3   |
| Madeira Portuguese Restaurant | Western      | \$\$     | Shop 746, Level 3   |
| Lei Garden                    | Chinese      | \$\$\$   | Shop 855, Level 3   |
| Tian Yi Restaurant            | Chinese      | \$\$     | Shop 3005, Level 3  |



|                             |         |        |                    |
|-----------------------------|---------|--------|--------------------|
| Marmeleira Seafood          | Chinese | \$\$\$ | Shop 3006, Level 5 |
| Glorious Seafood Restaurant | Chinese | \$\$   | Shop 3037, Level 5 |

### Café and Quick Eats

| Restaurants               | Location                     |
|---------------------------|------------------------------|
| Häagen Dazs               | Shop 310, Level 3            |
| Lord Stow's Bakery & Café | Shop 870, Level 3            |
| Mcdonald's & McCafé       | Shop 847, Level 3            |
| Starbucks Coffee          | Shop 1033a and 1044, Level 1 |
| Lady M New York           | Shop K2, Level 3             |

### Food Court Outlets

| Restaurants                      | Location           |
|----------------------------------|--------------------|
| Toei Delights                    | Shop 700, Level 3  |
| ChiangMai Thai                   | Shop 701, Level 3  |
| Pho 88 Noodle Shop               | Shop 702, Level 3  |
| Katsusato                        | Shop 703, Level 3  |
| Treasure Lake Green Food Kitchen | Shop 704, Level 3  |
| Honeymoon Dessert                | Shop 705, Level 3  |
| Spicy Boy                        | Shop 706, Level 3  |
| BEEF 1                           | Shop 706b, Level 3 |
| Good Luck Hong Kong Restaurant   | Shop 706c, Level 3 |
| Wu Fang Zhai                     | Shop 707, Level 3  |
| Hei Kei Wanton Noodles           | Shop 708, Level 3  |
| Rasa Singapura                   | Shop 709, Level 3  |
| Glorious BBQ King                | Shop 710, Level 3  |
| New Bill's Restaurant            | Shop 712, Level 3  |
| Dae Chang Kum                    | Shop 716, Level 3  |
| Treasure Lake Asian Cuisine      | Shop 718, Level 3  |
| Naruto Japanese Restaurant       | Shop 718a, Level 3 |
| Tim Ho Wan                       | Shop 720, Level 3  |
| Traditional Old Macau            | Shop 722, Level 3  |
| Joyea Juice                      | Shop 724, Level 3  |
| Triple O's                       | Shop 726, Level 3  |
| Ocean Empire Foodshop            | Shop 730, Level 3  |
| Hundred Tastes Kitchen           | Shop 732, Level 3  |

## 14. Social Events

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### Welcome Reception

Monday, Nov 4, 18:30 – 20:30

L3-RA to RC, Level 3

IROS 2019 will welcome you with a two-hour reception. The standing reception will serve a variety of food choices as well as alcoholic and non-alcoholic beverages to fully registered IROS delegates.

### Conference Banquet--A Night in Venice

Wednesday, Nov 6, 19:00 – 21:30

L3-RA to RC, Level 3

We have prepared an extraordinary night, with delicious food and outstanding performances for you to enjoy and have fun. The dinner menu will feature Chinese dishes, accompanied by entertainment and completed with wine choices. The evening will end with the introduction of IROS 2020. Do not forget to bring your badge and the banquet ticket!

### Awards Luncheon

Thursday, Nov 7, 12:40 – 14:30

L3-RA to RC, Level 3

A lunchbox with juice will be offered followed by a ceremony, where the main awards, together with competitions awards, will be announced.

### Farewell Party

Thursday, Nov 7, 18:30 – 20:30

L3-RA to RC, Level 3

IROS 2019 will bid its farewell to the participants in this two-hour reception. The participants will have an opportunity to relax with their colleagues and friends with parting words until the next IROS. The standing reception will serve a variety of food choices as well as alcoholic and non-alcoholic beverages to fully registered IROS delegates.

### Coffee Breaks

Coffee Breaks will be provided throughout five days of the conference, twice a day. Serving stations will be located outside the Session Rooms, the Ballrooms and the Exhibit Hall.

## Society Events

### IEEE/RAS Photo Scavenger Hunt

Monday-Friday, Nov 4-8

IROS 2019

Are you a student planning to attend IROS 2019 in Macau, China? Join the **IEEE RAS Student Activities Committee** for a fun scavenger hunt! Teams of 2-3 students will be emailed a super top secret list of objectives. Throughout the conference, teams will then take pictures demonstrating they achieved each objective - ranging from shaking hands with RAS leadership, visiting local sights near the conference venue, to doing funny poses. Awards will be presented to teams which found the most items and teams with the most creative photos!

**Who:** Students attending IROS 2019

**What:** A fun picture scavenger hunt

**Why:** Because everyone needs a little fun!

If you already know a few other students attending, you can form a Team and register as a group. If not, please register yourself, and we will team you up with other enthusiastic roboticists. See you in Macau!

**Register here:**

<https://app.smartsheet.com/b/form/0cb766c0756a4684a0b03d719e45f32e>

### RAS Women in Engineering (WIE) Luncheon

Tuesday, Nov 5, 12:00 – 13:30

L1-RAS, Level 1

The networking luncheon provides the opportunity to foster discussion on the role of women in robotics and automation, inspire girls and promote collaborations and initiatives to advance women in leadership. As the goal for this event is to be more than a Lunch *for* women, but a Lunch *with* women. Therefore, men are more than welcome to participate and enjoy the discussion.

**Space is limited, so please register in advance!**

### RSJ Luncheon for Industry and Academia Collaboration

Tuesday, Nov 5, 12:30 – 13:30

L1-R22, Level LG

This event provides a collaboration opportunity for industries and academia at lunchtime for anyone who attends IROS 2019. Each participant of this event will enjoy an introduction of products/prototypes available by exhibitors and opportunities for recruitment, as well as a lunch box (max 120).

### Networking Reception: Meet the RAS Technical Committees, Get Involved!

Tuesday, Nov 5, 17:00 – 18:30

L1-RAS, Level 1

This event is open to attendees in the early stages of their career — young professionals and researchers. Chairs and Co-Chairs of the RAS Technical Committees will be available for informal conversation centered on new

technologies in robotics and automation, future growth in the field, and how to get involved and contribute to RAS Technical Committee work.

**Refreshments will be served!** Come enjoy a snack and beverage, and meet some new colleagues!

**Space is limited. Please come early to avoid getting shut out. The event will close once room capacity has been reached.**

### IEEE/RAS Lunch with Leaders (LwL) for Students

Wednesday, Nov 6, 12:00 – 13:30

L1-RAS, Level 1

This luncheon is open to student and young professional attendees offering the chance to meet and interact with Leaders from RAS and industry. Informal discussion over lunch will take place round table style. Join us for career advice, insights into where the field is headed, or general conversation to get to know Leaders in the field of robotics and automation.

### SICE Luncheon Seminar

Wednesday, Nov 6, 12:00 – 13:00

L1-R25, Level LG

In IROS 2019, SICE will hold the lunch seminar for all participants. In this event, keynote speaker will give us his/her activity for anyone who attends the IROS2019. Each participant would enjoy the talk with a lunch box (Max. 50 including vegetarian one).

Speaker: Professor Hong Zhang, University of Alberta, Canada

Title: Visual Robot Navigation – Overview and recent developments

Detail information about the seminar:

<https://sice-si.org/iros2019-sice-lunch-seminar/>

## 15. Plenary Talks



Tuesday, Nov 5, 9:00 – 9:45

### AI in Medicine: Where Are We Heading?

#### Joseph Sung

Mok Hing Yiu Professor of Medicine,  
The Chinese University of Hong Kong, China  
Director, Institute of Digestive Disease,  
The Chinese University of Hong Kong, China



Artificial Intelligence is coming to Medicine in a big wave. From making diagnosis in various medical conditions, suggesting the most appropriate treatment, finding of the latest advancement in the literature, to predicting the prognosis and outcome of the disease, AI is offering unprecedented opportunities to improve care of our patients. Taking digestive tract cancer as an example, AI-assisted image analysis aids the detection of colorectal neoplasia during colonoscopy, provide so-called optical biopsy of the lesions, integrate genomic, epigenetic and metagenomics data to provide new classification and sub-classification of the cancers, and provide evidence-based suggestion what is the optimal therapy of the condition. Furthermore, AI-assisted surgery, through semi-automated and (in future) fully-automated robotic surgery, will take over at least some part of the surgical treatment of such malignant lesions. This is a defining moment in Medicine. What is the future role of doctors and nurses? How should we train medical students and pharmacists and physiotherapists in the future? And, importantly, when things go wrong, such as reaching a wrong diagnosis and/or mishap occurring in the treatment of a patient, who should take the responsibility? This lecture will offer a peek into the future.

#### Biography

Joseph Sung is Professor of Medicine and Director of Institute of Digestive Disease at the Chinese University of Hong Kong. He is also the Past President of the University and Director of Big Data Decision Analysis Centre of CUHK. He is an academician at the Chinese Academy of Engineering, Fellow of Royal Colleges of London, Edinburgh, Glasgow and Australia.

Tuesday, Nov 5, 9:45 – 10:30

### Embodied Visual Learning

**Kristen Grauman**

Professor, University of Texas at Austin, USA



Computer vision has seen major success in learning to recognize objects from massive “disembodied” Web photo collections labeled by human annotators. Yet cognitive science tells us that perception develops in the context of acting the world---and without intensive supervision. Meanwhile, many realistic vision tasks require not only categorizing a well-composed human-taken photo, but also actively deciding where to look in the first place. In the context of these challenges, we are exploring how machine perception benefits from anticipating the sights and sounds an agent will experience as a function of its own actions. Based on this premise, we introduce methods for learning to look around intelligently in novel environments, learning from video how to interact with objects, and perceiving audio-visual streams for both semantic and spatial context. Together, these are steps towards first-person perception, where interaction with the world is itself a supervisory signal.

### Biography

Kristen Grauman is a Professor in the Department of Computer Science at the University of Texas at Austin and a Research Scientist at Facebook AI Research. Her research in computer vision and machine learning focuses on visual recognition and search. Before joining UT Austin in 2007, she received her Ph.D. at MIT. She is a AAAI Fellow, a Sloan Fellow, and a recipient of the NSF CAREER, ONR YIP, PECASE, PAMI Young Researcher award, and the 2013 IJCAI Computers and Thought Award. She and her collaborators were recognized with best paper awards at CVPR 2008, ICCV 2011, ACCV 2016, and a 2017 Helmholtz Prize “test of time” award. She served as a Program Chair of the Conference on Computer Vision and Pattern Recognition (CVPR) in 2015 and Neural Information Processing Systems (NeurIPS) in 2018, and she currently serves as Associate Editor-in-Chief for the Transactions on Pattern Analysis and Machine Intelligence (PAMI).

Thursday, Nov 7, 9:00-9:45

### ImpACT Tough Robotics Challenge – A National Project of Japan Cabinet Office on Disaster Robotics

**Satoshi Tadokoro**

Professor, Tohoku University, Japan



The ImpACT Tough Robotics Challenge is a national project of Japan Cabinet Office (2014-18, 62 PIs and 300 researchers). It focused on technologies of robotics to give solutions to disaster response and recovery, and achieved the following results.

- Cyber Rescue Canine, a empowered rescue dog, wearing a suit for monitoring its behavior (motion, map, and action) and conditions (health and enthusiasm).
- Active Scope Camera, a serpentine robot for search in debris that crawls and levitates in few-cm gaps, with visual, auditory and haptic sense for navigation and victim search. Dragon Firefighter, a serpentine robot flying into buildings by water jets to extinguish origins of fire.
- Serpentine robots for plant inspection with high mobility in ducts, at pipes, on uneven terrain, on vertical ladders, and over high steps. Omni gripper that can grasp wide variety of targets including sharp edges without positioning.
- An UAV that is robust in strong win, rain, at change of payload, and at stop of propellers, with hearing and localizing voice coming from ground during flight.
- A 4-legged robot for plant inspection in risky places, with high mobility on rubbles, on vertical ladders, and over high steps. A 30-cm robot hand that can keep grip of 50-kg loads without electricity.
- A construction robot of double-swing dual-arm mechanism with both high-power and preciseness, with force and touch bilateral feedback without sensor at the end-effector, and teleoperation support by real and virtual bird's-eye-view images.

### Biography

Satoshi Tadokoro graduated from the University of Tokyo in 1984. He has been a Professor of Tohoku University since 2005, and the Director of Tough Cyberphysical AI Research Center since 2019. He has been the President of International Rescue System Institute since 2002 and was the President of IEEE Robotics and Automation Society in 2016-17. He served as a program of Japan Cabinet Office ImpACT Tough Robotics Challenge Project.

Thursday, Nov 7, 9:45-10:30

### Haptic Intelligence

#### **Katherine J. Kuchenbecker**

Director, Max Planck Institute for Intelligent Systems  
in Stuttgart, Germany



Our scientific understanding of haptic interaction is still evolving, both because what you feel greatly depends on how you move, and because engineered sensors, actuators, and algorithms typically struggle to match human capabilities. Consequently, few computer and machine interfaces provide the human operator with high-fidelity touch feedback or carefully analyze the physical signals generated during haptic interactions, limiting their usability. The crucial role of the sense of touch is also deeply appreciated by researchers working to create autonomous robots that can competently manipulate everyday objects and safely interact with humans in unstructured environments. My team works in all of these related areas, aiming to sharpen our understanding of haptic interaction while simultaneously inventing helpful human-computer, human-machine, and human-robot systems that take advantage of the unique capabilities of the sense of touch. This talk will showcase key examples from our ongoing research, including Haptipedia ([www.haptipedia.org](http://www.haptipedia.org)), three-to-one dimensional reduction of vibration signals, social-physical human-robot interaction for exercise, and large fabric-based tactile sensors that employ electrical resistance tomography. I will close by sharing suggestions on recruiting and leading a diverse team of researchers.

#### **Biography**

Katherine J. Kuchenbecker directs the Haptic Intelligence Department at the Max Planck Institute for Intelligent Systems in Stuttgart, Germany. She earned her Ph.D. at Stanford University in 2006, did postdoctoral research at the Johns Hopkins University, and was an engineering professor at the University of Pennsylvania before moving to the Max Planck Society in 2017. She delivered a TEDYouth talk on haptics in 2012 and has been honored with a 2009 NSF CAREER Award, the 2012 IEEE RAS Academic Early Career Award, a 2014 Penn Lindback Award for Distinguished Teaching, and various best paper and best demonstration awards. She co-chaired the Technical Committee on Haptics from 2015 to 2017 and the IEEE Haptics Symposium in 2016 and 2018.



## 16. Pioneer's Talks

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Wednesday, Nov 6, 10:30 – 11:00

L3-RB, Level 3

### A Journey in the History of Automated Driving

**Christian Laugier**

Research Director at Inria Grenoble Rhône-Alpes,  
France



Wednesday, Nov 6, 11:00 – 11:30

L3-RB, Level 3

### Multi-scale robotics

**Toshio Fukuda**

Professor Emeritus, Nagoya University, Japan  
Professor, Meijo University, Japan  
Professor, Beijing Institute of Technology, China



Wednesday, Nov 6, 11:30 – 12:00

L3-RB, Level 3

### Lifelong Learning in Robotics

**George Lee**

Professor, Purdue University, USA



## 17. Keynote Talks



Tuesday, Nov 5, 13:30-14:00

L3-RA, Level 3

### Learning Vision-based, Agile Drone Flight: from Frames to Event Cameras

#### **Davide Scaramuzza**

Professor, University of Zurich, Switzerland  
Director of the Robotics and Perception Group,  
University of Zurich, Switzerland



Autonomous quadrotors will soon play a major role in search-and-rescue and remote-inspection missions, where a fast response is crucial. Quadrotors have the potential to navigate quickly through unstructured environments, enter and exit buildings through narrow gaps, and fly through collapsed buildings. However, their speed and maneuverability are still far from those of birds and human pilots. Autonomous, vision-based agile navigation through unknown, indoor environments poses a number of challenges for robotics research in terms of perception, state estimation, planning, and control. In this talk, I will show that how the combination of both model-based and machine learning methods united with the power of new, low-latency sensors, such as event-based cameras, allow drones to achieve unprecedented speed and robustness by relying solely on the use of passive cameras, inertial sensors, and onboard computing.

#### **Biography**

Davide Scaramuzza is professor of robotics and perception at departments of Neuroinformatics (Univ. of Zurich & ETH Zurich) and Informatics (Univ. of Zurich), where he does research at the intersection of robotics and computer vision. He did his PhD at ETH Zurich (with Roland Siegwart) and a postdoc at the Univ. of Pennsylvania (with Vijay Kumar and Kostas Daniilidis). From 2009-2012, he led the European project sFly, which introduced the PX4 autopilot and pioneered visual-SLAM-based navigation of drones. From 2015-2018 he was part of the DARPA FLA program. He was awarded the prestigious IEEE RAS Early Career Award, the Misha Mahowald Neuromorphic Engineering Award, the SNSF-ERC Starting Grant, Google, Intel, Qualcomm, and KUKA awards, as well as several conference and journal paper awards (e.g., IEEE T-RO Best Paper Award in 2018). In 2015, he cofounded Zurich-Eye, which today is Facebook-Oculus Zurich. He was also the strategic advisor of Dacuda, an ETH spinoff dedicated to inside-out VR solutions, which today is Magic Leap. Many aspects of his research have been featured in the press, such as The New York Times, Discovery Channel, BBC, IEEE Spectrum, MIT Technology Review.

Tuesday, Nov 5, 13:30-14:00

### AI and Robotics Technology for Asteroid Sample Return Mission

#### HAYABUSA2

##### **Takashi Kubota**

Professor, Japan Aerospace Exploration Agency (JAXA), Japan

Professor, Graduate School of The University of Tokyo, Japan



JAXA has earnestly studied and promoted deep space exploration missions. In recent years, small body exploration missions have received a lot of attention in the world. JAXA is currently promoting Hayabusa-2 mission, which is the post Hayabusa including sample and return attempt to/from the near-earth asteroid. Hayabusa-2 spacecraft was launched to the asteroid in 2014 and performed the rendezvous for the target C-type asteroid Ryugu on June 27th in 2018. Hayabusa-2 challenges very interesting objectives: what are original organic matters and water existed in the solar system? Or how are they related to life and ocean water? Hayabusa-2 succeeded in deploying two exploration robots, which could hop and perform the in-situ surface exploration. The impactor also succeeded in exploding the surface and making an artificial crater. Then Hayabusa-2 successfully performed two trials to collect less altered materials. This talk presents AI and robotics technology developed in Hayabusa-2 mission, such as pin-point guidance, visual navigation, automatic sampling, autonomous exploration rovers, etc. This talk also presents robotics technology for future exploration plans.

##### **Biography**

Dr. Kubota is a professor at Institute of Space and Astronautical Science (ISAS), Japan Aerospace Exploration Agency (JAXA), Japan. He received Dr. degree in electrical engineering in 1991 from the University of Tokyo. He is also a professor of the graduate school of the University of Tokyo. He was a visiting scientist in Jet Propulsion Laboratory in 1997 and 1998. He was in charge of guidance, navigation and control, and asteroid exploration rover MINERVA in asteroid exploration mission HAYABUSA. He is a spokesperson for Hayabusa2 mission. He is also the Research Director at ISAS and the Director of Space Exploration Innovation Hub Center at JAXA. His research interests include exploration robots, AI in space, Robotics, Image based navigation etc.

Tuesday, Nov 5, 13:30-14:00

### **Towards robots that teach and learn through physical human-robot interaction**

**Marcia O'Malley**

Stanley C. Moore Professor, Rice University, USA



Robots are increasingly transitioning from factories to human environments: today we use robots in healthcare, households, and social settings. In such circumstances where the human and the robot work in close proximity---physical interactions are almost inevitable. In the past, these physical interactions have typically been treated as a disturbance, which should be avoided or rejected. But physical interaction offers an opportunity for the human and robot to implicitly communicate; when the robot guides the human, or the human corrects the robot, the human and robot are leveraging physical interactions to inform each other about some aspect of the current task. This talk will explore how robots can both teach and learn from humans through physical interaction.

#### **Biography**

Marcia O'Malley is the Stanley C. Moore Professor of Mechanical Engineering, of Computer Science, and of Electrical and Computer Engineering at Rice University where she directs the MAHI (Mechatronics and Haptic Interfaces) Lab. She is also the Director of Rehabilitation Engineering at TIRR-Memorial Hermann Hospital. Her research addresses issues that arise when humans physically interact with robotic systems, with a focus on training and rehabilitation in virtual environments. She is a Fellow of the American Society of Mechanical Engineers and serves as a senior editor for both the ASME/IEEE Transactions on Mechatronics and for the ACM Transactions on Human Robot Interaction.

Tuesday, Nov 5, 14:00-14:30

### Interaction with Vehicular Robots

#### **Cristina Olaverri Moreal**

Intelligent Transport Systems / BMVIT Endowed  
Professorship and Chair for Sustainable Transport  
Logistics 4.0, Johannes Kepler University Linz, Austria



Completely unmanned vehicles can be regarded as autonomous machines capable of sensing their environment, making decisions, and performing actions. They are already becoming a reality, as many vehicles are already equipped with the technology that enable self-driving automation, such as lane-keeping assistance and automated braking. The feasibility of incorporating new technology-driven functionality to vehicles has played a central role in automotive design, however issues related to human capabilities, which affect a system's operation have not always been considered. This presentation elucidates the broad issues involved in the interaction of road users with intelligent vehicle technologies and autonomous vehicles, detailing interaction-design concepts and metrics while focusing on the public's perception of road safety and trust.

#### **Biography**

Prof. Dr. Cristina Olaverri-Monreal graduated with a Master's degree in Computational Linguistics, Computer Science and Phonetics from the Ludwig-Maximilians University (LMU) in Munich and received her PhD in cooperation with BMW. After working several years internationally in the industry and in the academia, in her current position as full professor and holder of the BMVIT endowed chair sustainable transport logistics 4.0 at the Johannes Kepler University Linz, in Austria her research aims at studying solutions for an efficient and effective transportation focusing on minimizing the barrier between users and road systems. To this end, she relies on the automation, wireless communication and sensing technologies that pertain to the field of Intelligent Transportation Systems (ITS). Dr. Olaverri is Vice-president of Educational Activities in the IEEE ITS Society Executive Committee and chair of the Technical Activities Committee on Human Factors in ITS. In addition, she serves as an editorial board member of several journals, including the IEEE Intelligent Transportation Systems Transactions and the IEEE International Transportation Systems Magazine. She was recently recognized for her contribution to continuing education with the 2017 IEEE Educational Activities Board Meritorious Achievement Award in Continuing Education.

Tuesday, Nov 5, 14:00-14:30

### Robot Learning from Sensing to Behavior

**Fuchun Sun**

Professor, Tsinghua University, China



Traditional machine learning concentrates on developing algorithms and statistical models for a specific task, while robot learning, on the other hand, emphasizes the connection between perception and behavior, which enables robots to have cognitive abilities similar to those of human beings. Through interaction with human and environment, robots can understand and adapt to complex environments, and complete complex tasks.

In this talk, we will present a new active sensing architecture, in which a feedback mechanism is used for connecting perception and behavior. Under this framework, robot could also enhance its perception through intended action. In addition to some principle approaches on sensing and cognitive , we will further introduce a novel high-resolution sensor device with five modalities for robot dexterous operations. This sensor device has been equipped on complex robotic hardware including dexterous hand with muscle-like actuation. Finally, some empirical results and demos will be presented with some promising future directions.

### Biography

Dr. Fuchun Sun is professor of Department of Computer Science and Technology, President of Academic Committee of the Department, Tsinghua University, deputy director of State Key Lab. of Intelligent Technology & Systems, Beijing, China and a Fellow of IEEE. His research interests include robotic perception and intelligent control. He won the Champion of Autonomous Grasp Challenges in IROS2016.

Dr. Sun is the recipient of the excellent Doctoral Dissertation Prize of China in 2000 by MOE of China and the Choon-Gang Academic Award by Korea in 2003, and was recognized as a Distinguished Young Scholar in 2006 by the Natural Science Foundation of China. He served as Editor-in-Chief of International Journal on Cognitive Computation and Systems, and Associated Editors of IEEE Trans. on Neural Networks during 2006-2010, IEEE Trans. on Fuzzy Systems since 2011, IEEE Trans. on Systems, Man and Cybernetics: Systems since 2015 and IEEE Trans. on Cognitive and Development Systems since 2019.

Tuesday, Nov 5, 14:00-14:30

### Robot Manipulation with Deformation

#### Yunhui Liu

Choh-Ming Li Professor, The Chinese University of Hong Kong, China

Director, CUHK T Stone Robotics Institute, The Chinese University of Hong Kong, China



Many manipulation tasks of robots involve soft objects or deformable structures. Typical tasks of manipulating soft objects include robotic surgery handling soft tissues, cloth handling, assembly of cables, etc. The major technical challenges lie in two aspects: the difficulties in modelling the kinematics and dynamics of the deformation due to the unknown physical/material properties and the complicated structure involved, and in controlling the deformation stably without using any model or using models with large uncertainties. One of the promising approaches to cope with the problems is to control the manipulation tasks with deformation using visual feedback because humans can effectively and reliably perform such deformable manipulation tasks without knowing any deformation model but by monitoring the deformation using their eyes. This talk will demonstrate our latest work on vision-based model-free robotic manipulation involving deformation and applications of the approaches in robotic surgery, cable manipulation, grasping cloths, construction, etc.

#### Biography

Yun-Hui Liu received the B. Eng. degree from the Beijing Institute of Technology, the M. Eng. degree from Osaka University, and the Ph.D. degree from the University of Tokyo in 1992. He joined The Chinese University of Hong Kong (CUHK) in 1995 and is currently Choh-Ming Li Professor of Mechanical and Automation Engineering, the Director of the CUHK T Stone Robotics Institute, and the director of Hong Kong Centre for Logistics Robotics. He is also an adjunct professor at the State Key Lab of Robotics and Systems, Harbin Institute of Technology, China. He has published more than 400 and was listed in the Highly Cited Authors by Thomson Reuters in 2013. His research interests include visual servoing, medical robotics, multi-fingered grasping, mobile robots, and machine intelligence. Prof. Liu has received numerous international research awards from international journals, conferences, and government agencies. He was the Editor-in-Chief of Robotics and Biomimetics and served as an Associate Editor of the IEEE Transactions on Robotics and Automation and General Chair of the 2006 IROS. He is an IEEE Fellow.

Wednesday, Nov.6, 9:00-9:30

### Living with robots, how far, how close?

#### **Gentiane Venture**

Distinguished Professor, Tokyo University of  
Agriculture and Technology / AIST, Japan



If it is often said that robots are coming to share our working/living space. I feel lucky it is true for me, but I don't think most people can say the same yet. Human-Robot Interaction studies show that the readiness of the systems is far from reaching expectations. To compensate for the robots' limitations tricks are used: controlled lab experiments, Wizard of Oz, and minutely scenarized interactions. Studies controlling some very specific parameters are like in-vitro experiments, failing in providing a holistic study of human and robot shared experience. "HRI in the wild", in ecological environment, can provide a rich data set of interactions, they are like in-vivo experiments. Because of the unstructured nature of the experience, programming such interactions is ultimately time consuming and requires multiple expertise, thus often left behind. I will present our tools to create HRI in the wild and some applications in kindergarten and private houses. I will introduce our robot cognitive processes and expressive movements generation. I will conclude with some robot & UX design perspectives.

#### **Biography**

Gentiane Venture is a French Robotacist working in academia in Tokyo. She is a distinguished professor with Tokyo University of Agriculture and Technology and a cross appointed fellow with AIST. She obtained her MSc and PhD from Ecole Centrale/University of Nantes in 2000 and 2003 respectively. She worked at CEA in 2004 and for 6 years at the University of Tokyo. In 2009 she started with Tokyo University of Agriculture and Technology where she has established an international research group working on human science and robotics. With her group she conducts theoretical and applied research on motion dynamics, robot control and non-verbal communication to study the meaning of living with robots. Her work is highly interdisciplinary, collaborating with therapists, psychologists, neuroscientists, sociologists, philosophers, ergonomists, artists and designers.



Wednesday, Nov.6, 9:00-9:30

### Snake robots moving on land and exploring the oceans

**Kristin Y. Pettersen**

Professor, Norwegian University of Science and  
Technology, Norway



Snake robots are motivated by the long, slender and flexible body of biological snakes, which allows them to move in virtually any environment on land and in water. Since the snake robot is essentially a manipulator arm that can move by itself, it has a number of interesting applications including firefighting applications and search and rescue operations. In water, the robot is a highly flexible and dexterous manipulator arm that can swim by itself like a sea snake. This highly flexible snake-like mechanism has excellent accessibility properties; it can access virtually any location on a subsea oil & gas installation, move into the confined areas of ship wrecks, inside ice caves, or be used for observation of biological systems. Not only can the swimming manipulator access narrow openings and confined spaces, but it can also carry out highly complex manipulation tasks at this location since manipulation is an inherent capability of the system.

In this talk, I will present our research on snake robots and the ongoing efforts for bringing the results from university research towards industrial use.

#### Biography

Kristin Y. Pettersen is a Professor in the Department of Engineering Cybernetics, NTNU where she has been a faculty member since 1996. She was Head of Department 2011-2013 and Director of the NTNU ICT Program of Robotics 2010-2013. She is Adjunct Professor at the Norwegian Defence Research Establishment (FFI). She is also Key Scientist at the CoE Centre for Autonomous Marine Operations and Systems (NTNU AMOS). She is a co-founder of the NTNU spin-off company Eelume AS, where she was CEO 2015-2016.

Kristin Y. Pettersen is IEEE CSS Distinguished Lecturer 2019-2021. She is an IEEE Fellow, member of the Norwegian Academy of Technological Sciences, and member of the Academy of the Royal Norwegian Society of Sciences and Letters.

Wednesday, Nov.6, 9:00-9:30

### Engineering Humanoids

#### **Tamim Asfour**

Professor, Karlsruhe Institute of Technology,  
Germany



Humanoid robotics plays a central role in robotics research as well as in understanding intelligence. Engineering humanoid robots that are able to learn from humans and sensorimotor experience, to predict the consequences of actions and exploit the interaction with the world to extend their cognitive horizon remains a research grand challenge. Currently, we are experiencing AI systems with superhuman performance in games, image and speech processing. However, the generation of robot behaviors with human-like motion intelligence and performance has yet to be achieved. In this talk, I will present recent progress towards engineering 24/7 humanoid robots that link perception and action to generate intelligent behavior. I will show the ARMAR humanoid robots performing complex grasping and manipulation tasks in kitchen and industrial environments, learning actions from human observation and experience as well as reasoning about object-action relations.

#### **Biography**

Tamim Asfour is full Professor of Humanoid Robotics at the Institute for Anthropomatics and Robotics at the Karlsruhe Institute of Technology (KIT). His research focuses on the engineering of high performance 24/7 humanoid robotics as well as on the mechano-informatics of humanoids as the synergetic integration of informatics, artificial intelligence and mechatronics into humanoid robot systems, which are able to predict, act and interact in the real world. In his research, he is reaching out and connecting to neighboring areas in large-scale national and European interdisciplinary projects in the area of robotics in combination with machine learning and computer vision. Tamim is the developer of the ARMAR humanoid robot family. He is scientific spokesperson of the KIT Center "Information · Systems · Technologies (KCIST)", president of the Executive Board of the German Robotics Society (DGR), the Founding Editor-in-Chief of the IEEE-RAS Humanoids Conference Editorial Board, and Editor of the Robotics and Automation Letters.

Wednesday, Nov 6, 9:30-10:00

### Learning Human-Robot Interaction for Robot-Assisted Pedestrian Regulation

**Yi Guo**

Professor, Stevens Institute of Technology, USA



Controlling pedestrian crowd dynamics has attracted increasing attention due to its potential impact to save lives in emergency. The “fast-is-slower” effect defines the phenomenon of jamming at the exit or a bottleneck, caused by people rushing to the exit. In this talk, I will present our research on robot-assisted pedestrian regulation, where pedestrian flows are regulated and optimized through passive human-robot interaction. We design feedback motion control for a robot to efficiently interact with pedestrians to achieve desirable collective motion. Both adaptive dynamic programming and deep reinforcement learning methods are applied to the formulated problem of robot-assisted pedestrian flow optimization. Simulation results in a robot simulator show that our approach regulates pedestrian flows and achieves optimized outflow learning from the real-time observation of the pedestrian flow. Potential crowd disasters can be avoided as the critical crowd pressure is reduced by the proposed approach.

#### Biography

Yi Guo is a Professor in the Department of Electrical and Computer Engineering at Stevens Institute of Technology, where she joined in 2005 as an Assistant Professor. She obtained her Ph.D. degree in Electrical and Information Engineering from University of Sydney, Australia, in 1999. She was a postdoctoral research fellow at Oak Ridge National Laboratory from 2000 to 2002, and a Visiting Assistant Professor at University of Central Florida from 2002 to 2005. Her main research interests include autonomous mobile robotics, distributed sensor networks, and nonlinear control systems. She has published more than 100 peer-reviewed journal and conference papers, authored the book entitled “Distributed Cooperative Control: Emerging Applications” (John Wiley & Sons 2017), and edited a book on micro/nano-robotics for biomedical applications (Springer 2013). She currently serves on the editorial boards of IEEE Robotics and Automation Magazine, IEEE Robotics and Automation Letters, and IEEE/ASME Transactions on Mechatronics. She served in Organizing Committees of ICRA (2015, 2014, 2008, 2006).

Wednesday, Nov 6, 9:30-10:00

### Robots with Physical Intelligence

#### **Sangbae Kim**

Director, Biomimetic Robotics Laboratory,  
Massachusetts Institute of Technology, USA  
Associate Professor, Massachusetts Institute of  
Technology, USA



While industrial robots are effective in repetitive, precise kinematic tasks in factories, the design and control of these robots are not suited for physically interactive performance that humans do easily. These tasks require ‘physical intelligence’ through complex dynamic interactions with environments whereas conventional robots are designed primarily for position control. In order to develop a robot with ‘physical intelligence’, we first need a new type of machines that allows dynamic interactions. This talk will discuss how the new design paradigm allows dynamic interactive tasks. As an embodiment of such a robot design paradigm, the latest version of the MIT Cheetah robots and force-feedback teleoperation arms will be presented. These robots are equipped with proprioceptive actuators, a new design paradigm for dynamic robots. This new class of actuators will play a crucial role in developing ‘physical intelligence’ and future robot applications such as elderly care, home service, delivery, and services in environments unfavorable for humans.

#### **Biography**

Sangbae Kim is the director of the Biomimetic Robotics Laboratory and an associate professor of Mechanical Engineering at MIT. His research focuses on the bio-inspired robot design achieved by extracting principles from animals. Kim’s achievements include creating the world’s first directional adhesive inspired by gecko lizards and a climbing robot named Stickybot that utilizes the directional adhesive to climb smooth surfaces. TIME Magazine named Stickybot one of the best inventions of 2006. One of Kim’s recent achievements is the development of the MIT Cheetah, a robot capable of stable running outdoors up to 13 mph and autonomous jumping over obstacles at the efficiency of animals. Kim is a recipient of best paper awards from the ICRA (2007), King-Sun Fu Memorial TRO (2008) and IEEE/ASME TMECH (2016). Additionally, he received a DARPA YFA (2013), an NSF CAREER award (2014), and a Ruth and Joel Spira Award for Distinguished Teaching (2015).

Wednesday, Nov 6, 9:30-10:00

### Design and Control of BHR Humanoid Robots

#### Qiang Huang

Professor, Beijing Institute of Technology, China



Humanoid robots are promising candidates to work and assist humans in industry and services. In this talk, the development roadmap of six generations BHR humanoid robots from Beijing Institute of Technology, will be introduced. The motion generation and sensory reflex control for biped walking will be presented. For the problem that a biped humanoid always risks tipping itself over in complicated environments like disaster response scenario, this talk will discuss the bio-inspired mechanical design and control strategies of falling protection for a humanoid robot. Finally, in order to improve the dynamic motion performances of humanoid robots, a new design using speed reducer with small ratio and high torque motor with relatively low speed will be presented.

#### Biography

Qiang HUANG is an IEEE Fellow and a Professor in Beijing Institute of Technology (BIT), China. He received the B.S. and M.S. degrees in 1986 and 1989 in China, and the Ph.D. degree from Waseda University, Japan, in 1996. He joined AIST, Japan, as a research fellow in 1996, and was a Researcher in University of Tokyo from 1999 to 2000, and then joined BIT in 2000. At present, he is the Director of Intelligent Robotics Institute, BIT, China, and the Executive Director of Beijing Advanced Innovation Center for Intelligent Robots and Systems, China.

His research interests include humanoid robots, space robot and human-robot fusion systems. He has published over 260 refereed journal and conference papers, and holds about 60 patents. He is a recipient of IFToMM Award of Merit and has received over 10 best paper awards. He was granted the Chung Kong Scholar Professorship from MOE of China, and the Distinguished Young Scholar of the NSFC of China. He served as the General Chair of 2018 IEEE Humanoids, 2017 IEEE ROBOT and 2017 IEEE ICBS, and the Organization Chair of 2006 IEEE IROS, etc.

Tuesday, Nov 5, 14:45 – 16:30

### How the Emerging Technologies Drives the Paradigm Shift of the Robotics Industry and Its Business Landscape

The industry is in the midst of the industry 4.0 driven by many emerging technologies such as artificial intelligence, internet of things, big data, cloud computing, machine learning, 5G connectivity etc. Robotics is entering every traditional industry, from manufacturing, logistics to agriculture to retail, health care and driving towards increased productivity and effectiveness. Many companies are revising and rethinking their strategies to cement their futures in a world that is dictated by advanced robotics and aforementioned emerging technologies. This power panel of industry leaders and visionaries will present and discuss the real- world implications for how these emerging technologies drives the paradigm shift of the robotics industry and its business landscape. Some snapshot points to be discussed include:

- What do you see as the most growing industry vertical markets?
- What is the long-term outlook for the autonomous mobile robot and autonomous mobile industrial robot in logistic and warehousing market and how big is the industry?
- What are the do's and do not's using Robot Operating System 2.0 ? Is it an industrial mainstream trend and a Must?
- What are the challenges and hurdles you may encounter on Co-bot and dual arm robot?
- Why edge robotics? Why is real-time decision making important to modern factories and robotics

#### Chair and Organizer

##### **Ren C. Luo**

Chair Professor and Director of iCeIRA, National  
Taiwan University  
CTO of FFG Group



## Speakers

### **Rainer Bischoff**

Vice President for Corporate Research of KUKA



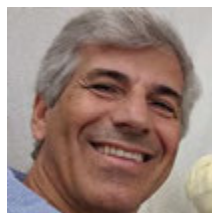
### **Chunyuan Gu**

President, Region Asia, Middle East and Africa (AMEA)  
Member of the Group Executive Committee of ABB  
Ltd.  
Chairman of ABB (China) Ltd.



### **Mario E. Munich**

Vice-President of iRobot Corp



### **Melonee Wise**

CEO of Fetch Robotics



## 19. Government Forum



Tuesday, Nov 5, 16:00 – 18:00

L3-RC, Level 3

### Factors That Will Be Shaping Evolving Robotics and AI-related Programs

Program managers from various countries will give overviews of their robotics and AI programs and will discuss the technological and sociological factors that will, and have been, shaping government priorities and investments. A panel discussion with audience interactions will follow presentations by each of the participants. This forum will provide IROS researchers with insights as to how future research and funding opportunities are likely to unfold.

| Time          | Agenda  | Speaker                        |
|---------------|---|--------------------------------|
| 16:00 – 16:10 | Opening Remark and Introduction                       | Guang-Zhong Yang, Moderator    |
| 16:10 – 16:25 | Programs in South Korea                               | Junku Yuh                      |
| 16:25 – 16:40 | Programs in Singapore                                 | Tong Boon Quek                 |
| 16:40 – 16:55 | Programs in the European Union                        | Stefano Stramigioli            |
| 16:55 – 17:10 | Programs in Japan                                     | Tomomasa Sato & Yuji Tobitsuka |
| 17:10 – 17:25 | Space Programs in United States                       | Rob Ambrose                    |
| 17:25 – 17:40 | Programs in China                                     | Han Ding                       |
| 17:40 – 18:00 | Panel Discussion with Audience Comments and Questions | Guang-Zhong Yang, Moderator    |

### Chairs and Organizers

#### William R. Hamel

The University of Tennessee, USA



#### Guang-Zhong Yang

Shanghai Jiao Tong University, China





## Speakers

### **Junku Yuh**

President, Korea Institute for Robotics and  
Technology Convergence, South Korea



### **Stefano Stramigioli**

Vice President, Research of euRobotics, European  
Union



### **Tong Boon Quek**

Chief Executive, National Robotics R&D Program  
Office, Singapore



### **Rob Ambrose**

Principal Technologist, Game Changing Development  
Program, Chief, Software, Robotics and Simulation  
Division, NASA Johnson Space Center, USA.



### **Han Ding**

Member, Chinese Academy of Science  
Professor, Huazhong University of Science and  
Technology, China



## 20. Industrial Forum



### Intelligence Technologies in Industry

Tuesday, Nov 5, 14:45 – 18:15

Room L3-RA, Level 3

Wednesday, Nov 6, 10:30 – 12:00

### Chairs and Organizers

Danwei Wang (Nanyang Technological University, Singapore) and Haoyao Chen (Harbin Institute of Technology, China)

### Program: Session A (Tuesday, Nov 5, 14:45 – 16:15)

| Time          | Title  | Speaker               |
|---------------|--|-----------------------|
| 14:45 – 15:15 | Walk into the Era of “Human-Robot Coexistence”   | Huan Tan, UBTEch      |
| 15:15 – 15:30 | Smart Compliant Actuator--Low cost solution for robotic motion control problem based on quasi-direct drive | Haotian Cui, INNFOs   |
| 15:30 – 15:45 | On-demand last mile delivery using autonomous vehicles   | Dongchun Ren, Meituan |
| 15:45 – 16:15 | Panel discussion   |                       |

### Program: Session B (Tuesday, Nov 5, 16:45 – 18:15)

| Time          | Title  | Speaker                                      |
|---------------|--|--|
| 16:45 – 17:05 | How AI Improves Learning Efficiency in K-12 Personalised Education                       | Wei Cui, Squirrel AI Learning by Yixue Group |
| 17:05 – 17:25 | Robotics Initiatives at Khalifa University and the UAE                                   | Lakmal Seneviratne, Khalifa University       |
| 17:25 – 17:40 | The fourth robotic revolution and what it means for the future of robot-based automation | Rainer Bischoff, KUKA                        |
| 17:40 – 18:15 | Panel discussion   |  |

**Program: Session C (Wednesday, Nov 6, 10:30 – 12:00)**

| Time          | Title   | Speaker                              |
|---------------|---|--------------------------------------|
| 10:30 – 10:45 | Applied Depth Sensing in Robotics with Intel® RealSense™ technology | Sergey Dorodnicov, Intel® RealSense™ |
| 10:45 – 11:00 | Using Data Labeling for Prediction & Planning                       | Elliot Branson, Scale AI             |
| 11:00 – 11:15 | Ideal 3D Camera For Both Research And Industrial Applications       | Tianlan Shao, Mech-Mind Robotics     |
| 11:15 – 12:00 | Panel discussion  |                                      |

## 21. Cutting Edge Forums



### Autonomous Driving: Contributions from Intelligent Robotics, AI and ITS

Tuesday, Nov 5, 11:00 – 12:30

LG-R8, Lower Ground

#### Organizers

Christian Laugier (Inria Grenoble Rhône-Alpes, Grenoble, France), Philippe Martinet (INRIA, France), Christoph Stiller (Karlsruhe Institute of Technology, Germany), Miguel Ángel Sotelo Vázquez (University of Alcalá, Spain), Marcelo H Ang Jr (National University of Singapore, Singapore)

#### Titles and Speakers

- Situation Awareness and Decision-making for Autonomous Driving, Christian Laugier (Inria Grenoble Rhône-Alpes, Grenoble, France)
- Autonomous Driving: Simulation and Navigation, Dinesh Manocha (University of Maryland, USA)
- Security of Autonomous Vehicle under Cyber Attacks, Danwei Wang (NTU, Singapore)

### Surgical Robotics of AI

Wednesday, Nov 6, 13:00 – 16:15

LG-R11, Lower Ground

#### Organizers

Mamoru Mitsuishi (The University of Tokyo, Japan) and team members

#### Titles and Speakers

- Medical Robotics: levels of autonomy and associated challenges, Guang-Zhong Yang (Shanghai Jiao Tong University, China)
- Future direction and regulations of surgical robots with AI, Mamoru Mitsuishi (University of Tokyo, Japan)
- Toward intelligent robotic assistance for safe manipulation in retinal surgery, Iulian Iordachita (Johns Hopkins University, USA)
- Thoughts on Innovation and Entrepreneurship of Medical Robots in China, Tianmiao Wang (Beihang University, China)
- Towards Autonomous Medical Robots, Ron Alterovitz (University of North Carolina, USA)
- Bionic and Bioinspired Solutions for Surgical Robotics, Paolo Dario (Scuola Superiore Sant'Anna, Italy)

### Human Interaction with Multi-robot Systems

Wednesday, Nov 6, 13:00 – 14:30

LG-R9, Lower Ground

#### Organizers

Lorenzo Sabattini (University of Modena and Reggio Emilia, Italy), Nora Ayanian (University of Southern California, USA), Robert Fitch (University of Technology Sydney, Australia), Antonio Franchi (LAAS-CNRS, France)

### Speakers

- Katia Sycara (Carnegie Mellon University, USA)
- Jeff Shamma (King Abdullah University of Science and Technology (KAUST), Saudi Arabia)
- Lorenzo Sabattini (University of Modena and Reggio Emilia, Italy)

## Cognitive Architectures for Humanoids: Where Are We in Our Quest to Achieve Human-Level AI in Robotics?

Wednesday, Nov 6, 14:45 – 16:15

LG-R9, Lower Ground

### Organizers

Giulio Sandini (Istituto Italiano di Tecnologia and University of Genova, Italy), David Vernon (Carnegie Mellon University Africa, Rwanda), Laurel D. Riek (University of California San Diego, USA), Shingo Shimoda (Riken Brain Science Institute, Japan)

### Speakers

- Michael Beetz (University Bremen, Germany)
- Serena Ivaldi (INRIA, France)
- Karinne Ramirez-Amaro (Chalmers University of Technology, Sweden)
- Alessandra Sciutti (Istituto Italiano Tecnologia, Italy)
- Angelo Cangelosi (University of Manchester, UK)

## Human Movement Understanding for Intelligent Robots and Systems

Thursday, Nov 7, 11:00 – 12:30

LG-R12, Lower Ground

### Organizers

Emel Demircan (California State University, Long Beach, USA), Tadej Petric (Jožef Stefan Institute, Slovenia), Taizo Yoshikawa (Honda R&D Co., Ltd, Japan), Philippe Fraisse (University of Montpellier, France)

### Speakers

- Emel Demircan (California State University Long Beach, USA)
- Tadej Petric (Jožef Stefan Institute, Slovenia)
- Taizo Yoshikawa (Honda R&D Co., Ltd. Japan)
- Philippe Fraisse (University of Montpellier, France)
- Martina Hasenjaeger (HRI-EU)

## 22. Special Forum



Friday, Nov 8, 09:00 – 17:00

Room LG-R10, Lower Ground

### Human-Centred Robot Systems and their Impact on Manufacturing and Society

#### Organizers

Jianwei Zhang (Universität Hamburg, Germany), Han Ding (Huazhong University of Science and Technology, China), Kazuhiro Kosuge (Tohoku University, Japan), Oussama Khatib (Stanford University, USA)

#### Scope

Presenting the state of the art of the Human-centred robot systems (by invited recognized researchers).

Recent innovative results on medical, rehabilitation and service robotics:

- Dysfunction assistant robot
- Intelligent robots in rehabilitation and physiotherapy
- Body assistance robots in astronautics
- Mechanism design theory and method of wearable robots,
- Intelligent perception and cognition
- Biomechanical modeling and simulation
- Dynamics and control, control theory for remote man-machine collaboration
- Other human-centered intelligent systems

Bridge between human-centered intelligent systems, AI and industry applications.

Discussion on current state, unsolved problems and future developments of human-centered intelligent systems and their impact on manufacturing and society.

#### Program: Session A (9:00-12:00)

Chair: Miao Li (Wuhan University, China)

| Time          | Title  | Speaker         |
|---------------|--|-----------------|
| 9:00 – 9:25   | Collaboration Research on Crossmodal Robot                 | Jianwei Zhang   |
| 9:25 – 9:50   | Overview on Coexisting-Cooperative-Cognitive Robots        | Han Ding        |
| 9:50 – 10:15  | The Age of Human-Robot Collaboration: Deep sea Exploration | Oussama Khatib  |
| 10:15 – 10:40 | Dance Partner Robot to Co-worker Robot “PaDY”              | Kazuhiro Kosuge |

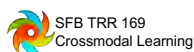
|               |  |             |
|---------------|--|-------------|
| 10:40 – 11:00 | Robot Autonomous Manipulation Based On Physical Relationship And Functional Reasoning In Collaborative Scenarios | Xuguang Lan |
| 11:00 – 11:20 | Recent Trends of Collaborative Robot   | Hao Ding    |
| 11:20 – 12:00 | Panel discussion   |             |

### Program: Session B (13:30-17:00)

Chair: Zhaopeng Chen (DLR, Germany)

| Time          | Title  | Speaker          |
|---------------|--|------------------|
| 13:30 – 13:50 | Grand Challenges of Assistive Medical Robot Systems  | Guang-Zhong Yang |
| 13:50 – 14:10 | Neurorobotic models for Human-Centred Robot Application  | Stefan Wermter   |
| 14:10 – 14:30 | Design and application of a mobile robot   | Xinjun Liu       |
| 14:30 – 14:50 | Dynamics and Interfaces of Human-Robot Hybrid Systems  | Qining Wang      |
| 14:50 – 15:10 | High Efficiency Walking Robot  | Qingdu Li        |
| 15:10 – 15:30 | Recent Trends of the Human-centred Development of Transfer robots for Nursing-care of Disabled Elderly | Shijie Guo       |
| 15:30 – 15:50 | Human kinesiology and wearable robot,  | Caihua Xiong     |
| 15:50 – 16:10 | Bio-Syncretic Robotics for Natural Intelligence  | Lianqing Liu     |
| 16:10 – 16:30 | Sparse Bayesian Learning-Based Adaptive Impedance Control in Physical Human-Robot Interaction          | Ye Yuan          |
| 16:30 – 17:00 | Panel discussion   |                  |

### Sponsors



## 23. Competitions

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### Drones

#### C1 - MathWorks Minidrone Competition

Organizer: MathWorks, USA

Date: Monday - Tuesday, Nov 4 - 5

Venue: L3-RD, Zone A

<https://www.mathworks.com/academia/student-competitions/minidrones/iros-2019.html>

#### C3 - Autonomous Drone Racing (ADR)

Organizers: Hyungpil Moon (Sungkyunkwan University, Korea), David Hyunchul Shim (KAIST, Korea), Si Jung SJ Kim (University of Nevada Las Vegas, USA)

Date: Monday - Tuesday, Nov 4 - 5

Venue: L3-RD, Zone B

<https://rise.skku.edu/2019-drone-racing>

### Humanoids & SLAM

#### C2 - Humanoid Challenge - Robot Magic

Organizers: Jacky Baltes (National Taiwan Normal University, Taiwan), Rodrigo da Silva Guerra (Universite Federal de Santa Maria, Brazil), Soroush Sadeghnejad (Amirkabir University of Technology, Iran)

Date: Monday - Wednesday, Nov 4 - Nov 6 (12:00)

Venue: L3-RD, Zone D

<https://www.facebook.com/humanoidchallenge/>

#### C4 - Lifelong Robotic Vision Challenge

Organizers: Qi She (Intel Labs China), Xuesong Shi (Intel Labs, China), Yimin Zhang (Intel Labs, China), Fei Qiao (Tsinghua University, China), Rosa H.M. Chan (City University of Hong Kong, China)

Date: Monday, Nov 4

Venue: L3-RD, Zone C

<https://lifelong-robotic-vision.github.io/>



## Grasping and Manipulation

### C6 - Object Pose Estimation Challenge for Bin-Picking

Organizers: Kilian Kleeberger (Fraunhofer IPA in Stuttgart, Germany), Marco Huber (Fraunhofer IPA in Stuttgart, Germany)

Date: Tuesday, Nov 5

Venue: L3-RD, Zone C

<http://www.bin-picking.ai>

### C7 - Robotic Grasping and Manipulation Competition

Organizers: Yu Sun (University of South Florida, USA), Joseph Falco (National Institute of Standards and Technology, USA)

Date: Monday - Tuesday, Nov 4 - 5

Venue: L3-RD, Zone F

[http://rpal.cse.usf.edu/competition\\_iros2019/](http://rpal.cse.usf.edu/competition_iros2019/)

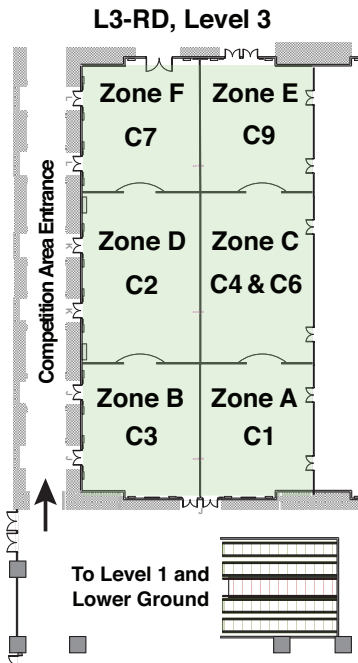
### C9 - Minesweepers: Towards a Landmine-free World Indoor Version

Organizer: Alaa Khamis (SMIEEE)

Date: Monday - Tuesday, Nov 4 - 5

Venue: L3-RD, Zone E

<https://landminefree.org/indoor/>



## 24. Conference Awards

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IROS 2019 Awards Luncheon  
Thursday, Nov 7, 12:40 – 14:30



### IROS Awards

#### IROS Harashima Award for Innovative Technologies

To honor Professor Fumio Harashima, the Founding Honorary Chair of the IROS conferences, by recognizing outstanding contributions of an individual of the IROS community who has pioneered activities in robotics and intelligent systems.

#### IROS Distinguished Service Award

To recognize an individual who has performed outstanding service and leadership for the benefit and advancement of the IROS Conference. Up to two awards will be given annually at the IROS Conference.

#### IROS Toshio Fukuda Young Professional Award

To recognize individuals (from academic institutions, government, industry, or research labs) who, in their early career, have made identifiable contributions that have had a major impact on intelligent robots and systems. Up to two awards will be given annually at the IROS Conference.

### IROS 2019 Awards

#### IROS JTCF Novel Technology Paper Award for Amusement Culture

To recognize technical papers which have made practical technology contributions to Toys, Toy Models and Amusement Culture.

Finalists:

- **Responsive Joint Attention in Human-Robot Interaction**  
André Pereira, Catharine Oertel, Leonor Fermoselle, Joe Mendelson, Joakim Gustafson
- **Deep Dive into Faces: Pose & Illumination Invariant Multi-Face Emotion Recognition System**  
Suchitra Saxena, Shikha Tripathi, Sudarshan T S B
- **Enthusiastic Robots make Better Contact**  
Elie Saad, Joost Broekens, Mark Neerincx, Koen Hindriks
- **Entropic Risk Measure in Policy Search**  
David Nass, Boris Belousov, Jan Peters

#### IROS RoboCup Best Paper Award

To recognize technical papers which have made identifiable contributions to RoboCup.

Finalists:

- **Motion Decoupling and Composition via Reduced Order Model Optimization for Dynamic Humanoid Walking with CLF-QP based Active Force Control**  
Xiaobin Xiong, Aaron Ames
- **Early Fusion for Goal Directed Robotic Vision**  
Aaron Walsman, Yonatan Bisk, Saadia Gabriel, Dipendra Misra, Yoav Artzi, Yejin Choi, Dieter Fox
- **Advanced Autonomy on a Low-Cost Educational Drone Platform**  
Luke Eller, Theo Guerin, Baichuan Huang, Garrett Warren, Sophie Yang, Josh Roy, Stefanie Tellex

### **IROs Best Paper Award on Cognitive Robotics sponsored by KROS**

To promote interdisciplinary researches on cognition for technical systems and advancements of cognitive robotics in industry, home applications, and daily life.

Finalists:

- **Goal-Directed Behavior under Variational Predictive Coding: Dynamic Organization of Visual Attention and Working**  
Minju Jung, Takazumi Matsumoto, Jun Tani
- **Scaling Robot Supervision to Hundreds of Hours with RoboTurk: Robotic Manipulation Dataset through Human Reasoning and Dexterity**  
Ajay Uday Mandlekar, Jonathan Booher, Max Spero, Albert Tung, Anchit Gupta, Yuke Zhu, Animesh Garg, Silvio Savarese, Li Fei-Fei
- **Robot Learning via Human Adversarial Games**  
Jiali Duan, Qian Wang, Lerrel Joseph Pinto, C.-C. Jay Kuo, Stefanos Nikolaidis
- **Planning Beyond The Sensing Horizon Using a Learned Context**  
Michael Everett, Justin Miller, Jonathan Patrick How
- **Volumetric Instance-Aware Semantic Mapping and 3D Object Discovery**  
Margarita Grinvald, Fadri Furrer, Tonci Novkovic, Jen Jen Chung, Cesar Cadena Lerma, Roland Siegwart, Juan Nieto

### **IROs Best Paper Award on Safety, Security, and Rescue Robotics in memory of Motohiro Kiso**

To promote advanced research on safety, security and rescue robotics.

The name of the award is connected with Mr. Motohiro Kiso who was killed in Great Hanshin-Awaji Earthquake on 17 January 1995. He was a master student of Kobe University, Japan at that time. He had a dream to create a robot that can help people. To memorialize him and Great Hanshin-Awaji Earthquake, the award has established.

Finalists:

- **Optimization Based Motion Planning for Multi-Limbed Vertical Climbing Robots**  
Xuan Lin, Jingwen Zhang, Junjie Shen, Gabriel Ikaika Fernandez, Dennis Hong
- **Landing of a Multirotor Aerial Vehicle on an Uneven Surface Using Multiple On-board Manipulators**  
Hannibal Paul, Ryo Miyazaki, Robert Ladig, Kazuhiro Shimonomura
- **Development of a Steel Bridge Climbing Robot**  
Son Nguyen, Hung La
- **FASTER: Fast and Safe Trajectory Planner for Flights in Unknown Environments**  
Jesus Tordesillas Torres, Brett Lopez, Jonathan Patrick How
- **Reconfiguration Motion Planning for Variable Topology Truss**  
Chao Liu, Mark Yim

### IROS ICROS Best Application Paper Award

To promote researches on excellent robot application.

Finalists:

- **SVIn2: An Underwater SLAM System Using Sonar, Visual, Inertial, and Depth Sensor**  
Sharmin Rahman, Alberto Quattrini Li, Ioannis Rekleitis
- **Integer Programming As a General Solution Methodology for Path-Based Optimization in Robotics: Principles, Best Practices, and Applications**  
Shuai D. Han, Jingjin Yu
- **Mapping for Planetary Rovers from Terramechanics Perspective**  
Ruyi Zhou, Liang Ding, Haibo Gao, Wenhao Feng, Zongquan Deng, Nan Li
- **Flexible Layouts for Fiducial Tags**  
Maximilian Krogus, Acshi Haggemiller, Edwin Olson
- **A Real-Time Dynamic Simulator and an Associated Front-End Representation Format for Simulating Complex Robots and Environments**  
Adnan Munawar, Yan Wang, Radian Gondokaryono, Gregory Scott Fischer
- **Visual Servoing of Miniature Magnetic Film Swimming Robots for 3D Arbitrary Path Following**  
Chenyang Huang, Tiantian Xu, Jia Liu, Laliphat Manamanchaiyaporn, Xinyu Wu

### IROS 2019 ABB Best Student Paper Award

To recognize the most outstanding paper authored primarily by a student at the annual IROS Conference.

Finalists:

- **Integer Programming As a General Solution Methodology for Path-Based Optimization in Robotics: Principles, Best Practices, and Applications**  
Shuai D. Han, Jingjin Yu
- **Efficient and Guaranteed Planar Pose Graph Optimization Using the Complex Number Representation**  
Taosha Fan, Hanlin Wang, Michael Rubenstein, Todd Murphey
- **Development of a Steel Bridge Climbing Robot**  
Son Nguyen, Hung La
- **Flexible Layouts for Fiducial Tags**  
Maximilian Krogus, Acshi Haggenmiller, Edwin Olson

### IROS 2019 Best Paper Award

To recognize the most outstanding paper at the annual IROS Conference.

Finalists:

- **Planning Reactive Manipulation in Dynamic Environments**  
Philipp Sebastian Schmitt, Florian Wirschofer, Kai M. Wurm, Georg v. Wichert, Wolfram Burgard
- **Bounded-Error LQR-Trees**  
Barrett Ames, George Konidaris
- **Interaction-aware Decision Making with Adaptive Strategies under Merging Scenarios**  
Yeping Hu, Alireza Nakhaei, Masayoshi Tomizuka, Kikuo Fujimura
- **Bee+: A 95-mg Four-Winged Insect-Scale Flying Robot Driven by Twinned Unimorph Actuators**  
Xiufeng Yang, Ying Chen, Longlong Chang, Ariel A Calderon, Nestor O Perez-Arancibia

### The current limits and potentials of autonomous assembly

Monday, Nov 4, 9:00 – 18:00      Workshop      MoW-R1      L1-R1, Level 1  
<http://zkks.w3.kanazawa-u.ac.jp/IROS2019WS/>

#### Organizers

Tetsuyou Watanabe, Kanazawa University, Japan  
Kensuke Harada, Osaka University, Japan  
Ryuta Ozawa, Meiji University, Japan  
Tokuo Tsuji, Kanazawa University, Japan

Imagenet large scale visual recognition challenge (ILSVRC) has increased the image recognition ability based on machine learning including Deep Neural Network, whereas Amazon Picking or Robotics Challenge has demonstrated that the image recognition methods are useful for robots to pick and place many types of objects. A pick-and-place task does not require accurate motion control, and the next challenge thus should involve the requirements for high motion accuracy. In this context, World Robot Summit industry category (WRS) was held to pursue the robot ability for completing a complex assembly task. However, even top teams did complete only several parts of the assembly tasks. It indicates not only a large gap between robots and human at assembling ability, but also the current limitations and potentials of robotic assembly technologies. The advancement of assembly technologies are required as a next step. To build up the next technologies, the reviewing of current state-of-the-art technologies are necessary. Based on this, this workshop aims at clarifying the current limits and potentials at robotic assembly by investigating the state-of-art technologies for robotic assembly as well as the assembly challenge program results, to accelerate the generation of new methodologies, strategies, and techniques for autonomous robotic assembly.

### RoboTac 2019: New Advances in Tactile Sensation, Perception, and Learning in Robotics: Emerging Materials and Technologies for Manipulation

Monday, Nov 4, 9:00 – 18:00      Workshop      MoW-R2      L1-R2, Level 1  
<https://robotac19.aau.at/>

#### Organizers:

Dr. Mohsen Kaboli, New Technologies, & Innovations, BMW Group, Germany  
Dr. Lisa-Marie Faller, Alpen-Adria-Universitt Klagenfurt, Austria  
Dr. Lorenzo Natale, Istituto Italiano di Tecnologia, Italy  
Dr. Tapomayukh Bhattacharjee, University of Washington, US  
Dr. Robert Haschke, Bielefeld University, Germany

Prof. Martin Kaltenbrunner, Johannes Keppeler University Linz, Austria

Prof. Ravinder Dahiya, University of Glasgow, UK

The sense of touch is a crucial capability for us to cope with manipulation related challenges in everyday life. It enables grasping, manipulation, learning, and decision-making based on the information we get from the hundreds of mechanoreceptors distributed over our skin. This sense of touch is a capability, which robotic systems of the future need to provide in order to be able to safely collaborate and physically interact with humans. Tactile sensing is also essential to perform a variety of other tasks including industrial applications, consumer services, and other highly dynamic environments such as assistance and care for elderly, housekeeping, etc.

This workshop is a follow up of our previous workshop, RoboTac18 at IROS2018 emerging on tactile object physical properties perception. In our current workshop, we are focusing mainly on new advances in materials and technologies in tactile sensing with the application in grasp and manipulation of soft and deformable objects. In this workshop we are bringing together researchers from different fields at the intersection of tactile perception, material sciences, and robotics manipulation. We are providing the opportunity to young researchers to get a compact overview of the field (and meet influential senior researchers). Moreover, we are fostering a new cooperation.

### Advances in Soft Robots Control

Monday, Nov 4, 9:00 – 18:00      Workshop      MoW-R3      L1-R3, Level 1  
<http://roboticslab.uc3m.es/roboticslab/content/iros-2019-workshop-advances-soft-robots-control>

### Organizers

Concepcin A. Monje, RoboticsLab, University Carlos III of Madrid, Spain

Helmut Hauser, Faculty of Engineering, University of Bristol, UK

Cecilia Laschi, Scuola Superiore Sant'Anna, Italy

The emerging field of soft robotics is nowadays looking at innovative ways to create and apply robotic technology in our lives. It is a relatively new domain in the field of robotics, but one that has a lot of potential to change how we relate with robots and also how they are used. The term "soft robot" describes a system that is inherently soft yielding a complex dynamics and a passive compliance similar to the biological counterpart. As this was a new design paradigm for the hardware,

methods or algorithms to prescribe the robotic system a certain dynamics changed as well.

Classical control approaches in robotics are nonlinear model based. However, the highly complex and nonlinear models necessary for a soft robotic system make this approach a difficult task and therefore seem to come to a limit in the presence of a soft robot. Therefore, other methods have been applied seemingly being more useful in this context, such as learning-based control algorithms, model-free approaches like bang bang control, control algorithms motivated by neuroscience, or morphological computation. These methods add new perspectives to the well known model-based approach. We want to provide an inter- and cross-disciplinary platform to discuss techniques, conventional as well as novel, that are currently applied and developed and discuss limitations, potentials and future directions.

### Reproducibility of Research, Benchmarking and Verification of Autonomous Robotic Systems

Monday, Nov 4, 9:00 – 18:00      Workshop      MoW-R4      L1-R4, Level 1  
<http://www.reproducibleroboticsresearch.org/Iros2019workshoprrr>

#### Organizers:

F. Bonsignorio, Heron Robots, Italy

Signe A. Redfield, Naval Research Lab,, USA

A. P. del Pobil, Universidad Jaume I, Spain

Tomoyuki Yamamoto, New Energy and Industrial Technology Development Organization, Japan

In robotics research the replicability and reproducibility of results and their objective evaluation and comparison is seldom put into practice. This situation impairs both research progress and technology transfer.

Significant progress has been made in these respects in recent years and this workshop will provide a curated view of the state of the art. From September 2017, the IEEE Robotics & Automation Magazine has been soliciting R-Articles.

Self-driving cars, robotic home assistants, medical robots, and other diverse autonomous systems are supposed to be spreading worldwide.

Their verification—compelling evidence that autonomous systems satisfy their requirements and behave safely—has become crucially important. The lack of shared procedures for their assessment is a main obstacle to widespread adoption of autonomous systems in safety-critical applications.



This workshop aims to gather researchers active in academia and industry to share the ideas so far developed and discuss the challenges still ahead.

### 3rd International Workshop on the Applications of Knowledge Representation and Semantic Technologies in Robotics (AnSWeR19)

Monday, Nov 4, 9:00 – 18:00    Workshop    MoW-R5    L1-R5, Level 1  
<http://wiki.knoesis.org/index.php/Answer-Robotic-SemanticWeb-IoT-Workshop-IROS2019>

#### Organizers:

Amelie Gyrard, Wright State University, USA  
Emanuele Bastianelli, Heriot-Watt University, UK  
Ilaria Tiddi, Vrije University Amsterdam, Netherlands  
Masoumeh Iran Mansouri, rebro University, Sweden

Autonomous mobile agents and robotics, in general, are experiencing a growing interest due to a number of factors, e.g. the advancements in Artificial Intelligence, Natural Language Processing, and Computer Vision; the amount of new efficient techniques for basic robotic tasks (perception, manipulation, navigation etc.); and the increasing number of cost-accessible robotic platforms in the market. As a consequence, robots will be required to achieve more and more complex tasks, hence exposing the ability to deal with different sources of knowledge about the world in order to improve their behaviors.

Autonomous mobile agents and robotics, are experiencing a growing interest due to a number of factors, e.g. the advancements in AI, NLP, and Computer Vision; the amount of efficient techniques for robotic tasks (perception, manipulation, navigation, etc.); and cost-accessible robotic platforms. Robots are required to achieve complex tasks, exposing the ability to deal with heterogeneous knowledge about the world to improve their behaviors (e.g. the RoboEarth or RoboBrain projects). Those techniques have a role to play in robotic applications to achieve their tasks.

The AnSWeR workshop studies the involvement and applications of Knowledge Representation and Semantic Web communities (studying techniques to model, integrate and exploit heterogeneous knowledge) in robotic applications, including the emerging “Internet of Cloud Robotic Things” topic. The IROS2019 AnSWeR workshop fosters conversations among the Asian community, and the EU audience, which presents a long-standing tradition in knowledge management and representation, and the Internet of Things.

### Articulated Actuation Towards Human Capabilities for Robots

Monday, Nov 4, 9:00 – 18:00      Workshop      MoW-R6      L1-R6, Level 1  
<https://www.ram.ewi.utwente.nl/iros19-articulated-actuation/>

#### Organizers:

Wesley Roozing, University of Twente, Netherlands  
Navvab Kashiri, Istituto Italiano di Tecnologia, Italy  
Tom Verstraten, Universiteit Brussel, Belgium  
Bram Vanderborght, Universiteit Brussel, Belgium  
Nikos Tsagarakis, Istituto Italiano di Tecnologia, Italy  
Stefano Stramigioli, University of Twente, Netherlands

Despite great strides in design and control of robotic systems leading to excellent force/impedance control, robotic systems as a whole are still vastly outperformed by their biological counterparts. The complex musculoskeletal system found in animals, comprised of rigid and soft structures, enables passive and active actuation synergies bestowing them with capabilities unattainable by current robots.

This workshop will explore what is needed to reach such a level of capability, by considering how design and control can be integrated. Firstly, it will study the biomechanical properties of prime examples from the animal kingdom. Secondly, it will ask how systems that exhibit desirable dynamics can be synthesised, and what those dynamics are for the capabilities that we want the robots to exhibit. Lastly, it will explore how such designed dynamics can be harnessed and exploited in control to obtain synergetic behaviour that displays capabilities matching or outperforming those of biological systems.

### Robotics in a day: ROS, ROL, AWS RoboMaker

Monday, Nov 4, 9:00 – 13:00      Tutorial      MoW-R7      L1-R7, Level 1  
<https://abstractionlanguages.github.io/IROS2019/>

#### Organizers:

Dr. Gabriel A. D. Lopes, RRC Robotics, Netherlands  
Ray Zhu, Amazon Web Services, USA  
Douglas Fulop, AWS Robotics and Autonomous Services, USA  
Dr. Carlos Hernandez Corbato, Delft University of Technology, Netherlands

This workshop focuses on quick setup, programming and deployment of software on robots. The objective of the tutorial is to familiarize academic and industry

robotics practitioners with new state-of-the-art development tools which were launched within the last 6 months. Revolving around the ROS ecosystem (Robot Operative System), we focus on the cloud infrastructure provided by Amazon Web Services (AWS) RoboMaker, and the open-source Robotics Language (RoL) as a general-purpose robotics programming language. With the combination of both tools, users can speed up development without the need of setting up infrastructure or use very low-level programming languages. Yet, the outcome is industrial-strength high performance computation, by leveraging on cloud computing and auto-generated c++/python/javascript code. This interactive tutorial spans the entire development process: from setting up a cloud-based development environment, programing a non-trivial behavior on a robot, simulating, and finally deploying.

### Different approaches, the same goal: Autonomous object manipulation

Monday, Nov 4, 9:00 – 18:00 Workshop MoW-R8 LG-R8, Lower Ground  
<https://manipulation-iros-workshop.github.io/>

#### Organizers:

Giulia Vezzani, Istituto Italiano di Tecnologia, Italy  
Lorenzo Natale, Istituto Italiano di Tecnologia, Italy  
Valerio Ortenzi, University of Birmingham, UK  
Tamim Asfour, Karlsruhe Institute of technology, Germany  
Peter Corke, Queensland University of Technology, Australia

Manipulating objects autonomously and in unstructured environments is one of the basic skills for robots to support people during everyday life outside industrial cages. The study of autonomous manipulation in robotics aims at transferring human-like perceptive skills to robots so that, combined with state of the art control techniques, they could be able to achieve similar performance in manipulating objects. The great complexity of this task makes autonomous manipulation one of the open problems in robotics that has been drawing a big interest in the community in the recent years.

The aim of this workshop is to discuss and present different techniques proposed for addressing the same problem: object manipulation. More than a comparison, this workshop is designed to encourage people belonging to different research fields such as robotics and deep learning to share their approaches, ideas, and problems regarding autonomous manipulation.

### Fast Neural Perception and Learning for Intelligent Vehicles and Robotics

Monday, Nov 4, 9:00 – 18:00      MoW-R9      LG-R9, Lower Ground  
<https://www.robomai.coms>

#### Organizers:

Jia Pan, The University of Hong Kong, Hong Kong, Hong Kong  
Changhong Fu, Tongji University, China  
Jianyu Yang, Soochow University, China  
Jie Cao, Beijing Institute of Technology, China.  
Haifei Zhu, Guangdong University of Technology, China

This workshop will bring together participants from academia and industry alike to share advancements and new technologies in the field of intelligent vehicles and robotics. The attendees of this workshop will be introduced to fast neural perception and learning from academic experts in the field. Experts from the industry will explain the current needs in intelligent vehicles and robotics, which will inspire researchers with challenges drawn from real use case scenarios. Experts from the academia will bring the latest advancements in the field, providing potential new solutions to real problems. The organizers and the invited speakers of this workshop have a multidisciplinary background that will stimulate interesting discussions, promote the cross-fertilization of ideas and encourage future collaborations.

### 11th Workshop on Planning, Perception and Navigation for Intelligent Vehicles

Monday, Nov 4, 9:00 – 18:00      Workshop      MoW-R10      LG-R10, Lower Ground  
<https://project.inria.fr/ppniv19/>

#### Organizers:

Christian Laugier, INRIA Grenoble Rhône-Alpes, France  
Philippe Martinet, Inria Sophia Antipolis, France  
Christoph Stiller, Karlsruher Institut für Technologie, Germany  
Miguel Angel Sotelo, University of Alcalá Alcalá de Henares, Spain  
Marcelo H. Ang Jr, National University of Singapore, Singapore

The purpose of this workshop is to discuss topics related to the challenging problems of autonomous navigation and of driving assistance in open and dynamic environments. Technologies related to application fields such as unmanned outdoor vehicles or intelligent road vehicles will be considered from both the

theoretical and technological point of views. Several research questions located on the cutting edge of the state of the art will be addressed. Among the many application areas that robotics is addressing, transportation of people and goods seem to be a domain that will dramatically benefit from intelligent automation. Fully automatic driving is emerging as the approach to dramatically improve efficiency while at the same time leading to the goal of zero fatalities. This workshop will address robotics technologies, which are at the very core of this major shift in the automobile paradigm.

### **Machines with Emotions: Affect Modeling, Evaluation, and Challenges in Intelligent Cars**

Monday, Nov 4, 9:00 – 18:00    Workshop    MoW-R11    LG-R11, Lower Ground  
<http://machines-with-emotions.com/>

#### **Organizers:**

Prof. Alois Knoll, Technical University of Munich, Germany  
Sina Shafaei, M. Sc., Technical University of Munich, Germany  
Dr. Radoslaw niewiadomski, University of Genoa, Italy  
Dr. Stefan Kugele, Technical University of Munich, Germany  
Christoph Segler, M. Sc., BMW Group, Germany  
Morteza Hashemi Farzaneh, M. Sc., Technical University of Munich, Germany

Studying the human behavior in the cabin and its differences from other environments is the very first step in paving the road for further progress in the field of affective computing and requires close coordination between the psychology, behavioral, and computer science besides automotive engineering. Yet, developing generic models based on emotional behavior of the driver/passenger for emotion recognition systems is at its early stages. There is still a lack of proper fusion strategies for different modalities of data and sensory inputs in affect recognition which varies from use case to use case, altogether with the absence of the proper databases which are collected accordingly to study and train the AI-based functions. This workshop aims to gather experts active in related scientific domains, dealing with the state-of-the-art technology in autonomous driving in order to shed a light on the currently existing challenges and their importance, with forming serious discussions.

### **Benchmark and Dataset for Probabilistic Prediction of Interactive Human Behavior**

Monday, Nov 4, 9:00 – 13:00    Workshop    MoWA-R12    LG-R12, Lower Ground  
<https://sites.google.com/berkeley.edu/iros2019-ws-dataset-benchmark/home>

### Organizers:

Wei Zhan, University of California, Berkeley, USA

Liting Sun, University of California, Berkeley, USA

Masayoshi Tomizuka, University of California, Berkeley, USA

Accurate prediction of probabilistic and interactive human behavior is a prerequisite to enable full autonomy of mobile robots (e.g., autonomous vehicles) in complex scenes. To enable accurate predictions, two fundamental problems should be addressed: 1) datasets of human behavior and motions in interactive tasks and scenarios, and 2) evaluation metrics and benchmarks for extensive prediction models/algorithms. Datasets are the most important asset since they provide sources for both model learning/training and validation. Similarly, evaluation metrics and benchmarks are also of fundamental importance since they provide not only criteria but also guidance for the design of prediction algorithms. Currently, the research community is still on its way to build high-quality datasets containing interactive human behavior, such as human-driven vehicles, pedestrians, cyclists, etc. Also, there is yet no widely accepted evaluation metric which can comprehensively quantify/evaluate the performance of different probabilistic prediction algorithms from perspectives of both data approximation and fatality/utility impacts on the autonomy of the mobile robots.

### Supernumerary Robotic Limbs

Monday, Nov 4, 14:00 – 18:00 Workshop MoWB-R12 LG-R12, Lower Ground  
<http://darbelofflab.mit.edu/2019-iros-workshop/>

### Organizers:

H. Harry Asada, Massachusetts Institute of Technology, USA

Chenglong Fu, Southern University of Science and Technology, China

Imagine that one-day humans have a third arm and a third leg attached to their body. The extra limbs will help them hold objects, support the human body, share a workload, and streamline the execution of a task. If the movements of such Supernumerary Limbs are naturally coordinated with their own limbs, the humans may come to perceive the extra limbs as an extension of the body, incorporated into their body image. The goal of the proposed workshop is to bring together researchers and practitioners interested in Supernumerary Robotic Limbs, displaying the state-of-the-art, discussing a broad spectrum of research challenges, and showcasing actual and potential applications of the technology in both industrial and rehabilitation areas.

In this workshop we invite speakers having diverse research activities and a variety of disciplinary backgrounds. These include biomechanics researchers, robot designers, materials scientists, and neuroscientists. We aim to exchange ideas from a broad spectrum of research activities, address fundamental research issues, explore promising applications, and establish foundations of SRL. We expect that the audience will find the proposed workshop useful and inspiring in exploring new research directions and setting new R&D goals.

### Aerial Swarms

Monday, Nov 4, 9:00 – 18:00    Workshop    MoW-R13    LG-R13, Lower Ground  
<http://go.epfl.ch/iros2019swarms>

#### Organizers:

Dr. Fabrizio Schiano, Swiss Federal Institute of Technology in Lausanne, Switzerland  
Prof. Dario Floreano, Swiss Federal Institute of Technology in Lausanne, Switzerland  
Dr. Paolo Robuffo Giordano, French National Center for Scientific Research, France

Recent advances in the field of aerial robotics and sensor technologies have greatly enhanced the capabilities of unmanned aerial vehicles (UAVs). One consequence of this outcome has been the growing interest in multi-aerial robotic systems often denoted simply as aerial swarms. Aerial swarm robotics consolidated itself as one of the most challenging, exciting and multidisciplinary fields of robotics. Real-world applications which could benefit from the use of aerial swarms include patrolling, exploration, search and rescue in large areas, as well as cooperative transportation and construction.

This workshop will bring together the subsets of the two communities of multi-robot and bio-inspired swarms dealing with systems of multiple aerial robots. We believe that there is not a gap between these two communities, but this workshop will try to highlight the differences in their approaches. The goal will be to share knowledge and understanding the main directions towards which these communities are heading.

### What's wrong with my robot? Unlearning biases in robot design

Monday, Nov 4, 9:00 – 18:00    Workshop    MoW-R14    LG-R14, Lower Ground  
<https://blogit.itu.dk/irosworkshop2019/>

#### Organizers:

Kasper Stoy, IT University of Copenhagen, Denmark  
Cathrine Hasse, University of Aarhus, Denmark

Pat Treusch, Technische Universitt Berlin, Germany  
Kathleen Richardson, De Montfort University, UK  
Morten Roed Frederiksen, IT University of Copenhagen, Denmark  
Ben Vermeulen, Universitt Hohenheim, Germany  
Dr. Karolina Zawieska, De Montfort University, UK

While developers are practiced in incorporating some values, like robustness, into their robots, many find it difficult to identify and address more implicit values and assumptions –especially in practice. This workshop explores how some values unintentionally seep into design, with real consequences for users and developers, by asking What will people design when they have no restrictions? and Can design provocation disrupt implicit faulty thinking patterns? Divided into four sessions consisting of open talks and practical tutorials, invited speakers will lead participants through design interventions to challenge existing assumptions in design, and to produce a prototype reflection tool for ethics, values, gender & stereotypes (EVGS) awareness and human-centered design, that may also enhance the uptake and acceptance of robots. The workshop emphasizes the potential for interdisciplinary collaborative learning across the social and technical sciences to enhance and broaden mindsets in robotic design.

### Marine Bio-inspired Soft Robotics

Monday, Nov 4, 9:00 – 18:00      MoW-R15      LG-R15, Lower Ground  
<https://sites.google.com/view/iros2019-marine-soro-workshop/home>

#### Organizers:

Prof. Li Wen, Beihang University, China  
Prof. Marcello Calisti, Scuola Superiore Sant'Anna, Italy  
Prof. Hannah Stuart, UC Berkeley, USA  
Dr. Yufeng Chen, Harvard University, USA

More than eighty percent of our ocean is unobserved and unexplored. This uncharted part of our planet offers huge potential for the industrial sectors, as well as for disruptive, exploration-driven scientific discoveries. Soft robots are compliant, light-weight, and multifunctional, and these properties offer many advantages over existing rigid robots for a diverse range of underwater applications, such as swimming among delicate coral reefs, cleaning near-shore pollutants, and collecting marine biological samples, etc. Developing agile, dexterous, and reliable underwater soft robots faces substantial challenges in structural design, material choice, sensing, actuation, modeling, and control. This workshop aims to foster a



synergetic discussion for developing next-generation underwater soft robots by inviting speakers from diverse backgrounds related to robotics. The workshop will not only cover major topics such as design, fabrication, sensing, actuation, and control, but also discuss emerging areas such as multiphase locomotion and hybrid soft-rigid systems.

### Behavior Trees for Robotics Systems: Tools, Applications, and Lessons Learned

Monday, Nov 4, 9:00 – 18:00    Workshop    MoW-R16    LG-R16, Lower Ground  
<https://behavior-trees-iros-workshop.github.io/>

#### Organizers:

Michele Colledanchise, Istituto Italiano di Tecnologia, Italy  
Lorenzo Natale, Istituto Italiano di Tecnologia, Italy  
Petter gren, Royal Institute of Technology, Sweden

Behavior Trees were developed in the video game industry as a tool to achieve modular, reusable, and flexible behaviors for Non-Player Characters (NPCs), and are now an established tool to the point that they integral parts of game AI textbooks as well as major game engines such as Unity3d, and the Unreal Engine.

In the last decade, Behavior Trees have received an increasing amount of attention in robotic as well, with applications in both academia and industry. The main advantages of Behavior Trees, with respect to conventional execution architectures like FSMs, are their ability to combine reactivity with deliberation in a very modular way.

This workshop has two main objectives: gather professionals and researchers with experience in using Behavior Trees for robotics applications, and sharing experiences and ideas to professionals and researchers interested in modeling complex behaviors for robots.

### Human Robot Collaboration (HRC): Biomechanical Limits, Modeling and Testing to Support Safe Robot Contacts with Humans

Monday, Nov 4, 9:00 – 18:00    Workshop    MoW-R17    LG-R17, Lower Ground  
<https://www.nist.gov/news-events/events/2019/11/human-robot-collaboration-hrc-biomechanical-limits-modeling-and-testing>

#### Organizers:

Joe Falco, National Institute of Standards and Technology, USA  
Dr.-Ing. Matthias Umbreit, Trade Association Wood and Metal, Germany

Dr. Sungsoo Rhim, Kyung Hee University, South Korea

A new class of robots that support human robot collaborative applications are designed with the functionality to safely work alongside humans. These robots are equipped with force sensing and active force control strategies or compliance through mechanical actuator technologies in order to limit forces and prevent injury upon contacts with humans. To ensure that humans are tolerable to contacts by the robot, biomechanical pressure and force limits are being developed that are based on both injury and pain tolerance. In addition to establishing these limits, additional research areas include the development of models to predict robot parameters for safe human contacts and test devices with associated methods to verify and validate robot operation. These tools are needed by the robot manufacturers as well as the application end-user before any system is commissioned for collaborative operation with humans.

### Assuring Safety for Physically Assistive Robots

Monday, Nov 4, 9:00 – 18:00    Workshop    MoW-R18    LG-R18, Lower Ground  
<https://www.bristolroboticslab.com/iros-2019>

#### Organizers:

Prof Praminda Caleb-Solly, University of the West of England, UK

Prof Sanja Dogramadzi, Bristol Robotics Lab, UK

Prof Jee-hwan Ryu, Korea

Dr Aghil Jafari, University of the West of England, UK

Prof Filippo Cavallo, BioRobotics Institute, SSS'A, Italy

Dr Ibrahim Habli, York University, UK

Robotics and autonomous systems (RAS) have the potential to provide personalised and cost-effective support for a range of care-related tasks for people with disabilities. To deploy physically assistive robots in real-world environments, it is fundamental to ensure that the design and operation, particularly with a vulnerable end-user in the loop, is going to be safe and reliable. Clinicians, carers and therapists will be unwilling to recommend these technologies unless they have confidence that assistive robots conform to healthcare guidance and regulations, and ensure patient safety and wellbeing. In this workshop, we will review the state of the art in physically assistive robots that are already deployed, as well as those being currently developed. We will also consider existing standards and methods for safety assurance for these systems, with a focus on the requirements for people with different accessibility needs. The objectives include identifying critical barriers to safety assurance and regulation, and analysing the adequacy of existing

guidelines and standards for physically assistive robots and gaps in current standards, using real-world use cases.

### Legacy Disruptors in Applied Telerobotics: Improving the Machine, the Interface, and the Human

Monday, Nov 4, 9:00 – 18:00    Workshop    MoW-R19    LG-R19, Lower Ground  
<https://rainhub.org.uk/legacy-disruptors-hmi-iros19/>

#### Organizers:

Ioannis D. Zoulias, RACE UKAEA , UK

Emily C. Collins, University of Liverpool, UK

William S. Harwin, University of Reading, UK

The workshop brings together individuals from the broad field of Robotics and Human-Robot Interaction research, to discuss the future of Human-Machine Interfaces in telerobotics. The workshop aims to identify technologies and methods that could introduce improvements to existing operations, and to capture best practices in human-machine interaction identified through a long history of telerobotics operations.

The workshop will encourage discussion of novel methods and technologies for disrupting existing legacy systems in telerobotics. Examples of established systems from research and industrial applications will be reviewed to identify the lessons learned, and considered alongside areas that have high levels of innovation.

We welcome participation across industry, academia, and throughout all applications in telerobotics, with speakers from a rich variety of backgrounds, aiming to drive a diverse and cross-collaborative discussion. Speakers bring experience on the challenges and insights of updating legacy telerobotics systems (be it surgical, nuclear, or space), and will present discipline specific solutions brought to these challenges.

The workshop features cutting-edge applications in telerobotics across all fields, giving a great overview on innovative solutions in applications of telerobotics.

### Intelligent Robotics Research: How to Close the Gap from Research Lab to the Real-World

Friday, Nov 8, 9:00-13:00      Workshop      FrWA-R1      L1-R1, Level 1

<https://www.ieee-ras.org/robotics-research-for-practicality/activities/338-technical-committees/tc-robotics-research-for-practicality/1407-rrpws-iros-2019>

#### Organizers:

Prof. Kazuhiro Kosuge, Tohoku University, Japan

Prof. Dikai Liu, University of Technology Sydney, Australia

Dr. Mahdi Hassan, University of Technology Sydney, Australia

Dr. Jose Salazar, Tohoku University, Japan

Significant progress is being made in robotic research and at an unprecedented rate. The substantial difference between robotic developments in research labs and implementations in the real-world is the “reality gap” that needs to be closed at a faster pace. There are various challenges that need to be addressed to close this reality gap. On one hand, robotics researchers may not fully appreciate the difficulties related to applying research in real-world applications. On the other hand, there are external limitations from social, economic, political and other factors. This workshop aims to provide an opportunity for researchers and practitioners to discuss the challenges, opportunities, and strategies related to applying robotics research in practical applications to generate significant economic and societal impact. There will be prominent experts and distinguished academics with strong backgrounds in both Academia and Industry discussing the latest challenges and breakthroughs in the field.

### Semantic Descriptor, Semantic Modeling and Mapping for Humanlike Perception and Navigation of Mobile Robots toward Large Scale Long-Term Autonomy

Friday, Nov 8, 14:00-18:00      Workshop      FrWB-R1      L1-R1, Level 1

[https://swb.skku.edu/cnrlab/iros2019\\_home.do](https://swb.skku.edu/cnrlab/iros2019_home.do)

#### Organizers:

Prof. Tae-Yong Kuc, Sung Kyun Kwan University, South Korea

Dr. Stephanie Lowry, Orebro University, Sweden

Pro. Fei Qiao, Tsinghua University, China

Dr. Sang-Hun Ji, Korea Institute of Industrial Technology, South Korea

This workshop aims to discuss topics related to semantic modeling for perception, learning, planning and navigation towards large-scale long-term autonomy on

global dynamic environments. The field of Simultaneous Localization and Mapping has been deeply researched for the previous decades. Even though several approaches are capable of obtaining precise and reliable maps, they still lack scalability and adaptiveness in order to work on large-scale unstructured environments. A big portion of our current environment was designed by humans, for humans, aiming our own capabilities and convenience. Robots are now being introduced into those environments, and it is paramount for them to be able to understand the World in a similar fashion as humans do. In other words, semantic information should be the core of reasoning, planning and learning algorithms. In this workshop, we will address the current obstacles on this field, while sharing the most recent breakthroughs and achievements. We will also propose a new framework for Semantic SLAM based on the understanding of human visual sensory information processing from cognitive science and efficient and flexible brain GPS model from neuroscience research and physiology.

### Challenges in Vision-based Drones Navigation

Friday, Nov 8, 9:00-18:00

Workshop

FrW-R2

L1-R2, Level 1

<https://wp.nyu.edu/workshopiros2019mav/>

#### Organizers:

Giuseppe Loianno, New York University, USA

Davide Scaramuzza, University of Zurich, Switzerland

This workshop will focus on the next research challenges in the area of vision-based navigation for single and multiple collaborative vision-based drones. In these areas, there are still several open research and scientific challenges related to the best and efficient environment representations for navigation and toward unified solutions for manipulation, transportation, locomotion, human-robot interaction, and heterogeneity in unstructured environments. How can drones autonomy change the human mobility? How can these machines interact with humans during a task predicting his future behavior and provide situational awareness relaxing communication constraints? How do we co-design perception and action loops for fast navigation of small-scale aerial platforms to obtain racing and super vehicles machines? What role should machine learning play for autonomy? What are and how do we solve the perception challenges in aerial swarms? We expect that this workshop will attract many researchers from both academia and industry, students, and practitioners interested to push the boundaries of the research in the field of autonomous navigation, manipulation, and physical/cognitive human-drones collaboration. The workshop will feature, in addition to contributed and invited

talks, real-time demos provided both from academia and industry actively working in this field.

### Intelligent Robot Interactions with the Anatomy

Friday, Nov 8, 9:00-18:00      Workshop      FrW-R3      L1-R3, Level 1  
<https://longwang.in/workshop-iros2019/>

#### Organizers:

Long Wang, Columbia University, USA  
Jing Guo, Guangdong University of Technology, China  
Bidan Huang, Tencent Robotics X, China  
Nabil Simaan, Vanderbilt University, USA  
Jaesung Hong, Daegu Gyeongbuk Institute of Science and Technology, South Korea  
Michael Yip, University of California San Diego, USA

Introducing robotic technology into surgery has advanced this field in many ways: less invasive procedures, less cognitive burden on surgeons, and better patient outcome. There are a great number of robotic systems, commercialized or being developed in research labs, that can provide interventions for a variety of surgical procedures. Yet, to this day, there are still very limited intelligent features on these robots compared to other robotic application domains, such as home, manufacturing, or warehouse.

At the core of robotic surgery lies the robot interactions with the anatomy, but challenges persist in fully monitoring, understanding, and regulating them. This workshop aims to bring world-class researchers to present the state-of-art research achievements and advances that contribute to better sensing the anatomy, to modeling the interaction more representatively, to regulating the interaction more intelligently, and to using methods that leverage recent advances in machine learning.

### Model-Driven Robot Software Engineering: From ROS-specific coding to framework-agnostic modeling

Friday, Nov 8, 9:00-13:00      Tutorial      FrWA-R4      L1-R4, Level 1  
<http://www.servicerobotik-ulm.de/iros2019/>

#### Organizers:

Prof. Dr. Christian SCHLEGEL, University of Applied Sciences Ulm, Germany  
Prof. Dr. Herman BRUYNINCKX, KU Leuven, Belgium  
Huascar ESPINOZA, CEA List, France

RobMoSys aims to coordinate the whole robotics community's best and consorted effort to realize a step change towards a European ecosystem for open and industry-grade model-driven software development for robotics. It enables the composition of robotics applications with managed, assured, and maintained system-level properties via model-driven techniques. Off-the-shelf software components come with data sheets for their proper selection, configuration and finally adequate composition to customized applications.

Key persons from the EU H2020 RobMoSys project guide through model-driven software engineering for robotics. RobMoSys conformant open-source Eclipse-based tooling is provided via virtual machines for direct use. The tooling demos cover system composition (from software components to pilot applications), address the stepwise migration to model-driven engineering (links to ROS systems, OPC UA systems), explain the benefits of model-driven approaches (like safety analysis) and you learn how you can use these approaches already now.

### Micro-robot and micro-manipulation

Friday, Nov 8, 14:00-18:00      Workshop      FrWB-R4      L1-R4, Level 1  
<http://web.suda.edu.cn/yhao/>

#### Organizers:

Xiangpeng Li (Soochow University, China), Hao Yang (Soochow University, China), Shiyang Tang (University of Wollongong, Australia), Mingyang Xie (Nanjing University of Aeronautics & Astronautics, China)

With the rapid progress of robot technologies, micro/nano robotics have significantly impacted our daily life, such as advanced manufacturing, material characterization, cancer therapy, and so on. Nowadays, both the fundamental theories and the practical applications of micro/nano robots have received increasing interest and paved new ways for many studies at a small scale. Main intention of this workshop is to provide a premier international platform for wide range of young researchers to share the latest advances in micro/nano robot systems areas.

### Automation in Construction: Artificial Intelligence and Robots for the Realization of Smart Buildings

Friday, Nov 8, 9:00-18:00      Workshop      FrW-R5      L1-R5, Level 1  
<https://edg.berkeley.edu/iros-2019-workshop-automation-in-construction/>

#### Organizers:

Dr. Hannah Stuart, University of California, USA

Sustainable and effective construction is a mounting global issue as the demand for affordable housing and green building solutions increases. Today, building materials, such as steel and lumber, are transported to construction sites and then buildings are raised using manual work and machinery of limited intelligence. Efficient construction through the development of new automated design approaches, on-site robotic activities and site sensorization could have tremendous impacts on the future of healthy living. Speakers from robotics, artificial intelligence, engineering and construction will facilitate conversation around the fusion of these fields to address this real-world application. Topics include flexible manipulation, prefabrication methods, onsite construction management, downstream maintenance and support of smart buildings, and close collaboration with human workers. The workshop will end with local industry site tours in the Hong Kong-Macao Bay Area in order to demonstrate the urgency and potential for this area of innovation.

### The Importance of Uncertainty in Deep Learning for Robotics

Friday, Nov 8, 9:00-18:00

Workshop

FrW-R6

L1-R6, Level 1

<https://nikosvunderhauf.github.io/roboticvisionchallenges/iros2019>

#### Organizers:

Dr Niko Sünderhauf, QUT, Australia

Dr Feras Dayoub, QUT, Australia

Dimity Miller, QUT, Australia

Dr Anelia Angelova, Google AI, USA

Dr David Hall, QUT, Australia

John Skinner, QUT, Australia

Prof Gustavo Carneiro, University of Adelaide, Australia

Prof Tom Drummond, Monash University, Australia

In this workshop we will discuss the importance of uncertainty in deep learning for robotic applications. In addition, the workshop will host the 2nd Probabilistic Object Detection challenge, a new challenge that evaluates the ability of visual object detectors to accurately quantify their spatial and semantic uncertainty.

The workshop will provide tutorial-style talks that cover the state-of-the-art of uncertainty quantification in deep learning, specifically Bayesian and non-Bayesian approaches, spanning perception, world-modeling, decision making, and actions. Invited expert speakers will discuss the importance of uncertainty in deep learning



for robotic perception, but also action. In addition the workshop will provide a forum to discuss novel and ongoing work in a variety of topics.

### Learning Representations for Planning and Control

Friday, Nov 8, 9:00-18:00      Workshop   FrW-R8      LG-R8, Lower Ground  
<https://sites.google.com/view/iros-2019-workshop-lrpc/home>

#### Organizers:

Ahmed H. Qureshi, University of California San Diego, USA  
Michael C. Yip, University of California San Diego, USA  
Byron Boots, Georgia Institute of Technology, GA 30332, USA  
Dmitry Berenson, University of Michigan, USA  
Jan Peters, Technische Universitaet Darmstadt, Germany  
Marco Pavone, Stanford University, USA  
Dorsa Sadigh, Stanford University, USA

Planning algorithms for control, also known as Motion Planning, has a long history ranging from methods with complete to probabilistic worst-case guarantees. However, despite having deep roots in artificial intelligence, these methods tend to be computationally inefficient in high-dimensional problems. On the other hand, machine learning advancements have led toward the systems that can perform complex decision-making by directly using the raw sensory information, thanks to the advancements in function approximation. This workshop aims to bring these two long-lived research communities under one forum to share insights towards building computationally tractable planning methods while retaining the theoretical guarantees. In general, the workshop will revolve around the themes: (i) Identify the bottlenecks of existing planning techniques and their solution through machine learning; (ii) Highlight challenges of combining the two fields and arrive at potential research directions; (iii) Critical problems that could emerge from merging two fields and think about possible solutions.

### The Fourth Workshop on Semantic Policy and Action Representations for Autonomous Robots (SPAR)

Friday, Nov 8, 9:00-18:00      Workshop   FrW-R9      LG-R9, Lower Ground  
<https://sites.google.com/view/spar2019/home>

#### Organizers:

Karinne Ramirez-Amaro, Technische Universität München, Germany  
Eren Erdal Aksoy, Halmstad University, Sweden  
Yezhou Yang, Arizona State University, USA

Shiqi Zhang, The State University of New York at Binghamton, USA

It has been a long-standing question of whether robots can reach a human level of intelligence that understands the essence of observed actions and imitates them even under different circumstances. Contemporary research in robotics and machine learning has attempted to solve this question from two different perspectives: One in a bottom-up manner by, for instance, solely relying on perceived continuous sensory data, whereas the other by approaching rather from the symbolic level in a top-down fashion. Although there have been shown encouraging results in both flows, understanding and imitation of actions have yet to be fully solved.

Action semantics stands as a potential glue for bridging the gap between symbolic action representation and its corresponding continuous signal level description. Semantic representation provides a tool for capturing the essence of action by revealing the inherent characteristics. Thus, semantic features help robots to understand, learn, and generate policies to imitate actions, even in various styles with different objects. Thus, more descriptive semantics yields robots with greater capability and autonomy. In this full-day workshop, we aim at presenting the recent developments on semantic-based methods in the robotics field.

### **Towards Cognitive Vehicles: perception, learning and decision making under real-world constraints. Is bio-inspiration helpful?**

Friday, Nov 8, 9:00-18:00    Workshop    FrW-R11    LG-R11, Lower Ground  
<https://cogvehicles2019.github.io/>

#### **Organizers:**

Dr. Yulia Sandamirskaya, University of Zurich and ETH Zurich, Switzerland  
Floran Mirus, BMW Group, Germany  
Dr.-Ing. Mohsen Kaboli, BMW Group, Germany  
Dr. Nicolai Waniek, Bosch Center for Artificial Intelligence, Germany  
Prof. Jörg Conradt, The Royal Institute of Technology, Sweden

The goal of the workshop is to discuss potential benefits and pitfalls in applying bio-inspired approaches when developing intelligent real-world systems that perceive, interact, learn, and make decisions. We will focus on the application area of intelligent, “cognitive” vehicles. While biological inspiration has led to some of the most successful approaches in perception and machine learning in form of deep neural networks, their deployment in real-world, safety-critical settings is yet limited. We aim to explore and critically discuss what biological inspiration in

perception, learning, and “cognition” could bring in the future for increasing intelligence of vehicles and other robotic systems. The workshop will stimulate discussion of the role of biological inspiration in the development of future AI systems in the context of real-world, safety-critical applications of robotic systems in environments shared with humans.

### Deep Probabilistic Generative Models for Cognitive Architecture in Robotics

Friday, Nov 8, 9:00-18:00      Workshop      FrW-R12      LG-R12, Lower Ground  
<https://sites.google.com/site/dpgmcar2019/home>

#### Organizers:

Takato Horii, The University of Electro-Communications, Japan  
Tadahiro Taniguchi, Ritsumeikan University, Japan  
Tetsunari Inamura, National Institute of Informatics, Japan  
Lorenzo Jamone, Queen Mary University of London, UK  
Takayuki Nagai, Osaka University, Japan  
Yiannis Demiris, Imperial College London, UK

In this workshop, we will investigate how we can create a cognitive architecture for a robot using deep and probabilistic generative models. To this end, we aim to bring together researchers from robotics and machine learning to share knowledge about the state-of-the-art machine learning methods that contribute to modeling language-related capabilities in robotics, and to exchange views among cutting-edge robotics researchers with a special emphasis on the usage of deep generative models in robotics and modeling a wide range of cognitive capabilities using probabilistic generative models. The workshop will include keynote presentations from established researchers in robotics, machine learning, and cognitive science. There will be a poster session highlighting contributed papers throughout the day.

### Novel trends for Design and Optimal Control of Wearable Assistive Technology

Friday, Nov 8, 9:00-18:00      Workshop      FrW-R13      LG-R13, Lower Ground

#### Organizers:

Katja Mombaur, Heidelberg University, Germany  
Lorenzo Masia, University of Twente, Netherlands

The workshop aims to broadly define the state of the art in the main areas of assistive technology, to allow experts to confront their expertise in mechanical

design, control implementation and clinical analysis in order to envision a unified strategy for "Human in the Loop".

The new design approaches in Bioinspiration and Biomimetics are re-shaping the field of rehabilitation robotics and assistive technology: yet these novel trends comprising soft wearable robotics, energy harvesting mechanisms, new intelligent materials, optimal control and machine learning, and intelligent prosthetics show a scattered scenario, where the synergistic use of these disciplines is far from being adopted.

How to formulate a unified approach which allows scientists to put together the above-mentioned fields and compose a roadmap for development of a more efficient technology?

To achieve the workshop's objectives, we will bring together experts who pioneered this multidisciplinary approach, and who effectively provided answers to the afore mentioned problems.

### Progress in Ergonomic Human-Robot Collaboration

Friday, Nov 8, 9:00-18:00      Workshop   FrW-R14   LG-R14, Lower Ground  
<https://hri.iit.it/news/organizations/iros-2019-workshop>

#### Organizers:

Luka Peternel, Delft University of Technology, Netherlands

Arash Ajoudani, Italian Institute of Technology, Italy

Dana Kulić, Monash University, University of Waterloo, Canada

Eiichi Yoshida, Intelligent Systems Research Institute, Japan

The proposed workshop will first follow up by reviewing the progress of the research that was initiated in the previous workshop on Ergonomic Physical Human-Robot Collaboration at ICRA2018. Then, we will focus on how to incorporate known ergonomic factors into the concept of human-robot collaboration. In addition, we will also put attention on discussing potential novel ergonomic factors that can be used within this framework. We will examine novel control strategies and interfaces for adaptive behaviour of collaborative robots that can facilitate the desired ergonomic conditions. Finally, we will discuss and design appropriate validation methods that can be used for objective benchmarking within the field.

In summary, the workshop goal is to bring together researchers, industry engineers, human factors researchers and medical doctors of different backgrounds and

provide an opportunity to discuss and solve challenges related to developing the concept of ergonomic human-robot collaboration.

### Factory of the Future - How to digitalize the robot-aided manufacturing process in Industry 4.0?

Friday, Nov 8, 9:00-18:00    Workshop    FrW-R15    LG-R15, Lower Ground  
<http://factory-of-the-future.dlr.de/>

#### Organizers:

Matteo Saveriano, German Aerospace Center, Germany  
Roman Weitschat, German Aerospace Center, Germany

Industrial mass production is no longer conceivable without robotics. The trend in modern manufacturing is towards individualized products, tailored to the customer, with an exploding variety of variants and much shorter product life-cycles. This, in order to satisfy the market demand of a flexible and customizable industrial production. In this context, the classic way of conceiving industrial automation, which is focused on purely automated or manual forms of production, is reaching its limits. The Factory of the Future needs a broad range of digital production technologies, robot systems, and applications for flexible and networked manufacturing processes effectively integrated in different production scenarios. An increased degree of autonomy and the digitalization of the robot-aided manufacturing are two of the main objective to pursue to make modern factory applications efficient, cost-effective, safe, and resource-conserving. Significant work in this direction has been done, but more has to be done to realize the Factory of the Future.

### Visual-Inertial Navigation: Challenges and Applications

Friday, Nov 8, 9:00-18:00    Workshop    FrW-R16    LG-R16, Lower Ground  
<http://udel.edu/~ghuang/iros19-vins-workshop/>

#### Organizers:

Guoquan (Paul) Huang, University of Delaware, USA  
Shaojie Shen, Hong Kong University of Science and Technology, Hoing Kong  
Michael Kaess, CMU, USA  
John Leonard, MIT, USA  
Sergios Roumeliotis, University of Minnesota, USA

As cameras and IMUs are becoming ubiquitous, visual-inertial navigation systems (VINS) that provide high-precision 3D motion estimation, hold great potentials in a wide range of applications from augmented reality (AR) and aerial navigation to

autonomous driving. While visual-inertial navigation, alongside with SLAM, has witnessed tremendous progress in the past decade, yet certain critical aspects in the design of visual-inertial systems remain poorly explored, greatly hindering the widespread deployment of these systems in practice. This workshop brings together researchers in robotics, computer vision and AI, from both academia and industry, to share their insights and thoughts on the R&D of VINS. The goal of this workshop is to bring forward the latest breakthroughs and cutting-edge research on visual-inertial navigation and beyond, to open discussions about technical challenges and future research directions for the community, and to identify new applications of this emerging technology.

### 2nd Workshop on Proximity Perception in Robotics

Friday, Nov 8, 9:00-13:00 Workshop FrWA-R17 LG-R17, Lower Ground  
<https://www.proxelsandtaxels.org>

#### Organizers:

Stephan Mühlbacher-Karrer, Institute for Robotics and Mechatronics, Austria  
Hosam Alagi, Karlsruhe Institute of Technology (KIT), Germany  
Stefan Escaida Navarro, Inria Lille-Nord Europe, France  
Hubert Zangl, Alpen-Adria-Universität Klagenfurt, Austria  
Björn Hein, Karlsruhe Institute of Technology, Germany  
Keisuke Koyama, The University of Tokyo, Japan

Proximity Perception is the link between long range and tactile perception. It also plays a key role in human-robot-collaboration and interaction in all their forms. Aiming to further increase the visibility of the topic, we invited excellent speakers from research and industry to report their new insights and findings in the field and to inspire the community with new ideas. Hands-on demonstrations emphasize the practical realization and raise questions about its challenges. This year we expanded the scope to include bio-inspired robotics and applications from underwater robotics. The audience will get insights into the capabilities and limitations of the various concepts and implementations of Proximity Perception (optical, acoustic, capacitive, radar, inductive, etc.) and its applications. The workshop will close with a panel discussion including all invited speakers establishing an open ended discussion.

### SIGVerse: Cloud-based VR platform for Human-Robot Interaction

Friday, Nov 8, 14:00-18:00 Tutorial FrWB-R17 LG-R17, Lower Ground

#### Organizers:

Tetsunari Inamura, National Institute of Informatics, Japan

Prof. Hiroyuki Okada, Tamagawa University, Japan

Dr. Yoshiaki Mizuchi, National Institute of Informatics, Japan

This tutorial is aimed to provide an opportunity to learn how to use the SIGVerse, which is virtual reality (VR) based platform for human-robot interaction (HRI) research. Since collecting and storing a massive amount of data concerning multimodal interaction experiences is an important task concerning research on HRI, a cloud- based VR platform, named "SIGVerse," which reduces costs of developing real robots and interaction experiments in the real world, is proposed. The system combines Unity and ROS frameworks to enable general users to login to an avatar in a robot simulator for the HRI experiments. The proposed architecture provides functionalities for constructing scalable 3D environments, embodied and social interaction via the Internet, compatible robot software, high-fidelity sensor feedback, and recording/playback of interaction. The following figure shows the concept of the SIGVerse platform.

### Open-Ended Learning for Object Perception and Grasping: Current Successes and Future Challenges

Friday, Nov 8, 9:00-18:00    Workshop    FrW-R18    LG-R18, Lower Ground  
<http://www.ai.rug.nl/oel/>

#### Organizers:

Hamidreza Kasaei, University of Groningen, Netherlands

Amir Ghalamzan Esfahani, University of Lincoln, UK

Service robots are expected to efficiently and autonomously work in human-centric environments. As such, robotic perception and grasping are major challenges because of accurate and real-time responses under changing / unpredictable environments are highly demanded. Although many problems have already been understood and solved successfully, many challenges remain. Open-ended learning is one of these challenges needs many improvements. Cognitive science revealed that humans learn to recognize object categories and grasp objects such that it affords completing desired tasks. This ability allows adapting to new environments by enhancing their knowledge from the accumulation of experiences and the conceptualization of new object categories. Accordingly, we hypothesis an autonomous robot must have the ability to process visual information and conduct learning and recognition tasks in a concurrent and open-ended fashion. In this workshop, we discuss the critical role of open-ended learning in object perception and grasp affordance.



### Manipulation through Contacts: Bridging the Gap between Research Community and Industry

Friday, Nov 8, 9:00-18:00    Workshop    FrW-R19    LG-R19, Lower Ground  
<https://yifan-hou.github.io/manipulation-workshop-2019/>

#### Organizers:

Yifan Hou, Carnegie Mellon University, USA

Weiwei Wan, Osaka University, Japan

Mehmet Dogar, University of Leeds, UK

Jurgen Leitner, Queensland University of Technology, Australia

Nikhil Chavan Dafle, MIT, USA

Francois Hogan, MIT, USA

We are seeing a growing need of dexterity in robotic manipulation beyond grasping. Such dexterity is usually motivated by a creative use of contacts, where these contacts can come from robot hands, arms, or any objects and fixtures in the environment. An intelligent robot can manipulate an object or its own body by exploiting the geometric and force constraints offered through contacts. Such skillful use of contact interactions could be crucial for realizing dexterous, reactive and robust robotic manipulation as well as mobile legged locomotion (self-manipulation).

While highly desired, such contact-rich manipulation comes with its own challenges -- from noisy sensors to computationally demanding planning and control frameworks. While the recent research have proposed efficient algorithms and solutions for dexterous and robust manipulation, the industrial applications are seldom seen. This workshop aims to address and hopefully bridge this gap by inviting leading researchers from academia to discuss the recent advances in the field and industry-experts to share their experiences and needs from the contact-rich robotic manipulation in industry. We hope this workshop can encourage discussions about possible transfers between the academic results and industrial applications.

### Informed Scientific Sampling in Large-scale Outdoor Environments

Friday, Nov 8, 9:00-18:00    Workshop    FrW-R20    LG-R20, Lower Ground  
<https://scientific-sampling-robots.github.io/iros-2019-workshop/>

#### Organizers:

Sandeep Manjanna, McGill University, Canada

Prof. Gregory Dudek, McGill University, Canada

Dr. Oscar Pizarro, The University of Sydney, Australia



Dr. Victor Zykov, Schmidt Ocean Institute, USA  
Johanna Hansen, McGill University, Canada

In this workshop, we aim at understanding the progress in the field of robotic sampling for monitoring large-scale outdoor environments, such as forests, large water bodies, agricultural fields, and complex urban settings. We also plan to focus and learn about the challenges faced by researchers in mapping and understanding these difficult environments. Persistent spatio-temporal maps of environmental phenomena have a critical role in understanding the interplay between changing global conditions and human activities that might be causing these changes. Building such persistent maps of environmental fields for a given region over a period of time requires continuous sensing. This workshop is aimed at providing a complete overview of the research related to field robotics in aerial, forest, urban, and marine applications. We plan to discuss a series of research issues that include measurement collection and evaluation, communication between multiple data-sampling robots, data fusion, sensor motion, pollution monitoring, and wildlife tracking.

## 26. Technical Visit



Tuesday, Nov 5 and Wednesday, Nov 6,  
15:00 – 16:30

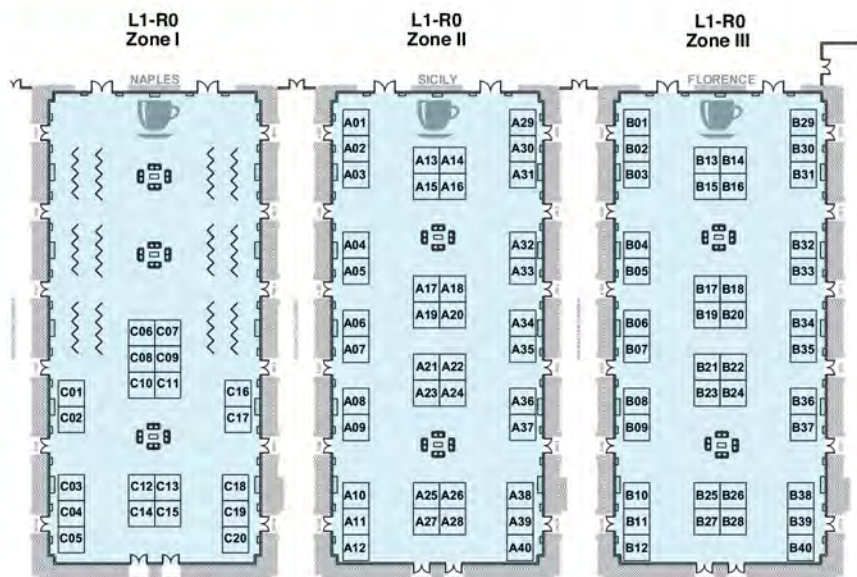











The University of Macau (UM) was founded in 1981. Its predecessor was the private University of East Asia. Through 38 years of development, UM is now not only the best university, but also the only public comprehensive university, in Macao. The UM's new campus is 20 times the size of its old campus. Covering approximately 1.09km<sup>2</sup>, it can accommodate 12,000 students. UM has implemented a residential college system, which is modelled upon the successful experience of the world's top universities, including Cambridge, Harvard, and Yale. The tour spots include University Gallery, UM Wu Yee Sun Library, Residential College, Research Buildings and Laboratories, etc.







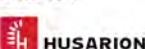

## 27. Exhibition



### Exhibitors Map (Level 1)



|    | Name  | Booth       |
|----|---|-------------|
| 1  | Accerion<br><b>ACCERION</b>   | B21         |
| 2  | Agilex Robotics<br>                                | A02         |
| 3  | AltVision, Inc.<br>                                | C10         |
| 4  | Amazon<br><b>amazon</b>   | C07         |
| 5  | ANYbotics<br><b>ANYbotics</b>   | B15         |
| 6  | Aries Robotics PLC<br><b>ARIES</b><br>ROBOTICS  | C01         |
| 7  | ATI Industrial Automation, Inc.<br>                | A17         |
| 8  | Autonomous Intelligent Driving GmbH<br>            | A16         |
| 9  | Baidu<br><b>Baidu</b> 百度  | A19         |
| 10 | Barrett Technology<br>                            | A01         |
| 11 | Beijing Nokov Science & Technology Co., Ltd.<br> | B39,<br>B40 |
| 12 | Bitcraze<br>                                     | B34         |
| 13 | Botnuvo Inc.<br>                                 | A29         |
| 14 | Cainiao Network<br>                              | A26-<br>A28 |











|    | Name   | Booth       |
|----|--|-------------|
| 15 | Clearpath Robotics<br>                                | A03         |
| 16 | DeepRobotics Technology Co., Ltd<br>                  | B32         |
| 17 | DJI<br>   | B25-<br>B28 |
| 18 | Dorabot Inc.<br>                                      | B05         |
| 19 | Frontiers<br>   | B33         |
| 20 | Gaitech<br>   | A13         |
| 21 | Genius Pros<br>                                       | B06         |
| 22 | Haption<br>  | B03         |
| 23 | HEBI Robotics<br>                                   | B17         |
| 24 | Husarion<br>  | A30         |
| 25 | IEEE Robotics & Automation Society   | C12         |
| 26 | INFO.instruments Technology (Shanghai) Co., Ltd<br> | C16         |



|    | Name  | Booth       |
|----|---|-------------|
| 27 | Inivation<br>  | A06         |
| 28 | INNFO5<br><b>INFOS</b>  | B23,<br>B24 |
| 29 | Institute of Medical<br>Robotics, Shanghai Jiao<br>Tong University<br>           | C17         |
| 30 | Intel RealSense<br>  | A37         |
| 31 | Iquotient Robotics<br> 智科特<br>机器人  | B30         |
| 32 | iRobot<br><b>iRobot</b>   | B12         |
| 33 | IROS 2020   | C14         |
| 34 | IROS Prague 2021 Czech<br>Republic  | C15         |
| 35 | Khalifa University<br> جامعة خليفة<br>Khalifa University                         | B18-<br>B20 |
| 36 | Krypto Labs<br><b>KRYPTO LABS</b>   | B38         |
| 37 | KUKA<br><b>KUKA</b>   | A08,<br>A09 |
| 38 | LeiShen Intelligent<br>System Co., Ltd.<br> 镭神智能<br>LeiShen Intelligent System | A31         |
| 39 | LG Electronics<br>   | A36         |
| 40 | LuxAI<br>  | A32         |

|    | Name  | Booth       |
|----|---|-------------|
| 41 | MathWorks<br>                | B09         |
| 42 | MBZIRC  | B18-<br>B20 |
| 43 | Mech-Mind Robotics<br>       | B13,<br>B14 |
| 44 | Meituan-Dianping<br> 美团 美团点评 | A34,<br>A35 |
| 45 | Momenta<br>                  | B02         |
| 46 | Motiv Robotics<br>           | B37         |
| 47 | MOV.Ai Ltd<br>               | A18         |
| 48 | Neuromeka<br>                | C09         |
| 49 | Ouster<br>                   | A20         |
| 50 | PAL Robotics<br>             | B31         |
| 51 | qb Robotics<br>             | B35         |
| 52 | Rainbow Robotics<br>       | B11         |
| 53 | RoboSense LiDAR<br>        | A12         |
| 54 | Robotmeta<br>              | B07         |
| 55 | Robotnik<br>               | A14         |
| 56 | RT Corporation<br>         | A40         |

|    | Name  | Booth       |
|----|---|-------------|
| 57 | Scale AI<br>   | A38,<br>A39 |
| 58 | Science Robotics/AAAS<br>  | A04         |
| 59 | Seed Robotics<br>  | B16         |
| 60 | Segway Robotics<br>  | C08         |
| 61 | Shandong Sunspeed<br>Robotics Co., Ltd.<br>  | B01         |
| 62 | Shenzhen EAI Technology<br>Co., Ltd<br>  | B29         |
| 63 | Shenzhen Institute of<br>Artificial Intelligence and<br>Robotics of Society (AIRS)<br> | C11         |
| 64 | Smarteye Tech Limited<br>   | A25         |
| 65 | SOS Lab Co., Ltd<br>   | B04         |
| 66 | Springer Nature<br>  | A33         |
| 67 | STAR LAB @ University of<br>Surrey  | C06         |

|    | Name  | Booth       |
|----|---|-------------|
| 68 | Sunrise Instruments<br>  | A05         |
| 69 | Teksbotics (Hong Kong)<br>Limited<br>                            | B22         |
| 70 | Tencent Robotics X<br>   | A07         |
| 71 | Toyota Research Institute<br>                                    | B36         |
| 72 | UBTECH<br>   | A21-<br>A24 |
| 73 | Unitech Embedded<br>Consulting Service<br>(Shanghai) Co. Ltd<br> | B08         |
| 74 | Unitree Robotics<br>   | B10         |
| 75 | Unity-Drive Innovation<br>Technology Co., Ltd.<br>             | A10,<br>A11 |
| 76 | Uvify<br>  | C13         |
| 77 | Wuhan Jingtian Electrical<br>Co., Ltd<br>                      | A15         |



# *Workshops & Tutorials*

*Monday, November 4<sup>th</sup> &  
Friday, November 8<sup>th</sup>, 2019*







## Workshops & Tutorials on November 4, Monday

|  |              |
|--|--------------|
| <b>MoW-R1</b>  | <b>L1-R1</b> |
| <b>The Current Limits and Potentials of Autonomous Assembly (Workshop)</b> |              |

09:00-18:00

*The Current Limits and Potentials of Autonomous Assembly.*

|                    |                     |
|--------------------|---------------------|
| Watanabe, Tetsuyou | Kanazawa University |
| Harada, Kensuke    | Osaka University    |
| Ozawa, Ryuta       | Meiji University    |
| Tsuji, Tokuo       | Kanazawa University |

|   |              |
|---|--------------|
| <b>MoW-R2</b>   | <b>L1-R2</b> |
| <b>RoboTac 2019: New Advances in Tactile Sensation, Perception, and Learning in Robotics: Emerging Materials and Technologies for Manipulation (Workshop)</b> |              |

09:00-18:00

*RoboTac 2019 - New Advances in Tactile Sensation, Perception, and Learning in Robotics: Emerging Material and Technologies in Tactile Sensing for Grasp and Manipulation.*

|                           |                                 |
|---------------------------|---------------------------------|
| Kaboli, Mohsen            | BMW AI & Robotics Research      |
| Faller, Lisa-Marie        | FH Kärnten                      |
| Natale, Lorenzo           | Istituto Italiano di Tecnologia |
| Bhattacharjee, Tapomayukh | University of Washington        |
| Haschke, Robert           | Bielefeld University            |
| Kaltenbrunner, Martin     | Johannes Kepler University      |
| Dahiya, Ravinder          | University of Glasgow           |

|   |              |
|---|--------------|
| <b>MoW-R3</b>                                     | <b>L1-R3</b> |
| <b>Advances in Soft Robots Control (Workshop)</b> |              |

09:00-18:00

*Advances in Soft Robots Control.*

|                      |                                 |
|----------------------|---------------------------------|
| Monje, Concepción A. | University Carlos III of Madrid |
| Hauser, Helmut       | University of Bristol           |
| Laschi, Cecilia      | Scuola Superiore Sant'Anna      |

|  |              |
|--|--------------|
| <b>MoW-R4</b>  | <b>L1-R4</b> |
| <b>Reproducibility of Research, Benchmarking and Verification of Autonomous Robotic Systems (Workshop)</b> |              |

09:00-18:00

*Reproducibility of Research, Benchmarking and Verification of Autonomous Robotic Systems.*

|                     |  |
|---------------------|--|
| Bonsignorio, Fabio  | Heron Robots srl   |
| Redfield, Signe     | Naval Research Laboratory  |
| del Pobil, Angel P. | Jaume-I University   |
| Yamamoto, Tomoyuki  | NEDO (New Energy and Industrial Technology<br>Developing Organization) |

|   |       |
|---|-------|
| <b>MoW-R5</b>   | L1-R5 |
| <b>3rd International Workshop on the Applications of Knowledge Representation and Semantic Technologies in Robotics (AnSWer19) (Workshop)</b> |       |

09:00-18:00

*3rd International Workshop on the Applications of Knowledge Representation and Semantic Technologies in Robotics (AnSWer19).*

|                       |                                       |
|-----------------------|---------------------------------------|
| Gyrard, Amelie        | Kno.e.sis, Wright State University    |
| Bastianelli, Emanuele | Heriot-Watt University                |
| Tiddi, Ilaria         | Vrije University Amsterdam, Amsterdam |
| Mansouri, Masoumeh    | Birmingham University                 |

|   |       |
|---|-------|
| <b>MoW-R6</b>   | L1-R6 |
| <b>Articulated Actuation towards Human Capabilities for Robots (Workshop)</b> |       |

09:00-18:00

*Articulated Actuation towards Human Capabilities for Robots.*

|                      |                                 |
|----------------------|---------------------------------|
| Roozing, Wesley      | University of Twente            |
| Kashiri, Navvab      | Istituto Italiano di Tecnologia |
| Verstraten, Tom      | Vrije Universiteit Brussel      |
| Vanderborght, Bram   | Vrije Universiteit Brussel      |
| Tsagarakis, Nikos    | Istituto Italiano di Tecnologia |
| Stramigioli, Stefano | University of Twente            |

|   |       |
|---|-------|
| <b>MoWA-R7</b>  | L1-R7 |
| <b>Robotics in a Day: ROS, ROL, AWS RoboMake (Tutorial)</b> |       |

09:00-13:00

*Robotics in a Day: ROS, ROL, AWS RoboMaker. Using Industrial-Strength Development Tools to Quickly Setup the Infrastructure, Program, Simulate, and Deploy Robotic Applications.*

|                |                                |
|----------------|--------------------------------|
| Lopes, Gabriel | Delft University of Technology |
|----------------|--------------------------------|

|   |       |
|---|-------|
| <b>MoW-R8</b>   | LG-R8 |
| <b>Different Approaches, the Same Goal: Autonomous Object Manipulation (Workshop)</b> |       |

09:00-18:00

*Different Approaches, the Same Goal: Autonomous Object Manipulation.*

|                  |   |
|------------------|---|
| Vezzani, Giulia  | DeepMind                                |
| Ortenzi, Valerio | University of Birmingham                |
| Natale, Lorenzo  | Istituto Italiano di Tecnologia         |
| Corke, Peter     | Queensland University of Technology     |
| Asfour, Tamim    | Karlsruhe Institute of Technology (KIT) |

|   |       |
|---|-------|
| <b>MoW-R9</b>   | LG-R9 |
| <b>Fast Neural Perception and Learning for Intelligent Vehicles and Robotics (Workshop)</b> |       |

09:00-18:00

*Fast Neural Perception and Learning for Intelligent Vehicles and Robotics.*

|               |                                    |
|---------------|------------------------------------|
| Zhang, Zhijun | Nanyang Technological University   |
| Pan, Jia      | University of Hong Kong            |
| Fu, Changhong | Tongji University                  |
| Yang, Jianyu  | Soochow University                 |
| Cao, Jie      | Beijing Institute of Technology    |
| Zhu, Haifei   | Guangdong University of Technology |

|   |        |
|---|--------|
| <b>MoW-R10</b>  | LG-R10 |
| <b>11th Workshop on Planning, Perception and Navigation for Intelligent Vehicles (Workshop)</b> |        |

09:00-18:00

*11th Workshop on Planning, Perception and Navigation for Intelligent Vehicles.*

|                              |                                   |
|------------------------------|-----------------------------------|
| Martinet, Philippe           | INRIA                             |
| Laugier, Christian           | INRIA                             |
| Stiller, Christoph           | Karlsruhe Institute of Technology |
| Sotelo Vázquez, Miguel Ángel | University of Alcalá              |
| Ang Jr, Marcelo H            | National University of Singapore  |

|   |        |
|---|--------|
| <b>MoW-R11</b>  | LG-R11 |
| <b>Machines with Emotions: Affect Modeling, Evaluation, and Challenges in Intelligent Cars (Workshop)</b> |        |

09:00-18:00

*Machines with Emotions: Affect Modeling, Evaluation, and Challenges in Intelligent Cars.*

|               |                                |
|---------------|--------------------------------|
| Shafaei, Sina | Technical University of Munich |
| Knoll, Alois  | Tech. Univ. Muenchen TUM       |

|  |        |
|--|--------|
| <b>MoWA-R12</b>  | LG-R12 |
| <b>Benchmark and Dataset for Probabilistic Prediction of Interactive Human Behavior (Workshop)</b> |        |

09:00-13:00

*Benchmark and Dataset for Probabilistic Prediction of Interactive Human Behavior.*

|                     |                                    |
|---------------------|------------------------------------|
| Zhan, Wei           | Univeristy of California, Berkeley |
| Sun, Liting         | University of California, Berkeley |
| Tomizuka, Masayoshi | University of California           |

|   |        |
|---|--------|
| <b>MoWB-R12</b>                               | LG-R12 |
| <b>Supernumerary Robotic Limbs (Workshop)</b> |        |

14:00-18:00

*Supernumerary Robotic Limbs: A Workshop Proposal.*

|              |     |
|--------------|-----|
| Asada, Harry | MIT |
|--------------|-----|

|                                 |               |
|---------------------------------|---------------|
| <b>MoW-R13</b>                  | <b>LG-R13</b> |
| <b>Aerial Swarms (Workshop)</b> |               |

09:00-18:00

*Aerial Swarms.*

|                         |   |
|-------------------------|---|
| Schiano, Fabrizio       | Ecole Polytechnique Federale de Lausanne, EPFL      |
| Floreano, Dario         | Ecole Polytechnique Federal, Lausanne               |
| Robuffo Giordano, Paolo | Centre National de la Recherche Scientifique (CNRS) |

|   |               |
|---|---------------|
| <b>MoW-R14</b>  | <b>LG-R14</b> |
| <b>What's Wrong with My Robot? Unlearning Biases in Robot Design (Workshop)</b> |               |

09:00-18:00

*What's Wrong with My Robot? Unlearning Biases in Robot Design.*

|                          |   |
|--------------------------|---|
| Stoy, Kasper             | IT University of Copenhagen                         |
| Hasse, Cathrine          | Program for Future Technology, Culture and Learning |
| Treusch, Patricia        | TU Berlin   |
| Richardson, Kathleen     | De Montfort University                              |
| Frederiksen, Morten Roed | IT-University of Copenhagen                         |
| Vermeulen, Ben           | University of Hohenheim                             |
| Zawieska, Karolina       | SMARTlab, University College Dublin                 |

|   |               |
|---|---------------|
| <b>MoW-R15</b>                                      | <b>LG-R15</b> |
| <b>Marine Bio-Inspired Soft Robotics (Workshop)</b> |               |

09:00-18:00

*Marine Bio-Inspired Soft Robotics.*

|                   |  |
|-------------------|--|
| Wen, Li           | Beihang University   |
| Calisti, Marcello | Scuola Superiore Sant'Anna   |
| Stuart, Hannah    | UC Berkeley  |
| Chen, YuFeng      | Microrobotics Laboratory, School of Applied Sciences and Engineering, Harvard University |

|   |               |
|---|---------------|
| <b>MoW-R16</b>  | <b>LG-R16</b> |
| <b>Behavior Trees for Robotics Systems: Tools, Applications, and Lessons Learned (Workshop)</b> |               |

09:00-18:00

*Behavior Trees for Robotics Systems: Tools, Applications, and Lessons Learned.*

|                        |                                       |
|------------------------|---------------------------------------|
| Colledanchise, Michele | IIT - Italian Institute of Technology |
| Natale, Lorenzo        | Istituto Italiano di Tecnologia       |
| Ogren, Petter          | Royal Institute of Technology (KTH)   |

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|--|---------------|
| <b>MoW-R17</b>   | <b>LG-R17</b> |
| <b>Human Robot Collaboration (HRC): Biomechanical Limits, Modeling and Testing to Support Safe Robot Contacts with Humans (Workshop)</b> |               |

09:00-18:00

*Human Robot Collaboration (HRC): Biomechanical Limits, Modeling and Testing to Support Safe Robot Contacts with Humans.*

|            |      |
|------------|------|
| Falco, Joe | NIST |
|------------|------|

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|---|--------|
| <b>MoW-R18</b>  | LG-R18 |
| <b>Assuring Safety for Physically Assistive Robots (Workshop)</b> |        |

09:00-18:00

*Assuring Safety for Physically Assistive Robots.*

|                       |  |
|-----------------------|--|
| Caleb-Solly, Praminda | University of the West of England                  |
| Dogramadzi, Sanja     | University of the West of England                  |
| Ryu, Jee-Hwan         | Korea Advanced Institute of Science and Technology |
| Jafari, Aghil         | University of the West of England                  |
| Cavallo, Filippo      | Scuola Superiore Sant'Anna - Pisa                  |
| Habli, Ibrahim        | University of York                                 |

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|--|--------|
| <b>MoW-R19</b>   | LG-R19 |
| <b>Legacy Disruptors in Applied Telerobotics: Improving the Machine, the Interface, and the Human (Workshop)</b> |        |

09:00-18:00

*Legacy Disruptors in Applied Telerobotics: Improving the Machine, the Interface, and the Human.*

|                            |                            |
|----------------------------|----------------------------|
| Zoulias, Ioannis Dimitrios | UK Atomic Energy Authority |
| Harwin, William            | University of Reading      |
| Collins, Emily Charlotte   | University of Liverpool    |

## Workshops & Tutorials on November 8, Friday

|  |   |
|--|---|
| FrSF1  | LG-R10  |
| Human-Centred Robot Systems and Their Impact on Manufacturing and Society (Special Forum)  |   |
| Chair: Ding, Han   | Huazhong University of Science and Technology |
| Co-Chair: Zhang, Jianwei   | University of Hamburg                         |
| Time: 9:00-17:00   |   |
| Organizers   |   |
| Ding, Han  | Huazhong University of Science and Technology |
| Zhang, Jianwei   | University of Hamburg                         |
| Kosuge, Kazuhiro   | Tohoku University                             |
| Khatib, Oussama  | Stanford University                           |
| FrWA-R1  | L1-R1   |
| Intelligent Robotics Research: How to Close the Gap from Research Lab to the Real-World (Workshop)   |   |
| 09:00-13:00  |   |
| Intelligent Robotics Research: How to Close the Gap from Research Lab to the Real-World.   |   |
| Kosuge, Kazuhiro   | Tohoku University                             |
| Liu, Dikai   | University of Technology, Sydney              |
| Hassan, Mahdi  | University of Technology, Sydney              |
| Salazar Luces, Jose Victorio   | Tohoku University                             |
| FrWB-R1  | L1-R1   |
| Semantic Descriptor, Semantic Modeling and Mapping for Humanlike Perception and Navigation of Mobile Robots Toward Large Scale Long-Term Autonomy (Workshop) |   |
| 14:00-18:00  |   |
| Semantic Descriptor, Semantic Modeling and Mapping for Humanlike Perception and Navigation of Mobile Robots Toward Large Scale Long-Term Autonomy.           |   |
| Kuc, Tae-Yong  | Sung Kyun Kwan University                     |
| FrW-R2   | L1-R2   |
| Challenges in Vision-Based Drones Navigation (Workshop)  |   |
| 09:00-18:00  |   |
| Challenges in Vision-Based Drones Navigation.  |   |
| Loianno, Giuseppe  | New York University                           |
| Scaramuzza, Davide   | University of Zurich                          |
| FrW-R3   | L1-R3   |
| Intelligent Robot Interactions with the Anatomy (Workshop)   |   |
| 09:00-18:00  |   |
| Intelligent Robot Interactions with the Anatomy.   |   |
| Wang, Long   | Columbia University                           |
| Guo, Jing  | Guangdong University of Technology            |
| Huang, Bidan   | Imperial College London                       |
| Simaan, Nabil  | Vanderbilt University                         |
| Hong, Jaesung  | DGIST   |
| Yip, Michael C.  | University of California, San Diego           |

|  |       |
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| <b>FrWA-R4</b>   | L1-R4 |
| <b>Model-Driven Robot Software Engineering: From ROS-Specific Coding to Framework-Agnostic Modeling (Tutorial)</b> |       |

09:00-13:00

*Model-Driven Robot Software Engineering: From ROS-Specific Coding to Framework-Agnostic Modeling.*

Schlegel, Christian

University of Applied Sciences Ulm

Bruyninckx, Herman

University of Leuven

|  |       |
|--|-------|
| <b>FrWB-R4</b>                                       | L1-R4 |
| <b>Micro-Robot and Micro-Manipulation (Workshop)</b> |       |

14:00-18:00

*Micro-Robot and Micro-Manipulation.*

Li, Xiangpeng

Soochow University

Yang, Hao

Soochow University

Tang, Shi-yang

University of Wollongong

Xie, Mingyang

Nanjing University of Aeronautics & Astronautics

|   |       |
|---|-------|
| <b>FrW-R5</b>   | L1-R5 |
| <b>Automation in Construction: Artificial Intelligence and Robots for the Realization of Smart Buildings (Workshop)</b> |       |

09:00-18:00

*Automation in Construction: Artificial Intelligence and Robots for the Realization of Smart Buildings.*

Stuart, Hannah

UC Berkeley

|   |       |
|---|-------|
| <b>FrW-R6</b>   | L1-R6 |
| <b>The Importance of Uncertainty in Deep Learning for Robotics (Workshop)</b> |       |

09:00-18:00

*The Importance of Uncertainty in Deep Learning for Robotics.*

Sünderhauf, Niko

Queensland University of Technology

Dayoub, Feras

Queensland University of Technology

Miller, Dimity

Queensland University of Technology

Angelova, Anelia

Google Research

Hall, David

Queensland University of Technology

Carneiro, Gustavo

The University of Adelaide

Drummond, Tom

Monash University

Skinner, John Robert

Queensland University of Technology

|   |       |
|---|-------|
| <b>FrW-R8</b>   | LG-R8 |
| <b>Learning Representations for Planning and Control (Workshop)</b> |       |

09:00-18:00

*Learning Representations for Planning and Control.*

Qureshi, Ahmed Hussain

University of California, San Diego

Yip, Michael C.

University of California, San Diego



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| <b>FrW-R9</b>  | LG-R9 |
| <b>The Fourth Workshop on Semantic Policy and Action Representations for Autonomous Robots (SPAR) (Workshop)</b> |       |

09:00-18:00

*The Fourth Workshop on Semantic Policy and Action Representations for Autonomous Robots (SPAR).*

|                        |                                   |
|------------------------|-----------------------------------|
| Ramirez-Amaro, Karinne | Chalmers University of Technology |
| Aksoy, Eren Erdal      | Halmstad University               |
| Yang, Yezhou           | Arizona State University          |
| Zhang, Shiqi           | SUNY Binghamton                   |

|  |        |
|--|--------|
| <b>FrW-R11</b>   | LG-R11 |
| <b>Towards Cognitive Vehicles: Perception, Learning and Decision Making under Real-World Constraints. Is Bio-Inspiration Helpful? (Workshop)</b> |        |

09:00-18:00

*Towards Cognitive Vehicles: Perception, Learning and Decision Making under Real-World Constraints. Is Bio-Inspiration Helpful?.*

|                      |                                   |
|----------------------|-----------------------------------|
| Sandamirskaya, Yulia | University and ETH Zurich         |
| Mirus, Florian       | BMW Group                         |
| Kaboli, Mohsen       | BMW AI & Robotics Research        |
| Waniek, Nicolai      | Robert Bosch GmbH                 |
| Conradt, Jorg        | KTH Royal Institute of Technology |

|   |        |
|---|--------|
| <b>FrW-R12</b>  | LG-R12 |
| <b>Deep Probabilistic Generative Models for Cognitive Architecture in Robotics (Workshop)</b> |        |

09:00-18:00

*Deep Probabilistic Generative Models for Cognitive Architecture in Robotics.*

|                     |  |
|---------------------|--|
| Horii, Takato       | The University of Electro-Communications |
| Taniguchi, Tadahiro | Ritsumeikan University                   |
| Inamura, Tetsunari  | National Institute of Informatics        |
| Jamone, Lorenzo     | Queen Mary University London             |
| Nagai, Takayuki     | Osaka University                         |
| Demiris, Yiannis    | Imperial College London                  |

|  |        |
|--|--------|
| <b>FrW-R13</b>   | LG-R13 |
| <b>Novel Trends for Design and Optimal Control of Wearable Assistive Technology (Workshop)</b> |        |

09:00-18:00

*Novel Trends for Design and Optimal Control of Wearable Assistive Technology.*

|                |                       |
|----------------|-----------------------|
| Mombaur, Katja | Heidelberg University |
| Masia, Lorenzo | Heidelberg University |

|  |   |
|--|---|
| <b>FrW-R14</b>   | LG-R14  |
| <b>Progress in Ergonomic Human-Robot Collaboration (Workshop)</b>  |   |
| 09:00-18:00  |   |
| <i>Progress in Ergonomic Human-Robot Collaboration.</i>  |   |
| Kim, Wansoo  | Istituto Italiano di Tecnologia                         |
| Peternel, Luka   | Delft University of Technology                          |
| Ajoudani, Arash  | Istituto Italiano di Tecnologia                         |
| Kulic, Dana  | University of Waterloo                                  |
| Yoshida, Eiichi  | National Inst. of AIST                                  |
| <b>FrW-R15</b>   | LG-R15  |
| <b>Factory of the Future - How to Digitalize the Robot-Aided Manufacturing Process in Industry 4.0? (Workshop)</b> |   |
| 09:00-18:00  |   |
| <i>Factory of the Future - How to Digitalize the Robot-Aided Manufacturing Process in Industry 4.0?.</i>           |   |
| Saveriano, Matteo  | University of Innsbruck                                 |
| Weitschat, Roman   | Robotics and Mechatronics Center (DLR)                  |
| <b>FrW-R16</b>   | LG-R16  |
| <b>Visual-Inertial Navigation: Challenges and Applications (Workshop)</b>  |   |
| 09:00-18:00  |   |
| <i>Visual-Inertial Navigation: Challenges and Applications.</i>  |   |
| Huang, Guoquan   | University of Delaware                                  |
| Shen, Shaojie  | Hong Kong University of Science and Technology          |
| Kaess, Michael   | Carnegie Mellon University                              |
| Leonard, John  | MIT   |
| Roumeliotis, Stergios  | University of Minnesota                                 |
| <b>FrWA-R17</b>  | LG-R17  |
| <b>2nd Workshop on Proximity Perception in Robotics (Workshop)</b>   |   |
| 09:00-13:00  |   |
| <i>2nd Workshop on Proximity Perception in Robotics.</i>   |   |
| Mühlbacher-Karrer, Stephan   | JOANNEUM RESEARCH Forschungsgesellschaft mbH - ROBOTICS |
| Alagi, Hosam   | Karlsruhe Institut of technology                        |
| Escaida Navarro, Stefan  | Inria   |
| Zangl, Hubert  | Alpen-Adria-Universitaet Klagenfurt                     |
| Hein, Björn  | Karlsruhe University of Applied Science                 |
| Koyama, Keisuke  | University of Tokyo                                     |
| <b>FrWB-R17</b>  | LG-R17  |
| <b>SIGVerse: Cloud-Based VR Platform for Human-Robot Interaction (Tutorial)</b>                                    |   |
| 14:00-18:00  |   |
| <i>SIGVerse: Cloud-Based VR Platform for Human-Robot Interaction.</i>  |   |
| Inamura, Tetsunari   | National Institute of Informatics                       |
| Okada, Hiroyuki  | Tamagawa University                                     |
| Mizuchi, Yoshiaki  | National Institute of Informatics                       |

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| <b>FrW-R18</b>  | LG-R18                  |
| <b>Open-Ended Learning for Object Perception and Grasping: Current Successes and Future Challenges (Workshop)</b> |                         |
| 09:00-18:00   |                         |
| <i>Open-Ended Learning for Object Perception and Grasping: Current Successes and Future Challenges.</i>           |                         |
| Mohades Kasaei, Seyed Hamidreza   | University of Groningen |
| Ghلامzan Esfahani, Amir Masoud  | University of Lincoln   |

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| <b>FrW-R19</b>  | LG-R19                                     |
| <b>Manipulation through Contacts: Bridging the Gap between Research Community and Industry (Workshop)</b> |  |
| 09:00-18:00   |  |
| <i>Manipulation through Contacts: Bridging the Gap between Research Community and Industry.</i>           |  |
| Hou, Yifan  | Carnegie Mellon University                 |
| Wan, Weiwei   | Osaka University                           |
| Dogar, Mehmet R   | University of Leeds                        |
| Leitner, Jurgен   | Australian Centre for Robotic Vision / QUT |
| Chavan-Dafle, Nikhil  | Massachusetts Institute of Technology      |
| Hogan, Francois   | Massachusetts Institute of Technology      |

|  |                                      |
|--|--------------------------------------|
| <b>FrW-R20</b>   | LG-R20                               |
| <b>Informed Scientific Sampling in Large-Scale Outdoor Environments (Workshop)</b> |                                      |
| 09:00-18:00  |                                      |
| <i>Informed Scientific Sampling in Large-Scale Outdoor Environments.</i>           |                                      |
| Manjanna, Sandeep  | McGill University                    |
| Dudek, Gregory   | McGill University                    |
| Pizarro, Oscar   | Australian Centre for Field Robotics |
| Zykov, Victor  | Kite Assist Institute                |
| Hansen, Johanna  | McGill University                    |

***Technical Sessions***  
***Tuesday, November 5<sup>th</sup>, 2019***





|   |   |
|---|---|
| <b>TuAT1</b>  | <b>L1-R1</b>                              |
| <b>Calibration and Identification (Regular session)</b>                             |   |
| Chair: Zhang, Xuebo   | Nankai University                         |
| Co-Chair: Stoyanov, Danail  | University College London                 |
| 11:00-11:15   | TuAT1.1                                   |
| <i>A Novel Robust Approach for Correspondence-Free Extrinsic Calibration.</i>       |   |
| Hu, Xiao  | Technical University of Denmark           |
| Olesen, Daniel  | Technical University of Denmark           |
| Knudsen, Per  | Technical University of Denmark           |
| 11:15-11:30   | TuAT1.2                                   |
| <i>Automatic Multi-Sensor Extrinsic Calibration for Mobile Robots.</i>              |   |
| Zuñiga-Noël, David  | University of Malaga                      |
| Ruiz-Sarmiento, J.R.  | University of Malaga                      |
| Gomez-Ojeda, Ruben  | University of Málaga                      |
| González-Jiménez, Javier  | University of Málaga                      |
| 11:30-11:45   | TuAT1.3                                   |
| <i>Automatic Calibration of Multiple 3D LiDARs in Urban Environments.</i>           |   |
| Jiao, Jianhao   | Hong Kong Univ. of Science and Technology |
| Yu, Yang  | Hong Kong Univ. of Science and Technology |
| Liao, Qinghai   | Hong Kong Univ. of Science and Technology |
| Ye, Haoyang   | Hong Kong Univ. of Science and Technology |
| Fan, Rui  | Hong Kong Univ. of Science and Technology |
| Liu, Ming   | Hong Kong Univ. of Science and Technology |
| 11:45-12:00   | TuAT1.4                                   |
| <i>Hand-Eye Calibration with a Remote Centre of Motion.</i>                         |   |
| Pachtrachai, Krittin  | University College London                 |
| Vasconcelos, Francisco  | University College London                 |
| Dwyer, George   | University College London                 |
| Hailes, Stephen   | University College London                 |
| Stoyanov, Danail  | University College London                 |
| 12:00-12:15   | TuAT1.5                                   |
| <i>Model Free Calibration of Wheeled Robots Using Gaussian Process.</i>             |   |
| Nutalapati, Mohan Krishna   | Indian Institute of Technology, Kanpur    |
| Arora, Lavish   | Indian Institute of Technology, Kanpur    |
| Bose, Anway   | Indian Institute of Technology, Kanpur    |
| Rajawat, Ketan  | Indian Institute of Technology, Kanpur    |
| Hegde, Rajesh M   | Indian Institute of Technology, Kanpur    |
| 12:15-12:30   | TuAT1.6                                   |
| <i>A Robust Extrinsic Calibration Framework for Vehicles with Unscaled Sensors.</i> |   |
| Walters, Celyn  | University of Surrey                      |
| Mendez Maldonado, Oscar Alejandro   | University of Surrey                      |
| Hadfield, Simon   | University of Surrey                      |
| Bowden, Richard   | University of Surrey                      |

|   |  |
|---|--|
| <b>TuAT2</b>  | L1-R2                                    |
| <b>Deep Learning for Aerial Systems (Regular session)</b>   |  |
| Chair: Saha, Indranil   | IIT Kanpur                               |
| Co-Chair: Hoenig, Wolfgang  | California Institute of Technology       |
| 11:00-11:15   | TuAT2.1                                  |
| <i>DeepControl: Energy-Efficient Control of a Quadrotor Using a Deep Neural Network.</i>  |  |
| Varshney, Pratyush  | Indian Institute of Technology, Kanpur   |
| Nagar, Gajendra   | Indian Institute of Technology, Kanpur   |
| Saha, Indranil  | Indian Institute of Technology, Kanpur   |
| 11:15-11:30   | TuAT2.2                                  |
| <i>Informed Region Selection for Efficient UAV-Based Object Detectors: Altitude-Aware Vehicle Detection with CyCAR Dataset.</i> |  |
| Kouris, Alexandros  | Imperial College London                  |
| Kyrkou, Christos  | University of Cyprus                     |
| Bouganis, Christos-Savvas   | Imperial College London                  |
| 11:30-11:45   | TuAT2.3                                  |
| <i>Sim-To-(Multi)-Real: Transfer of Low-Level Robust Control Policies to Multiple Quadrotors.</i>                               |  |
| Molchanov, Artem  | University of Southern California        |
| Chen, Tao   | University of Southern California        |
| Hoenig, Wolfgang  | California Institute of Technology       |
| Preiss, James   | USC                                      |
| Ayanian, Nora   | University of Southern California        |
| Sukhatme, Gaurav  | University of Southern California        |
| 11:45-12:00   | TuAT2.4                                  |
| <i>Low Level Control of a Quadrotor with Deep Model-Based Reinforcement Learning.</i>   |  |
| Lambert, Nathan   | University of California, Berkeley       |
| Drew, Daniel S.   | University of California, Berkeley       |
| Yaconelli, Joseph   | University of Oregon                     |
| Levine, Sergey  | University of California, Berkeley       |
| Calandra, Roberto   | Facebook                                 |
| Pister, Kristofer S. J.   | University of California, Berkeley       |
| 12:00-12:15   | TuAT2.5                                  |
| <i>A Convolutional Neural Network Feature Detection Approach to Autonomous Quadrotor Indoor Navigation.</i>                     |  |
| Garcia, Adriano   | Binghamton University                    |
| Mittal, Sandeep S   | Binghamton University                    |
| Kiewra, Edward  | SUNY Binghamton                          |
| Ghose, Kanad  | State University of New York, Binghamton |
| 12:15-12:30   | TuAT2.6                                  |
| <i>Long Range Neural Navigation Policies for the Real World.</i>  |  |
| Wahid, Ayzaan   | Google                                   |
| Toshev, Alexander   | Google                                   |
| Fiser, Marek  | Google                                   |
| Lee, Tsang-Wei Edward   | Google                                   |

|  |  |
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| <b>TuAT3</b>   | <b>L1-R3</b>                             |
| <b>Learning and Adaptive Systems I (Regular session)</b>   |  |
| Chair: Calinon, Sylvain  | Idiap Research Institute                 |
| Co-Chair: Caldwell, Darwin G.  | Istituto Italiano Di Tecnologia          |
| <b>11:00-11:15</b>   | <b>TuAT3.1</b>                           |
| <i>Uncertainty-Aware Imitation Learning Using Kernelized Movement Primitives.</i>                              |  |
| Silvério, João   | Idiap Research Institute                 |
| Huang, Yanlong   | Istituto Italiano Di Tecnologia          |
| Abu-Dakka, Fares   | Aalto University                         |
| Rozo, Leonel   | Bosch Center for Artificial Intelligence |
| Caldwell, Darwin G.  | Istituto Italiano Di Tecnologia          |
| <b>11:15-11:30</b>   | <b>TuAT3.2</b>                           |
| <i>Bayesian Gaussian Mixture Model for Robotic Policy Imitation.</i>   |  |
| Pignat, Emmanuel   | Idiap Research Institute                 |
| Calinon, Sylvain   | Idiap Research Institute                 |
| <b>11:30-11:45</b>   | <b>TuAT3.3</b>                           |
| <i>High-Dimensional Motion Segmentation by Variational Autoencoder and Gaussian Processes.</i>                 |  |
| Nagano, Masatoshi  | The University of Electro-Communications |
| Nakamura, Tomoaki  | The University of Electro-Communications |
| Nagai, Takayuki  | Osaka University                         |
| Mochihashi, Daichi   | Institute of Statistical Mathematics     |
| Kobayashi, Ichiro  | Ochanomizu University                    |
| Takano, Wataru   | Osaka University                         |
| <b>11:45-12:00</b>   | <b>TuAT3.4</b>                           |
| <i>Learning Barrier Functions for Constrained Motion Planning with Dynamical Systems.</i>                      |  |
| Saveriano, Matteo  | University of Innsbruck                  |
| Lee, Dongheui  | Technical University of Munich           |
| <b>12:00-12:15</b>   | <b>TuAT3.5</b>                           |
| <i>Active Learning of Reward Dynamics from Hierarchical Queries.</i>   |  |
| Basu, Chandrayee   | UC Merced                                |
| Biyyik, Erdem  | Stanford University                      |
| He, Zhixun   | UC Merced                                |
| Singhal, Mukesh  | UC Merced                                |
| Sadigh, Dorsa  | Stanford University                      |
| <b>12:15-12:30</b>   | <b>TuAT3.6</b>                           |
| <i>Neural-Learning Trajectory Tracking Control of Flexible-Joint Robot Manipulators with Unknown Dynamics.</i> |  |
| Chen, Shuyang  | Rensselaer Polytechnic Institute         |
| Wen, John  | Rensselaer Polytechnic Institute         |



| TuAT4  |                                    | L1-R4   |
|--|------------------------------------|---------|
| Award Session I (Regular session)  |                                    |         |
| Chair: Liu, Yunhui   | Chinese University of Hong Kong    |         |
| Co-Chair: Amato, Nancy   | University of Illinois             |         |
| 11:00-11:15  |                                    | TuAT4.1 |
| <i>Planning Reactive Manipulation in Dynamic Environments.</i>                                   |                                    |         |
| Schmitt, Philipp Sebastian   | Siemens Corporate Technology       |         |
| Wirnshofer, Florian  | Siemens AG                         |         |
| Wurm, Kai M.   | Siemens AG Corporate Technology    |         |
| v. Wichert, Georg  | Siemens AG                         |         |
| Burgard, Wolfram   | University of Freiburg             |         |
| 11:15-11:30  |                                    | TuAT4.2 |
| <i>Bounded-Error LQR-Trees.</i>  |                                    |         |
| Ames, Barrett  | Duke University                    |         |
| Konidaris, George  | Brown University                   |         |
| 11:30-11:45  |                                    | TuAT4.3 |
| <i>Interaction-Aware Decision Making with Adaptive Strategies under Merging Scenarios.</i>       |                                    |         |
| Hu, Yeping   | University of California, Berkeley |         |
| Nakhaei, Alireza   | Honda Research Institute USA       |         |
| Tomizuka, Masayoshi  | University of California           |         |
| Fujimura, Kikuo  | Honda Research Institute           |         |
| 11:45-12:00  |                                    | TuAT4.4 |
| <i>Bee+: A 95-Mg Four-Winged Insect-Scale Flying Robot Driven by Twinned Unimorph Actuators.</i> |                                    |         |
| Yang, Xiufeng  | University of Southern California  |         |
| Chen, Ying   | University of Southern California  |         |
| Chang, Longlong  | University of Southern California  |         |
| Calderon, Ariel, A   | University of Southern California  |         |
| Perez-Arancibia, Nestor O  | University of Southern California  |         |

| TuAT5  |  | L1-R5                                     |
|--|--|---|
| Robot Safety (Regular session)   |  |   |
| Chair: Wen, Li   |  | Beihang University                        |
| Co-Chair: Tang, Chaoquan   |  | China University of Mining and Technology |
| 11:00-11:15  |  | TuAT5.1                                   |
| <i>Lambda-Field: A Continuous Counterpart of the Bayesian Occupancy Grid for Risk Assessment.</i>                      |  |   |
| Laconte, Johann  |  | Institut Pascal                           |
| Debain, Christophe   |  | Irstea                                    |
| Chapuis, Roland  |  | Institut Pascal                           |
| Pomerleau, Francois  |  | Laval University                          |
| Aufrere, Romuald   |  | Clermont Auvergne University              |
| 11:15-11:30  |  | TuAT5.2                                   |
| <i>Online Active Safety for Robotic Manipulators.</i>  |  |   |
| Singletary, Andrew   |  | California Institute of Technology        |
| Nilsson, Petter  |  | California Institute of Technology        |
| Gurriet, Thomas  |  | California Institute of Technology        |
| Ames, Aaron  |  | California Institute of Technology        |
| 11:30-11:45  |  | TuAT5.3                                   |
| <i>Black Block Recorder: Immutable Black Box Logging for Robots Via Blockchain.</i>                                    |  |   |
| White, Ruffin  |  | University of California San Diego        |
| Caiazza, Gianluca  |  | Ca Foscari University of Venice           |
| Cortesi, Agostino  |  | Università Ca' Foscari Venezia            |
| Cho, Young Im  |  | Gachon University                         |
| Christensen, Henrik Iskov  |  | University of California San Diego        |
| 11:45-12:00  |  | TuAT5.4                                   |
| <i>DISC: A Large-Scale Virtual Dataset for Simulating Disaster Scenarios.</i>  |  |   |
| Jeon, Hae-Gon  |  | Carnegie Mellon University                |
| Im, Sunghoon   |  | Korea Advanced Inst. of Sci. and Tech     |
| Lee, Byeong-Uk   |  | Korea Advanced Inst. of Sci. and Tech     |
| Choi, Dong-Geol  |  | Korea Advanced Inst. of Sci. and Tech     |
| Hebert, Martial  |  | Carnegie Mellon University                |
| Kweon, In So   |  | Korea Advanced Inst. of Sci. and Tech     |
| 12:00-12:15  |  | TuAT5.5                                   |
| <i>The Role of Robot Payload in the Safety Map Framework.</i>  |  |   |
| Hamad, Mazin   |  | Technical University of Munich            |
| Mansfeld, Nico   |  | German Aerospace Center (DLR)             |
| Abdolshah, Saeed   |  | Nagoya University                         |
| Haddadin, Sami   |  | Technical University of Munich            |
| 12:15-12:30  |  | TuAT5.6                                   |
| <i>Concept and Validation of a Large-Scale Human-Machine Safety System Based on Real-Time UWB Indoor Localization.</i> |  |   |
| Wang, Wei  |  | Cooperate Research of Robert Bosch        |
| Zeng, Zhuoqi   |  | Bosch (China) Investment Ltd              |
| Ding, Wan  |  | Bosch (China) Investment Ltd              |
| Yu, Huajun   |  | Bosch (China) Investment Ltd              |
| Rose, Hannes   |  | Bosch (China) Investment Ltd              |

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| <b>TuAT6</b>  | <b>L1-R6</b>                                     |
| <b>Aerial Robotics I (Regular session)</b>  |  |
| Chair: He, Yuqing   | Shenyang Institute of Automation, CAS            |
| Co-Chair: Ollero, Anibal  | University of Seville                            |
| 11:00-11:15   | TuAT6.1  |
| <i>Small-Scale Compliant Dual Arm with Tail for Winged Aerial Robots (I).</i>   |  |
| Suarez, Alejandro   | University of Seville                            |
| Pérez García, Manuel  | University of Seville                            |
| Heredia, Guillermo  | University of Seville                            |
| Ollero, Anibal  | University of Seville                            |
| 11:15-11:30   | TuAT6.2  |
| <i>Design and Implementation of a Contact Aerial Manipulator System for Glass-Wall Inspection Tasks (I).</i>                                      |  |
| Meng, Xiangdong   | Shenyang Institute of Automation, CAS            |
| He, Yuqing  | Shenyang Institute of Automation, CAS            |
| Han, Jianda   | Shenyang Institute of Automation, CAS            |
| 11:30-11:45   | TuAT6.3  |
| <i>Achievement of Online Agile Manipulation Task for Aerial Transformable Multilink Robot.</i>  |  |
| Shi, Fan  | The University of Tokyo                          |
| Zhao, Moju  | The University of Tokyo                          |
| Anzai, Tomoki   | The University of Tokyo                          |
| Ito, Keita  | The University of Tokyo                          |
| Chen, Xiangyu   | The University of Tokyo                          |
| Okada, Kei  | The University of Tokyo                          |
| Inaba, Masayuki   | The University of Tokyo                          |
| 11:45-12:00   | TuAT6.4  |
| <i>Towards a Robust Aerial Cinematography Platform: Localizing and Tracking Moving Targets in Unstructured Environments.</i>                      |  |
| Bonatti, Rogerio  | Carnegie Mellon University                       |
| Ho, Cherie  | Carnegie Mellon University                       |
| Wang, Wenshan   | Shanghai Jiao Tong Univ., Res. Inst. of Robotics |
| Choudhury, Sanjiban   | University of Washington                         |
| Scherer, Sebastian  | Carnegie Mellon University                       |
| 12:00-12:15   | TuAT6.5  |
| <i>Aerial Animal Biometrics: Individual Friesian Cattle Recovery and Visual Identification Via an Autonomous UAV with Onboard Deep Inference.</i> |  |
| Andrew, William   | University of Bristol                            |
| Greatwood, Colin  | University of Bristol                            |
| Burghardt, Tilo   | University of Bristol                            |
| 12:15-12:30   | TuAT6.6  |
| <i>Geometric and Physical Constraints for Drone-Based Head Plane Crowd Density Estimation.</i>  |  |
| Liu, Weizhe   | EPFL   |
| Lis, Krzysztof  | EPFL   |
| Salzmann, Mathieu   | EPFL CVLab                                       |
| Fua, Pascal   | EPFL   |

| TuAT7  |  | L1-R7 |
|--|--|-------|
| Computer Vision and Applications I (Regular session)   |  |       |
| Chair: Rameau, Francois  | KAIST, RCV Lab                                 |       |
| Co-Chair: Liu, Peilin  | Shanghai Jiao Tong University                  |       |
| 11:00-11:15  | TuAT7.1  |       |
| Infrastructure-Free NLoS Obstacle Detection for Autonomous Cars.   |  |       |
| Naser, Felix Maximilian  | Massachusetts Institute of Technology          |       |
| Gilitschenski, Igor  | Massachusetts Institute of Technology          |       |
| Amini, Alexander   | Massachusetts Institute of Technology          |       |
| Christina, Liao  | Massachusetts Institute of Technology          |       |
| Rosman, Guy  | Massachusetts Institute of Technology          |       |
| Karaman, Sertac  | Massachusetts Institute of Technology          |       |
| Rus, Daniela   | Massachusetts Institute of Technology          |       |
| 11:15-11:30  | TuAT7.2  |       |
| Action Recognition Based on 3D Skeleton and RGB Frame Fusion.  |  |       |
| Liu, Guiyu   | Shanghai Jiao Tong University                  |       |
| Qian, Jiuchao  | Shanghai Jiao Tong University                  |       |
| Wen, Fei   | Shanghai Jiao Tong University                  |       |
| Zhu, Xiaoguang   | Shanghai Jiao Tong University                  |       |
| Ying, Rendong  | Shanghai Jiao Tong University                  |       |
| Liu, Peilin  | Shanghai Jiao Tong University                  |       |
| 11:30-11:45  | TuAT7.3  |       |
| Estimating Metric Scale Visual Odometry from Videos Using 3D Convolutional Networks.                           |  |       |
| Koumis, Alexander  | University of Southern California              |       |
| Preiss, James  | University of Southern California              |       |
| Sukhatme, Gaurav   | University of Southern California              |       |
| 11:45-12:00  | TuAT7.4  |       |
| Unsupervised Traffic Accident Detection in First-Person Videos.  |  |       |
| Yao, Yu  | University of Michigan                         |       |
| Xu, Mingze   | Indiana University                             |       |
| Wang, Yuchen   | Indiana University                             |       |
| Crandall, David  | Indiana University                             |       |
| Atkins, Ella   | University of Michigan                         |       |
| 12:00-12:15  | TuAT7.5  |       |
| Vehicular Multi-Camera Sensor System for Automated Visual Inspection of Electric Power Distribution Equipment. |  |       |
| Park, Jinsun   | Korea Advanced Inst. of Sci. and Tech          |       |
| Shin, Ukcheol  | Korea Advanced Inst. of Sci. and Tech          |       |
| Shim, Gyu Min  | Korea Advanced Inst. of Sci. and Tech          |       |
| Joo, Kyungdon  | Korea Advanced Inst. of Sci. and Tech          |       |
| Rameau, Francois   | Korea Advanced Inst. of Sci. and Tech, RCV Lab |       |
| Kim, Junhyuck  | KEPCO  |       |
| Choi, Dong-Geol  | Korea Advanced Inst. of Sci. and Tech          |       |
| Kweon, In So   | Korea Advanced Inst. of Sci. and Tech          |       |
| 12:15-12:30  | TuAT7.6  |       |
| Representation Learning Via Parallel Subset Reconstruction for 3D Point Cloud Generation.                      |  |       |
| Matsuzaki, Kohei   | KDDI Research, Inc                             |       |
| Tasaka, Kazuyuki   | KDDI Research, Inc                             |       |

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| <b>TuAT8</b>  | <b>LG-R8</b> |
| <b>Autonomous Driving: Contributions from Intelligent Robotics, AI and ITS (Cutting Edge Forum)</b> |              |

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|------------------------------|----------------------------------|
| Chair: Ang Jr, Marcelo H     | National University of Singapore |
| Co-Chair: Martinet, Philippe | INRIA                            |

Organizers

|                              |                                   |
|------------------------------|-----------------------------------|
| Martinet, Philippe           | INRIA                             |
| Laugier, Christian           | INRIA                             |
| Stiller, Christoph           | Karlsruhe Institute of Technology |
| Sotelo Vázquez, Miguel Ángel | University of Alcalá              |
| Ang Jr, Marcelo H            | National University of Singapore  |

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Time: 11:00-12:30

*Situation Awareness and Decision-making for Autonomous Driving*

|                    |       |
|--------------------|-------|
| Laugier, Christian | INRIA |
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*Autonomous Driving: Simulation and Navigation*

|                 |                        |
|-----------------|------------------------|
| Manocha, Dinesh | University of Maryland |
|-----------------|------------------------|

*Security of Autonomous Vehicle under Cyber Attacks*

|              |                                  |
|--------------|----------------------------------|
| Wang, Danwei | Nanyang Technological University |
|--------------|----------------------------------|

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|---|---|
| <b>TuAT9</b>  | <b>LG-R9</b>                              |
| <b>Social Human-Robot Interaction I (Regular session)</b>   |   |
| Chair: Guimarães Macharet, Douglas  | Univ. Federal De Minas Gerais             |
| Co-Chair: Lim, Yoonseob   | Korea Inst. of Science and Technology     |
| <b>11:00-11:15</b>  | <b>TuAT9.1</b>                            |
| <i>Identifying Opportunities for Relationship-Focused Robotic Interventions in Strained Hierarchical Relationships.</i> |   |
| Pettinati, Michael  | Georgia Institute of Technology           |
| Arkin, Ronald   | Georgia Institute of Technology           |
| <b>11:15-11:30</b>  | <b>TuAT9.2</b>                            |
| <i>Fast Adaptation with Meta-Reinforcement Learning for Trust Modelling in Human-Robot Interaction.</i>                 |   |
| Gao, Yuan   | Uppsala University                        |
| Sibirtseva, Elena   | KTH Royal Institute of Technology         |
| Castellano, Ginevra   | Uppsala University                        |
| Kragic, Danica  | KTH                                       |
| <b>11:30-11:45</b>  | <b>TuAT9.3</b>                            |
| <i>Are You with Me? Determining the Association of Individuals and the Collective Social Space.</i>                     |   |
| D. G. Silva, Alan   | Univ. Federal De Minas Gerais             |
| Guimarães Macharet, Douglas   | Univ. Federal De Minas Gerais             |
| <b>11:45-12:00</b>  | <b>TuAT9.4</b>                            |
| <i>Are You Hearing or Listening? the Effect of Task Performance in Verbal Behavior with Smart Speaker.</i>              |   |
| Park, Chaewon   | Korea Institute of Science and Technology |
| Choi, Jongsuk   | Korea Inst. of Sci. and Tech              |
| Sung, Jee Eun   | Ewha Womans University                    |
| Lim, Yoonseob   | Korea Institute of Science and Technology |
| <b>12:00-12:15</b>  | <b>TuAT9.5</b>                            |
| <i>The Robot Show Must Go On: Effective Responses to Robot Failures.</i>  |   |
| Fallatah, Abrar   | Oregon State University                   |
| Urann, Jeremy   | Oregon State University                   |
| Knight, Heather   | Oregon State University                   |
| <b>12:15-12:30</b>  | <b>TuAT9.6</b>                            |
| <i>Right of Way, Assertiveness and Social Recognition in Human-Robot Doorway Interaction.</i>                           |   |
| Thomas, Jack  | Simon Fraser University                   |
| Vaughan, Richard  | Simon Fraser University                   |

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| <b>TuAT10</b>  | LG-R10                       |
| <b>SLAM I (Regular session)</b>  |                              |
| Chair: Roumeliotis, Stergios   | University of Minnesota      |
| Co-Chair: Colosi, Mirco  | Sapienza, University of Rome |
| 11:00-11:15  | TuAT10.1                     |
| <i>Active SLAM Using Connectivity Graphs As Priors.</i>                    |                              |
| Soragna, Alberto   | Sapienza University of Rome  |
| Baldini, Marco   | KUKA Roboter GmbH            |
| Joho, Dominik  | University of Freiburg       |
| Kuemmerle, Rainer  | KUKA Roboter GmbH            |
| Grisetti, Giorgio  | Sapienza University of Rome  |
| 11:15-11:30  | TuAT10.2                     |
| <i>Map-Aware SLAM with Sparse Map Features.</i>                            |                              |
| Burger, Patrick  | Bundeswehr University Munich |
| Naujoks, Benjamin  | UniBw Munich                 |
| Wuensche, Hans J   | UniBw Munich                 |
| 11:30-11:45  | TuAT10.3                     |
| <i>RISE-SLAM: A Resource-Aware Inverse Schmidt Estimator for SLAM.</i>     |                              |
| Ke, Tong   | University of Minnesota      |
| Wu, Kejian   | University of Minnesota      |
| Roumeliotis, Stergios  | University of Minnesota      |
| 11:45-12:00  | TuAT10.4                     |
| <i>Better Lost in Transition Than Lost in Space: SLAM State Machine.</i>   |                              |
| Colosi, Mirco  | Sapienza University of Rome  |
| Haug, Sebastian  | Robert Bosch GmbH            |
| Biber, Peter   | Robert Bosch GmbH            |
| Arras, Kai Oliver  | Bosch Research               |
| Grisetti, Giorgio  | Sapienza University of Rome  |
| 12:00-12:15  | TuAT10.5                     |
| <i>Stereo Visual Inertial LiDAR Simultaneous Localization and Mapping.</i> |                              |
| Shao, Weizhao  | Carnegie Mellon University   |
| Vijayarangan, Srinivasan   | Carnegie Mellon University   |
| Li, Cong   | Carnegie Mellon University   |
| Kantor, George   | Carnegie Mellon University   |
| 12:15-12:30  | TuAT10.6                     |
| <i>Fast and Incremental Loop Closure Detection Using Proximity Graphs.</i> |                              |
| An, Shan   | JD.COM                       |
| Che, Guangfu   | JD.COM                       |
| Zhou, Fangru   | JD.COM                       |
| Liu, Xianglong   | Beihang University           |
| Ma, Xin  | Shandong University          |
| Chen, Yu   | JD.com                       |

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| <b>TuAT11</b>   | LG-R11                                |
| <b>Medical Robot: Design</b> (Regular session)  |                                       |
| Chair: Yang, Guang-Zhong  | Imperial College London               |
| Co-Chair: Gruijthuisen, Caspar  | KU Leuven                             |
| 11:00-11:15   | TuAT11.1                              |
| <i>An Open-Source 7-Axis, Robotic Platform to Enable Dexterous Procedures within CT Scanners.</i>   |                                       |
| Schreiber, Dimitri A.   | University of California              |
| Shak, Daniel B.   | University of California San Diego    |
| Norbash, Alexander M.   | University of California San Diego    |
| Yip, Michael C.   | University of California San Diego    |
| 11:15-11:30   | TuAT11.2                              |
| <i>A Handheld Master Controller for Robot-Assisted Microsurgery.</i>  |                                       |
| Zhang, Dandan   | Imperial College London               |
| Guo, Yao  | Imperial College London               |
| Chen, Junhong   | Imperial College London               |
| Liu, Jindong  | Imperial College London               |
| Yang, Guang-Zhong   | Imperial College London               |
| 11:30-11:45   | TuAT11.3                              |
| <i>A Hybrid Active/Passive Wrist Approach for Increasing Virtual Fixture Stiffness in Comanipulated Robotic Minimally Invasive Surgery.</i>                   |                                       |
| Gruijthuisen, Caspar  | KU Leuven                             |
| Borghesan, Gianni   | KU Leuven                             |
| Reynaerts, Dominiek   | KU Leuven                             |
| Vander Poorten, Emmanuel B  | KU Leuven                             |
| 11:45-12:00   | TuAT11.4                              |
| <i>Three-Degrees-Of-Freedom Passive Gravity Compensation Mechanism Applicable to Robotic Arm with Remote Center of Motion for Minimally Invasive Surgery.</i> |                                       |
| Kim, Chang Kyun   | Korea Advanced Inst. of Sci. and Tech |
| Chung, Deok Gyoon   | Korea Advanced Inst. of Sci. and Tech |
| Hwang, Minho  | Korea Advanced Inst. of Sci. and Tech |
| Cheon, Byungsik Cheon   | Kohyoung Company                      |
| Kim, Hansoul  | Korea Advanced Inst. of Sci. and Tech |
| Kim, Joonhwan   | Korea Advanced Inst. of Sci. and Tech |
| Kwon, Dong-Soo  | Korea Advanced Inst. of Sci. and Tech |
| 12:00-12:15   | TuAT11.5                              |
| <i>Design and Verification of a Portable Master Manipulator Based on an Effective Workspace Analysis Framework.</i>   |                                       |
| Zhang, Dandan   | Imperial College London               |
| Liu, Jindong  | Imperial College London               |
| Zhang, Lin  | Imperial College London               |
| Yang, Guang-Zhong   | Imperial College London               |
| 12:15-12:30   | TuAT11.6                              |
| <i>Macro-Micro Multi-Arm Robot for Single-Port Access Surgery.</i>  |                                       |
| Vandebroek, Tom   | KU Leuven                             |
| Ourak, Mouloud  | University of Leuven                  |
| Gruijthuisen, Caspar  | KU Leuven                             |
| Javaux, Allan   | KU Leuven                             |
| Legrand, Julie  | KU Leuven                             |
| Vercauteren, Tom  | King's College London                 |
| Ourselin, Sebastien   | University College London             |
| Deprest, Jan  | University Hospital Leuven            |
| Vander Poorten, Emmanuel B  | KU Leuven                             |



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| <b>TuAT12</b>   | LG-R12   |
| <b>Human Detection and Tracking (Regular session)</b>   |  |
| Chair: Rocco, Paolo   | Politecnico Di Milano                          |
| Co-Chair: Bera, Aniket  | University of Maryland                         |
| 11:00-11:15   | TuAT12.1                                       |
| <i>Real-Time Monitoring of Human Task Advancement.</i>  |  |
| Maderna, Riccardo   | Politecnico Di Milano                          |
| Lanfredini, Paolo   | Politecnico Di Milano                          |
| Zanchettin, Andrea Maria  | Politecnico Di Milano                          |
| Rocco, Paolo  | Politecnico Di Milano                          |
| 11:15-11:30   | TuAT12.2                                       |
| <i>Deep Orientation: Fast and Robust Upper Body Orientation Estimation for Mobile Robotic Applications.</i>                     |  |
| Lewandowski, Benjamin   | Ilmenau University of Technology               |
| Seichter, Daniel  | Ilmenau University of Technology               |
| Wengefeld, Tim  | Ilmenau University of Technology               |
| Pfennig, Lennard  | Ilmenau University of Technology               |
| Drumm, Helge  | Technische Universität Ilmenau                 |
| Gross, Horst-Michael  | Ilmenau University of Technology               |
| 11:30-11:45   | TuAT12.3                                       |
| <i>Wearable Activity Recognition for Robust Human-Robot Teaming in Safety-Critical Environments Via Hybrid Neural Networks.</i> |  |
| Frank, Andrea   | University of California, San Diego            |
| Kubota, Alyssa  | University of California San Diego             |
| Riek, Laurel D.   | University of California San Diego             |
| 11:45-12:00   | TuAT12.4                                       |
| <i>Normal Distribution Mixture Matching Based Model Free Object Tracking Using 2D LIDAR.</i>                                    |  |
| Choi, Baehoon   | Yonsei University                              |
| Jo, HyungGi   | Yonsei University                              |
| Kim, Euntai   | Yonsei University                              |
| 12:00-12:15   | TuAT12.5                                       |
| <i>Privacy-Preserving Robot Vision with Anonymized Faces by Extreme Low Resolution.</i>   |  |
| Kim, Myeung Un  | Ulsan National Inst. of Science and Technology |
| Lee, Harim  | Ulsan National Inst. of Science and Technology |
| Yang, Hyun Jong   | Ulsan National Inst. of Science and Technology |
| Ryoo, Michael S.  | Indiana University Bloomington                 |
| 12:15-12:30   | TuAT12.6                                       |
| <i>DensePeds: Pedestrian Tracking in Dense Crowds Using FRVO and Sparse Features.</i>   |  |
| Chandra, Rohan  | University of Maryland                         |
| Bhattacharya, Uttaran   | University of Maryland                         |
| Bera, Aniket  | University of North Carolina                   |
| Manocha, Dinesh   | University of Maryland                         |

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| <b>TuAT13</b>   | LG-R13                                |
| <b>Humanoid and Bipedal Locomotion I (Regular session)</b>  |                                       |
| Chair: Takanishi, Atsuo   | Waseda University                     |
| Co-Chair: Tsagarakis, Nikos   | Istituto Italiano Di Tecnologia       |
| 11:00-11:15   | TuAT13.1                              |
| <i>TIP Model: A Combination of Unstable Subsystems for Lateral Balance in Walking.</i>  |                                       |
| Firouzi, Vahid  | University of Tehran                  |
| Ahmad Sharbafi, Maziar  | Technical University of Darmstadt     |
| Seyfarth, Andre   | TU Darmstadt                          |
| 11:15-11:30   | TuAT13.2                              |
| <i>Avoiding Obstacles During Push Recovery Using Real-Time Vision Feedback.</i>   |                                       |
| Jeong, Hyobin   | Korea Advanced Inst. of Sci. and Tech |
| Kim, Joon-Ha  | Korea Advanced Inst. of Sci. and Tech |
| Sim, Okkee  | Korea Advanced Inst. of Sci. and Tech |
| Oh, Jun Ho  | Korea Advanced Inst. of Sci. and Tech |
| 11:30-11:45   | TuAT13.3                              |
| <i>Effect of Planning Period on MPC-Based Navigation for a Biped Robot in a Crowd.</i>  |                                       |
| Ciocca, Matteo  | INRIA                                 |
| Wieber, Pierre-Brice  | INRIA Rhône-Alpes                     |
| Fraichard, Thierry  | INRIA                                 |
| 11:45-12:00   | TuAT13.4                              |
| <i>Unified Balance Control for Biped Robots Including Modification of Footsteps with Angular Momentum and Falling Detection Based on Capturability.</i> |                                       |
| Kojio, Yuta   | The University of Tokyo               |
| Ishiguro, Yasuhiro  | The University of Tokyo               |
| Nguyen, Kim-Ngoc-Khanh  | The University of Tokyo               |
| Sugai, Fumihito   | The University of Tokyo               |
| Kakiuchi, Yohei   | The University of Tokyo               |
| Okada, Kei  | The University of Tokyo               |
| Inaba, Masayuki   | The University of Tokyo               |
| 12:00-12:15   | TuAT13.5                              |
| <i>Estimating the Center of Mass and the Angular Momentum Derivative for Legged Locomotion — a Recursive Approach.</i>                                  |                                       |
| Bailly, François  | LAAS-CNRS                             |
| Carpentier, Justin  | INRIA                                 |
| Benallegue, Mehdi   | AIST Japan                            |
| Watier, Bruno   | LAAS, CNRS, Université Toulouse 3     |
| Soueres, Philippe   | LAAS-CNRS                             |
| 12:15-12:30   | TuAT13.6                              |
| <i>Online Relative Footstep Optimization for Legged Robots Dynamic Walking Using Discrete-Time Model Predictive Control.</i>                            |                                       |
| Xin, Songyan  | Istituto Italiano Di Tecnologia       |
| Orsolino, Romeo   | Istituto Italiano Di Tecnologia       |
| Tsagarakis, Nikos   | Istituto Italiano Di Tecnologia       |

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| <b>TuAT14</b>   | LG-R14   |
| <b>Space Robotics (Regular session)</b>   |  |
| Chair: Secchi, Cristian   | Univ. of Modena & Reggio Emilia                        |
| Co-Chair: Higa, Shoya   | Jet Propulsion Laboratory                              |
| 11:00-11:15   | TuAT14.1   |
| <i>Time-Delay Compensation Using Energy Tank for Satellite Dynamics Robotic Simulators.</i>   |  |
| De Stefano, Marco   | German Aerospace Center (DLR)                          |
| Vezzadini, Luca   | Univ. of Modena & Reggio Emilia                        |
| Secchi, Cristian  | Univ. of Modena & Reggio Emilia                        |
| 11:15-11:30   | TuAT14.2   |
| <i>A Sweeping and Grinding Methods Combined Hybrid Sampler for Asteroid Exploration.</i>  |  |
| Dong, Chengcheng  | Southeast University                                   |
| Zhang, Jun  | Southeast University                                   |
| Jiang, Chaojun  | Southeast University                                   |
| Huang, Fanzhang   | Southeast University                                   |
| Lu, Xi  | Shanghai Inst. of Satellite Engineering                |
| Huang, Fan  | Shanghai Inst. of Satellite Engineering                |
| Song, Aiguo   | Southeast University                                   |
| 11:30-11:45   | TuAT14.3   |
| <i>Non-Myopic Planetary Exploration Combining in Situ and Remote Measurements.</i>  |  |
| Kodgule, Suhit  | Carnegie Mellon University                             |
| Candela, Alberto  | Carnegie Mellon University                             |
| Wettergreen, David  | Carnegie Mellon University                             |
| 11:45-12:00   | TuAT14.4   |
| <i>Vision-Based Estimation of Driving Energy for Planetary Rovers Using Deep Learning and Terramechanics.</i>                                   |  |
| Higa, Shoya   | Jet Propulsion Laboratory                              |
| Iwashita, Yumi  | NASA / Caltech Jet Propulsion Laboratory               |
| Otsu, Kyohei  | California Institute of Technology                     |
| Ono, Masahiro   | California Institute of Technology                     |
| Lamarre, Olivier  | University of Toronto                                  |
| Didier, Annie   | Jet Propulsion Laboratory                              |
| Hoffmann, Mark  | Jet Propulsion Laboratory                              |
| 12:00-12:15   | TuAT14.5   |
| <i>Improved Planetary Rover Inertial Navigation and Wheel Odometry Performance through Periodic Use of Zero-Type Constraints.</i>               |  |
| Kilic, Cagri  | West Virginia University                               |
| Gross, Jason  | West Virginia University                               |
| Ohi, Nicholas   | West Virginia University                               |
| Watson, Ryan  | West Virginia University                               |
| Strader, Jared  | West Virginia University                               |
| Swiger, Thomas  | West Virginia University                               |
| Harper, Scott   | West Virginia University                               |
| Gu, Yu  | West Virginia University                               |
| 12:15-12:30   | TuAT14.6   |
| <i>Modeling and Force Control of a Terramechanical Wheel-Soil Contact for a Robotic Manipulator Used in the Planetary Rover Design Process.</i> |  |
| Wachter, Jan  | Karlsruhe Institute of Technology                      |
| Mikut, Ralf   | Karlsruhe Institute of Technology                      |
| Buse, Fabian  | Inst. of Sys. Dyn. & Control - German Aerospace Center |

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| <b>TuAT15</b>  | LG-R15  |
| <b>Motion and Path Planning I (Regular session)</b>  |   |
| Chair: Kim, H. Jin   | Seoul National University                     |
| Co-Chair: Zhang, Shiwu   | University of Science and Technology of China |
| 11:00-11:15  | TuAT15.1                                      |
| <i>Predictive Inverse Kinematics: Optimizing Future Trajectory through Implicit Time Integration and Future Jacobian Estimation.</i> |   |
| Ayusawa, Ko  | AIST  |
| Suleiman, Wael   | University of Sherbrooke                      |
| Yoshida, Eiichi  | National Inst. of AIST                        |
| 11:15-11:30  | TuAT15.2                                      |
| <i>Computing 3D From-Region Visibility Using Visibility Integrity.</i>   |   |
| Zhi, Jixuan  | George Mason University                       |
| Hao, Yue   | George Mason University                       |
| Vo, Christopher  | George Mason University                       |
| Morales, Marco   | Instituto Tecnológico Autónomo De México      |
| Lien, Jyh-Ming   | George Mason University                       |
| 11:30-11:45  | TuAT15.3                                      |
| <i>Edge-Preserving Camera Trajectories for Improved Optical Character Recognition on Static Scenes with Text.</i>                    |   |
| Katoch, Rohan  | Georgia Institute of Technology               |
| Ueda, Jun  | Georgia Institute of Technology               |
| 11:45-12:00  | TuAT15.4                                      |
| <i>Virtual Region Based Multi-Robot Path Planning in an Unknown Occluded Environment.</i>  |   |
| Roy, Dibyendu  | Tata Consultancy Services Limited             |
| Chowdhury, Arijit  | TCS Research and Innovation                   |
| Maitra, Madhubanti   | Jadavpur University                           |
| Bhattacharya, Samar  | Jadavpur University                           |
| 12:00-12:15  | TuAT15.5                                      |
| <i>Fast Trajectory Planning for Multiple Quadrotors Using Relative Safe Flight Corridor.</i>   |   |
| Park, Jungwon  | Seoul National University                     |
| Kim, H. Jin  | Seoul National University                     |
| 12:15-12:30  | TuAT15.6                                      |
| <i>Predictive Inverse Kinematics for Redundant Manipulators with Task Scaling and Kinematic Constraints (I).</i>                     |   |
| Faroni, Marco  | University of Brescia                         |
| Beschi, Manuel   | National Research Council of Italy            |
| Pedrocchi, Nicola  | National Research Council of Italy            |
| Visioli, Antonio   | University of Brescia                         |

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| <b>TuAT16</b>   | LG-R16                                 |
| <b>Grasping I (Regular session)</b>   |  |
| Chair: Kroeger, Torsten   | Karlsruhe Institute of Technology      |
| Co-Chair: Watanabe, Tetsuyou  | Kanazawa University                    |
| 11:00-11:15   | TuAT16.1                               |
| <i>Robot Learning of Shifting Objects for Grasping in Cluttered Environments.</i>   |  |
| Berscheid, Lars   | Karlsruhe Institute of Technology      |
| Meißner, Pascal   | Karlsruhe Institute of Technology      |
| Kroeger, Torsten  | Karlsruhe Institute of Technology      |
| 11:15-11:30   | TuAT16.2                               |
| <i>Deep Reinforcement Learning for Robotic Pushing and Picking in Cluttered Environment.</i>                                  |  |
| Deng, Yuhong  | Tsinghua University                    |
| Guo, Xiaofeng   | Tsinghua University                    |
| Wei, Yixuan   | Tsinghua University                    |
| Lu, Kai   | Tsinghua University                    |
| Fang, Bin   | Tsinghua University                    |
| Guo, Di   | Tsinghua University                    |
| Liu, Huaping  | Tsinghua University                    |
| Sun, Fuchun   | Tsinghua University                    |
| 11:30-11:45   | TuAT16.3                               |
| <i>Vision-Based Automatic Control of a 5-Fingered Simulated Assistive Robotic Manipulator for Activities of Daily Living.</i> |  |
| Wang, Chen  | Imperial College London                |
| Freer, Daniel   | Imperial College London                |
| Liu, Jindong  | Imperial College London                |
| Yang, Guang-Zhong   | Imperial College London                |
| 11:45-12:00   | TuAT16.4                               |
| <i>Recalling Candidates of Grasping Method from an Object Image Using Neural Network.</i>                                     |  |
| Sanada, Makoto  | Ritsumeikan University                 |
| Matsuo, Tadashi   | Ritsumeikan University                 |
| Shimada, Nobutaka   | Ritsumeikan University                 |
| Shirai, Yoshiaki  | Ritsumeikan University                 |
| 12:00-12:15   | TuAT16.5                               |
| <i>Domain-Independent Unsupervised Detection of Grasp Regions to Grasp Novel Objects.</i>                                     |  |
| Pharswan, Siddhartha Vibhu  | Indian Institute of Technology, Kanpur |
| Vohra, Mohit  | Indian Institute of Technology, Kanpur |
| Kumar, Ashish   | Indian Institute of Technology, Kanpur |
| Behera, Laxmidhar   | Indian Institute of Technology, Kanpur |
| 12:15-12:30   | TuAT16.6                               |
| <i>Near-Contact Grasping Strategies from Awkward Poses: When Simply Closing Your Fingers Is Not Enough.</i>                   |  |
| Ong, Yi Heng  | Oregon State University                |
| Morrow, John  | Oregon State University                |
| Qiu, Yu   | Oregon State University                |
| Gupta, Kartik   | Oregon State University                |
| Balasubramanian, Ravi   | Oregon State University                |
| Grimm, Cindy  | Oregon State University                |

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| <b>TuAT17</b>  | LG-R17  |
| <b>Micro/Nano Robots I (Regular session)</b>   |   |
| Chair: Feng, Lin   | Beihang University                              |
| Co-Chair: Zhang, Xuping  | Aarhus University                               |
| 11:00-11:15  | TuAT17.1  |
| <i>Automated Macro-Micro Manipulation for Robotic Microinjection with Computer Vision.</i>                               |   |
| Zhang, Huipeng   | Beijing University of Technology                |
| Su, Liying   | Beijing University of Technology                |
| Wei, Hongmiao  | Beijing University of Technology                |
| Yu, Yueqing  | Beijing University of Technology                |
| Zhang, Xuping  | Aarhus University                               |
| 11:15-11:30  | TuAT17.2  |
| <i>A Robotic Surgery Approach to Mitochondrial Transfer Amongst Single Cells.</i>  |   |
| Shakoor, Adnan   | City University of Hong Kong                    |
| Xie, Mingyang  | Nanjing Univ. of Aeronautics & Astronautics     |
| Pan, Fei   | City University of Hong Kong                    |
| Gao, Wendi   | City University of Hong Kong                    |
| Sun, Jiayu   | City University of Hong Kong                    |
| Sun, Dong  | City University of Hong Kong                    |
| 11:30-11:45  | TuAT17.3  |
| <i>A Magnetically Transduced Whisker for Angular Displacement and Moment Sensing.</i>                                    |   |
| Kim, Suhan   | Carnegie Mellon University                      |
| Velez, Camilo  | Carnegie Mellon University                      |
| Patel, Dinesh  | Carnegie Mellon University                      |
| Bergbreiter, Sarah   | Carnegie Mellon University                      |
| 11:45-12:00  | TuAT17.4  |
| <i>Active Whisker Placement and Exploration for Rapid Object Recognition.</i>  |   |
| Pearson, Martin  | Bristol Robotics Laboratory                     |
| Salman, Mohammed   | Bristol University, Bristol Robotics Laboratory |
| 12:00-12:15  | TuAT17.5  |
| <i>On-Chip Three-Dimension Cell Rotation Using Whirling Flows Generated by Oscillating Asymmetrical Microstructures.</i> |   |
| Song, Bin  | Beihang University                              |
| Feng, Yanmin   | Beihang University                              |
| Zhou, Qiang  | Beihang University                              |
| Feng, Lin  | Beihang University                              |
| 12:15-12:30  | TuAT17.6  |
| <i>Adaptive Dynamic Control for Magnetically Actuated Medical Robots.</i>  |   |
| Barducci, Lavinia  | University of Leeds                             |
| Pittiglio, Giovanni  | University of Leeds                             |
| Norton, Joseph   | University of Leeds                             |
| Obstein, Keith   | Vanderbilt University                           |
| Valdastri, Pietro  | University of Leeds                             |

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| <b>TuAT18</b>   | LG-R18   |
| <b>Localization I</b> (Regular session)   |  |
| Chair: Tan, Xiaobo  | Michigan State University                      |
| Co-Chair: Akai, Naoki   | Nagoya University                              |
| 11:00-11:15   | TuAT18.1                                       |
| <i>Low-Cost Sonar Navigation System.</i>  |  |
| Guadagnino, Tiziano   | Sapienza University of Rome                    |
| Della Corte, Bartolomeo   | Sapienza University of Rome                    |
| Grisetti, Giorgio   | Sapienza University of Rome                    |
| 11:15-11:30   | TuAT18.2                                       |
| <i>Misalignment Recognition Using Markov Random Fields with Fully Connected Latent Variables for Detecting Localization Failures.</i> |  |
| Akai, Naoki   | Nagoya University                              |
| Morales Saiki, Luis Yoichi  | Nagoya University                              |
| Hirayama, Takatsugu   | Nagoya University                              |
| Murase, Hiroshi   | Nagoya University                              |
| 11:30-11:45   | TuAT18.3                                       |
| <i>Outlier-Robust State Estimation for Humanoid Robots.</i>   |  |
| Piperakis, Stylianos  | Foundation for Res. and Tech. – Hellas (FORTH) |
| Kanoulas, Dimitrios   | Istituto Italiano Di Tecnologia                |
| Tsagarakis, Nikos   | Istituto Italiano Di Tecnologia                |
| Trahanias, Panos  | Foundation for Res. and Tech. – Hellas (FORTH) |
| 11:45-12:00   | TuAT18.4                                       |
| <i>Robust Outdoor Self-Localization in Changing Environments.</i>   |  |
| Muhammad, Haris   | Frankfurt University of Applied Sciences       |
| Franzius, Mathias   | Honda Research Institute (HRI)                 |
| Bauer Wersing, Ute  | Frankfurt University of Applied Sciences       |
| 12:00-12:15   | TuAT18.5                                       |
| <i>Randomized Sensor Selection for Nonlinear Systems with Application to Target Localization.</i>                                     |  |
| Bopardikar, Shaunak D.  | Michigan State University                      |
| Ennasr, Osama   | Michigan State University                      |
| Tan, Xiaobo   | Michigan State University                      |
| 12:15-12:30   | TuAT18.6                                       |
| <i>On the Bayes Filter for Shared Autonomy.</i>   |  |
| Luft, Lukas   | Freiburg University                            |
| Boniardi, Federico  | University of Freiburg                         |
| Schaefer, Alexander   | Freiburg University                            |
| Büscher, Daniel   | Albert-Ludwigs-Universität Freiburg            |
| Burgard, Wolfram  | University of Freiburg                         |

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| <b>TuAT19</b>  | <b>LG-R19</b>                         |
| <b>AI-Based Methods for Robotics (Regular session)</b>   |                                       |
| Chair: Tan, Jindong  | University of Tennessee, Knoxville    |
| Co-Chair: Kyrki, Ville   | Aalto University                      |
| 11:00-11:15  | TuAT19.1                              |
| <i>A Model-Based Human Activity Recognition for Human-Robot Collaboration.</i>                             |                                       |
| Lee, Sang Uk   | Massachusetts Institute of Technology |
| Hofmann, Andreas   | Massachusetts Institute of Technology |
| Williams, Brian  | Massachusetts Institute of Technology |
| 11:15-11:30  | TuAT19.2                              |
| <i>Augmenting Knowledge through Statistical, Goal-Oriented Human-Robot Dialog.</i>                         |                                       |
| Amiri, Saeid   | SUNY Binghamton                       |
| Bajracharya, Sujay   | Cleveland State University            |
| Goktolga, Cihangir   | SUNY Binghamton                       |
| Thomason, Jesse  | University of Washington              |
| Zhang, Shiqi   | SUNY Binghamton                       |
| 11:30-11:45  | TuAT19.3                              |
| <i>Inverse Dynamics Modeling of Robotic Manipulator with Hierarchical Recurrent Network.</i>               |                                       |
| Sun, Pengfei   | Capital Normal University             |
| Shao, Zhenzhou   | Capital Normal University             |
| Qu, Ying   | University of Tennessee               |
| Guan, Yong   | Capital Normal University             |
| Tan, Jindong   | University of Tennessee               |
| 11:45-12:00  | TuAT19.4                              |
| <i>Bayesian Optimization for Policy Search in High-Dimensional Systems Via Automatic Domain Selection.</i> |                                       |
| Froehlich, Lukas   | Robert Bosch GmbH                     |
| Klenske, Edgar   | Bosch Research                        |
| Daniel, Christian  | Bosch                                 |
| Zeilinger, Melanie N.  | ETH Zurich                            |
| 12:00-12:15  | TuAT19.5                              |
| <i>Long-Term Prediction of Motion Trajectories Using Path Homology Clusters.</i>                           |                                       |
| Carvalho, Joao Frederico   | KTH Royal Technical Institute         |
| Vejdemo-Johansson, Mikael  | CUNY College of Staten Island         |
| Pokorny, Florian T.  | KTH Royal Institute of Technology     |
| Kragic, Danica   | KTH                                   |
| 12:15-12:30  | TuAT19.6                              |
| <i>Feedback-Based Fabric Strip Folding.</i>  |                                       |
| Petrik, Vladimir   | Aalto University                      |
| Kyrki, Ville   | Aalto University                      |



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| <b>TuAT20</b>   | LG-R20  |
| <b>Biologically-Inspired Robots I</b> (Regular session)   |   |
| Chair: Yun, Dongwon   | Daegu Gyeongbuk Inst. of Sci. and Tech. (DGIST) |
| Co-Chair: Asano, Yuki   | The University of Tokyo                         |
| 11:00-11:15   | TuAT20.1  |
| <i>Guinea Fowl Jumping Robot with Balance Control Mechanism: Modeling, Simulation, and Experiment Results.</i>                          |   |
| Kim, Myeong-Jin   | Daegu Gyeongbuk Inst. of Sci. and Tech. (DGIST) |
| Yun, Dongwon  | Daegu Gyeongbuk Inst. of Sci. and Tech. (DGIST) |
| 11:15-11:30   | TuAT20.2  |
| <i>Carpie: A Soft, Mechanically-Reconfigurable Worm Robot.</i>  |   |
| Ahmadian, Pouya   | University of Toronto                           |
| Natividad, Rainier  | National University of Singapore                |
| Yeow, Chen-Hua  | National University of Singapore                |
| 11:30-11:45   | TuAT20.3  |
| <i>A Spring-Aided Two-Dimensional Electromechanical Spine Architecture for Bio-Inspired Robots.</i>                                     |   |
| Ku, Bonhyun   | University of Illinois at Urbana-Champaign      |
| Wang, Sunyu   | University of Illinois at Urbana-Champaign      |
| Banerjee, Arijit  | University of Illinois at Urbana-Champaign      |
| 11:45-12:00   | TuAT20.4  |
| <i>Effect of Arm Swinging and Trunk Twisting on Bipedal Locomotion.</i>   |   |
| Onishi, Ryo   | Osaka Institute of Technology                   |
| Kitamura, Ryoma   | Osaka Institute of Technology                   |
| Takuma, Takashi   | Osaka Institute of Technology                   |
| Kase, Wataru  | Osaka Institute of Technology                   |
| 12:00-12:15   | TuAT20.5  |
| <i>Proto-Object Based Saliency for Event-Driven Cameras.</i>  |   |
| Iacono, Massimiliano  | Italian Institute of Technology                 |
| D'Angelo, Giulia  | Italian Institute of Technology                 |
| Glover, Arren   | Italian Institute of Technology                 |
| Tikhanoff, Vadim  | Italian Institute of Technology                 |
| Niebur, Ernst   | John Hopkins University                         |
| Bartolozzi, Chiara  | Italian Institute of Technology                 |
| 12:15-12:30   | TuAT20.6  |
| <i>Task-Specific Self-Body Controller Acquisition by Musculoskeletal Humanoids: Application to Pedal Control in Autonomous Driving.</i> |   |
| Kawaharazuka, Kento   | The University of Tokyo                         |
| Tsuzuki, Kei  | The University of Tokyo                         |
| Makino, Shogo   | The University of Tokyo                         |
| Onitsuka, Moritaka  | The University of Tokyo                         |
| Shinjo, Koki  | The University of Tokyo                         |
| Asano, Yuki   | The University of Tokyo                         |
| Okada, Kei  | The University of Tokyo                         |
| Kawasaki, Koji  | The University of Tokyo                         |
| Inaba, Masayuki   | The University of Tokyo                         |

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| <b>TuBT1</b>   | <b>L1-R1</b>                  |
| <b>3D Vision and Pose Estimation (Regular session)</b>                                 |                               |
| Chair: Xiang, Zhiyu  | Zhejiang University           |
| Co-Chair: Schwertfeger, Sören  | ShanghaiTech University       |
| 14:45-15:00  | TuBT1.1                       |
| <i>ESKO6d - a Binocular and RGB-D Dataset of Stored Kitchen Objects with 6d Poses.</i> |                               |
| Richter-Klug, Jesse  | Universität Bremen            |
| Wellhausen, Constantin   | Universität Bremen            |
| Frese, Udo   | Universität Bremen            |
| 15:00-15:15  | TuBT1.2                       |
| <i>Pose Estimation for Omni-Directional Cameras Using Sinusoid Fitting.</i>            |                               |
| Kuang, Haofei  | ShanghaiTech University       |
| Xu, Qingwen  | ShanghaiTech University       |
| Long, Xiaoling   | ShanghaiTech University       |
| Schwertfeger, Sören  | ShanghaiTech University       |
| 15:15-15:30  | TuBT1.3                       |
| <i>Region-Wise Polynomial Regression for 3D Mobile Gaze Estimation.</i>                |                               |
| Su, Dan  | City University of Hong Kong  |
| Li, You-Fu   | City University of Hong Kong  |
| Chen, Hao  | City University of Hong Kong  |
| 15:30-15:45  | TuBT1.4                       |
| <i>Camera Pose Estimation Based on PnL with a Known Vertical Direction.</i>            |                               |
| Lecrosnier, Louis  | IRSEEM                        |
| Boutteau, Rémi   | IRSEEM                        |
| Vasseur, Pascal  | Université De Rouen           |
| Savatier, Xavier   | IRSEEM                        |
| Fraundorfer, Friedrich   | Graz University of Technology |
| 15:45-16:00  | TuBT1.5                       |
| <i>3D Reconstruction by Single Camera Omnidirectional Multi-Stereo System.</i>         |                               |
| Chen, Shuya  | Zhejiang University           |
| Xiang, Zhiyu   | Zhejiang University           |
| Zou, Nan   | Zhejiang University           |
| Chen, Yiman  | Zhejiang University           |
| Qiao, Chengyu  | Zhejiang University           |
| 16:00-16:15  | TuBT1.6                       |
| <i>Efficient Environment Guided Approach for Exploration of Complex Environments.</i>  |                               |
| Butters, Daniel Benjamin   | University College London     |
| Jonasson, Emil T.  | UK Atomic Energy Authority    |
| Stuart-Smith, Robert   | University College London     |
| Pawar, Vijay Manohar   | University College London     |

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| <b>TuBT2</b>  | <b>L1-R2</b>                                     |
| <b>Deep Learning for Computer Vision (Regular session)</b>  |  |
| Chair: Cheng, Hong  | University of Electronic Science and Technology  |
| Co-Chair: Ang Jr, Marcelo H   | National University of Singapore                 |
| 14:45-15:00   | TuBT2.1  |
| <i>Siamese Convolutional Neural Network for Sub-Millimeter-Accurate Camera Pose Estimation and Visual Servoing.</i> |  |
| Yu, Cunjun  | Nanyang Technological University                 |
| Cai, Zhongang   | Nanyang Technological University                 |
| Pham, Hung  | Nanyang Technological University                 |
| Pham, Quang-Cuong   | NTU Singapore                                    |
| 15:00-15:15   | TuBT2.2  |
| <i>INFER: INtermediate Representations for FuturE PRediction.</i>   |  |
| Srikanth, Shashank  | Int. Inst. of Info. Tech., Hyderabad             |
| Ansari, Junaid Ahmed  | Int. Inst. of Info. Tech., Hyderabad             |
| Ramesh Kumar, Karnik Ram  | Int. Inst. of Info. Tech., Hyderabad             |
| Sharma, Sarthak   | Int. Inst. of Info. Tech., Hyderabad             |
| Jatavallabhula, Krishna Murthy  | Int. Inst. of Info. Tech., Hyderabad             |
| Krishna, Madhava  | Int. Inst. of Info. Tech., Hyderabad             |
| 15:15-15:30   | TuBT2.3  |
| <i>End-To-End Driving Model for Steering Control of Autonomous Vehicles with Future Spatiotemporal Features.</i>    |  |
| Wu, Tianhao   | Univ. of Electronic Sci. and Tech. of China      |
| Luo, Ao   | Univ. of Electronic Sci. and Tech. of China      |
| Huang, Rui  | Univ. of Electronic Sci. and Tech. of China      |
| Cheng, Hong   | Univ. of Electronic Sci. and Tech. of China      |
| Zhao, Yang  | Univ. of Electronic Sci. and Tech. of China      |
| 15:30-15:45   | TuBT2.4  |
| <i>PointAtrousNet: Point Atrous Convolution for Point Cloud Analysis.</i>   |  |
| Pan, Liang  | National University of Singapore                 |
| Wang, Pengfei   | National University of Singapore                 |
| Chew, Chee Meng   | National University of Singapore                 |
| 15:45-16:00   | TuBT2.5  |
| <i>A Convolutional Network for Joint Deraining and Dehazing from a Single Image for Autonomous Driving in Rain.</i> |  |
| Sun, Hao  | National University of Singapore                 |
| Ang Jr, Marcelo H   | National University of Singapore                 |
| Rus, Daniela  | MIT  |
| 16:00-16:15   | TuBT2.6  |
| <i>Improving Learning-Based Ego-Motion Estimation with Homomorphism-Based Losses and Drift Correction.</i>          |  |
| Wang, Xiangwei  | Tongji University/ Carnegie Mellon University    |
| Maturana, Daniel  | Carnegie Mellon University                       |
| Yang, Shichao   | Carnegie Mellon University                       |
| Wang, Wenshan   | Shanghai Jiao Tong Univ., Res. Inst. of Robotics |
| Chen, Qijun   | Tongji University                                |
| Scherer, Sebastian  | Carnegie Mellon University                       |

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| <b>TuBT3</b>   | L1-R3                                 |
| <b>Learning and Adaptive Systems II (Regular session)</b>  |                                       |
| Chair: Gao, Yue  | Shanghai JiaoTong University          |
| Co-Chair: Wang, Wenxue   | Shenyang Institute of Automation, CAS |
| 14:45-15:00  | TuBT3.1                               |
| <i>Meta-Learning for Multi-Objective Reinforcement Learning.</i>   |                                       |
| Chen, Xi   | KTH                                   |
| Ghadirzadeh, Ali   | KTH Royal Inst. of Tech., Aalto Univ. |
| Björkman, Mårten   | KTH                                   |
| Jensfelt, Patric   | KTH - Royal Institute of Technology   |
| 15:00-15:15  | TuBT3.2                               |
| <i>A Comparative Analysis on the Use of Autoencoders for Robot Security Anomaly Detection.</i>                     |                                       |
| Olivato, Matteo  | University of Verona                  |
| Cotugno, Omar  | Sapienza University of Roma           |
| Brigato, Lorenzo   | Sapienza University of Roma           |
| Bloisi, Domenico   | University of Basilicata              |
| Farinelli, Alessandro  | University of Verona                  |
| Iocchi, Luca   | Sapienza University of Roma           |
| 15:15-15:30  | TuBT3.3                               |
| <i>Fast and Safe Policy Adaptation Via Alignment-Based Transfer.</i>   |                                       |
| Kim, Jigang  | Seoul National University             |
| Choi, Seungwon   | Seoul Nat'l University                |
| Kim, H. Jin  | Seoul National University             |
| 15:30-15:45  | TuBT3.4                               |
| <i>Robotic Tracking Control with Kernel Trick-Based Reinforcement Learning.</i>                                    |                                       |
| Hu, Yazhou   | Shenyang Institute of Automation, CAS |
| Wang, Wenxue   | Shenyang Institute of Automation, CAS |
| Liu, Hao   | Georgia Institute of Technology       |
| Liu, Lianqing  | Shenyang Institute of Automation, CAS |
| 15:45-16:00  | TuBT3.5                               |
| <i>Graph-Based Design of Hierarchical Reinforcement Learning Agents.</i>   |                                       |
| Tateo, Davide  | TU Darmstadt                          |
| Erdenliç, İdil Su  | Politecnico Di Milano                 |
| Bonarini, Andrea   | Politecnico Di Milano                 |
| 16:00-16:15  | TuBT3.6                               |
| <i>Variable Impedance in End-Effector Space: An Action Space for Reinforcement Learning in Contact-Rich Tasks.</i> |                                       |
| Martín-Martín, Roberto   | Stanford University                   |
| Lee, Michelle  | Stanford University                   |
| Gardner, Rachel  | Stanford University                   |
| Savarese, Silvio   | Stanford University                   |
| Bohg, Jeannette  | Stanford University                   |
| Garg, Animesh  | Stanford University                   |

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| <b>TuBT4</b>   | L1-R4  |
| <b>Award Session II (Regular session)</b>  |  |
| Chair: Asada, Minoru   | Osaka University                               |
| Co-Chair: Xiao, Jing   | Worcester Polytechnic Institute                |
| 14:45-15:00  | TuBT4.1  |
| <i>Motion Decoupling and Composition Via Reduced Order Model Optimization for Dynamic Humanoid Walking with CLF-QP Based Active Force Control.</i> |  |
| Xiong, Xiaobin   | California Institute of Technology             |
| Ames, Aaron  | Caltech  |
| 15:00-15:15  | TuBT4.2  |
| <i>Early Fusion for Goal Directed Robotic Vision.</i>  |  |
| Walsman, Aaron   | University of Washington                       |
| Bisk, Yonatan  | University of Washington                       |
| Gabriel, Saadia  | University of Washington                       |
| Misra, Dipendra  | Cornell University                             |
| Artzi, Yoav  | Cornell University                             |
| Choi, Yejin  | University of Washington                       |
| Fox, Dieter  | University of Washington                       |
| 15:15-15:30  | TuBT4.3  |
| <i>Advanced Autonomy on a Low-Cost Educational Drone Platform.</i>   |  |
| Eller, Luke  | Brown University                               |
| Guerin, Theo   | Brown University                               |
| Huang, Baichuan  | Brown University                               |
| Warren, Garrett  | Brown University                               |
| Yang, Sophie   | Brown University                               |
| Roy, Josh  | Brown University                               |
| Tellex, Stefanie   | Brown University                               |
| 15:30-15:45  | TuBT4.4  |
| <i>Goal-Directed Behavior under Variational Predictive Coding: Dynamic Organization of Visual Attention and Working Memory.</i>                    |  |
| Jung, Minju  | Korea Advanced Inst. of Sci. and Tech          |
| Matsumoto, Takazumi  | Okinawa Inst. of Sci. and Tech. Graduate Univ. |
| Tani, Jun  | Okinawa Inst. of Sci. and Tech. Graduate Univ. |
| 15:45-16:00  | TuBT4.5  |
| <i>Scaling Robot Supervision to Hundreds of Hours with RoboTurk: Robotic Manipulation Dataset through Human Reasoning and Dexterity.</i>           |  |
| Mandlekar, Ajay Uday   | Stanford University                            |
| Booher, Jonathan   | Stanford University                            |
| Spero, Max   | Stanford University                            |
| Tung, Albert   | Stanford University                            |
| Gupta, Anchit  | Stanford University                            |
| Zhu, Yuke  | Stanford University                            |
| Garg, Animesh  | University of Toronto                          |
| Savarese, Silvio   | Stanford University                            |
| Fei-Fei, Li  | Stanford University                            |
| 16:00-16:15  | TuBT4.6  |
| <i>Robot Learning Via Human Adversarial Games.</i>   |  |
| Duan, Jiali  | University of Southern California              |
| Wang, Qian   | University of Southern California              |
| Pinto, Lerrel Joseph   | Carnegie Mellon University                     |
| Kuo, C.-C. Jay   | University of Southern California              |
| Nikolaïdis, Stefanos   | University of Southern California              |

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| <b>TuBT5</b>  | L1-R5                                       |
| <b>Award Session III (Regular session)</b>  |   |
| Chair: Sugano, Shigeki  | Waseda University                           |
| Co-Chair: Liu, Yunhui   | Chinese University of Hong Kong             |
| 14:45-15:00   | TuBT5.1                                     |
| <i>Planning Beyond the Sensing Horizon Using a Learned Context.</i>                                   |   |
| Everett, Michael  | Massachusetts Institute of Technology       |
| Miller, Justin  | Ford  |
| How, Jonathan Patrick   | Massachusetts Institute of Technology       |
| 15:00-15:15   | TuBT5.2                                     |
| <i>Volumetric Instance-Aware Semantic Mapping and 3D Object Discovery.</i>                            |   |
| Grinvald, Margarita   | ETH Zurich                                  |
| Furrer, Fadri   | ETH Zurich                                  |
| Novkovic, Tonci   | Autonomous Systems Lab, ETH Zurich          |
| Chung, Jen Jen  | Eidgenössische Technische Hochschule Zürich |
| Cadena Lerma, Cesar   | ETH Zurich                                  |
| Siegwart, Roland  | ETH Zurich                                  |
| Nieto, Juan   | ETH Zürich                                  |
| 15:15-15:30   | TuBT5.3                                     |
| <i>Responsive Joint Attention in Human-Robot Interaction.</i>   |   |
| Pereira, Andre  | KTH Royal Institute of Technology           |
| Oertel, Catharine   | KTH Royal Institute of Technology           |
| Fermoselle, Leonor  | KTH Royal Institute of Technology           |
| Mendelson, Joe  | KTH Royal Institute of Technology           |
| Gustafson, Joakim   | KTH Royal Institute of Technology           |
| 15:30-15:45   | TuBT5.4                                     |
| <i>Deep Dive into Faces: Pose &amp; Illumination Invariant Multi-Face Emotion Recognition System.</i> |   |
| Saxena, Suchitra  | PES University                              |
| Tripathi, Shikha  | PES University                              |
| T S B, Sudarshan  | PES University                              |
| 15:45-16:00   | TuBT5.5                                     |
| <i>Enthusiastic Robots Make Better Contact.</i>   |   |
| Saad, Elie  | Delft University of Technology (TU Delft)   |
| Broekens, Joost   | Leiden University                           |
| Neerincx, Mark  | TNO   |
| Hindriks, Koen  | Vrije Universiteit Amsterdam                |
| 16:00-16:15   | TuBT5.6                                     |
| <i>Entropic Risk Measure in Policy Search.</i>  |   |
| Nass, David   | Technische Universität Darmstadt            |
| Belousov, Boris   | Technische Universität Darmstadt            |
| Peters, Jan   | Technische Universität Darmstadt            |

| TuBT6  |  | L1-R6 |
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| Aerial Robotics II (Regular session)   |  |       |
| Chair: Saska, Martin   | Czech Technical University in Prague             |       |
| Co-Chair: Kim, H. Jin  | Seoul National University                        |       |
| 14:45-15:00  | TuBT6.1  |       |
| Can a Robot Become a Movie Director? Learning Artistic Principles for Aerial Cinematography.               |  |       |
| Gschwindt, Mirko   | Technical University of Munich                   |       |
| Camci, Efe   | Nanyang Technological University                 |       |
| Bonatti, Rogerio   | Carnegie Mellon University                       |       |
| Wang, Wenshan  | Shanghai Jiao Tong Univ., Res. Inst. of Robotics |       |
| Kayacan, Erdal   | Aarhus University                                |       |
| Scherer, Sebastian   | Carnegie Mellon University                       |       |
| 15:00-15:15  | TuBT6.2  |       |
| Online Trajectory Generation of a MAV for Chasing a Moving Target in 3D Dense Environments.                |  |       |
| Jeon, Boseong  | Seoul National University                        |       |
| Kim, H. Jin  | Seoul National University                        |       |
| 15:15-15:30  | TuBT6.3  |       |
| Thermal-Inertial Odometry for Autonomous Flight Throughout the Night.                                      |  |       |
| Delaune, Jeff  | Jet Propulsion Laboratory                        |       |
| Hewitt, Robert   | Jet Propulsion Laboratory                        |       |
| Lytle, Laura   | Jet Propulsion Laboratory                        |       |
| Sorice, Cristina   | NASA Jet Propulsion Laboratory                   |       |
| Thakker, Rohan   | NASA Jet Propulsion Laboratory                   |       |
| Matthies, Larry  | Jet Propulsion Laboratory                        |       |
| 15:30-15:45  | TuBT6.4  |       |
| Timepix Radiation Detector for Autonomous Radiation Localization and Mapping by Micro Unmanned Vehicles.   |  |       |
| Baca, Tomas  | Czech Technical University in Prague             |       |
| Jilek, Martin  | Czech Technical University in Prague             |       |
| Manek, Petr  | Czech Technical University in Prague             |       |
| Stibinger, Petr  | Czech Technical University in Prague             |       |
| Linhart, Vladimir  | Czech Technical University in Prague             |       |
| Jakubek, Jan   | Advacam S.r.o                                    |       |
| Saska, Martin  | Czech Technical University in Prague             |       |
| 15:45-16:00  | TuBT6.5  |       |
| Flexible Trinocular: Non-Rigid Multi-Camera-IMU Dense Reconstruction for UAV Navigation and Mapping.       |  |       |
| Hinzmann, Timo   | Swiss Federal Inst. of Technology / ETH Zurich   |       |
| Cadena Lerma, Cesar  | ETH Zurich                                       |       |
| Nieto, Juan  | ETH Zürich                                       |       |
| Sieglwart, Roland  | ETH Zurich                                       |       |
| 16:00-16:15  | TuBT6.6  |       |
| Contact-Based Bridge Inspection Multirotors: Design, Modelling and Control Considering the Ceiling Effect. |  |       |
| Jimenez-Cano, Antonio  | University of Seville                            |       |
| Sanchez-Cuevas, Pedro J  | University of Seville                            |       |
| Grau, Pedro  | University of Seville                            |       |
| Ollero, Anibal   | University of Seville                            |       |
| Heredia, Guillermo   | University of Seville                            |       |

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| <b>TuBT7</b>  | <b>L1-R7</b>                                   |
| <b>Computer Vision and Applications II (Regular session)</b>                                      |  |
| Chair: Yang, Guang-Zhong  | Imperial College London                        |
| Co-Chair: Bhattacharya, Sourabh   | Iowa State University                          |
| 14:45-15:00   | TuBT7.1  |
| <i>3D Canonical Pose Estimation and Abnormal Gait Recognition with a Single RGB-D Camera.</i>     |  |
| Guo, Yao  | Imperial College London                        |
| Deligianni, Fani  | Imperial College London                        |
| Gu, Xiao  | Imperial College London                        |
| Yang, Guang-Zhong   | Imperial College London                        |
| 15:00-15:15   | TuBT7.2  |
| <i>Path Planning with Incremental Roadmap Update for Visibility-Based Target Tracking.</i>        |  |
| Laguna, Guillermo   | Iowa State University                          |
| Bhattacharya, Sourabh   | Iowa State University                          |
| 15:15-15:30   | TuBT7.3  |
| <i>Camera Exposure Control for Robust Robot Vision with Noise-Aware Image Quality Assessment.</i> |  |
| Shin, Ukcheol   | Korea Advanced Inst. of Sci. and Tech          |
| Park, Jinsun  | Korea Advanced Inst. of Sci. and Tech          |
| Shim, Gyu Min   | Korea Advanced Inst. of Sci. and Tech          |
| Rameau, Francois  | Korea Advanced Inst. of Sci. and Tech, RCV Lab |
| Kweon, In So  | Korea Advanced Inst. of Sci. and Tech          |
| 15:30-15:45   | TuBT7.4  |
| <i>Visual Domain Adaptation Exploiting Confidence-Samples.</i>                                    |  |
| Tang, Song  | University of Hamburg                          |
| Ji, Yunfeng   | Univ. of Shanghai for Science and Technology   |
| Lyu, Jianzhi  | University of Hamburg                          |
| Mi, Jinpeng   | TAMS, University of Hamburg                    |
| Li, Qingdu  | Univ. of Shanghai for Science and Technology   |
| Zhang, Jianwei  | University of Hamburg                          |
| 15:45-16:00   | TuBT7.5  |
| <i>Learning Residual Flow As Dynamic Motion from Stereo Videos.</i>                               |  |
| Lee, Seokju   | Korea Advanced Inst. of Sci. and Tech          |
| Im, Sunghoon  | Korea Advanced Inst. of Sci. and Tech          |
| Lin, Stephen  | Microsoft Research                             |
| Kweon, In So  | Korea Advanced Inst. of Sci. and Tech          |
| 16:00-16:15   | TuBT7.6  |
| <i>Grounding Language Attributes to Objects Using Bayesian Eigenobjects.</i>                      |  |
| Cohen, Vanya  | Brown University                               |
| Burchfiel, Benjamin   | Duke University                                |
| Nguyen, Thao  | Brown University                               |
| Gopalan, Nakul  | Brown University                               |
| Konidaris, George   | Brown University                               |
| Tellex, Stefanie  | Brown University                               |



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| <b>TuBT8</b>   | LG-R8                                     |
| <b>Autonomous Agents and Robots (Regular session)</b>  |   |
| Chair: Liu, Zhe  | The Chinese University of Hong Kong       |
| Co-Chair: Sun, Yuxiang   | Hong Kong Univ. of Science and Technology |
| 14:45-15:00  | TuBT8.1                                   |
| <i>Metric Monocular Localization Using Signed Distance Fields.</i>   |   |
| Huang, Huaiyang  | Hong Kong Univ. of Science and Technology |
| Sun, Yuxiang   | Hong Kong Univ. of Science and Technology |
| Ye, Haoyang  | Hong Kong Univ. of Science and Technology |
| Liu, Ming  | Hong Kong Univ. of Science and Technology |
| 15:00-15:15  | TuBT8.2                                   |
| <i>Perception As Prediction Using General Value Functions in Autonomous Driving Applications.</i>  |   |
| Graves, Daniel   | Huawei Technologies Canada, Ltd           |
| Rezaee, Kasra  | Huawei Technologies Canada, Ltd           |
| Scheideman, Sean   | University of Alberta                     |
| 15:15-15:30  | TuBT8.3                                   |
| <i>Experience Reuse with Probabilistic Movement Primitives.</i>  |   |
| Stark, Svenja  | Technical University Darmstadt            |
| Peters, Jan  | Technical University Darmstadt            |
| Rueckert, Elmar  | University of Luebeck                     |
| 15:30-15:45  | TuBT8.4                                   |
| <i>SeqLPD: Sequence Matching Enhanced Loop-Closure Detection Based on Large-Scale Point Cloud Description for Self-Driving Vehicles.</i> |   |
| Liu, Zhe   | The Chinese University of Hong Kong       |
| Suo, Chuanzhe  | The Chinese University of Hong Kong       |
| Zhou, Shunbo   | The Chinese University of Hong Kong       |
| Xu, Fan  | Shanghai Jiao Tong University             |
| Wei, Huanshu   | The Chinese University of Hong Kong       |
| Chen, Wen  | The Chinese University of Hong Kong       |
| Wang, Hesheng  | Shanghai Jiao Tong University             |
| Liang, Xinwu   | Shanghai Jiao Tong University             |
| Liu, Yunhui  | The Chinese University of Hong Kong       |
| 15:45-16:00  | TuBT8.5                                   |
| <i>Belief Space Metareasoning for Exception Recovery.</i>  |   |
| Svegliato, Justin  | University of Massachusetts Amherst       |
| Wray, Kyle   | Alliance Innovation Lab Silicon Valley    |
| Witwicki, Stefan   | Alliance Innovation Laboratory            |
| Biswas, Joydeep  | University of Massachusetts Amherst       |
| Zilberstein, Shlomo  | University of Massachusetts               |
| 16:00-16:15  | TuBT8.6                                   |
| <i>IVOA: Introspective Vision for Obstacle Avoidance.</i>  |   |
| Rabiee, Sadegh   | University of Massachusetts Amherst       |
| Biswas, Joydeep  | University of Massachusetts Amherst       |

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| <b>TuBT9</b>  | <b>LG-R9</b>   |
| <b>Social Human-Robot Interaction II (Regular session)</b>  |  |
| Chair: Yamane, Katsu  | Honda  |
| Co-Chair: Basilico, Nicola  | University of Milan  |
| 14:45-15:00   | TuBT9.1  |
| <i>Can a Social Robot Encourage Children's Self-Study?.</i>   |  |
| Maeda, Risa   | Kyoto University   |
| Even, Jani  | Kyoto University   |
| Kanda, Takayuki   | Kyoto University   |
| 15:00-15:15   | TuBT9.2  |
| <i>Perception of Pedestrian Avoidance Strategies of a Self-Balancing Mobile Robot.</i>                                  |  |
| Lo, Shih-Yun  | Carnegie Mellon University                                 |
| Yamane, Katsu   | Honda  |
| Sugiyama, Ken-ichiro  | Honda  |
| 15:15-15:30   | TuBT9.3  |
| <i>A Deep Learning Approach for Multi-View Engagement Estimation of Children in a Child-Robot Joint Attention Task.</i> |  |
| Hadfield, Jack  | National Technical University of Athens                    |
| Chalvatzaki, Georgia  | National Technical University of Athens                    |
| Koutras, Petros   | National Technical University of Athens                    |
| Khamassi, Mehdi   | Cnrs / Upmc  |
| Tzafestas, Costas S.  | ICCS - Inst of Communication and Computer Systems          |
| Maragos, Petros   | National Technical University of Athens                    |
| 15:30-15:45   | TuBT9.4  |
| <i>Evaluating the Acceptability of Assistive Robots for Early Detection of Mild Cognitive Impairment.</i>               |  |
| Luperto, Matteo   | University of Milan  |
| Romeo, Marta  | University of Manchester, and AIST                         |
| Lunardini, Francesca  | Politecnico di Milano                                      |
| Basilico, Nicola  | University of Milan  |
| Abbate, Carlo   | Fondazione IRCCS Ca' Granda, Ospedale Maggiore Policlinico |
| Jones, Ray  | University of Plymouth                                     |
| Cangelosi, Angelo   | University of Manchester, and AIST                         |
| Ferrante, Simona  | Politecnico Di Milano                                      |
| Borghese, N. Alberto  | University of Milano                                       |
| 15:45-16:00   | TuBT9.5  |
| <i>A Method for Guiding a Person Combining Robot Movement and Projection.</i>   |  |
| Tamai, Aki  | Hiroshima City University                                  |
| Ikeda, Tetsushi   | Hiroshima City University                                  |
| Iwaki, Satoshi  | Hiroshima City University                                  |

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| <b>TuBT10</b>   | LG-R10                                   |
| <b>SLAM II (Regular session)</b>  |  |
| Chair: Song, Dezhen   | Texas A&M University                     |
| Co-Chair: Nieto, Juan   | ETH Zürich                               |
| 14:45-15:00   | TuBT10.1                                 |
| <i>Free-Space Features: Global Localization in 2D Laser SLAM Using Distance Function Maps.</i>      |  |
| Millane, Alexander James  | ETH Zurich                               |
| Oleynikova, Helen   | ETH Zürich                               |
| Nieto, Juan   | ETH Zürich                               |
| Sieglwart, Roland   | ETH Zurich                               |
| Cadena Lerma, Cesar   | ETH Zurich                               |
| 15:00-15:15   | TuBT10.2                                 |
| <i>Eigen-Factors: Plane Estimation for Multi-Frame and Time-Continuous Point Cloud Alignment.</i>   |  |
| Ferrer, Gonzalo   | Skolkovo Inst. of Science and Technology |
| 15:15-15:30   | TuBT10.3                                 |
| <i>A Robust Laser-Inertial Odometry and Mapping Method for Large-Scale Highway Environments.</i>    |  |
| Zhao, Shibo   | Northeastern University                  |
| Fang, Zheng   | Northeastern University                  |
| Li, Haolai  | Northeastern University                  |
| Scherer, Sebastian  | Carnegie Mellon University               |
| 15:30-15:45   | TuBT10.4                                 |
| <i>Degeneracy-Aware Factors with Applications to Underwater SLAM.</i>                               |  |
| Hinduja, Akshay   | Carnegie Mellon University               |
| Ho, Bing-Jui  | Carnegie Mellon University               |
| Kaess, Michael  | Carnegie Mellon University               |
| 15:45-16:00   | TuBT10.5                                 |
| <i>On the Tunable Sparse Graph Solver for Pose Graph Optimization in Visual SLAM Problems.</i>      |  |
| Chou, Chieh   | Texas A&M University                     |
| Wang, Di  | Texas A&M University                     |
| Song, Dezhen  | Texas A&M University                     |
| Davis, Timothy  | Texas A&M University                     |
| 16:00-16:15   | TuBT10.6                                 |
| <i>Radar SLAM for Indoor Disaster Environments Via Multi-Modal Registration to Prior LiDAR Map.</i> |  |
| Park, Yeong Sang  | Korea Advanced Inst. of Sci. and Tech    |
| Kim, Joowan   | Korea Advanced Inst. of Sci. and Tech    |
| Kim, Ayoung   | Korea Advanced Inst. of Sci. and Tech    |

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| <b>TuBT11</b>   | LG-R11  |
| <b>Medical Robot: Control</b> (Regular session)   |   |
| Chair: Au, K. W. Samuel   | The Chinese University of Hong Kong             |
| Co-Chair: Stoyanov, Danail  | University College London                       |
| 14:45-15:00   | TuBT11.1  |
| <i>Setup and Method for Remote Center of Motion Positioning Guidance During Robot-Assisted Surgery.</i>                     |   |
| Smits, Jonas  | KU Leuven                                       |
| Reynaerts, Dominiek   | KU Leuven, and Flanders Make                    |
| Vander Poorten, Emmanuel B  | KU Leuven                                       |
| 15:00-15:15   | TuBT11.2  |
| <i>A Reliable Gravity Compensation Control Strategy for dVRK Robotic Arms with Nonlinear Disturbance Forces.</i>            |   |
| Lin, Hongbin  | The Chinese University of Hong Kong             |
| Hui, Chiu-Wai   | The Chinese University of Hong Kong             |
| Wang, Yan   | The Chinese University of Hong Kong             |
| Deguet, Anton   | Johns Hopkins University                        |
| Kazanzides, Peter   | Johns Hopkins University                        |
| Au, K. W. Samuel  | The Chinese University of Hong Kong             |
| 15:15-15:30   | TuBT11.3  |
| <i>Collaborative Needle Insertion with Active Tissue Deformation Control.</i>   |   |
| Zhong, Fangxun  | The Chinese University of Hong Kong             |
| Wang, Yaqing  | The Chinese University of Hong Kong             |
| Wang, Zerui   | The Chinese University of Hong Kong             |
| Liu, Yunhui   | The Chinese University of Hong Kong             |
| 15:30-15:45   | TuBT11.4  |
| <i>Twin Kinematics Approach for Robotic-Assisted Tele-Echography.</i>   |   |
| Santos, Luís  | University of Coimbra                           |
| Cortesao, Rui   | Univ. of Coimbra, Inst. of Systems and Robotics |
| Quintas, João   | Instituto Pedro Nunes                           |
| 15:45-16:00   | TuBT11.5  |
| <i>Semi-Autonomous Interventional Manipulation Using Pneumatically Attachable Flexible Rails.</i>                           |   |
| D'Ettorre, Claudia  | University College London                       |
| Stilli, Agostino  | University College London                       |
| Dwyer, George   | University College London                       |
| Neves, Joana B.   | University College London                       |
| Tran, Maxine  | University College London                       |
| Stoyanov, Danail  | University College London                       |
| 16:00-16:15   | TuBT11.6  |
| <i>Optimizing Motion-Planning Problem Setup Via Bounded Evaluation with Application to Following Surgical Trajectories.</i> |   |
| Niyaz, Sherdil  | University of Washington                        |
| Kuntz, Alan   | University of North Carolina at Chapel Hill     |
| Salzman, Oren   | Carnegie Mellon University                      |
| Alterovitz, Ron   | University of North Carolina at Chapel Hill     |
| Srinivasa, Siddhartha   | University of Washington                        |

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| <b>TuBT12</b>  | LG-R12                                  |
| <b>Gesture, Posture and Facial Expressions (Regular session)</b>   |   |
| Chair: Kerzel, Matthias  | Univ. Hamburg                           |
| Co-Chair: Frederiksen, Morten Roed   | IT-University of Copenhagen             |
| 14:45-15:00  | TuBT12.1                                |
| <i>Generalized Multiple Correlation Coefficient As a Similarity Measurement between Trajectories.</i>                                |   |
| Urain De Jesus, Julien   | TU Darmstadt                            |
| Peters, Jan  | Technische Universität Darmstadt        |
| 15:00-15:15  | TuBT12.2                                |
| <i>Fusing Body Posture with Facial Expressions for Joint Recognition of Affect in Child-Robot Interaction.</i>                       |   |
| Filintisis, Panagiotis Paraskevas  | National Technical University of Athens |
| Efthymiou, Niki  | National Technical University of Athens |
| Koutras, Petros  | National Technical University of Athens |
| Potamianos, Gerasimos  | University of Thessaly                  |
| Maragos, Petros  | National Technical University of Athens |
| 15:15-15:30  | TuBT12.3                                |
| <i>Exploring Low-Level and High-Level Transfer Learning for Multi-Task Facial Recognition with a Semi-Supervised Neural Network.</i> |   |
| Barros, Pablo  | University of Hamburg                   |
| Fliesswasser, Erik   | University of Hamburg                   |
| Kerzel, Matthias   | University of Hamburg                   |
| Wermter, Stefan  | University of Hamburg                   |
| 15:30-15:45  | TuBT12.4                                |
| <i>A Systematic Comparison of Affective Robot Expression Modalities.</i>   |   |
| Frederiksen, Morten Roed   | IT-University of Copenhagen             |
| Stoy, Kasper   | IT University of Copenhagen             |
| 15:45-16:00  | TuBT12.5                                |
| <i>Towards More Realistic Human-Robot Conversation: A Seq2Seq-Based Body Gesture Interaction System.</i>                             |   |
| Hua, Minjie  | CloudMinds Technologies Inc             |
| Shi, Fuyuan  | CloudMinds Technologies Inc             |
| Nan, Yibing  | CloudMinds Technologies Inc             |
| Wang, Kai  | CloudMinds Technologies Inc             |
| Chen, Hao  | CloudMinds Technologies Inc             |
| Lian, Shiguo   | CloudMinds Technologies Inc             |

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| <b>TuBT13</b>  | LG-R13   |
| <b>Humanoid and Bipedal Locomotion II (Regular session)</b>  |  |
| Chair: Hur, Pilwon   | Texas A&M University                                   |
| Co-Chair: Rebula, John   | University of Michigan                                 |
| 14:45-15:00  | TuBT13.1   |
| <i>Virtual-Mass-Ellipsoid Inverted Pendulum Model and Its Applications to 3D Bipedal Locomotion on Uneven Terrains.</i>                                    |  |
| Guan, Kaixuan  | University of Tokyo                                    |
| Yamamoto, Ko   | University of Tokyo                                    |
| Nakamura, Yoshihiko  | University of Tokyo                                    |
| 15:00-15:15  | TuBT13.2   |
| <i>A Robustness Analysis of Inverse Optimal Control of Bipedal Walking.</i>  |  |
| Rebula, John   | University of Michigan                                 |
| Schaal, Stefan   | MPI Intelligent Systems & Univ. of Southern California |
| Finley, James  | Univ. of Southern California                           |
| Righetti, Ludovic  | New York University                                    |
| 15:15-15:30  | TuBT13.3   |
| <i>Periodic Trajectory Planning and Robust Output Zeroing Control for Underactuated Bipedal Robots with Predicted Disturbances.</i>                        |  |
| Takano, Rin  | Tokyo Institute of Technology                          |
| Chang, Junho   | Tokyo Institute of Technology                          |
| Yamakita, Masaki   | Tokyo Institute of Technology                          |
| 15:30-15:45  | TuBT13.4   |
| <i>Learning Footstep Planning on Irregular Surfaces with Partial Placements.</i>   |  |
| Castro, German   | The University of New South Wales                      |
| Sammut, Claude   | The University of New South Wales                      |
| 15:45-16:00  | TuBT13.5   |
| <i>A Robust Biped Locomotion Based on Linear-Quadratic-Gaussian Controller and Divergent Component of Motion.</i>  |  |
| Kasaei, Seyed Mohammadreza   | IEETA / DETI University of Aveiro                      |
| Lau, Nuno  | Aveiro University                                      |
| Pereira, Artur   | University of Aveiro                                   |
| 16:00-16:15  | TuBT13.6   |
| <i>Generalized Contact Constraints of Hybrid Trajectory Optimization for Different Terrains and Analysis of Sensitivity to Randomized Initial Guesses.</i> |  |
| Chao, Kenneth  | Texas A&M University                                   |
| Hur, Pilwon  | Texas A&M University                                   |

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|---|---|
| <b>TuBT14</b>   | LG-R14  |
| <b>Climbing Robots (Regular session)</b>  |   |
| Chair: Nikolakopoulos, George   | Luleå University of Technology                |
| Co-Chair: Li, Peng  | Harbin Institute of Technology (ShenZhen)     |
| 14:45-15:00   | TuBT14.1                                      |
| <i>Design of an Adhesion-Aware Façade Cleaning Robot.</i>   |   |
| Muthugala Arachchige, Viraj J. Muthugala  | Singapore University of Technology and Design |
| Vega-Heredia, Manuel  | Singapore University of Technology and Design |
| Ayyalusami, Vengadesh   | Singapore University of Technology and Design |
| Sriharsha, Ghanta   | Singapore University of Technology and Design |
| Elara, Mohan Rajesh   | Singapore University of Technology and Design |
| 15:00-15:15   | TuBT14.2                                      |
| <i>A Novel Capabilities of Quadruped Robot Moving through Vertical Ladder without Handrail Support.</i> |   |
| Saputra, Azhar Aulia  | Tokyo Metropolitan University                 |
| Toda, Yuichiro  | Okayama University                            |
| Takesue, Naoyuki  | Tokyo Metropolitan University                 |
| Kubota, Naoyuki   | Tokyo Metropolitan University                 |
| 15:15-15:30   | TuBT14.3                                      |
| <i>Adaptive Vision-Based Control for Rope-Climbing Robot Manipulator.</i>                               |   |
| Sun, Guangli  | The Chinese University of Hong Kong           |
| Li, Xiang   | Tsinghua University                           |
| Li, Peng  | Harbin Institute of Technology (ShenZhen)     |
| Yue, Linzhu   | The Chinese University of Hong Kong           |
| Zhou, Yang  | The Chinese University of Hong Kong           |
| Liu, Yunhui   | The Chinese University of Hong Kong           |
| 15:30-15:45   | TuBT14.4                                      |
| <i>On Model-Based Adhesion Control of a Vortex Climbing Robot.</i>                                      |   |
| Andrikopoulos, George   | Luleå University of Technology                |
| Papadimitriou, Andreas  | Luleå University of Technology                |
| Brusell, Angelica   | Luleå University of Technology                |
| Nikolakopoulos, George  | Luleå University of Technology                |
| 15:45-16:00   | TuBT14.5                                      |
| <i>An Interactive Physically-Based Model for Active Suction Phenomenon Simulation.</i>                  |   |
| Bernardin, Antonin  | INSA Rennes                                   |
| Duriez, Christian   | INRIA   |
| Marchal, Maud   | INSA/INRIA                                    |

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|---|---|
| <b>TuBT15</b>   | LG-R15                                      |
| <b>Motion and Path Planning II (Regular session)</b>  |   |
| Chair: Yoon, Sung-eui   | Korea Advanced Inst. of Sci. and Tech       |
| Co-Chair: Pěnička, Robert   | Czech Technical University in Prague        |
| 14:45-15:00   | TuBT15.1                                    |
| <i>Coverage Path Planning Using Path Primitive Sampling and Primitive Coverage Graph for Visual Inspection.</i> |   |
| Jing, Wei   | A*STAR                                      |
| Deng, Di  | Carnegie Mellon University                  |
| Xiao, Zhe   | Inst. of High Performance Computing         |
| Liu, Yong   | A*STAR Inst. of High Performance Computing  |
| Shimada, Kenji  | Carnegie Mellon University                  |
| 15:00-15:15   | TuBT15.2                                    |
| <i>Sampling-Based Motion Planning of 3D Solid Objects Guided by Multiple Approximate Solutions.</i>             |   |
| Vonasek, Vojtech  | Czech Technical University in Prague        |
| Pěnička, Robert   | Czech Technical University in Prague        |
| 15:15-15:30   | TuBT15.3                                    |
| <i>LEGO: Leveraging Experience in Roadmap Generation for Sampling-Based Planning.</i>                           |   |
| Kumar, Rahul  | IIT Kharagpur                               |
| Mandalika, Aditya   | University of Washington                    |
| Choudhury, Sanjiban   | University of Washington                    |
| Srinivasa, Siddhartha   | University of Washington                    |
| 15:30-15:45   | TuBT15.4                                    |
| <i>Volumetric Tree*: Adaptive Sparse Graph for Effective Exploration of Homotopy Classes.</i>                   |   |
| Kim, Donghyuk   | Korea Advanced Inst. of Sci. and Tech       |
| Kang, Mincheul  | Korea Advanced Inst. of Sci. and Tech       |
| Yoon, Sung-eui  | Korea Advanced Inst. of Sci. and Tech       |
| 15:45-16:00   | TuBT15.5                                    |
| <i>Multilevel Incremental Roadmap Spanners for Reactive Motion Planning.</i>                                    |   |
| Ichnowski, Jeffrey  | University of North Carolina at Chapel Hill |
| Alterovitz, Ron   | University of North Carolina at Chapel Hill |
| 16:00-16:15   | TuBT15.6                                    |
| <i>MT-RRT: A General Purpose Multithreading Library for Path Planning.</i>                                      |   |
| Casalino, Andrea  | Politecnico Di Milano                       |
| Zanchettin, Andrea Maria  | Politecnico Di Milano                       |
| Rocco, Paolo  | Politecnico Di Milano                       |



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| <b>TuBT16</b>   | LG-R16  |
| <b>Grasping II (Regular session)</b>  |   |
| Chair: Manocha, Dinesh  | University of Maryland                          |
| Co-Chair: Stuart, Hannah  | UC Berkeley                                     |
| 14:45-15:00   | TuBT16.1  |
| <i>Generating Grasp Poses for a High-DOF Gripper Using Neural Networks.</i>                   |   |
| Liu, Min  | National University of Defense Technology       |
| Pan, Zherong  | The University of North Carolina at Chapel Hill |
| Xu, Kai   | National University of Defense Technology       |
| Ganguly, Kanishka   | University of Maryland, College Park            |
| Manocha, Dinesh   | University of Maryland                          |
| 15:00-15:15   | TuBT16.2  |
| <i>Robust Grasp Planning Over Uncertain Shape Completions.</i>                                |   |
| Lundell, Jens   | Aalto University                                |
| Verdoja, Francesco  | Aalto University                                |
| Kyrki, Ville  | Aalto University                                |
| 15:15-15:30   | TuBT16.3  |
| <i>Partial Caging: A Clearance-Based Definition and Deep Learning.</i>                        |   |
| Varava, Anastasiia  | KTH Royal Institute of Technology               |
| Welle, Michael C.   | KTH Royal Institute of Technology               |
| Mahler, Jeffrey   | University of California, Berkeley              |
| Goldberg, Ken   | UC Berkeley                                     |
| Kragic, Danica  | KTH Royal Institute of Technology               |
| Pokorny, Florian T.   | KTH Royal Institute of Technology               |
| 15:30-15:45   | TuBT16.4  |
| <i>Grasping Unknown Objects Based on Gripper Workspace Spheres.</i>                           |   |
| Sorour, Mohamed   | University of Montpellier                       |
| Elgeneidy, Khaled   | University of Lincoln                           |
| Srinivasan, Aravinda  | University of Lincoln                           |
| Hanheide, Marc  | University of Lincoln                           |
| Neumann, Gerhard  | University of Lincoln                           |
| 15:45-16:00   | TuBT16.5  |
| <i>Optimization Model for Planning Precision Grasps with Multi-Fingered Hands.</i>            |   |
| Fan, Yongxiang  | University of California, Berkeley              |
| Zhu, Xinghao  | University of California, Berkeley              |
| Tomizuka, Masayoshi   | University of California, Berkeley              |
| 16:00-16:15   | TuBT16.6  |
| <i>Tunable Contact Conditions and Grasp Hydrodynamics Using Gentle Fingertip Suction (I).</i> |   |
| Stuart, Hannah  | University of California, Berkeley              |
| Wang, Shiquan   | Stanford University                             |
| Cutkosky, Mark  | Stanford University                             |

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| <b>TuBT17</b>   | LG-R17  |
| <b>Micro/Nano Robots II (Regular session)</b>   |   |
| Chair: Kim, MinJun  | Southern Methodist University                 |
| Co-Chair: Zhang, Li   | The Chinese University of Hong Kong           |
| 14:45-15:00   | TuBT17.1                                      |
| <i>Automated Sorting of Rare Cells Based on Autofocusing Visual Feedback in Fluorescence Microscopy.</i>                    |   |
| Bai, Kailun   | Beijing Institute of Technology               |
| Wang, Huaping   | Beijing Institute of Technology               |
| Shi, Qing   | Beijing Institute of Technology               |
| Zheng, Zhiqiang   | Beijing Institute of Technology               |
| Cui, Juan   | Beijing Institute of Technology               |
| Sun, Tao  | Beijing Institute of Technology               |
| Huang, Qiang  | Beijing Institute of Technology               |
| Dario, Paolo  | Scuola Superiore Sant'Anna                    |
| Fukuda, Toshio  | Meijo University                              |
| 15:00-15:15   | TuBT17.2                                      |
| <i>Continuous Mechanical Indexing of Single Cell Spheroids Using a Robot Integrated Microfluidic Chip.</i>                  |   |
| Sakuma, Shinya  | Nagoya University                             |
| Nakahara, Kou   | Nagoya University                             |
| Arai, Fumihito  | Nagoya University                             |
| 15:15-15:30   | TuBT17.3                                      |
| <i>3D Micromanipulation of Particle Swarm Using a Hexapole Magnetic Tweezer.</i>  |   |
| Zhang, Xiao   | Southern Methodist University                 |
| Rogowski, Louis   | Southern Methodist University                 |
| Kim, MinJun   | Southern Methodist University                 |
| 15:30-15:45   | TuBT17.4                                      |
| <i>High-Speed On-Chip Mixing by Micro-Vortex Generated by Controlling Local Jet Flow Using Dual Membrane Pumps.</i>         |   |
| Kasai, Yusuke   | Nagoya University                             |
| Sakuma, Shinya  | Nagoya University                             |
| Arai, Fumihito  | Nagoya University                             |
| 15:45-16:00   | TuBT17.5                                      |
| <i>Magnetic-Needle-Assisted Micromanipulation of Dynamically Self-Assembled Magnetic Droplets for Cargo Transportation.</i> |   |
| Wang, Qianqian  | The Chinese University of Hong Kong           |
| Du, Xingzhou  | The Chinese University of Hong Kong           |
| Ji, Fengtong  | The Chinese University of Hong Kong           |
| Zhang, Li   | The Chinese University of Hong Kong           |
| 16:00-16:15   | TuBT17.6                                      |
| <i>Vision-Based Magnetic Platform for Actuator Positioning and Wireless Control of Microrobots.</i>                         |   |
| Zarrouk, Azaddien   | INSA Centre Val De Loire                      |
| Belharet, Karim   | Hautes Etudes d'Ingénieur - HEI Campus Centre |
| Tahri, Omar   | INSA Centre Val-De-Loire                      |

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| <b>TuBT18</b>  | LG-R18   |
| <b>Localization II (Regular session)</b>   |  |
| Chair: Milford, Michael J  | Queensland University of Technology              |
| Co-Chair: Fontanelli, Daniele  | University of Trento                             |
| 14:45-15:00  | TuBT18.1   |
| <i>Robot Localization Via Odometry-Assisted Ultra-Wideband Ranging with Stochastic Guarantees.</i>                               |  |
| Magnago, Valerio   | University of Trento                             |
| Corbalán, Pablo  | University of Trento                             |
| Picco, Gian Pietro   | University of Trento                             |
| Palopoli, Luigi  | University of Trento                             |
| Fontanelli, Daniele  | University of Trento                             |
| 15:00-15:15  | TuBT18.2   |
| <i>Sparse-3D Lidar Outdoor Map-Based Autonomous Vehicle Localization.</i>  |  |
| Ahmed, Syed Zeeshan  | Institute for Infocomm Research (I2R), A*STAR    |
| Saputra, Vincensius Billy  | National University of Singapore                 |
| Verma, Saurab  | Institute of Infocomm Research, A*STAR           |
| Zhang, Kun   | Institute for Infocomm Research (I2R), A*STAR    |
| Adiwahono, Albertus Hendrawan  | I2R A-STAR                                       |
| 15:15-15:30  | TuBT18.3   |
| <i>Mobile Robot Localization with Reinforcement Learning Map Update Decision Aided by an Absolute Indoor Positioning System.</i> |  |
| Garrote, Luís Carlos   | Institute of Systems and Robotics                |
| Torres, Miguel   | Inst. of Systems and Robotics – Univ. of Coimbra |
| Barros, Tiago  | Inst. of Systems and Robotics – Univ. of Coimbra |
| Perdiz, João   | University of Coimbra                            |
| Premevida, Cristiano   | Loughborough University                          |
| Nunes, Urbano J.   | Instituto De Sistemas E Robotica                 |
| 15:30-15:45  | TuBT18.4   |
| <i>GLFP: Global Localization from a Floor Plan.</i>  |  |
| Wang, Xipeng   | Toyota Research Institute                        |
| Marcotte, Ryan   | University of Michigan                           |
| Olson, Edwin   | University of Michigan                           |
| 15:45-16:00  | TuBT18.5   |
| <i>Automatic Coverage Selection for Surface-Based Visual Localization.</i>   |  |
| Mount, James   | Queensland University of Technology              |
| Dawes, Les   | Queensland University of Technology              |
| Milford, Michael J   | Queensland University of Technology              |
| 16:00-16:15  | TuBT18.6   |
| <i>BTLE: A Binary Tree Encoding Approach for Visual Localization.</i>  |  |
| Le, Huu  | Chalmers University of Technology                |
| Hoang, Tuan  | Singapore Univ. of Technology and Design         |
| Milford, Michael J   | Queensland University of Technology              |

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| <b>TuBT19</b>  | LG-R19                                 |
| <b>Planning, Scheduling, and Coordination I</b> (Regular session)                                |  |
| Chair: Bezzo, Nicola   | University of Virginia                 |
| Co-Chair: Bhattacharya, Sourabh  | Iowa State University                  |
| 14:45-15:00  | TuBT19.1                               |
| <i>Planning in Stochastic Environments with Goal Uncertainty.</i>                                |  |
| Saisubramanian, Sandhya  | University of Massachusetts Amherst    |
| Wray, Kyle   | Alliance Innovation Lab Silicon Valley |
| Pineda, Luis   | University of Massachusetts Amherst    |
| Zilberstein, Shlomo  | University of Massachusetts            |
| 15:00-15:15  | TuBT19.2                               |
| <i>Adaptive Outcome Selection for Planning with Reduced Models.</i>                              |  |
| Saisubramanian, Sandhya  | University of Massachusetts Amherst    |
| Zilberstein, Shlomo  | University of Massachusetts            |
| 15:15-15:30  | TuBT19.3                               |
| <i>Fast Run-Time Monitoring, Replanning, and Recovery for Safe Autonomous System Operations.</i> |  |
| Yel, Esen  | University of Virginia                 |
| Bezzo, Nicola  | University of Virginia                 |
| 15:30-15:45  | TuBT19.4                               |
| <i>Cooperative Schedule-Driven Intersection Control with Connected and Autonomous Vehicles.</i>  |  |
| Hu, Hsu-Chieh  | Carnegie Mellon University             |
| Smith, Stephen F.  | Carnegie Mellon University             |
| Goldstein, Richard   | Carnegie Mellon University             |
| 15:45-16:00  | TuBT19.5                               |
| <i>Multirobot Charging Strategies: A Game-Theoretic Approach.</i>                                |  |
| Gao, Tianshuang  | Iowa State University                  |
| Bhattacharya, Sourabh  | Iowa State University                  |
| 16:00-16:15  | TuBT19.6                               |
| <i>Toward Model-Based Benchmarking of Robot Components.</i>                                      |  |
| Barدارo, Gianluca  | Politecnico Di Milano                  |
| El-Shamouty, Mohamed   | Fraunhofer IPA                         |
| Fontana, Giulio  | Politecnico Di Milano                  |
| Awad, Ramez  | Fraunhofer IPA                         |
| Matteucci, Matteo  | Politecnico Di Milano                  |

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| <b>TuBT20</b>  | LG-R20                                     |
| <b>Biologically-Inspired Robots II (Regular session)</b>   |  |
| Chair: Kurabayashi, Daisuke  | Tokyo Institute of Technology              |
| Co-Chair: Guo, Shuxiang  | Kagawa University                          |
| 14:45-15:00  | TuBT20.1                                   |
| <i>Lifelong Federated Reinforcement Learning: A Learning Architecture for Navigation in Cloud Robotic Systems.</i> |  |
| Liu, Boyi  | Chinese Academy of Sciences                |
| Wang, Lujia  | Shenzhen Institutes of Advanced Technology |
| Liu, Ming  | Hong Kong Univ. of Science and Technology  |
| 15:00-15:15  | TuBT20.2                                   |
| <i>Study on Elastic Elements Allocation for Energy-Efficient Robotic Cheetah Leg.</i>                              |  |
| Borisov, Ivan  | ITMO University                            |
| Kulagin, Ivan  | Univ. of Info. Tech., Mechanics and Optics |
| Larkina, Anastasiya  | ITMO University, Saint Petersburg          |
| Egorov, Artem  | ITMO University, Saint Petersburg          |
| Kolyubin, Sergey   | ITMO University                            |
| Stramigioli, Stefano   | University of Twente                       |
| 15:15-15:30  | TuBT20.3                                   |
| <i>A Novel Small-Scale Turtle-Inspired Amphibious Spherical Robot.</i>   |  |
| Xing, Huiming  | Beijing Institute of Technology            |
| Guo, Shuxiang  | Kagawa University                          |
| Shi, Liwei   | Beijing Institute of Technology            |
| Xihuan, Hou  | Beijing Institute of Technology            |
| Liu, Yu  | Beijing Institute of Technology            |
| Liu, Huikang   | Beijing Institute of Technology            |
| Hu, Yao  | Beijing Institute of Technology            |
| Xia, Debin   | Beijing Institute of Technology            |
| Li, Zan  | Beijing Institute of Technology            |
| 15:30-15:45  | TuBT20.4                                   |
| <i>Experimental Analysis of the Influence of Olfactory Property on Chemical Plume Tracing Performance.</i>         |  |
| Shigaki, Shunsuke  | Osaka University                           |
| Okajima, Kei   | Yokohama National University               |
| Sanada, Kazushi  | Yokohama National University               |
| Kurabayashi, Daisuke   | Tokyo Institute of Technology              |
| 15:45-16:00  | TuBT20.5                                   |
| <i>Efficient Quadrupedal Walking Via Decentralized Coordination Mechanism between Limbs and Neck.</i>              |  |
| Fukuhara, Akira  | Tohoku University                          |
| Suzuki, Shura  | Tohoku University                          |
| Kano, Takeshi  | Tohoku University                          |
| Ishiguro, Akio   | Tohoku University                          |
| 16:00-16:15  | TuBT20.6                                   |
| <i>Effects of a Bio-Mimicked Flapping Path on Propulsion Efficiency of Two-Segmental Fish Robots.</i>              |  |
| Abedinzadeh Shahri, Majid  | University of Tehran                       |
| Rouhollahi, Ali  | University of Tehran                       |
| Nili Ahmadabadi, Majid   | University of Tehran                       |

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| <b>TuCT1</b>  | <b>L1-R1</b>                         |
| <b>RGB-D Perception (Regular session)</b>   |                                      |
| Chair: Vincze, Markus   | Vienna University of Technology      |
| Co-Chair: Manocha, Dinesh   | University of Maryland               |
| 16:45-17:00   | TuCT1.1                              |
| <i>Directional TSDF: Modeling Surface Orientation for Coherent Meshes.</i>                                      |                                      |
| Splietker, Malte  | University of Bonn                   |
| Behnke, Sven  | University of Bonn                   |
| 17:00-17:15   | TuCT1.2                              |
| <i>Monocular Depth Estimation in New Environments with Absolute Scale.</i>                                      |                                      |
| Roussel, Tom  | KU Leuven                            |
| Tuytelaars, Tinne   | KU Leuven                            |
| Van Eycken, Luc   | KU Leuven                            |
| 17:15-17:30   | TuCT1.3                              |
| <i>Frustum ConvNet: Sliding Frustums to Aggregate Local Point-Wise Features for Amodal 3D Object Detection.</i> |                                      |
| Wang, Zhixin  | South China University of Technology |
| Jia, Kui  | South China University of Technology |
| 17:30-17:45   | TuCT1.4                              |
| <i>Recurrent Convolutional Fusion for RGB-D Object Recognition.</i>   |                                      |
| Loghmani, Mohammad Reza   | Vienna University of Technology      |
| Planamente, Mirco   | Italian Institute of Technology      |
| Caputo, Barbara   | Sapienza University                  |
| Vincze, Markus  | Vienna University of Technology      |
| 17:45-18:00   | TuCT1.5                              |
| <i>Piecewise Rigid Scene Flow with Implicit Motion Segmentation.</i>  |                                      |
| Goerlitz, Andreas   | University of Siegen                 |
| Geiping, Jonas  | University of Siegen                 |
| Kolb, Andreas   | University of Siegen                 |
| 18:00-18:15   | TuCT1.6                              |
| <i>3D Deformable Object Manipulation Using Deep Neural Networks.</i>  |                                      |
| Hu, Zhe   | City University of Hong Kong         |
| Han, Tao  | City University of Hong Kong         |
| Sun, Peigen   | City University of Hong Kong         |
| Pan, Jia  | University of Hong Kong              |
| Manocha, Dinesh   | University of Maryland               |

| TuCT2   |   | L1-R2 |
|---|---|-------|
| Deep Learning for Grasping (Regular session)  |   |       |
| Chair: Cheng, Hui   | Sun Yat-Sen University                        |       |
| Co-Chair: Zhang, Wei  | Shandong University                           |       |
| 16:45-17:00   | TuCT2.1                                       |       |
| PPRNet: Point-Wise Pose Regression Network for Instance Segmentation and 6D Pose Estimation in Bin-Picking Scenarios. |   |       |
| Dong, Zhikai  | Tsinghua University                           |       |
| Liu, Sicheng  | Tsinghua University                           |       |
| Zhou, Tao   | SenseTime                                     |       |
| Cheng, Hui  | Sun Yat-Sen University                        |       |
| Zeng, Long  | Tsinghua University                           |       |
| Yu, Xingyao   | Tencent                                       |       |
| Liu, Houde  | Shenzhen Graduate School, Tsinghua University |       |
| 17:00-17:15   | TuCT2.2                                       |       |
| Affordance Learning for End-To-End Visuomotor Robot Control.  |   |       |
| Hämäläinen, Aleksi  | Aalto University                              |       |
| Arndt, Karol  | Aalto University                              |       |
| Ghadrizadeh, Ali  | KTH Royal Inst. of Tech., Aalto University    |       |
| Kyrki, Ville  | Aalto University                              |       |
| 17:15-17:30   | TuCT2.3                                       |       |
| Pixel-Attentive Policy Gradient for Multi-Fingered Grasping in Cluttered Scenes.                                      |   |       |
| Wu, Bohan   | Columbia University                           |       |
| Akinola, Iretiayo   | Columbia University                           |       |
| Allen, Peter  | Columbia University                           |       |
| 17:30-17:45   | TuCT2.4                                       |       |
| The CoSTAR Block Stacking Dataset: Learning with Workspace Constraints.   |   |       |
| Hundt, Andrew   | Johns Hopkins University                      |       |
| Jain, Varun   | Johns Hopkins University                      |       |
| Lin, Chia-Hung  | Johns Hopkins University                      |       |
| Paxton, Chris   | NVIDIA Research                               |       |
| Hager, Gregory  | Johns Hopkins University                      |       |
| 17:45-18:00   | TuCT2.5                                       |       |
| Learning Actions from Human Demonstration Video for Robotic Manipulation.   |   |       |
| Yang, Shuo  | Shandong University                           |       |
| Zhang, Wei  | Shandong University                           |       |
| Lu, Weizhi  | Shandong University                           |       |
| Wang, Hesheng   | Shanghai Jiao Tong University                 |       |
| Li, Yibin   | Shandong University                           |       |
| 18:00-18:15   | TuCT2.6                                       |       |
| Learning Virtual Grasp with Failed Demonstrations Via Bayesian Inverse Reinforcement Learning.                        |   |       |
| Xie, Xu   | University of California, Los Angeles         |       |
| Li, Changyang   | University of California, Los Angeles         |       |
| Zhang, Chi  | University of California, Los Angeles         |       |
| Zhu, Yixin  | University of California, Los Angeles         |       |
| Zhu, Song-Chun  | University of California, Los Angeles         |       |

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| <b>TuCT3</b>   | <b>L1-R3</b>                              |
| <b>Learning and Adaptive Systems III (Regular session)</b>   |   |
| Chair: Caldwell, Darwin G.   | Istituto Italiano Di Tecnologia           |
| Co-Chair: Kayacan, Erkan   | University of Queensland                  |
| 16:45-17:00  | TuCT3.1                                   |
| <i>Hierarchical Reinforcement Learning for Concurrent Discovery of Compound and Composable Policies.</i>   |   |
| Esteban, Domingo   | Istituto Italiano Di Tecnologia           |
| Rozo, Leonel   | Bosch Center for Artificial Intelligence  |
| Caldwell, Darwin G.  | Istituto Italiano Di Tecnologia           |
| 17:00-17:15  | TuCT3.2                                   |
| <i>Active Inverse Model Learning with Error and Reachable Set Estimates.</i>   |   |
| Driess, Danny  | University of Stuttgart                   |
| Schmitt, Syn   | University of Stuttgart                   |
| Toussaint, Marc  | University of Stuttgart                   |
| 17:15-17:30  | TuCT3.3                                   |
| <i>Active Incremental Learning of a Contextual Skill Model.</i>  |   |
| Hazara, Murtaza  | Aalto University                          |
| Li, Xiaopu   | Aalto University                          |
| Kyrki, Ville   | Aalto University                          |
| 17:30-17:45  | TuCT3.4                                   |
| <i>Online System Identification Algorithm without Persistent Excitation for Robotic Systems: Application to Reconfigurable Autonomous Vessels.</i> |   |
| Kayacan, Erkan   | University of Queensland                  |
| Park, Shinkyu  | Massachusetts Institute of Technology     |
| Ratti, Carlo   | Massachusetts Institute of Technology     |
| Rus, Daniela   | Massachusetts Institute of Technology     |
| 17:45-18:00  | TuCT3.5                                   |
| <i>Learning to Estimate Centers of Mass of Arbitrary Objects.</i>  |   |
| McGovern, Sean   | Worcester Polytechnic Institute           |
| Mao, Huitan  | University of North Carolina at Charlotte |
| Xiao, Jing   | Worcester Polytechnic Institute           |
| 18:00-18:15  | TuCT3.6                                   |
| <i>Towards a Robot Architecture for Situated Lifelong Object Learning.</i>   |   |
| Part, Jose L.  | Edinburgh Centre for Robotics             |
| Lemon, Oliver  | Heriot-Watt University                    |



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| <b>TuCT4</b>  | L1-R4                                      |
| <b>Award Session IV (Regular session)</b>   |  |
| Chair: Cho, Kyu-Jin   | Seoul National University                  |
| Co-Chair: Yi, Byung-Ju  | Hanyang University                         |
| 16:45-17:00   | TuCT4.1                                    |
| <i>SVIn2: An Underwater SLAM System Using Sonar, Visual, Inertial, and Depth Sensor.</i>  |  |
| Rahman, Sharmin   | University of South Carolina               |
| Quattrini Li, Alberto   | Dartmouth College                          |
| Rekleitis, Ioannis  | University of South Carolina               |
| 17:00-17:15   | TuCT4.2                                    |
| <i>Mapping for Planetary Rovers from Terramechanics Perspective.</i>  |  |
| Zhou, Ruyi  | Harbin Institute of Technology             |
| Ding, Liang   | Harbin Institute of Technology             |
| Gao, Haibo  | Harbin Institute of Technology             |
| Feng, Wenhao  | Harbin Institute of Technology             |
| Deng, Zongquan  | Harbin Institute of Technology             |
| Li, Nan   | Harbin Institute of Technology             |
| 17:15-17:30   | TuCT4.3                                    |
| <i>A Real-Time Dynamic Simulator and an Associated Front-End Representation Format for Simulating Complex Robots and Environments.</i>              |  |
| Munawar, Adnan  | Worcester Polytechnic Institute            |
| Wang, Yan   | Chinese University of Hong Kong            |
| Gondokaryono, Radian  | Worcester Polytechnic Institute            |
| Fischer, Gregory Scott  | Worcester Polytechnic Institute            |
| 17:30-17:45   | TuCT4.4                                    |
| <i>Visual Servoing of Miniature Magnetic Film Swimming Robots for 3D Arbitrary Path Following.</i>  |  |
| Huang, Chenyang   | Shenzhen Inst. of Advanced Technology, CAS |
| Xu, Tiantian  | CAS  |
| Liu, Jia  | ShenZhen Inst. of Advanced Technology, CAS |
| Manamanchaiyaporn, Laliphat   | Shenzhen Inst. of Advanced Technology, CAS |
| Wu, Xinyu   | CAS  |
| 17:45-18:00   | TuCT4.5                                    |
| <i>Integer Programming As a General Solution Methodology for Path-Based Optimization in Robotics: Principles, Best Practices, and Applications.</i> |  |
| Han, Shuai D.   | Rutgers University                         |
| Yu, Jingjin   | Rutgers University                         |
| 18:00-18:15   | TuCT4.6                                    |
| <i>Flexible Layouts for Fiducial Tags.</i>  |  |
| Krogus, Maximilian  | University of Michigan                     |
| Haggenmiller, Acshi   | University of Michigan                     |
| Olson, Edwin  | University of Michigan                     |

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| <b>TuCT5</b>   | L1-R5                                 |
| <b>Award Session V (Regular session)</b>   |                                       |
| Chair: Matsuno, Fumitoshi  | Kyoto University                      |
| Co-Chair: Fiorini, Paolo   | University of Verona                  |
| 16:45-17:00  | TuCT5.1                               |
| <i>Efficient and Guaranteed Planar Pose Graph Optimization Using the Complex Number Representation.</i>  |                                       |
| Fan, Taosha  | Northwestern University               |
| Wang, Hanlin   | Northwestern University               |
| Rubenstein, Michael  | Northwestern University               |
| Murphey, Todd  | Northwestern University               |
| 17:00-17:15  | TuCT5.2                               |
| <i>Development of a Steel Bridge Climbing Robot.</i>   |                                       |
| Nguyen, Son  | University of Nevada, Reno            |
| La, Hung   | University of Nevada, Reno            |
| 17:15-17:30  | TuCT5.3                               |
| <i>Optimization Based Motion Planning for Multi-Limbed Vertical Climbing Robots.</i>                     |                                       |
| Lin, Xuan  | University of California, Los Angeles |
| Zhang, Jingwen   | University of California, Los Angeles |
| Shen, Junjie   | University of California, Los Angeles |
| Fernandez, Gabriel Ikaika  | University of California, Los Angeles |
| Hong, Dennis   | University of California, Los Angeles |
| 17:30-17:45  | TuCT5.4                               |
| <i>Landing of a Multirotor Aerial Vehicle on an Uneven Surface Using Multiple On-Board Manipulators.</i> |                                       |
| Paul, Hannibal   | Ritsumeikan University                |
| Miyazaki, Ryo  | Ritsumeikan University                |
| Ladig, Robert  | Ritsumeikan University                |
| Shimonomura, Kazuhiro  | Ritsumeikan University                |
| 17:45-18:00  | TuCT5.5                               |
| <i>FASTER: Fast and Safe Trajectory Planner for Flights in Unknown Environments.</i>                     |                                       |
| Tordesillas Torres, Jesus  | Massachusetts Institute of Technology |
| Lopez, Brett   | Massachusetts Institute of Technology |
| How, Jonathan Patrick  | Massachusetts Institute of Technology |
| 18:00-18:15  | TuCT5.6                               |
| <i>Reconfiguration Motion Planning for Variable Topology Truss.</i>                                      |                                       |
| Liu, Chao  | University of Pennsylvania            |
| Yim, Mark  | University of Pennsylvania            |

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| <b>TuCT6</b>  | L1-R6                                      |
| <b>Aerial Robotics III (Regular session)</b>  |  |
| Chair: Ollero, Anibal   | University of Seville                      |
| Co-Chair: Zufferey, Raphael   | Imperial College of London                 |
| 16:45-17:00   | TuCT6.1                                    |
| <i>Air to Ground Collaboration for Energy-Efficient Path Planing for Ground Robots.</i>           |  |
| Wei, Minghan  | University of Minnesota                    |
| Isler, Volkan   | University of Minnesota                    |
| 17:00-17:15   | TuCT6.2                                    |
| <i>SailMAV: Design and Implementation of a Novel Multi-Modal Flying Sailing Robot.</i>            |  |
| Zufferey, Raphael   | Imperial College of London                 |
| Ortega Ancel, Alejandro   | Imperial College London                    |
| Raposo, Célia   | EPFL                                       |
| Armanini, Sophie Franziska  | Imperial College London                    |
| Farinha, Andre  | Imperial College                           |
| Siddall, Robert   | Imperial College London                    |
| Kovac, Mirko  | Imperial College London                    |
| 17:15-17:30   | TuCT6.3                                    |
| <i>Motor-Propeller Matching of Aerial Propulsion Systems for Direct Aerial-Aquatic Operation.</i> |  |
| Tan, Yu Herng   | National University of Singapore           |
| Chen, Ben M.  | Chinese University of Hong Kong            |
| 17:30-17:45   | TuCT6.4                                    |
| <i>Trajectory Estimation for Geo-Fencing Applications on Small-Size Fixed-Wing UAVs.</i>          |  |
| Theile, Mirco   | Technical University of Munich             |
| Yu, Simon   | University of Illinois at Urbana-Champaign |
| Dantsker, Or Daniel   | Technical University of Munich             |
| Caccamo, Marco  | Technical University of Munich             |
| 17:45-18:00   | TuCT6.5                                    |
| <i>Multi-Sensor 6-DoF Localization for Aerial Robots in Complex GNSS-Denied Environments.</i>     |  |
| Paneque, Julio L.   | University of Sevilla                      |
| Martinez-de-Dios, Jose Ramiro   | University of Seville                      |
| Ollero, Anibal  | University of Seville                      |
| 18:00-18:15   | TuCT6.6                                    |
| <i>Teaching a Drone to Accompany a Person from Demonstrations Using Non-Linear ASFM.</i>          |  |
| Garrell, Anaïs  | UPC-CSIC                                   |
| Coll-Gomilla, Carles  | IRI  |
| Alquézar, Renato  | Universitat Politècnica De Catalunya       |
| Sanfeliu, Alberto   | Universitat Politècnica De Catalunya       |

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| <b>TuCT7</b>  | <b>L1-R7</b>   |
| <b>Computer Vision for Automation I (Regular session)</b>   |  |
| Chair: Kraft, Dirk  | University of Southern Denmark                           |
| Co-Chair: Hagelskjær, Frederik  | University of Southern Denmark                           |
| <b>16:45-17:00</b>  | <b>TuCT7.1</b>   |
| <i>Monocular Outdoor Semantic Mapping with a Multi-Task Network.</i>  |  |
| Bai, Yucai  | Sichuan University                                       |
| Fan, Lei  | Sun Yat-Sen University                                   |
| Pan, Ziyu   | Sun Yat-Sen University                                   |
| Chen, Long  | Sun Yat-Sen University                                   |
| <b>17:00-17:15</b>  | <b>TuCT7.2</b>   |
| <i>Seeing behind Things: Extending Semantic Segmentation to Occluded Regions.</i>                                     |  |
| Purkait, Pulak  | Toshiba Research Europe Ltd                              |
| Zach, Christopher   | Chalmers University of Technology                        |
| Reid, Ian   | University of Adelaide                                   |
| <b>17:15-17:30</b>  | <b>TuCT7.3</b>   |
| <i>Empowered Optical Inspection by Using Robotic Manipulator in Industrial Applications.</i>                          |  |
| Galdelli, Alessandro  | Università Politecnica Delle Marche                      |
| Proietti Pagnotta, Daniele  | Università Politecnica Delle Marche                      |
| Mancini, Adriano  | Università Politecnica Delle Marche                      |
| Freddi, Alessandro  | Università Politecnica Delle Marche                      |
| Monteriù, Andrea  | Università Politecnica Delle Marche                      |
| Frontoni, Emanuele  | Università Politecnica Delle Marche                      |
| <b>17:30-17:45</b>  | <b>TuCT7.4</b>   |
| <i>Simultaneous Drone Localisation and Wind Turbine Model Fitting During Autonomous Surface Inspection.</i>           |  |
| Moolan-Feroze, Oliver   | University of Bristol                                    |
| Karachalios, Konstantinos   | Perceptual Robotics                                      |
| Nikolaidis, Dimitrios   | Perceptual Robotics                                      |
| Calway, Andrew  | University of Bristol                                    |
| <b>17:45-18:00</b>  | <b>TuCT7.5</b>   |
| <i>Combined Optimization of Gripper Finger Design and Pose Estimation Processes for Advanced Industrial Assembly.</i> |  |
| Hagelskjær, Frederik  | University of Southern Denmark                           |
| Kramberger, Aljaz   | Maersk Mc-Kinney Møller Inst., Univ. of Southern Denmark |
| Wolniakowski, Adam  | Białystok University of Technology                       |
| Savarimuthu, Thiusius Rajeeth   | University of Southern Denmark                           |
| Krüger, Norbert   | University of Southern Denmark                           |
| <b>18:00-18:15</b>  | <b>TuCT7.6</b>   |
| <i>Rapid Estimation of Optical Properties for Simulation-Based Evaluation of Pose Estimation Performance.</i>         |  |
| Iversen, Thorbjørn Mosekjær   | Maersk Mc-Kinney Møller Inst., Univ. of Southern Denmark |
| Wilm, Jakob   | University of Southern Denmark                           |
| Kraft, Dirk   | University of Southern Denmark                           |

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| <b>TuCT8</b>   | LG-R8                                     |
| <b>Autonomous Vehicle Navigation I (Regular session)</b>   |   |
| Chair: Kneip, Laurent  | ShanghaiTech University                   |
| Co-Chair: Oh, Songhwai   | Seoul National University                 |
| 16:45-17:00  | TuCT8.1                                   |
| <i>Deep Multi-Task Learning for Anomalous Driving Detection Using CAN Bus Scalar Sensor Data.</i>          |   |
| Sadhu, Vidyasagar  | Rutgers University                        |
| Misu, Teruhisa   | Honda Research Institute USA, Inc.,       |
| Pompili, Dario   | Rutgers University                        |
| 17:00-17:15  | TuCT8.2                                   |
| <i>Safe Path Planning with Gaussian Process Regulated Risk Map.</i>  |   |
| Hongliang, Guo   | Singapore MIT Alliance for Res. and Tech. |
| Meng, Zehui  | National University of Singapore          |
| Huang, Zefan   | National University of Singapore          |
| Leong, Weikang   | Singapore-MIT Alliance for Res. and Tech. |
| Chen, Ziyue  | National University of Singapore          |
| Meghjani, Malika   | Singapore-MIT Alliance for Res. and Tech. |
| Ang Jr, Marcelo H  | National University of Singapore          |
| Rus, Daniela   | MIT                                       |
| 17:15-17:30  | TuCT8.3                                   |
| <i>Articulated Multi-Perspective Cameras and Their Application to Truck Motion Estimation.</i>             |   |
| Peng, Xin  | ShanghaiTech University                   |
| Cui, Jiadi   | ShanghaiTech University                   |
| Kneip, Laurent   | ShanghaiTech University                   |
| 17:30-17:45  | TuCT8.4                                   |
| <i>Agent Prioritization for Autonomous Navigation.</i>   |   |
| Refaat, Khaled   | Waymo                                     |
| Ding, Kai  | Waymo                                     |
| Ponomareva, Natalia  | Google Research                           |
| Ross, Stephane   | Waymo                                     |
| 17:45-18:00  | TuCT8.5                                   |
| <i>RINS-W: Robust Inertial Navigation System on Wheels.</i>  |   |
| Brossard, Martin   | Mines ParisTech                           |
| Barrau, Axel   | Safran                                    |
| Bonnabel, Silvere  | Mines ParisTech                           |
| 18:00-18:15  | TuCT8.6                                   |
| <i>Deep Predictive Autonomous Driving Using Multi-Agent Joint Trajectory Prediction and Traffic Rules.</i> |   |
| Cho, Kyunghoon   | Seoul National University                 |
| Ha, Timothy  | Seoul National University                 |
| Lee, Gunmin  | Seoul National University                 |
| Oh, Songhwai   | Seoul National University                 |

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| <b>TuCT9</b>   | <b>LG-R9</b>   |
| <b>Social Human-Robot Interaction III (Regular session)</b>  |  |
| Chair: Kanda, Takayuki   | Kyoto University   |
| Co-Chair: Liu, Honghai   | Portsmouth University                                      |
| 16:45-17:00  | TuCT9.1  |
| <i>People's V-Formation and Side-By-Side Model Adapted to Accompany Groups of People by Social Robots.</i>                                     |  |
| Repiso, Ely  | Inst. De Robòtica I Informàtica Industrial, CSIC-UPC       |
| Zanlungo, Francesco  | Adv. Telecommunications Res. Inst. Int.                    |
| Kanda, Takayuki  | Kyoto University   |
| Garrell, Anaïs   | UPC-CSIC   |
| Sanfeliu, Alberto  | Universitat Politècnica De Catalunya                       |
| 17:00-17:15  | TuCT9.2  |
| <i>Delivering Cognitive Behavioral Therapy Using a Conversational Social Robot.</i>  |  |
| Dino, Francesca  | University of Denver                                       |
| Zandie, Rohola   | University of Denver                                       |
| Abdollahi, Hojjat  | University of Denver                                       |
| Schoeder, Sarah  | Eaton Senior Community                                     |
| Mahoor, Mohammad   | University of Denver                                       |
| 17:15-17:30  | TuCT9.3  |
| <i>Person-Following for Telepresence Robots Using Web Cameras.</i>   |  |
| Cheng, Xianda  | Beijing Institute of Technology                            |
| Jia, Yunde   | Beijing Institute of Technology                            |
| Su, Jingyu   | Beijing Institute of Technology                            |
| Wu, Yuwei  | Beijing Institute of Technology                            |
| 17:30-17:45  | TuCT9.4  |
| <i>Cheating with Robots: How at Ease Do They Make Us Feel?.</i>  |  |
| Petisca, Sofia   | INESC-ID and Instituto Universidade de Lisboa              |
| Esteves, Francisco   | Mid Sweden University                                      |
| Paiva, Ana   | INESC-ID, Instituto Superior Tecnico, University of Lisbon |
| 17:45-18:00  | TuCT9.5  |
| <i>Exploring Logical Consistency and Viewport Sensitivity in Compositional VQA Models.</i>   |  |
| Sejnova, Gabriela  | Czech Technical University in Prague                       |
| Vavrecka, Michal   | Czech Technical University, CIIRC                          |
| Tesař, Michael   | Czech Technical University, CIIRC                          |
| Skoviera, Radoslav   | Czech Technical University, CIIRC                          |
| 18:00-18:15  | TuCT9.6  |
| <i>Robot-Enhanced Therapy: Development and Validation of a Supervised Autonomous Robotic System for Autism Spectrum Disorders Therapy (I).</i> |  |
| Cao, Hoang Long  | Vrije Universiteit Brussel                                 |
| Gomez Esteban, Pablo   | Vrije Universiteit Brussel                                 |
| Bartlett, Madeleine  | Plymouth University  |
| Baxter, Paul Edward  | University of Lincoln                                      |
| Belpaeme, Tony   | Plymouth University  |
| Billing, Erik Alexander  | University of Skövde                                       |
| Cai, Haibin  | University of Portsmouth                                   |
| Coeckelbergh, Mark   | University of Vienna                                       |

Costescu, Cristina  
David, Daniel  
De Beir, Albert  
Hernández García, Daniel  
Kennedy, James  
Liu, Honghai  
Matu, Silviu  
Mazel, Alexandre  
Pandey, Amit Kumar  
Richardson, Kathleen  
Senft, Emmanuel  
Thill, Serge  
Van de Perre, Greet  
Vanderborght, Bram  
Vernon, David  
Wakanuma, Kutoma  
Yu, Hui  
Zhou, Xiaolong  
Ziemke, Tom

Universitatea Babeş-Bolyai  
Babeş-Bolyai University  
Vrije Universiteit Brussel  
University of Plymouth  
Disney Research  
University of Portsmouth  
Babeş-Bolyai University  
Aldebaran-Robotics  
Hanson Robotics  
De Montfort University  
Plymouth University  
Radboud University  
Vrije Universiteit Brussel  
Vrije Universiteit Brussel  
Carnegie Mellon University Africa  
De Montfort University  
University of Portsmouth  
Zhejiang University of Technology  
University of Skovde

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| <b>TuCT10</b>  | LG-R10                                    |
| <b>SLAM III (Regular session)</b>  |   |
| Chair: Kim, Doik   | KIST                                      |
| Co-Chair: Roumeliotis, Stergios  | University of Minnesota                   |
| 16:45-17:00  | TuCT10.1                                  |
| <i>On Data Sharing Strategy for Decentralized Collaborative Visual-Inertial Simultaneous Localization and Mapping.</i> |   |
| Dubois, Rodolphe   | ONERA                                     |
| Eudes, Alexandre   | ONERA                                     |
| Fremont, Vincent   | Ecole Centrale De Nantes, CNRS, LS2N      |
| 17:00-17:15  | TuCT10.2                                  |
| <i>Collaborative Human Augmented SLAM.</i>   |   |
| Sidaoui, Abbas   | American University of Beirut             |
| Elhajj, Imad   | American University of Beirut             |
| Asmar, Daniel  | American University of Beirut             |
| 17:15-17:30  | TuCT10.3                                  |
| <i>Cooperative Range-Only SLAM Based on Sum of Gaussian Filter in Dynamic Environments.</i>                            |   |
| Kim, Jung-Hee  | Korea Institute of Science and Technology |
| Kim, Doik  | Korea Institute of Science and Technology |
| 17:30-17:45  | TuCT10.4                                  |
| <i>Decentralized Visual-Inertial Localization and Mapping on Mobile Devices for Augmented Reality.</i>                 |   |
| Sartipi, Kourosh   | Google Inc                                |
| DuToit, Ryan, C  | Google Inc                                |
| Cobar, Christopher   | Google Inc                                |
| Roumeliotis, Stergios  | University of Minnesota                   |
| 17:45-18:00  | TuCT10.5                                  |
| <i>Multi-Vehicle Cooperative Local Mapping Using Split Covariance Intersection Filter.</i>                             |   |
| Li, Hao  | Shanghai Jiao Tong University             |
| Yang, Ming   | Shanghai Jiao Tong University             |
| 18:00-18:15  | TuCT10.6                                  |
| <i>Communication Constrained Cloud-Based Long-Term Visual Localization in Real Time.</i>                               |   |
| Ding, Xiaqing  | Zhejiang University                       |
| Wang, Yue  | Zhejiang University                       |
| Tang, Li   | Zhejiang University                       |
| Yin, Huan  | Zhejiang University                       |
| Xiong, Rong  | Zhejiang University                       |



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| <b>TuCT11</b>   | LG-R11  |
| <b>Medical Robot: Continuum</b> (Regular session)   |   |
| Chair: Xu, Kai  | Shanghai Jiao Tong University                         |
| Co-Chair: Bergeles, Christos  | King's College London                                 |
| 16:45-17:00   | TuCT11.1  |
| <i>Model-Less Active Compliance for Continuum Robots Using Recurrent Neural Networks.</i>                               |   |
| Jakes, David  | Queensland University of Technology                   |
| Ge, Zongyuan  | Monash University                                     |
| Wu, Liao  | University of New South Wales                         |
| 17:00-17:15   | TuCT11.2  |
| <i>Self-Collision Detection and Avoidance for Dual-Arm Concentric Tube Robots.</i>                                      |   |
| Sabetian, Saba  | University of Toronto                                 |
| Looi, Thomas  | Hospital for Sick Children                            |
| Diller, Eric D.   | University of Toronto                                 |
| Drake, James  | Hospital for Sick Children, University of Toronto     |
| 17:15-17:30   | TuCT11.3  |
| <i>Configuration Transition Control of a Continuum Surgical Manipulator for Improved Kinematic Performance.</i>         |   |
| Zhang, Shu'an   | Shanghai Jiao Tong University                         |
| Li, Qi  | Shanghai Jiao Tong University                         |
| Yang, Haozhe  | Shanghai Jiao Tong University                         |
| Zhao, Jiangran  | Shanghai Jiao Tong University                         |
| Xu, Kai   | Shanghai Jiao Tong University                         |
| 17:30-17:45   | TuCT11.4  |
| <i>Design of a Modular Continuum-Articulated Laparoscopic Robotic Tool with Decoupled Kinematics.</i>                   |   |
| Wu, Zhonghao  | Shanghai Jiao Tong University                         |
| Li, Qi  | Shanghai Jiao Tong University                         |
| Zhao, Jiangran  | Shanghai Jiao Tong University                         |
| Gao, Jiangping  | The First Affiliated Hospital of PLA General Hospital |
| Xu, Kai   | Shanghai Jiao Tong University                         |
| 17:45-18:00   | TuCT11.5  |
| <i>Autonomous Steering of Concentric Tube Robots with Enhanced Force/Velocity Manipulability.</i>                       |   |
| Khadem, Mohsen  | University of Edinburgh                               |
| ONEill, John  | University of Minnesota                               |
| Mitros, Zisos   | University College London                             |
| Da Cruz, Lyndon   | Moorfields Eye Hospital                               |
| Bergeles, Christos  | King's College London                                 |
| 18:00-18:15   | TuCT11.6  |
| <i>Planning High-Quality Motions for Concentric Tube Robots in Point Clouds Via Parallel Sampling and Optimization.</i> |   |
| Kuntz, Alan   | University of North Carolina at Chapel Hill           |
| Fu, Mengyu  | University of North Carolina at Chapel Hill           |
| Alterovitz, Ron   | University of North Carolina at Chapel Hill           |

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| <b>TuCT12</b>  | <b>LG-R12</b>   |
| <b>Human Factors and Human-In-The-Loop I (Regular session)</b>                                   |   |
| Chair: Kwok, Ka-Wai  | The University of Hong Kong                               |
| Co-Chair: Zhang, Xuebo   | Nankai University   |
| 16:45-17:00  | TuCT12.1  |
| <i>A Taxonomy for Characterizing Modes of Interactions in Goal-Driven, Human-Robot Teams.</i>    |   |
| Parashar, Priyam   | Contextual Robotics Inst., Univ. of California, San Diego |
| Sanneman, Lindsay  | Massachusetts Institute of Technology                     |
| Christensen, Henrik Iskov  | UC San Diego  |
| Shah, Julie A.   | MIT   |
| 17:00-17:15  | TuCT12.2  |
| <i>Unified Human-Robot Shared Control with Application to Haptic Telemanipulation.</i>           |   |
| Cheong, Samuel   | Institute for Infocomm Research                           |
| Tee, Keng Peng   | Institute for Infocomm Research                           |
| 17:15-17:30  | TuCT12.3  |
| <i>Discrete N-Dimensional Entropy of Behavior: DNDEB.</i>  |   |
| Young, Michael   | Northwestern University                                   |
| Nejati Javaremi, Mahdiah   | Northwestern University                                   |
| Argall, Brenna   | Northwestern University                                   |
| 17:30-17:45  | TuCT12.4  |
| <i>On Modeling the Effects of Auditory Annoyance on Driving Style and Passenger Comfort.</i>     |   |
| Araujo, Edson  | Universidade Federal De Minas Gerais                      |
| Gregor, Michal   | University of Zilina                                      |
| Huang, Isabella  | Univ of California, Berkeley                              |
| Nascimento, Erickson   | Universidade Federal De Minas Gerais (UFMG)               |
| Bajcsy, Ruzena   | Univ of California, Berkeley                              |
| 17:45-18:00  | TuCT12.5  |
| <i>Physical Fatigue Analysis of Assistive Robot Teleoperation Via Whole-Body Motion Mapping.</i> |   |
| Lin, Tsung-Chi   | Worcester Polytechnic Institute                           |
| Unni Krishnan, Achyuthan   | Worcester Polytechnic Institute                           |
| Li, Zhi  | Worcester Polytechnic Institute                           |
| 18:00-18:15  | TuCT12.6  |
| <i>JISAP: Joint Inference for Surgeon Attributes Prediction During Robot-Assisted Surgery.</i>   |   |
| Zhou, Tian   | Purdue University   |
| Cha, Jackie  | Purdue University   |
| Gonzalez, Glebys   | Purdue University   |
| Sundaram, Chandru  | Indiana University School of Medicine                     |
| Wachs, Juan  | Purdue University   |
| Yu, Denny  | Purdue University   |

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| <b>TuCT13</b>   | LG-R13   |
| <b>Humanoid and Bipedal Locomotion III (Regular session)</b>  |  |
| Chair: LaViers, Amy   | Univ. of Illinois at Urbana-Champaign            |
| Co-Chair: Morisawa, Mitsuharu   | National Inst. of AIST                           |
| 16:45-17:00   | TuCT13.1   |
| <i>Multi-Contact Stabilization of a Humanoid Robot for Realizing Dynamic Contact Transitions on Non-Coplanar Surfaces.</i>                    |  |
| Morisawa, Mitsuharu   | National Inst. of AIST                           |
| Benallegue, Mehdi   | National Inst. of AIST                           |
| Cisneros Limon, Rafael  | National Inst. of Adv. Industrial Sci. and Tech. |
| Kumagai, Iori   | National Inst. of AIST                           |
| Escande, Adrien   | National Inst. of AIST                           |
| Kaneko, Kenji   | National Inst. of AIST                           |
| Kanehiro, Fumio   | National Inst. of AIST                           |
| 17:00-17:15   | TuCT13.2   |
| <i>Nonlinear Optimization of Step Duration and Step Location.</i>   |  |
| Ding, Jiatao  | Wuhan University                                 |
| Xiao, Xiaohui   | Wuhan University                                 |
| Tsagarakis, Nikos   | Istituto Italiano Di Tecnologia                  |
| 17:15-17:30   | TuCT13.3   |
| <i>Toward a Bipedal Robot with Variable Gait Styles: Sagittal Forces Analysis in a Planar Simulation and a Prototype Ball-Tray Mechanism.</i> |  |
| Huzaifa, Umer   | Univ. of Illinois at Urbana-Champaign            |
| Fuller, Caleb   | University of Tulsa                              |
| Schultz, Joshua   | University of Tulsa                              |
| LaViers, Amy  | Univ. of Illinois at Urbana-Champaign            |
| 17:30-17:45   | TuCT13.4   |
| <i>Implementation of a Natural Dynamic Controller on an Under-Actuated Compass-Biped Robot.</i>   |  |
| Hartston, Ron   | Technion   |
| Yakar, Rea  | Technion   |
| Katz, Reuven  | Technion   |
| Zacksenhouse, Miriam  | Technion-Israel Institute of Technology          |
| 17:45-18:00   | TuCT13.5   |
| <i>Stability and Gait Switching of Underactuated Biped Walkers.</i>   |  |
| Fevre, Martin   | University of Notre Dame                         |
| Lin, Hai  | University of Notre Dame                         |
| Schmiedeler, James  | University of Notre Dame                         |

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| <b>TuCT14</b>  | LG-R14   |
| <b>Robotics in Construction (Regular session)</b>  |  |
| Chair: Hutter, Marco   | ETH Zurich                                       |
| Co-Chair: Yang, Ruigang  | University of Kentucky                           |
| 16:45-17:00  | TuCT14.1   |
| <i>Printing-While-Moving: A New Paradigm for Large-Scale Robotic 3D Printing.</i>                                      |  |
| Tiryaki, Mehmet Efe  | ETH Zurich                                       |
| Zhang, Xu  | Nanyang Technological University                 |
| Pham, Quang-Cuong  | NTU Singapore                                    |
| 17:00-17:15  | TuCT14.2   |
| <i>Whole-Body Motion Planning for Walking Excavators.</i>  |  |
| Jelavic, Edo   | Swiss Federal Inst. of Technology Zurich         |
| Hutter, Marco  | ETH Zurich                                       |
| 17:15-17:30  | TuCT14.3   |
| <i>A Fully-Integrated Sensing and Control System for High-Accuracy Mobile Robotic Building Construction.</i>           |  |
| Gawel, Abel Roman  | ETH Zurich                                       |
| Blum, Hermann  | ETH Zurich                                       |
| Pankert, Johannes  | ETH Zurich                                       |
| Krämer, Koen   | ETH Zurich                                       |
| Bartolomei, Luca   | ETH Zurich                                       |
| Ercan, Selen   | ETH Zurich, Architecture and Digital Fabrication |
| Farshidian, Farbod   | ETH Zurich                                       |
| Chli, Margarita  | ETH Zurich                                       |
| Gramazio, Fabio  | ETH Zurich                                       |
| Sieewart, Roland   | ETH Zurich                                       |
| Hutter, Marco  | ETH Zurich                                       |
| Sandy, Timothy   | ETH Zürich                                       |
| 17:30-17:45  | TuCT14.4   |
| <i>Compact Reachability Map for Excavator Motion Planning.</i>   |  |
| Yang, Yajue  | City University of Hong Kong                     |
| Zhang, Liangjun  | Baidu USA  |
| Cheng, Xinjing   | Baidu  |
| Pan, Jia   | University of Hong Kong                          |
| Yang, Ruigang  | University of Kentucky                           |
| 17:45-18:00  | TuCT14.5   |
| <i>Application of Digging Control Based on the Center-Of-Mass Velocity of the Attachment of a Hydraulic Excavator.</i> |  |
| Kozui, Masatoshi   | Hiroshima University                             |
| Yamamoto, Toru   | Hiroshima University                             |
| Koiwai, Kazushige  | Kobelco Construction Machinery Co., Ltd          |
| Yamashita, Koji  | Kobelco Construction Machinery Co., Ltd          |
| Yamazaki, Yoichiro   | Kobelco Construction Machinery Co., Ltd          |
| 18:00-18:15  | TuCT14.6   |
| <i>YouWasps: Towards Autonomous Multi-Robot Mobile Deposition for Construction.</i>                                    |  |
| Sustarevas, Julius   | University College London                        |
| Tan Kai Xi, Benjamin   | University College London                        |
| Gerber, David  | Arup   |
| Stuart-Smith, Robert   | University College London                        |
| Pawar, Vijay Manohar   | University College London                        |

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| <b>TuCT15</b>   | LG-R15                                       |
| <b>Motion and Path Planning III</b> (Regular session)   |  |
| Chair: Chakravorty, Suman   | Texas A&M University                         |
| Co-Chair: Du, Wei   | Carnegie Mellon University                   |
| 16:45-17:00   | TuCT15.1                                     |
| <i>Computing a Minimal Set of T-Spanning Motion Primitives for Lattice Planners.</i>                                      |  |
| Botros, Alexander   | University of Waterloo                       |
| Smith, Stephen L.   | University of Waterloo                       |
| 17:00-17:15   | TuCT15.2                                     |
| <i>A Dynamic Optimization Approach for Sloshing Free Transport of Liquid Filled Containers Using an Industrial Robot.</i> |  |
| Reinhold, Jan   | Christian-Albrechts-Universität Zu Kiel      |
| Amersdorfer, Manuel   | Christian-Albrechts-Universität Zu Kiel      |
| Meurer, Thomas  | Inst. for Automatic Control, Kiel University |
| 17:15-17:30   | TuCT15.3                                     |
| <i>Time-Optimal Path Tracking for Jerk Controlled Robots.</i>   |  |
| Palleschi, Alessandro   | University of Pisa                           |
| Garabini, Manolo  | Università Di Pisa                           |
| Caporale, Danilo  | Centro Di Ricerca E. Piaggio                 |
| Pallottino, Lucia   | Università Di Pisa                           |
| 17:30-17:45   | TuCT15.4                                     |
| <i>T-PFC: A Trajectory-Optimized Perturbation Feedback Control Approach.</i>  |  |
| Parunandi, Karthikeya Sharma  | Texas A&M University                         |
| Chakravorty, Suman  | Texas A&M University                         |
| 17:45-18:00   | TuCT15.5                                     |
| <i>Online Motion Planning Over Multiple Homotopy Classes with Gaussian Process Inference.</i>                             |  |
| Kolur, Keshav   | Georgia Institute of Technology              |
| Chintalapudi, Sahit   | Georgia Institute of Technology              |
| Boots, Byron  | Georgia Institute of Technology              |
| Mukadam, Mustafa  | Facebook                                     |
| 18:00-18:15   | TuCT15.6                                     |
| <i>Escaping Local Minima in Search-Based Planning Using Soft Duplicate Detection.</i>                                     |  |
| Du, Wei   | Carnegie Mellon University                   |
| Kim, Sung-Kyun  | Carnegie Mellon University                   |
| Salzman, Oren   | Carnegie Mellon University                   |
| Likhachev, Maxim  | Carnegie Mellon University                   |

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| <b>TuCT16</b>  | LG-R16                                      |
| <b>Grasping III (Regular session)</b>  |   |
| Chair: Kinugawa, Jun   | Tohoku University                           |
| Co-Chair: Suh, Il Hong   | Hanyang University                          |
| 16:45-17:00  | TuCT16.1                                    |
| <i>Learning to Grasp Arbitrary Household Objects from a Single Demonstration.</i>                |   |
| De Coninck, Elias  | Ghent University - Imec                     |
| Verbelen, Tim  | Ghent University - Imec                     |
| Van Molle, Pieter  | Ghent University - Imec                     |
| Simoens, Pieter  | Ghent University - Imec                     |
| Dhoedt, Bart   | Ghent University - Imec                     |
| 17:00-17:15  | TuCT16.2                                    |
| <i>A Convex-Combinatorial Model for Planar Caging.</i>   |   |
| Aceituno-Cabezas, Bernardo   | Massachusetts Institute of Technology (MIT) |
| Dai, Hongkai   | Massachusetts Institute of Technology       |
| Rodriguez, Alberto   | Massachusetts Institute of Technology       |
| 17:15-17:30  | TuCT16.3                                    |
| <i>ContactGrasp: Functional Multi-Finger Grasp Synthesis from Contact.</i>                       |   |
| Brahmbhatt, Samarth Manoj  | Georgia Institute of Technology             |
| Handa, Ankur   | University of Cambridge                     |
| Hays, James  | Georgia Institute of Technology, Argo AI    |
| Fox, Dieter  | University of Washington                    |
| 17:30-17:45  | TuCT16.4                                    |
| <i>Efficient Grasp Planning and Execution with Multi-Fingered Hands by Surface Fitting.</i>      |   |
| Fan, Yongxiang   | University of California, Berkeley          |
| Tomizuka, Masayoshi  | University of California, Berkeley          |
| 17:45-18:00  | TuCT16.5                                    |
| <i>Object Singulation Via Nonlinear Pushing for Robotic Grasping.</i>                            |   |
| Won, Jongsoo   | Hanyang University                          |
| Park, Young-Bin  | Hanyang University                          |
| Yi, Byung-Ju   | Hanyang University                          |
| Suh, Il Hong   | Hanyang University                          |
| 18:00-18:15  | TuCT16.6                                    |
| <i>Design and Development of Compactly Folding Parallel Open-Close Gripper with Wide Stroke.</i> |   |
| Kobayashi, Akinari   | Tohoku University                           |
| Kinugawa, Jun  | Tohoku University                           |
| Arai, Shogo  | Tohoku University                           |
| Kosuge, Kazuhiro   | Tohoku University                           |

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| <b>TuCT17</b>  | LG-R17  |
| <b>Micro/Nano Robots III (Regular session)</b>   |   |
| Chair: Régnier, Stéphane   | Sorbonne University                                     |
| Co-Chair: Arai, Tatsuo   | University of Electro-Communications                    |
| 16:45-17:00  | TuCT17.1  |
| <i>Comparing Swimming Performances of flexible and Helical Magnetic Swimmers.</i>  |   |
| Oulmas, Ali  | University of Pierre and Marie Curie                    |
| Quispe, Johan Edilberto  | Sorbonne Univ., CNRS Inst. Des Systèmes Intelligents Et |
| Andreff, Nicolas   | Université De Franche Comté                             |
| Régnier, Stéphane  | Sorbonne University                                     |
| 17:00-17:15  | TuCT17.2  |
| <i>Characterizing Nanoparticle Swarms with Tuneable Concentrations for Enhanced Imaging Contrast.</i>                          |   |
| Yu, Jiangfan   | The Chinese University of Hong Kong                     |
| Wang, Qianqian   | The Chinese University of Hong Kong                     |
| Li, Mengzhi  | The Chinese University of Hong Kong                     |
| Liu, Chao  | City University of Hong Kong                            |
| Wang, Lidai  | City University of Hong Kong                            |
| Xu, Tiantian   | Chinese Academy of Sciences                             |
| Zhang, Li  | The Chinese University of Hong Kong                     |
| 17:15-17:30  | TuCT17.3  |
| <i>Automatic Cell Assembly by Two-Fingered Microhand.</i>  |   |
| Chen, Junnan   | Beijing Institute of Technology                         |
| Liu, Xiaoming  | Beijing Institute of Technology                         |
| Dong, Shengnan   | Beijing Institute of Technology                         |
| Li, Pengyun  | Beijing Institute of Technology                         |
| Tang, Xiaoqing   | Beijing Institute of Technology                         |
| Liu, Dan   | Beijing Institute of Technology                         |
| Kojima, Masaru   | Osaka University  |
| Huang, Qiang   | Beijing Institute of Technology                         |
| Arai, Tatsuo   | University of Electro-Communications                    |
| 17:30-17:45  | TuCT17.4  |
| <i>Atomic Force Microscope Tip Localization and Tracking through Deep Learning Based Vision Inside an Electron Microscope.</i> |   |
| Liang, Shuai   | University Pierre Et Marie Curie                        |
| Boudaoud, Mokrane  | University Pierre Et Marie Curie                        |
| Achard, Catherine  | ISIR-UPMC   |
| Rong, Weibin   | Harbin Institute of Technology                          |
| Régnier, Stéphane  | Sorbonne University                                     |
| 17:45-18:00  | TuCT17.5  |
| <i>Experimental Study on Microfluidic Mixing with Trapezoidal Obstacles in a 1000-Fold Span of Reynolds Number.</i>            |   |
| Lin, Xin-Yu  | National Chiao Tung University                          |
| Ito, Hiroaki   | Chiba University  |
| Kaneko, Makoto   | Osaka University  |
| Tsai, Chia-Hung Dylan  | National Chiao Tung University                          |

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| <b>TuCT18</b>  | LG-R18   |
| <b>Localization III (Regular session)</b>  |  |
| Chair: Huang, Guoquan  | University of Delaware                         |
| Co-Chair: Xiong, Rong  | Zhejiang University                            |
| 16:45-17:00  | TuCT18.1                                       |
| <i>Visual-Inertial Odometry with Point and Line Features.</i>                                      |  |
| Yang, Yulin  | University of Delaware                         |
| Geneva, Patrick  | University of Delaware                         |
| Eckenhoff, Kevin   | University of Delaware                         |
| Huang, Guoquan   | University of Delaware                         |
| 17:00-17:15  | TuCT18.2                                       |
| <i>Vision-Aided Localization for Ground Robots.</i>  |  |
| Li, Mingyang   | Alibaba  |
| Chen, Yiming   | Alibaba DAMO                                   |
| Zhang, Mingming  | Alibaba AI Labs                                |
| 17:15-17:30  | TuCT18.3                                       |
| <i>Rolling-Shutter Modelling for Direct Visual-Inertial Odometry.</i>                              |  |
| Schubert, David  | Technical University of Munich                 |
| Demmel, Nikolaus   | Technical University of Munich                 |
| von Stumberg, Lukas  | Technical University of Munich                 |
| Usenko, Vladislav  | Technical University of Munich                 |
| Cremers, Daniel  | Technical University of Munich                 |
| 17:30-17:45  | TuCT18.4                                       |
| <i>DISCOMAN: Dataset of Indoor SCenes for Odometry, Mapping and Navigation.</i>                    |  |
| Kirsanov, Pavel  | Samsung Research                               |
| Gaskarov, Airat  | Samsung R&D Institute Russia                   |
| Konokhov, Philipp  | Samsung AI Center                              |
| Sofiiuk, Konstantin  | Samsung Research Russia                        |
| Vorontsova, Anna   | Samsung Research                               |
| Slinko, Igor   | Samsung AI Center                              |
| Zhukov, Dmitry   | Samsung  |
| Bykov, Sergey  | Samsung AI Center                              |
| Barinova, Olga   | Samsung AI Center Moscow                       |
| Konushin, Anton  | Samsung AI Center Moscow                       |
| 17:45-18:00  | TuCT18.5                                       |
| <i>2-Entity RANSAC for Robust Visual Localization in Changing Environment.</i>                     |  |
| Jiao, Yanmei   | Zhejiang University                            |
| Wang, Yue  | Zhejiang University                            |
| Fu, Bo   | Zhejiang University                            |
| Ding, Xiaqing  | Zhejiang University                            |
| Tan, Qimeng  | Beijing Inst. of Spacecraft System Engineering |
| Chen, Lei  | Beijing Inst. of Spacecraft System Engineering |
| Xiong, Rong  | Zhejiang University                            |
| 18:00-18:15  | TuCT18.6                                       |
| <i>ViLIVO: Virtual LiDAR-Visual Odometry for an Autonomous Vehicle with a Multi-Camera System.</i> |  |
| Xiang, Zhenzhen  | Shanghai Jiao Tong University                  |
| Yu, Jingrui  | Shanghai Jiao Tong University                  |
| Li, Jie  | SAIC Motor                                     |
| Su, Jianbo   | Shanghai Jiao Tong University                  |



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| <b>TuCT19</b>  | <b>LG-R19</b>                       |
| <b>Planning, Scheduling, and Coordination II (Regular session)</b>   |                                     |
| Chair: O'Kane, Jason   | University of South Carolina        |
| Co-Chair: Aleotti, Jacopo  | University of Parma                 |
| 16:45-17:00  | TuCT19.1                            |
| <i>Humanoid Robot Next Best View Planning under Occlusions Using Body Movement Primitives.</i>               |                                     |
| Monica, Riccardo   | University of Parma                 |
| Aleotti, Jacopo  | University of Parma                 |
| Piccinini, Davide  | University of Parma                 |
| 17:00-17:15  | TuCT19.2                            |
| <i>Efficient Autonomous Robotic Exploration with Semantic Road Map in Indoor Environments.</i>               |                                     |
| Wang, Chaoqun  | The Chinese University of Hong Kong |
| Zhu, Delong  | The Chinese University of Hong Kong |
| Li, Teng   | The University of British Columbia  |
| Meng, Max Q.-H.  | The Chinese University of Hong Kong |
| de Silva, Clarence   | The University of British Columbia  |
| 17:15-17:30  | TuCT19.3                            |
| <i>Coverage Sampling Planner for UAV-Enabled Environmental Exploration and Field Mapping.</i>                |                                     |
| Li, Teng   | The University of British Columbia  |
| Wang, Chaoqun  | The Chinese University of Hong Kong |
| Meng, Max Q.-H.  | The Chinese University of Hong Kong |
| de Silva, Clarence   | The University of British Columbia  |
| 17:30-17:45  | TuCT19.4                            |
| <i>Approximating Cfree Space Topology by Constructing Vietoris-Rips Complex.</i>                             |                                     |
| Upadhyay, Aakriti  | University at Albany, SUNY          |
| Wang, Weifu  | University at Albany, SUNY          |
| Ekenna, Chinwe   | University at Albany                |
| 17:45-18:00  | TuCT19.5                            |
| <i>Optimal Temporal Logic Planning with Cascading Soft Constraints.</i>                                      |                                     |
| Rahmani, Hazhar  | University of South Carolina        |
| O'Kane, Jason  | University of South Carolina        |
| 18:00-18:15  | TuCT19.6                            |
| <i>Accelerating the Construction of Boundaries of Feasibility in Three Classes of Robot Design Problems.</i> |                                     |
| Ghasemlou, Shervin   | University of South Carolina        |
| O'Kane, Jason  | University of South Carolina        |

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| <b>TuCT20</b>  | LG-R20                                  |
| <b>Biologically-Inspired Robots III (Regular session)</b>  |   |
| Chair: Hosoda, Koh   | Osaka University                        |
| Co-Chair: Xie, Guangming   | Peking University                       |
| 16:45-17:00  | TuCT20.1                                |
| <i>Artificial Lateral Line Based Longitudinal Separation Sensing for Two Swimming Robotic Fish with Leader-Follower Formation.</i> |   |
| Zheng, Xingwen   | Peking University                       |
| Wang, Manyi  | Peking University                       |
| Zheng, Junzheng  | Peking University                       |
| Tian, Runyu  | Peking University                       |
| Xiong, Minglei   | Peking University                       |
| Xie, Guangming   | Peking University                       |
| 17:00-17:15  | TuCT20.2                                |
| <i>Common Dimensional Autoencoder for Learning Redundant Muscle-Posture Mappings of Complex Musculoskeletal Robots.</i>            |   |
| Masuda, Hiroaki  | Osaka University                        |
| Hitzmann, Arne   | Osaka University                        |
| Hosoda, Koh  | Osaka University                        |
| Ikemoto, Shuhei  | Osaka University                        |
| 17:15-17:30  | TuCT20.3                                |
| <i>Design, Fabrication, and Characterization of an Untethered Amphibious Sea Urchin-Inspired Robot.</i>                            |   |
| Paschal, Thibaut   | EPFL                                    |
| Bell, Michael  | Harvard School of Eng. and Applied Sci. |
| Sperry, Jakob  | Harvard School of Eng. and Applied Sci. |
| Sieniewicz, Satchel  | Harvard School of Eng. and Applied Sci. |
| Weaver, James  | Harvard University/ Wyss                |
| Wood, Robert   | Harvard University                      |
| 17:30-17:45  | TuCT20.4                                |
| <i>Motion Planning for a Continuum Robotic Mobile Lamp: Defining and Navigating the Configuration Space.</i>                       |   |
| Hawks, Zachary   | Clemson University                      |
| Frazelle, Chase  | Clemson University                      |
| Green, Keith Evan  | Cornell University                      |
| Walker, Ian  | Clemson University                      |
| 17:45-18:00  | TuCT20.5                                |
| <i>An Approach of Facilitated Investigation of Active Self-Healing Tension Transmission System Oriented for Legged Robots.</i>     |   |
| Nakashima, Shinsuke  | The University of Tokyo                 |
| Shirai, Takuma   | The University of Tokyo                 |
| Kawaharazuka, Kento  | The University of Tokyo                 |
| Asano, Yuki  | The University of Tokyo                 |
| Kakiuchi, Yohei  | The University of Tokyo                 |
| Okada, Kei   | The University of Tokyo                 |
| Inaba, Masayuki  | The University of Tokyo                 |

| TuPS1  |  | L1-R0, Zone 1                       |
|--|--|-------------------------------------|
| Late Breaking Result Poster Session 1 (Poster session)   |  |                                     |
| 12:30-13:30  |  | TuPS1.1                             |
| <i>Position Control of Wire-Suspended Hand for Long-Reach Aerial Manipulation.</i>                             |  |                                     |
| Miyazaki, Ryo  |  | Ritsumeikan University              |
| Paul, Hannibal   |  | Ritsumeikan University              |
| Shimonomura, Kazuhiro  |  | Ritsumeikan University              |
| 12:30-13:30  |  | TuPS1.2                             |
| <i>Hong Hu - an Efficient and Versatile Tail-Sitter VTOL UAV Platform: Design, Implementation and Control.</i> |  |                                     |
| Xu, Wei  |  | University of Hong Kong             |
| Gu, Haowei   | Hong Kong Univ. of Science and Technology  |                                     |
| Zhang, Fu  |  | University of Hong Kong             |
| 12:30-13:30  |  | TuPS1.3                             |
| <i>Adapting Weed Growth Predictions for Mechanical Weeding Agbots.</i>   |  |                                     |
| McAllister, Wyatt  | University of Illinois at Urbana-Champaign |                                     |
| Whitman, Joshua  |  | University of Illinois              |
| Davis, Adam  |  | USDA-ARS in Urbana, IL              |
| Chowdhary, Girish  | University of Illinois at Urbana Champaign |                                     |
| 12:30-13:30  |  | TuPS1.4                             |
| <i>HouseExpo: A Large-Scale 2D Indoor Layout Dataset for Learning-Based Algorithms.</i>                        |  |                                     |
| Li, Tingguang  |  | The Chinese University of Hong Kong |
| Ho, Danny  |  | The Chinese University of Hong Kong |
| Li, Chenming   |  | The Chinese University of Hong Kong |
| Zhu, Delong  |  | The Chinese University of Hong Kong |
| Wang, Chaoqun  |  | The Chinese University of Hong Kong |
| Meng, Max Q.-H.  |  | The Chinese University of Hong Kong |
| 12:30-13:30  |  | TuPS1.5                             |
| <i>Urban Street Trajectory Prediction with Multi-Class LSTM Networks.</i>                                      |  |                                     |
| Li, Xin  |  | Meituan-Dianping Group              |
| Zhu, Yanliang  |  | Meituan-Dianping                    |
| Qian, Deheng   |  | MeiTuan                             |
| Ren, Dongchun  |  | Meituan-Dianping                    |
| 12:30-13:30  |  | TuPS1.6                             |
| <i>Depth-Image-Based Textureless-Object Picking by DCNN and Visual Servoing.</i>                               |  |                                     |
| Jiang, Ping  |  | Toshiba Corporation                 |
| Ishihara, Yoshiyuki  |  | Toshiba Corporation                 |
| Sugiyama, Nobukatsu  |  | Toshiba Corporation                 |
| Oaki, Junji  |  | Toshiba Corporation                 |
| Tokura, Seiji  |  | Toshiba Corporation                 |
| Sugahara, Atsushi  |  | Toshiba Corporation                 |
| Ogawa, Akihito   |  | Toshiba Corporation                 |
| 12:30-13:30  |  | TuPS1.7                             |
| <i>Explainable One-Shot Meta-Learning to Imitate Motion Segments of Unseen Human-Robot Interactions.</i>       |  |                                     |
| Tian, Nan  |  | University of California, Berkeley  |
| Tanwani, Ajay Kumar  |  | University of California, Berkeley  |
| Sojoudi, Somayeh   |  | University of California, Berkeley  |

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| 12:30-13:30  | TuPS1.8                                   |
| <i>Data-Based Modeling of Contact State in Robotic Assembly.</i>   |   |
| Na, Minwoo   | Korea University                          |
| Song, Jae-Bok  | Korea University                          |
| 12:30-13:30  | TuPS1.9                                   |
| <i>Complexity Conditioned Goals for Reinforcement Learning Agents.</i>   |   |
| Gupta, Kashish   | University of British Columbia            |
| Najjaran, Homayoun   | University of British Columbia            |
| 12:30-13:30  | TuPS1.10                                  |
| <i>Design of a Mobile Robot for the Treatment, Reuse and Removal of Manure with Monitoring of Environmental Variables for Poultry Farms.</i> |   |
| Velasco, Luis  | Pontificia Universidad Católica Del Perú  |
| Hilario Poma, Javier Alfredo   | Pontificia Universidad Católica Del Perú  |
| Gonzales, Julio  | Pontificia Universidad Católica Del Perú  |
| Rodriguez, Laureano  | Pontificia Universidad Católica Del Perú  |
| Cuellar, Francisco   | Pontificia Universidad Catolica Del Peru  |
| 12:30-13:30  | TuPS1.11                                  |
| <i>Autonomous Human-Aware Navigation in Dense Crowds.</i>  |   |
| Yao, Xinjie  | Hong Kong Univ. of Science and Technology |
| Zhang, Ji  | Carnegie Mellon University                |
| Oh, Jean   | Carnegie Mellon University                |
| 12:30-13:30  | TuPS1.12                                  |
| <i>Graph Element Networks: A Flexible Model for Robotic Applications.</i>  |   |
| Alet, Ferran   | Massachusetts Institute of Technology     |
| Jeewajee, Adarsh K.  | Massachusetts Institute of Technology     |
| Bauza Villalonga, Maria  | Massachusetts Institute of Technology     |
| Rodriguez, Alberto   | Massachusetts Institute of Technology     |
| Kaelbling, Leslie  | Massachusetts Institute of Technology     |
| Lozano-Perez, Tomas  | Massachusetts Institute of Technology     |
| 12:30-13:30  | TuPS1.13                                  |
| <i>Automated Single-Particle Micropatterning System Using Dielectrophoresis.</i>   |   |
| Huang, Kaicheng  | The Hong Kong Polytechnic University      |
| Mills, James K.  | University of Toronto                     |
| Abu Ajamieh, Ihab  | University of Toronto                     |
| Cui, Zhenxi  | The Hong Kong Polytechnic University      |
| Lai, Jiewen  | The Hong Kong Polytechnic University      |
| Chu, Henry   | The Hong Kong Polytechnic University      |
| 12:30-13:30  | TuPS1.14                                  |
| <i>Design of a Bipedal Hopping Robot with Morphable Inertial Tail for Agile Locomotion.</i>  |   |
| An, Jiajun   | The Chinese University of Hong Kong       |
| Chung, Tsz Yin   | The Chinese University of Hong Kong       |
| Au, K. W. Samuel   | The Chinese University of Hong Kong       |
| 12:30-13:30  | TuPS1.15                                  |
| <i>Continuous Neural Control Based on Integration of BCI and Adaptive Controller for Steering a Vehicle.</i>                                 |   |
| Shi, Haonan  | Beijing Institute of Technology           |
| Bi, Luzheng  | Beijing Institute of Technology           |

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| 12:30-13:30  | TuPS1.16                                  |
| <i>Single-Hand Movement Direction Decoding from EEG Signals under Opposite-Hand Movement Distraction.</i>  |   |
| Wang, Jiarong  | Beijing Institute of Technology           |
| Bi, Luzheng  | Beijing Institute of Technology           |
| Fei, Weijie  | Beijing Institute of Technology           |
| 12:30-13:30  | TuPS1.17                                  |
| <i>Static Analysis on the Modular Detachable Climbing Robot for All Wall-To-Wall Transitions.</i>          |   |
| Park, Changmin   | RoDEL                                     |
| Lee, Jiseok  | Hanyang University                        |
| Ryu, Sijun   | Hanyang University                        |
| Seo, TaeWon  | Hanyang University                        |
| 12:30-13:30  | TuPS1.18                                  |
| <i>Obstacle Overcoming on a Façade: Novel Design of a Rotating Leg Mechanism.</i>                          |   |
| Lee, Youngjoo  | Hanyang University                        |
| Yoo, Sungkeun  | Seoul National University                 |
| Seo, Myoungjae   | Hanyang University                        |
| Kim, Jongwon   | Seoul National University                 |
| Kim, Hwa Soo   | Kyonggi University                        |
| Seo, TaeWon  | Hanyang University                        |
| 12:30-13:30  | TuPS1.19                                  |
| <i>Design of a Novel Leg for a Small Tree Climbing Robot Driven by Shape Memory Alloy.</i>                 |   |
| Ishibashi, Keitaro   | Waseda University                         |
| Takanishi, Atsuo   | Waseda University                         |
| Ishii, Hiroyuki  | Waseda University                         |
| 12:30-13:30  | TuPS1.20                                  |
| <i>IMU-Based Spectrogram Approach with Deep Convolutional Neural Networks for Gait Classification.</i>     |   |
| Nguyen, Mau Dung   | University of Science & Technology        |
| Mun, Kyung-Ryoul   | National University of Singapore          |
| Jung, Dawoon   | Korea Institute of Science and Technology |
| Park, Mina   | Korea Institute of Science and Technology |
| Kim, Jinwook   | Korea Institute of Science and Technology |
| 12:30-13:30  | TuPS1.21                                  |
| <i>Artificial Intelligent Navigation Technology for a Robotic Vacuum Cleaner in an Indoor Environment.</i> |   |
| Noh, DongKi  | LG Electronics                            |
| Kim, Jung-Hwan   | LG Electronics                            |
| Yang, Wonkeun  | LG Electronics                            |
| Eoh, Gyuho   | LG Electronics                            |
| Lee, Minho   | LG Electronics                            |
| Yim, Byungdoo  | LG Electronics                            |
| Shim, Inbo   | LG Electronics                            |
| Cho, Ilsoo   | LG Electronics                            |
| Baek, Seung-Min  | LG Electronics                            |

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| 12:30-13:30  | TuPS1.22                                      |
| <i>External Force Estimation of Human-Cooperative Robot During Object Manipulation Using Recurrent Neural Network.</i> |   |
| Hanafusa, Misaki   | Tokyo Denki University                        |
| Ishikawa, Jun  | Tokyo Denki University                        |
| 12:30-13:30  | TuPS1.23                                      |
| <i>Untethered Quadrupedal Hopping on a Trampoline.</i>   |   |
| Wang, Boxing   | Zhejiang University                           |
| Zhou, Chunlin  | Zhejiang University                           |
| Wu, Jun  | Zhejiang University                           |
| 12:30-13:30  | TuPS1.24                                      |
| <i>Target Classification and Prediction of Unguided Rocket Trajectories Using Deep Neural Networks.</i>                |   |
| Kim, Minwoo  | UNIST   |
| Park, Bumsoo   | UNIST   |
| Oh, Hyondong   | UNIST   |
| 12:30-13:30  | TuPS1.25                                      |
| <i>Robot-Assisted Composite Manufacturing Using Deep Learning and Multi-View Computer Vision.</i>                      |   |
| Djavadifar, Abtin  | University of British Columbia                |
| Graham-Knight, John Brandon  | University of British Columbia                |
| Körber, Marian   | German Aerospace Center                       |
| Najjaran, Homayoun   | University of British Columbia                |
| 12:30-13:30  | TuPS1.26                                      |
| <i>Ambiguity Poses Estimation for Objects with Symmetry.</i>   |   |
| Staszak, Rafal   | Poznan University of Technology               |
| Belter, Dominik  | Poznan University of Technology               |
| 12:30-13:30  | TuPS1.27                                      |
| <i>Contamination Detection and Classification for an Automated Façade Cleaning Operation.</i>                          |   |
| Lee, Jiseok  | Hanyang University                            |
| Park, Garam  | Hanyang University                            |
| Hong, Jooyoung   | Seoul National University                     |
| Kim, Hwa Soo   | Kyonggi University                            |
| Seo, TaeWon  | Hanyang University                            |
| 12:30-13:30  | TuPS1.28                                      |
| <i>Autonomous Photogrammetry Process for Managing Stockpile Inventory with Unmanned Aerial Vehicle.</i>                |   |
| Lim, Seunggho  | POSCO   |
| Kim, Hyungjin  | Graduate Inst. of Ferrous Technology, POSTECH |
| 12:30-13:30  | TuPS1.29                                      |
| <i>Autonomous Detection of PV Panels Using Unmanned Aerial Vehicles.</i>   |   |
| Ismail, Hesham   | DEWA  |
| Al Jasmi, Nawal  | DEWA  |
| Quadir, Jabirul  | DEWA  |
| Bandyopadhyay, Akash   | Amity Univeristy                              |
| Salim, Rufaidah  | Amity University                              |
| 12:30-13:30  | TuPS1.30                                      |
| <i>Co-Simulation of Mechanical Systems with Hydraulic Actuators.</i>   |   |
| Peiret, Albert   | McGill University                             |
| Gonzalez, Francisco  | University of a Coruna                        |

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| Kovecses, Jozsef  | McGill University                     |
| Teichmann, Marek  | CMLabs Simulations Inc                |
| 12:30-13:30   | TuPS1.31                              |
| <i>Meta-World: A Benchmark and Evaluation for Multi-Task and Meta Reinforcement Learning.</i>             |                                       |
| Yu, Tianhe  | Stanford University                   |
| Quillen, Deirdre  | Google                                |
| He, Zhanpeng  | University of Southern California     |
| Julian, Ryan  | University of Southern California     |
| Hausman, Karol  | University of Southern California     |
| Levine, Sergey  | UC Berkeley                           |
| Finn, Chelsea   | UC Berkeley                           |
| 12:30-13:30   | TuPS1.32                              |
| <i>Synergy-Based Control for Multi-Fingered Hands Using Selected Joint Spaces.</i>                        |                                       |
| Higashi, Kazuki   | Osaka University                      |
| Ozawa, Ryuta  | Meiji University                      |
| Nagata, Kazuyuki  | National Inst. of AIST                |
| Wan, Weiwei   | Osaka University                      |
| Harada, Kensuke   | Osaka University                      |
| 12:30-13:30   | TuPS1.33                              |
| <i>Redundant Resolution Method of an Underwater Manipulation for Disturbance Rejection.</i>               |                                       |
| Moon, Yecheol   | Hanyang University                    |
| Bae, Jangho   | Seoul National University             |
| Jin, Sangrok  | Pusan National University             |
| Kim, Jongwon  | Seoul National University             |
| Seo, TaeWon   | Hanyang University                    |
| 12:30-13:30   | TuPS1.34                              |
| <i>Experimental Study on the Parameters of High-Pressure Water-Jet Cleaning on a Facade.</i>              |                                       |
| Yoon, Dupyo   | Hanyang University                    |
| Lee, Youngjoo   | Hanyang University                    |
| Kwon, Daesung   | Hanyang University                    |
| Park, Changmin  | RoDEL                                 |
| Seo, Myoungjae  | Hanyang University                    |
| Seo, TaeWon   | Hanyang University                    |
| 12:30-13:30   | TuPS1.35                              |
| <i>Extrinsic Calibration of Thermal IR Camera and mmWave Radar by Exploiting Depth from RGB-D Camera.</i> |                                       |
| Yoon, SungHo  | Korea Advanced Inst. of Sci. and Tech |
| Kim, Ayoung   | Korea Advanced Inst. of Sci. and Tech |
| 12:30-13:30   | TuPS1.36                              |
| <i>Biomimetic Wrinkled MXene Pressure Sensors towards Collision-Aware Robots.</i>                         |                                       |
| Cai, Catherine  | National University of Singapore      |
| Ren, Hongliang  | National University of Singapore      |
| 12:30-13:30   | TuPS1.37                              |
| <i>A Force-Controlled Robotic Wrist Module for the Macro-Micro Manipulation of Industrial Robots.</i>     |                                       |
| Liu, Yen-Chun   | National Cheng Kung University        |
| Chang, Yu-Hsiang  | National Cheng Kung University        |
| Lan, Chao-Chieh   | National Cheng Kung University        |

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| 12:30-13:30  | TuPS1.38                                  |
| <i>Fault-Tolerant Force Tracking for a Multi-Legged Robot.</i>   |   |
| Ceah, Wei  | The University of Manchester              |
| Watson, Simon  | The University of Manchester              |
| Lennox, Barry  | The University of Manchester              |
| 12:30-13:30  | TuPS1.39                                  |
| <i>Admittance Control Based on Stiffness Ellipse for Collision Force Control of Object Manipulation.</i>                   |   |
| Oikawa, Masahide   | Saitama University                        |
| Kutsuzawa, Kyo   | Saitama University                        |
| Sakaino, Sho   | University of Tsukuba                     |
| Tsuji, Toshiaki  | Saitama University                        |
| 12:30-13:30  | TuPS1.40                                  |
| <i>A Linear Series Elastic Actuator for Accurate Force and Impedance Control with High Torque-To-Rotor-Inertia Ratios.</i> |   |
| Lee, Yu-Shen   | National Cheng Kung University            |
| Huang, Yan-Lin   | National Cheng Kung University            |
| Lan, Chao-Chieh  | National Cheng Kung University            |
| 12:30-13:30  | TuPS1.41                                  |
| <i>Generating Coordinated Reach-Grasp Motions with Neural Networks.</i>  |   |
| Chong, Eunsuk  | University of California, Los Angeles     |
| Park, Jinhyuk  | Seoul National University                 |
| Kim, Hyungmin  | Korea Institute of Science and Technology |
| Park, Frank  | Seoul National University                 |
| 12:30-13:30  | TuPS1.42                                  |
| <i>Curiosity Driven Exploration for Classification in the Dark Using Tactile Sensing.</i>                                  |   |
| Tickell, Blake   | University of California, Berkeley        |
| Mudigonda, Mayur   | University of California, Berkeley        |
| Agrawal, Pulkit  | University of California, Berkeley        |
| 12:30-13:30  | TuPS1.43                                  |
| <i>Behavior Change Based on Stiffness for Haptic Interface.</i>  |   |
| Ozeki, Tomoe   | Gifu University                           |
| Mouri, Tetsuya   | Gifu University                           |
| 12:30-13:30  | TuPS1.44                                  |
| <i>A Tactile Stimulation System for Robot-Assisted Hand Rehabilitation.</i>  |   |
| Chen, Jiazhou  | Xi'an Jiaotong University                 |
| Li, Min  | Xi'an Jiaotong University                 |
| Bo, He   | Xi'an Jiaotong University                 |
| Xu, Guanghua   | Xi'an Jiaotong University                 |
| Yao, Wei   | Strathclyde University                    |
| 12:30-13:30  | TuPS1.45                                  |
| <i>View Sharing to Enhance Driving Safety through Vehicle-To-Vehicle Communication.</i>                                    |   |
| Tran, Duy  | Oklahoma State University                 |
| Liu, Fangyao   | Oklahoma State University                 |
| Albrecht, Daniel   | Oklahoma State University                 |
| Sheng, Weihua  | Oklahoma State University                 |



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| 12:30-13:30  | TuPS1.46                                    |
| <i>Structured Classification of Locomotion Modes for Wearable Robot Control.</i>   |   |
| Narayan, Ashwin  | National University of Singapore            |
| Yu, Haoyong  | National University of Singapore            |
| 12:30-13:30  | TuPS1.47                                    |
| <i>Human Interactive Motion Planning for Shared Teleoperation.</i>   |   |
| Lee, Kwang-Hyun  | Korea Univ. of Tech. and Education          |
| Ryu, Jee-Hwan  | Korea Univ. of Tech. and Education          |
| Pruks, Vitalii   | Korea Univ. of Tech. and Education          |
| 12:30-13:30  | TuPS1.48                                    |
| <i>Motion Direction Decoding of Upper Limb from EEG Signals with a Cognitive Distraction Task.</i>                         |   |
| Fei, Weijie  | Beijing Institute of Technology             |
| Bi, Luzheng  | Beijing Institute of Technology             |
| Wang, Jiarong  | Beijing Institute of Technology             |
| 12:30-13:30  | TuPS1.49                                    |
| <i>Improved Energy Efficiency Via Parallel Elastic Elements for the Straight-Legged Vertically-Compliant Robot SLIDER.</i> |   |
| Wang, Ke   | Imperial College London                     |
| Saputra, Roni Permana  | Imperial College London                     |
| Foster, James Paul   | Imperial College London                     |
| Kormushev, Petar   | Imperial College London                     |
| 12:30-13:30  | TuPS1.50                                    |
| <i>Towards a General Framework for Generating Stable and Flexible Locomotion Skills.</i>                                   |   |
| André, João  | Universidade Do Minho                       |
| Tateo, Davide  | Politecnico Di Milano                       |
| Santos, Cristina   | University of Minho                         |
| Peters, Jan  | Technische Universität Darmstadt            |
| 12:30-13:30  | TuPS1.51                                    |
| <i>Joint Offset Optimization of Hip Joints in Humanoid Robots.</i>   |   |
| Kim, Jihun   | Chung-Ang University                        |
| Yang, Jaeha  | Chung-Ang University                        |
| Yang, Seung Tae  | Chung-Ang University                        |
| Lee, Giuk  | Chung-Ang University                        |
| 12:30-13:30  | TuPS1.52                                    |
| <i>Whole-Body Postural Control Approach Based on Multiple ZMP Evaluation in Humanoid Robots.</i>                           |   |
| Garcia-Haro, Juan Miguel   | University Carlos III of Madrid             |
| Martinez, Santiago   | University Carlos III of Madrid             |
| Oña, Edwin Daniel  | University Carlos III of Madrid             |
| Victores, Juan G.  | University Carlos III of Madrid             |
| Balaguer, Carlos   | University Carlos III of Madrid             |
| 12:30-13:30  | TuPS1.53                                    |
| <i>Obstacle Climbing by a Humanoid Robot Using Standing Jump Motion.</i>   |   |
| Ahn, DongHyun  | Kookmin University                          |
| Cho, Baek-Kyu  | Kookmin University                          |
| 12:30-13:30  | TuPS1.54                                    |
| <i>SpineBot: Pneumatically Actuated Muscle.</i>  |   |
| Lee, Amos Wei Lun  | Singapore Inst. of Manufacturing Technology |

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| Quek, Zhan Fan   | Singapore Inst. of Manufacturing Technology     |
| Short, Joel Stephen  | Singapore Inst. of Manufacturing Technology     |
| Tao, Pey Yuen  | Singapore Inst. of Manufacturing Technology     |
| 12:30-13:30  | TuPS1.55  |
| <i>A Methodology for Formulating and Exploiting Innovative Technologies for Collaborative Robots in a Manufacturing Setting.</i> |   |
| Parizi, M. Shahab  | Blue Ocean Robotics                             |
| Macovetchi, Ana Maria  | Blue Ocean Robotics                             |
| Kirstein, Franziska  | Blue Ocean Robotics                             |
| 12:30-13:30  | TuPS1.56  |
| <i>XL-Laser: Large-Scale Cable-Driven Laser Cutting/Engraving Robot.</i>   |   |
| Chan, Ngo Foon   | The Chinese University of Hong Kong             |
| Cheng, Hung Hon  | The Chinese University of Hong Kong             |
| Chan, Yuen Shan  | The Chinese University of Hong Kong             |
| Lau, Darwin  | The Chinese University of Hong Kong             |
| 12:30-13:30  | TuPS1.57  |
| <i>Establishing Safer Human-Vehicle Visual Interaction at Night.</i>   |   |
| Hirayama, Takatsugu  | Nagoya University                               |
| Maeda, Takashi   | Nagoya University                               |
| Liu, Hailong   | Nagoya University                               |
| Morales Saiki, Luis Yoichi   | Nagoya University                               |
| Akai, Naoki  | Nagoya University                               |
| Murase, Hiroshi  | Nagoya University                               |
| 12:30-13:30  | TuPS1.58  |
| <i>Towards Learning Trajectory Segmentation through Semi-Supervised Learning.</i>  |   |
| Urain De Jesus, Julien   | TU Darmstadt                                    |
| Tateo, Davide  | Politecnico Di Milano                           |
| Peters, Jan  | Technische Universität Darmstadt                |
| 12:30-13:30  | TuPS1.59  |
| <i>A Kernelized Approach for Learning and Adapting Symmetric Positive Definite Profiles.</i>                                     |   |
| Abu-Dakka, Fares   | Aalto University                                |
| 12:30-13:30  | TuPS1.60  |
| <i>Optimized Locomotion for Energy-Efficient Quadrupedal Robot Over Rough Terrain.</i>   |   |
| Chen, Lu   | The Chinese University of Hong Kong, Shenzhen   |
| Sun, Caiming   | The Chinese University of Hong Kong, Shenzhen   |
| Zhang, Aidong  | The Chinese University of Hong Kong, Shenzhen   |
| 12:30-13:30  | TuPS1.61  |
| <i>Pose-Graph Based Indoor Navigation Test for Unmanned Underwater Vehicle Navigation.</i>                                       |   |
| Lee, Yeongjun  | Korea Res. Inst. of Ships and Ocean Engineering |
| Jung, Jongdae  | Korea Res. Inst. of Ships and Ocean Engineering |
| Choi, Hyun-Taek  | Korea Inst. of Oceans Science and Technology    |
| 12:30-13:30  | TuPS1.62  |
| <i>Magnetic Sensor Based Probe for Microrobot Detection and Localization.</i>  |   |
| Kroubi, Tarik  | Univ. Mouloud Mammeri of Tizi-Ouzou, Algeria    |
| Belharet, Karim  | Hautes Etudes d'Ingénieur - HEI Campus Centre   |
| Bennamane, kamal   | University Mouloud Mammeri , TiziOuzou          |

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| 12:30-13:30  | TuPS1.63  |
| <i>Manipulation Planning with Soft Orientation Constraints Based on Composite Configuration Space.</i>                   |   |
| Wang, Jiangping  | Hangzhou Dianzi University                      |
| Liu, Shirong   | Hangzhou Dianzi University                      |
| Zhang, Botao   | Hangzhou Dianzi University                      |
| Wu, Qiuxuan  | Hangzhou Dianzi University                      |
| Yu, Changbin (Brad)  | The Australian National University              |
| 12:30-13:30  | TuPS1.64  |
| <i>Real-Time Sampling-Based Optimization on FPGA for Accurate Grid Map Merging in Embedded Robotic Systems.</i>          |   |
| Lee, Heoncheol   | Kumoh National Institute of Technology          |
| Lee, Seung-Hwan  | Kumoh National Institute of Technology          |
| 12:30-13:30  | TuPS1.65  |
| <i>Stair Environment Mapping and Walk-Able Plane Detecting Algorithm for Quadrupedal Robot's Locomotion.</i>             |   |
| Woo, Seungjun  | Sungkyunkwan University                         |
| Moon, Hyungpil   | Sungkyunkwan University                         |
| 12:30-13:30  | TuPS1.66  |
| <i>Design, Modelling and Adaptive Control of a Novel Autonomous Underwater Vehicle Equipped with Vectored Thrusters.</i> |   |
| Jisen, Li  | The Chinese University of Hong Kong, Shenzhen   |
| Sun, Caiming   | The Chinese University of Hong Kong, Shenzhen   |
| Zhang, Jiaming   | The Chinese University of Hong Kong, Shenzhen   |
| Zhang, Aidong  | The Chinese University of Hong Kong, Shenzhen   |
| 12:30-13:30  | TuPS1.67  |
| <i>Hovering Control of a TTURT with Thrust Vector Decomposition Technique.</i>   |   |
| Bak, Jeongae   | Seoul National University                       |
| Moon, Yecheol  | Hanyang University                              |
| Jin, Sangrok   | Pusan National University                       |
| Kim, Jongwon   | Seoul National University                       |
| Seo, TaeWon  | Hanyang University                              |
| 12:30-13:30  | TuPS1.68  |
| <i>Preliminary Study for Developing a Vision-Based Detection System of Unmanned Surface Vessels.</i>                     |   |
| Park, Jeonghong  | KRISO   |
| Lee, Yeongjun  | Korea Res. Inst. of Ships and Ocean Engineering |
| Park, Jin-Yeong  | Korea Res. Inst. of Ships and Ocean Engineering |
| Kim, Kihun   | KRISO   |
| Son, Namsun  | Korea Res. Inst. of Ships and Ocean Engineering |
| 12:30-13:30  | TuPS1.69  |
| <i>Design and Analysis of the All-In-One Actuation Module with Multi-Sensors.</i>  |   |
| Park, Dongil   | Korea Institute of Machinery and Materials      |
| Kim, Hwi-su  | Korea Institute of Machinery and Materials      |
| Park, Jongwoo  | Korea Institute of Machinery and Materials      |
| Park, Chanhun  | Korea Institute of Machinery and Materials      |
| Kim, Byung-in  | Korea Institute of Machinery and Materials      |

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| 12:30-13:30  | TuPS1.70                                    |
| <i>The Combination Function for Multi-Leg Modular Robot, Bio-Mimicked from Ant's Behavior.</i> |   |
| Yeoh, Chin Ean   | Kyungpook National University               |
| Kim, Tae-hyun  | Kyungpook National University               |
| Lee, Sang-Ryong  | Kyungpook National University               |
| Hak, Yi  | Kyungpook National University               |
| 12:30-13:30  | TuPS1.71                                    |
| <i>3-DOF Manipulator Design for a Slender-Shaped Wide End-Effector.</i>                        |   |
| Park, Garam  | Hanyang Unversity                           |
| Hong, Jooyoung   | Seoul National University                   |
| Lee, Jiseok  | Hanyang University                          |
| Kim, Jongwon   | Seoul National University                   |
| Seo, TaeWon  | Hanyang University                          |
| 12:30-13:30  | TuPS1.72                                    |
| <i>Design of a Variable Counterbalance Mechanism to Minimize Required Torque of Robot Arm.</i> |   |
| Kim, Hwi-su  | Korea Institute of Machinery and Materials  |
| Park, Dongil   | Korea Institute of Machinery and Materials  |
| Park, Chanhun  | Korea Institute of Machinery and Materials  |
| 12:30-13:30  | TuPS1.73                                    |
| <i>IRonCub: Towards Aerial Humanoid Robotics.</i>  |   |
| Pucci, Daniele   | Italian Institute of Technology             |
| Fiorio, Luca   | Italian Institute of Technology             |
| Traversaro, Silvio   | Italian Institute of Technology             |
| Nava, Gabriele   | Italian Institute of Technology             |
| L'Erario, Giuseppe   | Italian Institute of Technology             |
| Mohamed, Hosameldin Awadalla Omer  | Italian Institute of Technology             |
| Bergonti, Fabio  | Italian Institute of Technology             |
| Benenati, Emilio   | Italian Institute of Technology             |
| Metta, Giorgio   | Italian Institute of Technology             |
| 12:30-13:30  | TuPS1.74                                    |
| <i>A Stabilization Analysis of Omni-Mobile Manipulator with 4K Camera.</i>                     |   |
| Quan, Chenghao   | Gwangju Institute of Science and Technology |
| Kim, Jiyong  | Gwangju Institute of Science and Technology |
| Hong, Yohan  | Gwangju Institute of Science and Technology |
| Kim, Mun Sang  | Gwangju Institute of Science and Technology |



# *Technical Sessions*

*Wednesday, November 6<sup>th</sup>, 2019*





| WeAT1  | L1-R1                               |
|--|-------------------------------------|
| <b>Object Detection and Segmentation I (Regular session)</b>   |                                     |
| Chair: Xue, Jianru   | Xi'an Jiaotong University           |
| Co-Chair: Ogata, Tetsuya   | Waseda University                   |
| 10:30-10:45  | WeAT1.1                             |
| <i>Large-Scale 6D Object Pose Estimation Dataset for Industrial Bin-Picking.</i>                                       |                                     |
| Kleeberger, Kilian   | Fraunhofer IPA                      |
| Landgraf, Christian  | Fraunhofer IPA                      |
| Huber, Marco F.  | University of Stuttgart             |
| 10:45-11:00  | WeAT1.2                             |
| <i>Seeing Beyond Appearance – Mapping Real Images into Geometrical Domains for Unsupervised CAD-Based Recognition.</i> |                                     |
| Planche, Benjamin  | Siemens AG                          |
| Zakharov, Sergey   | Technical University of Munich      |
| Wu, Ziyang   | Siemens                             |
| Hutter, Andreas  | Siemens AG                          |
| Kosch, Harald  | University of Passau                |
| Ilic, Slobodan   | Technical University of Munich      |
| 11:00-11:15  | WeAT1.3                             |
| <i>Adaptive Loss Balancing for Multitask Learning of Object Instance Recognition and 3D Pose Estimation.</i>           |                                     |
| Hosono, Takashi  | NTT Media Intelligence Lab., NTT    |
| Hoshi, Yuuna   | Georgia Institute of Technology     |
| Shimamura, Jun   | NTT Media Intelligence Lab., NTT    |
| Sagata, Atsushi  | NTT Media Intelligence Lab., NTT    |
| 11:15-11:30  | WeAT1.4                             |
| <i>The Impact of Domain Randomization on Object Detection: Case Study on Parametric Shapes and Synthetic Textures.</i> |                                     |
| Dehban, Atabak   | IST-ID                              |
| Borrego, Joao  | Instituto Superior Técnico          |
| Figueiredo, Rui  | ISR-Instituto Superior Técnico      |
| Moreno, Plinio   | IST-ID                              |
| Bernardino, Alexandre  | IST - Técnico Lisboa                |
| Santos-Victor, José  | Instituto Superior Técnico - Lisbon |
| 11:30-11:45  | WeAT1.5                             |
| <i>Object Proposal Algorithms in the Wild: Are They Generalizable to Robot Perception?.</i>                            |                                     |
| Chan, Darren   | University of California, San Diego |
| Riek, Laurel D.  | University of California, San Diego |
| 11:45-12:00  | WeAT1.6                             |
| <i>Precise Correntropy-Based 3D Object Modelling with Geometrical Traffic Prior.</i>                                   |                                     |
| Wang, Di   | Xi'an Jiaotong University           |
| Xue, Jianru  | Xi'an Jiaotong University           |
| Zhan, Wei  | University of California, Berkeley  |
| Jin, Yinghan   | Zhejiang University                 |
| Zheng, Nanning   | Xi'an Jiaotong University           |
| Tomizuka, Masayoshi  | University of California            |



| WeAT2  |   | L1-R2 |
|--|---|-------|
| Deep Learning from Demonstration (Regular session)   |   |       |
| Chair: Ure, Nazim Kemal  | Istanbul Technical University             |       |
| Co-Chair: Liu, Ming  | Hong Kong Univ. of Science and Technology |       |
| 10:30-10:45  | WeAT2.1                                   |       |
| A Bi-Directional Multiple Timescales LSTM Model for Grounding of Actions and Verbs.  |   |       |
| Antunes, Alexandre   | Plymouth University                       |       |
| Laflaquière, Alban   | AI Lab, SoftBank Robotics EU              |       |
| Ogata, Tetsuya   | Waseda University                         |       |
| Cangelosi, Angelo  | University of Manchester                  |       |
| 10:45-11:00  | WeAT2.2                                   |       |
| Visual-Based Autonomous Driving Deployment from a Stochastic and Uncertainty-Aware Perspective.                                  |   |       |
| Tai, Lei   | Hong Kong Univ. of Science and Technology |       |
| Yun, Peng  | Hong Kong Univ. of Science and Technology |       |
| Chen, Yuying   | Hong Kong Univ. of Science and Technology |       |
| Liu, Congcong  | Hong Kong Univ. of Science and Technology |       |
| Ye, Haoyang  | Hong Kong Univ. of Science and Technology |       |
| Liu, Ming  | Hong Kong Univ. of Science and Technology |       |
| 11:00-11:15  | WeAT2.3                                   |       |
| Sample Efficient Interactive End-To-End Deep Learning for Self-Driving Cars with Selective Multi-Class Safe Dataset Aggregation. |   |       |
| Bicer, Yunus   | Istanbul Technical University             |       |
| Alizadeh, Ali  | Istanbul Technical University             |       |
| Ure, Nazim Kemal   | Istanbul Technical University             |       |
| Erdogan, Ahmetcan  | AVL Turkey                                |       |
| Kizilirmak, Orkun  | AVL Turkey                                |       |
| 11:15-11:30  | WeAT2.4                                   |       |
| Continuous Relaxation of Symbolic Planner for One-Shot Imitation Learning.   |   |       |
| Huang, De-An   | Stanford University                       |       |
| Xu, Danfei   | Stanford University                       |       |
| Zhu, Yuke  | Stanford University                       |       |
| Garg, Animesh  | Stanford University                       |       |
| Savarese, Silvio   | Stanford University                       |       |
| Fei-Fei, Li  | Stanford University                       |       |
| Niebles, Juan Carlos   | Stanford University                       |       |
| 11:30-11:45  | WeAT2.5                                   |       |
| One-Shot Composition of Vision-Based Skills from Demonstration.  |   |       |
| Yu, Tianhe   | Stanford University                       |       |
| Abbeel, Pieter   | UC Berkeley                               |       |
| Levine, Sergey   | UC Berkeley                               |       |
| Finn, Chelsea  | UC Berkeley                               |       |
| 11:45-12:00  | WeAT2.6                                   |       |
| Learning to Augment Synthetic Images for Sim2Real Policy Transfer.   |   |       |
| Pashevich, Alexander   | INRIA Grenoble Rhone-Alpes                |       |
| Strudel, Robin   | INRIA Paris                               |       |
| Kalevatykh, Igor   | INRIA                                     |       |
| Laptev, Ivan   | INRIA                                     |       |
| Schmid, Cordelia   | INRIA                                     |       |

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| <b>WeAT3</b>   | <b>L1-R3</b>                                 |
| <b>Learning for Motion and Path Planning I (Regular session)</b>   |  |
| Chair: Ou, Yongsheng   | Chinese Academy of Sciences                  |
| Co-Chair: Pucci, Daniele   | Italian Institute of Technology              |
| <b>10:30-10:45</b>   | <b>WeAT3.1</b>                               |
| <i>Driving with Style: Inverse Reinforcement Learning in General-Purpose Planning for Automated Driving.</i> |  |
| Rosbach, Sascha  | Volkswagen AG                                |
| James, Vinit   | Volkswagen AG                                |
| Grossjohann, Simon   | Volkswagen AG                                |
| Homoceanu, Silviu  | Volkswagen AG                                |
| Roth, Stefan   | TU Darmstadt                                 |
| <b>10:45-11:00</b>   | <b>WeAT3.2</b>                               |
| <i>Improving Local Trajectory Optimization by Probabilistic Movement Primitives.</i>                         |  |
| Ashith Shyam, R B  | University of Surrey                         |
| Lightbody, Peter   | University of Lincoln                        |
| Das, Gautham   | University of Lincoln                        |
| Liu, Pengcheng   | Cardiff Metropolitan University              |
| Gomez-Gonzalez, Sebastian  | Max Planck Institute for Intelligent Systems |
| Neumann, Gerhard   | University of Lincoln                        |
| <b>11:00-11:15</b>   | <b>WeAT3.3</b>                               |
| <i>Learning to Sequence Multiple Tasks with Competing Constraints.</i>                                       |  |
| Duan, Anqing   | Italian Institute of Technology              |
| Camoriano, Raffaello   | Italian Institute of Technology              |
| Ferigo, Diego  | Italian Institute of Technology              |
| Huang, Yanlong   | Italian Institute of Technology              |
| Calandriello, Daniele  | Politecnico Di Milano                        |
| Rosasco, Lorenzo   | Italian Institute of Technology & MIT        |
| Pucci, Daniele   | Italian Institute of Technology              |
| <b>11:15-11:30</b>   | <b>WeAT3.4</b>                               |
| <i>Improved Learning Accuracy for Learning Stable Control from Human Demonstrations.</i>                     |  |
| Jin, Shaokun   | Shenzhen Inst. of Advanced Technology, CAS   |
| Wang, Zhiyang  | Shenzhen Inst. of Advanced Technology, CAS   |
| Ou, Yongsheng  | Chinese Academy of Sciences                  |
| Zhou, Yimin  | Chinese Academy of Sciences                  |
| <b>11:30-11:45</b>   | <b>WeAT3.5</b>                               |
| <i>Learning to Explore in Motion and Interaction Tasks.</i>  |  |
| Bogdanovic, Miroslav   | Max Planck Inst. for Intelligent Systems     |
| Righetti, Ludovic  | New York University                          |
| <b>11:45-12:00</b>   | <b>WeAT3.6</b>                               |
| <i>Training in Task Space to Speed up and Guide Reinforcement Learning.</i>                                  |  |
| Bellegarda, Guillaume  | University of California, Santa Barbara      |
| Byl, Katie   | UCSB   |

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| <b>WeAT4</b>  | <b>L1-R4</b>                             |
| <b>Mechanism Design I (Regular session)</b>   |  |
| Chair: Paik, Jamie  | Ecole Polytechnique Federale De Lausanne |
| Co-Chair: Xu, Qingsong  | University of Macau                      |
| 10:30-10:45   | WeAT4.1                                  |
| <i>A Method for Designing Low-Profile Compliant Transmission Mechanisms.</i>  |  |
| Giraud, Frédéric  | EPFL - Rrl                               |
| Zhakypov, Zhenishbek  | École Polytechnique Fédérale De Lausanne |
| Paik, Jamie   | Ecole Polytechnique Federale De Lausanne |
| 10:45-11:00   | WeAT4.2                                  |
| <i>Design and Analysis of a New 3-DOF Active-Type Constant-Force Compliant Parallel Stage.</i>  |  |
| Zhang, Xiaozhi  | University of Macau                      |
| Xu, Qingsong  | University of Macau                      |
| Yuzhang, Wei  | University of Macau                      |
| 11:00-11:15   | WeAT4.3                                  |
| <i>Computational Design of Statically Balanced Planar Spring Mechanisms.</i>  |  |
| Takahashi, Takuto   | Waseda University                        |
| Zehnder, Jonas  | Université De Montréal                   |
| Okuno, Hiroshi G.   | Waseda University                        |
| Sugano, Shigeki   | Waseda University                        |
| Coros, Stelian  | Carnegie Mellon University               |
| Thomaszewski, Bernhard  | Université De Montréal                   |
| 11:15-11:30   | WeAT4.4                                  |
| <i>RoFiCoM -- First Open-Hardware Connector for Metamorphic Robots.</i>   |  |
| Mrázek, Jan   | FI MUNI                                  |
| Barnat, Jiri  | Masaryk University                       |
| 11:30-11:45   | WeAT4.5                                  |
| <i>Development of a Continuous Vertical-Pulling Automatic Doffing Robot for the Ring Spinning.</i>  |  |
| Zhang, Wenzeng  | Tsinghua University                      |
| Yang, Sicheng   | Tencent                                  |
| Luo, Chao   | Tsinghua University                      |
| Liu, Siyun  | Tsinghua University                      |
| Fu, Hong  | Tsinghua University                      |
| 11:45-12:00   | WeAT4.6                                  |
| <i>Basic Performance of Planar Omnidirectional Crawler During Direction Switching Using Disturbance Degree of Ground Evaluation Method.</i> |  |
| Takane, Eri   | Tohoku University                        |
| Tadakuma, Kenjiro   | Tohoku University                        |
| Shimizu, Tori   | Tohoku University                        |
| Hayashi, Sosuke   | Tohoku University                        |
| Watanabe, Masahiro  | Tohoku University                        |
| Kagami, Shingo  | Tohoku University                        |
| Nagatani, Keiji   | The University of Tokyo                  |
| Konyo, Masashi  | Tohoku University                        |
| Tadokoro, Satoshi   | Tohoku University                        |

| WeAT5  |   | L1-R5 |
|--|---|-------|
| Telerobotics and Teleoperation I (Regular session)   |   |       |
| Chair: Fu, Changhong   | Tongji University                         |       |
| Co-Chair: Wang, Qining   | Peking University                         |       |
| 10:30-10:45  | WeAT5.1                                   |       |
| Robust Impedance Shaping of Redundant Teleoperators with Time-Delay Via Sliding Mode Control.              |   |       |
| Nicolis, Davide  | Politecnico Di Milano                     |       |
| Allevi, Fabio  | Politecnico Di Milano                     |       |
| Rocco, Paolo   | Politecnico Di Milano                     |       |
| 10:45-11:00  | WeAT5.2                                   |       |
| Design of a Semi-Humanoid Telepresence Robot for Plant Disaster Response and Prevention.                   |   |       |
| Cardenas, Irvin Steve  | Kent State University                     |       |
| Kim, Jong-Hoon   | Kent State University                     |       |
| 11:00-11:15  | WeAT5.3                                   |       |
| Preliminary Evaluation of an Orbital Camera for Teleoperation of Remote Manipulators.                      |   |       |
| Talha, Mohammed  | University of Birmingham                  |       |
| Stolkin, Rustam  | University of Birmingham                  |       |
| 11:15-11:30  | WeAT5.4                                   |       |
| A Teleoperated Hexapod Robot for Imitation Learning Task Training.   |   |       |
| Gurley, Austin   | Deft Dynamics                             |       |
| 11:30-11:45  | WeAT5.5                                   |       |
| Toward a Human-Machine Interface Based on Electrical Impedance Tomography for Robotic Manipulator Control. |   |       |
| Zheng, Enhao   | Institute of Automation, CAS              |       |
| Li, Yuhua  | China University of Geosciences (Beijing) |       |
| Wang, Qining   | Peking University                         |       |
| Qiao, Hong   | Institute of Automation, CAS              |       |
| 11:45-12:00  | WeAT5.6                                   |       |
| Force Field-Based Indirect Manipulation of UAV Flight Trajectories.  |   |       |
| Isop, Werner Alexander   | Graz University of Technology             |       |
| Fraundorfer, Friedrich   | Graz University of Technology             |       |

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| <b>WeAT6</b>  | <b>L1-R6</b>                                   |
| <b>Aerial Robotics IV (Regular session)</b>   |  |
| Chair: Zhang, Ji  | Carnegie Mellon University                     |
| Co-Chair: Zhao, Moju  | The University of Tokyo                        |
| 10:30-10:45   | WeAT6.1  |
| <i>Observability Analysis of Position Estimation for Quadrotors with Modified Dynamics and Range Measurements.</i>            |  |
| Fernando, Eranga  | Memorial University of Newfoundland            |
| De Silva, Oscar   | Memorial University of Newfoundland            |
| Mann, George K. I.  | Memorial University of Newfoundland            |
| Gosine, Raymond G.  | Memorial University of Newfoundland            |
| 10:45-11:00   | WeAT6.2  |
| <i>Analysis of Ground Effect for Small-Scale UAVs in Forward Flight.</i>  |  |
| Kan, Xinyue   | University of California, Riverside            |
| Thomas, Justin  | Exyn Technologies                              |
| Teng, Hanzhe  | University of California, Riverside            |
| Tanner, Herbert G.  | University of Delaware                         |
| Kumar, Vijay  | University of Pennsylvania                     |
| Karydis, Konstantinos   | University of California, Riverside            |
| 11:00-11:15   | WeAT6.3  |
| <i>Disturbance Estimation and Rejection for High-Precision Multirotor Position Control.</i>                                   |  |
| Hentzen, Daniel Robert  | Nasa Jet Propulsion Laboratory                 |
| Stastny, Thomas   | Swiss Federal Inst. of Technology (ETH Zurich) |
| Siegwart, Roland  | ETH Zurich                                     |
| Brockers, Roland  | California Institute of Technology             |
| 11:15-11:30   | WeAT6.4  |
| <i>Maximum Likelihood Path Planning for Fast Aerial Maneuvers and Collision Avoidance.</i>                                    |  |
| Zhang, Ji   | Carnegie Mellon University                     |
| Hu, Chen  | Carnegie Mellon University                     |
| Gupta chadha, Rushat  | Near Earth Autonomy                            |
| Singh, Sanjiv   | Carnegie Mellon University                     |
| 11:30-11:45   | WeAT6.5  |
| <i>Aerial Robot Control in Close Proximity to Ceiling: A Force Estimation-Based Nonlinear MPC.</i>                            |  |
| Koçer, Başaran Bahadır  | Nanyang Technological University               |
| Tiryaki, Mehmet Efe   | ETH Zurich                                     |
| Pratama, Mahardhika   | Nanyang Technological University               |
| Tjahjowidodo, Tegoeh  | Nanyang Technological University               |
| Seet, Gim Lee, Gerald   | NTU  |
| 11:45-12:00   | WeAT6.6  |
| <i>Design, Modeling and Control of Fully Actuated 2D Transformable Aerial Robot with 1 DoF Thrust Vectorable Link Module.</i> |  |
| Anzai, Tomoki   | The University of Tokyo                        |
| Zhao, Moju  | The University of Tokyo                        |
| Murooka, Masaki   | The University of Tokyo                        |
| Shi, Fan  | The University of Tokyo                        |
| Okada, Kei  | The University of Tokyo                        |
| Inaba, Masayuki   | The University of Tokyo                        |

| WeAT7  |                                       | L1-R7 |
|--|---------------------------------------|-------|
| Computer Vision for Automation II (Regular session)  |                                       |       |
| Chair: LI, Xiang   | Tsinghua University                   |       |
| Co-Chair: Wang, Yiming   | Italian Institute of Technology       |       |
| 10:30-10:45  | WeAT7.1                               |       |
| Autonomous 3D Reconstruction, Mapping and Exploration of Indoor Environments with a Robotic Arm.                           |                                       |       |
| Wang, Yiming   | Italian Institute of Technology       |       |
| James, Stuart  | Italian Institute of Technology       |       |
| Stathopoulou, Ellie - K.   | Italian Institute of Technology       |       |
| Beltran-Gonzalez, Carlos   | Italian Institute of Technology       |       |
| Konishi, Yoshinori   | SenseTime Japan Ltd                   |       |
| Del Bue, Alessio   | Italian Institute of Technology       |       |
| 10:45-11:00  | WeAT7.2                               |       |
| ResFlow: Multi-Tasking of Sequentially Pooling Spatiotemporal Features for Action Recognition and Optical Flow Estimation. |                                       |       |
| Yeh, Tso-Hsin  | National Taiwan University            |       |
| Kuo, Chuan   | National Taiwan University            |       |
| Liu, An-Sheng  | National Taiwan University            |       |
| Liu, Yu-Hung   | National Taiwan University            |       |
| Yang, Yu-Huan  | National Taiwan University            |       |
| Li, Zi-Jun   | National Taiwan University            |       |
| Shen, Jui-Ting   | National Taiwan University            |       |
| Fu, Li-Chen  | National Taiwan University            |       |
| 11:00-11:15  | WeAT7.3                               |       |
| SilhoNet: An RGB Method for 6D Object Pose Estimation.   |                                       |       |
| Billings, Gideon   | University of Michigan                |       |
| Johnson-Roberson, Matthew  | University of Michigan                |       |
| 11:15-11:30  | WeAT7.4                               |       |
| Deep Neural Network Based Visual Inspection with 3D Metric Measurement of Concrete Defects Using Wall-Climbing Robot.      |                                       |       |
| Yang, Liang  | City College of New York, CUNY        |       |
| Li, Bing   | Clemson University                    |       |
| Yang, Guoyong  | Chinses Academy of Sciences           |       |
| Chang, Yong  | Shenyang Inst. of Automation, CAS     |       |
| Liu, Zhaoming  | Shenyang Inst. of Automation, CAS     |       |
| Jiang, Biao  | Hostos Community College              |       |
| Xiao, Jizhong  | The City College of New York          |       |
| 11:30-11:45  | WeAT7.5                               |       |
| Development of an Autonomous Sanding Robot with Structured-Light Technology.   |                                       |       |
| Huo, Yingxin   | Chinese University of Hong Kong       |       |
| Chen, Diancheng  | Chinese University of Hong Kong       |       |
| LI, Xiang  | Tsinghua University                   |       |
| LI, Peng   | Harbin Inst. of Technology (ShenZhen) |       |
| Liu, Yunhui  | Chinese University of Hong Kong       |       |
| 11:45-12:00  | WeAT7.6                               |       |
| Continuous Close-Range 3D Object Pose Estimation.  |                                       |       |
| Grossmann, Bjarne  | Aalborg University Copenhagen         |       |
| Rovida, Francesco  | Aalborg University Copenhagen         |       |
| Krueger, Volker  | Lund University                       |       |

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| <b>WeAT8</b>  | LG-R8                                    |
| <b>Autonomous Vehicle Navigation II (Regular session)</b>   |  |
| Chair: Ben-Tzvi, Pinhas   | Virginia Tech                            |
| Co-Chair: Liu, Zhe  | The Chinese University of Hong Kong      |
| 10:30-10:45   | WeAT8.1                                  |
| <i>Reinforcement Learning Boat Autopilot: A Sample-Efficient and Model Predictive Control Based Approach.</i> |  |
| Cui, Yunduan  | Nara Inst. of Science and Technology     |
| Osaki, Shigeki  | FURUNO Electric Co., Ltd                 |
| Matsubara, Takamitsu  | Nara Inst. of Science and Technology     |
| 10:45-11:00   | WeAT8.2                                  |
| <i>Monocular Plan View Networks for Autonomous Driving.</i>   |  |
| Wang, Dequan  | UC Berkeley                              |
| Devin, Coline   | UC Berkeley                              |
| Cai, Qizhi  | Sinovation Ventures AI Institute         |
| Kraehenbuehl, Philipp   | UT Austin                                |
| Darrell, Trevor   | UC Berkeley                              |
| 11:00-11:15   | WeAT8.3                                  |
| <i>Deep Imitation Learning for Autonomous Driving in Generic Urban Scenarios with Enhanced Safety.</i>        |  |
| Chen, Jianyu  | UC Berkeley                              |
| Yuan, Bodi  | UC Berkeley                              |
| Tomizuka, Masayoshi   | UC Berkeley                              |
| 11:15-11:30   | WeAT8.4                                  |
| <i>Context and Intention Aware Planning for Urban Driving.</i>  |  |
| Meghjani, Malika  | Singapore Univ. of Technology and Design |
| Luo, Yuanfu   | National University of Singapore         |
| Ho, Qi Heng   | National University of Singapore         |
| Cai, Panpan   | National University of Singapore         |
| Verma, Shashwat   | BITS Pilani, K.K. Birla Goa Campus       |
| Rus, Daniela  | Massachusetts Institute of Technology    |
| Hsu, David  | National University of Singapore         |
| 11:30-11:45   | WeAT8.5                                  |
| <i>Neural Network Based Heterogeneous Sensor Fusion for Robot Motion Planning.</i>                            |  |
| Sebastian, Bijo   | Virginia Tech                            |
| Ren, Hailin   | Virginia Tech                            |
| Ben-Tzvi, Pinhas  | Virginia Tech                            |
| 11:45-12:00   | WeAT8.6                                  |
| <i>Modelling and Dynamic Tracking Control of Industrial Vehicles with Tractor-Trailer Structure.</i>          |  |
| Zhao, Hongchao  | The Chinese University of Hong Kong      |
| Liu, Zhe  | The Chinese University of Hong Kong      |
| Zhiqiang, Li  | The Chinese University of Hong Kong      |
| Zhou, Shunbo  | The Chinese University of Hong Kong      |
| Chen, Wen   | The Chinese University of Hong Kong      |
| Suo, Chuanzhe   | The Chinese University of Hong Kong      |
| Liu, Yunhui   | The Chinese University of Hong Kong      |

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| <b>WeAT9</b>  | <b>LG-R9</b>   |
| <b>Social Human-Robot Interaction IV (Regular session)</b>  |  |
| Chair: Park, Chung Hyuk   | George Washington University                               |
| Co-Chair: Fu, Li-Chen   | National Taiwan University                                 |
| <b>10:30-10:45</b>  | <b>WeAT9.1</b>   |
| <i>Long-Term Community Social Robots to Promote Social Connectedness among Older Adults (I).</i>                                |  |
| Ostrowski, Anastasia K.   | Massachusetts Institute of Technology                      |
| DiPaola, Daniella   | Massachusetts Institute of Technology                      |
| Partridge, Erin   | Eldercare Alliance Organization                            |
| Park, Hae Won   | Massachusetts Institute of Technology                      |
| Breazeal, Cynthia   | Massachusetts Institute of Technology                      |
| <b>10:45-11:00</b>  | <b>WeAT9.2</b>   |
| <i>Robot–Robot Gesturing for Anchoring Representations (I).</i>   |  |
| Kontaxakis, Polychronis   | ABB AB   |
| Gulzar, Khurram   | Aalto University   |
| Kinauer, Stefan   | CentraleSupélec  |
| Kokkinos, Iasonas   | University College London                                  |
| Kyrki, Ville  | Aalto University   |
| <b>11:00-11:15</b>  | <b>WeAT9.3</b>   |
| <i>Interactions with an Empathetic Agent: Regulating Emotions and Improving Engagement in Autism (I).</i>                       |  |
| Javed, Hifza  | George Washington University                               |
| Park, Chung Hyuk  | George Washington University                               |
| <b>11:15-11:30</b>  | <b>WeAT9.4</b>   |
| <i>Multi-Layer Environmental Affordance Map for Robust Indoor Localization, Event Detection and Social Friendly Navigation.</i> |  |
| Wu, Ping-Tsang  | National Taiwan University                                 |
| Yu, Chee-An   | National Taiwan University                                 |
| Chan, Shao-Hung   | National Taiwan University                                 |
| Chiang, Ming-Li   | National Taiwan University                                 |
| Fu, Li-Chen   | National Taiwan University                                 |
| <b>11:30-11:45</b>  | <b>WeAT9.5</b>   |
| <i>A Multi-Channel Embedded DSP Closed-Loop Control System for Musical Robots.</i>  |  |
| Long, Jason   | Victoria University of Wellington                          |
| Murphy, James Wassell   | Victoria University of Wellington                          |
| Carnegie, Dale Anthony  | Victoria University of Wellington                          |
| Kapur, Ajay   | California Inst. of the Arts / New Zealand School of Music |



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| <b>WeAT11</b>   | LG-R11                                |
| <b>Medical Robot: Endoscope (Regular session)</b>   |                                       |
| Chair: Desai, Jaydev P.   | Georgia Institute of Technology       |
| Co-Chair: Li, Zheng   | The Chinese University of Hong Kong   |
| 10:30-10:45   | WeAT11.1                              |
| <i>Visual Servo Control of a Novel Magnetic Actuated Endoscope for Uniportal Video Assisted Thoracic Surgery.</i>   |                                       |
| Cheng, Truman   | The Chinese University of Hong Kong   |
| Li, Weibing   | The Chinese University of Hong Kong   |
| Ng, Sze Hang  | The Chinese University of Hong Kong   |
| Chiu, Wai, Yan Philip   | The Chinese University of Hong Kong   |
| Li, Zheng   | The Chinese University of Hong Kong   |
| 10:45-11:00   | WeAT11.2                              |
| <i>Sensorless Estimation of the Planar Distal Shape of a Tip-Actuated Endoscope.</i>                                |                                       |
| Slawinski, Piotr  | Vanderbilt University                 |
| Simaan, Nabil   | Vanderbilt University                 |
| Obstein, Keith  | Vanderbilt University                 |
| Valdastri, Pietro   | University of Leeds                   |
| 11:00-11:15   | WeAT11.3                              |
| <i>Endoscopic Bi-Manual Robotic Instrument Design Using a Genetic Algorithm.</i>                                    |                                       |
| Schmitz, Andreas  | Imperial College London               |
| Berthet-Rayne, Pierre   | Imperial College London               |
| Yang, Guang-Zhong   | Imperial College London               |
| 11:15-11:30   | WeAT11.4                              |
| <i>Hysteresis Compensator with Learning-Based Pose Estimation for a Flexible Endoscopic Surgery Robot.</i>          |                                       |
| Baek, DongHoon  | Korea Advanced Inst. of Sci. and Tech |
| Seo, JuHwan   | Korea Advanced Inst. of Sci. and Tech |
| Kim, Joonhwan   | Korea Advanced Inst. of Sci. and Tech |
| Kwon, Dong-Soo  | Korea Advanced Inst. of Sci. and Tech |
| 11:30-11:45   | WeAT11.5                              |
| <i>6-Axis Hybrid Sensing and Estimation of Tip Forces/Torques on a Hyper-Redundant Robotic Surgical Instrument.</i> |                                       |
| Yilmaz, Nural   | Marmara University                    |
| Bazman, Merve   | Marmara University                    |
| Alassi, Alaa  | Bahcesehir University                 |
| Gur, Berke  | Bahcesehir University                 |
| Tumerdem, Ugur  | Marmara University                    |
| 11:45-12:00   | WeAT11.6                              |
| <i>Towards the Design and Development of a Pediatric Neuroendoscope Tool.</i>                                       |                                       |
| Chitalia, Yash  | Georgia Institute of Technology       |
| Jeong, Seokhwan   | Georgia Institute of Technology       |
| Bok, Alice Ji   | Georgia Institute of Technology       |
| Nguyen, Vinh  | Georgia Institute of Technology       |
| Melkote, Shreyes  | Georgia Institute of Technology       |
| Chern, Joshua   | Children's Hospital of Atlanta        |
| Desai, Jaydev P.  | Georgia Institute of Technology       |

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| <b>WeAT12</b>   | LG-R12  |
| <b>Human Factors and Human-In-The-Loop II (Regular session)</b>   |   |
| Chair: Shiomi, Masahiro   | ATR   |
| Co-Chair: Hourdakis, Emmanouil  | Foundation for Research and Technology                      |
| 10:30-10:45   | WeAT12.1  |
| <i>Towards Ergonomic Control of Collaborative Effort in Multi-Human Mobile-Robot Teams.</i>                                     |   |
| Kim, Wansoo   | Istituto Italiano Di Tecnologia                             |
| Lorenzini, Marta  | Istituto Italiano Di Tecnologia                             |
| Balatti, Pietro   | Istituto Italiano Di Tecnologia                             |
| Wu, Yuqiang   | Xi'an Jiaotong University                                   |
| Ajoudani, Arash   | Istituto Italiano Di Tecnologia                             |
| 10:45-11:00   | WeAT12.2  |
| <i>Rebellion and Obedience: The Effects of Intention Prediction in Cooperative Handheld Robots.</i>                             |   |
| Stolzenwald, Schachar Janis Immanuel  | University of Bristol                                       |
| Mayol, Walterio   | University of Bristol                                       |
| 11:00-11:15   | WeAT12.3  |
| <i>Towards Explainable Shared Control Using Augmented Reality.</i>  |   |
| Zolotas, Mark   | Imperial College London                                     |
| Demiris, Yiannis  | Imperial College London                                     |
| 11:15-11:30   | WeAT12.4  |
| <i>How Can Robot's Gaze Ratio and Gaze Type Show an Awareness of Power Dynamics to the People with Whom It Is Interacting?.</i> |   |
| Arai, Honoka  | Doshisha University   |
| Kimoto, Mitsuhiro   | Keio University   |
| Iio, Takamasa   | University of Tsukuba / JST PRESTO                          |
| Shimohara, Katsunori  | Doshisha University   |
| Matsumura, Reo  | Osaka Univ., ATR Intelligent Robotics and Communication Lab |
| Shiomi, Masahiro  | ATR   |
| 11:30-11:45   | WeAT12.5  |
| <i>Online Performance Prediction and Profiling of Human Activities by Observation.</i>  |   |
| Hourdakis, Emmanouil  | Foundation for Research and Technology                      |
| Maniadas, Michail   | Foundation for Res. and Tech. – Hellas (FORTH)              |
| Trahanias, Panos  | Foundation for Res. and Tech. – Hellas (FORTH)              |

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| <b>WeAT13</b>  | LG-R13                    |
| <b>Humanoid Robots I (Regular session)</b>   |                           |
| Chair: Park, Jaeheung  | Seoul National University |
| Co-Chair: Yamane, Katsu  | Honda                     |
| 10:30-10:45  | WeAT13.1                  |
| <i>Long-Time Self-Body Image Acquisition and Its Application to the Control of Musculoskeletal Structures.</i>   |                           |
| Kawaharazuka, Kento  | The University of Tokyo   |
| Tsuzuki, Kei   | The University of Tokyo   |
| Makino, Shogo  | The University of Tokyo   |
| Onitsuka, Moritaka   | The University of Tokyo   |
| Asano, Yuki  | The University of Tokyo   |
| Okada, Kei   | The University of Tokyo   |
| Kawasaki, Koji   | The University of Tokyo   |
| Inaba, Masayuki  | The University of Tokyo   |
| 10:45-11:00  | WeAT13.2                  |
| <i>Foot with a Core-Shell Structural Six-Axis Force Sensor for Pedal Depressing and Recovering from Foot Slipping During Pedal Pushing Toward Autonomous Driving by Humanoids.</i> |                           |
| Shinjo, Koki   | The University of Tokyo   |
| Kawaharazuka, Kento  | The University of Tokyo   |
| Asano, Yuki  | The University of Tokyo   |
| Nakashima, Shinsuke  | The University of Tokyo   |
| Makino, Shogo  | The University of Tokyo   |
| Onitsuka, Moritaka   | The University of Tokyo   |
| Tsuzuki, Kei   | The University of Tokyo   |
| Okada, Kei   | The University of Tokyo   |
| Kawasaki, Koji   | The University of Tokyo   |
| Inaba, Masayuki  | The University of Tokyo   |
| 11:00-11:15  | WeAT13.3                  |
| <i>Humanoid Robot's Force-Based Heavy Manipulation Tasks with Torque-Controlled Arms and Wrist Force Sensors.</i>  |                           |
| Komatsu, Shintaro  | The University of Tokyo   |
| Nagamatsu, Yuya  | The University of Tokyo   |
| Ishikawa, Tatsuya  | The University of Tokyo   |
| Shirai, Takuma   | The University of Tokyo   |
| Kojima, Kunio  | The University of Tokyo   |
| Kakiuchi, Yohei  | The University of Tokyo   |
| Sugai, Fumihito  | The University of Tokyo   |
| Okada, Kei   | The University of Tokyo   |
| Inaba, Masayuki  | The University of Tokyo   |
| 11:15-11:30  | WeAT13.4                  |
| <i>Operational Space Control Framework for Torque Controlled Humanoid Robots with Joint Elasticity.</i>  |                           |
| Jung, Jaesug   | Seoul National University |
| Kim, Donghyeon   | Seoul National University |
| Park, Jaeheung   | Seoul National University |

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| <b>WeAT14</b>   | LG-R14                                       |
| <b>Field Robots I (Regular session)</b>   |  |
| Chair: Rekleitis, Ioannis   | University of South Carolina                 |
| Co-Chair: Shen, Yantao  | University of Nevada, Reno                   |
| 10:30-10:45   | WeAT14.1                                     |
| <i>Autonomous Hybrid Ground/Aerial Mobility in Unknown Environments.</i>                                    |  |
| Fan, David D  | Georgia Institute of Technology              |
| Thakker, Rohan  | Nasa's Jet Propulsion Laboratory, Caltech    |
| Bartlett, Tara  | NASA Jet Propulsion Laboratory               |
| Ben Miled , Meriem  | JPL NASA                                     |
| Kim, Leon   | Columbia University                          |
| Theodorou, Evangelos  | Georgia Institute of Technology              |
| Agha-mohammadi, Ali-akbar   | NASA-JPL, Caltech                            |
| 10:45-11:00   | WeAT14.2                                     |
| <i>An Approximation-Free Simple Control Scheme for Uncertain Quadrotor Systems: Theory and Validations.</i> |  |
| Wang, Gang  | University of Nevada                         |
| Yang, Weixin  | University of Nevada, Reno                   |
| Zhao, Na  | University of Nevada, Reno                   |
| Li, Peng  | Harbin Institute of Technology (ShenZhen)    |
| Shen, Yantao  | University of Nevada, Reno                   |
| Wang, Chaoli  | Univ. of Shanghai for Science and Technology |
| 11:00-11:15   | WeAT14.3                                     |
| <i>Local Pose Optimization with an Attention-Based Neural Network.</i>                                      |  |
| Liu, Yiling   | Shanghai Jiao Tong University                |
| Wang, Hesheng   | Shanghai Jiao Tong University                |
| Xu, Fan   | Shanghai Jiao Tong University                |
| Wang, Yong  | Shanghai Jiao Tong University                |
| Chen, Weidong   | Shanghai Jiao Tong University                |
| Tang, Qirong  | Tongji University                            |
| 11:15-11:30   | WeAT14.4                                     |
| <i>Learning State-Dependent Sensor Measurement Models for Localization.</i>                                 |  |
| Williams, Troi  | University of South Florida                  |
| Sun, Yu   | University of South Florida                  |
| 11:30-11:45   | WeAT14.5                                     |
| <i>Riverine Coverage with an Autonomous Surface Vehicle Over Known Environments.</i>                        |  |
| Karapetyan, Nare  | University of South Carolina                 |
| Braude, Adam  | University of Puget Sound                    |
| Moulton, Jason  | University of South Carolina                 |
| Burstein, Joshua A.   | University of South Carolina                 |
| White, Scott  | University of South Carolina                 |
| O'Kane, Jason   | University of South Carolina                 |
| Rekleitis, Ioannis  | University of South Carolina                 |
| 11:45-12:00   | WeAT14.6                                     |
| <i>Graph-Based Path Planning for Autonomous Robotic Exploration in Subterranean Environments.</i>           |  |
| Dang, Ung   | University of Nevada, Reno                   |
| Mascarich, Frank  | University of Nevada, Reno                   |
| Khattak, Shehryar   | University of Nevada, Reno                   |
| Papachristos, Christos  | University of Nevada, Reno                   |
| Alexis, Kostas  | University of Nevada, Reno                   |

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| <b>WeAT15</b>  | LG-R15   |
| <b>Motion and Path Planning: Aerial and Autonomous Vehicles (Regular session)</b>  |  |
| Chair: Shen, Shaojie   | Hong Kong Univ. of Science and Technology            |
| Co-Chair: Kim, H. Jin  | Seoul National University                            |
| 10:30-10:45  | WeAT15.1   |
| <i>Asynchronous Behavior Trees with Memory Aimed at Aerial Vehicles with Redundancy in Flight Controller.</i>                      |  |
| Safronov, Evgenii  | Skolkovo Institute of Science and Technology         |
| Vilzmann, Michael  | German Aerospace Center (DLR)                        |
| Tsetserukou, Dzmitry   | Skolkovo Institute of Science and Technology         |
| Kondak, Konstantin   | German Aerospace Center                              |
| 10:45-11:00  | WeAT15.2   |
| <i>Sampling-Based Path Planning for Cooperative Autonomous Maritime Vehicles to Reduce Uncertainty in Range-Only Localisation.</i> |  |
| Scharff Willners, Jonatan  | Heriot-Watt University                               |
| Toohey, Lachlan  | The University of Sydney                             |
| Petillot, Yvan R.  | Heriot-Watt University                               |
| 11:00-11:15  | WeAT15.3   |
| <i>Physical Orienteering Problem for Unmanned Aerial Vehicle Data Collection Planning in Environments with Obstacles.</i>          |  |
| Pěnička, Robert  | Czech Technical University in Prague                 |
| Faigl, Jan   | Czech Technical University in Prague                 |
| Saska, Martin  | Czech Technical University in Prague                 |
| 11:15-11:30  | WeAT15.4   |
| <i>Robust and Efficient Quadrotor Trajectory Generation for Fast Autonomous Flight.</i>  |  |
| Zhou, Boyu   | Hong Kong Univ. of Science and Technology            |
| Gao, Fei   | Hong Kong Univ. of Science and Technology            |
| Wang, Luqi   | Hong Kong Univ. of Science and Technology            |
| Liu, Chuhao  | Hong Kong Univ. of Science and Technology            |
| Shen, Shaojie  | Hong Kong Univ. of Science and Technology            |
| 11:30-11:45  | WeAT15.5   |
| <i>Timed-Elastic Smooth Curve Optimization for Mobile-Base Motion Planning.</i>  |  |
| Deray, Jeremie   | Inst. De Robòtica I Informàtica Industrial, CSIC-UPC |
| Magyar, Bence  | Heriot-Watt University                               |
| Solà, Joan   | Inst. De Robòtica I Informàtica Industrial           |
| Andrade-Cetto, Juan  | CSIC-UPC   |
| 11:45-12:00  | WeAT15.6   |
| <i>Robust Trajectory Planning for a Multirotor against Disturbance Based on Hamilton-Jacobi Reachability Analysis.</i>             |  |
| Seo, Hoseong   | Seoul National University                            |
| Lee, Donggun   | UC Berkeley  |
| Son, Clark Youngdong   | Seoul National University                            |
| Tomlin, Claire   | UC Berkeley  |
| Kim, H. Jin  | Seoul National University                            |

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| <b>WeAT16</b>   | LG-R16                                    |
| <b>Grasping and Manipulation (Regular session)</b>  |   |
| Chair: Yim, Mark  | University of Pennsylvania                |
| Co-Chair: Aoyagi, Seiji   | Kansai University                         |
| 10:30-10:45   | WeAT16.1                                  |
| <i>Dynamic Flex-And-Flip Manipulation of Deformable Linear Objects.</i>                             |   |
| Jiang, Chunli   | Hong Kong Univ. of Science and Technology |
| Nazir, Syed Abdullah  | Hong Kong Univ. of Science and Technology |
| Abbasnejad, Ghasem  | Hong Kong Univ. of Science and Technology |
| Seo, Jungwon  | Hong Kong Univ. of Science and Technology |
| 10:45-11:00   | WeAT16.2                                  |
| <i>An Assisted Telemanipulation Approach: Combining Autonomous Grasp Planning with Haptic Cues.</i> |   |
| Adjigble, Komlan Jean Maxime  | University of Birmingham                  |
| Marturi, Naresh   | University of Birmingham                  |
| Ortenzi, Valerio  | University of Birmingham                  |
| Stolkin, Rustam   | University of Birmingham                  |
| 11:00-11:15   | WeAT16.3                                  |
| <i>Robot Finger with Remote Center of Motion Mechanism for Covering Joints with Thick Skin.</i>     |   |
| Hsu, Chincheng  | Waseda University                         |
| Schmitz, Alexander  | Waseda University                         |
| Kusayanagi, Kosuke  | Waseda University                         |
| Sugano, Shigeki   | Waseda University                         |
| 11:15-11:30   | WeAT16.4                                  |
| <i>Spiral Zipper Manipulator for Aerial Grasping and Manipulation.</i>                              |   |
| Liu, Chao   | University of Pennsylvania                |
| Bera, Abhraneel   | University of Pennsylvania                |
| Tsabedze, Thulani   | University of Pennsylvania                |
| Edgar, Daniel   | University of Pennsylvania                |
| Yim, Mark   | University of Pennsylvania                |
| 11:30-11:45   | WeAT16.5                                  |
| <i>Harmonious Sampling for Mobile Manipulation Planning.</i>  |   |
| Kang, Mincheul  | Korea Advanced Inst. of Sci. and Tech     |
| Kim, Donghyuk   | Korea Advanced Inst. of Sci. and Tech     |
| Yoon, Sung-eui  | Korea Advanced Inst. of Sci. and Tech     |
| 11:45-12:00   | WeAT16.6                                  |
| <i>Whole-Body MPC for a Dynamically Stable Mobile Manipulator.</i>                                  |   |
| Minniti, Maria Vittoria   | ETH Zurich                                |
| Farshidian, Farbod  | ETH Zurich                                |
| Grandia, Ruben  | ETH Zurich                                |
| Hutter, Marco   | ETH Zurich                                |

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| <b>WeAT17</b>   | LG-R17                                  |
| <b>Virtual Reality and Interfaces</b> (Regular session)   |   |
| Chair: Kim, Jun-Sik   | Korea Institute of Science & Technology |
| Co-Chair: Chen, Jun   | KDDI Reseach Inc                        |
| 10:30-10:45   | WeAT17.1                                |
| <i>A Virtual Reality Interface for an Autonomous Spray Painting UAV.</i>  |   |
| Vempati, Anurag Sai   | ETH Zurich, Disney Research Zurich      |
| Khurana, Harshit  | ETH Zurich                              |
| Kabelka, Vojtech  | ETH Zurich                              |
| Flueckiger, Simon   | ETH Zurich                              |
| Sieewart, Roland  | ETH Zurich                              |
| Beardsley, Paul   | Disney Research Zurich                  |
| 10:45-11:00   | WeAT17.2                                |
| <i>A Fast Free-Viewpoint Video Synthesis Algorithm for Sports Scenes.</i>   |   |
| Chen, Jun   | KDDI Reseach Inc                        |
| Watanabe, Ryosuke   | KDDI Reseach Inc                        |
| Nonaka, Keisuke   | KDDI Reseach Inc                        |
| Konno, Tomoaki  | KDDI Reseach Inc                        |
| Sankoh, Hiroshi   | KDDI Reseach Inc                        |
| Naito, Sei  | KDDI Reseach Inc                        |
| 11:00-11:15   | WeAT17.3                                |
| <i>Toward an Efficient Hybrid Interaction Paradigm for Object Manipulation in Optical See-Through Mixed Reality.</i>    |   |
| Zhang, Zhenliang  | Beijing Institute of Technology         |
| Weng, Dongdong  | Beijing Institute of Technology         |
| Guo, Jie  | Beijing Institute of Technology         |
| Liu, Yue  | Beijing Institute of Technology         |
| Wang, Yongtian  | Beijing Institute of Technology         |
| 11:15-11:30   | WeAT17.4                                |
| <i>An Augmented Reality Interface for Human-Robot Interaction in Unconstrained Environments.</i>                        |   |
| Chacko, Sonia   | NYU Tandon School of Engineering        |
| Kapila, Vikram  | NYU Tandon School of Engineering        |
| 11:30-11:45   | WeAT17.5                                |
| <i>Evaluation System for Hydraulic Excavator Operation Skill Using Remote Controlled Excavator and Virtual Reality.</i> |   |
| Sekizuka, Ryota   | Hiroshima University                    |
| Ito, Masaru   | Hiroshima University                    |
| Saiki, Seiji  | Kobelco Construction Machinery Co., Ltd |
| Yamazaki, Yoichiro  | Kobelco Construction Machinery Co., Ltd |
| Kurita, Yuichi  | Hiroshima University                    |
| 11:45-12:00   | WeAT17.6                                |
| <i>Multi-Hand Direct Manipulation of Complex Constrained Virtual Objects.</i>   |   |
| Kim, Jun-Sik  | Korea Inst. of Science and Technology   |
| Jeon, MyungHwan   | Korea Advanced Inst. of Sci. and Tech   |
| Park, Jung-Min  | Korea Inst. of Science and Technology   |

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| <b>WeAT18</b>   | LG-R18                                     |
| <b>Localization IV</b> (Regular session)  |  |
| Chair: Milford, Michael J   | Queensland University of Technology        |
| Co-Chair: Schaupp, Lukas  | ETH Zurich                                 |
| 10:30-10:45   | WeAT18.1                                   |
| <i>RONet: Real-Time Range-Only Indoor Localization Via Stacked Bidirectional LSTM with Residual Attention.</i>                            |  |
| Lim, Hyungtae   | Korea Advanced Inst. of Sci. and Tech      |
| Park, Changgwe  | Korea Advanced Inst. of Sci. and Tech      |
| Myung, Hyun   | Korea Advanced Inst. of Sci. and Tech      |
| 10:45-11:00   | WeAT18.2                                   |
| <i>DeepPCO: End-To-End Point Cloud Odometry through Deep Parallel Neural Network.</i>   |  |
| Wang, Wei   | University of Oxford                       |
| Saputra, Muhamad Risqi U.   | University of Oxford                       |
| Zhao, Peijun  | University of Oxford                       |
| Porto Buarque de Gusmão, Pedro  | University of Oxford                       |
| Yang, Bo  | University of Oxford                       |
| Chen, Changhao  | University of Oxford                       |
| Markham, Andrew   | University of Oxford                       |
| Trigoni, Niki   | University of Oxford                       |
| 11:00-11:15   | WeAT18.3                                   |
| <i>OREOS: Oriented Recognition of 3D Point Clouds in Outdoor Scenarios.</i>   |  |
| Schaupp, Lukas  | ETH Zurich                                 |
| Bürki, Mathias  | Autonomous Systems Lab, ETH Zurich         |
| Dubé, Renaud  | ETH Zurich                                 |
| Siegwart, Roland  | ETH Zurich                                 |
| Cadena Lerma, Cesar   | ETH Zurich                                 |
| 11:15-11:30   | WeAT18.4                                   |
| <i>Absolute Localization through Orbital Maps and Surface Perspective Imagery: A Synthetic Lunar Dataset and Neural Network Approach.</i> |  |
| Wu, Benjamin  | National Astronomical Observatory of Japan |
| Potter, Ross  | Brown University                           |
| Ludvig, Philippe  | University of Luxembourg                   |
| Chung, Andrew S.  | Tensorlicious                              |
| Seabrook, Timothy   | University of Oxford                       |
| 11:30-11:45   | WeAT18.5                                   |
| <i>Filter Early, Match Late: Improving Network-Based Visual Place Recognition.</i>  |  |
| Hausler, Stephen  | Queensland University of Technology        |
| Jacobson, Adam  | Queensland University of Technology        |
| Milford, Michael J  | Queensland University of Technology        |



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| <b>WeAT19</b>  | LG-R19   |
| <b>Path Planning for Multiple Robots I (Regular session)</b>   |  |
| Chair: Bian, Gui-Bin   | Institute of Automation, CAS                   |
| Co-Chair: Cichella, Venanzio   | University of Iowa                             |
| 10:30-10:45  | WeAT19.1                                       |
| <i>Cooperative Decentralised Circumnavigation with Application to Algalbloom Tracking.</i>                         |  |
| Fonseca, Joana   | KTH  |
| Wei, Jieqiang  | KTH  |
| Johansson, Karl H.   | Royal Institute of Technology                  |
| Johansen, Tor Arne   | Norwegian University of Science and Technology |
| 10:45-11:00  | WeAT19.2                                       |
| <i>Lazy Compilation of Variants of Multi-Robot Path Planning with Satisfiability Modulo Theory (SMT) Approach.</i> |  |
| Surynek, Pavel   | Czech Technical University                     |
| 11:00-11:15  | WeAT19.3                                       |
| <i>BeBOT: Bernstein Polynomial Toolkit for Trajectory Generation.</i>  |  |
| Kielas-Jensen, Calvin  | University of Iowa                             |
| Cichella, Venanzio   | University of Iowa                             |
| 11:15-11:30  | WeAT19.4                                       |
| <i>Trust but Verify: A Distributed Algorithm for Multi-Robot Wireframe Exploration and Mapping.</i>                |  |
| Caccavale, Adam  | Stanford University                            |
| Schwager, Mac  | Stanford University                            |
| 11:30-11:45  | WeAT19.5                                       |
| <i>Path Planning for Surgery Robot with Bidirectional Continuous Tree Search and Neural Network.</i>               |  |
| Huang, Ruijian   | Institute of Automation, CAS                   |
| Bian, Gui-Bin  | Institute of Automation, CAS                   |
| Xin, Chen  | Beijing Tongren Hospital                       |
| Li, Zhen   | Institute of Automation, CAS                   |
| Hou, Zeng-Guang  | Chinese Academy of Science                     |
| 11:45-12:00  | WeAT19.6                                       |
| <i>Heuristic-Based Multiple Mobile Depots Route Planning for Recharging Persistent Surveillance Robots.</i>        |  |
| Ding, Yifan  | Carnegie Mellon University                     |
| Luo, Wenhao  | Carnegie Mellon University                     |
| Sycara, Katia  | Carnegie Mellon University                     |

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| <b>WeAT20</b>  | LG-R20                                       |
| <b>Biologically-Inspired Robots IV (Regular session)</b>   |  |
| Chair: Gan, Dongming   | Khalifa University of Science AndTechnology  |
| Co-Chair: Gu, Guoying  | Shanghai Jiao Tong University                |
| 10:30-10:45  | WeAT20.1                                     |
| <i>Seeking the Analytical Approximation of the Stance Dynamics of the 3D Spring-Loaded Inverted Pendulum Model by Using Perturbation Approach.</i> |  |
| Yu, Haitao   | Harbin Institute of Technology               |
| Wang, Shengjun   | Harbin Institute of Technology               |
| Shan, Kaizheng   | Harbin Institute of Technology               |
| Li, Jun  | Harbin Institute of Technology               |
| Zhang, Lixian  | Harbin Institute of Technology               |
| Gao, Haibo   | Harbin Institute of Technology               |
| 10:45-11:00  | WeAT20.2                                     |
| <i>Development of an Adaptive Hexapod Robot Based on Follow-The-Contact-Point Gait Control and Timekeeper Control.</i>                             |  |
| Murata, Yuki   | Nagoya University                            |
| Inagaki, Shinkichi   | Nagoya University                            |
| Suzuki, Tatsuya  | Nagoya University                            |
| 11:00-11:15  | WeAT20.3                                     |
| <i>Design, Modeling and Testing of a Flagellum-Inspired Soft Underwater Propeller Exploiting Passive Elasticity.</i>                               |  |
| Calisti, Marcello  | Scuola Superiore Sant'Anna                   |
| Giorgio-Serchi, Francesco  | University of Edinburgh                      |
| Stefanini, Cesare  | Scuola Superiore Sant'Anna                   |
| Farman, Madiha   | Khalifa University of Science and Technology |
| Hussain, Irfan   | Khalifa University of Science and Technology |
| Armanini, Costanza   | Khalifa University of Science and Technology |
| Gan, Dongming  | Khalifa University of Science and Technology |
| Seneviratne, Lakmal  | Khalifa University of Science and Technology |
| Renda, Federico  | Khalifa University of Science and Technology |
| 11:15-11:30  | WeAT20.4                                     |
| <i>Characterizing Environmental Interactions for Soft Growing Robots.</i>  |  |
| Haggerty, David Arthur   | University of California, Santa Barbara      |
| Naclerio, Nicholas   | University of California, Santa Barbara      |
| Hawkes, Elliot Wright  | University of California, Santa Barbara      |
| 11:30-11:45  | WeAT20.5                                     |
| <i>A Multimodal Soft Crawling-Climbing Robot with the Controllable Horizontal Plane to Slope Transition.</i>                                       |  |
| Zhang, Yifan   | Shanghai Jiao Tong University                |
| Ge, Lisen  | Shanghai Jiao Tong University                |
| Zou, Jiang   | Shanghai Jiao Tong University                |
| Xu, Haipeng  | Shanghai Jiao Tong University                |
| Gu, Guoying  | Shanghai Jiao Tong University                |
| 11:45-12:00  | WeAT20.6                                     |
| <i>Effects of Limb Morphology on Transient Locomotion in Quadruped Robots.</i>   |  |
| Raw, Leanne  | University of Cape Town                      |
| Fisher, Callen   | University of Cape Town                      |
| Patel, Amir  | University of Cape Town                      |

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| <b>WeBT1</b>   | <b>L1-R1</b>                     |
| <b>Object Detection and Segmentation II (Regular session)</b>  |                                  |
| Chair: Pers, Janez   | University of Ljubljana          |
| Co-Chair: Liu, Yong  | Zhejiang University              |
| <b>13:00-13:15</b>   | <b>WeBT1.1</b>                   |
| <i>The MaSTr1325 Dataset for Training Deep USV Obstacle Detection Models.</i>                                  |                                  |
| Bovcon, Borja  | University of Ljubljana          |
| Muhovič, Jon   | University of Ljubljana          |
| Pers, Janez  | University of Ljubljana          |
| Kristan, Matej   | University of Ljubljana          |
| <b>13:15-13:30</b>   | <b>WeBT1.2</b>                   |
| <i>Dynamic Density Topological Structure Generation for Real-Time Ladder Affordance Detection.</i>             |                                  |
| Saputra, Azhar Aulia   | Tokyo Metropolitan University    |
| Chin, Wei Hong   | Tokyo Metropolitan University    |
| Toda, Yuichiro   | Okayama University               |
| Takesue, Naoyuki   | Tokyo Metropolitan University    |
| Kubota, Naoyuki  | Tokyo Metropolitan University    |
| <b>13:30-13:45</b>   | <b>WeBT1.3</b>                   |
| <i>EPN: Edge-Aware PointNet for Object Recognition from Multi-View 2.5D Point Clouds.</i>                      |                                  |
| Ahmed, Syeda Mariam  | National University of Singapore |
| Pan, Liang   | National University of Singapore |
| Chew, Chee Meng  | National University of Singapore |
| <b>13:45-14:00</b>   | <b>WeBT1.4</b>                   |
| <i>Real-Time 6D Object Pose Estimation on CPU.</i>   |                                  |
| Konishi, Yoshinori   | SenseTime Japan Ltd              |
| Hattori, Kosuke  | OMRON Corporation                |
| Hashimoto, Manabu  | Chukyo University                |
| <b>14:00-14:15</b>   | <b>WeBT1.5</b>                   |
| <i>Improving 3D Object Detection for Pedestrians with Virtual Multi-View Synthesis Orientation Estimation.</i> |                                  |
| Ku, Jason  | University of Toronto            |
| Pon, Alexander   | University of Toronto            |
| Walsh, Sean  | University of Toronto            |
| Waslander, Steven Lake   | University of Toronto            |
| <b>14:15-14:30</b>   | <b>WeBT1.6</b>                   |
| <i>PASS3D: Precise and Accelerated Semantic Segmentation for 3D Point Cloud.</i>                               |                                  |
| Kong, Xin  | Zhejiang University              |
| Zhai, Guangyao   | Zhejiang University              |
| Zhong, Baoquan   | Zhejiang University              |
| Liu, Yong  | Zhejiang University              |

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| <b>WeBT2</b>   | <b>L1-R2</b>                                    |
| <b>Deep Learning in Robotics and Automation I (Regular session)</b>  |   |
| Chair: Sugiura, Komei  | National Inst. of Info. and Communications Tech |
| Co-Chair: Lu, Cewu   | ShangHai Jiao Tong University                   |
| 13:00-13:15  | WeBT2.1   |
| <i>TendencyRL: Multi-Stage Discriminative Hints for Efficient Goal-Oriented Reverse Curriculum Learning.</i>                           |   |
| Wang, Chen   | Shanghai Jiao Tong University                   |
| Ding, Junfeng  | Shanghai Jiao Tong University                   |
| Chen, Xiangyu  | Shanghai Jiao Tong University                   |
| Ye, Zelin  | Shanghai Jiao Tong University                   |
| Wang, Jialu  | Shanghai Jiao Tong University                   |
| Cai, Ziruo   | Shanghai Jiao Tong University                   |
| Lu, Cewu   | ShangHai Jiao Tong University                   |
| 13:15-13:30  | WeBT2.2   |
| <i>Structured Reward Shaping Using Signal Temporal Logic Specifications.</i>   |   |
| Balakrishnan, Anand  | University of Southern California               |
| Deshmukh, Jyotirmoy  | University of Southern California               |
| 13:30-13:45  | WeBT2.3   |
| <i>Trajectory Optimization for Unknown Constrained Systems Using Reinforcement Learning.</i>   |   |
| Ota, Kei   | Mitsubishi Electric                             |
| Jha, Devesh  | Mitsubishi Electric Research Laboratories       |
| Oiki, Tomohiro   | Mitsubishi Electric                             |
| Miura, Mamoru  | Mitsubishi Electric                             |
| Nammoto, Takashi   | Mitsubishi Electric                             |
| Nikovski, Daniel   | MERL  |
| Mariyama, Toshisada  | Daifuku Co., Ltd                                |
| 13:45-14:00  | WeBT2.4   |
| <i>Understanding Natural Language Instructions for Fetching Daily Objects Using GAN-Based Multimodal Target-Source Classification.</i> |   |
| Magassouba, Aly  | National Inst. of Info. and Communications Tech |
| Sugiura, Komei   | National Inst. of Info. and Communications Tech |
| Trinh Quoc, Anh  | National Inst. of Info. and Communications Tech |
| Kawai, Hisashi   | National Inst. of Info. and Communications Tech |
| 14:00-14:15  | WeBT2.5   |
| <i>Sim-To-Real Transfer for Biped Locomotion.</i>  |   |
| Yu, Wenhao   | Georgia Institute of Technology                 |
| C V Kumar, Visak   | Georgia Institute of Technology                 |
| Turk, Greg   | Georgia Institute of Technology                 |
| Liu, Karen   | Georgia Institute of Technology                 |
| 14:15-14:30  | WeBT2.6   |
| <i>From Pixels to Buildings: End-To-End Probabilistic Deep Networks for Large-Scale Semantic Mapping.</i>                              |   |
| Zheng, Kaiyu   | Brown University                                |
| Pronobis, Andrzej  | University of Washington                        |

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| <b>WeBT3</b>  | <b>L1-R3</b>                               |
| <b>Learning for Motion and Path Planning II (Regular session)</b>   |  |
| Chair: Shen, Shaojie  | Hong Kong Univ. of Science and Technology  |
| Co-Chair: Cao, Qixin  | Shanghai Jiao Tong University              |
| <b>13:00-13:15</b>  | <b>WeBT3.1</b>                             |
| <i>Optimal Solving of Constrained Path-Planning Problems with Graph Convolutional Networks and Optimized Tree Search.</i> |  |
| Osanlou, Kevin  | Lamsade, Paris-Dauphine University         |
| Bursuc, Andrei  | Valeo                                      |
| Guettier, Christophe  | Sagem DS                                   |
| Cazenave, Tristan   | Lamsade, Paris-Dauphine University         |
| Jacopin, Eric   | CREC Saint-Cyr                             |
| <b>13:15-13:30</b>  | <b>WeBT3.2</b>                             |
| <i>Flying through a Narrow Gap Using Neural Network: An End-To-End Planning and Control Approach.</i>                     |  |
| Lin, Jiarong  | The University of Hong Kong                |
| Wang, Luqi  | Hong Kong Univ. of Science and Technology  |
| Gao, Fei  | Hong Kong Univ. of Science and Technology  |
| Shen, Shaojie   | Hong Kong Univ. of Science and Technology  |
| Zhang, Fu   | The University of Hong Kong                |
| <b>13:30-13:45</b>  | <b>WeBT3.3</b>                             |
| <i>Comparison of Deep Reinforcement Learning Policies to Formal Methods for Moving Obstacle Avoidance.</i>                |  |
| Garg, Arpit   | University of New Mexico                   |
| Chiang, Hao-Tien  | University of New Mexico                   |
| Sugaya, Satomi  | University of New Mexico                   |
| Faust, Aleksandra   | Google Brain                               |
| Tapia, Lydia  | University of New Mexico                   |
| <b>13:45-14:00</b>  | <b>WeBT3.4</b>                             |
| <i>Fast Motion Planning Via Free C-Space Estimation Based on Deep Neural Network.</i>                                     |  |
| Li, Xiang   | Shanghai Jiao Tong University              |
| Cao, Qixin  | Shanghai Jiao Tong University              |
| Sun, Mingjing   | Shanghai Jiao Tong University              |
| Yang, Ganggang  | Shanghai Jiao Tong University              |
| <b>14:00-14:15</b>  | <b>WeBT3.5</b>                             |
| <i>Adaptive Deep Path: Efficient Coverage of a Known Environment under Various Configurations.</i>                        |  |
| Chen, Xin   | Georgia Institute of Technology            |
| Tucker, Thomas M.   | Tucker Innovations                         |
| Kurfess, Thomas   | Georgia Institute of Technology            |
| Vuduc, Richard  | Georgia Institute of Technology            |
| <b>14:15-14:30</b>  | <b>WeBT3.6</b>                             |
| <i>Adjusting Weight of Action Decision in Exploration for Logistics Warehouse Picking Learning.</i>                       |  |
| Kato, Yusuke  | Advanced Industrial Science and Technology |
| Nakamura, Tomoaki   | The University of Electro-Communications   |
| Nagai, Takayuki   | Osaka University                           |
| Yamanobe, Natsuki   | Advanced Industrial Science and Technology |
| Nagata, Kazuyuki  | National Inst. of AIST                     |
| Ozawa, Jun  | Panasonic                                  |

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| <b>WeBT4</b>  | <b>L1-R4</b>                            |
| <b>Mechanism Design II (Regular session)</b>  |   |
| Chair: Song, Jae-Bok  | Korea University                        |
| Co-Chair: Lee, Giuk   | Chung-Ang University                    |
| 13:00-13:15   | WeBT4.1                                 |
| <i>3-DOF Gravity Compensation Mechanism for Robot Waists with the Variations of Center of Mass.</i>                         |   |
| Yun, Seong-Ho   | Koreatech, IRIM Lab                     |
| Seo, Jiwon  | Koreatech                               |
| Yoon, Junsuk  | Korea Univ. of Technology and Education |
| Song, Hansol  | Koreatech                               |
| Kim, Yun-Soo  | Koreatech                               |
| Kim, Yong-Jae   | Korea Univ. of Technology and Education |
| 13:15-13:30   | WeBT4.2                                 |
| <i>Wall-Mounted Robot Arm Equipped with 3-DOF Roll-Pitch-Pitch Counterbalance Mechanism.</i>                                |   |
| Lee, Won-Bum  | Korea University                        |
| Moon, ByungYoon   | Korea University                        |
| Kim, Tae-Jung   | Korea University                        |
| Song, Jae-Bok   | Korea University                        |
| 13:30-13:45   | WeBT4.3                                 |
| <i>A Novel 4-DoF Robotic Link Mechanism with E-CoSMo : Kinematics Based Torque Analysis.</i>                                |   |
| Lee, Jaeyong  | Kwangwoon University                    |
| Noh, Jaeho  | Kwangwoon University                    |
| Lee, Sungon   | Hanyang University                      |
| Yang, Woosung   | Kwangwoon University                    |
| 13:45-14:00   | WeBT4.4                                 |
| <i>Design of Compact Variable Gravity Compensator (CVGC) Based on Cam and Variable Pivot of a Lever Mechanism.</i>          |   |
| Kim, Jehyeok  | Seoul National University               |
| Moon, JunYoung  | Chung-Ang University                    |
| Kim, Jongwon  | Seoul National University               |
| Lee, Giuk   | Chung-Ang University                    |
| 14:00-14:15   | WeBT4.5                                 |
| <i>Kinematically Redundant Hybrid Robots with Simple Singularity Conditions and Analytical Inverse Kinematic Solutions.</i> |   |
| Wen, Kefeï  | Université Laval                        |
| Gosselin, Clement   | Université Laval                        |
| 14:15-14:30   | WeBT4.6                                 |
| <i>Unstructured Terrain Navigation and Topographic Mapping with a Low-Cost Mobile Cuboid Robot.</i>                         |   |
| Morgan, Andrew  | Yale University                         |
| Baines, Robert Lawrence   | Yale University                         |
| McClintock, Hayley  | Yale University                         |
| Scassellati, Brian  | Yale University                         |

| WeBT5   |  | L1-R5 |
|---|--|-------|
| Telerobotics and Teleoperation II (Regular session)   |  |       |
| Chair: Liarokapis, Minas  | The University of Auckland                   |       |
| Co-Chair: Behnke, Sven  | University of Bonn                           |       |
| 13:00-13:15   | WeBT5.1                                      |       |
| A Teleoperation Interface for Loco-Manipulation Control of MOBILE Collaborative Robotic Assistant (MOCA).                           |  |       |
| Wu, Yuqiang   | Xi'an Jiaotong University                    |       |
| Balatti, Pietro   | Istituto Italiano Di Tecnologia              |       |
| Lorenzini, Marta  | Istituto Italiano Di Tecnologia              |       |
| Zhao, Fei   | Xi'an Jiaotong University                    |       |
| Kim, Wansoo   | Istituto Italiano Di Tecnologia              |       |
| Ajoudani, Arash   | Istituto Italiano Di Tecnologia              |       |
| 13:15-13:30   | WeBT5.2                                      |       |
| An Intuitive, Affordances Oriented Telemanipulation Framework for a Dual Robot Arm Hand System: On the Execution of Bimanual Tasks. |  |       |
| Gorjup, Gal   | The University of Auckland                   |       |
| Dwivedi, Anany  | The University of Auckland                   |       |
| Elangovan, Nathan   | The University of Auckland                   |       |
| Liarokapis, Minas   | The University of Auckland                   |       |
| 13:30-13:45   | WeBT5.3                                      |       |
| Haptic-Guided Shared Control for Needle Grasping Optimization in Minimally Invasive Robotic Surgery.                                |  |       |
| Selvaggio, Mario  | Università Degli Studi Di Napoli Federico II |       |
| Ghahamzan Esfahani, Amir Masoud   | University of Lincoln                        |       |
| Moccia, Rocco   | Università Degli Studi Di Napoli Federico II |       |
| Ficuciello, Fanny   | Università Di Napoli Federico II             |       |
| Siciliano, Bruno  | Univ. Napoli Federico II                     |       |
| 13:45-14:00   | WeBT5.4                                      |       |
| Connectivity-Preserving Swarm Teleoperation with a Tree Network.  |  |       |
| Yang, Yuan  | University of Victoria                       |       |
| Constantinescu, Daniela   | University of Victoria                       |       |
| Shi, Yang   | University of Victoria                       |       |
| 14:00-14:15   | WeBT5.5                                      |       |
| A VR System for Immersive Teleoperation and Live Exploration with a Mobile Robot.   |  |       |
| Stotko, Patrick   | University of Bonn                           |       |
| Kruppen, Stefan   | University of Bonn                           |       |
| Schwarz, Max  | University of Bonn                           |       |
| Lenz, Christian   | University of Bonn                           |       |
| Behnke, Sven  | University of Bonn                           |       |
| Klein, Reinhard   | University of Bonn                           |       |
| Weinmann, Michael   | University of Bonn                           |       |

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| <b>WeBT6</b>   | L1-R6                                      |
| <b>Aerial Robotics V (Regular session)</b>   |  |
| Chair: Ollero, Anibal  | University of Seville                      |
| Co-Chair: Zufferey, Raphael  | Imperial College of London                 |
| 13:00-13:15  | WeBT6.1                                    |
| <i>Flight Recovery of MAVs with Compromised IMU.</i>   |  |
| Tu, Zhan   | Purdue University                          |
| Fei, Fan   | Purdue University                          |
| Eagon, Matthew   | Purdue University                          |
| Xu, Dongyan  | Purdue University                          |
| Deng, Xinyan   | Purdue University                          |
| 13:15-13:30  | WeBT6.2                                    |
| <i>An Integrated Delta Manipulator for Aerial Repair: A New Aerial Robotic System (I).</i>                             |  |
| Chermprayong, Pisak  | Imperial College London                    |
| Zhang, Ketao   | Queen Mary University of London            |
| Xiao, Feng   | Imperial College London                    |
| Kovac, Mirko   | Imperial College London                    |
| 13:30-13:45  | WeBT6.3                                    |
| <i>Aerial Robots with Advanced Manipulation Capabilities for Inspection and Maintenance: The AEROARMS Project (I).</i> |  |
| Ollero, Anibal   | University of Seville                      |
| Heredia, Guillermo   | University of Seville                      |
| Franchi, Antonio   | LAAS-CNRS                                  |
| Antonelli, Gianluca  | Univ. of Cassino and Southern Lazio        |
| Kondak, Konstantin   | German Aerospace Center                    |
| Sanfeliu, Alberto  | Universitat Politècnica De Catalunya       |
| Viguria, Antidio   | Center for Advanced Aerospace Technologies |
| Martinez-de-Dios, Jose Ramiro  | University of Seville                      |
| Pierrri, Francesco   | Università Della Basilicata                |
| Cortes, Juan   | LAAS-CNRS                                  |
| Santamaria-Navarro, Angel  | CSIC-UPC                                   |
| Trujillo Soto, Miguel Angel  | Center for Advanced Aerospace Technologies |
| Balachandran, Ribin  | DLR  |
| Andrade-Cetto, Juan  | CSIC-UPC                                   |
| Rodriguez Castaño, Angel   | University of Seville                      |
| 13:45-14:00  | WeBT6.4                                    |
| <i>2D Contour Following with an Unmanned Aerial Manipulator: Towards Tactile-Based Aerial Navigation.</i>              |  |
| Hamaza, Salua  | University of Bristol                      |
| Georgilas, Ioannis   | University of Bath                         |
| Richardson, Thomas   | University of Bristol                      |
| 14:00-14:15  | WeBT6.5                                    |
| <i>Sensor Installation and Retrieval Operations Using an Unmanned Aerial Manipulator.</i>                              |  |
| Hamaza, Salua  | University of Bristol                      |
| Georgilas, Ioannis   | University of Bath                         |
| Fernandez, Manuel J  | University of Seville                      |
| Sanchez-Cuevas, Pedro J  | University of Seville                      |
| Richardson, Thomas   | University of Bristol                      |
| Heredia, Guillermo   | University of Seville                      |
| Ollero, Anibal   | University of Seville                      |
| 14:15-14:30  | WeBT6.6                                    |
| <i>Hybrid Force/Motion Control and Implementation of an Aerial Manipulator towards Sustained Contact Operations.</i>   |  |
| Meng, Xiangdong  | Shenyang Institute of Automation, CAS      |
| He, Yuqing   | Shenyang Institute of Automation, CAS      |
| Han, Jianda  | Shenyang Institute of Automation, CAS      |



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| <b>WeBT7</b>   | L1-R7                                |
| <b>Computer Vision and Visual Servoing I (Regular session)</b>   |                                      |
| Chair: Dolan, John M.  | Carnegie Mellon University           |
| Co-Chair: Chen, Weidong  | Shanghai Jiao Tong University        |
| 13:00-13:15  | WeBT7.1                              |
| <i>Retrieval-Based Localization Based on Domain-Invariant Feature Learning under Changing Environments.</i>      |                                      |
| Hu, Hanjiang   | Shanghai Jiao Tong University        |
| Wang, Hesheng  | Shanghai Jiao Tong University        |
| Liu, Zhe   | The Chinese University of Hong Kong  |
| Yang, Chenguang  | University of the West of England    |
| Chen, Weidong  | Shanghai Jiao Tong University        |
| Xie, Le  | Shanghai Jiao Tong University        |
| 13:15-13:30  | WeBT7.2                              |
| <i>Learning Event-Based Height from Plane and Parallax.</i>  |                                      |
| Chaney, Kenneth  | University of Pennsylvania           |
| Zhu, Alex Zihao  | University of Pennsylvania           |
| Daniilidis, Kostas   | University of Pennsylvania           |
| 13:30-13:45  | WeBT7.3                              |
| <i>Attention-Based Hierarchical Deep Reinforcement Learning for Lane Change Behaviors in Autonomous Driving.</i> |                                      |
| Chen, Yilun  | Carnegie Mellon University           |
| Dong, Chiyu  | Carnegie Mellon University           |
| Palanisamy, Praveen  | General Motors                       |
| Mudalige, Priyantha  | General Motors                       |
| Muelling, Katharina  | Carnegie Mellon University           |
| Dolan, John M.   | Carnegie Mellon University           |
| 13:45-14:00  | WeBT7.4                              |
| <i>Improved Exploration through Latent Trajectory Optimization in Deep Deterministic Policy Gradient.</i>        |                                      |
| Luck, Kevin Sebastian  | Arizona State University             |
| Vecerik, Mel   | DeepMind                             |
| Stepputtis, Simon  | Arizona State University             |
| Ben Amor, Heni   | Arizona State University             |
| Scholz, Jonathan   | Google Deepmind                      |
| 14:00-14:15  | WeBT7.5                              |
| <i>A Deep Learning Approach for Robust Corridor Following.</i>   |                                      |
| Dorbala, Vishnu Sashank  | Int. Inst. of Info. Tech., Hyderabad |
| Abdul Hafez, A. H.   | Hasan Kalyoncu University            |
| Jawahar, C.V.  | IIIT, Hyderabad                      |
| 14:15-14:30  | WeBT7.6                              |
| <i>A Framework for Depth Estimation and Relative Localization of Ground Robots Using Computer Vision.</i>        |                                      |
| T. Rodrigues, Rômulo   | University of Porto                  |
| Miraldo, Pedro   | KTH Royal Institute of Technology    |
| Dimarogonas, Dimos V.  | KTH Royal Institute of Technology    |
| Aguiar, A. Pedro   | University of Porto                  |

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| <b>WeBT8</b>   | LG-R8  |
| <b>Autonomous Vehicle Navigation III (Regular session)</b>   |  |
| Chair: Song, Dezhen  | Texas A&M University                         |
| Co-Chair: Dayoub, Feras  | Queensland University of Technology          |
| 13:00-13:15  | WeBT8.1                                      |
| <i>Stochastic Path Planning for Autonomous Underwater Gliders with Safety Constraints.</i>   |  |
| Yoo, Chanyeol  | University of Technology Sydney              |
| Anstee, Stuart David   | Defence Science and Technology Group         |
| Fitch, Robert  | University of Technology Sydney              |
| 13:15-13:30  | WeBT8.2                                      |
| <i>Virtual Lane Boundary Generation for Human-Compatible Autonomous Driving: A Tight Coupling between Perception and Planning.</i> |  |
| Li, Binbin   | Texas A&M University                         |
| Song, Dezhen   | Texas A&M University                         |
| Ramchandani, Ankit   | Texas A&M University                         |
| Cheng, Hsin-Min  | Texas A&M University                         |
| Wang, Di   | Texas A&M University                         |
| Xu, Yiliang  | Tencent America                              |
| Chen, Baifan   | Central South University                     |
| 13:30-13:45  | WeBT8.3                                      |
| <i>Development of a Navigation Algorithm for Optimal Path Planning for Autonomous Electric Vehicles.</i>                           |  |
| Dinges, Marco  | Bertrandt Ingenieurbuero GmbH Cologne        |
| Schilberg, Daniel  | Hochschule Bochum                            |
| Ciethier, Stephan  | Bertrandt Ingenieurbuero GmbH Cologne        |
| 13:45-14:00  | WeBT8.4                                      |
| <i>Did You Miss the Sign? a False Negative Alarm System for Traffic Sign Detectors.</i>  |  |
| Rahman, Quazi Marufur  | Queensland University of Technology          |
| Sünderhauf, Niko   | Queensland University of Technology          |
| Dayoub, Feras  | Queensland University of Technology          |
| 14:00-14:15  | WeBT8.5                                      |
| <i>LiDAR Based Navigable Region Detection for Unmanned Surface Vehicles.</i>   |  |
| Yao, Xiangtong   | Sun Yat-Sen University                       |
| Shan, Yunxiao  | Sun Yat-Sen University                       |
| Li, Jieling  | Sun Yat-Sen University                       |
| Ma, Donghui  | Sun Yat-Sen University                       |
| Huang, Kai   | Sun Yat-Sen University                       |
| 14:15-14:30  | WeBT8.6                                      |
| <i>Dempster Shafer Grid-Based Hybrid Fusion of Virtual Lanes for Autonomous Driving.</i>   |  |
| Uzer, Ferit  | Valeo  |
| Benmokhtar, Rachid   | Valeo Vision - Driving Assistance Res. (DAR) |
| Moujtahid, Salma   | Valeo Vision - Driving Assistance Res. (DAR) |
| perrotton, Xavier  | Valeo  |

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| Chair: Sabattini, Lorenzo     | University of Modena and Reggio Emilia           |
| Co-Chair: Ferraguti, Federica | Università Degli Studi Di Modena E Reggio Emilia |

Organizers

|                    |  |
|--------------------|--|
| Sabattini, Lorenzo | University of Modena and Reggio Emilia |
| Ayanian, Nora      | University of Southern California      |
| Fitch, Robert      | University of Technology Sydney        |
| Franchi, Antonio   | LAAS-CNRS                              |

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Time: 13:00-14:30

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| <b>WeBT10</b>   | LG-R10                           |
| <b>SLAM IV (Regular session)</b>  |                                  |
| Chair: Gu, Dongbing   | University of Essex              |
| Co-Chair: Yue, Haosong  | Beihang University               |
| 13:00-13:15   | WeBT10.1                         |
| <i>Degeneracy in Self-Calibration Revisited and a Deep Learning Solution for Uncalibrated SLAM.</i>                 |                                  |
| Zhuang, Bingbing  | National University of Singapore |
| Tran, Quoc-Huy  | NEC Laboratories America, Inc    |
| Lee, Gim Hee  | National University of Singapore |
| Cheong, Loong Fah   | National University of Singapore |
| Chandraker, Manmohan  | NEC Labs America                 |
| 13:15-13:30   | WeBT10.2                         |
| <i>SGANVO: Unsupervised Deep Visual Odometry and Depth Estimation with Stacked Generative Adversarial Networks.</i> |                                  |
| Feng, Tuo   | University of Essex              |
| Gu, Dongbing  | University of Essex              |
| 13:30-13:45   | WeBT10.3                         |
| <i>Deep Supervised Hashing with Similar Hierarchy for Place Recognition.</i>  |                                  |
| Wu, Lang  | Peking University                |
| Wu, Yihong  | Inst. of Automation, CAS         |
| 13:45-14:00   | WeBT10.4                         |
| <i>Robust Loop Closure Detection Based on Bag of SuperPoints and Graph Verification.</i>                            |                                  |
| Yue, Haosong  | Beihang University               |
| Miao, Jinyu   | Beihang University               |
| Yu, Yue   | Beihang University               |
| Chen, Weihai  | Beihang University               |
| Wen, Changyun   | Nanyang Technological University |
| 14:00-14:15   | WeBT10.5                         |
| <i>Learning Local Feature Descriptor with Motion Attribute for Vision-Based Localization.</i>                       |                                  |
| Song, Yafei   | Alibaba Group                    |
| Zhu, Di   | Alibaba Group                    |
| Li, Jia   | Beihang University               |
| Tian, Yonghong  | Peking University                |
| Li, Mingyang  | Alibaba                          |
| 14:15-14:30   | WeBT10.6                         |
| <i>DeepLocNet: Deep Observation Classification and Ranging Bias Regression for Radio Positioning Systems.</i>       |                                  |
| Dhanjal, Sahib  | University of Michigan           |
| Ghaffari Jadidi, Maani  | University of Michigan           |
| Eustice, Ryan   | University of Michigan           |

| <b>WeBT11</b>   |  | LG-R11                       |
|---|--|------------------------------|
| <b>Surgical Robotics with AI (Cutting Edge Forum)</b>                                 |  |                              |
| Chair: Mitsuishi, Mamoru  |  | The University of Tokyo      |
| Co-Chair: Dario, Paolo  |  | Scuola Superiore Sant'Anna   |
| Organizer   |  |                              |
| Mitsuishi, Mamoru   |  | The University of Tokyo      |
| <hr/>   |  |                              |
| Time: 13:00-16:15   |  |                              |
| <i>Medical Robotics: levels of autonomy and associated challenges</i>                 |  |                              |
| Yang, Guang-Zhong   |  | Imperial College London      |
| <i>Future direction and regulations of surgical robots with AI</i>                    |  |                              |
| Mitsuishi, Mamoru   |  | The University of Tokyo      |
| <i>Toward intelligent robotic assistance for safe manipulation in retinal surgery</i> |  |                              |
| Lordachita, Lulian  |  | Johns Hopkins University     |
| <i>Thoughts on Innovation and Entrepreneurship of Medical Robots in China</i>         |  |                              |
| Wang, Tianmiao  |  | Beihang University           |
| <i>Towards Autonomous Medical Robots</i>  |  |                              |
| Alterovitz, Ron   |  | University of North Carolina |
| <i>Bionic and Bioinspired Solutions for Surgical Robotics</i>                         |  |                              |
| Dario, Paolo  |  | Scuola Superiore Sant'Anna   |

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| <b>WeBT12</b>   | LG-R12   |
| <b>Human-Centered Robotics I (Regular session)</b>  |  |
| Chair: Kawase, Toshihiro  | Tokyo Medical and Dental University                |
| Co-Chair: Fang, Yi  | New York University                                |
| 13:00-13:15   | WeBT12.1   |
| <i>Skill Interaction Categories for Communication in Flexible Human-Robot Teams.</i>  |  |
| Riedelbauch, Dominik  | University of Bayreuth                             |
| Schweizer, Stephan  | University of Bayreuth                             |
| Henrich, Dominik  | University of Bayreuth                             |
| 13:15-13:30   | WeBT12.2   |
| <i>An Assistive Low-Vision Platform That Augments Spatial Cognition through Proprioceptive Guidance: Point-To-Tell-And-Touch.</i> |  |
| Gui, Wenjun   | New York University                                |
| Li, Bingyu  | New York University                                |
| Yuan, Shuaihang   | New York University                                |
| Rizzo, John-Ross  | NYU School of Medicine / NYU Tandon School of Eng. |
| Sharma, Lakshay   | New York University                                |
| Feng, Chen  | New York University                                |
| Tzes, Anthony   | New York University Abu Dhabi                      |
| Fang, Yi  | New York University                                |
| 13:30-13:45   | WeBT12.3   |
| <i>Adaptive Swept Volumes Generation for Human-Robot Coexistence Using Gaussian Processes.</i>                                    |  |
| Casalino, Andrea  | Politecnico Di Milano                              |
| Brameri, Alberto  | Politecnico Di Milano                              |
| Zanchettin, Andrea Maria  | Politecnico Di Milano                              |
| Rocco, Paolo  | Politecnico Di Milano                              |
| 13:45-14:00   | WeBT12.4   |
| <i>Development of an Arm Curl Machine with Variable Resistance Using Pneumatic Artificial Rubber Muscle.</i>                      |  |
| Nakanishi, Tomoya   | Tokyo Medical and Dental University                |
| Kawase, Toshihiro   | Tokyo Medical and Dental University                |
| Aizawa, Junya   | Tokyo Medical and Dental University                |
| Yoshida, Shintaro   | Bridgestone Corporation                            |
| Ohno, Shingo  | Bridgestone Corporation                            |
| Sakurai, Ryo  | Bridgestone Corporation                            |
| Miyazaki, Tetsuro   | Tokyo Medical and Dental University                |
| Kanno, Takahiro   | Tokyo Medical and Dental University                |
| Kawashima, Kenji  | Tokyo Medical and Dental University                |
| 14:00-14:15   | WeBT12.5   |
| <i>Follow the Robot: Modeling Coupled Human-Robot Dyads During Navigation.</i>  |  |
| Nanavati, Amal  | Carnegie Mellon University                         |
| Tan, Xiang Zhi  | Carnegie Mellon University                         |
| Connolly, Joe   | Yale University                                    |
| Steinfeld, Aaron  | Carnegie Mellon University                         |
| 14:15-14:30   | WeBT12.6   |
| <i>Learn to Adapt to Human Walking: A Model-Based Reinforcement Learning Approach for a Robotic Assistant Rollator.</i>           |  |
| Chalvatzaki, Georgia  | National Technical University of Athens            |
| Papageorgiou, Xanthi S.   | ATHENA Research Center                             |
| Maragos, Petros   | National Technical University of Athens            |
| Tzafestas, Costas S.  | ICCS - Inst of Communication and Computer Systems  |

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| <b>WeBT13</b>   | LG-R13                                     |
| <b>Humanoid Robots II</b> (Regular session)   |  |
| Chair: Aoyama, Tadayoshi  | Nagoya University                          |
| Co-Chair: Tsagarakis, Nikos   | Istituto Italiano Di Tecnologia            |
| 13:00-13:15   | WeBT13.1                                   |
| <i>Generating a Key Pose Sequence Based on Kinematics and Statics Optimization for Manipulating a Heavy Object by a Humanoid Robot.</i>   |  |
| Shigematsu, Riku  | The University of Tokyo                    |
| Murooka, Masaki   | The University of Tokyo                    |
| Kakiuchi, Yohei   | The University of Tokyo                    |
| Okada, Kei  | The University of Tokyo                    |
| Inaba, Masayuki   | The University of Tokyo                    |
| 13:15-13:30   | WeBT13.2                                   |
| <i>Whole-Body Control of Humanoid Robot in 3D Multi-Contact under Contact Wrench Constraints Including Joint Load Reduction with Self-Collision and Internal Wrench Distribution.</i> |  |
| Hiraoka, Naoki  | The University of Tokyo                    |
| Murooka, Masaki   | The University of Tokyo                    |
| Ito, Hideaki  | The University of Tokyo                    |
| Yanokura, Iori  | The University of Tokyo                    |
| Okada, Kei  | The University of Tokyo                    |
| Inaba, Masayuki   | The University of Tokyo                    |
| 13:30-13:45   | WeBT13.3                                   |
| <i>Learning Grasp Affordance Reasoning through Semantic Relations.</i>  |  |
| Ardón, Paola  | Edinburgh Centre for Robotics              |
| Pairat, Èric  | Edinburgh Centre for Robotics              |
| Petrack, Ron  | Heriot-Watt University                     |
| Ramamoorthy, Subramanian  | The University of Edinburgh                |
| Lohan, Katrin Solveig   | Heriot-Watt University                     |
| 13:45-14:00   | WeBT13.4                                   |
| <i>Synchronizing Virtual Constraints and Preview Controller: A Walking Pattern Generator for the Humanoid Robot COMAN+.</i>   |  |
| Ruscelli, Francesco   | Istituto Italiano Di Tecnologia            |
| Laurenzi, Arturo  | Istituto Italiano Di Tecnologia            |
| Mingo Hoffman, Enrico   | Fondazione Istituto Italiano Di Tecnologia |
| Tsagarakis, Nikos   | Istituto Italiano Di Tecnologia            |
| 14:00-14:15   | WeBT13.5                                   |
| <i>A Ring Network Protocol for Articulated Robots.</i>  |  |
| Ishizaki, Ryusuke   | Honda Research Institute Japan Co., Ltd    |
| Misumi, Takeshi   | Honda R&D Co., Ltd                         |
| Yoshiike, Takahide  | Honda Research Institute Japan             |

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| <b>WeBT14</b>  | LG-R14                                    |
| <b>Field Robots II (Regular session)</b>   |   |
| Chair: Milford, Michael J  | Queensland University of Technology       |
| Co-Chair: Wang, Shuo   | Chinese Academy of Sciences               |
| 13:00-13:15  | WeBT14.1                                  |
| <i>3D Move to See: Multi-Perspective Visual Servoing towards the Next Best View within Unstructured and Occluded Environments.</i> |   |
| Lehnert, Christopher   | Queensland University of Technology       |
| Tsai, Dorian   | Queensland University of Technology       |
| Eriksson, Anders   | University of Queensland                  |
| McCool, Christopher Steven   | University of Bonn                        |
| 13:15-13:30  | WeBT14.2                                  |
| <i>Forest Tree Detection and Segmentation Using High Resolution Airborne LiDAR.</i>  |   |
| Windrim, Lloyd   | University of Sydney                      |
| Bryson, Mitch  | University of Sydney                      |
| 13:30-13:45  | WeBT14.3                                  |
| <i>Manipulation Purpose Underwater Agent Vehicle for Ghost Net Recovery Mission.</i>   |   |
| Kim, Juhwan  | Pohang Univ. of Sci. and Tech. (POSTECH)  |
| Kim, Taesik  | Pohang Univ. of Sci. and Tech. (POSTECH)  |
| Kim, Jason   | Pohang Univ. of Sci. and Tech. (POSTECH)  |
| Yu, Son-Cheol  | Pohang Univ. of Sci. and Tech. (POSTECH)  |
| 13:45-14:00  | WeBT14.4                                  |
| <i>Self-Modeling Tracking Control of Crawler Fire Fighting Robot Based on Causal Network.</i>                                      |   |
| Chang, Wenkai  | Institute of Automation, CAS              |
| Li, Peng   | Institute of Automation, CAS              |
| Yang, Caiyun   | Institute of Automation, CAS              |
| Lu, Tao  | The Hi-Tech Innovation Engineering Center |
| Cai, Yinghao   | Institute of Automation, CAS              |
| Wang, Shuo   | Chinese Academy of Sciences               |
| 14:00-14:15  | WeBT14.5                                  |
| <i>Sim-To-Real Learning for Casualty Detection from Ground Projected Point Cloud Data.</i>   |   |
| Saputra, Roni Permana  | Imperial College London                   |
| Rakicevic, Nemanja   | Imperial College London                   |
| Kormushev, Petar   | Imperial College London                   |
| 14:15-14:30  | WeBT14.6                                  |
| <i>TIMTAM: Tunnel-Image Texturally-Accorded Mosaic for Location Refinement of Underground Vehicles with a Single Camera.</i>       |   |
| Zeng, Fan  | Queensland University of Technology       |
| Jacobson, Adam   | Queensland University of Technology       |
| Smith, David   | Caterpillar                               |
| Boswell, Nigel   | Caterpillar                               |
| Peynot, Thierry  | Queensland University of Technology (QUT) |
| Milford, Michael J   | Queensland University of Technology       |



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| <b>WeBT15</b>  | <b>LG-R15</b>                         |
| <b>Motion and Path Planning: Learning and Adaptive Systems (Regular session)</b>                                 |                                       |
| Chair: Seabra Lopes, Luís  | Universidade De Aveiro                |
| Co-Chair: Yip, Michael C.  | University of California, San Diego   |
| <b>13:00-13:15</b>   | <b>WeBT15.1</b>                       |
| <i>NeuroTrajectory: A Neuroevolutionary Approach to Local State Trajectory Learning for Autonomous Vehicles.</i> |                                       |
| Grigorescu, Sorin Mihai  | Transilvania University of Brasov     |
| Trasnea, Bogdan  | Transilvania University of Brasov     |
| Marina, Liviu Alexandru  | Transilvania University of Brasov     |
| Vasilcoi, Andrei   | Elektrobit Automotive                 |
| Cocias, Tiberiu Teodor   | Transilvania University of Brasov     |
| <b>13:15-13:30</b>   | <b>WeBT15.2</b>                       |
| <i>Adaptive Trajectory Planning and Optimization at Limits of Handling.</i>                                      |                                       |
| Svensson, Lars   | KTH Royal Institute of Technology     |
| Bujarbaruah, Monimoy   | UC Berkeley                           |
| Kapania, Nitin   | Stanford University                   |
| Tornngren, Martin  | KTH Royal Institute of Technology     |
| <b>13:30-13:45</b>   | <b>WeBT15.3</b>                       |
| <i>Jointly Learnable Behavior and Trajectory Planning for Self-Driving Vehicles.</i>                             |                                       |
| Sadat, Abbas   | Uber                                  |
| Ren, Mengye  | University of Toronto, Uber ATG       |
| Pokrovsky, Andrei  | Uber                                  |
| Lin, Yen-Chen  | Massachusetts Institute of Technology |
| Yumer, Ersin   | Uber ATG                              |
| Urtasun, Raquel  | University of Toronto                 |
| <b>13:45-14:00</b>   | <b>WeBT15.4</b>                       |
| <i>Information-Guided Robotic Maximum Seek-And-Sample in Partially Observable Continuous Environments.</i>       |                                       |
| Preston, Victoria  | Massachusetts Institute of Technology |
| Flaspohler, Genevieve  | Massachusetts Institute of Technology |
| Michel, Anna Pauline Miranda   | Woods Hole Oceanographic Institution  |
| Girdhar, Yogesh  | Woods Hole Oceanographic Institution  |
| Roy, Nicholas  | Massachusetts Institute of Technology |
| <b>14:00-14:15</b>   | <b>WeBT15.5</b>                       |
| <i>Neural Path Planning: Fixed Time, Near-Optimal Path Generation Via Oracle Imitation.</i>                      |                                       |
| Bency, Mayur J.  | University of California, San Diego   |
| Qureshi, Ahmed Hussain   | University of California, San Diego   |
| Yip, Michael C.  | University of California, San Diego   |
| <b>14:15-14:30</b>   | <b>WeBT15.6</b>                       |
| <i>Learning the Scope of Applicability for Task Planning Knowledge in Experience-Based Planning Domains.</i>     |                                       |
| Mokhtari, Vahid  | KU Leuven - University                |
| Manevich, Roman  | The University of Texas at Austin     |
| Seabra Lopes, Luís   | Universidade De Aveiro                |
| Pinho, Armando   | University of Aveiro                  |

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| <b>WeBT16</b>  | LG-R16                            |
| <b>Perception for Grasping and Manipulation I (Regular session)</b>  |                                   |
| Chair: Li, Xiaojian  | Hefei University of Technology    |
| Co-Chair: Giguère, Philippe  | Université Laval                  |
| 13:00-13:15  | WeBT16.1                          |
| <i>Learning to Estimate Pose and Shape of Hand-Held Objects from RGB Images.</i>                                     |                                   |
| Kokic, Mia   | KTH                               |
| Kragic, Danica   | KTH                               |
| Bohg, Jeannette  | Stanford University               |
| 13:15-13:30  | WeBT16.2                          |
| <i>GRIP: Generative Robust Inference and Perception for Semantic Robot Manipulation in Adversarial Environments.</i> |                                   |
| Chen, Xiaotong   | University of Michigan            |
| Chen, Rui  | University of Michigan            |
| Sui, Zhiqiang  | University of Michigan            |
| Ye, Zhefan   | University of Michigan, Ann Arbor |
| Liu, Yanqi   | Brown University                  |
| Bahar, Iris  | Brown University                  |
| Jenkins, Odest Chadwicke   | University of Michigan            |
| 13:30-13:45  | WeBT16.3                          |
| <i>GQ-STN: Optimizing One-Shot Grasp Detection Based on Robustness Classifier.</i>                                   |                                   |
| Gariépy, Alexandre   | Laval University                  |
| Ruel, Jean-Christophe  | Laval University                  |
| Chaib-draa, Brahim   | Laval University                  |
| Giguère, Philippe  | Laval University                  |
| 13:45-14:00  | WeBT16.4                          |
| <i>Multi-Step Pick-And-Place Tasks Using Object-Centric Dense Correspondences.</i>                                   |                                   |
| Chai, Chun-Yu  | National Chiao Tung University    |
| Hsu, Keng-Fu   | National Chiao Tung University    |
| Tsao, Shiao-Li   | National Chiao Tung University    |
| 14:00-14:15  | WeBT16.5                          |
| <i>Toward Affordance Detection and Ranking on Novel Objects for Real-World Robotic Manipulation.</i>                 |                                   |
| Chu, Fu-Jen  | University of Michigan            |
| Xu, Ruinian  | Georgia Institute of Technology   |
| Seguin, Landan   | Georgia Institute of Technology   |
| Vela, Patricio   | Georgia Institute of Technology   |
| 14:15-14:30  | WeBT16.6                          |
| <i>Self-Supervised Transfer Learning for Instance Segmentation through Physical Interaction.</i>                     |                                   |
| Eitel, Andreas   | University of Freiburg            |
| Burgard, Wolfram   | University of Freiburg            |

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| <b>WeBT17</b>   | <b>LG-R17</b>                             |
| <b>Wearable Robots (Regular session)</b>  |   |
| Chair: Su, Hao  | City University of New York, City College |
| Co-Chair: Agrawal, Sunil  | Columbia University                       |
| 13:00-13:15   | WeBT17.1                                  |
| <i>Inertial-Based Motion Capturing and Smart Training System.</i>   |   |
| Windau, Jens  | University of Southern California         |
| Itti, Laurent   | University of Southern California         |
| 13:15-13:30   | WeBT17.2                                  |
| <i>Design and Control of a High-Torque and Highly-Backdrivable Hybrid Soft Exoskeleton for Knee Injury Prevention During Squatting.</i> |   |
| Yu, Shuangyue   | City University of New York, City College |
| Huang, Tzu-Hao  | City College of New York                  |
| Wang, Dianpeng  | City University of New York, City College |
| Lynn, Brian Patrick   | City University of New York, City College |
| Sayd, Dina  | City University of New York, City College |
| Silivanov, Viktor   | City University of New York, City College |
| Park, Young Soo   | Argonne National Laboratory               |
| Tian, Yingli  | City University of New York, City College |
| Su, Hao   | City University of New York, City College |
| 13:30-13:45   | WeBT17.3                                  |
| <i>Development of Adjustable Knee Assist Device for Wearable Robot Based on Linkage and Rolling Joint.</i>                              |   |
| Choi, Byungjune   | Samsung Advanced Institute of Technology  |
| Lee, Younbaek   | Samsung Electronics Co., Ltd              |
| Lee, Jongwon  | Samsung Advanced Institute of Technology  |
| Lee, Minhyung   | Samsung Advanced Institute of Technology  |
| Lim, Bokman   | Samsung Electronics Co., Ltd              |
| Park, Young Jin   | Samsung Advanced Institute of Technology  |
| Kim, Kyung-Rock   | Samsung Electronics Co., Ltd              |
| Kim, Yong-Jae   | Korea Univ. of Technology and Education   |
| Shim, Youngbo   | Samsung Electronics Co., Ltd              |
| 13:45-14:00   | WeBT17.4                                  |
| <i>Exo Wrist: A Soft Tendon Driven Wrist Wearable Robot with Active Anchor for Dart Throwing Motion in Hemiplegic Patients.</i>         |   |
| Choi, Hyungmin  | Seoul National University                 |
| Kang, Brian Byunghyun   | Seoul National University                 |
| Jung, Bong-Keun   | Seoul National University                 |
| Cho, Kyu-Jin  | Seoul National University                 |
| 14:00-14:15   | WeBT17.5                                  |
| <i>Walking with Augmented Reality Real-Time Visual Feedback Wearing a Cable-Driven Active Leg Exoskeleton (C-ALEX).</i>                 |   |
| Hidayah, Rand   | Columbia University                       |
| Chamrathy, Siddharth  | Quadrus Medical Technologies              |
| Maguire Fitzgerald, Matthew   | Columbia University                       |
| Shah, Avni  | Columbia University                       |
| Agrawal, Sunil  | Columbia University                       |
| 14:15-14:30   | WeBT17.6                                  |
| <i>Adaptive Assist-As-Needed Control Based on Actor-Critic Reinforcement Learning.</i>  |   |
| Zhang, Yufeng   | Stevens Institute of Technology           |
| Li, Shuai   | Stevens Institute of Technology           |
| Nolan, Karen J.   | Kessler Foundation                        |
| Zanotto, Damiano  | Stevens Institute of Technology           |

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| <b>WeBT18</b>  | LG-R18                                       |
| <b>Swarm Robotics (Regular session)</b>  |  |
| Chair: Tang, Qirong  | Tongji University                            |
| Co-Chair: Hauert, Sabine   | University of Bristol                        |
| 13:00-13:15  | WeBT18.1                                     |
| <i>Toward Controllable Morphogenesis in Large Robot Swarms.</i>  |  |
| Carrillo-Zapata, Daniel  | Bristol Robotics Laboratory                  |
| Sharpe, James  | European Molecular Biology Laboratory        |
| Winfield, Alan Frank   | University of the West of England, Bristol   |
| Giuggioli, Luca  | University of Bristol                        |
| Hauert, Sabine   | University of Bristol                        |
| 13:15-13:30  | WeBT18.2                                     |
| <i>Segregation and Flow of Modules in a Robot Swarm Utilising the Brazil Nut Effect.</i>   |  |
| Joshi, Devvrat Omkar   | Osaka University                             |
| Shimizu, Masahiro  | Osaka University                             |
| Hosoda, Koh  | Osaka University                             |
| 13:30-13:45  | WeBT18.3                                     |
| <i>Self-Organized Adaptive Paths in Multi-Robot Manufacturing: Reconfigurable and Pattern-Independent Fibre Deployment.</i>                            |  |
| Eschke, Catriona   | Helmholtz-Zentrum Geesthacht                 |
| Heinrich, Mary Katherine   | University of Luebeck                        |
| Wahby, Mostafa   | Universität Zu Lübeck, Technische Informatik |
| Hamann, Heiko  | University of Luebeck                        |
| 13:45-14:00  | WeBT18.4                                     |
| <i>Clone Swarms: Learning to Predict and Control Multi-Robot Systems by Imitation.</i>   |  |
| Zhou, Siyu   | Arizona State University                     |
| Phielipp, Mariano  | Intel Corporation                            |
| Sefair, Jorge A.   | Arizona State University                     |
| Walker, Sara Imari   | Arizona State University                     |
| Ben Amor, Henri  | Arizona State University                     |
| 14:00-14:15  | WeBT18.5                                     |
| <i>Plasticity in Collective Decision-Making for Robots: Creating Global Reference Frames, Detecting Dynamic Environments, and Preventing Lock-Ins.</i> |  |
| Divband Soorati, Mohammad  | University of Southampton                    |
| Krome, Maximilian  | University of Luebeck                        |
| Mora-Mendoza, Marco  | Stanford University                          |
| Ghofrani, Javad  | Dresden University of Applied Sciences       |
| Hamann, Heiko  | University of Luebeck                        |
| 14:15-14:30  | WeBT18.6                                     |
| <i>Non-Uniform Robot Densities in Vibration Driven Swarms Using Phase Separation Theory.</i>   |  |
| Mayya, Siddharth   | Georgia Institute of Technology              |
| Notomista, Gennaro   | Georgia Institute of Technology              |
| Shell, Dylan   | Texas A&M University                         |
| Hutchinson, Seth   | Georgia Institute of Technology              |
| Egerstedt, Magnus  | Georgia Institute of Technology              |

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| <b>WeBT19</b>   | <b>LG-R19</b>   |
| <b>Path Planning for Multiple Robots II (Regular session)</b>   |   |
| Chair: Kantaros, Yiannis  | University of Pennsylvania  |
| Co-Chair: Zhou, Yimin   | Chinese Academy of Sciences                                       |
| <b>13:00-13:15</b>  | <b>WeBT19.1</b>   |
| <i>Constrained Heterogeneous Vehicle Path Planning for Large-Area Coverage.</i>                           |   |
| Deng, Di  | Carnegie Mellon University  |
| Jing, Wei   | A*STAR  |
| Fu, Yuhe  | Carnegie Mellon University  |
| Huang, Ziyin  | Carnegie Mellon University  |
| Liu, Jiahong  | Carnegie Mellon University  |
| Shimada, Kenji  | Carnegie Mellon University  |
| <b>13:15-13:30</b>  | <b>WeBT19.2</b>   |
| <i>Combining Stochastic Optimization and Frontiers for Aerial Multi-Robot Exploration of 3D Terrains.</i> |   |
| Renzaglia, Alessandro   | INRIA   |
| Dibangoye, Jilles   | INSA Lyon   |
| Le Doze, Vincent  | INRIA   |
| Simonin, Olivier  | INSA De Lyon  |
| <b>13:30-13:45</b>  | <b>WeBT19.3</b>   |
| <i>Optimal Temporal Logic Planning for Multi-Robot Systems in Uncertain Semantic Maps.</i>                |   |
| Kantaros, Yiannis   | University of Pennsylvania  |
| Pappas, George J.   | University of Pennsylvania  |
| <b>13:45-14:00</b>  | <b>WeBT19.4</b>   |
| <i>Multi Robot Route Planning (MRRP): Extended Spatial-Temporal Prioritized Planning.</i>                 |   |
| Binder, Benjamin  | Vienna University of Technology                                   |
| Beck, Florian   | Vienna University of Technology                                   |
| König, Felix  | TU Vienna   |
| Bader, Markus   | Vienna University of Technology                                   |
| <b>14:00-14:15</b>  | <b>WeBT19.5</b>   |
| <i>An Optimal Algorithm to Solve the Combined Task Allocation and Path Finding Problem.</i>               |   |
| Henkel, Christian   | University of Stuttgart   |
| Abbenseth, Jannik   | Fraunhofer Institute for Manufacturing Engineering and Automation |
| Toussaint, Marc   | University of Stuttgart   |
| <b>14:15-14:30</b>  | <b>WeBT19.6</b>   |
| <i>Scheduling of Mobile Workstations for Overlapping Production Time and Delivery Time.</i>               |   |
| Lee, Dohee  | Ulsan National Inst. of Science and Technology                    |
| Au, Tsz-Chiu  | Ulsan National Inst. of Science and Technology                    |

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| <b>WeBT20</b>   | LG-R20   |
| <b>Neurorobotics (Regular session)</b>  |  |
| Chair: Shibata, Tomohiro  | Kyushu Institute of Technology                 |
| Co-Chair: Bongard, Josh   | University of Vermont                          |
| 13:00-13:15   | WeBT20.1                                       |
| <i>Word2vec to Behavior: Morphology Facilitates the Grounding of Language in Machines.</i>                              |  |
| Matthews, David   | University of Vermont                          |
| Kriegman, Sam   | University of Vermont                          |
| Cappelle, Collin  | University of Vermont                          |
| Bongard, Josh   | University of Vermont                          |
| 13:15-13:30   | WeBT20.2                                       |
| <i>Combining Spiking Motor Primitives with a Behavior-Based Architecture to Model Locomotion for Six-Legged Robots.</i> |  |
| Vasquez Tieck, Juan Camilo  | FZI Forschungszentrum Informatik               |
| Rutschke, Jacqueline  | Karlsruhe Institute of Technology (KIT)        |
| Kaiser, Jacques   | FZI Forschungszentrum Informatik               |
| Schulze, Martin   | FZI Research Center for Information Technology |
| Buettner, Timothee  | FZI Research Center for Information Technology |
| Reichard, Daniel  | FZI Research Center for Information Technology |
| Roennau, Arne   | FZI Forschungszentrum Informatik, Karlsruhe    |
| Dillmann, Rüdiger   | FZI - Forschungszentrum Informatik - Karlsruhe |
| 13:30-13:45   | WeBT20.3                                       |
| <i>A Multiclass EEG Signal Classification Model Using Spatial Feature Extraction and XGBoost Algorithm.</i>             |  |
| Tiwari, Anurag  | Indian Institute of Technology, Varanasi       |
| Chaturvedi, Amrita  | Indian Institute of Technology (BHU), Varanasi |
| 13:45-14:00   | WeBT20.4                                       |
| <i>Spiking Neural Network on Neuromorphic Hardware for Energy-Efficient Unidimensional SLAM.</i>                        |  |
| Tang, Guangzhi  | Rutgers University                             |
| Shah, Arpit   | Rutgers University                             |
| Michmizos, Konstantinos   | Rutgers University                             |
| 14:00-14:15   | WeBT20.5                                       |
| <i>A Neurologically Inspired Sequence Processing Model for Mobile Robot Place Recognition.</i>                          |  |
| Neubert, Peer   | Chemnitz University of Technology              |
| Schubert, Stefan  | Chemnitz University of Technology              |
| Protzel, Peter  | Chemnitz University of Technology              |

| WeCT1  | L1-R1  |
|--|--|
| <b>Semantic Scene Understanding I</b> (Regular session)  |  |
| Chair: Scalise, Rosario  | University of Washington                         |
| Co-Chair: Stachniss, Cyrill  | University of Bonn                               |
| 14:45-15:00  | WeCT1.1  |
| <i>Learning Topometric Semantic Maps from Occupancy Grids.</i>                                       |  |
| Hiller, Markus   | Friedrich-Alexander University Erlangen-Nürnberg |
| Qiu, Chen  | Friedrich-Alexander University Erlangen-Nürnberg |
| Particke, Florian  | Friedrich-Alexander University Erlangen-Nürnberg |
| Hofmann, Christian   | Friedrich-Alexander University Erlangen-Nürnberg |
| Thielecke, Jörn  | Friedrich-Alexander University Erlangen-Nürnberg |
| 15:00-15:15  | WeCT1.2  |
| <i>DEDUCE: Diverse scEnE Detection Methods in Unseen Challenging Environments.</i>                   |  |
| Pal, Anwesun   | University of California, San Diego              |
| Nieto-Granda, Carlos   | Georgia Institute of Technology                  |
| Christensen, Henrik Iskov  | UC San Diego                                     |
| 15:15-15:30  | WeCT1.3  |
| <i>PanopticFusion: Online Volumetric Semantic Mapping at the Level of Stuff and Things.</i>          |  |
| Narita, Gaku   | Sony Corporation                                 |
| Seno, Takashi  | Sony Corporation                                 |
| Ishikawa, Tomoya   | Sony Corporation                                 |
| Kaji, Yohsuke  | Sony Corporation                                 |
| 15:30-15:45  | WeCT1.4  |
| <i>RangeNet++: Fast and Accurate LiDAR Semantic Segmentation.</i>                                    |  |
| Milioto, Andres  | University of Bonn                               |
| Vizzo, Ignacio   | University of Bonn                               |
| Behley, Jens   | University of Bonn                               |
| Stachniss, Cyrill  | University of Bonn                               |
| 15:45-16:00  | WeCT1.5  |
| <i>Automatic Spatial Template Generation for Realistic 3D Modeling of Large-Scale Indoor Spaces.</i> |  |
| Hyeon, Janghun   | Korea University                                 |
| Choi, Hyunga   | Korea University                                 |
| Kim, Joo Hyung   | Korea University                                 |
| Jang, Bumchul  | Korea University                                 |
| Kang, Jaehyeon   | Korea University                                 |
| Doh, Nakju   | Korea University                                 |
| 16:00-16:15  | WeCT1.6  |
| <i>Improving Robot Success Detection Using Static Object Data.</i>                                   |  |
| Scalise, Rosario   | University of Washington                         |
| Thomason, Jesse  | University of Washington                         |
| Bisk, Yonatan  | University of Washington                         |
| Srinivasa, Siddhartha  | University of Washington                         |

| WeCT2  |                                       | L1-R2 |
|--|---------------------------------------|-------|
| Deep Learning in Robotics and Automation II (Regular session)  |                                       |       |
| Chair: Yang, Guang-Zhong   | Imperial College London               |       |
| Co-Chair: Jung, Bernhard   | TU Bergakademie Freiberg              |       |
| 14:45-15:00  | WeCT2.1                               |       |
| Stochastic Sampling Simulation for Pedestrian Trajectory Prediction.                                   |                                       |       |
| Anderson, Cyrus  | University of Michigan                |       |
| Du, Xiaoxiao   | University of Michigan                |       |
| Vasudevan, Ram   | University of Michigan                |       |
| Johnson-Roberson, Matthew  | University of Michigan                |       |
| 15:00-15:15  | WeCT2.2                               |       |
| Learning Multiple Sensorimotor Units to Complete Compound Tasks Using an RNN with Multiple Attractors. |                                       |       |
| Kase, Kei  | Waseda University                     |       |
| Nakajo, Ryoichi  | Waseda University                     |       |
| Mori, Hiroki   | Waseda University                     |       |
| Ogata, Tetsuya   | Waseda University                     |       |
| 15:15-15:30  | WeCT2.3                               |       |
| A Novel Approach for Outlier Detection and Robust Sensory Data Model Learning.                         |                                       |       |
| Cursi, Francesco   | Imperial College London               |       |
| Yang, Guang-Zhong  | Imperial College London               |       |
| 15:30-15:45  | WeCT2.4                               |       |
| Deep Learning of Proprioceptive Models for Robotic Force Estimation.                                   |                                       |       |
| Berger, Erik   | TU Bergakademie Freiberg              |       |
| Eger Passos, Daniel  | TU Bergakademie Freiberg              |       |
| Grehl, Steve   | TU Bergakademie Freiberg              |       |
| Ben Amor, Heni   | Arizona State University              |       |
| Jung, Bernhard   | TU Bergakademie Freiberg              |       |
| 15:45-16:00  | WeCT2.5                               |       |
| Omnipush: Accurate, Diverse, Real-World Dataset of Pushing Dynamics with RGB-D Video.                  |                                       |       |
| Bauza Villalonga, Maria  | Massachusetts Institute of Technology |       |
| Alet, Ferran   | Massachusetts Institute of Technology |       |
| Lin, Yen-Chen  | Massachusetts Institute of Technology |       |
| Lozano-Perez, Tomas  | Massachusetts Institute of Technology |       |
| Kaelbling, Leslie  | Massachusetts Institute of Technology |       |
| Isola, Phillip   | UC Berkeley                           |       |
| Rodriguez, Alberto   | Massachusetts Institute of Technology |       |
| 16:00-16:15  | WeCT2.6                               |       |
| Adaptive Leader-Follower Formation Control and Obstacle Avoidance Via Deep Reinforcement Learning.     |                                       |       |
| Zhou, Yanlin   | University of Florida                 |       |
| Lu, Fan  | University of Florida                 |       |
| Pu, George   | University of Florida                 |       |
| Ma, Xiyao  | University of Florida                 |       |
| Sun, Runhan  | University of Florida                 |       |
| Chen, Hsi-Yuan   | University of Florida                 |       |
| Li, Xiaolin  | University of Florida                 |       |



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| <b>WeCT3</b>   | L1-R3   |
| <b>Learning from Demonstration (Regular session)</b>   |   |
| Chair: Howard, Matthew   | King's College London                             |
| Co-Chair: Peters, Jan  | Leibniz Universität Hannover                      |
| 14:45-15:00  | WeCT3.1   |
| <i>Improving Task-Parameterised Movement Learning Generalisation with Frame-Weighted Trajectory Generation.</i>        |   |
| Sena, Aran   | King's College London                             |
| Michael, Brendan   | King's College London                             |
| Howard, Matthew  | King's College London                             |
| 15:00-15:15  | WeCT3.2   |
| <i>Learning Multimodal Representations for Sample-Efficient Recognition of Human Actions.</i>                          |   |
| Vasco, Miguel  | INESC-ID  |
| Melo, Francisco S.   | Instituto Superior Técnico, Tech. Univ. of Lisbon |
| Martins de Matos, David  | Instituto Superior Técnico, Tech. Univ. of Lisbon |
| Paiva, Ana   | Instituto Superior Técnico, Tech. Univ. of Lisbon |
| Inamura, Tetsunari   | National Institute of Informatics                 |
| 15:15-15:30  | WeCT3.3   |
| <i>Reinforcement Learning of Trajectory Distributions: Applications in Assisted Teleoperation and Motion Planning.</i> |   |
| Ewerton, Marco   | Idiap Research Institute                          |
| Maeda, Guilherme Jorge   | ATR Computational Neuroscience Labs               |
| Koert, Dorothea  | Technische Universität Darmstadt                  |
| Kolev, Zlatko  | Technische Universität Darmstadt                  |
| Takahashi, Masaki  | Keio University                                   |
| Peters, Jan  | Technische Universität Darmstadt                  |
| 15:30-15:45  | WeCT3.4   |
| <i>Learning Via-Point Movement Primitives with Inter and Extrapolation Capabilities.</i>                               |   |
| Zhou, You  | Karlsruhe Institute of Technology                 |
| Gao, Jianfeng  | Karlsruhe Institute of Technology                 |
| Asfour, Tamim  | Karlsruhe Institute of Technology                 |
| 15:45-16:00  | WeCT3.5   |
| <i>Contact Skill Imitation Learning for Robot-Independent Assembly Programming.</i>                                    |   |
| Scherzinger, Stefan  | FZI Research Center for Information Technology    |
| Roennau, Arne  | FZI Forschungszentrum Informatik, Karlsruhe       |
| Dillmann, Rüdiger  | Karlsruhe Institute of Technology                 |
| 16:00-16:15  | WeCT3.6   |
| <i>Combined Task and Action Learning from Human Demonstrations for Mobile Manipulation Applications.</i>               |   |
| Welschehold, Tim   | Albert-Ludwigs-Universität Freiburg               |
| Abdo, Nichola  | University of Freiburg                            |
| Dornhege, Christian  | University of Freiburg                            |
| Burgard, Wolfram   | University of Freiburg                            |

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| <b>WeCT4</b>  | <b>L1-R4</b>   |
| <b>Mechanism Design III (Regular session)</b>   |  |
| Chair: Ma, Shugen   | Ritsumeikan University                                     |
| Co-Chair: Nakamura, Taro  | Chuo University  |
| 14:45-15:00   | WeCT4.1  |
| <i>Design and Control of Aerial Modules for Inflight Self-Disassembly.</i>  |  |
| Saldaña, David  | Lehigh University  |
| Gupta, Parakh M.  | University of Pennsylvania                                 |
| Kumar, Vijay  | University of Pennsylvania                                 |
| 15:00-15:15   | WeCT4.2  |
| <i>Design of Robot Leg with Variable Reduction Ratio Crossed Four-Bar Linkage Mechanism.</i>                                  |  |
| Tomishiro, Kohei  | The University of Electro-Communications                   |
| Sato, Ryuki   | The University of Electro-Communications                   |
| Harada, Yasuji  | Nippon Veterinary and Life Science University              |
| Ming, Aiguo   | The University of Electro-Communications                   |
| Meng, Fei   | Beijing Institute of Technology                            |
| Liu, Huaxin   | Beijing Institute of Technology                            |
| Fan, Xuxiao   | Beijing Institute of Technology                            |
| Chen, Xuechao   | Beijing Institute of Technology                            |
| Yu, Zhanguo   | Beijing Institute of Technology                            |
| Huang, Qiang  | Intelligent Robotics Inst, Beijing Institute of Technology |
| 15:15-15:30   | WeCT4.3  |
| <i>WLR-II, a Hose-Less Hydraulic Wheel-Legged Robot.</i>  |  |
| Li, Xu  | Harbin Institute of Technology                             |
| Zhou, Haitao  | Harbin Institute of Technology                             |
| Zhang, Songyuan   | Harbin Institute of Technology                             |
| Feng, Haibo   | Harbin Institute of Technology                             |
| Fu, Yili  | Harbin Institute of Technology                             |
| 15:30-15:45   | WeCT4.4  |
| <i>An In-Pipe Inspection Module with an Omnidirectional Bent-Pipe Self-Adaptation Mechanism Using a Joint Torque Control.</i> |  |
| Kakogawa, Atsushi   | Ritsumeikan University                                     |
| Ma, Shugen  | Ritsumeikan University                                     |
| 15:45-16:00   | WeCT4.5  |
| <i>Configuration Modeling of a Soft Robotic Element with Selectable Bending Axes.</i>   |  |
| Allen, Emily  | Washington State University                                |
| Townsend, Brandon   | Washington State University                                |
| Swensen, John   | Washington State University                                |
| 16:00-16:15   | WeCT4.6  |
| <i>Laminated Foam-Based Soft Actuator for Actuatable Flexible Structure.</i>  |  |
| Yamada, Yasuyuki  | Chuo University  |
| Nakamura, Taro  | Chuo University  |

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| <b>WeCT5</b>  | L1-R5                                |
| <b>Robot Control I</b> (Regular session)  |                                      |
| Chair: Sidobre, Daniel  | University of Toulouse               |
| Co-Chair: Choi, Sungjoon  | Disney Research                      |
| 14:45-15:00   | WeCT5.1                              |
| <i>Adaptive Unscented Kalman Filter-Based Disturbance Rejection with Application to High Precision Hydraulic Robotic Control.</i> |                                      |
| Lu, Peng  | The Hong Kong Polytechnic University |
| Sandy, Timothy  | ETH Zürich                           |
| Buchli, Jonas   |                                      |
| 15:00-15:15   | WeCT5.2                              |
| <i>Towards a Natural Motion Generator: A Pipeline to Control a Humanoid Based on Motion Data.</i>                                 |                                      |
| Choi, Sungjoon  | Disney Research                      |
| Kim, Joohyung   | Disney Research                      |
| 15:15-15:30   | WeCT5.3                              |
| <i>Online Trajectory Generation: Reactive Control with Return Inside an Admissible Kinematic Domain.</i>                          |                                      |
| Desormeaux, Kevin   | University of Toulouse               |
| Sidobre, Daniel   | University of Toulouse               |
| 15:30-15:45   | WeCT5.4                              |
| <i>Whole-Body Control with (Self) Collision Avoidance Using Vector Field Inequalities.</i>  |                                      |
| Quiroz Omaña, Juan José   | Federal University of Minas Gerais   |
| Adorno, Bruno Vilhena   | Federal University of Minas Gerais   |
| 15:45-16:00   | WeCT5.5                              |
| <i>Autonomous Free-Form Trenching Using a Walking Excavator.</i>  |                                      |
| Jud, Dominic  | ETH Zurich                           |
| Leemann, Philipp  | ETH Zurich                           |
| Kerscher, Simon   | ETH Zurich                           |
| Hutter, Marco   | ETH Zurich                           |

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| <b>WeCT6</b>  | <b>L1-R6</b>                              |
| <b>Aerial Robotics VI (Regular session)</b>   |   |
| Chair: Lu, Peng   | The Hong Kong Polytechnic University      |
| Co-Chair: Shen, Shaojie   | Hong Kong Univ. of Science and Technology |
| 14:45-15:00   | WeCT6.1                                   |
| <i>Robust UAV Position and Attitude Estimation Using Multiple GNSS Receivers for Laser-Based 3D Mapping.</i>                                |   |
| Suzuki, Taro  | Chiba Institute of Technology             |
| Inoue, Daichi   | Waseda University                         |
| Amano, Yoshiharu  | Waseda University                         |
| 15:00-15:15   | WeCT6.2                                   |
| <i>UAV Landing at an Unknown Location Marked by a Radio Beacon.</i>   |   |
| Stefas, Nikolaos  | University of Minnesota                   |
| Bayram, Haluk   | Istanbul Medeniyet University             |
| Isler, Volkan   | University of Minnesota                   |
| 15:15-15:30   | WeCT6.3                                   |
| <i>Boundary Effect-Aware Visual Tracking for UAV with Online Enhanced Background Learning and Multi-Frame Consensus Verification.</i>       |   |
| Fu, Changhong   | Tongji University                         |
| Huang, Ziyuan   | Tongji University                         |
| Li, Yiming  | Tongji University                         |
| Duan, Ran   | Nanyang Technological University          |
| Lu, Peng  | The Hong Kong Polytechnic University      |
| 15:30-15:45   | WeCT6.4                                   |
| <i>FIESTA: Fast Incremental Euclidean Distance Fields for Online Quadrotor Motion Planning.</i>   |   |
| Han, Luxin  | Hong Kong Univ. of Science and Technology |
| Gao, Fei  | Hong Kong Univ. of Science and Technology |
| Zhou, Boyu  | Hong Kong Univ. of Science and Technology |
| Shen, Shaojie   | Hong Kong Univ. of Science and Technology |
| 15:45-16:00   | WeCT6.5                                   |
| <i>Onboard Marker-Less Detection and Localization of Non-Cooperating Drones for Their Safe Interception by an Autonomous Aerial System.</i> |   |
| Vrba, Matous  | Czech Technical University in Prague      |
| Hert, Daniel  | Czech Technical University in Prague      |
| Saska, Martin   | Czech Technical University in Prague      |
| 16:00-16:15   | WeCT6.6                                   |
| <i>MAVNet: An Effective Semantic Segmentation Micro-Network for MAV-Based Tasks.</i>  |   |
| Nguyen, Ty  | University of Pennsylvania                |
| Skandan, Shreyas  | University of Pennsylvania                |
| Miller, Ian   | University of Pennsylvania                |
| Keller, James   | University of Pennsylvania                |
| Lee, Elijah S.  | University of Pennsylvania                |
| Zhou, Alex  | University of Pennsylvania                |
| Ozaslan, Tolga  | University of Pennsylvania                |
| Loianno, Giuseppe   | New York University                       |
| Taylor, Camillo Jose  | University of Pennsylvania                |
| Kumar, Vijay  | University of Pennsylvania                |

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| <b>WeCT7</b>  | L1-R7   |
| <b>Computer Vision and Visual Servoing II (Regular session)</b>   |   |
| Chair: Mattos, Leonardo   | Istituto Italiano Di Tecnologia                           |
| Co-Chair: Kim, H. Jin   | Seoul National University                                 |
| 14:45-15:00   | WeCT7.1   |
| <i>A Comparison of Visual Servoing from Features Velocity and Acceleration Interaction Models.</i>          |   |
| Fusco, Franco   | LS2N Centrale Nantes                                      |
| Kermorgant, Olivier   | École Centrale Nantes                                     |
| Martinet, Philippe  | INRIA   |
| 15:00-15:15   | WeCT7.2   |
| <i>Subspace-Based Direct Visual Servoing.</i>   |   |
| Marchand, Eric  | Univ Rennes, INRIA, CNRS, IRISA                           |
| 15:15-15:30   | WeCT7.3   |
| <i>Hybrid Visual Servoing for Autonomous Robotic Laser Tattoo Removal.</i>                                  |   |
| Penza, Veronica   | Istituto Italiano Di Tecnologia                           |
| Salerno, Damiano  | Istit. Italiano Di Tecnologia, Univ. Degli Studi Di Catan |
| Acemoglu, Alperen   | Istituto Italiano Di Tecnologia                           |
| Ortiz, Jesus  | Istituto Italiano Di Tecnologia                           |
| Mattos, Leonardo  | Istituto Italiano Di Tecnologia                           |
| 15:30-15:45   | WeCT7.4   |
| <i>Position-Based Monocular Visual Servoing of an Unknown Target Using Online Self-Supervised Learning.</i> |   |
| Lee, Chungkeun  | Seoul National University                                 |
| Seo, Hoseong  | Seoul National University                                 |
| Kim, H. Jin   | Seoul National University                                 |
| 15:45-16:00   | WeCT7.5   |
| <i>Gaussian Mixture Model (GMM) Based Object Detection and Tracking Using Dynamic Patch Estimation.</i>     |   |
| Hariharan Anand, Vishnu   | Tata Consultancy Services                                 |
| Pushp, Durgakant  | Tata Consultancy Services                                 |
| Raj, Rishin   | TCS Research and Innovation                               |
| Das, Kaushik  | TATA Consultancy Service                                  |
| 16:00-16:15   | WeCT7.6   |
| <i>Robust Hand-Eye Calibration Via Iteratively Re-Weighted Rank-Constrained Semi-Definite Programming.</i>  |   |
| Samant, Chinmay   | University of Strasbourg                                  |
| Habed, Adlane   | University of Strasbourg                                  |
| de Mathelin, Michel   | University of Strasbourg                                  |
| Goffin, Laurent   | Unistra, ICube  |

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| <b>WeCT8</b>  | LG-R8                                     |
| <b>Autonomous Vehicle Navigation IV (Regular session)</b>   |   |
| Chair: Liu, Yong  | Zhejiang University                       |
| Co-Chair: Ordonez, Camilo   | Florida State University                  |
| 14:45-15:00   | WeCT8.1                                   |
| <i>Robust and Efficient Vehicles Motion Estimation with Low-Cost Multi-Camera and Odometer-Gyroscope.</i> |   |
| Ye, Wenlong   | Zhejiang University                       |
| Zheng, Renjie   | Zhejiang University                       |
| Zhang, Fangqiang  | SAIC Motor Corporation Limited            |
| Ouyang, Zizhou  | SAIC Motor Corporation Limited            |
| Liu, Yong   | Zhejiang University                       |
| 15:00-15:15   | WeCT8.2                                   |
| <i>Towards Generalizing Sensorimotor Control across Weather Conditions.</i>                               |   |
| Khan, Qadeer  | Technical University of Munich            |
| Wenzel, Patrick   | Technical University of Munich            |
| Cremers, Daniel   | Technical University of Munich            |
| Leal-Taixe, Laura   | Technical University of Munich            |
| 15:15-15:30   | WeCT8.3                                   |
| <i>Learning 2D to 3D Lifting for Object Detection in 3D for Autonomous Vehicles.</i>                      |   |
| Srivastava, Siddharth   | Indian Institute of Technology Delhi      |
| Jurie, Frederic   | University of Caen, France                |
| Sharma, Gaurav  | NEC Labs America                          |
| 15:30-15:45   | WeCT8.4                                   |
| <i>COBRA: COllaborative Bot with Multi-Rotor Actuation.</i>   |   |
| Ordonez, Camilo   | Florida State University                  |
| Chuy, Oscar   | FAMU-FSU College of Engineering           |
| Fajardo, Tomas  | Florida State University                  |
| 15:45-16:00   | WeCT8.5                                   |
| <i>Model Predictive Control Based Dynamic Path Tracking of a Four-Wheel Steering Mobile Robot.</i>        |   |
| Fnadi, Mohamed  | ISIR - Sorbonne University                |
| Plumet, Frederic  | UPMC                                      |
| Ben Amar, Faiz  | Université Pierre Et Marie Curie, Paris 6 |
| 16:00-16:15   | WeCT8.6                                   |
| <i>On Enhancing Ground Surface Detection from Sparse Lidar Point Cloud.</i>                               |   |
| Li, Bo  | Trunk Inc                                 |

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| <b>WeCT9</b>  | LG-R9 |
| <b>Cognitive Architectures for Humanoids: Where Are We in Our Quest to Achieve Human-Level AI in Robotics?</b> (Cutting Edge Forum) |       |

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| Chair: Vernon, David      | Carnegie Mellon University Africa |
| Co-Chair: Sandini, Giulio | Italian Institute of Technology   |

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|-----------------|------------------------------------|
| Organizer       |                                    |
| Sandini, Giulio | Italian Institute of Technology    |
| Vernon, David   | Carnegie Mellon University Africa  |
| Riek, Laurel D. | University of California San Diego |
| Shimoda, Shingo | RIKEN                              |

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Time: 14:45 – 16:15

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| <b>WeCT10</b>  | LG-R10   |
| <b>SLAM V (Regular session)</b>  |  |
| Chair: Huang, Guoquan  | University of Delaware                         |
| Co-Chair: Bernreiter, Lukas  | ETH Zurich, Autonomous Systems Lab             |
| 14:45-15:00  | WeCT10.1                                       |
| <i>SuMa++: Efficient LiDAR-Based Semantic SLAM.</i>  |  |
| Chen, Xieyuanli  | University of Bonn                             |
| Milioto, Andres  | University of Bonn                             |
| Palazzolo, Emanuele  | University of Bonn                             |
| Giguère, Philippe  | Université Laval                               |
| Behley, Jens   | University of Bonn                             |
| Stachniss, Cyrill  | University of Bonn                             |
| 15:00-15:15  | WeCT10.2                                       |
| <i>Monocular Object and Plane SLAM in Structured Environments.</i>   |  |
| Yang, Shichao  | Carnegie Mellon University                     |
| Scherer, Sebastian   | Carnegie Mellon University                     |
| 15:15-15:30  | WeCT10.3                                       |
| <i>Multiple Hypothesis Semantic Mapping for Robust Data Association.</i>   |  |
| Bernreiter, Lukas  | Autonomous Systems Lab, ETH Zurich             |
| Gawel, Abel Roman  | Autonomous Systems Lab, ETH Zurich             |
| Sommer, Hannes   | ETH Zürich                                     |
| Nieto, Juan  | ETH Zürich                                     |
| Sieglwart, Roland  | ETH Zurich                                     |
| Cadena Lerma, Cesar  | ETH Zurich                                     |
| 15:30-15:45  | WeCT10.4                                       |
| <i>CALC2.0: Combining Appearance, Semantic and Geometric Information for Robust and Efficient Visual Loop Closure.</i> |  |
| Nate, Merrill  | University of Delaware                         |
| Huang, Guoquan   | University of Delaware                         |
| 15:45-16:00  | WeCT10.5                                       |
| <i>Semantically Assisted Loop Closure in SLAM Using NDT Histograms.</i>  |  |
| Zaganidis, Anestis   | University of Lincoln                          |
| Zerntev, Alexandros  | National and Kapodistrian University of Athens |
| Duckett, Tom   | University of Lincoln                          |
| Cielniak, Grzegorz   | University of Lincoln                          |
| 16:00-16:15  | WeCT10.6                                       |
| <i>Camera Pose Estimation with Semantic 3D Model.</i>  |  |
| Gaudilliere, Vincent   | Inria Nancy Grand-Est                          |
| Simon, Gilles  | Loria  |
| Berger, Marie-Odile  | INRIA  |



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| <b>WeCT12</b>   | LG-R12                                      |
| <b>Human-Centered Robotics II (Regular session)</b>   |   |
| Chair: Sugahara, Yusuke   | Tokyo Institute of Technology               |
| Co-Chair: Xie, Le   | Shanghai Jiao Tong University               |
| 14:45-15:00   | WeCT12.1                                    |
| <i>Learning Intention Aware Online Adaptation of Movement Primitives.</i>                             |   |
| Koert, Dorothea   | Technische Universität Darmstadt            |
| Pajarinen, Joni   | Technische Universität Darmstadt            |
| Schotschneider, Albert  | Technische Universität Darmstadt            |
| Trick, Susanne  | Technische Universität Darmstadt            |
| Rothkopf, Constantin  | Frankfurt Institute for Advanced Studies    |
| Peters, Jan   | Technische Universität Darmstadt            |
| 15:00-15:15   | WeCT12.2                                    |
| <i>Synthesizing Robot Manipulation Programs from a Single Observed Human Demonstration.</i>           |   |
| Huang, Justin   | University of Washington                    |
| Fox, Dieter   | University of Washington                    |
| Cakmak, Maya  | University of Washington                    |
| 15:15-15:30   | WeCT12.3                                    |
| <i>A Multi-DOF Human-Powered Robot Using Regenerative Clutches and Constant-Force Springs.</i>        |   |
| Sugahara, Yusuke  | Tokyo Institute of Technology               |
| Tsukamoto, Kohei  | Tokyo Institute of Technology               |
| Endo, Mitsuru   | Nihon University                            |
| Okamoto, Jun  | Tokyo Women's Medical University            |
| Matsuura, Daisuke   | Tokyo Institute of Technology               |
| Takeda, Yukio   | Tokyo Institute of Technology               |
| 15:30-15:45   | WeCT12.4                                    |
| <i>Inference of User-Intention in Remote Robot Wheelchair Assistance Using Multimodal Interfaces.</i> |   |
| Schettino, Vinicius   | Imperial College London                     |
| Demiris, Yiannis  | Imperial College London                     |
| 15:45-16:00   | WeCT12.5                                    |
| <i>Learning Virtual Borders through Semantic Scene Understanding and Augmented Reality.</i>           |   |
| Sprute, Dennis  | Bielefeld University of Applied Sciences    |
| Viertel, Philipp  | Bielefeld University of Applied Sciences    |
| Tönnies, Klaus  | Otto-Von-Guericke University Magdeburg      |
| König, Matthias   | Bielefeld University of Applied Sciences    |
| 16:00-16:15   | WeCT12.6                                    |
| <i>Pedestrian Density Prediction for Efficient Mobile Robot Exploration.</i>                          |   |
| Zapf, Marc Patrick Hans   | Bosch (China) Investment Co., Ltd           |
| Kawanabe, Motoaki   | Advanced Telecommunications Res. Inst. Int. |
| Morales Saiki, Luis Yoichi  | Nagoya University                           |

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| <b>WeCT13</b>   | LG-R13  |
| <b>Legged Robots I (Regular session)</b>  |   |
| Chair: Sun, Zhenglong   | Chinese University of Hong Kong, Shenzhen     |
| Co-Chair: Tsagarakis, Nikos   | Istituto Italiano Di Tecnologia               |
| 14:45-15:00   | WeCT13.1                                      |
| <i>Dynamic Locomotion on Slippery Ground.</i>   |   |
| Jenelten, Fabian  | ETH Zurich                                    |
| Hwangbo, Jemin  | Swiss Federal Institute of Technology, Zurich |
| Bellicoso, C. Dario   | ETH Zurich                                    |
| Tresoldi, F. Dante  | ETH Zurich                                    |
| Hutter, Marco   | ETH Zurich                                    |
| 15:00-15:15   | WeCT13.2                                      |
| <i>Joint Torque Estimation Toward Dynamic and Compliant Control for Gear-Driven Torque Sensorless Quadruped Robot.</i>                              |   |
| Jin, Bingchen   | The Chinese University of Hong Kong, Shenzhen |
| Sun, Caiming  | The Chinese University of Hong Kong, Shenzhen |
| Zhang, Aidong   | The Chinese University of Hong Kong, Shenzhen |
| Ding, Ning  | The Chinese University of Hong Kong, Shenzhen |
| Lin, Jing   | The Chinese University of Hong Kong, Shenzhen |
| Deng, Ganyu   | The Chinese University of Hong Kong, Shenzhen |
| Zhu, Zuwen  | The Chinese University of Hong Kong, Shenzhen |
| Sun, Zhenglong  | The Chinese University of Hong Kong, Shenzhen |
| 15:15-15:30   | WeCT13.3                                      |
| <i>Sensitivity of Legged Balance Control to Uncertainties and Sampling Period.</i>  |   |
| Villa, Nahuel Alejandro   | INRIA   |
| Englsberger, Johannes   | DLR (German Aerospace Center)                 |
| Wieber, Pierre-Brice  | INRIA Rhône-Alpes                             |
| 15:30-15:45   | WeCT13.4                                      |
| <i>Orbit Characterization, Stabilization and Composition of 3D Underactuated Bipedal Walking Via Hybrid Passive Linear Inverted Pendulum Model.</i> |   |
| Xiong, Xiaobin  | California Institute of Technology            |
| Ames, Aaron   | California Institute of Technology            |
| 15:45-16:00   | WeCT13.5                                      |
| <i>Agile Standing-Up Control of Humanoids: Energy-Based Reactive Contact Wrench Optimization with Strict Dynamic Consistency.</i>                   |   |
| Lee, Yisoo  | Istituto Italiano Di Tecnologia               |
| Tsagarakis, Nikos   | Istituto Italiano Di Tecnologia               |
| Lee, Jinoh  | Fondazione Istituto Italiano Di Tecnologia    |
| 16:00-16:15   | WeCT13.6                                      |
| <i>A Two-DOF Bipedal Robot Utilizing the Reuleaux Triangle Drive Mechanism.</i>   |   |
| Yang, Jiteng  | Virginia Tech                                 |
| Saab, Wael  | Virginia Tech                                 |
| Ben-Tzvi, Pinhas  | Virginia Tech                                 |

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| <b>WeCT14</b>   | LG-R14   |
| <b>Field Robots III (Regular session)</b>   |  |
| Chair: Cera, Angelo Brian   | UC Berkeley                                      |
| Co-Chair: Wang, Xueqian   | Tsinghua University                              |
| 14:45-15:00   | WeCT14.1   |
| <i>On Training Flexible Robots Using Deep Reinforcement Learning.</i>   |  |
| Dwiel, Zach   | Intel AI Lab                                     |
| Candadai, Madhavun  | Indiana University, Bloomington                  |
| Phielipp, Mariano   | Intel Corporation                                |
| 15:00-15:15   | WeCT14.2   |
| <i>A 3D Static Modeling Method and Experimental Verification of Continuum Robots Based on Pseudo-Rigid Body Theory.</i> |  |
| Huang, Shaoping   | Graduate School at Shenzhen, Tsinghua University |
| Meng, Deshan  | Tsinghua University                              |
| Wang, Xueqian   | Tsinghua University                              |
| Liang, Bin  | Tsinghua University                              |
| Lu, Weining   | Tsinghua University                              |
| 15:15-15:30   | WeCT14.3   |
| <i>Energy-Efficient Locomotion Strategies and Performance Benchmarks Using Point Mass Tensegrity Dynamics.</i>          |  |
| Cera, Angelo Brian  | UC Berkeley                                      |
| Thompson, Anthony   | UC Berkeley                                      |
| Agogino, Alice  | UC Berkeley                                      |
| 15:30-15:45   | WeCT14.4   |
| <i>Design and Experiment of Dragonfly Inspired Flexible Blade to Improve Safety of Drones.</i>                          |  |
| Jang, JaeHyung  | Korea Institute of Industrial Technology         |
| Cho, Kyunghwan  | Korea Institute of Industrial Technology         |
| Yang, Gi-Hun  | KITECH   |
| 15:45-16:00   | WeCT14.5   |
| <i>Actuation and Stiffening in Fluid-Driven Soft Robots Using Low-Melting-Point Material.</i>                           |  |
| Peters, Jan   | Leibniz Universität Hannover                     |
| Nolan, Erin   | University College London                        |
| Wiese, Mats   | Leibniz Universität Hannover                     |
| Miodownik, Mark   | University College London                        |
| Spurgeon, Sarah   | University College London                        |
| Arezzo, Alberto   | University of Torino                             |
| Raatz, Annika   | Leibniz Universität Hannover                     |
| Wurdemann, Helge Arne   | University College London                        |
| 16:00-16:15   | WeCT14.6   |
| <i>Design of Soft Flexible Wire-Driven Finger Mechanism for Contact Pressure Distribution.</i>                          |  |
| Hirose, Toshinori   | The University of Tokyo                          |
| Kakiuchi, Yohei   | The University of Tokyo                          |
| Okada, Kei  | The University of Tokyo                          |
| Inaba, Masayuki   | The University of Tokyo                          |

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| <b>WeCT15</b>  | LG-R15                          |
| <b>Motion and Path Planning: Legged Robots</b> (Regular session)   |                                 |
| Chair: Hutter, Marco   | ETH Zurich                      |
| Co-Chair: Tsagarakis, Nikos  | Istituto Italiano Di Tecnologia |
| 14:45-15:00  | WeCT15.1                        |
| <i>Trajectory Optimization for Legged Robots with Slipping Motions.</i>  |                                 |
| Carius, Jan  | ETH Zurich                      |
| Ranftl, Rene   | Intel                           |
| Koltun, Vladlen  | Intel Labs                      |
| Hutter, Marco  | ETH Zurich                      |
| 15:00-15:15  | WeCT15.2                        |
| <i>Multi-Controller Multi-Objective Locomotion Planning for Legged Robots.</i>   |                                 |
| Brandao, Martim  | University of Oxford            |
| Fallon, Maurice  | University of Oxford            |
| Havoutis, Ioannis  | University of Oxford            |
| 15:15-15:30  | WeCT15.3                        |
| <i>Rapid Trajectory Optimization Using C-FROST with Illustration on a Cassie-Series Dynamic Walking Biped.</i>               |                                 |
| Hereid, Ayonga   | Ohio State University           |
| Harib, Omar  | University of Michigan          |
| Hartley, Ross  | University of Michigan          |
| Gong, Yukai  | University of Michigan          |
| Grizzle, J.W   | University of Michigan          |
| 15:30-15:45  | WeCT15.4                        |
| <i>Feedback MPC for Torque-Controlled Legged Robots.</i>   |                                 |
| Grandia, Ruben   | ETH Zurich                      |
| Farshidian, Farbod   | ETH Zurich                      |
| Ranftl, Rene   | Intel                           |
| Hutter, Marco  | ETH Zurich                      |
| 15:45-16:00  | WeCT15.5                        |
| <i>Variable Configuration Planner for Legged-Rolling Obstacle Negotiation Locomotion: Application on the CENTAURO Robot.</i> |                                 |
| Raghavan, Vignesh Sushrutha  | Istituto Italiano Di Tecnologia |
| Kanoulas, Dimitrios  | Istituto Italiano Di Tecnologia |
| Laurenzi, Arturo   | Istituto Italiano Di Tecnologia |
| Caldwell, Darwin G.  | Istituto Italiano Di Tecnologia |
| Tsagarakis, Nikos  | Istituto Italiano Di Tecnologia |
| 16:00-16:15  | WeCT15.6                        |
| <i>Whole-Body Motion and Landing Force Control for Quadrupedal Stair Climbing.</i>   |                                 |
| Lee, Young Hun   | Sungkyunkwan University         |
| Lee, Yoon Haeng  | Sungkyunkwan University         |
| Lee, Hyunyong  | Sungkyunkwan University         |
| Kang, Hansol   | Sungkyunkwan University         |
| kim, Yong Bum  | Sungkyunkwan University         |
| Lee, Jun Hyuk  | Sungkyunkwan University         |
| Phan, Luong Tin  | Sungkyunkwan University         |
| Jin, Sungmoon  | Sungkyunkwan University         |
| Moon, Hyungpil   | Sungkyunkwan University         |
| Koo, Ja Choon  | Sungkyunkwan University         |
| Choi, Hyouk Ryeol  | Sungkyunkwan University         |

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| <b>WeCT16</b>  | <b>LG-R16</b>                              |
| <b>Perception for Grasping and Manipulation II (Regular session)</b>   |  |
| Chair: Wang, Hsueh-Cheng   | National Chiao Tung University             |
| Co-Chair: Lan, Xuguang   | Xi'an Jiaotong University                  |
| 14:45-15:00  | WeCT16.1                                   |
| <i>Learning Real-Time Closed Loop Robotic Reaching from Monocular Vision by Exploiting a Control Lyapunov Function Structure.</i>    |  |
| Zhuang, Zheyu  | Australian National University             |
| Leitner, Jorgen  | Australian Centre for Robotic Vision / QUT |
| Mahony, Robert   | Australian National University             |
| 15:00-15:15  | WeCT16.2                                   |
| <i>Pose-Aware Placing with Semantic Labels - Brandname-Based Affordance Prediction and Cooperative Dual-Arm Active Manipulation.</i> |  |
| Su, Yung-Shan  | National Chiao Tung University             |
| Lu, Shao-Huang   | National Chiao Tung University             |
| Ser, Po Sheng  | National Chiao Tung University             |
| Hsu, Wei-Ting  | National Chiao Tung University             |
| Lai, Wei-Cheng   | National Chiao Tung University             |
| Xie, Biao  | University of Massachusetts Boston         |
| Huang, Hong-Ming   | National Chiao Tung University             |
| Lee, Teng-Yok  | Mitsubishi Electric Research Laboratories  |
| Chen, Hung-Wen   | Delta Electronics, Inc                     |
| Yu, Lap Fai  | George Mason University                    |
| Wang, Hsueh-Cheng  | National Chiao Tung University, Taiwan     |
| 15:15-15:30  | WeCT16.3                                   |
| <i>ROI-Based Robotic Grasp Detection for Object Overlapping Scenes.</i>  |  |
| Zhang, Hanbo   | Xi'an Jiaotong University                  |
| Lan, Xuguang   | Xi'an Jiaotong University                  |
| Bai, Site  | Xi'an Jiaotong University                  |
| ZHOU, Xinwen   | Xi'an Jiaotong University                  |
| Tian, Zhiqiang   | Xi'an Jiaotong University                  |
| Zheng, Nanning   | Xi'an Jiaotong University                  |
| 15:30-15:45  | WeCT16.4                                   |
| <i>GlassLoc: Plenoptic Grasp Pose Detection in Transparent Clutter.</i>  |  |
| Zhou, Zheming  | University of Michigan                     |
| Pan, Tianyang  | University of Michigan                     |
| Wu, Shiyu  | University of Michigan                     |
| Chang, Haonan  | University of Michigan                     |
| Jenkins, Odest Chadwicke   | University of Michigan                     |
| 15:45-16:00  | WeCT16.5                                   |
| <i>Learning Object Models for Non-Prehensile Manipulation.</i>   |  |
| Sanan, Siddharth   | Samsung Research America                   |
| Bretan, Mason  | Samsung Research America                   |
| Heck, Larry  | Samsung Research America                   |
| 16:00-16:15  | WeCT16.6                                   |
| <i>Disaster Response Robot's Autonomous Manipulation of Valves in Disaster Sites Based on Visual Analyses of RGBD Images.</i>        |  |
| Nishikawa, Keishi  | Mitsubishi Electric                        |
| Imai, Asaki  | Waseda University                          |
| Miyakawa, Kazuya   | Waseda University                          |
| Kanda, Takuya  | Waseda University                          |
| Matsuzawa, Takashi   | Waseda University                          |
| Hashimoto, Kenji   | Meiji University                           |
| Takanishi, Atsuo   | Waseda University                          |
| Ogata, Hiroyuki  | Seikei University                          |
| Ohya, Jun  | Waseda University                          |

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| <b>WeCT17</b>   | LG-R17                               |
| <b>Physically Assistive Devices (Regular session)</b>   |                                      |
| Chair: Cheng, Gordon  | Technical University of Munich       |
| Co-Chair: Jeong, Seokhwan   | Georgia Institute of Technology      |
| 14:45-15:00   | WeCT17.1                             |
| <i>Predictive Optimization of Assistive Force on Admittance Control-Based Mobile Walking Support System.</i>                                  |                                      |
| Itadera, Shunki   | Nagoya University                    |
| Dean-Leon, Emmanuel   | Technical University of Munich       |
| Nakanishi, Jun  | Meijo University                     |
| Hasegawa, Yasuhisa  | Nagoya University                    |
| Cheng, Gordon   | Technical University of Munich       |
| 15:00-15:15   | WeCT17.2                             |
| <i>Development of Load Weight and Height Classifier in Lifting-Up Task Using Body Motion Metrics.</i>   |                                      |
| Ishibashi, Naoya  | Yamaguchi University                 |
| Fujii, Fumitake   | Yamaguchi University                 |
| 15:15-15:30   | WeCT17.3                             |
| <i>Augmented Reality Controlled Smart Wheelchair Using Dynamic Signifiers for Affordance Representation.</i>                                  |                                      |
| Chacon Quesada, Rodrigo   | Imperial College London              |
| Demiris, Yiannis  | Imperial College London              |
| 15:30-15:45   | WeCT17.4                             |
| <i>Effects of a Person-Following Light-Touch Device During Overground Walking with Visual Perturbations in a Virtual Reality Environment.</i> |                                      |
| Stramel, Danielle   | Columbia University                  |
| Carrera, Robert Martin  | Columbia University                  |
| Sam Ann, Rahok  | Oyama National College of Technology |
| Stein, Joel   | Columbia University                  |
| Agrawal, Sunil  | Columbia University                  |
| 15:45-16:00   | WeCT17.5                             |
| <i>Toward a Ballbot for Physically Leading People: A Human-Centered Approach.</i>   |                                      |
| Li, Zhongyu   | Zhejiang University                  |
| Hollis, Ralph   | Carnegie Mellon University           |
| 16:00-16:15   | WeCT17.6                             |
| <i>Voice-Controlled Flexible Exotendon (FLEXotendon) Glove for Hand Rehabilitation.</i>   |                                      |
| Tran, Phillip   | Georgia Institute of Technology      |
| Jeong, Seokhwan   | Georgia Institute of Technology      |
| Desai, Jaydev P.  | Georgia Institute of Technology      |

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| <b>WeCT18</b>  | LG-R18  |
| <b>Cellular and Modular Robots (Regular session)</b>   |   |
| Chair: Yim, Mark   | University of Pennsylvania                          |
| Co-Chair: Elara, Mohan Rajesh  | Singapore University of Technology and Design       |
| 14:45-15:00  | WeCT18.1  |
| <i>Scaffold-Based Asynchronous Distributed Self-Reconfiguration by Continuous Module Flow.</i>                   |   |
| Thalamy, Pierre  | Univ. Bourgogne Franche-Comté / FEMTO-ST / CNRS     |
| Piranda, Benoît  | Université De Franche-Comté / FEMTO-ST              |
| Lassabe, Frédéric  | FEMTO-ST Inst., Univ. Bourgogne Franche-Comté, CNRS |
| Bourgeois, Julien  | Institut FEMTO-ST                                   |
| 15:00-15:15  | WeCT18.2  |
| <i>A Distributed Reconfiguration Planning Algorithm for SMORES-EP, a Modular Robot.</i>                          |   |
| Liu, Chao  | University of Pennsylvania                          |
| Whitzer, Michael   | University of Pennsylvania                          |
| Yim, Mark  | University of Pennsylvania                          |
| 15:15-15:30  | WeCT18.3  |
| <i>Decentralized Pose Control of Modular Reconfigurable Robots Operating in Liquid Environments.</i>             |   |
| Amorim Marques, João V.  | The University of Sheffield                         |
| Ozdemir, Anil  | The University of Sheffield                         |
| Doyle, Matthew J.  | The University of Sheffield                         |
| Rus, Daniela   | MIT   |
| Gross, Roderich  | The University of Sheffield                         |
| 15:30-15:45  | WeCT18.4  |
| <i>Decentralized Control for 3D M-Blocks for Path Following, Line Formation, and Light Gradient Aggregation.</i> |   |
| Romanishin, John   | MIT   |
| Mamish, John   | University of Michigan                              |
| Rus, Daniela   | MIT   |
| 15:45-16:00  | WeCT18.5  |
| <i>Time-Varying Graph Patrolling against Attackers with Locally Limited and Imperfect Observation Models.</i>    |   |
| Diaz Alvarenga, Carlos   | University of California, Merced                    |
| Basilico, Nicola   | University of Milan                                 |
| Carpin, Stefano  | University of California, Merced                    |
| 16:00-16:15  | WeCT18.6  |
| <i>HTetran – a Polyabolo Inspired Self Reconfigurable Tiling Robot.</i>  |   |
| Prabakaran, Veerajagadheswar   | Singapore University of Technology and Design       |
| Vinu, Sivanantham  | Amrita University                                   |
| Devarassu, Manojkumar  | Singapore University of Technology and Design       |
| Elara, Mohan Rajesh  | Singapore University of Technology and Design       |

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| <b>WeCT19</b>  | <b>LG-R19</b>                                  |
| <b>Reactive and Sensor-Based Planning (Regular session)</b>  |  |
| Chair: Englot, Brendan   | Stevens Institute of Technology                |
| Co-Chair: Thomas, Ulrike   | Chemnitz University of Technology              |
| 14:45-15:00  | WeCT19.1                                       |
| <i>An Autonomous Exploration Algorithm Using Environment-Robot Interacted Traversability Analysis.</i>                   |  |
| Tang, Yujie  | Shanghai University                            |
| Cai, Jun   | Shanghai University                            |
| Chen, Meng   | Inst. of Aerospace System Engineering Shanghai |
| Yan, Xuejiao   | Inst. of Aerospace System Engineering Shanghai |
| Xie, Yangmin   | Shanghai University                            |
| 15:00-15:15  | WeCT19.2                                       |
| <i>Autonomous Safe Locomotion System for Bipedal Robot Applying Vision and Sole Reaction Force to Footstep Planning.</i> |  |
| Omori, Yuki  | The University of Tokyo                        |
| Kojio, Yuta  | The University of Tokyo                        |
| Ishikawa, Tatsuya  | The University of Tokyo                        |
| Kojima, Kunio  | The University of Tokyo                        |
| Sugai, Fumihito  | The University of Tokyo                        |
| Kakiuchi, Yohei  | The University of Tokyo                        |
| Okada, Kei   | The University of Tokyo                        |
| Inaba, Masayuki  | The University of Tokyo                        |
| 15:15-15:30  | WeCT19.3                                       |
| <i>Virtual Maps for Autonomous Exploration with Pose SLAM.</i>   |  |
| Wang, Jinkun   | Stevens Institute of Technology                |
| Shan, Tixiao   | Stevens Institute of Technology                |
| Englot, Brendan  | Stevens Institute of Technology                |
| 15:30-15:45  | WeCT19.4                                       |
| <i>With Proximity Servoing towards Safe Human-Robot-Interaction.</i>   |  |
| Ding, Yitao  | Chemnitz University of Technology              |
| Wilhelm, Felix   | Chemnitz University of Technology              |
| Faulhammer, Leonhard   | Chemnitz University of Technology              |
| Thomas, Ulrike   | Chemnitz University of Technology              |
| 15:45-16:00  | WeCT19.5                                       |
| <i>Maximum Information Bounds for Planning Active Sensing Trajectories.</i>  |  |
| Schlottfeldt, Brent  | University of Pennsylvania                     |
| Atanasov, Nikolay  | University of California, San Diego            |
| Pappas, George J.  | University of Pennsylvania                     |
| 16:00-16:15  | WeCT19.6                                       |
| <i>Distributed Dynamic Sensor Assignment of Multiple Mobile Targets.</i>   |  |
| Montijano, Eduardo   | Universidad De Zaragoza                        |
| Tardioli, Danilo   | Centro Universitario De La Defensa             |
| Mosteo, Alejandro R.   | Centro Universitario De La Defensa             |



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| <b>WeCT20</b>   | LG-R20   |
| <b>Soft Robot: Applications (Regular session)</b>   |  |
| Chair: Paik, Jamie  | Ecole Polytechnique Federale De Lausanne                         |
| Co-Chair: Wakimoto, Shuichi   | Okayama University   |
| 14:45-15:00   | WeCT20.1   |
| <i>Morphing Structure for Changing Hydrodynamic Characteristics of a Soft Underwater Walking Robot.</i>   |  |
| Ishida, Michael   | University of California, San Diego                              |
| Drotman, Dylan  | University of California, San Diego                              |
| Shih, Benjamin  | University of California, San Diego                              |
| Hermes, Mark  | University of Southern California                                |
| Luhar, Mitul  | University of Southern California                                |
| Tolley, Michael T.  | University of California, San Diego                              |
| 15:00-15:15   | WeCT20.2   |
| <i>Convolutional Autoencoder for Feature Extraction in Tactile Sensing.</i>                               |  |
| Polic, Marsela  | University of Zagreb   |
| Krajacic, Ivona   | University of Zagreb   |
| Lepora, Nathan  | University of Bristol  |
| Orsag, Matko  | University of Zagreb   |
| 15:15-15:30   | WeCT20.3   |
| <i>Intuitive Control of a Robotic Arm and Hand System with Pneumatic Haptic Feedback.</i>                 |  |
| Li, Sihui   | Worcester Polytechnic Institute                                  |
| Rameshwar, Raagini  | Worcester Polytechnic Institute                                  |
| Votta, Ann Marie  | Worcester Polytechnic Institute                                  |
| Onal, Cagdas  | Worcester Polytechnic Institute                                  |
| 15:30-15:45   | WeCT20.4   |
| <i>Operation of a Pneumatic Soft Manipulator Using a Wearable Interface with Flexible Strain Sensors.</i> |  |
| Hagihara, Hiroki  | Okayama University   |
| Wakimoto, Shuichi   | Okayama University   |
| Kanda, Takefumi   | Okayama University   |
| Furukawa, Shota   | Okayama University   |
| 15:45-16:00   | WeCT20.5   |
| <i>A Flexible Sensor for Suture Training.</i>   |  |
| Choi, Woonjae   | Korea Institute of Industrial Technology (KITECH), Robotics R&BD |
| Ahn, Bummo  | Korea Institute of Industrial Technology                         |
| 16:00-16:15   | WeCT20.6   |
| <i>Multi-DoF Force Characterization of Soft Actuators.</i>  |  |
| Joshi, Sagar  | École Polytechnique Fédérale De Lausanne                         |
| Paik, Jamie   | Ecole Polytechnique Federale De Lausanne                         |

| WeDT1   | L1-R1  |
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| <b>Semantic Scene Understanding II (Regular session)</b>  |  |
| Chair: Crandall, David  | Indiana University                           |
| Co-Chair: Takahata, Tomoyuki  | The University of Tokyo                      |
| 16:45-17:00   | WeDT1.1                                      |
| <i>Automatic Annotation for Semantic Segmentation in Indoor Scenes.</i>   |  |
| Reza, Md  | Indiana University                           |
| Naik, Akshay  | Indiana University Bloomington               |
| Chen, Kai   | Fudan University                             |
| Crandall, David   | Indiana University                           |
| 17:00-17:15   | WeDT1.2                                      |
| <i>Simultaneous Transparent and Non-Transparent Objects Segmentation with Multispectral Scenes.</i>                               |  |
| Okazawa, Atsuro   | Olympus Corporation                          |
| Takahata, Tomoyuki  | The University of Tokyo                      |
| Harada, Tatsuya   | The University of Tokyo                      |
| 17:15-17:30   | WeDT1.3                                      |
| <i>Localization and Mapping Using Instance-Specific Mesh Models.</i>  |  |
| Feng, Qiaojun   | University of California, San Diego          |
| Meng, Yue   | University of California, San Diego          |
| Shan, Mo  | University of California, San Diego          |
| Atanasov, Nikolay   | University of California, San Diego          |
| 17:30-17:45   | WeDT1.4                                      |
| <i>Learning to Generate Unambiguous Spatial Referring Expressions for Real-World Environments.</i>                                |  |
| Doğan, Fethiye Irmak  | KTH Royal Institute of Technology            |
| Kalkan, Sinan   | Middle East Technical University             |
| Leite, Iolanda  | KTH Royal Institute of Technology            |
| 17:45-18:00   | WeDT1.5                                      |
| <i>A RUGD Dataset for Autonomous Navigation and Visual Perception in Unstructured Outdoor Environments.</i>                       |  |
| Wigness, Maggie   | U.S. Army Research Laboratory                |
| Eum, Sungmin  | U.S. Army Res. Lab., Booz Allen Hamilton Inc |
| Rogers III, John G.   | US Army Research Laboratory                  |
| Han, David  | Office of Naval Research                     |
| Kwon, Heesung   | U.S. Army Research Laboratory                |
| 18:00-18:15   | WeDT1.6                                      |
| <i>Explore, Approach, and Terminate: Evaluating Subtasks in Active Visual Object Search Based on Deep Reinforcement Learning.</i> |  |
| Schmid, Jan Fabian  | University of Hamburg                        |
| Lauri, Mikko  | University of Hamburg                        |
| Frintrop, Simone  | University of Hamburg                        |

| WeDT2   |  | L1-R2 |
|---|--|-------|
| Deep Learning of Autonomous Agents (Regular session)  |  |       |
| Chair: Oh, Songhwai   | Seoul National University                  |       |
| Co-Chair: Motee, Nader  | Lehigh University                          |       |
| 16:45-17:00   | WeDT2.1                                    |       |
| Dot-To-Dot: Explainable Hierarchical Reinforcement Learning for Robotic Manipulation.                     |  |       |
| Beyret, Benjamin  | Imperial College London                    |       |
| Shafti, Ali   | Imperial College London                    |       |
| Faisal, Aldo  | Imperial College London                    |       |
| 17:00-17:15   | WeDT2.2                                    |       |
| Multi-Agent Image Classification Via Reinforcement Learning.  |  |       |
| Mousavi, Hossein K.   | Lehigh University                          |       |
| Nazari, Mohammadreza  | Lehigh University                          |       |
| Takac, Martin   | Lehigh University                          |       |
| Motee, Nader  | Lehigh University                          |       |
| 17:15-17:30   | WeDT2.3                                    |       |
| Soft Action Particle Deep Reinforcement Learning for a Continuous Action Space.                           |  |       |
| Kang, Minjae  | Seoul National University                  |       |
| Lee, Kyungjae   | Seoul National University                  |       |
| Oh, Songhwai  | Seoul National University                  |       |
| 17:30-17:45   | WeDT2.4                                    |       |
| Deep Generative Modeling of LiDAR Data.   |  |       |
| Pagé-Caccia, Lucas  | McGill University                          |       |
| Van Hoof, Herke   | University of Amsterdam                    |       |
| Pineau, Joelle  | McGill University                          |       |
| Courville, Aaron  | Montreal Institute for Learning Algorithms |       |
| 17:45-18:00   | WeDT2.5                                    |       |
| EnsembleDagger: A Bayesian Approach to Safe Imitation Learning.   |  |       |
| Menda, Kunal  | Stanford University                        |       |
| Driggs-Campbell, Katherine  | University of Illinois at Urbana-Champaign |       |
| Kochenderfer, Mykel   | Stanford University                        |       |
| 18:00-18:15   | WeDT2.6                                    |       |
| An Automated Learning-Based Procedure for Large-Scale Vehicle Dynamics Modeling on Baidu Apollo Platform. |  |       |
| Xu, Jiaxuan   | Baidu USA LLC                              |       |
| Luo, Qi   | Baidu USA LLC                              |       |
| Xu, Kecheng   | Baidu USA LLC                              |       |
| Xiao, Xiangquan   | Baidu USA LLC                              |       |
| Yu, Siyang  | Baidu USA                                  |       |
| Hu, Jiangtao  | Baidu USA                                  |       |
| Miao, Jinghao   | Baidu                                      |       |
| Wang, Jingao  | Baidu USA LLC                              |       |

| <b>WeDT3</b>   |  | L1-R3                          |
|--|--|--------------------------------|
| <b>Learning for Human-Robot Interaction (Regular session)</b>  |  |                                |
| Chair: Cangelosi, Angelo   |  | University of Plymouth         |
| Co-Chair: Knoll, Alois   |  | Technical University of Munich |
| 16:45-17:00  |  | WeDT3.1                        |
| <i>Mobile Robot Learning from Human Demonstrations with Nonlinear Model Predictive Control.</i>          |  |                                |
| Hu, Yingbai  |  | Technical University of Munich |
| Chen, Guang  |  | Technical University of Munich |
| Ning, Xiangyu  |  | Tongji University              |
| Dong, Jinhu  |  | Tongji University              |
| Liu, Shu   |  | ETH Zurich                     |
| Knoll, Alois   |  | Technical University of Munich |
| 17:00-17:15  |  | WeDT3.2                        |
| <i>Towards Reversible Dynamic Movement Primitives.</i>   |  |                                |
| Iturrate, Iñigo  |  | University of Southern Denmark |
| Sloth, Christoffer   |  | University of Southern Denmark |
| Kramberger, Aljaz  | Maersk Mc-Kinney Møller Inst., Univ. of Southern Denmark |                                |
| Petersen, Henrik Gordon  |  | University of Southern Denmark |
| Østergaard, Esben  |  | Universal Robots               |
| Savarimuthu, Thiusius Rajeeth  |  | University of Southern Denmark |
| 17:15-17:30  |  | WeDT3.3                        |
| <i>Learning Interactive Behaviors for Musculoskeletal Robots Using Bayesian Interaction Primitives.</i>  |  |                                |
| Campbell, Joseph   |  | Arizona State University       |
| Hitzmann, Arne   |  | Osaka University               |
| Stepputtis, Simon  |  | Arizona State University       |
| Ikemoto, Shuhei  |  | Osaka University               |
| Hosoda, Koh  |  | Osaka University               |
| Ben Amor, Heni   |  | Arizona State University       |
| 17:30-17:45  |  | WeDT3.4                        |
| <i>Sample-Efficient Deep Reinforcement Learning with Imaginary Rollouts for Human-Robot Interaction.</i> |  |                                |
| Thabet, Mohammad   |  | University of Manchester       |
| Patacchiola, Massimiliano  |  | The University of Edinburgh    |
| Cangelosi, Angelo  |  | University of Manchester       |
| 17:45-18:00  |  | WeDT3.5                        |
| <i>A-EXP4: Online Social Policy Learning for Adaptive Robot-Pedestrian Interaction.</i>                  |  |                                |
| Jin, Pengju  |  | Carnegie Mellon University     |
| Ohn-Bar, Eshed   |  | Carnegie Mellon University     |
| Kitani, Kris   |  | Carnegie Mellon University     |
| Asakawa, Chieko  |  | Carnegie Mellon University     |

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|---|---|
| <b>WeDT4</b>  | <b>L1-R4</b>                                  |
| <b>Mechanism Design IV (Regular session)</b>  |   |
| Chair: Kim, Keehoon   | POSTECH, Pohang Univ. of Sci. and Tech.       |
| Co-Chair: Suh, Jung-wook  | Kyungpook National University (KNU)           |
| 16:45-17:00   | WeDT4.1                                       |
| <i>HaptiCube: A Compact 5-DoF Finger-Wearable Tactile Interface.</i>  |   |
| Lim, Byeongkyu  | Korea Institute of Science and Technology     |
| Kim, Keehoon  | Korea Institute of Science and Technology     |
| Oh, Sang-Rok  | Korea Institute of Science and Technology     |
| Hwang, Donghyun   | Korea Institute of Science and Technology     |
| 17:00-17:15   | WeDT4.2                                       |
| <i>A Study of a Class of Vibration-Driven Robots: Modeling, Analysis, Control and Design of the Brushbot.</i>                         |   |
| Notomista, Gennaro  | Georgia Institute of Technology               |
| Mayya, Siddharth  | Georgia Institute of Technology               |
| Mazumdar, Anirban   | Georgia Institute of Technology               |
| Hutchinson, Seth  | Georgia Institute of Technology               |
| Egerstedt, Magnus   | Georgia Institute of Technology               |
| 17:15-17:30   | WeDT4.3                                       |
| <i>Design and Verification of a Gravity Compensated Tool Handler for Supporting an Automatic Hair Implanting Device.</i>              |   |
| Suh, Jung-wook  | Kyungpook National University                 |
| Choi, Eun-chang   | Electronics and Telecommunications Res. Inst. |
| 17:30-17:45   | WeDT4.4                                       |
| <i>Fluid Lubricated Dexterous Finger Mechanism for Human-Like Impact Absorbing Capability.</i>  |   |
| Kim, Yong-Jae   | Korea University of Technology and Education  |
| Yoon, Junsuk  | Korea University of Technology and Education  |
| Sim, Youngwoo   | Seoul National University                     |
| 17:45-18:00   | WeDT4.5                                       |
| <i>Development of Joint Module with Two-Speed Gear Transmission and Joint Lock Mechanism During Driving for Task Adaptable Robot.</i> |   |
| Makabe, Tasuku  | The University of Tokyo                       |
| Shirai, Takuma  | The University of Tokyo                       |
| Nagamatsu, Yuya   | The University of Tokyo                       |
| Kawaharazuka, Kento   | The University of Tokyo                       |
| Sugai, Fumihito   | The University of Tokyo                       |
| Okada, Kei  | The University of Tokyo                       |
| Inaba, Masayuki   | The University of Tokyo                       |
| 18:00-18:15   | WeDT4.6                                       |
| <i>A Mobile Extendable Robot Arm: Singularity Analysis and Design.</i>  |   |
| Teshigawara, Seiichi  | Massachusetts Institute of Technology         |
| Asada, Harry  | Massachusetts Institute of Technology         |

| WeDT5   |  | L1-R5 |
|---|--|-------|
| Robot Control II (Regular session)  |  |       |
| Chair: Goodwine, Bill   | University of Notre Dame                     |       |
| Co-Chair: Tsagarakis, Nikos   | Istituto Italiano Di Tecnologia              |       |
| 16:45-17:00   | WeDT5.1                                      |       |
| A Simple Approach on Global Control of a Class of Underactuated Mechanical Robotic Systems.                   |  |       |
| Chen, Tan   | University of Notre Dame                     |       |
| Goodwine, Bill  | University of Notre Dame                     |       |
| 17:00-17:15   | WeDT5.2                                      |       |
| The Compliant Joint Toolbox for MATLAB: An Introduction with Examples (I).                                    |  |       |
| Malzahn, Jörn   | Istituto Italiano Di Tecnologia              |       |
| Roosting, Wesley  | University of Twente                         |       |
| Tsagarakis, Nikos   | Istituto Italiano Di Tecnologia              |       |
| 17:15-17:30   | WeDT5.3                                      |       |
| Executing Underspecified Actions in Real World Based on Online Projection.                                    |  |       |
| Kazhoyan, Gayane  | University of Bremen                         |       |
| Beetz, Michael  | University of Bremen                         |       |
| 17:30-17:45   | WeDT5.4                                      |       |
| Kinematic Synthesis of a Serial Robotic Manipulator by Using Generalized Differential Inverse Kinematics (I). |  |       |
| Shirafuji, Shouhei  | The University of Tokyo                      |       |
| Ota, Jun  | The University of Tokyo                      |       |
| 17:45-18:00   | WeDT5.5                                      |       |
| Control of Nonprehensile Planar Rolling Manipulation: A Passivity-Based Approach (I).                         |  |       |
| Serra, Diana  | Università Degli Studi Di Napoli Federico II |       |
| Ruggiero, Fabio   | Università Di Napoli Federico II             |       |
| Donaire, Alejandro  | Queensland University of Technology          |       |
| Buonocore, Luca Rosario   | Università Degli Studi Di Napoli Federico II |       |
| Lippiello, Vincenzo   | University of Naples FEDERICO II             |       |
| Siciliano, Bruno  | Univ. Napoli Federico II                     |       |
| 18:00-18:15   | WeDT5.6                                      |       |
| General Hand Guidance Framework Using Microsoft HoloLens.   |  |       |
| Puljiz, David   | Karlsruhe Institute of Technology            |       |
| Stöhr, Erik   | Karlsruhe Institute of Technology IAR-IPR    |       |
| Riesterer, Katharina  | Karlsruhe Institute of Technology IAR-IPR    |       |
| Hein, Björn   | Karlsruhe University of Applied Science      |       |
| Kroeger, Torsten  | Karlsruhe Institute of Technology            |       |

| WeDT6   | L1-R6   |
|---|---|
| <b>Aerial Robotics VII</b> (Regular session)  |   |
| Chair: Tapia, Lydia   | University of New Mexico                            |
| Co-Chair: Mehrandezh, Mehran  | University of Regina                                |
| 16:45-17:00   | WeDT6.1   |
| <i>Specification-Based Maneuvering of Quadcopters through Hoops.</i>  |   |
| Banks, Christopher  | Georgia Institute of Technology                     |
| Coogan, Samuel  | Georgia Institute of Technology                     |
| Egerstedt, Magnus   | Georgia Institute of Technology                     |
| Slovak, Kyle  | Georgia Institute of Technology                     |
| 17:00-17:15   | WeDT6.2   |
| <i>On Flying Backwards: Preventing Run-Away of Small, Low-Speed Fixed-Wing UAVs in Strong Winds.</i>                      |   |
| Stastny, Thomas   | Swiss Federal Inst. of Tech. (ETH Zurich)           |
| Sieglwart, Roland   | ETH Zurich  |
| 17:15-17:30   | WeDT6.3   |
| <i>Precision Modeling and Optimally-Safe Design of Quadcopters for Controlled Crash Landing in Case of Rotor Failure.</i> |   |
| Hedayatpour, Mojtaba  | University of Regina                                |
| Mehrandezh, Mehran  | University of Regina                                |
| Janabi-Sharifi, Farrokh   | Ryerson University                                  |
| 17:30-17:45   | WeDT6.4   |
| <i>Design of a Ballistically-Launched Foldable Multirotor.</i>  |   |
| Pastor, Daniel  | California Institute of Technology                  |
| Izraelevitz, Jacob  | NASA Jet Propulsion Laboratory                      |
| Nadan, Paul   | Olin College  |
| Bouman, Amanda  | California Institute of Technology                  |
| Burdick, Joel   | California Institute of Technology                  |
| Kennedy, Brett  | Jet Propulsion Laboratory                           |
| 17:45-18:00   | WeDT6.5   |
| <i>Attitude and Cruise Control of a VTOL Tiltwing UAV.</i>  |   |
| Rohr, David   | ETH Zurich  |
| Stastny, Thomas   | Swiss Federal Inst. of Tech. (ETH Zurich)           |
| Verling, Sebastian  | ETH Zurich  |
| Sieglwart, Roland   | ETH Zurich  |
| 18:00-18:15   | WeDT6.6   |
| <i>An Autonomous Quadrotor System for Robust High-Speed Flight through Cluttered Environments without GPS.</i>            |   |
| Rigter, Marc  | Pembroke College                                    |
| Morrell, Benjamin   | The University of Sydney                            |
| Reid, Robert G  | Jet Propulsion Laboratory                           |
| Merewether, Gene  | Carnegie Mellon University                          |
| Tzanetos, Theodore  | NASA Jet Propulsion Lab., California Inst. of Tech. |
| Rajur, Vinay  | Georgia Tech University                             |
| Wong, KC  | The University of Sydney                            |
| Matthies, Larry   | Jet Propulsion Laboratory                           |

| WeDT7  | L1-R7                             |
|--|-----------------------------------|
| Performance Evaluation and Benchmarking (Regular session)  |                                   |
| Chair: Tang, Qirong  | Tongji University                 |
| Co-Chair: Yang, Hao  | Soochow University                |
| 16:45-17:00  | WeDT7.1                           |
| Benchmarking and Workload Analysis of Robot Dynamics Algorithms.   |                                   |
| Neuman, Sabrina  | MIT                               |
| Koolen, Twan   | MIT                               |
| Drean, Jules   | MIT                               |
| Miller, Jason  | MIT                               |
| Devadas, Srini   | MIT                               |
| 17:00-17:15  | WeDT7.2                           |
| Simitate: A Hybrid Imitation Learning Benchmark.   |                                   |
| Memmesheimer, Raphael  | University of Koblenz-Landau      |
| Kramer, Ivanna   | University of Koblenz-Landau      |
| Seib, Viktor   | University of Koblenz-Landau      |
| Paulus, Dietrich   | University of Koblenz-Landau      |
| 17:15-17:30  | WeDT7.3                           |
| N-MeRCI: A New Metric to Evaluate the Correlation between Predictive Uncertainty and True Error.                                       |                                   |
| Moukari, Michel  | Unicaen, Safran                   |
| Simon, Loïc  | Ensicaen, Unicaen                 |
| Picard, Sylvaine   | Safran                            |
| Jurie, Frederic  | University of Caen                |
| 17:30-17:45  | WeDT7.4                           |
| A Benchmark for Visual-Inertial Odometry Systems Employing Onboard Illumination.   |                                   |
| Kasper, Michael  | University of Colorado, Boulder   |
| McGuire, Steve   | University of Colorado, Boulder   |
| Heckman, Christoffer   | University of Colorado, Boulder   |
| 17:45-18:00  | WeDT7.5                           |
| Systematic Benchmarking for Reproducibility of Computer Vision Algorithms for Real-Time Systems: The Example of Optic Flow Estimation. |                                   |
| Nguyen, Björnborg  | Chalmers University of Technology |
| Berger, Christian  | University of Gothenburg          |
| Benderius, Ola   | Chalmers University of Technology |
| 18:00-18:15  | WeDT7.6                           |
| WSRender: A Workspace Analysis and Visualization Toolbox for Robotic System Design and Verification.                                   |                                   |
| Zhang, Dandan  | Imperial College London           |
| Cursi, Francesco   | Imperial College London           |
| Yang, Guang-Zhong  | Imperial College London           |



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| <b>WeDT8</b>  | LG-R8  |
| <b>Autonomous Vehicle Navigation V (Regular session)</b>  |  |
| Chair: Kim, Jinwhan   | KAIST  |
| Co-Chair: Valada, Abhinav   | University of Freiburg                         |
| 16:45-17:00   | WeDT8.1  |
| <i>Modeling, Learning and Prediction of Longitudinal Behaviors of Human-Driven Vehicles by Incorporating Internal Human Decision-Making Process Using Inverse Model Predictive Control.</i> |  |
| Guo, Longxiang  | Clemson University                             |
| Jia, Yunyi  | Clemson University                             |
| 17:00-17:15   | WeDT8.2  |
| <i>Talk to the Vehicle: Language Conditioned Autonomous Navigation of Self Driving Cars.</i>  |  |
| N N, Sriram   | IIIT Hyderabad                                 |
| Maniar, Tirth   | IIIT Hyderabad                                 |
| Kalyanasundaram, Jayaganesh   | IIIT Hyderabad                                 |
| Gandhi, Vineet  | IIIT Hyderabad                                 |
| Bhowmick, Brojeshwar  | Tata Consultancy Services                      |
| Krishna, Madhava  | IIIT Hyderabad                                 |
| 17:15-17:30   | WeDT8.3  |
| <i>Robot Localization in Floor Plans Using a Room Layout Edge Extraction Network.</i>   |  |
| Boniardi, Federico  | University of Freiburg                         |
| Valada, Abhinav   | University of Freiburg                         |
| Mohan, Rohit  | University of Freiburg                         |
| Caseltiz, Tim   | University of Freiburg                         |
| Burgard, Wolfram  | University of Freiburg                         |
| 17:30-17:45   | WeDT8.4  |
| <i>Fusing Lidar Data and Aerial Imagery with Perspective Correction for Precise Localization in Urban Canyons.</i>  |  |
| Kim, Jonghwi  | Korea Advanced Inst. of Sci. and Tech          |
| Kim, Jinwhan  | Korea Advanced Inst. of Sci. and Tech          |
| 17:45-18:00   | WeDT8.5  |
| <i>Exploiting Sparse Semantic HD Maps for Self-Driving Vehicle Localization.</i>  |  |
| Ma, Wei-Chiu  | Massachusetts Institute of Technology          |
| Tartavull, Ignacio  | Uber ATG                                       |
| Bârsan, Ioan Andrei   | Uber ATG / University of Toronto               |
| Wang, Shenlong  | University of Toronto                          |
| Bai, Min  | Univ. of Toronto and Uber Advanced Tech. Group |
| Mattyus, Gellert  | Uber ATG                                       |
| Homayounfar, Namdar   | Uber ATG                                       |
| Kowshika Lakshmikanth, Shrinidhi  | Uber   |
| Pokrovsky, Andrei   | Uber   |
| Urtasun, Raquel   | University of Toronto                          |
| 18:00-18:15   | WeDT8.6  |
| <i>FLAME: Feature-Likelihood Based Mapping and Localization for Autonomous Vehicles.</i>  |  |
| Pang, Su  | Michigan State University                      |
| Kent, Daniel  | Michigan State University                      |
| Morris, Daniel  | Michigan State University                      |
| Radha, Hayder   | Michigan State University                      |

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| <b>WeDT9</b>  | LG-R9                                      |
| <b>Robot Audition</b> (Regular session)   |  |
| Chair: Nakadai, Kazuhiro  | Honda Research Inst. Japan Co., Ltd        |
| Co-Chair: Valls Miro, Jaime   | University of Technology Sydney            |
| 16:45-17:00   | WeDT9.1                                    |
| <i>Audio-Visual Sensing from a Quadcopter: Dataset and Baselines for Source Localization and Sound Enhancement (I).</i> |  |
| Wang, Lin   | Queen Mary University of London            |
| Sanchez Matilla, Ricardo  | Queen Mary University of London            |
| Cavallaro, Andrea   | Queen Mary University of London            |
| 17:00-17:15   | WeDT9.2                                    |
| <i>Belief-Driven Control Policy of a Drone with Microphones for Multiple Sound Source Search (I).</i>                   |  |
| Yamada, Kenshiro  | Kumamoto University                        |
| Kumon, Makoto   | Kumamoto University                        |
| Furukawa, Tomonari  | Virginia Polytechnic Inst. and State Univ. |
| 17:15-17:30   | WeDT9.3                                    |
| <i>Making Sense of Audio Vibration for Liquid Height Estimation in Robotic Pouring.</i>                                 |  |
| Liang, Hongzhuo   | University of Hamburg                      |
| Li, Shuang  | University of Hamburg                      |
| Ma, Xiaojian  | Tsinghua University                        |
| Hendrich, Norman  | University of Hamburg                      |
| Gerkmann, Timo  | University of Hamburg                      |
| Sun, Fuchun   | Tsinghua University                        |
| Zhang, Jianwei  | University of Hamburg                      |
| 17:30-17:45   | WeDT9.4                                    |
| <i>Environmental Sound Segmentation Utilizing Mask U-Net (I).</i>   |  |
| Sudo, Yui   | Tokyo Institute of Technolgy               |
| Itoyama, Katsutoshi   | Tokyo Institute of Technolgy               |
| Nishida, Kenji  | Tokyo Institute of Technolgy               |
| Nakadai, Kazuhiro   | Honda Research Inst. Japan Co., Ltd        |
| 17:45-18:00   | WeDT9.5                                    |
| <i>Can a Robot Hear the Shape and Dimensions of a Room? (I).</i>  |  |
| Nguyen, Linh  | University of Technology Sydney            |
| Valls Miro, Jaime   | University of Technology Sydney            |
| Qiu, Xiaojun  | University of Technology Sydney            |
| 18:00-18:15   | WeDT9.6                                    |
| <i>Fast and Robust 3-D Sound Source Localization with DSVD-PHAT.</i>  |  |
| Grondin, Francois   | Massachusetts Institute of Technology      |
| Glass, Jim  | Massachusetts Institute of Technology      |

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| <b>WeDT10</b>   | LG-R10                                |
| <b>Visual SLAM I (Regular session)</b>  |                                       |
| Chair: Liu, Yong  | Zhejiang University                   |
| Co-Chair: Carlone, Luca   | Massachusetts Institute of Technology |
| 16:45-17:00   | WeDT10.1                              |
| <i>Accelerated Visual Inertial Navigation Via Fragmented Structure Updates.</i>   |                                       |
| Litman, Yehonathan  | Stony Brook University                |
| Wang, Ya  | Texas A&M University                  |
| Liu, Ji   | Stony Brook University                |
| 17:00-17:15   | WeDT10.2                              |
| <i>Long-Term Visual Inertial SLAM Based on Time Series Map Prediction.</i>  |                                       |
| Song, Bowen   | Shanghai Jiao Tong University         |
| Chen, Weidong   | Shanghai Jiao Tong University         |
| Wang, Jingchuan   | Shanghai Jiao Tong University         |
| Wang, Hesheng   | Shanghai Jiao Tong University         |
| 17:15-17:30   | WeDT10.3                              |
| <i>Data Flow ORB-SLAM for Real-Time Performance on Embedded GPU Boards.</i>   |                                       |
| Aldegheri, Stefano  | University of Verona                  |
| Bombieri, Nicola  | University of Verona                  |
| Bloisi, Domenico  | University of Basilicata              |
| Farinelli, Alessandro   | University of Verona                  |
| 17:30-17:45   | WeDT10.4                              |
| <i>A Robust Stereo Semi-Direct SLAM System Based on Hybrid Pyramid.</i>   |                                       |
| Zhao, Xiangrui  | Zhejiang University                   |
| Zheng, Renjie   | Zhejiang University                   |
| Ye, Wenlong   | Zhejiang University                   |
| Liu, Yong   | Zhejiang University                   |
| 17:45-18:00   | WeDT10.5                              |
| <i>Outlier-Robust Spatial Perception: Hardness, General-Purpose Algorithms, and Guarantees.</i>                                     |                                       |
| Tzoumas, Vasileios  | Massachusetts Institute of Technology |
| Antonante, Pasquale   | Massachusetts Institute of Technology |
| Carlone, Luca   | Massachusetts Institute of Technology |
| 18:00-18:15   | WeDT10.6                              |
| <i>Visual-Inertial Odometry Tightly Coupled with Wheel Encoder Adopting Robust Initialization and Online Extrinsic Calibration.</i> |                                       |
| Liu, Jinxu  | Institute of Automation, CAS          |
| Gao, Wei  | Institute of Automation, CAS          |
| Hu, Zhanyi  | Institute of Automation, CAS          |

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| <b>WeDT11</b>   | <b>LG-R11</b>                         |
| <b>Medical Robot: Endovascular and Needle (Regular session)</b>   |                                       |
| Chair: Heunis, Christoff Marthinus  | University of Twente                  |
| Co-Chair: Petruska, Andrew J.   | Colorado School of Mines              |
| <b>16:45-17:00</b>  | <b>WeDT11.1</b>                       |
| <i>Haptic Guidance for Robot-Assisted Endovascular Procedures: Implementation and Evaluation on Surgical Simulator.</i>     |                                       |
| Benavente Molinero, Miguel  | The Hamlyn Centre for Robotic Surgery |
| Dagnino, Giulio   | Imperial College London               |
| Liu, Jindong  | Imperial College London               |
| Chi, Wenqiang   | Imperial College London               |
| Abdelaziz, Mohamed Essam Mohamed Kassem   | Imperial College London               |
| Kwok, Trevor M Y  | Imperial College London               |
| Riga, Celia   | Imperial College London               |
| Yang, Guang-Zhong   | Imperial College London               |
| <b>17:00-17:15</b>  | <b>WeDT11.2</b>                       |
| <i>Robotic Ultrasound for Catheter Navigation in Endovascular Procedures.</i>   |                                       |
| Levy Langsch, Fernanda  | Technical University of Munich        |
| Virga, Salvatore  | Technical University of Munich        |
| Esteban, Javier   | Technical University of Munich        |
| Göbl, Rüdiger   | Technical University of Munich        |
| Navab, Nassir   | Technical University of Munich        |
| <b>17:15-17:30</b>  | <b>WeDT11.3</b>                       |
| <i>Toward a Versatile Robotic Platform for Fluoroscopy and MRI-Guided Endovascular Interventions: A Pre-Clinical Study.</i> |                                       |
| Abdelaziz, Mohamed Essam Mohamed Kassem   | Imperial College London               |
| Kundrat, Dennis   | Imperial College London               |
| Pupillo, Marco  | Imperial College London               |
| Dagnino, Giulio   | Imperial College London               |
| Kwok, Trevor M Y  | Imperial College London               |
| Chi, Wenqiang   | Imperial College London               |
| Groenhuis, Vincent  | University of Twente                  |
| Siepel, Françoise J   | University of Twente                  |
| Riga, Celia   | Imperial College London               |
| Stramigioli, Stefano  | University of Twente                  |
| Yang, Guang-Zhong   | Imperial College London               |
| <b>17:30-17:45</b>  | <b>WeDT11.4</b>                       |
| <i>Reconstructing Endovascular Catheter Interaction Forces in 3D Using Multicore Optical Shape Sensors.</i>                 |                                       |
| Heunis, Christoff Marthinus   | University of Twente                  |
| Belfiore, Vincenzo  | Sapienza University of Rome           |
| Vendittelli, Marilena   | Sapienza University of Rome           |
| Misra, Sarthak  | University of Twente                  |
| <b>17:45-18:00</b>  | <b>WeDT11.5</b>                       |
| <i>Human Robot Visual Interface for 3D Steering of a Flexible, Bio-Inspired Needle for Brain Surgery.</i>                   |                                       |
| Matheson, Eloise  | Imperial College London               |
| Secoli, Riccardo  | Imperial College London               |
| Galvan, Stefano   | Imperial College London               |
| Rodriguez y Baena, Ferdinando   | Imperial College, London, UK          |
| <b>18:00-18:15</b>  | <b>WeDT11.6</b>                       |
| <i>Magnetic Needle Steering Model Identification Using Expectation-Maximization.</i>  |                                       |
| Pratt, Richard L.   | Colorado School of Mines              |
| Petruska, Andrew J.   | Colorado School of Mines              |

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| <b>WeDT12</b>  | LG-R12                                |
| <b>Service Robots</b> (Regular session)  |                                       |
| Chair: Bian, Gui-Bin   | Institute of Automation, CAS          |
| Co-Chair: Kolvenbach, Hendrik  | ETHZ                                  |
| 16:45-17:00  | WeDT12.1                              |
| <i>Look Further to Recognize Better: Learning Shared Topics and Category-Specific Dictionaries for Open-Ended 3D Object Recognition.</i> |                                       |
| Mohades Kasaei, Seyed Hamidreza  | University of Groningen               |
| 17:00-17:15  | WeDT12.2                              |
| <i>Fast Perception, Planning, and Execution for a Robotic Butler: Wheeled Humanoid M-Hubo.</i>   |                                       |
| Lee, Moonyoung   | Korea Advanced Inst. of Sci. and Tech |
| Heo, Yujin   | Korea Advanced Inst. of Sci. and Tech |
| Park, Jinyong  | Korea Advanced Inst. of Sci. and Tech |
| Yang, Hyun-Dae   | Korea Advanced Inst. of Sci. and Tech |
| Jang, Ho-Deok  | Korea Advanced Inst. of Sci. and Tech |
| Benz, Philipp  | Korea Advanced Inst. of Sci. and Tech |
| Park, Hyunsub  | Korea Advanced Inst. of Sci. and Tech |
| Kweon, In So   | Korea Advanced Inst. of Sci. and Tech |
| Oh, Jun Ho   | Korea Advanced Inst. of Sci. and Tech |
| 17:15-17:30  | WeDT12.3                              |
| <i>Continuous Modeling of Affordances in a Symbolic Knowledge Base.</i>  |                                       |
| Bozcuoglu, Asil Kaan   | University of Bremen                  |
| Furuta, Yuki   | The University of Tokyo               |
| Okada, Kei   | The University of Tokyo               |
| Beetz, Michael   | University of Bremen                  |
| Inaba, Masayuki  | The University of Tokyo               |
| 17:30-17:45  | WeDT12.4                              |
| <i>Towards Jumping Locomotion for Quadruped Robots on the Moon.</i>  |                                       |
| Kolvenbach, Hendrik  | ETH Zurich                            |
| Hampp, Elias   | ETH Zurich                            |
| Barton, Patrick  | ETH Zurich                            |
| Zenkl, Radek   | ETH Zurich                            |
| Hutter, Marco  | ETH Zurich                            |
| 17:45-18:00  | WeDT12.5                              |
| <i>Evaluation of Hopping Robot Performance with Novel Foot Pad Design on Natural Terrain for Hopper Development.</i>                     |                                       |
| Sakamoto, Kosuke   | The University of Tokyo               |
| Kubota, Takashi  | JAXA ISAS                             |
| Otsuki, Masatsugu  | Japan Aerospace Exploration Agency    |
| Maeda, Takao   | Chuo University                       |
| Yoshikawa, Kent  | JAXA                                  |

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| <b>WeDT13</b>   | LG-R13   |
| <b>Legged Robots II</b> (Regular session)   |  |
| Chair: Vasudevan, Ram   | University of Michigan                         |
| Co-Chair: Manoonpong, Poramate  | Bio-Inspired Robotics and Neural Eng. Lab      |
| 16:45-17:00   | WeDT13.1                                       |
| <i>Neural Control with an Artificial Hormone System for Energy-Efficient Compliant Terrain Locomotion and Adaptation of Walking Robots.</i> |  |
| Homchanthanakul, Jettanan   | Vidyasirimedhi Inst. of Science and Technology |
| Ngamkajornwiwat, Potiwat  | King Mongkut's Univ. of Technology Thonburi    |
| Teerakittikul, Pitiwut  | King Mongkut's Univ. of Technology Thonburi    |
| Manoonpong, Poramate  | Bio-Inspired Robotics and Neural Eng. Lab      |
| 17:00-17:15   | WeDT13.2                                       |
| <i>A Fast Online Frequency Adaptation Mechanism for CPG-Based Robot Motion Control.</i>   |  |
| Thor, Mathias   | University of Southern Denmark                 |
| Manoonpong, Poramate  | Bio-Inspired Robotics and Neural Eng. Lab      |
| 17:15-17:30   | WeDT13.3                                       |
| <i>Ankle Torque During Mid-Stance Does Not Lower Energy Requirements of Steady Gaits.</i>   |  |
| Hector, Michael   | Oregon State University                        |
| Green, Kevin  | Oregon State University                        |
| Sencer, Burak   | Nagoya University                              |
| Hurst, Jonathan   | Oregon State University                        |
| 17:30-17:45   | WeDT13.4                                       |
| <i>First Steps towards Full Model Based Motion Planning and Control of Quadrupeds: A Hybrid Zero Dynamics Approach.</i>                     |  |
| Ma, Wenlong   | California Institute of Technology             |
| Akbari Hamed, Kaveh   | Virginia Tech                                  |
| Ames, Aaron   | California Institute of Technology             |
| 17:45-18:00   | WeDT13.5                                       |
| <i>Walking with Confidence: Safety Regulation for Full Order Biped Models.</i>  |  |
| Smit-Anseeuw, Nils  | University of Michigan                         |
| Remy, C. David  | University of Michigan                         |
| Vasudevan, Ram  | University of Michigan                         |

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| <b>WeDT14</b>   | LG-R14                                 |
| <b>Agricultural Automation (Regular session)</b>  |  |
| Chair: Pan, Jia   | University of Hong Kong                |
| Co-Chair: Meng, Max Q.-H.   | The Chinese University of Hong Kong    |
| 16:45-17:00   | WeDT14.1                               |
| <i>A Density Map Estimation Model with DropBlock Regularization for Clustered-Fruit Counting.</i> |  |
| Mai, Xiaochun   | The Chinese University of Hong Kong    |
| Jia, Xiao   | The Chinese University of Hong Kong    |
| Deng, Xiaoling  | South China Agricultural University    |
| Meng, Max Q.-H.   | The Chinese University of Hong Kong    |
| 17:00-17:15   | WeDT14.2                               |
| <i>Design, Modelling and Control of a Novel Agricultural Robot with Interlock Drive System.</i>   |  |
| Reiser, David   | University Hohenheim                   |
| Nannen, Volker  | Sedewa                                 |
| Hubel, Gero   | University Stuttgart                   |
| Griepentrog, Hans   | University Hohenheim                   |
| 17:15-17:30   | WeDT14.3                               |
| <i>Plant Phenotyping by Deep-Learning Based Planner for Multi-Robots.</i>                         |  |
| Wu, Chenming  | Tsinghua University                    |
| Zeng, Rui   | Tsinghua University                    |
| Pan, Jia  | University of Hong Kong                |
| Wang, Charlie C.L.  | The Chinese University of Hong Kong    |
| Liu, Yong-Jin   | Tsinghua University                    |
| 17:30-17:45   | WeDT14.4                               |
| <i>Flower Interaction Subsystem for a Precision Pollination Robot.</i>                            |  |
| Strader, Jared  | West Virginia University               |
| Nguyen, Jennifer  | West Virginia University               |
| Arend Tatsch, Christopher Alexander   | West Virginia University               |
| Du, Yixin   | West Virginia University               |
| Lassak, Kyle  | West Virginia University               |
| Buzzo, Benjamin   | West Virginia University               |
| Watson, Ryan  | West Virginia University               |
| Cerbone, Henry  | West Virginia University               |
| Ohi, Nicholas   | West Virginia University               |
| Yang, Chizhao   | West Virginia University               |
| Gu, Yu  | West Virginia University               |
| 17:45-18:00   | WeDT14.5                               |
| <i>Automated Boxwood Topiary Trimming with a Robotic Arm and Integrated Stereo Vision.</i>        |  |
| Kaljaca, Dejan  | Wageningen University                  |
| Mayer, Nikolaus   | University of Freiburg                 |
| Vroegindeweyj, Bastiaan   | Livestock Robotics                     |
| Mencarelli, Angelo  | Wageningen University & Research - WUR |
| Van Henten, Eldert J.   | Wageningen University                  |
| Brox, Thomas  | University of Freiburg                 |
| 18:00-18:15   | WeDT14.6                               |
| <i>Whole-Body Locomotion and Posture Control on a Torque-Controlled Hydraulic Rover.</i>          |  |
| Hyon, Sang-Ho   | Ritsumeikan University                 |
| Ida, Yusuke   | Ritsumeikan University                 |
| Ishikawa, Junichi   | Kubota Cooperation                     |
| Hiraoka, Minoru   | Kubota Cooperation                     |

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| <b>WeDT15</b>   | <b>LG-R15</b>  |
| <b>Motion and Path Planning: Manipulators (Regular session)</b>   |  |
| Chair: Sun, Yu  | University of South Florida                          |
| Co-Chair: Harada, Kensuke   | Osaka University                                     |
| <b>16:45-17:00</b>  | <b>WeDT15.1</b>                                      |
| <i>Timed-Elastic Bands for Manipulation Motion Planning.</i>  |  |
| Magyar, Bence   | Heriot-Watt University                               |
| Tsiogkas, Nikolaos  | Heriot Watt University                               |
| Deray, Jeremie  | Inst. De Robòtica I Informàtica Industrial, CSIC-UPC |
| Pfeiffer, Sammy   | University of Technology Sydney                      |
| Lane, David   | Heriot-Watt University                               |
| <b>17:00-17:15</b>  | <b>WeDT15.2</b>                                      |
| <i>Dual-Arm Assembly Planning Considering Gravitational Constraints.</i>  |  |
| Moriyama, Ryota   | Osaka University                                     |
| Wan, Weiwei   | Osaka University                                     |
| Harada, Kensuke   | Osaka University                                     |
| <b>17:15-17:30</b>  | <b>WeDT15.3</b>                                      |
| <i>Context-Dependent Search for Generating Paths for Redundant Manipulators in Cluttered Environments.</i>                  |  |
| Rajendran, Pradeep  | University of Southern California                    |
| Thakar, Shantanu  | University of Southern California                    |
| Kabir, Ariyan M   | University of Southern California                    |
| Shah, Brual C.  | University of Southern California                    |
| Gupta, Satyandra K.   | University of Southern California                    |
| <b>17:30-17:45</b>  | <b>WeDT15.4</b>                                      |
| <i>Quaternion-Based Smooth Trajectory Generator for Via Poses in SE(3) Considering Kinematic Limits in Cartesian Space.</i> |  |
| Grassmann, Reinhard M.  | University of Toronto Mississauga                    |
| Burgner-Kahrs, Jessica  | University of Toronto Mississauga                    |
| <b>17:45-18:00</b>  | <b>WeDT15.5</b>                                      |
| <i>Representing Robot Task Plans As Robust Logical-Dynamical Systems.</i>   |  |
| Paxton, Chris   | NVIDIA Research                                      |
| Ratliff, Nathan   | Lula Robotics Inc                                    |
| Eppner, Clemens   | Technische Universität Berlin                        |
| Fox, Dieter   | University of Washington                             |
| <b>18:00-18:15</b>  | <b>WeDT15.6</b>                                      |
| <i>Manipulation Motion Taxonomy and Coding for Robots.</i>  |  |
| Paulius, David A.   | University of South Florida                          |
| Huang, Yongqiang  | University of South Florida                          |
| Melancon, Jason   | University of South Florida                          |
| Sun, Yu   | University of South Florida                          |



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| <b>WeDT16</b>   | LG-R16  |
| <b>Grippers and Other End-Effectors (Regular session)</b>   |   |
| Chair: Wan, Weiwei  | Osaka University                                      |
| Co-Chair: Yi, Byung-Ju  | Hanyang University                                    |
| 16:45-17:00   | WeDT16.1  |
| <i>A Passive Closing, Tendon Driven, Adaptive Robot Hand for Ultra-Fast, Aerial Grasping and Perching.</i>                        |   |
| McLaren, Andrew John  | University of Auckland                                |
| Fitzgerald, Zak   | University of Auckland                                |
| Gao, Geng   | University of Auckland                                |
| Liarokapis, Minas   | University of Auckland                                |
| 17:00-17:15   | WeDT16.2  |
| <i>Design of a 3-DOF Linkage-Driven Underactuated Finger for Multiple Grasping.</i>   |   |
| Kang, Long  | Hanyang University                                    |
| Seo, Jong-Tae   | Hanyang University                                    |
| Yoon, Dukchan   | Hanyang University                                    |
| Kim, Sang-Hwa   | Hanyang University                                    |
| Suh, Il Hong  | Hanyang University                                    |
| Yi, Byung-Ju  | Hanyang University                                    |
| 17:15-17:30   | WeDT16.3  |
| <i>Paper-Based Modular Origami Gripper.</i>   |   |
| Maneewarn, Thavida  | King Mongkut's University of Technology Thonburi      |
| Pengwang, Eakkachai Ton   | King Mongkut's University of Technology Thonburi      |
| Jamroonpan, Natthanicha   | King Mongkut's University of Technology Thonburi      |
| Phummapooti, Ratchatida   | King Mongkut's University of Technology Thonburi      |
| Polchankajorn, Pongsakorn   | King Mongkut's University of Technology Thonburi      |
| 17:30-17:45   | WeDT16.4  |
| <i>Design of a Novel Gripper System with 3D and Inkjet-Printed Multimodal Sensors for Automated Grasping of a Forestry Robot.</i> |   |
| Faller, Lisa-Marie  | Carinthian University of Applied Sciences: FH Kärnten |
| Stetco, Christian   | Alpen-Adria Universität Klagenfurt                    |
| Zangl, Hubert   | Alpen-Adria-Universitaet Klagenfurt                   |
| 17:45-18:00   | WeDT16.5  |
| <i>Capillary Force Gripper for Complex Shaped Micro Objects with Fast Droplet Forming by On-Off Control of a Piston Slider.</i>   |   |
| Hagiwara, Wataru  | Komatsu Ltd   |
| Fuchiwaki, Ohmi   | Yokohama National University                          |
| Tokui, Ryota  | Yokohama National University                          |
| Ito, Takatoshi  | Yokohama National University                          |
| Tanaka, Kenta   | Yokohama National University                          |
| 18:00-18:15   | WeDT16.6  |
| <i>Designing a Mechanical Tool for Robots with 2-Finger Parallel Grippers.</i>  |   |
| Hu, Zhengtao  | Osaka University                                      |
| Wan, Weiwei   | Osaka University                                      |
| Harada, Kensuke   | Osaka University                                      |

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| <b>WeDT17</b>   | LG-R17                                   |
| <b>Rehabilitation Robotics I (Regular session)</b>  |  |
| Chair: Hayashibe, Mitsuhiro   | Tohoku University                        |
| Co-Chair: Shahriari, Erfan  | Technical University of Munich           |
| 16:45-17:00   | WeDT17.1                                 |
| <i>Employing Whole-Body Control in Assistive Robotics.</i>  |  |
| Iskandar, Maged   | German Aerospace Center - DLR            |
| Quere, Gabriel  | DLR                                      |
| Hagengruber, Annette  | German Aerospace Center                  |
| Dietrich, Alexander   | German Aerospace Center - DLR            |
| Vogel, Joern  | German Aerospace Center                  |
| 17:00-17:15   | WeDT17.2                                 |
| <i>ANYexo: A Versatile and Dynamic Upper-Limb Rehabilitation Robot.</i>                                       |  |
| Zimmermann, Yves Dominic  | ETH Zurich                               |
| Forino, Alessandro  | ETH Zurich                               |
| Riener, Robert  | ETH Zurich                               |
| Hutter, Marco   | ETH Zurich                               |
| 17:15-17:30   | WeDT17.3                                 |
| <i>Study on Stumbles of the Elderly from a Depth Perception Dependency Test.</i>                              |  |
| Uchiyama, Emiko   | The University of Tokyo                  |
| Mino, Toshihiro   | The University of Tokyo                  |
| Obara, Hiroki   | The University of Tokyo                  |
| Tanaka, Tomoki  | The University of Tokyo                  |
| Takano, Wataru  | Osaka University                         |
| Nakamura, Yoshihiko   | The University of Tokyo                  |
| Iijima, Katsuya   | The University of Tokyo                  |
| 17:30-17:45   | WeDT17.4                                 |
| <i>Identification of Time-Varying and Time-Scalable Synergies from Continuous Electromyographic Patterns.</i> |  |
| Moreira Ramos, Felipe   | Tohoku University                        |
| d'Avella, Andrea  | Santa Lucia Foundation                   |
| Hayashibe, Mitsuhiro  | Tohoku University                        |
| 17:45-18:00   | WeDT17.5                                 |
| <i>Energy-Based Adaptive Control and Learning for Patient-Aware Rehabilitation.</i>                           |  |
| Shahriari, Erfan  | Technical University of Munich           |
| Zardykhan, Dinmukhamed  | Technical University of Munich           |
| Koenig, Alexander   | Reactive Robotics GmbH                   |
| Jensen, Elisabeth   | Technical University of Munich           |
| Haddadin, Sami  | Technical University of Munich           |
| 18:00-18:15   | WeDT17.6                                 |
| <i>Delayed Output Feedback Control for Gait Assistance with a Robotic Hip Exoskeleton (I).</i>                |  |
| Lim, Bokman   | Samsung Electronics Co., Ltd             |
| Lee, Jusuk  | Samsung Electronics Co., Ltd             |
| Jang, Junwon  | Samsung Electronics Co., Ltd             |
| Kim, Kyungrock  | Samsung Advanced Institute of Technology |
| Park, Young Jin   | Samsung Advanced Institute of Technology |
| Seo, Keehong  | Samsung Electronics Co., Ltd             |
| Shim, Youngbo   | Samsung Electronics                      |

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| <b>WeDT18</b>   | LG-R18  |
| <b>Dynamics (Regular session)</b>   |   |
| Chair: He, Wei  | University of Science and Technology Beijing        |
| Co-Chair: Kumar, Shivesh  | DFKI GmbH   |
| 16:45-17:00   | WeDT18.1  |
| <i>Dynamic Identification of the Franka Emika Panda Robot with Retrieval of Feasible Parameters Using Penalty-Based Optimization.</i>           |   |
| Gaz, Claudio Roberto  | Sapienza University of Rome                         |
| Cognetti, Marco   | Centre National De La Recherche Scientifique (CNRS) |
| Oliva, Alexander Antonio  | INRIA   |
| Robuffo Giordano, Paolo   | Centre National De La Recherche Scientifique (CNRS) |
| De Luca, Alessandro   | Sapienza University of Rome                         |
| 17:00-17:15   | WeDT18.2  |
| <i>Modeling, Simulation and Experimental Validation of Tendon-Driven Soft-Arm Robot Configuration - a Continuum Mechanics Approach.</i>         |   |
| Chairopoulos, Nikos   | National Technical University of Athens             |
| Vartholomeos, Panagiotis  | National Technical University of Athens             |
| Papadopoulos, Evangelos   | National Technical University of Athens             |
| 17:15-17:30   | WeDT18.3  |
| <i>Model Simplification for Dynamic Control of Series-Parallel Hybrid Robots - a Representative Study on the Effects of Neglected Dynamics.</i> |   |
| Kumar, Shivesh  | DFKI GmbH   |
| Martensen, Julius   | University of Bremen                                |
| Mueller, Andreas  | Johannes Kepler University Linz                     |
| Kirchner, Frank   | University of Bremen                                |
| 17:30-17:45   | WeDT18.4  |
| <i>High-Speed Sliding Locomotion Generation on Slippery Surface of an Indirectly Controlled Robot with Viscoelastic Body.</i>                   |   |
| Li, Longchuan   | Ritsumeikan University                              |
| Asano, Fumihiko   | Japan Advanced Inst. of Sci. and Tech.              |
| Tokuda, Isao  | Ritsumeikan University                              |
| 17:45-18:00   | WeDT18.5  |
| <i>Design and Comparative Analysis of 1D Hopping Robots.</i>  |   |
| Ambrose, Eric   | California Institute of Technology                  |
| Csomay-Shanklin, Noel   | Georgia Institute of Technology                     |
| Or, Yizhar  | Technion  |
| Ames, Aaron   | California Institute of Technology                  |
| 18:00-18:15   | WeDT18.6  |
| <i>Dynamic Whole-Body Control of Unstable Wheeled Humanoid Robots.</i>  |   |
| Zambella, Grazia  | University of Pisa                                  |
| Lentini, Gianluca   | University of Pisa                                  |
| Garabini, Manolo  | Università Di Pisa                                  |
| Grioli, Giorgio   | Istituto Italiano Di Tecnologia                     |
| Catalano, Manuel Giuseppe   | Istituto Italiano Di Tecnologia                     |
| Palleschi, Alessandro   | University of Pisa                                  |
| Pallottino, Lucia   | Università Di Pisa                                  |
| Bicchi, Antonio   | Università Di Pisa                                  |
| Settimi, Alessandro   | Università Di Pisa                                  |
| Caporale, Danilo  | Centro Di Ricerca E. Piaggio                        |

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| <b>WeDT19</b>  | LG-R19                                    |
| <b>Sensing and Planning</b> (Regular session)  |   |
| Chair: Pham, Quang-Cuong   | NTU Singapore                             |
| Co-Chair: Harada, Kensuke  | Osaka University                          |
| 16:45-17:00  | WeDT19.1                                  |
| <i>CubeSLAM: Monocular 3-D Object SLAM (I).</i>  |   |
| Yang, Shichao  | Carnegie Mellon University                |
| Scherer, Sebastian   | Carnegie Mellon University                |
| 17:00-17:15  | WeDT19.2                                  |
| <i>Statistical Coverage Control of Mobile Sensor Networks (I).</i>   |   |
| Arslan, Omur   | Max Planck Inst. for Intelligent Systems  |
| 17:15-17:30  | WeDT19.3                                  |
| <i>On the Covariance of <math>X</math> in <math>AX = XB</math> (I).</i>  |   |
| Nguyen, Huy  | Nanyang Technological University          |
| Pham, Quang-Cuong  | NTU Singapore                             |
| 17:30-17:45  | WeDT19.4                                  |
| <i>Real-Time Global Registration for Globally Consistent RGB-D SLAM (I).</i>   |   |
| Han, Lei   | Hong Kong Univ. of Science and Technology |
| Xu, Lan  | Hong Kong Univ. of Science and Technology |
| Bobkov, Dmytro   | Technical University of Munich            |
| Steinbach, Eckehard  | Technical University of Munich            |
| Fang, Lu   | Tsinghua University                       |
| 17:45-18:00  | WeDT19.5                                  |
| <i>Detecting Layered Structures of Partially Occluded Objects for Bin Picking.</i>                                     |   |
| Inagaki, Yusuke  | Chubu University                          |
| Araki, Ryosuke   | Chubu University                          |
| Yamashita, Takayoshi   | Chubu University                          |
| Fujiyoshi, Hironobu  | Chubu University                          |
| 18:00-18:15  | WeDT19.6                                  |
| <i>Quickly Inserting Pegs into Uncertain Holes Using Multi-View Images and Deep Network Trained on Synthetic Data.</i> |   |
| Triyonoputro, Joshua Christanto  | Osaka University                          |
| Wan, Weiwei  | Osaka University                          |
| Harada, Kensuke  | Osaka University                          |

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| <b>WeDT20</b>   | LG-R20  |
| <b>Soft Robot: Materials and Design (Regular session)</b>   |   |
| Chair: Ollero, Anibal   | University of Seville                                 |
| Co-Chair: Su, Hao   | City University of New York, City College             |
| 16:45-17:00   | WeDT20.1  |
| <i>Inchworm-Inspired Soft Climbing Robot Using Microspine Arrays.</i>   |   |
| Hu, Qiqiang   | Univ. of Sci. and Tech. of China & CityU of Hong Kong |
| Dong, Erbao   | Univ. of Sci. and Tech. of China                      |
| Cheng, Gang   | Beijing Institute of Spacecraft System Engineering    |
| Jin, Hu   | Univ. of Sci. and Tech. of China                      |
| Yang, Jie   | Univ. of Sci. and Tech. of China                      |
| Sun, Dong   | City University of Hong Kong                          |
| 17:00-17:15   | WeDT20.2  |
| <i>Spine-Inspired Continuum Soft Exoskeleton for Stoop Lifting Assistance.</i>  |   |
| Yang, Xiaolong  | City University of New York, City College             |
| Huang, Tzu-Hao  | The City College of New York                          |
| Hu, Hang  | The City College of New York                          |
| Yu, Shuangyue   | City University of New York, City College             |
| Zhang, Sainan   | The City College of New York                          |
| Zhou, Xianlian  | New Jersey Institute of Technology                    |
| Carriero, Alessandra  | The City College of New York                          |
| Yue, Guang  | Kessler Foundation                                    |
| Su, Hao   | City University of New York, City College             |
| 17:15-17:30   | WeDT20.3  |
| <i>A Parallel Gripper with a Universal Fingertip Device Using Optical Sensing and Jamming Transition for Maintaining Stable Grasps.</i> |   |
| Sakuma, Tatsuya   | Nara Institute of Science and Technology              |
| Phillips, Elaine  | Massachusetts Institute of Technology                 |
| Garcia Ricardez, Gustavo Alfonso  | Nara Institute of Science and Technology              |
| Ding, Ming  | Nara Institute of Science and Technology              |
| Takamatsu, Jun  | Nara Institute of Science and Technology              |
| Ogasawara, Tsukasa  | Nara Institute of Science and Technology              |
| 17:30-17:45   | WeDT20.4  |
| <i>Rapid Design of Mechanical Logic Based on Quasi-Static Electromechanical Modeling.</i>   |   |
| Yan, Wenzhong   | UCLA  |
| Yu, Yunchen   | UCLA  |
| Mehta, Ankur  | UCLA  |
| 17:45-18:00   | WeDT20.5  |
| <i>Design and Characterization of a Fully Autonomous Under-Actuated Soft Batoid-Like Robot.</i>   |   |
| Van Tien, Truong  | Singapore University of Technology and Design         |
| Viswanathan, Vinodh Kumar   | Singapore-MIT Alliance for Research and Technology    |
| Joseph, Vincent   | Singapore University of Technology and Design         |
| Valdivia y Alvarado, Pablo  | Singapore University of Technology and Design, MIT    |
| 18:00-18:15   | WeDT20.6  |
| <i>Autonomous Landing on Pipes Using Soft Gripper for Inspection and Maintenance in Outdoor Environments (I).</i>                       |   |
| Ramon Soria, Pablo  | University of Seville                                 |
| Gómez Tamm, Alejandro Ernesto   | University of Seville                                 |
| García Rubiales, Francisco Javier   | University of Seville                                 |
| Arrue, Begoña C.  | University of Seville                                 |
| Ollero, Anibal  | University of Seville                                 |

| WePS2  | L1-R0, Zone I                             |
|--|---|
| Late Breaking Result Poster Session 2 (Poster session)   |   |
| 12:00-13:00  | WePS2.1                                   |
| <i>Towards an Assisted Robotic Platform for Soft Neural Tissue Interaction.</i>  |   |
| Ihn, Yong Seok   | Korea Institute of Science and Technology |
| Jeong, Jinwoo  | Sungkyunkwan University                   |
| Hwang, Donghyun  | Korea Institute of Science and Technology |
| Yim, Sehyuk  | Korea Institute of Science and Technology |
| Yang, Sungwook   | Korea Institute of Science and Technology |
| Oh, Sang-Rok   | Korea Institute of Science and Technology |
| Kim, Keehoon   | Korea Institute of Science and Technology |
| 12:00-13:00  | WePS2.2                                   |
| <i>Design of a Compact SMA-Actuated MRI-Compatible Steerable Neurosurgical Robot.</i>  |   |
| Shao, Shicong  | The Chinese University of Hong Kong       |
| Cheng, Shing Shin  | The Chinese University of Hong Kong       |
| 12:00-13:00  | WePS2.3                                   |
| <i>Fiber Optic Fabry-Perot Interferometry for a Biopsy Needle with Tip Force Sensing.</i>  |   |
| Schneegans, Hubert   | Instant-Lab, EPFL                         |
| Rubbert, Lennart   | INSA - Strasbourg                         |
| Rivera, José   | Instant-Lab, EPFL                         |
| Fifanski, Sebastian  | Instant-Lab, EPFL                         |
| Renaud, Pierre   | ICube AVR                                 |
| Henein, Simon  | EPFL                                      |
| Baur, Charles  | EPFL                                      |
| 12:00-13:00  | WePS2.4                                   |
| <i>The ARMM System: Demonstrating Clinical Feasibility in Steering Magnetically Actuated Catheters in Endovascular Applications.</i> |   |
| Heunis, Christoff Marthinus  | University of Twente                      |
| Sikorski, Jakub  | University of Twente                      |
| Phillips Furtado, Guilherme  | University of Sao Paulo                   |
| Misra, Sarthak   | University of Twente                      |
| 12:00-13:00  | WePS2.5                                   |
| <i>Towards Active Stabilization of Probe-Based Confocal Laser Endomicroscopy Using a Handheld Micromanipulator.</i>                  |   |
| Kim, Eunchan   | Korea Institute of Science and Technology |
| Choi, Nara   | Korea Institute of Science and Technology |
| Hwang, Donghyun  | Korea Institute of Science and Technology |
| Ihn, Yong Seok   | Korea Institute of Science and Technology |
| Oh, Sang-Rok   | Korea Institute of Science and Technology |
| Yang, Sungwook   | Korea Institute of Science and Technology |
| 12:00-13:00  | WePS2.6                                   |
| <i>A Learning-Based Inverse Kinematics Solver for Two-Segment Continuum Robot Models.</i>  |   |
| Lai, Jiewen  | The Hong Kong Polytechnic University      |
| Lu, Bo   | The Hong Kong Polytechnic University      |
| Chu, Henry   | The Hong Kong Polytechnic University      |

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| 12:00-13:00   | WePS2.7                              |
| <i>Use of Deep Learning Based on Recurrent Neural Network for Modeling of Characteristics of a Pneumatic Artificial Muscle.</i> |                                      |
| Kang, Bongsoo   | Hannam University                    |
| Park, Edward J.   | Simon Fraser University              |
| 12:00-13:00   | WePS2.8                              |
| <i>Realtime Contact Dynamics for Continuum Arms Using Physics Engines.</i>  |                                      |
| Grey, Jonathan  | DePaul University                    |
| Godage, Isuru S.  | Depaul University                    |
| 12:00-13:00   | WePS2.9                              |
| <i>Real-Time Biped Walking-Pattern Generation by Spline Collocation.</i>  |                                      |
| Seiwald, Philipp  | Technical University of Munich       |
| Sygulla, Felix  | Technical University of Munich       |
| Staufenberg, Nora-Sophie  | Technical University of Munich       |
| Rixen, Daniel   | Technical University of Munich       |
| 12:00-13:00   | WePS2.10                             |
| <i>A Real-Time V2X Enabled Dynamic Path Planning System for Autonomous Vehicles in Road Blockage Test Scenarios.</i>            |                                      |
| Arshad, Saba  | Chungbuk National University         |
| Kim, Do-Hyeong  | Chungbuk National University         |
| Kim, Gon-Woo  | Chungbuk National University         |
| 12:00-13:00   | WePS2.11                             |
| <i>A Fast Heuristic Path Planning Algorithm for Mobile Robots.</i>  |                                      |
| Chi, Wenzheng   | Soochow University                   |
| Zhi Yu, Ding  | Soochow University                   |
| Chen, Guodong   | Soochow University                   |
| Sun, Lining   | Harbin Institute of Technology       |
| 12:00-13:00   | WePS2.12                             |
| <i>Autonomous Search for Sources of Gamma Radiation.</i>  |                                      |
| Woller, David   | Czech Technical University in Prague |
| Kulich, Miroslav  | Czech Technical University in Prague |
| Preucil, Libor  | Czech Technical University in Prague |
| 12:00-13:00   | WePS2.13                             |
| <i>Locomotion Planning of a Variable Geometry Robot Based on Polygon-Shaped Ground Contacts.</i>                                |                                      |
| Bae, Jangho   | Seoul National University            |
| Park, Sumin   | Seoul National University            |
| Lee, Seohyeon   | Hanyang University                   |
| Yim, Mark   | University of Pennsylvania           |
| Kim, Jongwon  | Seoul National University            |
| Seo, TaeWon   | Hanyang University                   |
| 12:00-13:00   | WePS2.14                             |
| <i>Energy-Based Hybrid Control of a Ball-Dribbling Robot.</i>   |                                      |
| Massaroli, Stefano  | The University of Tokyo              |
| Califano, Federico  | University of Twente                 |
| Faragasso, Angela   | The University of Tokyo              |
| Yamashita, Atsushi  | The University of Tokyo              |
| Asama, Hajime   | The University of Tokyo              |

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| 12:00-13:00   | WePS2.15  |
| <i>Design a Dexterous Hand for the Logistic Robot in Bin Picking.</i>   |   |
| Wang, Tao   | Dorabot Inc   |
| Gong, Shangdong   | University of South Florida                               |
| Salman, Yusuf   | Dorabot Inc   |
| Chen, Shuqu   | Dorabot Inc   |
| Zhang, Hao  | Dorabot Inc   |
| Kirchner, Frank   | University of Bremen                                      |
| 12:00-13:00   | WePS2.16  |
| <i>Multi-Robot Distributed Digital Printing System.</i>   |   |
| Karpe, Kedar  | SRM Institute of Science and Technology                   |
| Chatterjee, Ayon  | SRM Institute of Science and Technology                   |
| Samiappan, Dhanalakshmi   | SRM Institute of Science and Technology                   |
| Ramamoorthy, Kumar  | SRM Institute of Science and Technology                   |
| Sabattini, Lorenzo  | University of Modena and Reggio Emilia                    |
| 12:00-13:00   | WePS2.17  |
| <i>Robust UAV Localization Around the Large Scale Facilities with Multiple Subsidiary UAVs.</i>                                 |   |
| Kimura, Keisuke   | Nagoya University   |
| Funabara, Yuki  | Nagoya University   |
| Doki, Shinji  | Nagoya University   |
| Doki, Kae   | Aichi Institute of Technology                             |
| 12:00-13:00   | WePS2.18  |
| <i>Self-Calibration and Learning on Chip: Towards Neuromorphic Robots.</i>  |   |
| Kreiser, Raphaela   | Inst. of Neuroinformatics, Univ. of Zurich and ETH Zurich |
| Waibel, Gabriel   | ETH Zurich  |
| Renner, Alpha   | Inst. of Neuroinformatics, Univ. of Zurich and ETH Zurich |
| Sandamirskaya, Yulia  | University and ETH Zurich                                 |
| 12:00-13:00   | WePS2.19  |
| <i>Study on Performance of Marker Detection Via Training Data Augmentation of Partial Distortion in Underwater Sonar Image.</i> |   |
| Lee, Eon-Ho   | Kongju National University                                |
| Lee, Yeongjun   | Korea Research Inst. of Ships and Ocean Engineering       |
| Choi, Jinwoo  | KRISO   |
| Lee, Sejin  | Kongju National University                                |
| 12:00-13:00   | WePS2.20  |
| <i>SP2 (spherically-Stratified-Points Projection): Generating Novel Images for 3D Point Cloud Segmentation.</i>                 |   |
| Bae, Chulhee  | Kongju National University                                |
| Lee, Sejin  | Kongju National University                                |
| 12:00-13:00   | WePS2.21  |
| <i>Learning Continuous Time Control Policies by Minimizing the Hamilton-Jacobi-Bellman Residual.</i>                            |   |
| Lutter, Michael   | Technische Universität Darmstadt                          |
| Belousov, Boris   | Technische Universität Darmstadt                          |
| Listmann, Kim Daniel  | ABB AG  |
| Clever, Debora  | ABB Corporate Research Center                             |
| Peters, Jan   | Technische Universität Darmstadt                          |



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| 12:00-13:00   | WePS2.22                                       |
| <i>Computationally Efficient MPC for Cable-Driven Robot.</i>  |  |
| Song, Chen  | The Chinese University of Hong Kong            |
| Lau, Darwin   | The Chinese University of Hong Kong            |
| 12:00-13:00   | WePS2.23                                       |
| <i>Camera Zoom Control of Integrated Control Platform for Advancement of Performance Shooting System.</i>     |  |
| Kim, Jiyong   | Gwangju Institute of Science and Technology    |
| Quan, Chenghao  | Gwangju Institute of Science and Technology    |
| Hong, Yohan   | Gwangju Institute of Science and Technology    |
| Kim, Mun Sang   | Gwangju Institute of Science and Technology    |
| 12:00-13:00   | WePS2.24                                       |
| <i>Tactile Localization for Unknown and Known Objects.</i>  |  |
| Bauza Villalonga, Maria   | Massachusetts Institute of Technology          |
| Rodriguez, Alberto  | Massachusetts Institute of Technology          |
| 12:00-13:00   | WePS2.25                                       |
| <i>Autonomous Mobile Manipulation Framework for Intelligent Home Service Robots.</i>                          |  |
| Yi, Jae-Bong  | Pusan National University                      |
| Yi, Seung-Joon  | Pusan National University                      |
| 12:00-13:00   | WePS2.26                                       |
| <i>Design for Cobot-Assisted Manufacturing and Assembly (DFcoMA).</i>   |  |
| Duwyn, Lennart  | Univ. of Antwerp, Vrije Univ. Brussel, Alberts |
| Mathijssen, Glenn   | Vrije Universiteit Brussel                     |
| Vanderborght, Bram  | Vrije Universiteit Brussel                     |
| Verlinden, Jouke Casper   | University of Antwerp                          |
| 12:00-13:00   | WePS2.27                                       |
| <i>Preliminary Results of Active Compression Sleeve Using Wire and Fabric Mechanism.</i>                      |  |
| Yang, Seung Tae   | Chung-Ang University                           |
| Ryu, Jae Wook   | Chung-Ang University                           |
| Park, June Il   | Chung-Ang University                           |
| Lee, Giuk   | Chung-Ang University                           |
| 12:00-13:00   | WePS2.28                                       |
| <i>Feasibility Test of Exoskeleton Ankle Robot for Gait Training on Stairs for Sub-Acute Stroke Patients.</i> |  |
| Yeung, Ling Fung  | The Chinese University of Hong Kong            |
| Lau, Choi Yin   | The Chinese University of Hong Kong            |
| Lai, Wai Kin  | Shatin Hospital, Hong Kong                     |
| Soo, Oi Yan   | The Chinese University of Hong Kong            |
| Chan, Man Lok   | Tung Wah Hospital, Hong Kong                   |
| Tong, Kai Yu  | The Chinese University of Hong Kong            |
| 12:00-13:00   | WePS2.29                                       |
| <i>Non-Contact Sensing of Respiratory Signals.</i>  |  |
| Zhai, Qian  | Zhejiang University                            |
| Han, Meimei   | Zhejiang Fuzhi Medical Devices Limited Company |
| Liu, Tao  | Zhejiang University                            |

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| 12:00-13:00  | WePS2.30                                   |
| <i>Robot-Based Strategy for Objective Assessment of Motor Impairments.</i>   |  |
| Oña Simbaña, Edwin Daniel  | University Carlos III of Madrid            |
| Garcia-Haro, Juan Miguel   | Carlos III University of Madrid            |
| Jardon, Alberto  | Universidad Carlos III De Madrid           |
| Balaguer, Carlos   | Universidad Carlos III De Madrid           |
| 12:00-13:00  | WePS2.31                                   |
| <i>Intention-Driven Shoulder Rehabilitation for Targeted Neuro-Muscular Training Using an Exo-Musculoskeletal Robot.</i> |  |
| Cheng, Hiu Yee, Hilary   | The Chinese University of Hong Kong        |
| Leung, Wing Cheong   | The Chinese University of Hong Kong        |
| Tong, Kai Yu   | The Chinese University of Hong Kong        |
| Lau, Darwin  | The Chinese University of Hong Kong        |
| 12:00-13:00  | WePS2.32                                   |
| <i>Hand Movement Intention Recognition Based on EMG Intensity Map and Convolutional Neural Networks.</i>                 |  |
| Wang, Congqing   | University of Aeronautics and Astronautics |
| 12:00-13:00  | WePS2.33                                   |
| <i>Robot Audition Approaches to Field Observation of Bird Songs.</i>   |  |
| Sumitani, Shinji   | Nagoya University                          |
| Morimatsu, Takemi  | Nagoya University                          |
| Suzuki, Reiji  | Nagoya University                          |
| Matsubayashi, Shiho  | Osaka University                           |
| Arita, Takaya  | Nagoya University                          |
| Nakadai, Kazuhiro  | Honda Research Inst. Japan Co., Ltd        |
| Okuno, Hiroshi G.  | Waseda University                          |
| 12:00-13:00  | WePS2.34                                   |
| <i>Handover Process of Autonomous Driver Assist Systems - a Call for Critical Performance Assessment.</i>                |  |
| Takács, Árpád  | Óbuda University                           |
| Drexler, Dániel András   | Óbuda University                           |
| Nagy, Tamas  | Obuda University                           |
| Haidegger, Tamas   | Obuda University                           |
| 12:00-13:00  | WePS2.35                                   |
| <i>ResQbot 2.0: A Mobile Stretcher Bed Robot with Neck Securing Device for Safe Casualty Extraction.</i>                 |  |
| Saputra, Roni Permana  | Imperial College London                    |
| Kuder, Isabelle  | Imperial College London                    |
| Alexander, Gough   | Imperial College London                    |
| Bilsdorfer, Marius   | Imperial College London                    |
| de Cocker, Emma  | Imperial College London                    |
| Dakin, Alexandra   | Imperial College London                    |
| Kormushev, Petar   | Imperial College London                    |
| 12:00-13:00  | WePS2.36                                   |
| <i>Feasibility of Wireless Power Transfer for Mobile Robots.</i>   |  |
| Cheah, Wei   | The University of Manchester               |
| Watson, Simon  | The University of Manchester               |
| Lennox, Barry  | The University of Manchester               |

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| 12:00-13:00  | WePS2.37   |
| <i>A Study on the Electric Wheelchair-Humanoid Collaboration for Clothing Assistance of the Elderly.</i>               |  |
| Joshi, Ravi Prakash  | Kyushu Institute of Technology                         |
| Tarapore, Jayant Prasad  | Indian Institute of Technology Delhi                   |
| Shibata, Tomohiro  | Kyushu Institute of Technology                         |
| 12:00-13:00  | WePS2.38   |
| <i>Semantic Segmentation Using GAN and Weakly Supervised Based on Deep Transfer Learning.</i>                          |  |
| Wen, Shuhuan   | Yanshan University                                     |
| Li, Xiongfei   | Yanshan University                                     |
| Manfredi, Luigi  | University of Dundee                                   |
| Zhang, Dan   | York University  |
| Zhou, Nannan   | Yanshan University                                     |
| 12:00-13:00  | WePS2.39   |
| <i>Upper-Limb Joint Angle Estimation Method with Commercial Depth Sensor for Planar Robot-Aided Reaching Movement.</i> |  |
| Hwang, Yeji  | DGIST  |
| Kim, Jonghyun  | DGIST  |
| 12:00-13:00  | WePS2.40   |
| <i>Geo-Referenced Semantic Point Cloud Map Using the USyd Campus Dataset.</i>  |  |
| Berrio Perez, Julie Stephany   | ACFR - the University of Sydney                        |
| Zhou, Wei  | University of Sydney                                   |
| Yi, Siqi   | Australian Centre for Field Robotics, Univ. of Sydney  |
| Ward, James Robert   | University of Sydney                                   |
| Worrall, Stewart   | University of Sydney                                   |
| Nebot, Eduardo   | University of Sydney                                   |
| 12:00-13:00  | WePS2.41   |
| <i>An Educational Robotic Platform with Multimodal Perception for Teaching Sensor Servoing Controls.</i>               |  |
| Navarro-Alarcon, David   | The Hong Kong Polytechnic University                   |
| Hu, Lu Yin   | The Hong Kong Polytechnic University                   |
| Shi, San Qiang   | The Hong Kong Polytechnic University                   |
| 12:00-13:00  | WePS2.42   |
| <i>3D Shape Control of Linear Deformable Objects by Robot Manipulator.</i>   |  |
| Li, Le   | Technical University of Munich                         |
| Ma, Wanyu  | The Hong Kong Polytechnic University                   |
| Dean-Leon, Emmanuel  | Technical University of Munich                         |
| Ramirez-Amaro, Karinne   | Inst. for Cognitive Systems. Technical Univ. of Munich |
| Navarro-Alarcon, David   | The Hong Kong Polytechnic University                   |
| 12:00-13:00  | WePS2.43   |
| <i>Path Planning Algorithm for a Transformation of a Shape-Morphing Wheel for a Step-Climbing.</i>                     |  |
| Ryu, Sijun   | Hanyang University                                     |
| Kim, Kijung  | Seoul National University                              |
| Kim, Youngsoo  | Seoul National University                              |
| Kim, Jongwon   | Seoul National University                              |
| Seo, TaeWon  | Hanyang University                                     |
| Kim, Hwa Soo   | Kyonggi University                                     |

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| 12:00-13:00   | WePS2.44   |
| <i>2-DOF Transformable Wheel Design for Various Sized Stair and Step Climbing.</i>                                  |  |
| Kim, Youngsoo   | Seoul National University                            |
| Lee, Yunhyuk  | Hanyang University                                   |
| Lee, Seungmin   | Kyonggi University                                   |
| Kim, Jongwon  | Seoul National University                            |
| Seo, TaeWon   | Hanyang University                                   |
| Kim, Hwa Soo  | Kyonggi University                                   |
| 12:00-13:00   | WePS2.45   |
| <i>Various Sized Obstacle and Stair Climbing Robot by Wheel Transformation: Prototype and Experimental Results.</i> |  |
| Lee, Yunhyuk  | Hanyang University                                   |
| Kim, Youngsoo   | Seoul National University                            |
| Lee, Seungmin   | Kyonggi University                                   |
| Kim, Jongwon  | Seoul National University                            |
| Seo, TaeWon   | Hanyang University                                   |
| Kim, Hwa Soo  | Kyonggi University                                   |
| 12:00-13:00   | WePS2.46   |
| <i>A Development of Inertial-2D LiDAR SLAM on Manifolds towards AGV.</i>  |  |
| Dinh, Van Nam   | Chungbuk National University                         |
| Kim, Gon-Woo  | Chungbuk National University                         |
| 12:00-13:00   | WePS2.47   |
| <i>Boosting SLAM: Combining SLAM Methodologies for Robust Localization.</i>   |  |
| Ohashi, Nozomu  | Nagoya University                                    |
| Funabora, Yuki  | Nagoya University                                    |
| Doki, Shinji  | Nagoya University                                    |
| Doki, Kae   | Aichi Institute of Technology                        |
| 12:00-13:00   | WePS2.48   |
| <i>Bag of Semantic Visual Words.</i>  |  |
| Sualeh, Muhammad  | Chungbuk National University                         |
| Kim, Gon-Woo  | Chungbuk National University                         |
| 12:00-13:00   | WePS2.49   |
| <i>Loam_livox: A Robust LiDAR Odometry and Mapping (LOAM) Package for Livox LiDAR.</i>                              |  |
| Lin, Jiarong  | The University of Hong Kong                          |
| Zhang, Fu   | The University of Hong Kong                          |
| 12:00-13:00   | WePS2.50   |
| <i>A Novel Rescue System Using Multi-Agent SLAM Framework.</i>  |  |
| Lee, Seung-Hwan   | Kumoh National Institute of Technology               |
| Kim, Seung-Hun  | Korea Electronics Technology Institute               |
| Seung-Ju, Oh  | Korea Soongsil Cyber Univ. Disaster Management Inst. |
| 12:00-13:00   | WePS2.51   |
| <i>Stereo Visual-Inertial SLAM Using Graph-Based Optimization.</i>  |  |
| Wen, Shuhuan  | Yanshan University                                   |
| Hu, Xueheng   | Yanshan University                                   |
| Liu, Yang   | Yanshan University                                   |
| Zhang, Hong   | University of Alberta                                |
| Sheng, Miao   | Yanshan University                                   |

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| 12:00-13:00  | WePS2.52                                       |
| <i>"Why Don't You Have a Wife?!" Free Format Dialogue in CRI*.</i>   |  |
| Zguda, Paulina   | Jagiellonian University                        |
| Kolota, Anna   | Jagiellonian University                        |
| Jarosz, Mateusz  | AGH Univ. of Science and Technology            |
| Izui, Takamune   | Tokyo Univ. of Agriculture and Technology      |
| Snieszynski, Bartlomiej  | AGH Univ. of Science and Technology            |
| Venture, Gentiane  | Tokyo Univ. of Agriculture and Technology      |
| Indurkha, Bipin  | Jagiellonian University                        |
| 12:00-13:00  | WePS2.53                                       |
| <i>Preliminary Investigation about Relationship between Perceived Intimacy and Touch Characteristics.</i>                          |  |
| Zheng, Xiqian  | Osaka University                               |
| Shiomi, Masahiro   | ATR  |
| Minato, Takashi  | ATR  |
| Ishiguro, Hiroshi  | Osaka University                               |
| 12:00-13:00  | WePS2.54                                       |
| <i>Contact Distance Estimation by Soft Active Bio-Whisker Sensor Based on Morphological Computation.</i>                           |  |
| Nguyen, Nhan Huu   | Univ. of Sci. and Tech. - the Univ. of Da Nang |
| Ho, Van  | Japan Adv. Inst. of Sci. and Tech.             |
| 12:00-13:00  | WePS2.55                                       |
| <i>A Challenge of Deformation Control for Cloth Actuators.</i>   |  |
| Yamaguchi, Hiroki  | Nagoya University                              |
| Funabara, Yuki   | Nagoya University                              |
| Doki, Shinji   | Nagoya University                              |
| Doki, Kae  | Aichi Institute of Technology                  |
| 12:00-13:00  | WePS2.56                                       |
| <i>A Video Data-Driven Approach for the Development of Active Guidance in Robot-Assisted Minimally Invasive Surgical Training.</i> |  |
| Huang, Jinghan   | Zhejiang University                            |
| Hong, Kaiwen   | Zhejiang University                            |
| Singh, Santosh Kumar   | RGM CET Nnadyal                                |
| Lei, Yong  | Zhejiang University                            |
| Kesavadas, Thenkurussi   | University of Illinois at Urbana-Champaign     |
| Yang, Liangjing  | Zhejiang University                            |
| 12:00-13:00  | WePS2.57                                       |
| <i>A Novel Four-Degree-Of-Freedom versus a Conventional Foot Interface for Controlling a Robotic Assistive Arm in Surgery.</i>     |  |
| Ye, Shangzhou  | Monash University                              |
| Jain, Prakhhar   | IITB   |
| Walley, Andrew   | Monash University                              |
| Yang, Yan-Jun  | Monash University                              |
| Abdi, Elahe  | Monash University                              |
| 12:00-13:00  | WePS2.58                                       |
| <i>Remote Center Motion of a Surgical Assisted Robot for In-Situ Collaboration.</i>  |  |
| Jin, Sangrok   | Pusan National University                      |
| Park, Jun Seok   | Kyungpook National University                  |

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| 12:00-13:00   | WePS2.59                                   |
| <i>Robotic Laparoendoscopic Single-Site Surgery Platform on DVRK.</i>   |  |
| Huang, Jing   | The Chinese University of Hong Kong        |
| Hui, Chiu-Wai   | The Chinese University of Hong Kong        |
| Au, K. W. Samuel  | The Chinese University of Hong Kong        |
| 12:00-13:00   | WePS2.60                                   |
| <i>Advection and Diffusion Effects towards a Bio-Inspired Artificial Pheromone System.</i>                            |  |
| Na, Seongin   | The University of Manchester               |
| Raoufi, Mohsen  | The University of Manchester               |
| Turgut, Ali Emre  | Middle East Technical University           |
| Krajník, Tomáš  | Czech Technical University                 |
| Lennox, Barry   | The University of Manchester               |
| Arvin, Farshad  | The University of Manchester               |
| 12:00-13:00   | WePS2.61                                   |
| <i>Self-Organised Flocking in Robotic Swarm Based on Active Elastic Sheet.</i>  |  |
| Raoufi, Mohsen  | The University of Manchester               |
| Turgut, Ali Emre  | Middle East Technical University           |
| Lennox, Barry   | The University of Manchester               |
| Arvin, Farshad  | The University of Manchester               |
| 12:00-13:00   | WePS2.62                                   |
| <i>Shared Controller for Obstacle Avoidance of Manipulator for Teleoperation System.</i>                              |  |
| Han, JiWoong  | KITECH, University of Science & Technology |
| Cho, Kyunghwan  | Korea Institute of Industrial Technology   |
| Jang, In Hoon   | Korea Institute of Industrial Technology   |
| Yang, Gi-Hun  | KITECH                                     |
| 12:00-13:00   | WePS2.63                                   |
| <i>Efficient and Accurate Operational Space Control with Dual-Haptic Interface for Large Workspace Teleoperation.</i> |  |
| Ng, Kwun Wang   | The Chinese University of Hong Kong        |
| Chan, Yin Pok   | The Chinese University of Hong Kong        |
| Mahony, Robert  | Australian National University             |
| Lau, Darwin   | The Chinese University of Hong Kong        |
| 12:00-13:00   | WePS2.64                                   |
| <i>High-Fidelity Dexterous Tactile Telerobot for Intuitive Teleoperation.</i>   |  |
| Fishel, Jeremy  | SynTouch, Inc                              |
| Oliver, Toni  | Shadow Robot Company                       |
| Eichermueller, Michael  | HaptX, Inc                                 |
| Barbieri, Giuseppe  | Shadow Robot Company                       |
| Fowler, Ethan   | Shadow Robot Company                       |
| Moss, Luke  | Shadow Robot Company                       |
| Baird, Johnathan  | HaptX Inc                                  |
| Walker, Rich  | Shadow Robot Company                       |
| 12:00-13:00   | WePS2.65                                   |
| <i>An Interactive Method for Virtual Fixture Generation in Unstructured Environments.</i>                             |  |
| Pruks, Vitalii  | Korea Univ. of Technology and Education    |
| Ryu, Jee-Hwan   | Korea Univ. of Technology and Education    |

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|---|--|
| 12:00-13:00   | WePS2.66   |
| <i>Mixed Reality Control of the Humanoid Robot Eve.</i>   |  |
| Smith, Jesper   | Halodi Robotics AS                                       |
| Børnich, Bernt  | Halodi Robotics  |
| 12:00-13:00   | WePS2.67   |
| <i>Development of 3DoF Manipulators with Cable-Hydraulic Driven Actuation Modules for Large Workspace and High Payload-To-Weight.</i> |  |
| Kim, JungYeong  | Univ. of Sci. and Tech., Korea Inst. of Industrial Tech. |
| Cho, Jungsan  | Univ. of Sci. and Tech., Korea Inst. of Industrial Tech. |
| 12:00-13:00   | WePS2.68   |
| <i>Opposite Treatments on Null Space: Null Space Projection vs Null Space Avoidance.</i>  |  |
| Chu, Xiangyu  | The Chinese University of Hong Kong                      |
| Lo, Chun Ho, David  | The Chinese University of Hong Kong                      |
| Au, K. W. Samuel  | The Chinese University of Hong Kong                      |
| 12:00-13:00   | WePS2.69   |
| <i>Development of Immersive VR Interface of Finger Motion without Restriction of Real Environment.</i>                                |  |
| Mochizuki, Noriki   | Hosei University   |
| Nakamura, Sousuke   | Hosei University   |
| 12:00-13:00   | WePS2.70   |
| <i>Real-Time Detection of Distracted Driving Using Dual Cameras.</i>  |  |
| Tran, Duy   | Oklahoma State University                                |
| Alemu, Getasew  | Oklahoma State University                                |
| Do, Ha Manh   | Oklahoma State University                                |
| Gu, Ye  | Shenzhen Academy of Robotics                             |
| Sheng, Weihua   | Oklahoma State University                                |
| 12:00-13:00   | WePS2.71   |
| <i>Regressing Noisy Joint States from Visual Data Using CNN.</i>  |  |
| Güler, Püren  | KTH  |
| Stork, Johannes Andreas   | Örebro University  |
| Stoyanov, Todor   | Örebro University  |
| 12:00-13:00   | WePS2.72   |
| <i>Target Tracking of Moving and Rotating Object by High-Speed Monocular Active Vision.</i>   |  |
| Liu, Yang   | Chiba University   |
| Namiki, Akio  | Chiba University   |
| 12:00-13:00   | WePS2.73   |
| <i>Commercialization of Robot Navigation Technology for a Guidance Service in a Large and Highly-Crowded Airport.</i>                 |  |
| Kim, Hyoung-Rock  | LG Electronics Co. Advanced Research Institute           |
| Kim, Kang Uk  | LG Electronics   |
| Kim, Min-Jung   | LG Electronics   |
| Kim, Sang-Ki  | LG Electronics   |
| Kim, Jungsik  | LG Electronics   |
| Kim, Hyoung-Seok  | LG Electronics   |
| Noh, DongKi   | LG Electronics   |
| Park, Jae Hark  | LG Electronics   |
| Park, Joongtae  | LG Electronics   |
| Bae, Sunwook  | LG Electronics   |

|                 |                |
|-----------------|----------------|
| Eoh, Gyuho      | LG Electronics |
| Lee, Byunghoon  | LG Electronics |
| Jung, Jaesik    | LG Electronics |
| Han, Hyemin     | LG Electronics |
| Baek, Seung-Min | LG Electronics |

12:00-13:00

WePS2.74

*Design of Wearable Robot Focused on Contact State with Wearer.*

|                |                               |
|----------------|-------------------------------|
| Honda, Shota   | Nagoya University             |
| Funabora, Yuki | Nagoya University             |
| Doki, Shinji   | Nagoya University             |
| Doki, Kae      | Aichi Institute of Technology |





***Technical Sessions***  
***Thursday, November 7<sup>th</sup>, 2019***





| ThAT1   | L1-R1                                    |
|---|--|
| <b>Sensor Fusion and Sensor-Based Control (Regular session)</b>   |  |
| Chair: Kudoh, Shunsuke  | The University of Electro-Communications |
| Co-Chair: Liu, Yong   | Zhejiang University                      |
| 11:00-11:15   | ThAT1.1                                  |
| <i>The Road Is Enough! Extrinsic Calibration of Non-Overlapping Stereo Camera and LiDAR Using Road Information.</i> |  |
| Jeong, Jinyong  | Korea Advanced Inst. of Sci. and Tech    |
| Cho, Younghun   | Korea Advanced Inst. of Sci. and Tech    |
| Kim, Ayoung   | Korea Advanced Inst. of Sci. and Tech    |
| 11:15-11:30   | ThAT1.2                                  |
| <i>LIC-Fusion: LiDAR-Inertial-Camera Odometry.</i>  |  |
| Zuo, Xingxing   | Zhejiang University                      |
| Geneva, Patrick   | University of Delaware                   |
| Lee, Woosik   | University of Delaware                   |
| Liu, Yong   | Zhejiang University                      |
| Huang, Guoquan  | University of Delaware                   |
| 11:30-11:45   | ThAT1.3                                  |
| <i>3D Point Cloud Data Acquisition Using a Synchronized In-Air Imaging Sonar Sensor Network.</i>                    |  |
| Kerstens, Robin   | University of Antwerp                    |
| Laurijssen, Dennis  | University of Antwerp                    |
| Schouten, Girmi   | University of Antwerp                    |
| Steckel, Jan  | University of Antwerp                    |
| 11:45-12:00   | ThAT1.4                                  |
| <i>Transferable Trial-Minimizing Progressive Peg-In-Hole Model.</i>   |  |
| Ding, Junfeng   | Shanghai Jiao Tong University            |
| Wang, Chen  | Shanghai Jiao Tong University            |
| Lu, Cewu  | Shanghai Jiao Tong University            |
| 12:00-12:15   | ThAT1.5                                  |
| <i>End-To-End Sensorimotor Control Problems of AUVs with Deep Reinforcement Learning.</i>                           |  |
| Hui, Wu   | Tsinghua University                      |
| Song, Shiji   | Tsinghua University                      |
| Hsu, Ya-Chu   | Tsinghua University                      |
| You, Keyou  | Tsinghua University                      |
| Wu, Cheng   | Tsinghua University                      |
| 12:15-12:30   | ThAT1.6                                  |
| <i>Precision Pouring into Unknown Containers by Service Robots.</i>   |  |
| Dong, Chenyu  | The University of Electro-Communications |
| Takizawa, Masaru  | The University of Electro-Communications |
| Kudoh, Shunsuke   | The University of Electro-Communications |
| Suehiro, Takashi  | The University of Electro-Communications |

| ThAT2   | L1-R2  |
|---|--|
| <b>Deep Learning with Visual Method</b> (Regular session)   |  |
| Chair: Belter, Dominik  | Poznan University of Technology                  |
| Co-Chair: Khorrami, Farshad   | New York University Tandon School of Engineering |
| 11:00-11:15   | ThAT2.1  |
| <i>Resolving Elevation Ambiguity in 1-D Radar Array Measurements Using Deep Learning.</i>                             |  |
| Unnikrishnan, Jayakrishnan  | Qualcomm   |
| Niesen, Urs   | Qualcomm   |
| 11:15-11:30   | ThAT2.2  |
| <i>Double Refinement Network for Efficient Monocular Depth Estimation.</i>  |  |
| Durasov, Nikita   | Samsung AI Center Moscow, EPFL                   |
| Romanov, Mikhail  | Samsung AI Center Moscow                         |
| Bubnova, Valeriya   | Samsung AI Center Moscow                         |
| Bogomolov, Pavel  | Samsung AI Center Moscow                         |
| Konushin, Anton   | Samsung AI Center Moscow                         |
| 11:30-11:45   | ThAT2.3  |
| <i>3D LiDAR and Stereo Fusion Using Stereo Matching Network with Conditional Cost Volume Normalization.</i>           |  |
| Wang, Tsun-Hsuan  | National Tsing Hua University                    |
| Hu, Hou-Ning  | National Tsing Hua University                    |
| Lin, Chieh Hubert   | National Tsing Hua University                    |
| Tsai, Yi-Hsuan  | NEC Labs America                                 |
| Chiu, Wei-Chen  | National Chiao Tung University                   |
| Sun, Min  | National Tsing Hua University                    |
| 11:45-12:00   | ThAT2.4  |
| <i>Generate What You Can't See - a View-Dependent Image Generation.</i>   |  |
| Piaskowski, Karol   | Poznan University of Technology                  |
| Staszak, Rafal  | Poznan University of Technology                  |
| Belter, Dominik   | Poznan University of Technology                  |
| 12:00-12:15   | ThAT2.5  |
| <i>DLD: A Deep Learning Based Line Descriptor for Line Feature Matching.</i>  |  |
| Lange, Manuel   | University of Tuebingen                          |
| Schweinfurth, Fabian  | Wilhelm-Schickard-Institut Tübingen              |
| Schilling, Andreas  | University of Tuebingen                          |
| 12:15-12:30   | ThAT2.6  |
| <i>Adaptive Adversarial Videos on Roadside Billboards: Dynamically Modifying Trajectories of Autonomous Vehicles.</i> |  |
| Patel, Naman  | New York Univ. Tandon School of Engineering      |
| Krishnamurthy, Prashanth  | New York Univ. Tandon School of Engineering      |
| Garg, Siddharth   | NYU  |
| Khorrami, Farshad   | New York Univ. Tandon School of Engineering      |

| ThAT3  | L1-R3                                       |
|--|---|
| <b>Physical Human-Robot Interaction I (Regular session)</b>  |   |
| Chair: Luo, Ren  | National Taiwan University                  |
| Co-Chair: Saint-Bauzel, Ludovic  | Sorbonne University                         |
| 11:00-11:15  | ThAT3.1                                     |
| <i>A Capability-Aware Role Allocation Approach to Industrial Assembly Tasks.</i>   |   |
| Lamon, Edoardo   | Istituto Italiano Di Tecnologia             |
| De Franco, Alessandro  | Istituto Italiano Di Tecnologia             |
| Peternel, Luka   | TU Delft                                    |
| Ajoudani, Arash  | Istituto Italiano Di Tecnologia             |
| 11:15-11:30  | ThAT3.2                                     |
| <i>Specifying and Synthesizing Human-Robot Handovers.</i>  |   |
| Kshirsagar, Alap   | Cornell University                          |
| Kress-Gazit, Hadas   | Cornell University                          |
| Hoffman, Guy   | Cornell University                          |
| 11:30-11:45  | ThAT3.3                                     |
| <i>Underactuated Gripper with Forearm Roll Estimation for Human Limbs Manipulation in Rescue Robotics.</i>               |   |
| Gandarias, Juan M.   | University of Malaga                        |
| Pastor, Francisco  | University of Malaga                        |
| Muñoz-Ramírez, Antonio   | University of Malaga                        |
| García-Cerezo, Alfonso   | University of Malaga                        |
| Gomez de Gabriel, Jesus Manuel   | University of Malaga                        |
| 11:45-12:00  | ThAT3.4                                     |
| <i>An Experimental Study of Parameters Influencing Physical Human-Robot Negotiation in Comanipulative Tracking Task.</i> |   |
| Roche, Lucas   | Université Pierre Et Marie Curie            |
| Monachan, Anish  | Sorbonne Université                         |
| Saint-Bauzel, Ludovic  | Sorbonne Université                         |
| 12:00-12:15  | ThAT3.5                                     |
| <i>Prediction of Human Arm Target for Robot Reaching Movements.</i>  |   |
| Talignani Landi, Chiara  | University of Modena and Reggio Emilia      |
| Cheng, Yujiao  | University of California, Berkeley          |
| Ferraguti, Federica  | Univ. Degli Studi Di Modena E Reggio Emilia |
| Bonfe, Marcello  | University of Ferrara                       |
| Secchi, Cristian   | Univ. of Modena & Reggio Emilia             |
| Tomizuka, Masayoshi  | University of California                    |
| 12:15-12:30  | ThAT3.6                                     |
| <i>Human Intention Inference and On-Line Human Hand Motion Prediction for Human-Robot Collaboration.</i>                 |   |
| Luo, Ren   | National Taiwan University                  |
| Mai, Li-Cong   | National Taiwan University                  |

| ThAT4   | L1-R4   |
|---|---|
| <b>Tendon/Wire Mechanism</b> (Regular session)  |   |
| Chair: Lau, Darwin  | The Chinese University of Hong Kong           |
| Co-Chair: Li, Yangmin   | The Hong Kong Polytechnic University          |
| 11:00-11:15   | ThAT4.1                                       |
| <i>Effect of Vibration on Twisted String Actuation through Conduit at High Bending Angles.</i>  |   |
| Lee, Dong hyee  | Korea Univ. of Tech. and Education            |
| Gaponov, Igor   | Innopolis University                          |
| Ryu, Jee-Hwan   | Korea Univ. of Tech. and Education            |
| 11:15-11:30   | ThAT4.2                                       |
| <i>Single Motor-Based Bidirectional Twisted String Actuation with Variable Radius Pulleys.</i>  |   |
| Khan, Muhammad Arshad   | Korea Univ. of Tech. and Education            |
| Suthar, Bhivraj   | KOREATECH                                     |
| Gaponov, Igor   | Innopolis University                          |
| Ryu, Jee-Hwan   | Korea Univ. of Tech. and Education            |
| 11:30-11:45   | ThAT4.3                                       |
| <i>Improved Mechanical Design and Simplified Motion Planning of Hybrid Active and Passive Cable-Driven Segmented Manipulator with Coupled Motion.</i> |   |
| Liu, Tianliang  | Harbin Institute of Technology                |
| Mu, Zonggao   | Harbin Institute of Technology                |
| Xu, Wenfu   | Harbin Institute of Technology                |
| Yang, Taiwei  | Harbin Institute of Technology, Shenzhen      |
| You, Kailing  | Harbin Institute of Technology, Shenzhen      |
| Fu, Haiming   | Harbin Institute of Technology, Shenzhen      |
| Li, Yangmin   | The Hong Kong Polytechnic University          |
| 11:45-12:00   | ThAT4.4                                       |
| <i>A Mechanical Approach to Suppress the Oscillation of a Long Continuum Robot Flying with Water Jets.</i>  |   |
| Yamaguchi, Tomoka   | Tohoku University                             |
| Ambe, Yuichi  | Tohoku University                             |
| Ando, Hisato  | Tohoku University                             |
| Konyo, Masashi  | Tohoku University                             |
| Tadakuma, Kenjiro   | Tohoku University                             |
| Maruyama, Shigenao  | National Inst. of Tech., Hachinohe College    |
| Tadokoro, Satoshi   | Tohoku University                             |
| 12:00-12:15   | ThAT4.5                                       |
| <i>Generalized Ray-Based Lattice Generation and Graph Representation of Wrench-Closure Workspace for Arbitrary Cable-Driven Robots (I).</i>           |   |
| Abbasnejad, Ghasem  | The Hong Kong Univ. of Science and Technology |
| Eden, Jonathan Paul   | The University of Melbourne                   |
| Lau, Darwin   | The Chinese University of Hong Kong           |

| ThAT5   | L1-R5   |
|---|---|
| <b>Compliance and Impedance Control (Regular session)</b>   |   |
| Chair: Catalano, Manuel Giuseppe  | Istituto Italiano Di Tecnologia                 |
| Co-Chair: Jiang, Xin  | Harbin Inst. of Technology Shenzhen Grad. Sch.  |
| 11:00-11:15   | ThAT5.1   |
| <i>Port-Hamiltonian Passivity-Based Control on SE(3) of a Fully-Actuated UAV for Aerial Physical Interaction Near-Hovering.</i> |   |
| Rashad, Ramy Abdelmonem Mohamed   | University of Twente                            |
| Califano, Federico  | University of Twente                            |
| Stramigioli, Stefano  | University of Twente                            |
| 11:15-11:30   | ThAT5.2   |
| <i>A Comparison of Action Spaces for Learning Manipulation Tasks.</i>   |   |
| Varin, Patrick  | Harvard University                              |
| Grossman, Lev   | Harvard University                              |
| Kuindersma, Scott   | Harvard University                              |
| 11:30-11:45   | ThAT5.3   |
| <i>Global Vision-Based Impedance Control for Robotic Wall Polishing.</i>  |   |
| Zhou, Yang  | The Chinese University of Hong Kong             |
| Yue, Linzhu   | The Chinese University of Hong Kong             |
| Gui, Linhai   | The Chinese University of Hong Kong             |
| Li, Xiang   | Tsinghua University                             |
| Sun, Guangli  | The Chinese University of Hong Kong             |
| Jiang, Xin  | Harbin Inst. of Technology, Shenzhen Grad. Sch. |
| Liu, Yunhui   | The Chinese University of Hong Kong             |
| 11:45-12:00   | ThAT5.4   |
| <i>Online Optimal Impedance Planning for Legged Robots.</i>   |   |
| Angelini, Franco  | University of Pisa                              |
| Xin, Guiyang  | University of Edinburgh                         |
| Wolfslag, Wouter  | University of Edinburgh                         |
| Tiseo, Carlo  | University of Edinburgh                         |
| Mistry, Michael   | University of Edinburgh                         |
| Garabini, Manolo  | University of Pisa                              |
| Bicchi, Antonio   | University of Pisa                              |
| Vijayakumar, Sethu  | University of Edinburgh                         |
| 12:00-12:15   | ThAT5.5   |
| <i>Stiffness Bounds for Resilient and Stable Physical Interaction of Articulated Soft Robots.</i>                               |   |
| Mengacci, Riccardo  | Università Di Pisa                              |
| Angelini, Franco  | University of Pisa                              |
| Catalano, Manuel Giuseppe   | Istituto Italiano Di Tecnologia                 |
| Grioli, Giorgio   | Istituto Italiano Di Tecnologia                 |
| Bicchi, Antonio   | Università Di Pisa                              |
| Garabini, Manolo  | Università Di Pisa                              |
| 12:15-12:30   | ThAT5.6   |
| <i>Robust, Compliant Assembly with Elastic Parts and Model Uncertainty.</i>   |   |
| Wirnshofer, Florian   | Siemens AG                                      |
| Schmitt, Philipp Sebastian  | Siemens Corporate Technology                    |
| Meister, Philine  | Siemens   |
| v. Wichert, Georg   | Siemens AG                                      |
| Burgard, Wolfram  | University of Freiburg                          |



|   |                                    |
|---|------------------------------------|
| <b>ThAT6</b>  | L1-R6                              |
| <b>Aerial Robotics VIII (Regular session)</b>   |                                    |
| Chair: Chirarattananon, Pakpong   | City University of Hong Kong       |
| Co-Chair: Waibel, Alex  | Karlsruhe Institute of Technology  |
| 11:00-11:15   | ThAT6.1                            |
| <i>An Interactive Indoor Drone Assistant.</i>   |                                    |
| Fuhrmann, Tino  | Karlsruhe Institute of Technology  |
| David, Schneider  | Karlsruhe Institute of Technology  |
| Altenberg, Felix  | Karlsruhe Institute of Technology  |
| Nguyen, Xuan Tung   | Karlsruhe Institute of Technology  |
| Blasen, Simon   | Karlsruhe Institute of Technology  |
| Constantin, Stefan  | Karlsruhe Institute of Technology  |
| Waibel, Alex  | Karlsruhe Institute of Technology  |
| 11:15-11:30   | ThAT6.2                            |
| <i>Development of Micro Ultrasonic Actuator and Micro Rotor Blade for Micro Aerial Vehicle.</i> |                                    |
| Kai Chiang, Eric Tan  | Toyohashi University of Technology |
| Mashimo, Tomoaki  | Toyohashi University of Technology |
| 11:30-11:45   | ThAT6.3                            |
| <i>Cooperative Audio-Visual System for Localizing Micro Aerial Robots.</i>                      |                                    |
| Rosa, Jose Eduardo  | Instituto Superior Tecnico         |
| Basiri, Meysam  | IST-ID, Instituto Superior Tecnico |
| 11:45-12:00   | ThAT6.4                            |
| <i>Design and Take-Off Flight of a Samara-Inspired Revolving-Wing Robot.</i>                    |                                    |
| Bai, Songnan  | City University of Hong Kong       |
| Chirarattananon, Pakpong  | City University of Hong Kong       |
| 12:00-12:15   | ThAT6.5                            |
| <i>The "Smellicopter, " a Bio-Hybrid Odor Localizing Nano Air Vehicle.</i>                      |                                    |
| Anderson, Melanie   | University of Washington           |
| Sullivan, Joseph  | University of Washington           |
| Brink, Kevin  | AFRL                               |
| Talley, Jennifer  | AFRL                               |
| Fuller, Sawyer  | University of Washington           |
| Daniel, Thomas  | University of Washington           |

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| <b>ThAT7</b>  | L1-R7  |
| <b>Visual Learning (Regular session)</b>  |  |
| Chair: Liu, Wenyin  | Guangdong University of Technology             |
| Co-Chair: Nagahama, Kotaro  | Shinshu University                             |
| 11:00-11:15   | ThAT7.1  |
| <i>Self-Supervised 3D Shape and Viewpoint Estimation from Single Images for Robotics.</i>                     |  |
| Mees, Oier  | Albert-Ludwigs-Universität                     |
| Tatarchenko, Maxim  | University of Freiburg                         |
| Brox, Thomas  | University of Freiburg                         |
| Burgard, Wolfram  | University of Freiburg                         |
| 11:15-11:30   | ThAT7.2  |
| <i>Inferring Distributions Over Depth from a Single Image.</i>  |  |
| Yang, Gengshan  | Carnegie Mellon University                     |
| Hu, Peiyun  | Carnegie Mellon University                     |
| Ramanan, Deva   | Carnegie Mellon University                     |
| 11:30-11:45   | ThAT7.3  |
| <i>The RGB-D Triathlon: Towards Agile Visual Toolboxes for Robots.</i>  |  |
| Cermelli, Fabio   | Politecnico Di Torino                          |
| Mancini, Massimiliano   | Sapienza University of Rome                    |
| Ricci, Elisa  | University of Trento                           |
| Caputo, Barbara   | Sapienza University                            |
| 11:45-12:00   | ThAT7.4  |
| <i>EV-IMO: Motion Segmentation Dataset and Learning Pipeline for Event Cameras.</i>                           |  |
| Mitrokhin, Anton  | University of Maryland, College Park           |
| Ye, Chengxi   | University of Maryland                         |
| Fermuller, Cornelia   | University of Maryland                         |
| Aloimonos, Yiannis  | University of Maryland                         |
| Delbruck, Tobi  | Inst. of Neuroinformatics, Univ. of Zurich/ETH |
| 12:00-12:15   | ThAT7.5  |
| <i>An Object Attribute Guided Framework for Robot Learning Manipulations from Human Demonstration Videos.</i> |  |
| Zhang, Qixiang  | Guangdong University of Technology             |
| Chen, Junhong   | Guangdong University of Technology             |
| Liang, Dayong   | Guangdong University of Technology             |
| Liu, Huaping  | Tsinghua University                            |
| Zhou, Xiaojing  | Guangdong University of Technology             |
| Ye, Zihan   | Guangdong University of Technology             |
| Liu, Wenyin   | Guangdong University of Technology             |
| 12:15-12:30   | ThAT7.6  |
| <i>Learning from Demonstration Based on a Mechanism to Utilize an Object's Invisibility.</i>                  |  |
| Nagahama, Kotaro  | Shinshu University                             |
| Yamazaki, Kimitoshi   | Shinshu University                             |

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|---|--|
| <b>ThAT8</b>  | LG-R8  |
| <b>Intelligent Transportation Systems (Regular session)</b>                                   |  |
| Chair: Jang, Inmo   | The University of Manchester                 |
| Co-Chair: Yang, Ming  | Shanghai Jiao Tong University                |
| 11:00-11:15   | ThAT8.1                                      |
| <i>Learning Generative Socially-Aware Models of Pedestrian Motion.</i>                        |  |
| Blaiotta, Claudia   | Bosch Center for Artificial Intelligence     |
| 11:15-11:30   | ThAT8.2                                      |
| <i>Sharing Is Caring: Socially-Compliant Autonomous Intersection Negotiation.</i>             |  |
| Buckman, Noam   | Massachusetts Institute of Technology        |
| Pierson, Alyssa   | Massachusetts Institute of Technology        |
| Schwarting, Wilko   | Massachusetts Institute of Technology        |
| Karaman, Sertac   | Massachusetts Institute of Technology        |
| Rus, Daniela  | MIT  |
| 11:30-11:45   | ThAT8.3                                      |
| <i>Two-View Fusion Based Convolutional Neural Network for Urban Road Detection.</i>           |  |
| Gu, Shuo  | Nanjing University of Science and Technology |
| Zhang, Yigong   | Nanjing University of Science and Technology |
| Yang, Jian  | Nanjing University of Science and Technology |
| Alvarez, Jose   | NVIDIA                                       |
| Kong, Hui   | Nanjing University of Science and Technology |
| 11:45-12:00   | ThAT8.4                                      |
| <i>Conditional Generative Neural System for Probabilistic Trajectory Prediction.</i>          |  |
| Li, Jiachen   | University of California, Berkeley           |
| Ma, Hengbo  | University of California, Berkeley           |
| Tomizuka, Masayoshi   | University of California, Berkeley           |
| 12:00-12:15   | ThAT8.5                                      |
| <i>Probabilistic Risk Metrics for Navigating Occluded Intersections.</i>                      |  |
| McGill, Stephen   | University of Pennsylvania                   |
| Rosman, Guy   | Massachusetts Institute of Technology        |
| Ort, Teddy  | Massachusetts Institute of Technology        |
| Pierson, Alyssa   | Massachusetts Institute of Technology        |
| Gillitschenski, Igor  | Massachusetts Institute of Technology        |
| Araki, Brandon  | Massachusetts Institute of Technology        |
| Fletcher, Luke  | Boeing                                       |
| Karaman, Sertac   | Massachusetts Institute of Technology        |
| Rus, Daniela  | Massachusetts Institute of Technology        |
| Leonard, John   | Massachusetts Institute of Technology        |
| 12:15-12:30   | ThAT8.6                                      |
| <i>Anonymous Hedonic Game for Task Allocation in a Large-Scale Multiple Agent System (I).</i> |  |
| Jang, Inmo  | The University of Manchester                 |
| Shin, Hyo-Sang  | Cranfield University                         |
| Tsourdos, Antonios  | Cranfield University                         |

| ThAT9  |  | LG-R9 |
|--|--|-------|
| Cognitive Human-Robot Interaction I (Regular session)  |  |       |
| Chair: Knoll, Alois  | Tech. Univ. Muenchen TUM                             |       |
| Co-Chair: Losey, Dylan   | Stanford University                                  |       |
| 11:00-11:15  | ThAT9.1  |       |
| Semantic Mates: Intuitive Geometric Constraints for Efficient Assembly Specifications.       |  |       |
| Wildgrube, Fabian  | Fortiss - An-Institut Technische Universität München |       |
| Perzylo, Alexander Clifford  | Fortiss - An-Institut Technische Universität München |       |
| Rickert, Markus  | Fortiss - An-Institut Technische Universität München |       |
| Knoll, Alois   | Tech. Univ. Muenchen TUM                             |       |
| 11:15-11:30  | ThAT9.2  |       |
| A Behavior Tree Cognitive Assistant System for Emergency Medical Services.                   |  |       |
| Shu, Sile  | University of Virginia                               |       |
| Preum, Sarah Masud   | University of Virginia                               |       |
| Pitchford, Haydon  | University of Virginia                               |       |
| Williams, Ronald   | University of Virginia                               |       |
| Stankovic, John  | University of Virginia                               |       |
| Alemzadeh, Homa  | University of Virginia                               |       |
| 11:30-11:45  | ThAT9.3  |       |
| Enabling Human-Like Task Identification from Natural Conversation.                           |  |       |
| Pramanick, Pradip  | TCS Research & Innovation                            |       |
| Sarkar, Chayan   | TCS Research & Innovation                            |       |
| P, Balamuralidhar  | Tata Consultancy Services Ltd                        |       |
| Kattepur, Ajay   | Tata Consultancy Services                            |       |
| Bhattacharya, Indrajit   | TCS Research & Innovation                            |       |
| Pal, Arpan   | TCS Innovation Labs, Kolkata                         |       |
| 11:45-12:00  | ThAT9.4  |       |
| Torso-Mounted Vibrotactile Interface to Experimentally Induce Illusory Own-Body Perceptions. |  |       |
| Fadaei Jouybari, Atena   | EPFL   |       |
| Rognini, Giulio  | EPFL   |       |
| Hara, Masayuki   | Saitama University                                   |       |
| Bleuler, Hannes  | EPFL   |       |
| Blanke, Olaf   | EPFL   |       |
| 12:00-12:15  | ThAT9.5  |       |
| Gaze-Based Intention Anticipation Over Driving Manoeuvres in Semi-Autonomous Vehicles.       |  |       |
| Wu, Min  | University of Oxford                                 |       |
| Louw, Tyron  | University of Leeds                                  |       |
| Lahijanian, Morteza  | University of Colorado Boulder                       |       |
| Ruan, Wenjie   | University of Oxford                                 |       |
| Huang, Xiaowei   | University of Liverpool                              |       |
| Merat, Natasha   | University of Leeds                                  |       |
| Kwiatkowska, Marta   | University of Oxford                                 |       |
| 12:15-12:30  | ThAT9.6  |       |
| A Probabilistic Approach to Human-Robot Communication.                                       |  |       |
| Cha, Elizabeth   | University of Southern California                    |       |
| Meschke, Emily   | University of Southern California                    |       |
| Fong, Terrence   | NASA Ames Research Center (ARC)                      |       |
| Mataric, Maja  | University of Southern California                    |       |

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| <b>ThAT10</b>  | LG-R10  |
| <b>Visual SLAM II (Regular session)</b>  |   |
| Chair: Montiel, J.M.M  | I3A. Universidad De Zaragoza                    |
| Co-Chair: Zelek, John S.   | University of Waterloo                          |
| 11:00-11:15  | ThAT10.1  |
| <i>FA-Harris: A Fast and Asynchronous Corner Detector for Event Cameras.</i>                                 |   |
| Li, Ruoxiang   | National University of Defense Technology       |
| Shi, Dianxi  | National Innovation Inst. of Defense Technology |
| Zhang, Yongjun   | National Innovation Inst. of Defense Technology |
| Li, Kaiyue   | National University of Defense Technology       |
| Li, Ruihao   | National Innovation Institute of Defense        |
| 11:15-11:30  | ThAT10.2  |
| <i>Rapid and Robust Monocular Visual-Inertial Initialization with Gravity Estimation Via Vertical Edges.</i> |   |
| Li, Jinyu  | Zhejiang University                             |
| Bao, Hujun   | Zhejiang University                             |
| Zhang, Guofeng   | Zhejiang University                             |
| 11:30-11:45  | ThAT10.3  |
| <i>A Unified Formulation for Visual Odometry.</i>  |   |
| Younes, Georges  | Univ. of Waterloo, American Univ. of Beirut     |
| Asmar, Daniel  | American University of Beirut                   |
| Zelek, John S.   | University of Waterloo                          |
| 11:45-12:00  | ThAT10.4  |
| <i>An Efficient and Accurate Algorithm for the Perspective-N-Point Problem.</i>                              |   |
| Zhou, Lipu   | Carnegie Mellon University                      |
| Kaess, Michael   | Carnegie Mellon University                      |
| 12:00-12:15  | ThAT10.5  |
| <i>ORB_SLAM-Atlas: A Robust and Accurate Multi-Map System.</i>   |   |
| Elvira, Richard  | Universidad De Zaragoza                         |
| Tardos, Juan D.  | Universidad De Zaragoza                         |
| Montiel, J.M.M   | I3A. Universidad De Zaragoza                    |
| 12:15-12:30  | ThAT10.6  |
| <i>Sparse Depth Enhanced Direct Thermal-Infrared SLAM Beyond the Visible Spectrum.</i>                       |   |
| Shin, Young-Sik  | Korea Advanced Inst. of Sci. and Tech           |
| Kim, Ayoung  | Korea Advanced Inst. of Sci. and Tech           |

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| <b>ThAT11</b>  | LG-R11   |
| <b>Medical Robot: Laparoscopic</b> (Regular session)   |  |
| Chair: Lueth, Tim C.   | Technical University of Munich                 |
| Co-Chair: Kim, Chunwoo   | Korea Inst. of Science and Technology          |
| 11:00-11:15  | ThAT11.1                                       |
| <i>An Asynchronous Multi-Body Simulation Framework for Real-Time Dynamics, Haptics and Learning with Application to Surgical Robots.</i> |  |
| Munawar, Adnan   | Worcester Polytechnic Institute                |
| Fischer, Gregory Scott   | Worcester Polytechnic Institute                |
| 11:15-11:30  | ThAT11.2                                       |
| <i>PnS: A Perspective-N-Spheres Algorithm for Laparoscope Calibration in Minimally Invasive Surgery.</i>                                 |  |
| Arico, Mario   | Sorbonne Université, CNRS, INSERM, ISIR-Agathe |
| Morel, Guillaume   | Sorbonne Université, CNRS, INSERM              |
| 11:30-11:45  | ThAT11.3                                       |
| <i>Development of Novel Bevel-Geared 5mm Articulating Wrist for Micro-Laparoscopy Instrument.</i>  |  |
| Kim, Jongwoo   | Biorobotics Lab., Seoul National University    |
| Han, Hyung Taeg  | Korea Inst. of Science and Technology          |
| Kang, Sungchul   | Korea Inst. of Science and Technology          |
| Kim, Chunwoo   | Korea Inst. of Science and Technology          |
| 11:45-12:00  | ThAT11.4                                       |
| <i>Towards a Generic in Vivo in Situ Camera Lens Cleaning Module for Laparoscopic Surgery.</i>   |  |
| Liu, Xiaolong  | University of Tennessee, Knoxville             |
| Liu, Hui   | University of Tennessee, Knoxville             |
| Tan, Jindong   | University of Tennessee, Knoxville             |
| 12:00-12:15  | ThAT11.5                                       |
| <i>3D Printed Single Incision Laparoscopic Manipulator System Adapted to the Required Forces in Laparoscopic Surgery.</i>                |  |
| Brecht, Sandra V.  | Technical University of Munich                 |
| Stock, Matthias  | Technical University of Munich                 |
| Stolzenburg, Jens-Uwe  | University Leipzig                             |
| Lueth, Tim C.  | Technical University of Munich                 |

**Human Movement Understanding for Intelligent Robots and Systems** (Cutting Edge Forum)

Chair: Demircan, Emel

California State University Long Beach

Co-Chair: Yoshikawa, Taizo

Honda R&amp;D Japan

## Organizers

Demircan, Emel

California State University Long Beach

Petric, Tadej

Jozef Stefan Institute

Yoshikawa, Taizo

Honda R&amp;D Japan

Fraisie, Philippe

University of Montpellier

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Time: 11:00 – 12:30

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| <b>ThAT13</b>  | LG-R13                                  |
| <b>Legged Robots III (Regular session)</b>   |   |
| Chair: Sun, Xiao   | Waseda University                       |
| Co-Chair: Lin, Pei-Chun  | National Taiwan University              |
| 11:00-11:15  | ThAT13.1                                |
| <i>On the Effect of Semielliptical Foot Shape on the Energetic Efficiency of Passive Bipedal Gait.</i>                         |   |
| Smyrli, Aikaterini   | National Technical University of Athens |
| Ghiassi, Mehdi   | University of Duisburg-Essen            |
| Kecskemethy, Andr s  | University of Duisburg-Essen            |
| Papadopoulos, Evangelos  | National Technical University of Athens |
| 11:15-11:30  | ThAT13.2                                |
| <i>Robust Legged Robot State Estimation Using Factor Graph Optimization.</i>   |   |
| Wisth, David   | University of Oxford                    |
| Camurri, Marco   | University of Oxford                    |
| Fallon, Maurice  | University of Oxford                    |
| 11:30-11:45  | ThAT13.3                                |
| <i>Implementing Regularized Predictive Control for Simultaneous Real-Time Footstep and Ground Reaction Force Optimization.</i> |   |
| Bledt, Gerardo   | Massachusetts Institute of Technology   |
| Kim, Sangbae   | Massachusetts Institute of Technology   |
| 11:45-12:00  | ThAT13.4                                |
| <i>Moving Onto High Steps for a Four-Limbed Robot with Torso Contact.</i>  |   |
| Matsuzawa, Takashi   | Waseda University                       |
| Matsubara, Takanobu  | Waseda University                       |
| Namura, Keisuke  | Waseda University                       |
| Sun, Xiao  | Waseda University                       |
| Imai, Asaki  | Waseda University                       |
| Okawara, Masahiro  | Waseda University                       |
| Kimura, Shunsuke   | Waseda University                       |
| Kumagai, Kengo   | Waseda University                       |
| Yamaguchi, Koki  | Waseda University                       |
| Naito, Hiroshi   | Waseda University                       |
| Sato, Takehiro   | Waseda University                       |
| Terae, Kota  | Waseda University                       |
| Murakami, Masatsugu  | Waseda University                       |
| Yoshida, Shunya  | Waseda University                       |
| Takanishi, Atsuo   | Waseda University                       |
| Hashimoto, Kenji   | Meiji University                        |
| 12:00-12:15  | ThAT13.5                                |
| <i>Clock-Torqued Rolling SLIP Model and Its Application to Variable-Speed Running in a Hexapod Robot (I).</i>                  |   |
| Lu, Wei-Chun   | National Taiwan University              |
| Yu, Ming-Yuan  | University of Michigan                  |
| Lin, Pei-Chun  | National Taiwan University              |



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| <b>ThAT14</b>  | LG-R14   |
| <b>Marine Robots I (Regular session)</b>   |  |
| Chair: Stilwell, Daniel  | Virginia Tech  |
| Co-Chair: Aguiar, A. Pedro   | University of Porto (FEUP)   |
| <b>11:00-11:15</b>   | <b>ThAT14.1</b>  |
| <i>Roboat: An Autonomous Surface Vehicle for Urban Waterways.</i>  |  |
| Wang, Wei  | Massachusetts Institute of Technology  |
| Gheneti, Banti   | Massachusetts Institute of Technology  |
| Mateos, Luis   | Massachusetts Institute of Technology  |
| Duarte, Fábio  | Massachusetts Institute of Technology  |
| Ratti, Carlo   | Massachusetts Institute of Technology  |
| Rus, Daniela   | Massachusetts Institute of Technology  |
| <b>11:15-11:30</b>   | <b>ThAT14.2</b>  |
| <i>Control and Perception Framework for Deep Sea Mining Exploration.</i>   |  |
| Sartore, Carlotta  | University of Genova   |
| Campos, Ricard   | University of Girona   |
| Quintana Plana, Josep  | Coronis Computing S.L  |
| Simetti, Enrico  | Univ. of Genova - ISME: Interuniversity Res. Center on Integrated Sys. for the Marine Env. |
| Garcia, Rafael   | University of Girona   |
| Casalino, Giuseppe   | University of Genova   |
| <b>11:30-11:45</b>   | <b>ThAT14.3</b>  |
| <i>Online Planning for Autonomous Underwater Vehicles Performing Information Gathering Tasks in Large Subsea Environments.</i> |  |
| Yetkin, Harun  | Bartın University  |
| McMahon, James   | The Naval Research Laboratory  |
| Topin, Nicholay  | Carnegie Mellon University   |
| Wolek, Artur   | University of Maryland   |
| Waters, Zachary  | US Naval Research Laboratory   |
| Stilwell, Daniel   | Virginia Tech  |
| <b>11:45-12:00</b>   | <b>ThAT14.4</b>  |
| <i>Performance Guarantees for Receding Horizon Search with Terminal Cost.</i>  |  |
| Biggs, Benjamin  | Virginia Polytechnic Inst. and State Univ.   |
| Stilwell, Daniel   | Virginia Tech  |
| Yetkin, Harun  | Bartın University  |
| McMahon, James   | The Naval Research Laboratory  |
| <b>12:00-12:15</b>   | <b>ThAT14.5</b>  |
| <i>Robust Moving Path Following Control for Robotic Vehicles: Theory and Experiments.</i>                                      |  |
| Reis, Matheus  | University of Porto  |
| Jain, R. Praveen   | University of Porto  |
| Aguiar, A. Pedro   | University of Porto  |
| Sousa, João  | University of Porto  |
| <b>12:15-12:30</b>   | <b>ThAT14.6</b>  |
| <i>Towards Autonomous Industrial-Scale Bathymetric Surveying.</i>  |  |
| Torroba Balmori, Ignacio   | KTH Royal Institute of Technology  |
| Bore, Nils   | KTH Royal Institute of Technology  |
| Folkesson, John  | KTH  |

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| <b>ThAT15</b>  | LG-R15                             |
| <b>Behavior-Based Systems (Regular session)</b>  |                                    |
| Chair: Natale, Lorenzo   | Italian Institute of Technology    |
| Co-Chair: Petillot, Yvan R.  | Heriot-Watt University             |
| 11:00-11:15  | ThAT15.1                           |
| <i>Reactive Interaction through Body Motion and the Phase-State-Machine.</i>   |                                    |
| Deimel, Raphael  | TU Berlin                          |
| 11:15-11:30  | ThAT15.2                           |
| <i>Learning Generalisable Coupling Terms for Obstacle Avoidance Via Low-Dimensional Geometric Descriptors.</i>       |                                    |
| Pairet, Èric   | Edinburgh Centre for Robotics      |
| Ardón, Paola   | Edinburgh Centre for Robotics      |
| Mistry, Michael  | University of Edinburgh            |
| Petillot, Yvan R.  | Heriot-Watt University             |
| 11:30-11:45  | ThAT15.3                           |
| <i>Analysis and Exploitation of Synchronized Parallel Executions in Behavior Trees.</i>                              |                                    |
| Colledanchise, Michele   | Italian Institute of Technology    |
| Natale, Lorenzo  | Italian Institute of Technology    |
| 11:45-12:00  | ThAT15.4                           |
| <i>A Behavior Driven Approach for Sampling Rare-Event Situations for Autonomous Vehicles.</i>                        |                                    |
| Sarkar, Atrisha  | University of Waterloo             |
| Czarnecki, Krzysztof   | University of Waterloo             |
| 12:00-12:15  | ThAT15.5                           |
| <i>Constructing a Highly Interactive Vehicle Motion Dataset.</i>   |                                    |
| Zhan, Wei  | University of California, Berkeley |
| Sun, Liting  | University of California, Berkeley |
| Wang, Di   | Xi'an Jiaotong University          |
| Jin, Yinghan   | Zhejiang University                |
| Tomizuka, Masayoshi  | University of California           |
| 12:15-12:30  | ThAT15.6                           |
| <i>Introducing a Scalable and Modular Control Framework for Low-Cost Monocular Robots in Hazardous Environments.</i> |                                    |
| Taylor, Hazel  | The University of Manchester       |
| Dondrup, Christian   | Heriot-Watt University             |
| Lohan, Katrin Solveig  | Heriot-Watt University             |

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| <b>ThAT16</b>   | LG-R16                        |
| <b>Grasping and Object Tracking</b> (Regular session)   |                               |
| Chair: Lan, Xuguang   | Xi'an Jiaotong University     |
| Co-Chair: Roa, Maximo A.  | DLR - German Aerospace Center |
| 11:00-11:15   | ThAT16.1                      |
| <i>Task-Oriented Grasping in Object Stacking Scenes with CRF-Based Semantic Model.</i>                        |                               |
| Yang, Chenjie   | Xi'an Jiaotong University     |
| Lan, Xuguang  | Xi'an Jiaotong University     |
| Zhang, Hanbo  | Xi'an Jiaotong University     |
| Zheng, Nanning  | Xi'an Jiaotong University     |
| 11:15-11:30   | ThAT16.2                      |
| <i>A Multi-Task Convolutional Neural Network for Autonomous Robotic Grasping in Object Stacking Scenes.</i>   |                               |
| Zhang, Hanbo  | Xi'an Jiaotong University     |
| Lan, Xuguang  | Xi'an Jiaotong University     |
| Bai, Site   | Xi'an Jiaotong University     |
| Wan, Lipeng   | Xi'an Jiaotong University     |
| Yang, Chenjie   | Xi'an Jiaotong University     |
| Zheng, Nanning  | Xi'an Jiaotong University     |
| 11:30-11:45   | ThAT16.3                      |
| <i>Occlusion-Robust Deformable Object Tracking without Physics Simulation.</i>                                |                               |
| Chi, Cheng  | University of Michigan        |
| Berenson, Dmitry  | University of Michigan        |
| 11:45-12:00   | ThAT16.4                      |
| <i>LDLS: 3-D Object Segmentation through Label Diffusion from 2-D Images.</i>                                 |                               |
| Wang, Brian   | Cornell University            |
| Chao, Wei-Lun   | Cornell University            |
| Wang, Yan   | Cornell University            |
| Hariharan, Bharath  | Cornell University            |
| Weinberger, Kilian  | Cornell University            |
| Campbell, Mark  | Cornell University            |
| 12:00-12:15   | ThAT16.5                      |
| <i>Curved-Voxel Clustering for Accurate Segmentation of 3D LiDAR Point Clouds with Real-Time Performance.</i> |                               |
| Park, Seungcheol  | Seoul National University     |
| Wang, Shu Yu  | Seoul National University     |
| Lim, Hunjung  | Samsunh                       |
| Kang, U   | Seoul National University     |

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| <b>ThAT17</b>  | LG-R17                       |
| <b>Rehabilitation Robotics II (Regular session)</b>  |                              |
| Chair: Dubey, Rajiv  | University of South Florida  |
| Co-Chair: Liarokapis, Minas  | The University of Auckland   |
| <b>11:00-11:15</b>   | <b>ThAT17.1</b>              |
| <i>Cable-Driven 4-DOF Upper Limb Rehabilitation Robot.</i>   |                              |
| Shi, Ke  | Southeast University         |
| Song, Aiguo  | Southeast University         |
| Li, Ye   | Southeast University         |
| Chen, Dapeng   | Southeast University         |
| Li, Huijun   | Southeast University         |
| <b>11:15-11:30</b>   | <b>ThAT17.2</b>              |
| <i>Design and Control of a Multifunctional Ankle Exoskeleton Powered by Magnetorheological Actuators to Assist Walking, Jumping and Landing.</i> |                              |
| Khazoom, Charles   | Université De Sherbrooke     |
| Veronneau, Catherine   | Universite De Sherbrooke     |
| Lucking Bigué, Jean-Philippe   | Université De Sherbrooke     |
| Grenier, Jordane   | Safran Electronics & Defense |
| Girard, Alexandre  | Université De Sehrbrooke     |
| Plante, Jean-Sebastien   | Université De Sherbrooke     |
| <b>11:30-11:45</b>   | <b>ThAT17.3</b>              |
| <i>A Soft Exoglove Equipped with a Wearable Muscle-Machine Interface Based on Forcemyography and Electromyography.</i>                           |                              |
| Dwivedi, Anany   | University of Auckland       |
| Gerez, Lucas   | University of Auckland       |
| Hasan, Waris   | University of Auckland       |
| Yang, Chi-Hung   | University of Auckland       |
| Liarokapis, Minas  | University of Auckland       |
| <b>11:45-12:00</b>   | <b>ThAT17.4</b>              |
| <i>Applying the Interaction of Walking-Emotion to an Assistive Device for Rehabilitation and Exercise.</i>                                       |                              |
| Zhuang, Jyun Rong  | Waseda University            |
| Wu, Guan Yu  | Waseda University            |
| Lee, Hee-hyol  | Waseda University            |
| Tanaka, Eiichiro   | Waseda University            |
| <b>12:00-12:15</b>   | <b>ThAT17.5</b>              |
| <i>Upper Limb Motion Simulation Algorithm for Prosthesis Prescription and Training.</i>  |                              |
| Menychtas, Dimitrios   | University of South Florida  |
| Carey, Stephanie   | University of South Florida  |
| Alqasemi, Redwan   | University of South Florida  |
| Dubey, Rajiv   | University of South Florida  |

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| <b>ThAT18</b>  | LG-R18                             |
| <b>Multi-Robot Systems I</b> (Regular session)   |                                    |
| Chair: Fricke, George Matthew  | The University of New Mexico       |
| Co-Chair: Liu, Yen-Chen  | National Cheng Kung University     |
| 11:00-11:15  | ThAT18.1                           |
| <i>Multi-Robot Assembly Sequencing Via Discrete Optimization.</i>  |                                    |
| Culbertson, Preston  | Stanford University                |
| Bandyopadhyay, Saptarshi   | California Institute of Technology |
| Schwager, Mac  | Stanford University                |
| 11:15-11:30  | ThAT18.2                           |
| <i>Ignorance Is Not Bliss: An Analysis of Central-Place Foraging Algorithms.</i>                                   |                                    |
| Aggarwal, Abhinav  | University of New Mexico           |
| Gupta, Diksha  | University of New Mexico           |
| Vining, William  | University of New Mexico           |
| Fricke, George Matthew   | University of New Mexico           |
| Moses, Melanie   | University of New Mexico           |
| 11:30-11:45  | ThAT18.3                           |
| <i>Resilience by Reconfiguration: Exploiting Heterogeneity in Robot Teams.</i>                                     |                                    |
| Ramachandran, Ragesh Kumar   | University of Southern California  |
| Preiss, James  | University of Southern California  |
| Sukhatme, Gaurav   | University of Southern California  |
| 11:45-12:00  | ThAT18.4                           |
| <i>Centralized Control Architecture for Cooperative Object Transportation Using Multiple Omnidirectional AGVs.</i> |                                    |
| Huzaefa, Firhan  | National Cheng Kung University     |
| Liu, Yen-Chen  | National Cheng Kung University     |
| 12:00-12:15  | ThAT18.5                           |
| <i>Distance-Based Cooperative Relative Localization for Leader-Following Control of MAVs.</i>                      |                                    |
| Nguyen, Thien-Minh   | Nanyang Technological University   |
| Qiu, Zhirong   | Nanyang Technological University   |
| Nguyen, Thien Hoang  | Nanyang Technological University   |
| Cao, Muqing  | Nanyang Technological University   |
| Xie, Lihua   | Nanyang Technological University   |
| 12:15-12:30  | ThAT18.6                           |
| <i>Range-Limited, Distributed Algorithms on Higher-Order Voronoi Partitions in Multi-Robot Systems.</i>            |                                    |
| Kong, Lingxuan   | The Australian National University |
| Liu, Qingchen  | The Australian National University |
| Yu, Changbin (Brad)  | The Australian National University |

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| <b>ThAT19</b>  | LG-R19  |
| <b>Manipulation Planning I (Regular session)</b>   |   |
| Chair: Stoyanov, Todor   | Örebro University                                 |
| Co-Chair: Dogar, Mehmet R  | University of Leeds                               |
| <b>11:00-11:15</b>   | <b>ThAT19.1</b>                                   |
| <i>Towards an Autonomous Unwrapping System for Intralogistics.</i>   |   |
| Gabellieri, Chiara   | University of Pisa                                |
| Palleschi, Alessandro  | University of Pisa                                |
| Mannucci, Anna   | University of Pisa                                |
| Pierallini, Michele  | Centro Di Ricerca E. Piaggio - Università Di Pisa |
| Stefanini, Elisa   | Centro Di Ricerca E. Piaggio - Università Di Pisa |
| Catalano, Manuel Giuseppe  | Istituto Italiano Di Tecnologia                   |
| Caporale, Danilo   | Centro Di Ricerca E. Piaggio                      |
| Settimi, Alessandro  | University of Pisa                                |
| Stoyanov, Todor  | Örebro University                                 |
| Magnusson, Martin  | Örebro University                                 |
| Garabini, Manolo   | University of Pisa                                |
| Pallottino, Lucia  | University of Pisa                                |
| <b>11:15-11:30</b>   | <b>ThAT19.2</b>                                   |
| <i>Criteria for Maintaining Desired Contacts for Quasi-Static Systems.</i>   |   |
| Hou, Yifan   | Carnegie Mellon University                        |
| Mason, Matthew T.  | Carnegie Mellon University                        |
| <b>11:30-11:45</b>   | <b>ThAT19.3</b>                                   |
| <i>Learning Physics-Based Manipulation in Clutter: Combining Image-Based Generalization and Look-Ahead Planning.</i> |   |
| Bejjani, Wissam  | University of Leeds                               |
| Dogar, Mehmet R  | University of Leeds                               |
| Leonetti, Matteo   | University of Leeds                               |
| <b>11:45-12:00</b>   | <b>ThAT19.4</b>                                   |
| <i>Homography-Based Deep Visual Servoing Methods for Planar Grasps.</i>  |   |
| Wang, Austin S.  | Carnegie Mellon University                        |
| Zhang, Wuming  | Carnegie Mellon University                        |
| Troniak, Daniel  | Carnegie Mellon University                        |
| Jacky, Liang   | Carnegie Mellon University                        |
| Kroemer, Oliver  | Carnegie Mellon University                        |
| <b>12:00-12:15</b>   | <b>ThAT19.5</b>                                   |
| <i>Object Rearrangement with Nested Nonprehensile Manipulation Actions.</i>  |   |
| Song, Changkyu   | Rutgers University                                |
| Boularias, Abdeslam  | Rutgers University                                |
| <b>12:15-12:30</b>   | <b>ThAT19.6</b>                                   |
| <i>Robust Deformation Model Approximation for Robotic Cable Manipulation.</i>  |   |
| Jin, Shiyu   | University of California, Berkeley                |
| Wang, Changhao   | University of California, Berkeley                |
| Tomizuka, Masayoshi  | University of California, Berkeley                |

| <b>ThAT20</b>  |  | LG-R20                                |
|--|--|---------------------------------------|
| <b>Soft Robot: Modeling, Control, and Learning (Regular session)</b>   |  |                                       |
| Chair: Xie, Shane  |  | University of Leeds                   |
| Co-Chair: Nakamura, Taro   |  | Chuo University                       |
| 11:00-11:15  |  | ThAT20.1                              |
| <i>Local Online Motor Babbling: Learning Motor Abundance of a Musculoskeletal Robot Arm.</i>                               |  |                                       |
| Liu, Zinan   | Tech Univ Darmstadt Fachbereich Informatik Fachgeb |                                       |
| Hitzmann, Arne   |  | Osaka University                      |
| Ikemoto, Shuhei  |  | Osaka University                      |
| Stark, Svenja  |  | Technical University Darmstadt        |
| Peters, Jan  |  | Technical University Darmstadt        |
| Hosoda, Koh  |  | Osaka University                      |
| 11:15-11:30  |  | ThAT20.2                              |
| <i>Iterative Learning Control for Fast and Accurate Position Tracking with an Articulated Soft Robotic Arm.</i>            |  |                                       |
| Hofer, Matthias  |  | ETH Zurich                            |
| Spannagl, Lukas  |  | ETH Zurich                            |
| D'Andrea, Raffaello  |  | ETHZ                                  |
| 11:30-11:45  |  | ThAT20.3                              |
| <i>Coupling Disturbance Compensated MIMO Control of Parallel Ankle Rehabilitation Robot Actuated by Pneumatic Muscles.</i> |  |                                       |
| Zuo, Jie   |  | Wuhan University of Technology        |
| Meng, Wei  |  | Wuhan University of Technology        |
| Liu, Quan  |  | Wuhan University of Technology        |
| Ai, Qingsong   |  | Wuhan University of Technology        |
| Xie, Shane   |  | University of Leeds                   |
| Zhou, Zude   |  | Wuhan University of Technology        |
| 11:45-12:00  |  | ThAT20.4                              |
| <i>Proposal of a Peristaltic Motion Type Duct Cleaning Robot for Traveling in a Flexible Pipe.</i>                         |  |                                       |
| Ito, Fumio   |  | Chuo University                       |
| Kawaguchi, Takahiko  |  | Chuo University                       |
| Kamata, Masashi  |  | Chuo University                       |
| Yamada, Yasuyuki   |  | Chuo University                       |
| Nakamura, Taro   |  | Chuo University                       |
| 12:00-12:15  |  | ThAT20.5                              |
| <i>Dynamic Control for Soft Robots with Internal Constraints in the Presence of Obstacles.</i>                             |  |                                       |
| Della Santina, Cosimo  |  | Massachusetts Institute of Technology |
| Bicchi, Antonio  |  | Università Di Pisa                    |
| Rus, Daniela   |  | Massachusetts Institute of Technology |
| 12:15-12:30  |  | ThAT20.6                              |
| <i>Closed-Form Equations and Experimental Verification for Soft Robot Arm Based on Cosserat Theory.</i>                    |  |                                       |
| Niu, Lizhou  |  | Harbin Institute of Technology        |
| Ding, Liang  |  | Harbin Institute of Technology        |
| Gao, Haibo   |  | Harbin Institute of Technology        |
| Su, Yang   |  | Harbin Institute of Technology        |
| Deng, Zongquan   |  | Harbin Institute of Technology        |
| Liu, Zhen  |  | Harbin Institute of Technology        |

| ThBT1   | L1-R1                                 |
|---|---------------------------------------|
| <b>Sensor Fusion I (Regular session)</b>  |                                       |
| Chair: Chen, Shengyong  | Tianjin University of Technology      |
| Co-Chair: Huang, Guoquan  | University of Delaware                |
| 14:45-15:00   | ThBT1.1                               |
| <i>Robust High Accuracy Visual-Inertial-Laser SLAM System.</i>  |                                       |
| Wang, Zengyuan  | Zhejiang University of Technology     |
| Zhang, Jianhua  | Zhejiang University                   |
| Chen, Shengyong   | Zhejiang University of Technology     |
| Yuan, Conger  | Zhejiang University of Technology     |
| Zhang, Jingqian   | Zhejiang University of Technology     |
| Zhang, Jianwei  | University of Hamburg                 |
| 15:00-15:15   | ThBT1.2                               |
| <i>Covariance Pre-Integration for Delayed Measurements in Multi-Sensor Fusion.</i>  |                                       |
| Allak, Eren   | Alpen-Adria-Universität Klagenfurt    |
| Jung, Roland  | Alpen-Adria-Universität Klagenfurt    |
| Weiss, Stephan  | Alpen-Adria-Universität Klagenfurt    |
| 15:15-15:30   | ThBT1.3                               |
| <i>Real-Time Dense Depth Estimation Using Semantically-Guided LIDAR Data Propagation and Motion Stereo.</i>                           |                                       |
| Hirata, Atsuki  | The University of Tokyo               |
| Ishikawa, Ryoichi   | The University of Tokyo               |
| Roxas, Menandro   | The University of Tokyo               |
| Oishi, Takeshi  | The University of Tokyo               |
| 15:30-15:45   | ThBT1.4                               |
| <i>Non-Parametric Mixed-Manifold Products Using Multiscale Kernel Densities.</i>  |                                       |
| Fourie, Dehann  | MIT and Woods Hole Oceanograph        |
| Vaz Teixeira, Pedro   | Massachusetts Institute of Technology |
| Leonard, John   | Massachusetts Institute of Technology |
| 15:45-16:00   | ThBT1.5                               |
| <i>Perception System Design for Low-Cost Commercial Ground Robots: Sensor Configurations, Calibration, Localization, and Mapping.</i> |                                       |
| Chen, Yiming  | Alibaba DAMO                          |
| Zhang, Mingming   | Alibaba AI Labs                       |
| Hong, Dongsheng   | Alibaba Inc                           |
| Deng, Chengcheng  | Alibaba                               |
| Li, Mingyang  | Alibaba                               |
| 16:00-16:15   | ThBT1.6                               |
| <i>Visual-Inertial Localization with Prior LiDAR Map Constraints.</i>   |                                       |
| Zuo, Xingxing   | Zhejiang University                   |
| Geneva, Patrick   | University of Delaware                |
| Yang, Yulin   | University of Delaware                |
| Ye, Wenlong   | Zhejiang University                   |
| Liu, Yong   | Zhejiang University                   |
| Huang, Guoquan  | University of Delaware                |



| ThBT2   | L1-R2  |
|---|--|
| <b>Learning for Localization</b> (Regular session)  |  |
| Chair: Brock, Oliver  | Technische Universität Berlin                              |
| Co-Chair: Dörr, Stefan  | Fraunhofer Inst. for Manufacturing Eng. and Automation IPA |
| 14:45-15:00   | ThBT2.1  |
| <i>Deep Sensor Fusion for Real-Time Odometry Estimation.</i>  |  |
| Valente, Michelle   | Mines Paristech  |
| Joly, Cyril   | Mines ParisTech, PSL Research University                   |
| de La Fortelle, Arnaud  | Mines ParisTech, PSL Research University                   |
| 15:00-15:15   | ThBT2.2  |
| <i>Angle of Arrival Estimation Based on Channel Impulse Response Measurements.</i>  |  |
| Ledergerber, Anton Josef  | ETH Zurich   |
| Hamer, Michael  | ETH Zurich   |
| D'Andrea, Raffaello   | ETH Zurich   |
| 15:15-15:30   | ThBT2.3  |
| <i>State Representation Learning with Robotic Priors for Partially Observable Environments.</i>                                   |  |
| Morik, Marco  | Technische Universität Berlin                              |
| Rastogi, Divyam   | Technische Universität Berlin                              |
| Jonschkowski, Rico  | Google   |
| Brock, Oliver   | Technische Universität Berlin                              |
| 15:30-15:45   | ThBT2.4  |
| <i>One-Shot Object Localization Using Learnt Visual Cues Via Siamese Networks.</i>  |  |
| Gubbi Venkatesh, Sagar  | Indian Institute of Science                                |
| Amrutur, Bharadwaj  | Indian Institute of Science                                |
| 15:45-16:00   | ThBT2.5  |
| <i>Deep Learning-Based Mutual Detection and Collaborative Localization for Mobile Robot Fleets Using Solely 2D LIDAR Sensors.</i> |  |
| Dietrich, Robin   | Fraunhofer Inst. for Manufacturing Eng. and Automation IPA |
| Dörr, Stefan  | Fraunhofer Inst. for Manufacturing Eng. and Automation IPA |
| 16:00-16:15   | ThBT2.6  |
| <i>RGB-To-TSDF: Direct TSDF Prediction from a Single RGB Image for Dense 3D Reconstruction.</i>                                   |  |
| Kim, Hanjun   | Seoul National University                                  |
| Moon, Jiyoun  | Seoul National University                                  |
| Lee, Beom-Hee   | Seoul National University                                  |

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| <b>ThBT3</b>   | <b>L1-R3</b>                             |
| <b>Physical Human-Robot Interaction II (Regular session)</b>   |  |
| Chair: Lou, Yunjiang   | Harbin Institute of Technology, Shenzhen |
| Co-Chair: Zefran, Milos  | University of Illinois at Chicago        |
| 14:45-15:00  | ThBT3.1                                  |
| <i>Mathematic Modeling and Optimal Design of a Magneto-Rheological Clutch for the Compliant Actuator in Physical Robot Interactions.</i> |  |
| Chen, Guangzeng  | Harbin Institute of Technology, Shenzhen |
| Lou, Yunjiang  | Harbin Institute of Technology, Shenzhen |
| Shang, Tongyi  | Harbin Institute of Technology, Shenzhen |
| 15:00-15:15  | ThBT3.2                                  |
| <i>Collaborative Robot Assistant for the Ergonomic Manipulation of Cumbersome Objects.</i>   |  |
| Zanchettin, Andrea Maria   | Politecnico Di Milano                    |
| Lotano, Elio   | Politecnico Di Milano                    |
| Rocco, Paolo   | Politecnico Di Milano                    |
| 15:15-15:30  | ThBT3.3                                  |
| <i>Fast Handovers with a Robot Character: Small Sensorimotor Delays Improve Perceived Qualities.</i>                                     |  |
| Pan, Matthew   | Walt Disney Imagineering                 |
| Knoop, Espen   | The Walt Disney Company                  |
| Bächer, Moritz   | Disney Research                          |
| Niemeyer, Günter   | Disney Research                          |
| 15:30-15:45  | ThBT3.4                                  |
| <i>Obstacle Avoidance Using a Capacitive Skin for Safe Human-Robot Interaction.</i>  |  |
| M'colo, Kamal-Edine  | University of Montpellier                |
| Bruno, Luong   | FOGALE                                   |
| Crosnier, André  | LIRMM                                    |
| Christian, Neel  | FOGALE                                   |
| Fraisse, Philippe  | LIRMM                                    |
| 15:45-16:00  | ThBT3.5                                  |
| <i>Complex Stiffness Model of Physical Human-Robot Interaction: Implications for Control of Performance Augmentation Exoskeletons.</i>   |  |
| He, Bingham  | The University of Texas at Austin        |
| Huang, Huang   | The University of Texas at Austin        |
| Thomas, Gray   | The University of Texas at Austin        |
| Sentis, Luis   | The University of Texas at Austin        |
| 16:00-16:15  | ThBT3.6                                  |
| <i>A Multimodal Human-Robot Interaction Manager for Assistive Robots.</i>  |  |
| Abbasi, Bahareh  | University of Illinois at Chicago        |
| Monaikul, Natawut  | University of Illinois at Chicago        |
| Rysbek, Zhanibek   | University of Illinois at Chicago        |
| Di Eugenio, Barbara  | University of Illinois at Chicago        |
| Zefran, Milos  | University of Illinois at Chicago        |

| ThBT4  | L1-R4                                      |
|--|--|
| <b>Parallel Robots</b> (Regular session)   |  |
| Chair: Yuan, Jianjun   | Shanghai University, China                 |
| Co-Chair: Zanutto, Damiano   | Stevens Institute of Technology            |
| 14:45-15:00  | ThBT4.1                                    |
| <i>Kinematics, Design and Experimental Validation of a Novel Parallel Robot for Two-Fingered Dexterous Manipulation.</i> |  |
| Haouas, Wissem   | Femto-St                                   |
| Laurent, Guillaume J.  | Univ. Bourgogne Franche-Comté, ENSMM       |
| Thibaud, Sébastien   | ENSMM                                      |
| Dahmouche, Redwan  | Université De Franche Comté                |
| 15:00-15:15  | ThBT4.2                                    |
| <i>Influence of Parameters Uncertainties on the Positioning of Cable-Driven Parallel Robots.</i>                         |  |
| Merlet, Jean-Pierre  | INRIA                                      |
| 15:15-15:30  | ThBT4.3                                    |
| <i>A New Time-Varying Feedback RISE Control of PKMs: Theory and Application.</i>   |  |
| Saied, Hussein   | University of Montpellier, LIRMM           |
| Chemori, Ahmed   | Cnrs - Lirmm                               |
| Bouri, Mohamed   | EPFL                                       |
| El Rafei, Maher  | Lebanese University, CRSI                  |
| Francis, Clovis  | Lebanese University                        |
| Pierrot, François  | Cnrs - Lirmm                               |
| 15:30-15:45  | ThBT4.4                                    |
| <i>Tracking Control of Fully-Constrained Cable-Driven Parallel Robots Using Adaptive Dynamic Programming.</i>            |  |
| Li, Shuai  | Stevens Institute of Technology            |
| Zanutto, Damiano   | Stevens Institute of Technology            |
| 15:45-16:00  | ThBT4.5                                    |
| <i>Optimization Based Trajectory Planning of Mobile Cable-Driven Parallel Robots.</i>                                    |  |
| Rasheed, Tahir   | IRCCyN - ECN - IRT JV                      |
| Long, Philip   | Northeastern University                    |
| Suarez Roos, Adolfo  | IRT Jules Verne                            |
| Caro, Stéphane   | CNRS/LS2N                                  |
| 16:00-16:15  | ThBT4.6                                    |
| <i>Inverse Kinematics and Sensitivity Minimization of an N-Stack Stewart Platform.</i>                                   |  |
| Balaban, David   | University of Massachusetts Amherst        |
| Cooper, John   | NASA                                       |
| Komendera, Erik  | Virginia Polytechnic Inst. and State Univ. |

| ThBT5  | L1-R5                                      |
|--|--|
| <b>Optimal Control I (Regular session)</b>   |  |
| Chair: Nadubettu Yadukumar, Shishir  | Indian Institute of Science                |
| Co-Chair: Yang, Insoon   | Seoul National University                  |
| 14:45-15:00  | ThBT5.1                                    |
| <i>Trajectory Planning for a Bat-Like Flapping Wing Robot.</i>   |  |
| Hoff, Jonathan   | University of Illinois at Urbana-Champaign |
| Syed, Usman Ahmed  | University of Illinois at Urbana Champaign |
| Ramezani, Alireza  | California Institute of Technology         |
| Hutchinson, Seth   | Georgia Institute of Technology            |
| 15:00-15:15  | ThBT5.2                                    |
| <i>Risk-Aware Motion Planning and Control Using CVaR-Constrained Optimization.</i>                         |  |
| Hakobyan, Astghik  | Seoul National University                  |
| Kim, Gyeong Chan   | Seoul National University                  |
| Yang, Insoon   | Seoul National University                  |
| 15:15-15:30  | ThBT5.3                                    |
| <i>Contact-Implicit Trajectory Optimization for Dynamic Object Manipulation.</i>                           |  |
| Sleiman, Jean-Pierre   | ETH Zurich                                 |
| Carius, Jan  | ETH Zurich                                 |
| Grandia, Ruben   | ETH Zurich                                 |
| Wermelinger, Martin  | ETH Zurich                                 |
| Hutter, Marco  | ETH Zurich                                 |
| 15:30-15:45  | ThBT5.4                                    |
| <i>Learning Q-Network for Active Information Acquisition.</i>  |  |
| Jeong, Heejin  | University of Pennsylvania                 |
| Schlotfeldt, Brent   | University of Pennsylvania                 |
| Hassani, Hamed   | University of Pennsylvania                 |
| Morari, Manfred  | ETH Zurich                                 |
| Lee, Daniel  | Cornell Tech                               |
| Pappas, George J.  | University of Pennsylvania                 |
| 15:45-16:00  | ThBT5.5                                    |
| <i>Chance-Constrained Trajectory Optimization for Non-Linear Systems with Unknown Stochastic Dynamics.</i> |  |
| Celik, Mevlüt Onur   | Universität Tübingen                       |
| Abdulsamad, Hany   | Technische Universität Darmstadt           |
| Peters, Jan  | Technische Universität Darmstadt           |
| 16:00-16:15  | ThBT5.6                                    |
| <i>PD Based Robust Quadratic Programs for Robotic Systems.</i>   |  |
| Nadubettu Yadukumar, Shishir   | Indian Institute of Science                |
| Veer, Sushant  | University of Delaware                     |

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|---|------------------------------------|
| <b>ThBT6</b>  | L1-R6                              |
| <b>Model Learning for Control I (Regular session)</b>                                   |                                    |
| Chair: Sharf, Inna  | McGill University                  |
| Co-Chair: Howard, Matthew   | King's College London              |
| 14:45-15:00   | ThBT6.1                            |
| <i>Time Series Motion Generation Considering Long Short-Term Motion.</i>                |                                    |
| Fujimoto, Kazuki  | Saitama University                 |
| Sakaino, Sho  | University of Tsukuba              |
| Tsuji, Toshiaki   | Saitama University                 |
| 15:00-15:15   | ThBT6.2                            |
| <i>Learning Singularity Avoidance.</i>  |                                    |
| Manavalan, Jeevan   | King's College London              |
| Howard, Matthew   | King's College London              |
| 15:15-15:30   | ThBT6.3                            |
| <i>Learning-Based Model Predictive Control for Autonomous Racing.</i>                   |                                    |
| Kabzan, Juraj   | ETH Zurich/APTIV                   |
| Hewing, Lukas   | ETH Zurich                         |
| Liniger, Alexander  | ETH Zurich                         |
| Zeilinger, Melanie N.   | ETH Zurich                         |
| 15:30-15:45   | ThBT6.4                            |
| <i>Data-Driven Model Predictive Control for Trajectory Tracking with a Robotic Arm.</i> |                                    |
| Carron, Andrea  | ETH Zurich                         |
| Arcari, Elena   | ETH Zurich                         |
| Wermelinger, Martin   | ETH Zurich                         |
| Hewing, Lukas   | ETH Zurich                         |
| Hutter, Marco   | ETH Zurich                         |
| Zeilinger, Melanie N.   | ETH Zurich                         |
| 15:45-16:00   | ThBT6.5                            |
| <i>Cascaded Gaussian Processes for Data-Efficient Robot Dynamics Learning.</i>          |                                    |
| Rezaei-Shoshtari, Sahand  | McGill University                  |
| Meger, David Paul   | McGill University                  |
| Sharf, Inna   | McGill University                  |
| 16:00-16:15   | ThBT6.6                            |
| <i>Episodic Learning with Control Lyapunov Functions for Uncertain Robotic Systems.</i> |                                    |
| Taylor, Andrew  | California Institute of Technology |
| Dorobantu, Victor   | California Institute of Technology |
| Le, Hoang M.  | California Institute of Technology |
| Yue, Yisong   | California Institute of Technology |
| Ames, Aaron   | California Institute of Technology |

| ThBT7   | L1-R7                                 |
|---|---------------------------------------|
| <b>Vision-Based Navigation I</b> (Regular session)  |                                       |
| Chair: Sattar, Junaed   | University of Minnesota               |
| Co-Chair: Quan, Quan  | Beihang University                    |
| 14:45-15:00   | ThBT7.1                               |
| <i>Active Infrared Coded Target Design and Pose Estimation for Multiple Objects.</i>                                |                                       |
| Yan, Xudong   | Beihang University                    |
| Deng, Heng  | Beihang University                    |
| Quan, Quan  | Beihang University                    |
| 15:00-15:15   | ThBT7.2                               |
| <i>Robust Real-Time RGB-D Visual Odometry in Dynamic Environments Via Rigid Motion Model.</i>                       |                                       |
| Lee, Sangil   | Seoul National University             |
| Son, Clark Youngdong  | Seoul National University             |
| Kim, H. Jin   | Seoul National University             |
| 15:15-15:30   | ThBT7.3                               |
| <i>Visual-Inertial On-Board Throw-And-Go Initialization for Micro Air Vehicles.</i>                                 |                                       |
| Scheiber, Martin  | Universität Klagenfurt                |
| Delaune, Jeff   | Jet Propulsion Laboratory             |
| Brockers, Roland  | California Institute of Technology    |
| Weiss, Stephan  | Alpen-Adria-Universität Klagenfurt    |
| 15:30-15:45   | ThBT7.4                               |
| <i>DeepVIO: Self-Supervised Deep Learning of Monocular Visual Inertial Odometry Using 3D Geometric Constraints.</i> |                                       |
| Han, Liming   | CloudMinds Technologies Inc           |
| Lin, Yimin  | CloudMinds Technologies Inc           |
| Du, Guoguang  | CloudMinds Technologies Inc           |
| Lian, Shiguo  | CloudMinds Technologies Inc           |
| 15:45-16:00   | ThBT7.5                               |
| <i>Line-Based Absolute and Relative Camera Pose Estimation in Structured Environments.</i>                          |                                       |
| Li, Haoang  | The Chinese University of Hong Kong   |
| Zhao, Ji  | ReadSense Ltd                         |
| Bazin, Jean-Charles   | Korea Advanced Inst. of Sci. and Tech |
| Chen, Wen   | The Chinese University of Hong Kong   |
| Chen, Kai   | Wuhan University                      |
| Liu, Yunhui   | Chinese University of Hong Kong       |
| 16:00-16:15   | ThBT7.6                               |
| <i>Extending Monocular Visual Odometry to Stereo Camera Systems by Scale Optimization.</i>                          |                                       |
| Mo, Jiawei  | University of Minnesota, Twin Cities  |
| Sattar, Junaed  | University of Minnesota               |

| ThBT8   | LG-R8  |
|---|--|
| <b>Simulation and Animation</b> (Regular session)   |  |
| Chair: Voyles, Richard  | Purdue University                            |
| Co-Chair: Lee, Dongjun  | Seoul National University                    |
| 14:45-15:00   | ThBT8.1                                      |
| <i>DESK: A Robotic Activity Dataset for Dexterous Surgical Skills Transfer to Medical Robots.</i>                               |  |
| Madapana, Naveen  | Indian Institute of Technology Guwahati      |
| Rahman, Md Masudur  | Purdue University - West Lafayette           |
| Sanchez-Tamayo, Natalia   | Purdue University                            |
| Balakuntala Srinivasa Murthy, Mythra Varun  | Purdue University                            |
| Gonzalez, Glebys  | Purdue University                            |
| Padmakumar Bindu, Jyothsna  | Purdue University                            |
| Venkatesh, L.N Vishnunandan   | Purdue University                            |
| Zhang, Xingguang  | Purdue University                            |
| Barragan, Juan Antonio  | Purdue University                            |
| Low, Thomas   | SRI International                            |
| Voyles, Richard   | Purdue University                            |
| Xue, Yexiang  | Purdue University                            |
| Wachs, Juan   | Purdue University                            |
| 15:00-15:15   | ThBT8.2                                      |
| <i>Research on Finite Ground Effect of a Rotor.</i>   |  |
| Wang, Xinkuang  | Nanjing University of Science and Technology |
| Liu, Yong   | Nanjing University of Science and Technology |
| Huang, Chengwei   | Nanjing University of Science and Technology |
| 15:15-15:30   | ThBT8.3                                      |
| <i>FlightGoggles: Photorealistic Sensor Simulation for Perception-Driven Robotics Using Photogrammetry and Virtual Reality.</i> |  |
| Guerra, Winter  | Massachusetts Institute of Technology        |
| Tal, Ezra   | Massachusetts Institute of Technology        |
| Murali, Varun   | Massachusetts Institute of Technology        |
| Ryou, Gilhyun   | Massachusetts Institute of Technology        |
| Karaman, Sertac   | Massachusetts Institute of Technology        |
| 15:30-15:45   | ThBT8.4                                      |
| <i>A Model for Simulating the Robotic Pushing of Dirt.</i>  |  |
| Rodriguez, Samuel   | Texas Wesleyan University                    |
| Su, Zixiu   | Texas Wesleyan University                    |
| Yu, Jiazhen   | Texas Wesleyan University                    |
| 15:45-16:00   | ThBT8.5                                      |
| <i>Ergodic Flocking.</i>  |  |
| Veitch, Conan   | University of Northern British Columbia      |
| Render, Duncan  | University of Northern British Columbia      |
| Aravind, Alex   | University of Northern British Columbia      |
| 16:00-16:15   | ThBT8.6                                      |
| <i>Passive Model Reduction and Switching for Fast Soft Object Simulation with Intermittent Contacts.</i>                        |  |
| Yoon, Jaemin  | Seoul National University                    |
| Hong, IlKwon  | Seoul National University                    |
| Lee, Dongjun  | Seoul National University                    |

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|---|---|
| <b>ThBT9</b>  | <b>LG-R9</b>                              |
| <b>Cognitive Human-Robot Interaction II (Regular session)</b>   |   |
| Chair: Kim, Keehoon   | Korea Institute of Science and Technology |
| Co-Chair: Losey, Dylan  | Stanford University                       |
| 14:45-15:00   | ThBT9.1                                   |
| <i>The Stability of Human Supervisory Control Operator Behavioral Models Using Hidden Markov Models.</i>        |   |
| Zhu, Haibei   | Duke University                           |
| Cummings, M. L.   | Duke University                           |
| 15:00-15:15   | ThBT9.2                                   |
| <i>Measuring Engagement Elicited by Eye Contact in Human-Robot Interaction.</i>                                 |   |
| Kompatsiari, Kyveli   | Istituto Italiano Di Tecnologia           |
| Ciaro, Francesca  | Istituto Italiano Di Tecnologia           |
| De Tommaso, Davide  | Istituto Italiano Di Tecnologia           |
| Wykowska, Agnieszka   | Istituto Italiano Di Tecnologia           |
| 15:15-15:30   | ThBT9.3                                   |
| <i>Can User-Centered Reinforcement Learning Allow a Robot to Attract Passersby without Causing Discomfort?.</i> |   |
| Ozaki, Yasunori   | NTT                                       |
| Ishihara, Tatsuya   | NTT                                       |
| Matsumura, Narimune   | NTT                                       |
| Nunobiki, Tadashi   | NTT                                       |
| 15:30-15:45   | ThBT9.4                                   |
| <i>Hierarchical Segmentation of Continuous Motions through sEMG Signal Analysis.</i>                            |   |
| Park, Seongsik  | POSTECH                                   |
| Lee, Donghyeon  | Pohang Univ. of Sci. and Tech.(POSTECH)   |
| Chung, Wan Kyun   | POSTECH                                   |
| Kim, Keehoon  | Korea Inst. of Science and Technology     |
| 15:45-16:00   | ThBT9.5                                   |
| <i>Robots That Take Advantage of Human Trust.</i>   |   |
| Losey, Dylan  | Stanford University                       |
| Sadigh, Dorsa   | Stanford University                       |
| 16:00-16:15   | ThBT9.6                                   |
| <i>Multimodal Uncertainty Reduction for Intention Recognition in Human-Robot Interaction.</i>                   |   |
| Trick, Susanne  | Technische Universität Darmstadt          |
| Koert, Dorothea   | Technische Universität Darmstadt          |
| Peters, Jan   | Technische Universität Darmstadt          |
| Rothkopf, Constantin  | Frankfurt Institute for Advanced Studies  |



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| <b>ThBT10</b>   | LG-R10                                   |
| <b>Mapping I (Regular session)</b>  |  |
| Chair: Ramos, Fabio   | University of Sydney, NVIDIA             |
| Co-Chair: Krajník, Tomáš  | Czech Technical University               |
| 14:45-15:00   | ThBT10.1                                 |
| <i>Spatiotemporal Learning of Directional Uncertainty in Urban Environments with Kernel Recurrent Mixture Density Networks.</i> |  |
| Zhi, Weiming  | University of Sydney                     |
| Senanayake, Ransalu   | University of Sydney                     |
| Ott, Lionel   | University of Sydney                     |
| Ramos, Fabio  | University of Sydney, NVIDIA             |
| 15:00-15:15   | ThBT10.2                                 |
| <i>Dense 3D Reconstruction for Visual Tunnel Inspection Using Unmanned Aerial Vehicle.</i>                                      |  |
| Pahwa, Ramanpreet Singh   | Inst. for Infocomm Research, Singapore   |
| Yanting, Kennard Chan   | NTU                                      |
| Bai, Jiamin   | I2R                                      |
| Saputra, Vincensius Billy   | National University of Singapore         |
| Do, Minh N.   | UIUC                                     |
| Foong, Shaohui  | Singapore Univ. of Technology and Design |
| 15:15-15:30   | ThBT10.3                                 |
| <i>Predictive and Adaptive Maps for Long-Term Visual Navigation in Changing Environments.</i>                                   |  |
| Halodová, Lucie   | Czech Technical University               |
| Dvořáková, Eliška   | FEE, Czech Technical University          |
| Majer, Filip  | FEE, Czech Technical University          |
| Vintr, Tomas  | FEE, Czech Technical University          |
| Mozos, Oscar  | Technical University of Cartagena        |
| Dayoub, Ferat   | Queensland University of Technology      |
| Krajník, Tomáš  | Czech Technical University               |
| 15:30-15:45   | ThBT10.4                                 |
| <i>Lane Marking Learning Based on Crowdsourced Data.</i>  |  |
| Pannen, David   | BMW Group                                |
| Liebner, Martin   | BMW Group                                |
| Burgard, Wolfram  | University of Freiburg                   |
| 15:45-16:00   | ThBT10.5                                 |
| <i>Crowd-Sourced Semantic Edge Mapping for Autonomous Vehicles.</i>   |  |
| Herb, Markus  | AUDI AG                                  |
| Weiherer, Tobias  | AUDI AG                                  |
| Navab, Nassir   | Technische Universität München           |
| Tombari, Federico   | Technische Universität München           |
| 16:00-16:15   | ThBT10.6                                 |
| <i>Warped Hypertime Representations for Long-Term Autonomy of Mobile Robots.</i>  |  |
| Krajník, Tomáš  | Czech Technical University               |
| Vintr, Tomas  | FEE, Czech Technical University          |
| Molina, Sergi   | University of Lincoln                    |
| Pulido Fentanes, Jaime  | University of Lincoln                    |
| Cielniak, Grzegorz  | University of Lincoln                    |
| Mozos, Oscar  | Technical University of Cartagena        |
| Broughton, George   | Czech Technical University               |
| Duckett, Tom  | University of Lincoln                    |

| ThBT11  | LG-R11  |
|---|---|
| <b>Medical Robot: Microsurgery</b> (Regular session)  |   |
| Chair: Kang, Jin  | The Johns Hopkins University                      |
| Co-Chair: Belharet, Karim   | Hautes Etudes d'Ingénieur - HEI Campus Centre     |
| 14:45-15:00   | ThBT11.1  |
| <i>Permanent Magnets Based Actuator for Microrobots Navigation.</i>   |   |
| Abbes, Manel  | University of Orleans - University of Sousse      |
| Belharet, Karim   | Hautes Etudes d'Ingénieur - HEI Campus Centre     |
| Mekki, Hassen   | University of Sousse                              |
| Poisson, Gérard   | University of Orleans                             |
| 15:00-15:15   | ThBT11.2  |
| <i>Optical Coherence Tomography Guided Robotic Device for Autonomous Needle Insertion in Cornea Transplant Surgery.</i>   |   |
| Guo, Shoujing   | Johns Hopkins University                          |
| Sarfaraz, Nicolas   | University of Maryland                            |
| Gensheimer, William   | Warfighter Eye Center, MGMSCS, Joint Base Andrews |
| Krieger, Axel   | University of Maryland                            |
| Kang, Jin   | Johns Hopkins University                          |
| 15:15-15:30   | ThBT11.3  |
| <i>Toward Improving Patient Safety and Surgeon Comfort in a Synergic Robot-Assisted Eye Surgery: A Comparative Study.</i> |   |
| Ebrahimi, Ali   | Johns Hopkins University                          |
| Alambeigi, Farshid  | University of Texas at Austin                     |
| Zimmer-Galler, Ingrid   | Johns Hopkins University                          |
| Gehlbach, Peter   | Johns Hopkins Medical Institute                   |
| Taylor, Russell H.  | Johns Hopkins University                          |
| Iordachita, Ioan Iulian   | Johns Hopkins University                          |
| 15:30-15:45   | ThBT11.4  |
| <i>A Novel Semi-Autonomous Control Framework for Retina Confocal Endomicroscopy Scanning.</i>                             |   |
| Li, Zhaoshuo  | Johns Hopkins University                          |
| Shahbazi, Mahya   | Johns Hopkins University                          |
| Patel, Niravkumar   | Johns Hopkins University                          |
| O' Sullivan, Eimear   | Imperial College of London                        |
| Zhang, Haojie   | Imperial College London                           |
| Vyas, Khushi  | Imperial College London                           |
| Chalasani, Preetham   | Johns Hopkins University                          |
| Gehlbach, Peter   | Johns Hopkins Medical Institute                   |
| Iordachita, Ioan Iulian   | Johns Hopkins University                          |
| Yang, Guang-Zhong   | Imperial College London                           |
| Taylor, Russell H.  | Johns Hopkins University                          |
| 15:45-16:00   | ThBT11.5  |
| <i>A Compact Laser-Steering End-Effector for Transoral Robotic Surgery.</i>   |   |
| Bothner, Simon Antoni   | EPFL  |
| York, Peter   | Harvard University                                |
| Song, Phillip   | Massachusetts Eye and Ear Institute               |
| Wood, Robert  | Harvard University                                |
| 16:00-16:15   | ThBT11.6  |
| <i>Electrical Bio-Impedance Proximity Sensing for Vitreo-Retinal Micro-Surgery.</i>                                       |   |
| Schoevaerdt, Laurent  | KU Leuven   |
| Borghesan, Gianni   | KU Leuven   |
| Ourak, Mouloud  | University of Leuven                              |
| Reynaerts, Dominiek   | KU Leuven   |
| Vander Poorten, Emmanuel B  | KU Leuven   |

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| <b>ThBT12</b>   | LG-R12  |
| <b>Force and Tactile Sensing I (Regular session)</b>  |   |
| Chair: Park, Yong-Lae   | Seoul National University                     |
| Co-Chair: Zwiener, Adrian   | University of Tuebingen                       |
| 14:45-15:00   | ThBT12.1                                      |
| <i>ARMCL: ARM Contact Point Localization Via Monte Carlo Localization.</i>  |   |
| Zwiener, Adrian   | University of Tübingen                        |
| Hanten, Richard   | University of Tübingen                        |
| Schulz, Cornelia  | University of Tübingen                        |
| Zell, Andreas   | University of Tübingen                        |
| 15:00-15:15   | ThBT12.2                                      |
| <i>Force Sensitive Robotic End-Effector Using Embedded Fiber Optics and Deep Learning Characterization for Dexterous Remote Manipulation.</i>   |   |
| Kim, Jae In   | Seoul National University                     |
| Kim, DongWook   | Seoul National University                     |
| Krebs, Matthew  | Argonne National Laboratory                   |
| Park, Young Soo   | Argonne National Laboratory                   |
| Park, Yong-Lae  | Seoul National University                     |
| 15:15-15:30   | ThBT12.3                                      |
| <i>Predicting Grasp Success with a Soft Sensing Skin and Shape-Memory Actuated Gripper.</i>   |   |
| Zimmer, Julian  | Karlsruhe Institute of Technology             |
| Hellebrekers, Tess  | Carnegie Mellon University                    |
| Asfour, Tamim   | Karlsruhe Institute of Technology             |
| Majidi, Carmel  | Carnegie Mellon University                    |
| Kroemer, Oliver   | Carnegie Mellon University                    |
| 15:30-15:45   | ThBT12.4                                      |
| <i>Formation of PVDF Piezoelectric Film on 3D Bellows Surface of Robotic Suction Cup for Providing Force Sensing Ability -Feasibility Study on Two Methods of Dip-Coating and Lamination.</i> |   |
| Aoyagi, Seiji   | Kansai University                             |
| Morita, Tatsuki   | Kansai University                             |
| Shintani, Takuto  | Kansai University                             |
| Takise, Hiroki  | Kansai University                             |
| Takahashi, Tomokazu   | Kansai University                             |
| Suzuki, Masato  | Kansai University                             |
| 15:45-16:00   | ThBT12.5                                      |
| <i>Effective Estimation of Contact Force and Torque for Vision-Based Tactile Sensors with Helmholtz-Hodge Decomposition.</i>  |   |
| Zhang, Yazhan   | The Hong Kong Univ. of Science and Technology |
| Kan, Zicheng  | The Hong Kong Univ. of Science and Technology |
| Yang, Yang  | The Hong Kong Univ. of Science and Technology |
| Alexander, Tse  | HKUST Robotics Institute                      |
| Wang, Michael Yu  | The Hong Kong Univ. of Science and Technology |
| 16:00-16:15   | ThBT12.6                                      |
| <i>Haptic Perception of Liquids Enclosed in Containers.</i>   |   |
| Matl, Carolyn   | Univ of California, Berkeley                  |
| Matthew, Robert, Peter  | Univ of California, Berkeley                  |
| Bajcsy, Ruzena  | Univ of California, Berkeley                  |

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| <b>ThBT13</b>   | <b>LG-R13</b>                           |
| <b>Hydraulic/Pneumatic Actuators (Regular session)</b>  |   |
| Chair: Takanishi, Atsuo   | Waseda University                       |
| Co-Chair: Pucci, Daniele  | Italian Institute of Technology         |
| <b>14:45-15:00</b>  | <b>ThBT13.1</b>                         |
| <i>Miniaturization of MR Safe Pneumatic Rotational Stepper Motors.</i>                          |   |
| Groenhuis, Vincent  | University of Twente                    |
| Siepel, Françoise J   | University of Twente                    |
| Stramigioli, Stefano  | University of Twente                    |
| <b>15:00-15:15</b>  | <b>ThBT13.2</b>                         |
| <i>Closed-Loop Force Control of a Pneumatic Gripper Actuated by Two Pressure Regulators.</i>    |   |
| Romeo, Rocco Antonio  | Italian Institute of Technology         |
| Fiorio, Luca  | Italian Institute of Technology         |
| Avila-Mireles, Edwin Johnatan   | Italian Institute of Technology         |
| Cannella, Ferdinando  | Italian Institute of Technology         |
| Metta, Giorgio  | Italian Institute of Technology         |
| Pucci, Daniele  | Italian Institute of Technology         |
| <b>15:15-15:30</b>  | <b>ThBT13.3</b>                         |
| <i>Experimental Validation of Hydraulic Interlocking Drive System for Biped Humanoid Robot.</i> |   |
| Shimizu, Juri   | Waseda University                       |
| Otani, Takuya   | Waseda University                       |
| Mizukami, Hideki  | Waseda University                       |
| Hashimoto, Kenji  | Meiji University                        |
| Takanishi, Atsuo  | Waseda University                       |
| <b>15:30-15:45</b>  | <b>ThBT13.4</b>                         |
| <i>Energy Harvesting across Temporal Temperature Gradients Using Vaporization.</i>              |   |
| Xiao, Charles   | University of California, Santa Barbara |
| Naclerio, Nicholas  | University of California, Santa Barbara |
| Hawkes, Elliot Wright   | University of California, Santa Barbara |
| <b>15:45-16:00</b>  | <b>ThBT13.5</b>                         |
| <i>Kinematic Modeling of a Soft Pneumatic Actuator Using Cubic Hermite Splines.</i>             |   |
| Wiese, Mats   | Leibniz Universität Hannover            |
| Rüstmann, Kenneth   | Leibniz Universität Hannover            |
| Raatz, Annika   | Leibniz Universität Hannover            |
| <b>16:00-16:15</b>  | <b>ThBT13.6</b>                         |
| <i>High-Speed Humanoid Robot Arm for Badminton Using Pneumatic-Electric Hybrid Actuators.</i>   |   |
| Mori, Shotaro   | The University of Tokyo                 |
| Tanaka, Kazutoshi   | The University of Tokyo                 |
| Nishikawa, Satoshi  | The University of Tokyo                 |
| Niiyama, Ryuma  | The University of Tokyo                 |
| Kuniyoshi, Yasuo  | The University of Tokyo                 |

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| <b>ThBT14</b>   | LG-R14                                |
| <b>Marine Robots II (Regular session)</b>   |                                       |
| Chair: Quattrini Li, Alberto  | Dartmouth College                     |
| Co-Chair: Schwertfeger, Sören   | ShanghaiTech University               |
| 14:45-15:00   | ThBT14.1                              |
| <i>Real-Time Model-Based Image Color Correction for Underwater Robots.</i>  |                                       |
| Roznere, Monika   | Dartmouth College                     |
| Quattrini Li, Alberto   | Dartmouth College                     |
| 15:00-15:15   | ThBT14.2                              |
| <i>Passive Inverted Ultra-Short Baseline (piUSBL) Localization: An Experimental Evaluation of Accuracy.</i>               |                                       |
| Rypkema, Nicholas Rahardiyana   | Massachusetts Institute of Technology |
| Schmidt, Henrik   | Massachusetts Institute of Technology |
| 15:15-15:30   | ThBT14.3                              |
| <i>Concurrent Flow-Based Localization and Mapping in Time-Invariant Flow Fields.</i>                                      |                                       |
| Song, Zhuoyuan  | University of Hawaii at Manoa         |
| Mohseni, Kamran   | University of Florida at Gainesville  |
| 15:30-15:45   | ThBT14.4                              |
| <i>Adaptive Navigation Scheme for Optimal Deep-Sea Localization Using Multimodal Perception Cues.</i>                     |                                       |
| Gomez Chavez, Arturo  | Jacobs University Bremen GGmbH        |
| Xu, Qingwen   | ShanghaiTech University               |
| Mueller, Christian Atanas   | Jacobs University                     |
| Schwertfeger, Sören   | ShanghaiTech University               |
| Birk, Andreas   | Jacobs University                     |
| 15:45-16:00   | ThBT14.5                              |
| <i>Duckiepond: An Open Education and Research Environment for a Fleet of Autonomous Maritime Vehicles.</i>                |                                       |
| Lin, Ni-Ching   | National Chiao Tung University        |
| Hsiao, YuChieh  | National Chiao Tung University        |
| Huang, Yi-Wei   | National Chiao Tung University        |
| Hung, ChingTang   | National Taiwan University            |
| Chuang, Tzu-Kuan  | National Chiao Tung University        |
| Chen, Pin-Wei   | National Chiao Tung University        |
| Huang, Jui-Te   | National Chiao Tung University        |
| Hsu, Chao-Chun  | National Chiao Tung University        |
| Censi, Andrea   | ETH Zürich & NuTonomy                 |
| Benjamin, Michael   | Massachusetts Institute of Technology |
| Chen, Chi-Fang  | National Taiwan University            |
| Wang, Hsueh-Cheng   | National Chiao Tung University        |
| 16:00-16:15   | ThBT14.6                              |
| <i>Experimental Comparison of Open Source Visual-Inertial-Based State Estimation Algorithms in the Underwater Domain.</i> |                                       |
| Joshi, Bharat   | University of South Carolina          |
| Rahman, Sharmin   | University of South Carolina          |
| Kalaitzakis, Michail  | University of South Carolina          |
| Cain, Brennan   | University of South Carolina          |
| Johnson, James  | University of South Carolina          |
| Xanthidis, Marios   | University of South Carolina          |
| Karapetyan, Nare  | University of South Carolina          |
| Hernandez, Alan   | MiraCosta College                     |
| Quattrini Li, Alberto   | Dartmouth College                     |
| Vitzilaios, Nikolaos  | University of South Carolina          |
| Rekleitis, Ioannis  | University of South Carolina          |

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| <b>ThBT15</b>  | LG-R15                               |
| <b>Collision Avoidance I (Regular session)</b>   |                                      |
| Chair: Zachmann, Gabriel   | University of Bremen                 |
| Co-Chair: Xu, Tiantian   | Chinese Academy of Sciences          |
| 14:45-15:00  | ThBT15.1                             |
| <i>Rapid Collision Detection for Multicopter Trajectories.</i>   |                                      |
| Bucki, Nathan  | University of California, Berkeley   |
| Mueller, Mark Wilfried   | University of California, Berkeley   |
| 15:00-15:15  | ThBT15.2                             |
| <i>Fast Time-Optimal Avoidance of Moving Obstacles for High-Speed MAV Flight.</i>                                |                                      |
| Beul, Marius   | University of Bonn                   |
| Behnke, Sven   | University of Bonn                   |
| 15:15-15:30  | ThBT15.3                             |
| <i>Continuous-Time Collision Avoidance for Trajectory Optimization in Dynamic Environments.</i>                  |                                      |
| Merkt, Wolfgang Xaver  | University of Edinburgh              |
| Ivan, Vladimir   | University of Edinburgh              |
| Vijayakumar, Sethu   | University of Edinburgh              |
| 15:30-15:45  | ThBT15.4                             |
| <i>SIMDop: SIMD Optimized Bounding Volume Hierarchies for Collision Detection.</i>                               |                                      |
| Tan, Toni  | University of Bremen                 |
| Weller, René   | University of Bremen                 |
| Zachmann, Gabriel  | Clausthal University                 |
| 15:45-16:00  | ThBT15.5                             |
| <i>Model Predictive Contouring Control for Collision Avoidance in Unstructured Dynamic Environments.</i>         |                                      |
| Brito, Bruno   | TU Delft                             |
| Floor, Boaz  | Delft University of Technology       |
| Ferranti, Laura  | Delft University of Technology       |
| Alonso-Mora, Javier  | Delft University of Technology       |
| 16:00-16:15  | ThBT15.6                             |
| <i>LSwarm: Efficient Collision Avoidance for Large Swarms with Coverage Constraints in Complex Urban Scenes.</i> |                                      |
| Arul, Senthil Hariharan  | University of Maryland, College Park |
| Sathyamoorthy, Adarsh Jagan  | University of Maryland               |
| Patel, Shivang   | University of Maryland, College Park |
| Otte, Michael W.   | University of Maryland               |
| Xu, Huan   | University of Maryland               |
| Lin, Ming C.   | University of North Carolina         |
| Manocha, Dinesh  | University of Maryland               |

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| <b>ThBT16</b>   | <b>LG-R16</b>   |
| <b>Haptics and Bio-Inspired (Regular session)</b>   |   |
| Chair: Lelevé, Arnaud   | INSA De Lyon, Université De Lyon                      |
| Co-Chair: Ishii, Hiroyuki   | Waseda University                                     |
| 14:45-15:00   | ThBT16.1  |
| <i>Position-Based Control of Under-Constrained Haptics: A System for the Dexmo Glove.</i>   |   |
| Friston, Sebastian  | University College London                             |
| Griffith, Elias   | University of Liverpool                               |
| Swapp, David  | University College London                             |
| Marshall, Alan  | University of Liverpool                               |
| Steed, Anthony  | University College London                             |
| 15:00-15:15   | ThBT16.2  |
| <i>On the Feasibility of Multi-Degree-Of-Freedom Haptic Devices Using Passive Actuators.</i>                                      |   |
| Lacki, Maciej   | Ontario Tech University                               |
| Rossa, Carlos   | Ontario Tech University                               |
| 15:15-15:30   | ThBT16.3  |
| <i>Identification of Rat Ultrasonic Vocalizations from Mix Sounds of a Robotic Rat in Non-Silent Environments.</i>                |   |
| Li, Chang   | Beijing Institute of Technology                       |
| Shi, Qing   | Beijing Institute of Technology                       |
| Gao, Zihang   | Beijing Institute of Technology                       |
| Ishii, Hiroyuki   | Waseda University                                     |
| Takanishi, Atsuo  | Waseda University                                     |
| Huang, Qiang  | Beijing Institute of Technology                       |
| Fukuda, Toshio  | Meijo University                                      |
| 15:30-15:45   | ThBT16.4  |
| <i>Component Modularized Design of Musculoskeletal Humanoid Platform Musashi to Investigate Learning Control Systems.</i>         |   |
| Kawaharazuka, Kento   | The University of Tokyo                               |
| Makino, Shogo   | The University of Tokyo                               |
| Tsuzuki, Kei  | The University of Tokyo                               |
| Onitsuka, Moritaka  | The University of Tokyo                               |
| Nagamatsu, Yuya   | The University of Tokyo                               |
| Shinjo, Koki  | The University of Tokyo                               |
| Makabe, Tasuku  | The University of Tokyo                               |
| Asano, Yuki   | The University of Tokyo                               |
| Okada, Kei  | The University of Tokyo                               |
| Kawasaki, Koji  | The University of Tokyo                               |
| Inaba, Masayuki   | The University of Tokyo                               |
| 15:45-16:00   | ThBT16.5  |
| <i>Development of a Location Finding System for Minute Sound Source by Using Human Acoustic System with Stochastic Resonance.</i> |   |
| Tsujita, Katsuyoshi   | Osaka Institute of Technology                         |
| 16:00-16:15   | ThBT16.6  |
| <i>A Multi-Trainee Architecture for Haptic Hands-On Training.</i>   |   |
| Licon, Angel Ricardo  | Université De Lyon, INSA Lyon, Ampere                 |
| Lelevé, Arnaud  | INSA De Lyon (Inst. National Des Sciences Appliquées) |
| Pham, Minh Tu   | INSA De Lyon (Inst. National Des Sciences Appliquées) |
| Eberard, Damien   | INSA De Lyon (Inst. National Des Sciences Appliquées) |

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| <b>ThBT17</b>   | <b>LG-R17</b>                                 |
| <b>Prosthetics and Exoskeletons I (Regular session)</b>   |   |
| Chair: Suzuki, Kenji  | University of Tsukuba                         |
| Co-Chair: Catalano, Manuel Giuseppe   | Istituto Italiano Di Tecnologia               |
| <b>14:45-15:00</b>  | <b>ThBT17.1</b>                               |
| <i>A Gear-Driven Prosthetic Hand with Major Grasp Functions for Toddlers.</i>   |   |
| Jing, Xiaobei   | The Univ. of Electro-Comm., Shenzhen Inst. of |
| Yong, Xu  | The Univ. of Electro-Comm., Shenzhen Inst. of |
| Shi, Yuankang   | The University of Electro-Communications      |
| Yabuki, Yoshiko   | The University of Electro-Communications      |
| Jiang, Yinlai   | The University of Electro-Communications      |
| Yokoi, Hiroshi  | The University of Electro-Communications      |
| Li, Guanglin  | Shenzhen Inst. of Advanced Tech., CAS         |
| <b>15:00-15:15</b>  | <b>ThBT17.2</b>                               |
| <i>A Variable Stiffness Elbow Joint for Upper Limb Prosthesis.</i>  |   |
| Lemerle, Simon  | University of Pisa                            |
| Grioli, Giorgio   | Istituto Italiano Di Tecnologia               |
| Bicchi, Antonio   | Università Di Pisa                            |
| Catalano, Manuel Giuseppe   | Istituto Italiano Di Tecnologia               |
| <b>15:15-15:30</b>  | <b>ThBT17.3</b>                               |
| <i>Robust and Adaptive Lower Limb Prosthesis Stance Control Via Extended Kalman Filter-Based Gait Phase Estimation.</i> |   |
| Thatte, Nitish  | Carnegie Mellon University                    |
| Shah, Tanvi   | Carnegie Mellon University                    |
| Geyer, Hartmut  | Carnegie Mellon University                    |
| <b>15:30-15:45</b>  | <b>ThBT17.4</b>                               |
| <i>Feasibility of Gait Entrainment to Hip Mechanical Perturbation for Locomotor Rehabilitation.</i>                     |   |
| Lee, Jongwoo  | Massachusetts Institute of Technology         |
| Goetz, Devon  | Massachusetts Institute of Technology         |
| Huber, Meghan   | Massachusetts Institute of Technology         |
| Hogan, Neville  | Massachusetts Institute of Technology         |
| <b>15:45-16:00</b>  | <b>ThBT17.5</b>                               |
| <i>MRLift: A Semi-Active Lower Back Support Exoskeleton Based on MR Fluid and Force Retention Technology.</i>           |   |
| Hassan, Modar   | University of Tsukuba                         |
| Kennard, Maxwell  | University of Tsukuba                         |
| Yagi, Keisuke   | Ibaraki University                            |
| Kadone, Hideki  | University of Tsukuba                         |
| Mochiyama, Hiromi   | University of Tsukuba                         |
| Suzuki, Kenji   | University of Tsukuba                         |



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| <b>ThBT18</b>  | LG-R18                                     |
| <b>Multi-Robot Systems II (Regular session)</b>  |  |
| Chair: Secchi, Cristian  | Univ. of Modena & Reggio Emilia            |
| Co-Chair: Amato, Nancy   | University of Illinois                     |
| 14:45-15:00  | ThBT18.1                                   |
| <i>Understanding Multi-Robot Systems: On the Concept of Legibility.</i>                                  |  |
| Capelli, Beatrice  | University of Modena and Reggio Emilia     |
| Villani, Valeria   | University of Modena and Reggio Emilia     |
| Secchi, Cristian   | University of Modena and Reggio Emilia     |
| Sabattini, Lorenzo   | University of Modena and Reggio Emilia     |
| 15:00-15:15  | ThBT18.2                                   |
| <i>Interaction Templates for Multi-Robot Systems.</i>  |  |
| Motes, James   | Texas A&M University                       |
| Sandstrom, Read  | Texas A&M University                       |
| Adams, Will  | University of Texas at Austin              |
| Ogunyale, Tobi   | Georgia State University                   |
| Thomas, Shawna   | Texas A&M University                       |
| Amato, Nancy   | University of Illinois                     |
| 15:15-15:30  | ThBT18.3                                   |
| <i>Minimum <math>\S k \S</math>-Connectivity Maintenance for Robust Multi-Robot Systems.</i>             |  |
| Luo, Wenhao  | Carnegie Mellon University                 |
| Sycara, Katia  | Carnegie Mellon University                 |
| 15:30-15:45  | ThBT18.4                                   |
| <i>Submodular Optimization for Coupled Task Allocation and Intermittent Deployment Problems.</i>         |  |
| Liu, Jun   | Virginia Tech                              |
| Williams, Ryan   | Virginia Polytechnic Inst. and State Univ. |
| 15:45-16:00  | ThBT18.5                                   |
| <i>Cannot Avoid Penalty for Fluctuating Order Arrival Rate? Let's Minimize.</i>                          |  |
| Agarwal, Marichi   | TCS Research & Innovation                  |
| Sarkar, Chayan   | TCS Research & Innovation                  |
| 16:00-16:15  | ThBT18.6                                   |
| <i>Adaptive Risk-Based Replanning for Human-Aware Multi-Robot Task Allocation with Local Perception.</i> |  |
| Talebpour, Zeynab  | École Polytechnique Fédérale De Lausanne   |
| Martinoli, Alcherio  | EPFL                                       |

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| <b>ThBT19</b>  | LG-R19                                |
| <b>Manipulation Planning II (Regular session)</b>  |                                       |
| Chair: Likhachev, Maxim  | Carnegie Mellon University            |
| Co-Chair: Stork, Johannes A.   | Örebro University                     |
| 14:45-15:00  | ThBT19.1                              |
| <i>Sampling-Based Motion Planning for Aerial Pick-And-Place.</i>   |                                       |
| Kim, Hyoin   | Seoul National University             |
| Seo, Hoseong   | Seoul National University             |
| Kim, JongChan  | Seoul National University             |
| Kim, H. Jin  | Seoul National University             |
| 15:00-15:15  | ThBT19.2                              |
| <i>Force-And-Motion Constrained Planning for Tool Use.</i>   |                                       |
| Holladay, Rachel   | Massachusetts Institute of Technology |
| Lozano-Perez, Tomas  | Massachusetts Institute of Technology |
| Rodriguez, Alberto   | Massachusetts Institute of Technology |
| 15:15-15:30  | ThBT19.3                              |
| <i>Object Placement Planning and Optimization for Robot Manipulators.</i>  |                                       |
| Haustein, Joshua Alexander   | KTH Royal Institute of Technology     |
| Hang, Kaiyu  | Yale University                       |
| Stork, Johannes Andreas  | Örebro University                     |
| Kragic, Danica   | KTH                                   |
| 15:30-15:45  | ThBT19.4                              |
| <i>Bidirectional Heuristic Search for Motion Planning with an Extend Operator.</i>                               |                                       |
| Cheng, Allen   | Carnegie Mellon University            |
| Saxena, Dhruv Mauria   | Carnegie Mellon University            |
| Likhachev, Maxim   | Carnegie Mellon University            |
| 15:45-16:00  | ThBT19.5                              |
| <i>Pixels to Plans: Learning Non-Prehensile Manipulation by Imitating a Planner.</i>                             |                                       |
| Tosun, Tarik   | Samsung AI Center NY                  |
| Mitchell, Eric   | Samsung AI Center NY                  |
| Eisner, Benjamin   | Samsung AI Center NY                  |
| Huh, Jinwook   | University of Pennsylvania            |
| Lee, Bhoram  | University of Pennsylvania            |
| Lee, Daewon  | Samsung AI Center New York            |
| Isler, Volkan  | University of Minnesota               |
| Seung, Sebastian   | Samsung AI Center NY                  |
| Lee, Daniel  | Cornell Tech                          |
| 16:00-16:15  | ThBT19.6                              |
| <i>Exploiting Linearity in Dynamics Solvers for the Design of Composable Robotic Manipulation Architectures.</i> |                                       |
| Schneider, Sven  | Bonn-Rhein-Sieg University            |
| Bruyninckx, Herman   | University of Leuven                  |

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| <b>ThBT20</b>   | LG-R20   |
| <b>Soft Sensors and Actuators I (Regular session)</b>   |  |
| Chair: Renaud, Pierre   | ICube AVR  |
| Co-Chair: Vanderborght, Bram  | Vrije Universiteit Brussel   |
| 14:45-15:00   | ThBT20.1   |
| <i>Deep Neural Network Approach in Electrical Impedance Tomography-Based Real-Time Soft Tactile Sensor.</i> |  |
| Park, Hyunkyu   | Korea Advanced Inst. of Sci. and Tech                                |
| Lee, Hyosang  | Max Planck Inst. for Intelligent Systems                             |
| Park, Kyungseo  | Korea Advanced Inst. of Sci. and Tech                                |
| Mo, Sangwoo   | Korea Advanced Inst. of Sci. and Tech                                |
| Kim, Jung   | Korea Advanced Inst. of Sci. and Tech                                |
| 15:00-15:15   | ThBT20.2   |
| <i>Modeling and Identification for the Design of a Rotary Soft Actuator Based on Wren Mechanism.</i>        |  |
| Gayral, Thibault  | ICube  |
| Rubbert, Lennart  | INSA - Strasbourg  |
| Renaud, Pierre  | ICube AVR  |
| 15:15-15:30   | ThBT20.3   |
| <i>Modular Volumetric Actuators Using Motorized Auxetics.</i>   |  |
| Lipton, Jeffrey   | University of Washington   |
| Chin, Lillian   | Massachusetts Institute of Technology                                |
| Miske, Jacob  | Massachusetts Institute of Technology                                |
| Rus, Daniela  | Massachusetts Institute of Technology                                |
| 15:30-15:45   | ThBT20.4   |
| <i>Novel Lockable and Stackable Compliant Actuation Unit for Modular +SPEA Actuators.</i>                   |  |
| Mathijssen, Glenn   | Vrije Universiteit Brussel   |
| Furnémont, Raphaël  | Vrije Universiteit Brussel   |
| Saerens, Elias  | Vrije Universiteit Brussel   |
| Garabini, Manolo  | Università Di Pisa   |
| Catalano, Manuel Giuseppe   | Istituto Italiano Di Tecnologia                                      |
| Lefebber, Dirk  | Vrije Universiteit Brussel   |
| Bicchi, Antonio   | Università Di Pisa   |
| Vanderborght, Bram  | Vrije Universiteit Brussel   |
| 15:45-16:00   | ThBT20.5   |
| <i>Modelling of Uniaxial EGaln-Based Strain Sensors for Proprioceptive Sensing of Soft Robots.</i>          |  |
| Al-Azzawi, Abdullah   | Australian Centre for Field Robotics (ACFR),<br>University of Sydney |
| Boudali, A. Mounir  | University of Sydney   |
| Kong, He  | University of Sydney   |
| Goktogan, Ali Haydar  | Australian Centre for Field Robotics (ACFR)                          |
| Sukkarieh, Salah  | University of Sydney   |
| 16:00-16:15   | ThBT20.6   |
| <i>Modeling Novel Soft Mechanosensors Based on Air-Flow Measurements.</i>                                   |  |
| Escaida Navarro, Stefan   | INRIA  |
| Goury, Olivier  | INRIA - Lille Nord Europe  |
| Zheng, Gang   | INRIA  |
| Morales Bieze, Thor Enrique   | University of Lille  |
| Duriez, Christian   | INRIA  |

| ThCT1  | L1-R1  |
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| <b>Sensor Fusion II (Regular session)</b>  |  |
| Chair: Oh, Jun Ho  | Korea Advanced Inst. of Sci. and Tech                            |
| Co-Chair: Ogata, Kunihiro  | National Inst. of Adv. Industrial Sci. and Tech.                 |
| 16:45-17:00  | ThCT1.1  |
| <i>Outlier-Robust Manifold Pre-Integration for INS/GPS Fusion.</i>   |  |
| Ch'ng, Shin-Fang   | The University of Adelaide                                       |
| Khosravian, Alireza  | The University of Adelaide                                       |
| Doan, Anh-Dzung  | The University of Adelaide                                       |
| Chin, Tat-Jun  | The University of Adelaide                                       |
| 17:00-17:15  | ThCT1.2  |
| <i>A Robust Position and Posture Measurement System Using Visual Markers and an Inertia Measurement Unit.</i>  |  |
| Ogata, Kunihiro  | National Inst. of Adv. Industrial Sci. and Tech.                 |
| Tanaka, Hideyuki   | National Inst. of Adv. Industrial Sci. and Tech.                 |
| Matsumoto, Yoshio  | National Inst. of Adv. Industrial Sci. and Tech.                 |
| 17:15-17:30  | ThCT1.3  |
| <i>Joint Velocity and Acceleration Estimation in Serial Chain Rigid Body and Flexible Joint Manipulators.</i>  |  |
| Baradaran Birjandi, Seyed Ali  | Technical University of Munich                                   |
| Kuehn, Johannes  | Technical University of Munich                                   |
| Haddadin, Sami   | Technical University of Munich                                   |
| 17:30-17:45  | ThCT1.4  |
| <i>Biped Robot Pelvis Kinematics Estimation Based on the Touch-Point Updating Method.</i>  |  |
| Bae, HyoIn   | KAIST, HuboLab   |
| Oh, Jaesung  | Korea Advanced Inst. of Sci. and Tech                            |
| Joe, Hyun Min  | Korea Advanced Inst. of Sci. and Tech                            |
| Oh, Jun Ho   | Korea Advanced Inst. of Sci. and Tech                            |
| 17:45-18:00  | ThCT1.5  |
| <i>A Joint Optimization Approach of LiDAR-Camera Fusion for Accurate Dense 3D Reconstructions.</i>   |  |
| Zhen, Weikun   | Carnegie Mellon University                                       |
| Hu, Yaoyu  | Carnegie Mellon University                                       |
| Liu, Jingfeng  | Carnegie Mellon University                                       |
| Scherer, Sebastian   | Carnegie Mellon University                                       |
| 18:00-18:15  | ThCT1.6  |
| <i>Fusion of Passive Ferromagnetic Sensors with the Navigational Data for the Improvement of the Detection of Underwater Metal-Containing Objects.</i> |  |
| Frolov, Dmitry   | Russian State Scientific Center for Robotics and Technical Cyber |
| Gromoshinskiy, Dmitry  | RTC  |
| Smirnova, Ekaterina  | RTC  |
| Korsakov, Anton  | Russian State Scientific Center for Robotics and Technical Cyber |
| Bakshiev, Alexander  | RTC  |

| ThCT2  | L1-R2                             |
|--|-----------------------------------|
| <b>Learning for Mobile System</b> (Regular session)  |                                   |
| Chair: Beetz, Michael  | University of Bremen              |
| Co-Chair: Boedecker, Joschka   | University of Freiburg            |
| 16:45-17:00  | ThCT2.1                           |
| <i>Task-Motion Planning with Reinforcement Learning for Adaptable Mobile Service Robots.</i> |                                   |
| Jiang, Yuqian  | University of Texas at Austin     |
| Yang, Fangkai  | Schlumberger Ltd                  |
| Zhang, Shiqi   | SUNY Binghamton                   |
| Stone, Peter   | University of Texas at Austin     |
| 17:00-17:15  | ThCT2.2                           |
| <i>Inverse Optimal Planning for Air Traffic Control.</i>                                     |                                   |
| Tolstaya, Ekaterina  | University of Pennsylvania        |
| Ribeiro, Alejandro   | University of Pennsylvania        |
| Kumar, Vijay   | University of Pennsylvania        |
| Kapoor, Ashish   | MicroSoft                         |
| 17:15-17:30  | ThCT2.3                           |
| <i>Self-Specialization of General Robot Plans Based on Experience.</i>                       |                                   |
| Koralewski, Sebastian  | University of Bremen              |
| Kazhoyan, Gayane   | University of Bremen              |
| Beetz, Michael   | University of Bremen              |
| 17:30-17:45  | ThCT2.4                           |
| <i>Hierarchical Reinforcement Learning for Quadruped Locomotion.</i>                         |                                   |
| Jain, Deepali  | Robotics at Google                |
| Iscen, Atil  | Google                            |
| Caluwaerts, Ken  | Google                            |
| 17:45-18:00  | ThCT2.5                           |
| <i>Learning Safe Unlabeled Multi-Robot Planning with Motion Constraints.</i>                 |                                   |
| Khan, Arbaaz   | University of Pennsylvania        |
| Zhang, Chi   | University of Pennsylvania        |
| Li, Shuo   | University of Pennsylvania        |
| Wu, Jiayue   | University of Pennsylvania        |
| Schlotfeldt, Brent   | University of Pennsylvania        |
| Tang, Sarah  | University of Pennsylvania        |
| Ribeiro, Alejandro   | University of Pennsylvania        |
| Bastani, Osbert  | University of Pennsylvania        |
| Kumar, Vijay   | University of Pennsylvania        |
| 18:00-18:15  | ThCT2.6                           |
| <i>Dynamic Input for Deep Reinforcement Learning in Autonomous Driving.</i>                  |                                   |
| Huegle, Maria  | University of Freiburg            |
| Kalweit, Gabriel   | University of Freiburg            |
| Mirchevska, Branka   | BMW Group                         |
| Werling, Moritz  | Karlsruhe Institute of Technology |
| Boedecker, Joschka   | University of Freiburg            |

| ThCT3   | L1-R3   |
|---|---|
| <b>Physical Human-Robot Interaction III (Regular session)</b>   |   |
| Chair: He, Wei  | Univ. of Science and Technology Beijing                   |
| Co-Chair: Rozo, Leonel  | Bosch Center for Artificial Intelligence                  |
| 16:45-17:00   | ThCT3.1   |
| <i>Adaptive Neural Admittance Control for Collision Avoidance in Human-Robot Collaborative Tasks.</i>                           |   |
| Yu, Xinbo   | Univ. of Science and Technology Beijing                   |
| He, Wei   | Univ. of Science and Technology Beijing                   |
| Xue, Chengqian  | Univ. of Science and Technology Beijing                   |
| Li, Bin   | Univ. of Science and Technology Beijing                   |
| Cheng, Long   | Chinese Academy of Sciences                               |
| Yang, Chenguang   | University of the West of England                         |
| 17:00-17:15   | ThCT3.2   |
| <i>Safe Physical HRI: Toward a Unified Treatment of Speed and Separation Monitoring Together with Power and Force Limiting.</i> |   |
| Svarny, Petr  | Czech Technical University in Prague, FEE                 |
| Tesař, Michael  | Czech Inst. of Informatics, Robotics and Cybernetics, CTU |
| Behrens, Jan Kristof  | Czech Inst. of Informatics, Robotics and Cybernetics, CTU |
| Hoffmann, Matej   | Czech Technical University in Prague                      |
| 17:15-17:30   | ThCT3.3   |
| <i>An Evaluation of Robot-To-Human Handover Configurations for Commercial Robots.</i>   |   |
| Rasch, Robin  | Bielefeld University of Applied Sciences                  |
| Wachsmuth, Sven   | Bielefeld University                                      |
| König, Matthias   | Bielefeld University of Applied Sciences                  |
| 17:30-17:45   | ThCT3.4   |
| <i>Interactive Trajectory Adaptation through Force-Guided Bayesian Optimization.</i>  |   |
| Roza, Leonel  | Bosch Center for Artificial Intelligence                  |
| 17:45-18:00   | ThCT3.5   |
| <i>Collision Detection and Isolation on a Robot Using Joint Torque Sensing.</i>   |   |
| Bimbo, Joao   | Istituto Italiano Di Tecnologia                           |
| Pacchierotti, Claudio   | Centre National De La Recherche Scientifique (CNRS)       |
| Tsagarakis, Nikos   | Istituto Italiano Di Tecnologia                           |
| Prattichizzo, Domenico  | Università Di Siena                                       |

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| <b>ThCT4</b>   | <b>L1-R4</b>                               |
| <b>Compliant Structures (Regular session)</b>  |  |
| Chair: Oh, Sehoon  | Daegu Gyeongbuk Inst. of Sci. and Tech.    |
| Co-Chair: Aktas, Buse  | Harvard University                         |
| 16:45-17:00  | ThCT4.1                                    |
| <i>Relaxing the Conservatism of Passivity Condition for Impedance Controlled Series Elastic Actuators.</i>       |  |
| Lee, Hyunwook  | DGIST                                      |
| Lee, Jinoh   | Fondazione Istituto Italiano Di Tecnologia |
| Ryu, Jee-Hwan  | Korea Univ. of Tech. and Education         |
| Oh, Sehoon   | Daegu Gyeongbuk Inst. of Sci. and Tech.    |
| 17:00-17:15  | ThCT4.2                                    |
| <i>Flexure Mechanisms with Variable Stiffness and Damping Using Layer Jamming.</i>                               |  |
| Aktas, Buse  | Harvard University                         |
| Howe, Robert D.  | Harvard University                         |
| 17:15-17:30  | ThCT4.3                                    |
| <i>Six DoF Pose Estimation for a Tendon-Driven Continuum Mechanism without a Deformation Model.</i>              |  |
| Deutschmann, Bastian   | German Aerospace Center                    |
| Chalon, Maxime   | German Aerospace Center (DLR)              |
| Reinecke, Jens   | DLR  |
| Maier, Maximilian  | German Aerospace Center                    |
| Ott, Christian   | German Aerospace Center (DLR)              |
| 17:30-17:45  | ThCT4.4                                    |
| <i>Employing Magnets to Improve the Force Exertion Capabilities of Adaptive Robot Hands in Precision Grasps.</i> |  |
| Gerez, Lucas   | The University of Auckland                 |
| Gao, Geng  | The University of Auckland                 |
| Liarokapis, Minas  | The University of Auckland                 |
| 17:45-18:00  | ThCT4.5                                    |
| <i>Theoretical Foundation for Design of Friction-Tunable Soft Finger with Wrinkle's Morphology.</i>              |  |
| Trinh, Hiep  | Ryukoku University                         |
| Ho, Van  | Japan Adv. Inst. of Science and Technology |
| Shibuya, Koji  | Ryukoku University                         |

| ThCT5   | L1-R5                                      |
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| <b>Optimal Control II (Regular session)</b>   |  |
| Chair: Manchester, Zachary  | Stanford University                        |
| Co-Chair: Park, Hae-Won   | Korea Advanced Inst. of Sci. and Tech      |
| 16:45-17:00   | ThCT5.1                                    |
| <i>Time-Optimal Trajectory Generation for Dynamic Vehicles: A Bilevel Optimization Approach.</i>              |  |
| Tang, Gao   | Duke University                            |
| Sun, Weidong  | Duke University                            |
| Hauser, Kris  | Duke University                            |
| 17:00-17:15   | ThCT5.2                                    |
| <i>Do Intermediate Gaits Matter When Rapidly Accelerating?.</i>   |  |
| Fisher, Callen  | University of Cape Town                    |
| Hubicki, Christian  | Florida State University                   |
| Patel, Amir   | University of Cape Town                    |
| 17:15-17:30   | ThCT5.3                                    |
| <i>QpSWIFT : A Real-Time Sparse Quadratic Program Solver for Robotic Applications.</i>                        |  |
| Pandala, Abhishek   | University of Illinois at Urbana-Champaign |
| Ding, Yanran  | University of Illinois at Urbana-Champaign |
| Park, Hae-Won   | Korea Advanced Inst. of Sci. and Tech      |
| 17:30-17:45   | ThCT5.4                                    |
| <i>Real-Time Quad-Rotor Path Planning Using Convex Optimization and Compound State-Triggered Constraints.</i> |  |
| Szmuk, Michael  | Amazon                                     |
| Malyuta, Danylo   | University of Washington                   |
| Reynolds, Taylor Patrick  | University of Washington                   |
| Mceowen, Margaret Skye  | University of Washington                   |
| Acikmese, Behcet  | University of Washington                   |
| 17:45-18:00   | ThCT5.5                                    |
| <i>ALTRO: A Fast Solver for Constrained Trajectory Optimization.</i>  |  |
| Howell, Taylor  | Stanford University                        |
| Jackson, Brian  | Stanford University                        |
| Manchester, Zachary   | Stanford University                        |



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| <b>ThCT6</b>  | <b>L1-R6</b>                                |
| <b>Model Learning for Control II (Regular session)</b>  |   |
| Chair: Sun, Yu  | University of South Florida                 |
| Co-Chair: Kumon, Makoto   | Kumamoto University                         |
| 16:45-17:00   | ThCT6.1                                     |
| <i>Learning Real-World Robot Policies by Dreaming.</i>  |   |
| Piergiovanni, AJ  | Indiana University                          |
| Wu, Alan  | Indiana University Bloomington              |
| Ryoo, Michael S.  | Indiana University Bloomington              |
| 17:00-17:15   | ThCT6.2                                     |
| <i>Accurate Pouring Using Model Predictive Control Enabled by Recurrent Neural Network.</i>                       |   |
| Chen, Tianze  | University of South Florida                 |
| Huang, Yongqiang  | University of South Florida                 |
| Sun, Yu   | University of South Florida                 |
| 17:15-17:30   | ThCT6.3                                     |
| <i>Dynamic Task Control Method of a Flexible Manipulator Using a Deep Recurrent Neural Network.</i>               |   |
| Kawaharazuka, Kento   | The University of Tokyo                     |
| Ogawa, Toru   | Preferred Networks, Inc                     |
| Nabeshima, Cota   | Preferred Networks, Inc                     |
| 17:30-17:45   | ThCT6.4                                     |
| <i>Analyzing Liquid Pouring Sequences Via Audio-Visual Neural Networks.</i>                                       |   |
| Wilson, Justin  | University of North Carolina at Chapel Hill |
| Sterling, Auston  | University of North Carolina at Chapel Hill |
| Lin, Ming C.  | University of North Carolina                |
| 17:45-18:00   | ThCT6.5                                     |
| <i>Aerodynamic Model Identification of a Quadrotor Subject to Rotor Failures in the High-Speed Flight Regime.</i> |   |
| Sun, Sihao  | Delft University of Technology              |
| de Visser, Coen   | Delft University of Technology              |
| 18:00-18:15   | ThCT6.6                                     |
| <i>Deep Lagrangian Networks for End-To-End Learning of Energy-Based Control for Under-Actuated Systems.</i>       |   |
| Lutter, Michael   | Technische Universität Darmstadt            |
| Listmann, Kim Daniel  | ABB AG                                      |
| Peters, Jan   | Technische Universität Darmstadt            |

| ThCT7   | L1-R7  |
|---|--|
| <b>Vision-Based Navigation II</b> (Regular session)   |  |
| Chair: Indelman, Vadim  | Technion - Israel Institute of Technology      |
| Co-Chair: Yang, Yezhou  | Arizona State University                       |
| 16:45-17:00   | ThCT7.1  |
| <i>GAPLE: Generalizable Approaching Policy LEarning for Robotic Object Searching in Indoor Environment.</i> |  |
| Ye, Xin   | Arizona State University                       |
| Lin, Zhe  | Adobe Systems, Inc                             |
| Lee, Joon-Young   | Adobe Research                                 |
| Zhang, Jianming   | Adobe Inc                                      |
| Zheng, Shibin   | Arizona State University                       |
| Yang, Yezhou  | Arizona State University                       |
| 17:00-17:15   | ThCT7.2  |
| <i>Deep Visual MPC-Policy Learning for Navigation.</i>  |  |
| Hirose, Noriaki   | Stanford University                            |
| Xia, Fei  | Stanford University                            |
| Martin-Martín, Roberto  | Stanford University                            |
| Sadeghian, Amir   | Stanford University                            |
| Savarese, Silvio  | Stanford University                            |
| 17:15-17:30   | ThCT7.3  |
| <i>Data Association Aware Semantic Mapping and Localization Via a Viewpoint-Dependent Classifier Model.</i> |  |
| Tchuiev, Vladimir   | Technion - Israel Institute of Technology      |
| Feldman, Yuri   | Technion                                       |
| Indelman, Vadim   | Technion - Israel Institute of Technology      |
| 17:30-17:45   | ThCT7.4  |
| <i>A GPS-Aided Omnidirectional Visual-Inertial State Estimator in Ubiquitous Environments.</i>              |  |
| Yu, Yang  | Hong Kong Univ. of Science and Technology      |
| Gao, Wenliang   | Hong Kong Univ. of Science and Technology      |
| Liu, Chengju  | Tongji University                              |
| Shen, Shaojie   | Hong Kong Univ. of Science and Technology      |
| Liu, Ming   | Hong Kong Univ. of Science and Technology      |
| 17:45-18:00   | ThCT7.5  |
| <i>Gaze Training by Modulated Dropout Improves Imitation Learning.</i>                                      |  |
| Chen, Yuying  | Hong Kong Univ. of Science and Technology      |
| Liu, Congcong   | Hong Kong Univ. of Science and Technology      |
| Tai, Lei  | Hong Kong Univ. of Science and Technology      |
| Liu, Ming   | Hong Kong Univ. of Science and Technology      |
| Shi, Bertram Emil   | Hong Kong Univ. of Science and Technology      |
| 18:00-18:15   | ThCT7.6  |
| <i>LiDAR-Flow: Dense Scene Flow Estimation from Sparse LiDAR and Stereo Images.</i>                         |  |
| Batraway, Ramy  | DFKI   |
| Schuster, René  | DFKI   |
| Wasenmüller, Oliver   | German Res. Center for Artificial Intelligence |
| Rao, Qing   | BMW AG   |
| Stricker, Didier  | German Res. Center for Artificial Intelligence |

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| <b>ThCT8</b>  | <b>LG-R8</b>                              |
| <b>Control and Programming (Regular session)</b>  |   |
| Chair: Kroeger, Torsten   | Karlsruhe Institute of Technology         |
| Co-Chair: Wang, Yu-Ping   | Tsinghua University                       |
| 16:45-17:00   | ThCT8.1                                   |
| <i>Toward Achieving Formal Guarantees for Human-Aware Controllers in Human-Robot Interaction.</i>     |   |
| Schlossman, Rachel  | University of Texas at Austin             |
| Kim, MinKyu   | Korea Institute of Science and Technology |
| Topcu, Ufuk   | The University of Texas at Austin         |
| Sentis, Luis  | The University of Texas at Austin         |
| 17:00-17:15   | ThCT8.2                                   |
| <i>Robot-Based Machining of Unmodeled Objects Via Feature Detection in Dense Point Clouds.</i>        |   |
| Hartmann, Dennis  | Karlsruhe Institute of Technology         |
| Mende, Michael  | Karlsruhe Institute of Technology         |
| Stogl, Denis  | Karlsruhe Institute of Technology         |
| Hein, Björn   | Karlsruhe University of Applied Science   |
| Kroeger, Torsten  | Karlsruhe Institute of Technology         |
| 17:15-17:30   | ThCT8.3                                   |
| <i>MPERL : Hardware and Software Co-Design for Robotic Manipulators.</i>                              |   |
| Pirron, Marcus  | MPI-SWS                                   |
| Zufferey, Damien  | MPI-SWS                                   |
| 17:30-17:45   | ThCT8.4                                   |
| <i>Arguing Security of Autonomous Robots.</i>   |   |
| Hochgeschwender, Nico   | German Aerospace Center (DLR)             |
| Cornelius, Gary   | University of Luxembourg                  |
| Voos, Holger  | University of Luxembourg                  |
| 17:45-18:00   | ThCT8.5                                   |
| <i>MuSe: Multi-Sensor Integration Strategies Applied to Sequential Monte Carlo Methods.</i>           |   |
| Hanten, Richard   | University of Tübingen                    |
| Schulz, Cornelia  | University of Tübingen                    |
| Zwiener, Adrian   | University of Tübingen                    |
| Zell, Andreas   | University of Tübingen                    |
| 18:00-18:15   | ThCT8.6                                   |
| <i>TZC: Efficient Inter-Process Communication for Robotics Middleware with Partial Serialization.</i> |   |
| Wang, Yu-Ping   | Tsinghua University                       |
| Tan, Wende  | Tsinghua University                       |
| Hu, Xu-Qiang  | Tsinghua University                       |
| Manocha, Dinesh   | University of Maryland                    |
| Hu, Shi-Min   | Tsinghua University                       |

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| <b>ThCT9</b>   | <b>LG-R9</b>                                |
| <b>Cognitive Human-Robot Interaction III (Regular session)</b>   |   |
| Chair: Alami, Rachid   | CNRS  |
| Co-Chair: Muradore, Riccardo   | University of Verona                        |
| <b>16:45-17:00</b>   | <b>ThCT9.1</b>                              |
| <i>Situation Awareness for Proactive Robots in HRI.</i>  |   |
| Hewa Pelendage, Chapa Sirithunge   | University of Moratuwa                      |
| Bandara, Ravindu   | University of Moratuwa                      |
| Jayasekara, A.G.B.P.   | University of Moratuwa                      |
| Dedduwa Pathirana, Chandima  | University of Moratuwa                      |
| <b>17:00-17:15</b>   | <b>ThCT9.2</b>                              |
| <i>Older People Prefrontal Cortex Activation Estimates Their Perceived Difficulty of a Humanoid-Mediated Conversation.</i>             |   |
| Keshmiri, Soheil   | Adv. Telecommunications Res. Inst.          |
| Sumioka, Hidenobu  | Adv. Telecommunications Res. Inst.          |
| Yamazaki, Ryuji  | Adv. Telecommunications Res. Inst.          |
| Ishiguro, Hiroshi  | Osaka University                            |
| <b>17:15-17:30</b>   | <b>ThCT9.3</b>                              |
| <i>Cognitive Robotic Architecture for Semi-Autonomous Execution of Manipulation Tasks in a Surgical Environment.</i>                   |   |
| De Rossi, Giacomo  | University of Verona                        |
| Minelli, Marco   | University of Modena and Reggio Emilia      |
| Sozzi, Alessio   | University of Ferrara                       |
| Piccinelli, Nicola   | University of Verona                        |
| Ferraguti, Federica  | Univ. Degli Studi Di Modena E Reggio Emilia |
| Setti, Francesco   | University of Verona                        |
| Bonfe, Marcello  | University of Ferrara                       |
| Secchi, Cristian   | Univ. of Modena & Reggio Emilia             |
| Muradore, Riccardo   | University of Verona                        |
| <b>17:30-17:45</b>   | <b>ThCT9.4</b>                              |
| <i>Simulation-Based Physics Reasoning for Consistent Scene Estimation in an HRI Context.</i>   |   |
| Sallami, Yoan  | LAAS-CNRS                                   |
| Lemaignan, Séverin   | University of the West of England           |
| Clodic, Aurélie  | LAAS-CNRS                                   |
| Alami, Rachid  | CNRS  |
| <b>17:45-18:00</b>   | <b>ThCT9.5</b>                              |
| <i>Decoding the Perceived Difficulty of Communicated Contents by Older People: Toward Conversational Robot-Assistive Elderly Care.</i> |   |
| Keshmiri, Soheil   | Adv. Telecommunications Res. Inst.          |
| Sumioka, Hidenobu  | Adv. Telecommunications Res. Inst.          |
| Yamazaki, Ryuji  | Adv. Telecommunications Res. Inst.          |
| Ishiguro, Hiroshi  | Osaka University                            |
| <b>18:00-18:15</b>   | <b>ThCT9.6</b>                              |
| <i>Map Based Human Motion Prediction for People Tracking.</i>  |   |
| Beck, Florian  | Vienna University of Technology             |
| Bader, Markus  | Vienna University of Technology             |

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| <b>ThCT10</b>  | LG-R10                                |
| <b>Mapping II (Regular session)</b>  |                                       |
| Chair: Stachniss, Cyrill   | University of Bonn                    |
| Co-Chair: Munich, Mario Enrique  | IRobot                                |
| 16:45-17:00  | ThCT10.1                              |
| <i>ReFusion: 3D Reconstruction in Dynamic Environments for RGB-D Cameras Exploiting Residuals.</i> |                                       |
| Palazzolo, Emanuele  | University of Bonn                    |
| Behley, Jens   | University of Bonn                    |
| Lottes, Philipp  | University of Bonn                    |
| Giguère, Philippe  | Université Laval                      |
| Stachniss, Cyrill  | University of Bonn                    |
| 17:00-17:15  | ThCT10.2                              |
| <i>GPU Accelerated Robust Scene Reconstruction.</i>  |                                       |
| Dong, Wei  | Carnegie Mellon University            |
| Park, Jaesik   | POSTECH                               |
| Yang, Yi   | Carnegie Mellon University            |
| Kaess, Michael   | Carnegie Mellon University            |
| 17:15-17:30  | ThCT10.3                              |
| <i>View Management for Lifelong Visual Maps.</i>   |                                       |
| Banerjee, Nandan   | IRobot Corporation                    |
| Connolly, Ryan   | Duke University                       |
| Lisin, Dimitri   | IRobot                                |
| Briggs, Jimmy  | IRobot                                |
| Munich, Mario Enrique  | IRobot                                |
| 17:30-17:45  | ThCT10.4                              |
| <i>Online and Consistent Occupancy Grid Mapping for Planning in Unknown Environments.</i>          |                                       |
| Sodhi, Paloma  | Carnegie Mellon University            |
| Ho, Bing-Jui   | Carnegie Mellon University            |
| Kaess, Michael   | Carnegie Mellon University            |
| 17:45-18:00  | ThCT10.5                              |
| <i>Information Filter Occupancy Mapping Using Decomposable Radial Kernels.</i>                     |                                       |
| Guo, Siwei   | University of California, San Diego   |
| Atanasov, Nikolay  | University of California, San Diego   |
| 18:00-18:15  | ThCT10.6                              |
| <i>TerrainFusion: Real-Time Digital Surface Model Reconstruction Based on Monocular SLAM.</i>      |                                       |
| Wang, Wei  | Northwestern Polytechnical University |
| Zhao, Yong   | Northwestern Polytechnical University |
| Han, Pengcheng   | Northwestern Polytechnical University |
| Zhao, Pengcheng  | Northwestern Polytechnical University |
| Bu, Shuhui   | Northwestern Polytechnical University |

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| <b>ThCT11</b>   | LG-R11                                       |
| <b>Medical Robot: Vision</b> (Regular session)  |  |
| Chair: Guo, Yao   | Imperial College London                      |
| Co-Chair: Li, Zheng   | The Chinese University of Hong Kong          |
| 16:45-17:00   | ThCT11.1                                     |
| <i>Robust Non-Rigid Point Set Registration Algorithm Considering Anisotropic Uncertainties Based on Coherent Point Drift.</i> |  |
| Min, Zhe  | The Chinese University of Hong Kong          |
| Jin, Pan  | The Chinese University of Hong Kong          |
| Zhang, Ang  | The Chinese University of Hong Kong          |
| Meng, Max Q.-H.   | The Chinese University of Hong Kong          |
| 17:00-17:15   | ThCT11.2                                     |
| <i>Multicamera 3D Reconstruction of Dynamic Surgical Cavities: Non-Rigid Registration and Point Classification.</i>           |  |
| Su, Yun-Hsuan   | University of Washington                     |
| Huang, Kevin  | Trinity College                              |
| Hannaford, Blake  | University of Washington                     |
| 17:15-17:30   | ThCT11.3                                     |
| <i>Shared Autonomy of a Flexible Manipulator in Constrained Endoluminal Surgical Tasks.</i>                                   |  |
| Ma, Xin   | The Chinese University of Hong Kong          |
| Wang, Peng  | The Chinese University of Hong Kong          |
| Ye, MinXin  | The Chinese University of Hong Kong          |
| Chiu, Wai Yan Philip  | The Chinese University of Hong Kong          |
| Li, Zheng   | The Chinese University of Hong Kong          |
| 17:30-17:45   | ThCT11.4                                     |
| <i>Deep Learning Based Robotic Tool Detection and Articulation Estimation with Spatio-Temporal Layers.</i>                    |  |
| Colleoni, Emanuele  | Politecnico Di Milano                        |
| Moccia, Sara  | Università Politecnica Delle Marche          |
| Du, Xiaofei   | University College London                    |
| De Momi, Elena  | Politecnico Di Milano                        |
| Stoyanov, Danail  | University College London                    |
| 17:45-18:00   | ThCT11.5                                     |
| <i>Vision-Based Virtual Fixtures Generation for Robotic-Assisted Polyp Dissection Procedures.</i>                             |  |
| Moccia, Rocco   | Università Degli Studi Di Napoli Federico II |
| Selvaggio, Mario  | Università Degli Studi Di Napoli Federico II |
| Villani, Luigi  | Univ. Napoli Federico II                     |
| Siciliano, Bruno  | Univ. Napoli Federico II                     |
| Ficuciello, Fanny   | Università Di Napoli Federico II             |
| 18:00-18:15   | ThCT11.6                                     |
| <i>Unsupervised Task Segmentation Approach for Bimanual Surgical Tasks Using Spatiotemporal and Variance Properties.</i>      |  |
| Tsai, Ya-Yen  | Imperial College London                      |
| Guo, Yao  | Imperial College London                      |
| Yang, Guang-Zhong   | Imperial College London                      |

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| <b>ThCT12</b>   | LG-R12                                   |
| <b>Force and Tactile Sensing II (Regular session)</b>   |  |
| Chair: Sferrazza, Carmelo   | ETH Zurich                               |
| Co-Chair: Cheng, Gordon   | Technical University of Munich           |
| 16:45-17:00   | ThCT12.1                                 |
| <i>Pressure-Driven Body Compliance Using Robot Skin.</i>  |  |
| Guadarrama-Olvera, Julio Rogelio  | Technical University of Munich           |
| Dean-Leon, Emmanuel   | Technical University of Munich           |
| Bergner, Florian  | Technical University of Munich           |
| Cheng, Gordon   | Technical University of Munich           |
| 17:00-17:15   | ThCT12.2                                 |
| <i>Tactile-Based Insertion for Dense Box-Packing.</i>   |  |
| Dong, Siyuan  | Massachusetts Institute of Technology    |
| Rodriguez, Alberto  | Massachusetts Institute of Technology    |
| 17:15-17:30   | ThCT12.3                                 |
| <i>Transfer Learning for Vision-Based Tactile Sensing.</i>  |  |
| Sferrazza, Carmelo  | ETH Zurich                               |
| D'Andrea, Raffaello   | ETHZ                                     |
| 17:30-17:45   | ThCT12.4                                 |
| <i>Bi-Modal Hemispherical Sensor: A Unifying Solution for Three Axis Force and Contact Angle Measurement.</i> |  |
| Chuah, Meng Yee (Michael)   | Agency for Sci., Tech. and Res. (A*STAR) |
| Epstein, Lindsay  | Massachusetts Institute of Technology    |
| Kim, Donghyun   | Massachusetts Institute of Technology    |
| Romero, Juan  | University of California, Berkeley       |
| Kim, Sangbae  | Massachusetts Institute of Technology    |
| 17:45-18:00   | ThCT12.5                                 |
| <i>A 2-Piece Six-Axis Force/torque Sensor Capable of Measuring Loads Applied to Tools of Complex Shapes.</i>  |  |
| Noh, Yohan  | Brunel University London                 |
| Lindenroth, Lukas   | King's College London                    |
| Wang, Shuangyi  | King's College London                    |
| Housden, Richard James  | King's College London                    |
| van Wingerden, Anne-Sophie  | Williams College                         |
| Li, Wanlin  | Queen Mary University of London          |
| Rhode, Kawal  | King's College London                    |
| 18:00-18:15   | ThCT12.6                                 |
| <i>Evaluation of a Large-Scale Event-Driven Robot Skin.</i>   |  |
| Bergner, Florian  | Technical University of Munich           |
| Dean-Leon, Emmanuel   | Technical University of Munich           |
| Guadarrama-Olvera, Julio Rogelio  | Technical University of Munich           |
| Cheng, Gordon   | Technical University of Munich           |

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| <b>ThCT13</b>  | <b>LG-R13</b>                                    |
| <b>Industrial Robots &amp; Actuators (Regular session)</b>   |  |
| Chair: Harada, Kensuke   | Osaka University                                 |
| Co-Chair: Carmichael, Marc   | Centre for Autonomous Systems                    |
| <b>16:45-17:00</b>   | <b>ThCT13.1</b>                                  |
| <i>Learning Based Robotic Bin-Picking for Potentially Tangled Objects.</i>   |  |
| Matsumura, Ryo   | Osaka University                                 |
| Domae, Yukiyasu  | National Inst. of Adv. Industrial Sci. and Tech. |
| Wan, Weiwei  | Osaka University                                 |
| Harada, Kensuke  | Osaka University                                 |
| <b>17:00-17:15</b>   | <b>ThCT13.2</b>                                  |
| <i>An Efficient Scheduling Algorithm for Multi-Robot Task Allocation in Assembling Aircraft Structures.</i>          |  |
| Tereshchuk, Veniamin   | University of Washington                         |
| Stewart, John  | University of Washington                         |
| Bykov, Nikolay   | University of Washington                         |
| Pedigo, Samuel   | The Boeing Company                               |
| Devasia, Santosh   | University of Washington                         |
| Banerjee, Ashis  | University of Washington                         |
| <b>17:15-17:30</b>   | <b>ThCT13.3</b>                                  |
| <i>Design of a Growing Robot Inspired by Plant Growth.</i>   |  |
| Yan, Tongxi  | Massachusetts Institute of Technology            |
| Teshigawara, Seiichi   | Massachusetts Institute of Technology            |
| Asada, Harry   | Massachusetts Institute of Technology            |
| <b>17:30-17:45</b>   | <b>ThCT13.4</b>                                  |
| <i>DISR: Deep Infrared Spectral Restoration Algorithm for Robot Sensing and Intelligent Visual Tracking Systems.</i> |  |
| Liu, Hai   | City University of Hong Kong                     |
| Li, You-Fu   | City University of Hong Kong                     |
| Su, Dan  | City University of Hong Kong                     |
| Zhang, Zhaoli  | Central China Normal University                  |
| Liu, Sannyuya  | Central China Normal University                  |
| Liu, Tingting  | City University of Hong Kong                     |
| <b>17:45-18:00</b>   | <b>ThCT13.5</b>                                  |
| <i>Empirical Characterization of a High-Performance Exterior-Rotor Type Brushless DC Motor and Drive.</i>            |  |
| Lee, Ung Hee   | University of Michigan                           |
| Pan, Chien-Wen   | Arizona State University                         |
| Rouse, Elliott   | University of Michigan                           |
| <b>18:00-18:15</b>   | <b>ThCT13.6</b>                                  |
| <i>The ANBOT: An Intelligent Robotic Co-Worker for Industrial Abrasive Blasting.</i>                                 |  |
| Carmichael, Marc   | Centre for Autonomous Systems                    |
| Aldini, Stefano  | University of Technology Sydney                  |
| Khonasty, Richardo   | Centre for Autonomous Systems                    |
| Tran, Antony   | University of Technology Sydney                  |
| Reeks, Christian   | University of Technology Sydney                  |
| Liu, Dikai   | University of Technology Sydney                  |
| Waldron, Kenneth John  | Stanford University                              |
| Dissanayake, Gamini  | University of Technology Sydney                  |



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| <b>ThCT14</b>   | LG-R14                                |
| <b>Marine Robots III (Regular session)</b>  |                                       |
| Chair: Kaess, Michael   | Carnegie Mellon University            |
| Co-Chair: Quattrini Li, Alberto   | Dartmouth College                     |
| 16:45-17:00   | ThCT14.1                              |
| <i>A Generative Model of Underwater Images for Active Landmark Detection and Docking.</i>                               |                                       |
| Liu, Shuang   | Shenyang Institute of Automation, CAS |
| Ozay, Mete  | Tohoku University                     |
| Xu, Hongli  | Shenyang Institute of Automation, CAS |
| Lin, Yang   | Shenyang Institute of Automation, CAS |
| Okatani, Takayuki   | Tohoku University                     |
| 17:00-17:15   | ThCT14.2                              |
| <i>ElevateNet: A Convolutional Neural Network for Estimating the Missing Dimension in 2D Underwater Sonar Images.</i>   |                                       |
| DeBortoli, Robert   | Oregon State University               |
| Li, Fuxin   | Oregon State University               |
| Hollinger, Geoffrey   | Oregon State University               |
| 17:15-17:30   | ThCT14.3                              |
| <i>Towards an Open-Source Micro Robot Oceanarium: A Low-Cost, Modular, and Mobile Underwater Motion-Capture System.</i> |                                       |
| Duecker, Daniel Andre   | Hamburg University of Technology      |
| Eusemann, Kevin   | Hamburg University of Technology      |
| Kreuzer, Edwin  | Hamburg University of Technology      |
| 17:30-17:45   | ThCT14.4                              |
| <i>Contour Based Reconstruction of Underwater Structures Using Sonar, Visual, Inertial, and Depth Sensor.</i>           |                                       |
| Rahman, Sharmin   | University of South Carolina          |
| Quattrini Li, Alberto   | Dartmouth College                     |
| Rekleitis, Ioannis  | University of South Carolina          |
| 17:45-18:00   | ThCT14.5                              |
| <i>Dense, Sonar-Based Reconstruction of Underwater Scenes.</i>  |                                       |
| Vaz Teixeira, Pedro   | Massachusetts Institute of Technology |
| Fourie, Dehann  | MIT and Woods Hole Oceanograph        |
| Kaess, Michael  | Carnegie Mellon University            |
| Leonard, John   | Massachusetts Institute of Technology |
| 18:00-18:15   | ThCT14.6                              |
| <i>Wide Aperture Imaging Sonar Reconstruction Using Generative Models.</i>  |                                       |
| Westman, Eric   | Carnegie Mellon University            |
| Kaess, Michael  | Carnegie Mellon University            |

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| <b>ThCT15</b>   | LG-R15                             |
| <b>Collision Avoidance II (Regular session)</b>   |                                    |
| Chair: Burschka, Darius   | Technical University of Munich     |
| Co-Chair: Kim, Young J.   | Ewha Womans University             |
| 16:45-17:00   | ThCT15.1                           |
| <i>StarNet: Pedestrian Trajectory Prediction Using Deep Neural Network in Star Topology.</i>      |                                    |
| Zhu, Yanliang   | Meituan-Dianping                   |
| Qian, Deheng  | MeiTuan                            |
| Ren, Dongchun   | Meituan-Dianping                   |
| Xia, Huaxia   | Meituan-Dianping                   |
| 17:00-17:15   | ThCT15.2                           |
| <i>Forecasting Time-To-Collision from Monocular Video: Feasibility, Dataset, and Challenges.</i>  |                                    |
| Manglik, Aashi  | Carnegie Mellon University         |
| Weng, Xinshuo   | Carnegie Mellon University         |
| Ohn-Bar, Eshed  | Carnegie Mellon University         |
| Kitani, Kris  | Carnegie Mellon University         |
| 17:15-17:30   | ThCT15.3                           |
| <i>An Adaptive Velocity Obstacle Avoidance Algorithm for Autonomous Surface Vehicles.</i>         |                                    |
| Campos, Daniel Filipe Barros  | INESC-TEC                          |
| Matos, Anibal   | University of Porto, and INESC TEC |
| Pinto, Andry  | University of Porto                |
| 17:30-17:45   | ThCT15.4                           |
| <i>Continuous Collision Detection for a Robotic Arm Mounted on a Cable-Driven Parallel Robot.</i> |                                    |
| Bury, Diane   | Tecnalia France                    |
| Izard, Jean-Baptiste  | Tecnalia France                    |
| Gouttefarde, Marc   | CNRS                               |
| Lamiriaux, Florent  | CNRS                               |
| 17:45-18:00   | ThCT15.5                           |
| <i>Spatiotemporal Representation of Dynamic Scenes.</i>   |                                    |
| Burschka, Darius  | Technical University of Munich     |
| 18:00-18:15   | ThCT15.6                           |
| <i>A Penetration Metric for Deforming Tetrahedra Using Object Norm.</i>                           |                                    |
| Kim, Jisu   | Ewha Womans University             |
| Kim, Young J.   | Ewha Womans University             |

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| <b>ThCT16</b>  | <b>LG-R16</b>                                       |
| <b>Haptics and Haptic Interfaces (Regular session)</b>   |   |
| Chair: Weber, Bernhard   | German Aerospace Center                             |
| Co-Chair: Shen, Yantao   | University of Nevada, Reno                          |
| 16:45-17:00  | ThCT16.1  |
| <i>Sequential Clustering for Tactile Image Compression to Enable Direct Adaptive Feedback.</i>                             |   |
| Geier, Andreas   | Waseda University                                   |
| Yan, Gang  | Waseda University                                   |
| Tomo, Tito Pradhono  | Waseda University                                   |
| Ogasa, Shun  | Waseda University                                   |
| Somlor, Sophon   | Waseda University                                   |
| Schmitz, Alexander   | Waseda University                                   |
| Sugano, Shigeki  | Waseda University                                   |
| 17:00-17:15  | ThCT16.2  |
| <i>A Testbed for Haptic and Magnetic Resonance Imaging-Guided Percutaneous Needle Biopsy.</i>                              |   |
| Mendoza, Evelyn  | Northeastern University                             |
| Whitney, John Peter  | Northeastern University                             |
| 17:15-17:30  | ThCT16.3  |
| <i>Dynamic Spatiotemporal Pattern Identification and Analysis Using a Fingertip-Based Electro-Tactile Display Array.</i>   |   |
| Rahimi, Mehdi  | University of Nevada, Reno                          |
| Jiang, Fang  | University of Nevada, Reno                          |
| Ye, Cang   | Virginia Commonwealth University                    |
| Shen, Yantao   | University of Nevada, Reno                          |
| 17:30-17:45  | ThCT16.4  |
| <i>Generating an Image of an Object's Appearance from Somatosensory Information During Haptic Exploration.</i>             |   |
| Sekiya, Kento  | The University of Tokyo                             |
| Ohmura, Yoshiyuki  | The University of Tokyo                             |
| Kuniyoshi, Yasuo   | The University of Tokyo                             |
| 17:45-18:00  | ThCT16.5  |
| <i>Teleoperating Robots from the International Space Station: Microgravity Effects on Performance with Force Feedback.</i> |   |
| Weber, Bernhard  | German Aerospace Center                             |
| Balachandran, Ribin  | DLR   |
| Riecke, Cornelia   | German Aerospace Center (DLR)                       |
| Stulp, Freek   | DLR - Deutsches Zentrum Für Luft Und Raumfahrt E.V  |
| Stelzer, Martin  | German Aerospace Center (DLR)                       |
| 18:00-18:15  | ThCT16.6  |
| <i>Haptic Shared-Control Methods for Robotic Cutting under Nonholonomic Constraints.</i>                                   |   |
| Rahal, Rahaf   | Univ Rennes, Inria, CNRS, IRISA                     |
| Abi-Farraj, Firas  | CNRS-Irisa  |
| Robuffo Giordano, Paolo  | Centre National De La Recherche Scientifique (CNRS) |
| Pacchierotti, Claudio  | Centre National De La Recherche Scientifique (CNRS) |

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| <b>ThCT17</b>   | <b>LG-R17</b>   |
| <b>Prosthetics and Exoskeletons II (Regular session)</b>  |   |
| Chair: Asfour, Tamim  | Karlsruhe Institute of Technology                         |
| Co-Chair: Chen, Fei   | Istituto Italiano Di Tecnologia                           |
| 16:45-17:00   | ThCT17.1  |
| <i>BP Neural Network Based On-Board Training for Real-Time Locomotion Mode Recognition in Robotic Transtibial Prostheses.</i> |   |
| Xu, Dongfang  | Peking University   |
| Wang, Qining  | Peking University   |
| 17:00-17:15   | ThCT17.2  |
| <i>Minimal Sensor Setup in Lower Limb Exoskeletons for Motion Classification Based on Multi-Modal Sensor Data.</i>            |   |
| Patzner, Isabel   | Karlsruhe Institute of Technology                         |
| Asfour, Tamim   | Karlsruhe Institute of Technology                         |
| 17:15-17:30   | ThCT17.3  |
| <i>Delayed Output Feedback Control for Gait Assistance and Resistance Using a Robotic Exoskeleton.</i>                        |   |
| Lim, Bokman   | Samsung Electronics Co., Ltd                              |
| Jang, Junwon  | Samsung Electronics Co., Ltd                              |
| Lee, Jusuk  | Samsung Electronics Co., Ltd                              |
| Choi, Byungjune   | Samsung Advanced Institute of Technology                  |
| Lee, Younbaek   | Samsung Electronics Co., Ltd                              |
| Shim, Youngbo   | Mechatronics and Manufacturing Tech. Center, Samsung Elec |
| 17:30-17:45   | ThCT17.4  |
| <i>Design of a Fail-Safe Wearable Robot with Novel Extendable Arms for Ergonomic Accommodation During Floor Work.</i>         |   |
| Hahm, Katie   | Massachusetts Institute of Technology                     |
| Asada, Harry  | MIT   |
| 17:45-18:00   | ThCT17.5  |
| <i>A Unified Active Assistance Control Framework of Hip Exoskeleton for Walking and Balance Assistance.</i>                   |   |
| Qiu, Shiyin   | Harbin Institute of Technology                            |
| Guo, Wei  | Harbin Institute of Technology                            |
| Wang, Pengfei   | Harbin Institute of Technology                            |
| Chen, Fei   | Istituto Italiano Di Tecnologia                           |
| Zha, Fusheng  | Harbin Institute of Technology                            |
| Wang, Xin   | Shenzhen Academy of Aerospace Technology                  |
| Deng, Jing  | Harbin Institute of Technology                            |

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| <b>ThCT18</b>   | LG-R18                                     |
| <b>Multi-Robot Systems III (Regular session)</b>  |  |
| Chair: Williams, Ryan   | Virginia Polytechnic Inst. and State Univ. |
| Co-Chair: Kayacan, Erkan  | University of Queensland                   |
| 16:45-17:00   | ThCT18.1                                   |
| <i>Policy Distillation and Value Matching in Multiagent Reinforcement Learning.</i>   |  |
| Wadhwanja, Samir  | Massachusetts Institute of Technology      |
| Kim, Dong Ki  | Massachusetts Institute of Technology      |
| Omidshafiei, Shayegan   | Massachusetts Institute of Technology      |
| How, Jonathan Patrick   | Massachusetts Institute of Technology      |
| 17:00-17:15   | ThCT18.2                                   |
| <i>A Deep Learning Approach for Probabilistic Security in Multi-Robot Teams.</i>  |  |
| Wehbe, Remy   | Virginia Tech                              |
| Williams, Ryan  | Virginia Polytechnic Inst. and State Univ. |
| 17:15-17:30   | ThCT18.3                                   |
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| Reisenauer, Matthias  | University of Tübingen                     |
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| Cap, Michal   | Czech Technical University in Prague       |
| Mrkos, Jan  | CVUT                                       |
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| Co-Chair: Catalano, Manuel Giuseppe   | Istituto Italiano Di Tecnologia                   |
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| Drumwright, Evan  | Toyota Research Institute                         |
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| Jamone, Lorenzo   | Queen Mary University of London                   |
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| Negrello, Francesca   | Istituto Italiano Di Tecnologia                   |
| Mghames, Sariah   | Università Di Pisa                                |
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| Garabini, Manolo  | Università Di Pisa                                |
| Catalano, Manuel Giuseppe   | Istituto Italiano Di Tecnologia                   |
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| Co-Chair: Zhang, Wenlong  | Arizona State University                         |
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| Taguchi, Yoshitaka  | The University of Tokyo                          |
| Nishikawa, Satoshi  | The University of Tokyo                          |
| Niiyama, Ryuma  | The University of Tokyo                          |
| Kawahara, Yoshihiro   | The University of Tokyo                          |
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| Kodaira, Akio   | Tokyo Institute of Technology                    |
| Horiuchi, Tetsuya   | National Inst. of Adv. Industrial Sci. and Tech. |
| Asaka, Kinji  | National Inst. of Adv. Industrial Sci. and Tech. |
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| Noh, Jiho   | Sungkyunkwan University                          |
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| Beardsley, Paul.....          | WeAT17.1 |    |
| Beck, Florian.....            | WeBT19.4 |    |
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| Beetz, Michael .....          | WeDT5.3  |    |
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| Behera, Laxmidhar .....       | TuAT16.5 |    |
| Behley, Jens.....             | WeCT1.4  |    |
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| Behnke, Sven.....             | TuCT1.1  |    |
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| Behrens, Jan Kristof .....    | ThCT3.2  |    |
| Bejjani, Wissam.....          | ThAT19.3 |    |
| Belfiore, Vincenza .....      | WeDT11.4 |    |
| Belharet, Karim .....         | TuBT17.6 |    |
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| Bellegarda, Guillaume .....        | WeAT3.6  |    |
| Bellicoso, C. Dario .....          | WeCT13.1 |    |
| Belousov, Boris.....               | TuBT5.6  |    |
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| Belpaeme, Tony .....               | TuCT9.6  |    |
| Belter, Dominik .....              | TuPS1.26 |    |
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| Beltran-Gonzalez, Carlos.....      | WeAT7.1  |    |
| Ben Amar, Faiz .....               | WeCT8.5  |    |
| Ben Amor, Henri.....               | WeBT7.4  |    |
| .....                              | WeBT18.4 |    |
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| Ben Miled , Meriem .....           | WeAT14.1 |    |
| Ben-Tzvi, Pinhas .....             | WeAT8    | C  |
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| .....                              | WeCT13.6 |    |
| Benallegue, Mehdi .....            | TuAT13.5 |    |
| .....                              | TuCT13.1 |    |
| Benavente Molinero, Miguel .....   | WeDT11.1 |    |
| Bency, Mayur J. ....               | WeBT15.5 |    |
| Benderius, Ola.....                | WeDT7.5  |    |
| Benenati, Emilio .....             | TuPS1.73 |    |
| Benjamin, Michael .....            | ThBT14.5 |    |
| Benmokhtar, Rachid .....           | WeBT8.6  |    |
| Bennamane, Kamal .....             | TuPS1.62 |    |
| Benz, Philipp .....                | WeDT12.2 |    |
| Bera, Abhraneel .....              | WeAT16.4 |    |
| Bera, Aniket .....                 | TuAT12   | CC |
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| Berenson, Dmitry .....             | ThAT16.3 |    |
| Bergbreiter, Sarah .....           | TuAT17.3 |    |
| Bergeles, Christos .....           | TuCT11   | CC |
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| Berger, Christian .....            | WeDT7.5  |    |
| Berger, Erik.....                  | WeCT2.4  |    |
| Berger, Marie-Odile .....          | WeCT10.6 |    |
| Bergner, Florian .....             | ThCT12.1 |    |
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| Bernardin, Antonin .....           | TuBT14.5 |    |
| Bernardino, Alexandre .....        | WeAT1.4  |    |
| Bernreiter, Lukas.....             | WeCT10   | CC |
| .....                              | WeCT10.3 |    |
| Berrio Perez, Julie Stephany ..... | WePS2.40 |    |
| Berscheid, Lars .....              | TuAT16.1 |    |
| Berthet-Rayne, Pierre .....        | WeAT11.3 |    |
| Beschi, Manuel.....                | TuAT15.6 |    |
| Beul, Marius .....                 | ThBT15.2 |    |
| Beyret, Benjamin .....             | WeDT2.1  |    |
| Bezzo, Nicola .....                | TuBT19   | C  |
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| .....                           | TuBT19   | CC |
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| Bhowmick, Brojeshwar .....      | WeDT8.2  |    |
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| Bicchi, Antonio .....           | WeDT18.6 |    |
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| Bicer, Yunus .....              | WeAT2.3  |    |
| Biggs, Benjamin .....           | ThAT14.4 |    |
| Billing, Erik Alexander .....   | TuCT9.6  |    |
| Billings, Gideon .....          | WeAT7.3  |    |
| Bilsdorfer, Marius .....        | WePS2.35 |    |
| Bimbo, Joao .....               | ThCT3.5  |    |
| Binder, Benjamin .....          | WeBT19.4 |    |
| Bircher, Walter .....           | ThCT19.6 |    |
| Birk, Andreas .....             | ThBT14.4 |    |
| Bisk, Yonatan .....             | TuBT4.2  |    |
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| Blanke, Olaf .....              | ThAT9.4  |    |
| Blasen, Simon .....             | ThAT6.1  |    |
| Bledt, Gerardo .....            | ThAT13.3 |    |
| Bleuler, Hannes .....           | ThAT9.4  |    |
| Bloisi, Domenico .....          | TuBT3.2  |    |
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| Blum, Hermann .....             | TuCT14.3 |    |
| Bo, He .....                    | TuPS1.44 |    |
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| Boedecker, Joschka .....        | ThCT2    | CC |
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| Bogdanovic, Miroslav .....      | WeAT3.5  |    |
| Bogomolov, Pavel .....          | ThAT2.2  |    |
| Bohg, Jeannette .....           | TuBT3.6  |    |
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| Bok, Alice Ji .....             | WeAT11.6 |    |
| Bombieri, Nicola .....          | WeDT10.3 |    |

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| Bonatti, Rogerio .....         | TuAT6.4  |    |
| Bonatti, Rogerio .....         | TuBT6.1  |    |
| Bonfe, Marcello.....           | ThAT3.5  |    |
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| Bonnabel, Silvere .....        | TuCT8.5  |    |
| Bonsignorio, Fabio .....       | MoW-R4.1 |    |
| Booher, Jonathan.....          | TuBT4.5  |    |
| Boots, Byron.....              | TuCT15.5 |    |
| Bopardikar, Shaunak D.....     | TuAT18.5 |    |
| Bore, Nils.....                | ThAT14.6 |    |
| Borghesan, Gianni.....         | TuAT11.3 |    |
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| Bose, Anway.....               | TuAT1.5  |    |
| Boswell, Nigel.....            | WeBT14.6 |    |
| Bothner, Simon Antoni .....    | ThBT11.5 |    |
| Botros, Alexander .....        | TuCT15.1 |    |
| Boudali, A. Mounir .....       | ThBT20.5 |    |
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| Bouganis, Christos-Savvas..... | TuAT2.2  |    |
| Boularias, Abdeslam .....      | ThAT19.5 |    |
| Bouman, Amanda .....           | WeDT6.4  |    |
| Bourgeois, Julien .....        | WeCT18.1 |    |
| Bouri, Mohamed .....           | ThBT4.3  |    |
| Boutteau, Rémi .....           | TuBT1.4  |    |
| Bovcon, Borja .....            | WeBT1.1  |    |
| Bowden, Richard.....           | TuAT1.6  |    |
| Bozcuoglu, Asil Kaan .....     | WeDT12.3 |    |
| Brahmbhatt, Samarth Manoj..... | TuCT16.3 |    |
| Brameri, Alberto .....         | WeBT12.3 |    |
| Brandao, Martim.....           | WeCT15.2 |    |
| Braude, Adam .....             | WeAT14.5 |    |
| Breazeal, Cynthia .....        | WeAT9.1  |    |
| Brecht, Sandra V. ....         | ThAT11.5 |    |
| Bretan, Mason .....            | WeCT16.5 |    |
| Brigato, Lorenzo .....         | TuBT3.2  |    |
| Briggs, Jimmy .....            | ThCT10.3 |    |
| Brink, Kevin .....             | ThAT6.5  |    |
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| Brockers, Roland .....         | WeAT6.3  |    |
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| Brossard, Martin .....         | TuCT8.5  |    |
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| Brox, Thomas .....             | WeDT14.5  |
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| Brusell, Angelica.....         | TuBT14.4  |
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| Bu, Shuhui.....                | ThCT10.6  |
| Bubnova, Valeriya .....        | ThAT2.2   |
| Buchli, Jonas.....             | WeCT5.1   |
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| Buckman, Noam.....             | ThAT8.2   |
| Buettner, Timothee .....       | WeBT20.2  |
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| Buonocore, Luca Rosario .....  | WeDT5.5   |
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| Burger, Patrick .....          | TuAT10.2  |
| Burghardt, Tilo .....          | TuAT6.5   |
| Burgner-Kahrs, Jessica .....   | WeDT15.4  |
| Bürki, Mathias .....           | WeAT18.3  |
| Burschka, Darius .....         | ThCT15    |
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| Burstein, Joshua A.....        | WeAT14.5  |
| Bursuc, Andrei.....            | WeBT3.1   |
| Bury, Diane.....               | ThCT15.4  |
| Büscher, Daniel .....          | TuAT18.6  |
| Buse, Fabian.....              | TuAT14.6  |
| Butters, Daniel Benjamin ..... | TuBT1.6   |
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| Caccavale, Adam .....     | WeAT19.4 |
| Cadena Lerma, Cesar ..... | TuBT5.2  |
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| Cai, Catherine.....       | TuPS1.36 |
| Cai, Haibin .....         | TuCT9.6  |
| Cai, Jun .....            | WeCT19.1 |
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| Cai, Yinghao .....                 | ..WeBT14.4  |    |
| Cai, Zhongang.....                 | ..TuBT2.1   |    |
| Cai, Ziruo .....                   | ..WeBT2.1   |    |
| Caiazza, Gianluca .....            | ..TuAT5.3   |    |
| Cain, Brennan.....                 | ..ThBT14.6  |    |
| Cakmak, Maya.....                  | ..WeCT12.2  |    |
| Calandra, Roberto .....            | ..TuAT2.4   |    |
| Calandriello, Daniele .....        | ..WeAT3.3   |    |
| Calderon, Ariel, A .....           | ..TuAT4.4   |    |
| Caldwell, Darwin G.....            | ..TuAT3     | CC |
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| Caleb-Solly, Praminda .....        | ..MoW-R18.1 |    |
| Califano, Federico .....           | ..WePS2.14  |    |
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| Calisti, Marcello .....            | ..MoW-R15.1 |    |
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| Caluwaerts, Ken .....              | ..ThCT2.4   |    |
| Calway, Andrew .....               | ..TuCT7.4   |    |
| Camci, Efe .....                   | ..TuBT6.1   |    |
| Camoriano, Raffaello .....         | ..WeAT3.3   |    |
| Campbell, Joseph .....             | ..WeDT3.3   |    |
| Campbell, Mark.....                | ..ThAT16.4  |    |
| Campos, Daniel Filipe Barros ..... | ..ThCT15.3  |    |
| Campos, Ricard .....               | ..ThAT14.2  |    |
| Camurri, Marco .....               | ..ThAT13.2  |    |
| Candadai, Madhavun .....           | ..WeCT14.1  |    |
| Candela, Alberto .....             | ..TuAT14.3  |    |
| Cangelosi, Angelo.....             | ..TuBT9.4   |    |
| Cangelosi, Angelo.....             | ..WeAT2.1   |    |
| Cangelosi, Angelo.....             | ..WeDT3     | C  |
| Cangelosi, Angelo.....             | ..WeDT3.4   |    |
| Cannella, Ferdinando.....          | ..ThBT13.2  |    |
| Cao, Hoang Long .....              | ..TuCT9.6   |    |
| Cao,Jie .....                      | ..MoW-R9.1  |    |
| Cao, Muqing.....                   | ..ThAT18.5  |    |
| Cao, Qixin .....                   | ..WeBT3     | CC |
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| Cap, Michal .....                  | ..ThCT18.5  |    |
| Capelli, Beatrice .....            | ..ThBT18.1  |    |
| Caporale, Danilo.....              | ..TuCT15.3  |    |
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| Cappelle, Collin .....             | ..WeBT20.1  |    |
| Caputo, Barbara .....              | ..TuCT1.4   |    |
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| Cardenas, Irvin Steve .....        | ..WeAT5.2   |    |
| Carey, Stephanie .....             | ..ThAT17.5  |    |
| Carius, Jan .....                  | ..WeCT15.1  |    |

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| Carlone, Luca .....             | WeDT10    | CC |
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| Carmichael, Marc .....          | ThCT13    | CC |
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| Carnegie, Dale Anthony .....    | WeAT9.5   |    |
| Carneiro, Gustavo .....         | FrW-R6.1  |    |
| Caro, Stéphane.....             | ThBT4.5   |    |
| Carpentier, Justin .....        | TuAT13.5  |    |
| Carpin, Stefano .....           | WeCT18.5  |    |
| Carrera, Robert Martin .....    | WeCT17.4  |    |
| Carriero, Alessandra .....      | WeDT20.2  |    |
| Carrillo-Zapata, Daniel .....   | WeBT18.1  |    |
| Carron, Andrea.....             | ThBT6.4   |    |
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| Caselitz, Tim .....             | WeDT8.3   |    |
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| Castro, German .....            | TuBT13.4  |    |
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| Cavallo, Filippo .....          | MoW-R18.1 |    |
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| Celik, Mevlüt Onur .....        | ThBT5.5   |    |
| Censi, Andrea .....             | ThBT14.5  |    |
| Cera, Angelo Brian .....        | WeCT14    | C  |
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| Cerbone, Henry .....            | WeDT14.4  |    |
| Cermelli, Fabio .....           | ThAT7.3   |    |
| Ch'ng, Shin-Fang .....          | ThCT1.1   |    |
| Cha, Elizabeth .....            | ThAT9.6   |    |
| Cha, Jackie.....                | TuCT12.6  |    |
| Chacko, Sonia .....             | WeAT17.4  |    |
| Chacon Quesada, Rodrigo .....   | WeCT17.3  |    |
| Chai, Chun-Yu.....              | WeBT16.4  |    |
| Chaib-draa, Brahim .....        | WeBT16.3  |    |
| Chairopoulos, Nikos .....       | WeDT18.2  |    |
| Chakravorty, Suman.....         | TuCT15    | C  |
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| Chalasani, Preetham .....       | ThBT11.4  |    |
| Chalon, Maxime .....            | ThCT4.3   |    |
| Chalvatzaki, Georgia .....      | TuBT9.3   |    |
| .....                           | WeBT12.6  |    |
| Chamrathy, Siddharth .....      | WeBT17.5  |    |

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| Chan, Man Lok .....       | WePS2.28  |    |
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| Chan, Shao-Hung .....     | WeAT9.4   |    |
| Chan, Yin Pok .....       | WePS2.63  |    |
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| Chandra, Rohan .....      | TuAT12.6  |    |
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| Chang, Haonan.....        | WeCT16.4  |    |
| Chang, Junho.....         | TuBT13.3  |    |
| Chang, Longlong.....      | TuAT4.4   |    |
| Chang, Wenkai .....       | WeBT14.4  |    |
| Chang, Yong .....         | WeAT7.4   |    |
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| Chao, Kenneth.....        | TuBT13.6  |    |
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| Che, Guangfu .....        | TuAT10.6  |    |
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| Chen, Baifan .....        | WeBT8.2   |    |
| Chen, Ben M.....          | TuCT6.3   |    |
| Chen, Changhao .....      | WeAT18.2  |    |
| Chen, Chi-Fang.....       | ThBT14.5  |    |
| Chen, Dapeng.....         | ThAT17.1  |    |
| Chen, Diancheng.....      | WeAT7.5   |    |
| Chen, Fei .....           | ThCT17    | CC |
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| Chen, Feifei .....        | ThCT20    | C  |
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| Chen, Guang.....          | WeDT3.1   |    |
| Chen, Guangzeng .....     | ThBT3.1   |    |
| Chen, Guodong .....       | WePS2.11  |    |
| Chen, Hao.....            | TuBT1.3   |    |
| Chen, Hao.....            | TuBT12.5  |    |
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| Chen, Hsi-Yuan.....       | WeCT2.6   |    |
| Chen, Hung-Wen.....       | WeCT16.2  |    |
| Chen, I-Ming.....         | WeK7      | C  |
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| Chen, Jianyu .....        | WeAT8.3   |    |
| Chen, Jiazhou .....       | TuPS1.44  |    |
| Chen, Jun.....            | WeAT17    | CC |
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| Chen, Junhong .....       | TuAT11.2  |    |
| Chen, Junhong .....       | ThAT7.5   |    |
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| Kim, Kyungrock .....  | ..WeDT17.6 |   |
| Kim, Leon .....       | ..WeAT14.1 |   |
| Kim, Min-Jung .....   | ..WePS2.73 |   |
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| Kim, Sang-Hwa .....   | ..WeDT16.2 |   |
| Kim, Sang-Ki .....    | ..WePS2.73 |   |
| Kim, Sangbae.....     | ..ThAT13.3 |   |
| .....                 | ..ThCT12.4 |   |
| Kim, Seung-Hun .....  | ..WePS2.50 |   |
| Kim, Suhan .....      | ..TuAT17.3 |   |
| Kim, Sung-Kyun .....  | ..TuCT15.6 |   |
| Kim, Tae-hyun .....   | ..TuPS1.70 |   |
| Kim, Tae-Jung.....    | ..WeBT4.2  |   |
| Kim, Taeseung.....    | ..ThCT20.3 |   |
| Kim, Taesik .....     | ..WeBT14.3 |   |
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| Kim, Youngsoo .....         | WePS2.43  |    |
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| Kimoto, Mitsuhiko .....     | WeAT12.4  |    |
| Kimura, Keisuke .....       | WePS2.17  |    |
| Kimura, Shunsuke .....      | ThAT13.4  |    |
| Kinauer, Stefan.....        | WeAT9.2   |    |
| Kinugawa, Jun .....         | TuCT16    | C  |
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| Kirsanov, Pavel.....        | TuCT18.4  |    |
| Kirstein, Franziska .....   | TuPS1.55  |    |
| Kitamura, Ryoma .....       | TuAT20.4  |    |
| Kitani, Kris .....          | WeDT3.5   |    |
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| Kizilirmak, Orkun.....      | WeAT2.3   |    |
| Kleeberger, Kilian.....     | WeAT1.1   |    |
| Klein, Reinhard.....        | WeBT5.5   |    |
| Klenske, Edgar .....        | TuAT19.4  |    |
| Kneip, Laurent.....         | TuCT8     | C  |
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| Knight, Heather.....        | TuAT9.5   |    |
| Knoll, Alois .....          | MoW-R11.1 |    |
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| Knudsen, Per .....          | TuAT1.1   |    |
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| Kobayashi, Ichiro.....      | TuAT3.3   |    |
| Koçer, Başaran Bahadır..... | WeAT6.5   |    |
| Kochenderfer, Mykel .....   | WeDT2.5   |    |
| Kodaira, Akio.....          | ThCT20.2  |    |
| Kodgule, Suhit .....        | TuAT14.3  |    |
| Koenig, Alexander .....     | WeDT17.5  |    |
| Koert, Dorothea .....       | WeCT3.3   |    |
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| Koiwai, Kazushige.....      | TuCT14.5  |    |
| Kojima, Kunio .....         | WeAT13.3  |    |
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| Kojima, Masaru .....        | TuCT17.3  |    |
| Kojio, Yuta .....           | TuAT13.4  |    |
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| Kolev, Zlatko.....                    | WeCT3.3    |
| Kolota, Anna.....                     | WePS2.52   |
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| Konokhov, Filipp.....                 | TuCT18.4   |
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| Kragic, Danica.....           | TuAT9.2   |    |
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| Kramer, Ivanna.....           | WeDT7.2   |    |
| Krämer, Koen.....             | TuCT14.3  |    |
| Krebs, Matthew.....           | ThBT12.2  |    |
| Kreiser, Raphaela.....        | WePS2.18  |    |
| Kress-Gazit, Hadas.....       | ThAT3.2   |    |
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| Kristan, Matej.....           | WeBT1.1   |    |
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| Ku, Bonhyun.....              | TuAT20.3  |    |
| Ku, Jason.....                | WeBT1.5   |    |
| Kuang, Haofei.....            | TuBT1.2   |    |
| Kubota, Alyssa.....           | TuAT12.3  |    |
| Kubota, Naoyuki.....          | TuBT14.2  |    |
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| Kubota, Takashi.....          | WeDT12.5  |    |
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| Kulagin, Ivan .....        | TuBT20.2  |    |
| Kulic, Dana .....          | FrW-R14.1 |    |
| Kulich, Miroslav .....     | WePS2.12  |    |
| Kumagai, Iori .....        | TuCT13.1  |    |
| Kumagai, Kengo .....       | ThAT13.4  |    |
| Kumar, Ashish .....        | TuAT16.5  |    |
| Kumar, Nitish .....        | ThCT18.4  |    |
| Kumar, Rahul .....         | TuBT15.3  |    |
| Kumar, Shivesh .....       | WeDT18    | CC |
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| .....                      | WeCT4.1   |    |
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| Kumon, Makoto .....        | WeDT9.2   |    |
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| Kundrat, Dennis .....      | WeDT11.3  |    |
| Kuniyoshi, Yasuo .....     | ThBT13.6  |    |
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| Kuntz, Alan .....          | TuBT11.6  |    |
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| Kuo, Chuan .....           | WeAT7.2   |    |
| Kurabayashi, Daisuke ..... | TuBT20    | C  |
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| Kurfess, Thomas .....      | WeBT3.5   |    |
| Kurita, Yuichi .....       | WeAT17.5  |    |
| Kusayanagi, Kosuke .....   | WeAT16.3  |    |
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| Kwiatkowska, Marta .....   | ThAT9.5   |    |
| Kwok, Ka-Wai .....         | TuCT12    | C  |
| Kwok, Trevor M Y .....     | WeDT11.1  |    |
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| Kwon, Heesung .....        | WeDT1.5   |    |
| Kyrki, Ville .....         | TuAT19    | CC |
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| Ladig, Robert.....            | TuCT5.4   |    |
| Laflaquière, Alban .....      | WeAT2.1   |    |
| Laguna, Guillermo .....       | TuBT7.2   |    |
| Lahijanian, Morteza .....     | ThAT9.5   |    |
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| Lai, Wei-Cheng .....          | WeCT16.2  |    |
| Lamarre, Olivier .....        | TuAT14.4  |    |
| Lambert, Nathan .....         | TuAT2.4   |    |
| Lamiraux, Florent .....       | ThCT15.4  |    |
| Lamon, Edoardo.....           | ThAT3.1   |    |
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| Lane, David.....              | WeDT15.1  |    |
| Lanfredini, Paolo .....       | TuAT12.1  |    |
| Lange, Manuel .....           | ThAT2.5   |    |
| Laptev, Ivan .....            | WeAT2.6   |    |
| Larkina, Anastasiya .....     | TuBT20.2  |    |
| Laschi, Cecilia .....         | MoW-R3.1  |    |
| Lassabe, Frédéric .....       | WeCT18.1  |    |
| Lassak, Kyle .....            | WeDT14.4  |    |
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| Lau, Nuno .....               | TuBT13.5  |    |
| Laugier, Christian .....      | MoW-R10.1 |    |
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| Laurent, Guillaume J. ....    | ThBT4.1   |    |
| Laurenzi, Arturo .....        | WeBT13.4  |    |
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| Lauri, Mikko .....            | WeDT1.6   |    |
| Laurijssen, Dennis .....      | ThAT1.3   |    |
| LaViers, Amy .....            | TuCT13    | C  |
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| Le, Hoang M. ....             | ThBT6.6   |    |
| Le, Huu .....                 | TuBT18.6  |    |
| Le Doze, Vincent .....        | WeBT19.2  |    |
| Leal-Taixe, Laura .....       | WeCT8.2   |    |
| Lecrosnier, Louis .....       | TuBT1.4   |    |
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| Lee, Byunghoon.....  | WePS2.73 |    |
| Lee, Chungkeun.....  | WeCT7.4  |    |
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| Lee, Elijah S.....   | WeCT6.6  |    |
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| Lee, Harim.....      | TuAT12.5 |    |
| Lee, Hee-hyol.....   | ThAT17.4 |    |
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| Lee, Hyosang.....    | ThBT20.1 |    |
| Lee, Hyunwook.....   | ThCT4.1  |    |
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| Lee, Sang Uk.....    | TuAT19.1 |    |
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| Lee, Teng-Yok.....           | WeCT16.2  |
| Lee, Tsang-Wei Edward.....   | TuAT2.6   |
| Lee, Ung Hee.....            | ThCT13.5  |
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| Lee, Yoon Haeng .....        | WeCT15.6  |
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| Legrand, Julie .....         | TuAT11.6  |
| Lehnert, Christopher.....    | WeBT14.1  |
| Lei, Yong.....               | WePS2.56  |
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| Lepora, Nathan .....         | WeCT20.2  |
| Leung, Wing Cheong .....     | WePS2.31  |
| Levine, Sergey .....         | TuAT2.4   |
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| Li, Bing.....               | WeAT7.4  |
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| Li, Bo.....                 | WeCT8.6  |
| Li, Chang.....              | ThBT16.3 |
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| Li, Chenming.....           | TuPS1.4  |
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| Li, Guanglin.....           | ThBT17.1 |
| Li, Hao.....                | TuCT10.5 |
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| Li, Huijun.....             | ThAT17.1 |
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| Li, Jieling.....            | WeBT8.5  |
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| Liu, Hui .....       | ThAT11.4 |    |
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| Liu, Ji .....        | WeDT10.1 |    |
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| Oertel, Catharine .....   | TuBT5.3   |    |
| Ogasa, Shun .....         | ThCT16.1  |    |
| Ogasawara, Tsukasa .....  | WeDT20.3  |    |
| Ogata, Hiroyuki .....     | WeCT16.6  |    |
| Ogata, Kunihiro .....     | ThCT1     | CC |
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| Ogata, Tetsuya .....      | WeAT1     | CC |
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| Oh, Hyondong .....        | TuPS1.24  |    |
| Oh, Jaesung .....         | ThCT1.4   |    |
| Oh, Jean .....            | TuPS1.11  |    |
| Oh, Jun Ho.....           | TuAT13.2  |    |
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| Oh, Sang-Rok.....         | WeDT4.1   |    |
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| Oh, Sehoon .....          | ThCT4     | C  |
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| Oh, Songhwai .....        | TuCT8     | CC |
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| Olson, Edwin .....              | ..TuBT18.4   |    |
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| Omidshafiei, Shayegan .....     | ..ThCT18.1   |    |
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| Onal, Cagdas .....              | ..WeCT20.3   |    |
| Oneill, John .....              | ..TuCT11.5   |    |

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| Or, Yizhar.....                  | WeDT18.5 |    |
| Ordonez, Camilo .....            | WeCT8    | CC |
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| Orsag, Matko .....               | WeCT20.2 |    |
| Orsolino, Romeo .....            | TuAT13.6 |    |
| Ort, Teddy .....                 | ThAT8.5  |    |
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| Pan, Fei .....                | TuAT17.2 |   |
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| Pan, Zherong .....            | TuBT16.1 |   |
| Pan, Ziyu .....               | TuCT7.1  |   |
| Pandala, Abhishek .....       | ThCT5.3  |   |
| Pandey, Amit Kumar .....      | TuCT9.6  |   |
| Paneque, Julio L. ....        | TuCT6.5  |   |
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| Pankert, Johannes .....       | TuCT14.3 |   |
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| Papachristos, Christos .....  | WeAT14.6 |   |
| Papadimitriou, Andreas .....  | TuBT14.4 |   |
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| Park, Jung-Min .....               | WeAT17.6 |    |
| Park, Jungwon .....                | TuAT15.5 |    |
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| Park, Seongsik .....               | ThBT9.4  |    |
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| Park, Shinkyu .....                | TuCT3.4  |    |
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| Park, Yeong Sang .....             | TuBT10.6 |    |
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| Partridge, Erin .....              | WeAT9.1  |    |
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| Patel, Niravkumar .....           | ThBT11.4  |    |
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| Pedigo, Samuel .....              | ThCT13.2  |    |
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| Penza, Veronica .....             | WeCT7.3   |    |
| Perdiz, João .....                | TuBT18.3  |    |
| Pereira, Andre .....              | TuBT5.3   |    |
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| Perrotton, Xavier.....            | WeBT8.6   |    |
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| Petric, Tadej .....               | ThAT12.1  |    |
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| Petrik, Vladimir .....            | TuAT19.6  |    |
| Petrović, Luka .....              | ThCT19.4  |    |
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| Petruska, Andrew J. ....          | WeDT11    | CC |
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| Pettinati, Michael .....          | TuAT9.1   |    |
| Peynot, Thierry .....             | WeBT14.6  |    |
| Pfeiffer, Sammy .....             | WeDT15.1  |    |
| Pfennig, Lennard .....            | TuAT12.2  |    |
| Pham, Hung .....                  | TuBT2.1   |    |
| Pham, Huy Nguyen .....            | ThCT20.6  |    |
| Pham, Minh Tu .....               | ThBT16.6  |    |
| Pham, Quang-Cuong .....           | TuBT2.1   |    |
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| Pharswan, Siddhartha Vibhu .....  | TuAT16.5  |    |
| Phielipp, Mariano .....           | WeBT18.4  |    |
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| Phillips Furtado, Guilherme ..... | WePS2.4   |    |
| Phummapooti, Ratchatida .....     | WeDT16.3  |    |
| Piaskowski, Karol .....           | ThAT2.4   |    |
| Picard, Sylvaine .....            | WeDT7.3   |    |
| Piccinelli, Nicola .....          | ThCT9.3   |    |
| Piccinini, Davide .....           | TuCT19.1  |    |
| Pico, Gian Pietro .....           | TuBT18.1  |    |
| Pierallini, Michele .....         | ThAT19.1  |    |
| Piergiovanni, AJ .....            | ThCT6.1   |    |
| Pierri, Francesco .....           | WeBT6.3   |    |
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| Pineau, Joelle .....              | WeDT2.4   |    |
| Pineda, Luis .....                | TuBT19.1  |    |
| Pinho, Armando .....              | WeBT15.6  |    |
| Pinto, Andry .....                | ThCT15.3  |    |
| Pinto, Lerrel Joseph .....        | TuBT4.6   |    |
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| Piranda, Benoît .....             | WeCT18.1  |    |
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| Pittiglio, Giovanni .....         | TuAT17.6  |    |
| Pizarro, Oscar .....              | FrW-R20.1 |    |
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| Planche, Benjamin .....           | WeAT1.2   |    |
| Plante, Jean-Sebastien .....      | ThAT17.2  |    |
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| Pon, Alexander.....                  | WeBT1.5  |    |
| Ponomareva, Natalia .....            | TuCT8.4  |    |
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| Potamianos, Gerasimos .....          | TuBT12.2 |    |
| Potter, Ross.....                    | WeAT18.4 |    |
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| Pramanick, Pradip .....              | ThAT9.3  |    |
| Pratama, Mahardhika .....            | WeAT6.5  |    |
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| Preiss, James .....                  | TuAT2.3  |    |
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| Premebida, Cristiano .....           | TuBT18.3 |    |
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| Schotschneider, Albert ..... | WeCT12.1 |    |
| Schouten, Girmi .....        | ThAT1.3  |    |
| Schreiber, Dimitri A. ....   | TuAT11.1 |    |
| Schubert, David .....        | TuCT18.3 |    |
| Schubert, Stefan .....       | WeBT20.5 |    |
| Schultz, Joshua .....        | TuCT13.3 |    |
| Schulz, Cornelia .....       | ThBT12.1 |    |
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| .....                        | ThCT18.3 |    |
| Schulze, Martin .....        | WeBT20.2 |    |
| Schuster, René .....         | ThCT7.6  |    |
| Schwager, Mac .....          | WeAT19.4 |    |
| .....                        | ThAT18.1 |    |
| Schwarting, Wilko .....      | ThAT8.2  |    |
| Schwarz, Max .....           | WeBT5.5  |    |
| Schweinfurth, Fabian .....   | ThAT2.5  |    |
| Schweizer, Stephan .....     | WeBT12.1 |    |
| Schwertfeger, Sören .....    | TuBT1    | CC |
| .....                        | TuBT1.2  |    |
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| .....                        | ThBT14.4 |    |
| Seabra Lopes, Luís .....     | WeBT15   | C  |
| .....                        | WeBT15.6 |    |
| Seabrook, Timothy .....      | WeAT18.4 |    |
| Sebastian, Bijo .....        | WeAT8.5  |    |
| Secchi, Cristian .....       | TuAT14   | C  |
| .....                        | TuAT14.1 |    |
| .....                        | ThAT3.5  |    |
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| Secoli, Riccardo .....       | WeDT11.5 |    |
| Seet, Gim Lee, Gerald .....  | WeAT6.5  |    |
| Sefair, Jorge A. ....        | WeBT18.4 |    |
| Seguin, Landan .....         | WeBT16.5 |    |
| Seib, Viktor .....           | WeDT7.2  |    |
| Seichter, Daniel .....       | TuAT12.2 |    |
| Seiwald, Philipp .....       | WePS2.9  |    |
| Sejnova, Gabriela .....      | TuCT9.5  |    |
| Sekiya, Kento .....          | ThCT16.4 |    |
| Sekizuka, Ryota .....        | WeAT17.5 |    |
| Selvaggio, Mario .....       | WeBT5.3  |    |
| .....                        | ThCT11.5 |    |
| Sena, Aran .....             | WeCT3.1  |    |
| Senanayake, Ransalu .....    | ThBT10.1 |    |

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| Sencer, Burak .....       | WeDT13.3  |    |
| Seneviratne, Lakmal ..... | WeAT20.3  |    |
| Senft, Emmanuel .....     | TuCT9.6   |    |
| Seno, Takashi .....       | WeCT1.3   |    |
| Sentis, Luis .....        | ThBT3.5   |    |
| .....                     | ThCT8.1   |    |
| Seo, Hoseong .....        | WeAT15.6  |    |
| .....                     | WeCT7.4   |    |
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| Seo, Jiwon .....          | WeBT4.1   |    |
| Seo, Jong-Tae .....       | WeDT16.2  |    |
| Seo, JuHwan .....         | WeAT11.4  |    |
| Seo, Jungwon .....        | WeAT16.1  |    |
| Seo, Keehong .....        | WeDT17.6  |    |
| Seo, Myoungjae .....      | TuPS1.18  |    |
| .....                     | TuPS1.34  |    |
| Seo, TaeWon .....         | TuPS1.17  |    |
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| Ser, Po Sheng .....       | WeCT16.2  |    |
| Serra, Diana .....        | WeDT5.5   |    |
| Setti, Francesco .....    | ThCT9.3   |    |
| Settimi, Alessandro ..... | WeDT18.6  |    |
| .....                     | ThAT19.1  |    |
| Seung, Sebastian .....    | ThBT19.5  |    |
| Seung-Ju, Oh .....        | WePS2.50  |    |
| Seyfarth, Andre .....     | TuAT13.1  |    |
| Sferrazza, Carmelo .....  | ThCT12    | C  |
| .....                     | ThCT12.3  |    |
| Shafaei, Sina .....       | MoW-R11.1 |    |
| Shafti, Ali .....         | WeDT2.1   |    |
| Shah, Arpit .....         | WeBT20.4  |    |
| Shah, Avni .....          | WeBT17.5  |    |
| Shah, Brual C. ....       | WeDT15.3  |    |
| Shah, Julie A. ....       | TuCT12.1  |    |
| Shah, Tanvi .....         | ThBT17.3  |    |
| Shahbazi, Mahya .....     | ThBT11.4  |    |
| Shahriari, Erfan .....    | WeDT17    | CC |
| .....                     | WeDT17.5  |    |
| Shak, Daniel B. ....      | TuAT11.1  |    |
| Shakoor, Adnan .....      | TuAT17.2  |    |
| Shan, Kaizheng .....      | WeAT20.1  |    |
| Shan, Mo .....            | WeDT1.3   |    |
| Shan, Tixiao .....        | WeCT19.3  |    |
| Shan, Yunxiao .....       | WeBT8.5   |    |
| Shang, Tongyi .....       | ThBT3.1   |    |

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| Shao, Shicong .....     | ..WePS2.2   |    |
| Shao, Weizhao .....     | ..TuAT10.5  |    |
| Shao, Zhenzhou.....     | ..TuAT19.3  |    |
| Sharf, Inna .....       | ..ThBT6     | C  |
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| Sharma, Gaurav .....    | ..WeCT8.3   |    |
| Sharma, Lakshay .....   | ..WeBT12.2  |    |
| Sharma, Sarthak.....    | ..TuBT2.2   |    |
| Sharpe, James .....     | ..WeBT18.1  |    |
| Shell, Dylan .....      | ..WeBT18.6  |    |
| Shen, Jui-Ting .....    | ..WeAT7.2   |    |
| Shen, Junjie .....      | ..TuCT5.3   |    |
| Shen, Shaojie.....      | ..WeAT15    | C  |
| .....                   | ..WeAT15.4  |    |
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| .....                   | ..WeCT6.4   |    |
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| .....                   | ..FrW-R16.1 |    |
| Shen, Yantao .....      | ..WeAT14    | CC |
| .....                   | ..WeAT14.2  |    |
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| .....                   | ..ThCT16.3  |    |
| Sheng, Miao .....       | ..WePS2.51  |    |
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| .....                   | ..WePS2.70  |    |
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| Shi, Bertram Emil ..... | ..ThCT7.5   |    |
| Shi, Dianxi.....        | ..ThAT10.1  |    |
| Shi, Fan.....           | ..TuAT6.3   |    |
| .....                   | ..WeAT6.6   |    |
| Shi, Fuyuan.....        | ..TuBT12.5  |    |
| Shi, Haonan .....       | ..TuPS1.15  |    |
| Shi, Ke .....           | ..ThAT17.1  |    |
| Shi, Liwei .....        | ..TuBT20.3  |    |
| Shi, Qing.....          | ..TuBT17.1  |    |
| .....                   | ..ThBT16.3  |    |
| Shi, San Qiang .....    | ..WePS2.41  |    |
| Shi, Yang.....          | ..WeBT5.4   |    |
| Shi, Yuan kang.....     | ..ThBT17.1  |    |
| Shibata, Tomohiro ..... | ..WeBT20    | C  |
| .....                   | ..WePS2.37  |    |
| Shibuya, Koji.....      | ..ThCT4.5   |    |
| Shigaki, Shunsuke ..... | ..TuBT20.4  |    |
| Shigematsu, Riku.....   | ..WeBT13.1  |    |
| Shih, Benjamin .....    | ..WeCT20.1  |    |
| Shim, Gyu Min.....      | ..TuAT7.5   |    |
| .....                   | ..TuBT7.3   |    |
| Shim, Inbo .....        | ..TuPS1.21  |    |
| Shim, Youngbo .....     | ..WeBT17.3  |    |
| .....                   | ..WeDT17.6  |    |
| Shim, Youngbo .....     | ..ThCT17.3  |    |
| Shimada, Kenji .....    | ..TuBT15.1  |    |

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| Shimada, Nobutaka.....      | .....TuAT16.4 |   |
| Shimamura, Jun .....        | .....WeAT1.3  |   |
| Shimizu, Juri .....         | .....ThBT13.3 |   |
| Shimizu, Masahiro .....     | .....WeBT18.2 |   |
| Shimizu, Tori .....         | .....WeAT4.6  |   |
| Shimoda, Shingo .....       | .....WeCT9.1  |   |
| Shimohara, Katsunori .....  | .....WeAT12.4 |   |
| Shimonomura, Kazuhiro ..... | .....TuCT5.4  |   |
| .....                       | .....TuPS1.1  |   |
| Shin, Hyo-Sang .....        | .....ThAT8.6  |   |
| Shin, Ukcheol .....         | .....TuAT7.5  |   |
| .....                       | .....TuBT7.3  |   |
| Shin, Young-Sik.....        | .....ThAT10.6 |   |
| Shinjo, Koki .....          | .....TuAT20.6 |   |
| .....                       | .....WeAT13.2 |   |
| .....                       | .....ThBT16.4 |   |
| Shintani, Takuto .....      | .....ThBT12.4 |   |
| Shiomi, Masahiro .....      | .....WeAT12   | C |
| .....                       | .....WeAT12.4 |   |
| .....                       | .....WePS2.53 |   |
| Shirafuji, Shouhei .....    | .....WeDT5.4  |   |
| Shirai, Takuma .....        | .....TuCT20.5 |   |
| .....                       | .....WeAT13.3 |   |
| .....                       | .....WeDT4.5  |   |
| Shirai, Yoshiaki .....      | .....TuAT16.4 |   |
| Short, Joel Stephen .....   | .....TuPS1.54 |   |
| Shu, Sile.....              | .....ThAT9.2  |   |
| Sibirtseva, Elena .....     | .....TuAT9.2  |   |
| Siciliano, Bruno .....      | .....WeBT5.3  |   |
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| Sidaoui, Abbas.....         | .....TuCT10.2 |   |
| Siddall, Robert.....        | .....TuCT6.2  |   |
| Sidobre, Daniel.....        | .....WeCT5    | C |
| .....                       | .....WeCT5.3  |   |
| Siegtwart, Roland .....     | .....TuBT5.2  |   |
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| .....                       | .....WeCT10.3 |   |
| .....                       | .....WeDT6.2  |   |
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| Sieniewicz, Satchel .....   | .....TuCT20.3 |   |
| Siepel, Françoise J .....   | .....WeDT11.3 |   |
| .....                       | .....ThBT13.1 |   |
| Sikorski, Jakub .....       | .....WePS2.4  |   |
| Silivanov, Viktor .....     | .....WeBT17.2 |   |
| Silvério, João .....        | .....TuAT3.1  |   |
| Sim, Okkee .....            | .....TuAT13.2 |   |
| Sim, Youngwoo .....         | .....WeDT4.4  |   |

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| Simetti, Enrico.....        | ThAT14.2 |   |
| Simoens, Pieter .....       | TuCT16.1 |   |
| Simon, Gilles .....         | WeCT10.6 |   |
| Simon, Loïc.....            | WeDT7.3  |   |
| Simonin, Olivier.....       | WeBT19.2 |   |
| Singh, Sanjiv .....         | WeAT6.4  |   |
| Singh, Santosh Kumar .....  | WePS2.56 |   |
| Singhal, Mukesh.....        | TuAT3.5  |   |
| Singletary, Andrew.....     | TuAT5.2  |   |
| Skandan, Shreyas .....      | WeCT6.6  |   |
| Skinner, John Robert.....   | FrW-R6.1 |   |
| Skoviera, Radoslav .....    | TuCT9.5  |   |
| Slawinski, Piotr.....       | WeAT11.2 |   |
| Sleiman, Jean-Pierre .....  | ThBT5.3  |   |
| Slinko, Igor .....          | TuCT18.4 |   |
| Sloth, Christoffer.....     | WeDT3.2  |   |
| Slovak, Kyle .....          | WeDT6.1  |   |
| Smirnova, Ekaterina.....    | ThCT1.6  |   |
| Smit-Anseeuw, Nils .....    | WeDT13.5 |   |
| Smith, David.....           | WeBT14.6 |   |
| Smith, Jesper.....          | WePS2.66 |   |
| Smith, Stephen F.....       | TuBT19.4 |   |
| Smith, Stephen L .....      | TuCT15.1 |   |
| Smits, Jonas.....           | TuBT11.1 |   |
| Smyrli, Aikaterini.....     | ThAT13.1 |   |
| Sniezynski, Bartlomiej..... | WePS2.52 |   |
| Sodhi, Paloma .....         | ThCT10.4 |   |
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| Sojoudi, Somayeh .....      | TuPS1.7  |   |
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| Solak, Gokhan .....         | ThCT19.2 |   |
| Somlor, Sophon.....         | ThCT16.1 |   |
| Sommer, Hannes.....         | WeCT10.3 |   |
| Son, Clark Youngdong .....  | WeAT15.6 |   |
| .....                       | ThBT7.2  |   |
| Son, Namsun .....           | TuPS1.68 |   |
| Song, Aiguo .....           | TuAT14.2 |   |
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| Song, Bin .....             | TuAT17.5 |   |
| Song, Bowen .....           | WeDT10.2 |   |
| Song, Changkyu.....         | ThAT19.5 |   |
| Song, Chen .....            | WePS2.22 |   |
| Song, Dezhen .....          | TuBT10   | C |
| .....                       | TuBT10.5 |   |
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| .....                       | WeBT8.2  |   |
| Song, Hansol .....          | WeBT4.1  |   |
| Song, Jae-Bok .....         | TuPS1.8  |   |
| .....                       | WeBT4    | C |
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| Song, Phillip.....          | ThBT11.5 |   |
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| Song, Zhuoyuan .....               | ..ThBT14.3  |    |
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| Soragna, Alberto .....             | ..TuAT10.1  |    |
| Sorice, Cristina .....             | ..TuBT6.3   |    |
| Sorour, Mohamed.....               | ..TuBT16.4  |    |
| Sotelo Vázquez, Miguel Ángel ..... | ..MoW-R10.1 |    |
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| Soueres, Philippe .....            | ..TuAT13.5  |    |
| Sousa, João.....                   | ..ThAT14.5  |    |
| Sozzi, Alessio .....               | ..ThCT9.3   |    |
| Spannagl, Lukas.....               | ..ThAT20.2  |    |
| Spero, Max.....                    | ..TuBT4.5   |    |
| Sperry, Jakob.....                 | ..TuCT20.3  |    |
| Splietker, Malte.....              | ..TuCT1.1   |    |
| Sprute, Dennis.....                | ..WeCT12.5  |    |
| Spurgeon, Sarah.....               | ..WeCT14.5  |    |
| Sriharsha, Ghanta .....            | ..TuBT14.1  |    |
| Srikanth, Shashank.....            | ..TuBT2.2   |    |
| Srinivasa, Siddhartha .....        | ..TuBT11.6  |    |
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| .....                              | ..WeCT1.6   |    |
| Srinivasan, Aravinda.....          | ..TuBT16.4  |    |
| Srivastava, Siddharth .....        | ..WeCT8.3   |    |
| Stachniss, Cyrill .....            | ..WeCT1     | CC |
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| .....                              | ..WeCT10.1  |    |
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| Stankovic, John .....              | ..ThAT9.2   |    |
| Stark, Svenja.....                 | ..TuBT8.3   |    |
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| Stastny, Thomas.....               | ..WeAT6.3   |    |
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| Staszak, Rafal .....               | ..TuPS1.26  |    |
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| Stathopoulou, Ellie - K.....       | ..WeAT7.1   |    |
| Staufenberg, Nora-Sophie .....     | ..WePS2.9   |    |
| Steckel, Jan.....                  | ..ThAT1.3   |    |
| Steed, Anthony .....               | ..ThBT16.1  |    |
| Stefanini, Cesare .....            | ..WeAT20.3  |    |
| Stefanini, Elisa.....              | ..ThAT19.1  |    |
| Stefas, Nikolaos.....              | ..WeCT6.2   |    |
| Stein, Joel .....                  | ..WeCT17.4  |    |
| Steinbach, Eckehard.....           | ..WeDT19.4  |    |
| Steinfeld, Aaron .....             | ..WeBT12.5  |    |
| Stelzer, Martin .....              | ..ThCT16.5  |    |
| Stepputtis, Simon.....             | ..WeBT7.4   |    |
| .....                              | ..WeDT3.3   |    |
| Sterling, Auston.....              | ..ThCT6.4   |    |
| Stetco, Christian.....             | ..WeDT16.4  |    |
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| Stilli, Agostino .....                     | TuBT11.5  |    |
| Stilwell, Daniel .....                     | ThAT14    | C  |
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| Stock, Matthias .....                      | ThAT11.5  |    |
| Stogl, Denis .....                         | ThCT8.2   |    |
| Stöhr, Erik.....                           | WeDT5.6   |    |
| Stolkin, Rustam .....                      | WeAT5.3   |    |
| .....                                      | WeAT16.2  |    |
| Stolzenburg, Jens-Uwe.....                 | ThAT11.5  |    |
| Stolzenwald, Schachar Janis Immanuel ..... | WeAT12.2  |    |
| Stone, Peter .....                         | ThCT2.1   |    |
| Stork, Johannes A.....                     | ThBT19    | CC |
| Stork, Johannes Andreas.....               | WePS2.71  |    |
| .....                                      | ThBT19.3  |    |
| Stotko, Patrick.....                       | WeBT5.5   |    |
| Stoy, Kasper .....                         | MoW-R14.1 |    |
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| Stoyanov, Danail .....                     | TuAT1     | CC |
| .....                                      | TuAT1.4   |    |
| .....                                      | TuBT11    | CC |
| .....                                      | TuBT11.5  |    |
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| Strader, Jared .....                       | TuAT14.5  |    |
| .....                                      | WeDT14.4  |    |
| Stramel, Danielle.....                     | WeCT17.4  |    |
| Stramigioli, Stefano.....                  | MoW-R6.1  |    |
| Stramigioli, Stefano.....                  | TuBT20.2  |    |
| .....                                      | WeDT11.3  |    |
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| Stricker, Didier .....                     | ThCT7.6   |    |
| Strudel, Robin .....                       | WeAT2.6   |    |
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| .....                                      | TuBT16    | CC |
| .....                                      | TuBT16.6  |    |
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| Stuart-Smith, Robert .....                 | TuBT1.6   |    |
| .....                                      | TuCT14.6  |    |
| Stulp, Freek .....                         | ThCT16.5  |    |
| Su, Dan .....                              | TuBT1.3   |    |
| .....                                      | ThCT13.4  |    |
| Su, Hao .....                              | WeBT17    | C  |
| .....                                      | WeBT17.2  |    |
| .....                                      | WeDT20    | CC |
| .....                                      | WeDT20.2  |    |
| Su, Jianbo .....                           | TuCT18.6  |    |
| Su, Jingyu .....                           | TuCT9.3   |    |
| Su, Liying .....                           | TuAT17.1  |    |

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| Su, Yun-Hsuan .....        | ThCT11.2   |    |
| Su, Yung-Shan .....        | WeCT16.2   |    |
| Su, Zixiu .....            | ThBT8.4    |    |
| Sualeh, Muhammad .....     | WePS2.48   |    |
| Suarez, Alejandro .....    | TuAT6.1    |    |
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| Sudo, Yui .....            | WeDT9.4    |    |
| Suehiro, Takashi .....     | ThAT1.6    |    |
| Sugahara, Atsushi.....     | TuPS1.6    |    |
| Sugahara, Yusuke .....     | WeCT12     | C  |
| .....                      | WeCT12.3   |    |
| Sugai, Fumihito .....      | TuAT13.4   |    |
| .....                      | WeAT13.3   |    |
| .....                      | WeCT19.2   |    |
| .....                      | WeDT4.5    |    |
| Sugano, Shigeki .....      | TuBT5      | C  |
| .....                      | WeAT4.3    |    |
| .....                      | WeAT16.3   |    |
| .....                      | ThCT16.1   |    |
| Sugaya, Satomi.....        | WeBT3.3    |    |
| Sugiura, Komei .....       | WeBT2      | C  |
| .....                      | WeBT2.4    |    |
| Sugiyama, Ken-ichiro ..... | TuBT9.2    |    |
| Sugiyama, Nobukatsu .....  | TuPS1.6    |    |
| Suh, Il Hong .....         | TuCT16     | CC |
| .....                      | TuCT16.5   |    |
| .....                      | WeDT16.2   |    |
| Suh, Jung-wook .....       | WeDT4      | CC |
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| Sun, Tao .....             | TuBT17.1 |    |
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| Sustarevas, Julius .....   | TuCT14.6 |    |
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| Tani, Jun .....               | TuBT4.4   |   |
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| Vartholomeos, Panagiotis .....    | WeDT18.2  |    |
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| Vasquez Tieck, Juan Camilo .....  | WeBT20.2  |    |
| Vasseur, Pascal .....             | TuBT1.4   |    |
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| Vendittelli, Marilena .....       | WeDT11.4  |    |
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| Verdoja, Francesco .....          | TuBT16.2  |    |
| Verlinden, Jouke Casper .....     | WePS2.26  |    |
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| Verma, Saurab .....               | TuBT18.2  |    |
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| Vermeulen, Ben .....              | MoW-R14.1 |    |
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| Viguria, Antidio .....         | WeBT6.3  |    |
| Vijayakumar, Sethu .....       | ThAT5.4  |    |
| .....                          | ThBT15.3 |    |
| Vijayarangan, Srinivasan ..... | TuAT10.5 |    |
| Villa, Nahuel Alejandro .....  | WeCT13.3 |    |
| Villani, Luigi .....           | ThCT11.5 |    |
| Villani, Valeria .....         | ThBT18.1 |    |
| Vilzmann, Michael .....        | WeAT15.1 |    |
| Vincze, Markus .....           | TuCT1    | C  |
| .....                          | TuCT1.4  |    |
| Vining, William .....          | ThAT18.2 |    |
| Vintr, Tomas .....             | ThBT10.3 |    |
| .....                          | ThBT10.6 |    |
| Vinu, Sivanantham .....        | WeCT18.6 |    |
| Virga, Salvatore .....         | WeDT11.2 |    |
| Visioli, Antonio .....         | TuAT15.6 |    |
| Viswanathan, VinothKumar ..... | WeDT20.5 |    |
| Vitziliaios, Nikolaos .....    | ThBT14.6 |    |
| Vizzo, Ignacio .....           | WeCT1.4  |    |
| Vo, Christopher .....          | TuAT15.2 |    |
| Vogel, Joern .....             | WeDT17.1 |    |
| Vohra, Mohit .....             | TuAT16.5 |    |
| Vokrinek, Jiri .....           | ThCT18.5 |    |
| von Stumberg, Lukas .....      | TuCT18.3 |    |
| Vonasek, Vojtech .....         | TuBT15.2 |    |
| Voos, Holger .....             | ThCT8.4  |    |
| Vorontsova, Anna .....         | TuCT18.4 |    |
| Votta, Ann Marie .....         | WeCT20.3 |    |
| Voyles, Richard .....          | ThBT8    | C  |
| .....                          | ThBT8.1  |    |
| Vrba, Matous .....             | WeCT6.5  |    |
| Vroegindewei, Bastiaan .....   | WeDT14.5 |    |
| Vuduc, Richard .....           | WeBT3.5  |    |
| Vyas, Khushi .....             | ThBT11.4 |    |
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| Wachs, Juan .....              | TuCT12.6 |    |
| .....                          | ThBT8.1  |    |
| Wachsmuth, Sven .....          | ThCT3.3  |    |
| Wachter, Jan .....             | TuAT14.6 |    |
| Wadhwania, Samir .....         | ThCT18.1 |    |
| Wahby, Mostafa .....           | WeBT18.3 |    |
| Wahid, Ayzaan .....            | TuAT2.6  |    |
| Waibel, Alex .....             | ThAT6    | CC |
| .....                          | ThAT6.1  |    |
| Waibel, Gabriel .....          | WePS2.18 |    |
| Wakanuma, Kutoma .....         | TuCT9.6  |    |
| Wakimoto, Shuichi .....        | WeCT20   | CC |
| .....                          | WeCT20.4 |    |
| Waldron, Kenneth John .....    | ThCT13.6 |    |
| Walker, Ian .....              | TuCT20.4 |    |
| Walker, Rich .....             | WePS2.64 |    |
| Walker, Sara Imari .....       | WeBT18.4 |    |
| Walley, Andrew .....           | WePS2.57 |    |
| Walsh, Sean .....              | WeBT1.5  |    |

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| Walsman, Aaron .....    | TuBT4.2   |   |
| Walters, Celyn .....    | TuAT1.6   |   |
| Wan, Lipeng .....       | ThAT16.2  |   |
| Wan, Weiwei .....       | TuPS1.32  |   |
| .....                   | WeDT15.2  |   |
| .....                   | WeDT16    | C |
| .....                   | WeDT16.6  |   |
| .....                   | WeDT19.6  |   |
| .....                   | ThCT13.1  |   |
| .....                   | FrW-R19.1 |   |
| Wang, Austin S. ....    | ThAT19.4  |   |
| Wang, Boxing .....      | TuPS1.23  |   |
| Wang, Brian .....       | ThAT16.4  |   |
| Wang, Changhao .....    | ThAT19.6  |   |
| Wang, Chaoli .....      | WeAT14.2  |   |
| Wang, Chaoqun .....     | TuCT19.2  |   |
| .....                   | TuCT19.3  |   |
| .....                   | TuPS1.4   |   |
| Wang, Charlie C.L. .... | WeDT14.3  |   |
| Wang, Chen .....        | TuAT16.3  |   |
| Wang, Chen .....        | WeBT2.1   |   |
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| Wang, Congqing .....    | WePS2.32  |   |
| Wang, Danwei .....      | TuSF1     | C |
| .....                   | WeSF1     | C |
| Wang, Dequan .....      | WeAT8.2   |   |
| Wang, Di .....          | TuBT10.5  |   |
| Wang, Di .....          | WeAT1.6   |   |
| Wang, Di .....          | WeBT8.2   |   |
| Wang, Di .....          | ThAT15.5  |   |
| Wang, Dianpeng .....    | WeBT17.2  |   |
| Wang, Gang .....        | WeAT14.2  |   |
| Wang, Hanlin .....      | TuCT5.1   |   |
| Wang, Hesheng .....     | TuBT8.4   |   |
| .....                   | TuCT2.5   |   |
| .....                   | WeK9      | C |
| .....                   | WeK12     | C |
| .....                   | WeAT14.3  |   |
| .....                   | WeBT7.1   |   |
| .....                   | WeDT10.2  |   |
| Wang, Hsueh-Cheng ..... | WeCT16    | C |
| .....                   | WeCT16.2  |   |
| .....                   | ThBT14.5  |   |
| Wang, Huaping .....     | TuBT17.1  |   |
| Wang, Jialu .....       | WeBT2.1   |   |
| Wang, Jiangping .....   | TuPS1.63  |   |
| Wang, Jiarong .....     | TuPS1.16  |   |
| .....                   | TuPS1.48  |   |
| Wang, Jingao .....      | WeDT2.6   |   |
| Wang, Jingchuan .....   | WeDT10.2  |   |
| Wang, Jinkun .....      | WeCT19.3  |   |
| Wang, Kai .....         | TuBT12.5  |   |
| Wang, Ke .....          | TuPS1.49  |   |
| Wang, Lidai .....       | TuCT17.2  |   |

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| Wang, Lin .....        | ..WeDT9.1  |    |
| Wang, Long .....       | ..FrW-R3.1 |    |
| Wang, Lujia .....      | ..TuBT20.1 |    |
| Wang, Luqi .....       | ..WeAT15.4 |    |
| .....                  | ..WeBT3.2  |    |
| Wang, Manyi.....       | ..TuCT20.1 |    |
| Wang, Michael Yu ..... | ..ThBT12.5 |    |
| Wang, Peng.....        | ..ThCT11.3 |    |
| Wang, Pengfei.....     | ..TuBT2.4  |    |
| Wang, Pengfei.....     | ..ThCT17.5 |    |
| Wang, Qian .....       | ..TuBT4.6  |    |
| Wang, Qianqian .....   | ..TuBT17.5 |    |
| .....                  | ..TuCT17.2 |    |
| Wang, Qining .....     | ..WeAT5    | CC |
| .....                  | ..WeAT5.5  |    |
| .....                  | ..ThCT17.1 |    |
| Wang, Shengjun .....   | ..WeAT20.1 |    |
| Wang, Shenlong .....   | ..WeDT8.5  |    |
| Wang, Shiquan .....    | ..TuBT16.6 |    |
| Wang, Shu Yu .....     | ..ThAT16.5 |    |
| Wang, Shuangyi .....   | ..ThCT12.5 |    |
| Wang, Shuo .....       | ..WeBT14   | CC |
| .....                  | ..WeBT14.4 |    |
| Wang, Sunyu .....      | ..TuAT20.3 |    |
| Wang, Tao .....        | ..WePS2.15 |    |
| Wang, Tsun-Hsuan ..... | ..ThAT2.3  |    |
| Wang, Wei.....         | ..TuAT5.6  |    |
| Wang, Wei.....         | ..WeAT18.2 |    |
| Wang, Wei.....         | ..ThAT14.1 |    |
| Wang, Wei.....         | ..ThCT10.6 |    |
| Wang, Weifu .....      | ..TuCT19.4 |    |
| Wang, Wenshan.....     | ..TuAT6.4  |    |
| .....                  | ..TuBT2.6  |    |
| .....                  | ..TuBT6.1  |    |
| Wang, Wenxue.....      | ..TuBT3    | CC |
| .....                  | ..TuBT3.4  |    |
| Wang, Xiangwei .....   | ..TuBT2.6  |    |
| Wang, Xin .....        | ..ThCT17.5 |    |
| Wang, Xinkuang .....   | ..ThBT8.2  |    |
| Wang, Xipeng.....      | ..TuBT18.4 |    |
| Wang, Xueqian.....     | ..WeCT14   | CC |
| .....                  | ..WeCT14.2 |    |
| Wang, Ya .....         | ..WeDT10.1 |    |
| Wang, Yan .....        | ..TuBT11.2 |    |
| .....                  | ..TuCT4.3  |    |
| Wang, Yan .....        | ..ThAT16.4 |    |
| Wang, Yaqing .....     | ..TuBT11.3 |    |
| Wang, Yiming .....     | ..WeAT7    | CC |
| .....                  | ..WeAT7.1  |    |
| Wang, Yong .....       | ..WeAT14.3 |    |
| Wang, Yongtian.....    | ..WeAT17.3 |    |
| Wang, Yu-Ping.....     | ..ThCT8    | CC |
| .....                  | ..ThCT8.6  |    |
| Wang, Yuchen .....     | ..TuAT7.4  |    |

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| .....                        | TuCT18.5  |    |
| Wang, Zengyuan .....         | ThBT1.1   |    |
| Wang, Zerui .....            | TuBT11.3  |    |
| Wang, Zhixin .....           | TuCT1.3   |    |
| Wang, Zhiyang .....          | WeAT3.4   |    |
| Waniek, Nicolai .....        | FrW-R11.1 |    |
| Ward, James Robert .....     | WePS2.40  |    |
| Warren, Garrett .....        | TuBT4.3   |    |
| Wasenmüller, Oliver .....    | ThCT7.6   |    |
| Waslander, Steven Lake ..... | WeBT1.5   |    |
| Watanabe, Masahiro .....     | WeAT4.6   |    |
| Watanabe, Ryosuke .....      | WeAT17.2  |    |
| Watanabe, Tetsuyou .....     | MoW-R1.1  |    |
| .....                        | TuAT16    | CC |
| Waters, Zachary .....        | ThAT14.3  |    |
| Watier, Bruno .....          | TuAT13.5  |    |
| Watson, Ryan .....           | TuAT14.5  |    |
| .....                        | WeDT14.4  |    |
| Watson, Simon .....          | TuPS1.38  |    |
| .....                        | WePS2.36  |    |
| Weaver, James .....          | TuCT20.3  |    |
| Weber, Bernhard .....        | ThCT16    | C  |
| .....                        | ThCT16.5  |    |
| Wehbe, Remy .....            | ThCT18.2  |    |
| Wei, Hongmiao .....          | TuAT17.1  |    |
| Wei, Huanshu .....           | TuBT8.4   |    |
| Wei, Jieqiang .....          | WeAT19.1  |    |
| Wei, Minghan .....           | TuCT6.1   |    |
| Wei, Yixuan .....            | TuAT16.2  |    |
| Weiharer, Tobias .....       | ThBT10.5  |    |
| Weinberger, Kilian .....     | ThAT16.4  |    |
| Weinmann, Michael .....      | WeBT5.5   |    |
| Weiss, Stephan .....         | ThBT1.2   |    |
| .....                        | ThBT7.3   |    |
| Weitschat, Roman .....       | FrW-R15.1 |    |
| Welle, Michael C. ....       | TuBT16.3  |    |
| Weller, René .....           | ThBT15.4  |    |
| Wellhausen, Constantin ..... | TuBT1.1   |    |
| Welschehold, Tim .....       | WeCT3.6   |    |
| Wen, Changyun .....          | WeBT10.4  |    |
| Wen, Fei .....               | TuAT7.2   |    |
| Wen, John .....              | TuAT3.6   |    |
| Wen, Kefei .....             | WeBT4.5   |    |
| Wen, Li .....                | MoW-R15.1 |    |
| .....                        | TuAT5     | C  |
| Wen, Shuhuan .....           | WePS2.38  |    |
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| Weng, Dongdong .....         | WeAT17.3  |    |
| Weng, Xinshuo .....          | ThCT15.2  |    |
| Wengefeld, Tim .....         | TuAT12.2  |    |
| Wenzel, Patrick .....        | WeCT8.2   |    |
| Werling, Moritz .....        | ThCT2.6   |    |
| Wermelinger, Martin .....    | ThBT5.3   |    |

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| .....                      | ThBT6.4  |
| Wermter, Stefan .....      | TuBT12.3 |
| Westman, Eric .....        | ThCT14.6 |
| Wettergreen, David .....   | TuAT14.3 |
| White, Ruffin .....        | TuAT5.3  |
| White, Scott .....         | WeAT14.5 |
| Whitman, Joshua .....      | TuPS1.3  |
| Whitney, John Peter .....  | ThCT16.2 |
| Whitzer, Michael .....     | WeCT18.2 |
| Wieber, Pierre-Brice ..... | TuAT13.3 |
| .....                      | WeCT13.3 |
| Wiese, Mats .....          | WeCT14.5 |
| .....                      | ThBT13.5 |
| Wigness, Maggie .....      | WeDT1.5  |
| Wildgrube, Fabian .....    | ThAT9.1  |
| Wilhelm, Felix .....       | WeCT19.4 |
| Williams, Brian .....      | TuAT19.1 |
| Williams, Ronald .....     | ThAT9.2  |
| Williams, Ryan .....       | ThBT18.4 |
| .....                      | ThCT18   |
| .....                      | ThCT18.2 |
| Williams, Troi .....       | WeAT14.4 |
| Wilm, Jakob .....          | TuCT7.6  |
| Wilson, Justin .....       | ThCT6.4  |
| Windau, Jens .....         | WeBT17.1 |
| Windrim, Lloyd .....       | WeBT14.2 |
| Winfield, Alan Frank ..... | WeBT18.1 |
| Wirnshofer, Florian .....  | TuAT4.1  |
| .....                      | ThAT5.6  |
| Wisth, David .....         | ThAT13.2 |
| Witwicki, Stefan .....     | TuBT8.5  |
| Wolek, Artur .....         | ThAT14.3 |
| Wolfslag, Wouter .....     | ThAT5.4  |
| Woller, David .....        | WePS2.12 |
| Wolniakowski, Adam .....   | TuCT7.5  |
| Won, Jongsoon .....        | TuCT16.5 |
| Wong, KC .....             | WeDT6.6  |
| Woo, Seungjun .....        | TuPS1.65 |
| Wood, Robert .....         | TuCT20.3 |
| .....                      | ThBT11.5 |
| Worrall, Stewart .....     | WePS2.40 |
| Wray, Kyle .....           | TuBT8.5  |
| .....                      | TuBT19.1 |
| Wu, Alan .....             | ThCT6.1  |
| Wu, Benjamin .....         | WeAT18.4 |
| Wu, Bohan .....            | TuCT2.3  |
| Wu, Cheng .....            | ThAT1.5  |
| Wu, Chenming .....         | WeDT14.3 |
| Wu, Guan Yu .....          | ThAT17.4 |
| Wu, Jiayue .....           | ThCT2.5  |
| Wu, Jun .....              | TuPS1.23 |
| Wu, Kejian .....           | TuAT10.3 |
| Wu, Lang .....             | WeBT10.3 |
| Wu, Liao .....             | TuCT11.1 |

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| Wu, Min .....               | ThAT9.5   |    |
| Wu, Ping-Tsang .....        | WeAT9.4   |    |
| Wu, Qiuxuan .....           | TuPS1.63  |    |
| Wu, Shiyu .....             | WeCT16.4  |    |
| Wu, Tianhao .....           | TuBT2.3   |    |
| Wu, Xinyu .....             | TuCT4.4   |    |
| Wu, Yihong .....            | WeBT10.3  |    |
| Wu, Yuqiang .....           | WeAT12.1  |    |
| .....                       | WeBT5.1   |    |
| Wu, Yuwei .....             | TuCT9.3   |    |
| Wu, Zhonghao .....          | TuCT11.4  |    |
| Wu, Ziyang .....            | WeAT1.2   |    |
| Wuenschel, Hans J .....     | TuAT10.2  |    |
| Wurdehann, Helge Arne ..... | WeCT14.5  |    |
| Wurm, Kai M. ....           | TuAT4.1   |    |
| Wykowska, Agnieszka .....   | ThBT9.2   |    |
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| Xanthidis, Marios .....     | ThBT14.6  |    |
| Xia, Debin .....            | TuBT20.3  |    |
| Xia, Fei .....              | ThCT7.2   |    |
| Xia, Huaxia .....           | ThCT15.1  |    |
| Xiang, Zhenzhen .....       | TuCT18.6  |    |
| Xiang, Zhiyu .....          | TuBT1     | C  |
| .....                       | TuBT1.5   |    |
| Xiao, Charles .....         | ThBT13.4  |    |
| Xiao, Feng .....            | WeBT6.2   |    |
| Xiao, Jing .....            | TuBT4     | CC |
| .....                       | TuCT3.5   |    |
| .....                       | WeK8      | C  |
| .....                       | WeK11     | C  |
| Xiao, Jizhong .....         | WeAT7.4   |    |
| Xiao, Xiangquan .....       | WeDT2.6   |    |
| Xiao, Xiaohui .....         | TuCT13.2  |    |
| Xiao, Zhe .....             | TuBT15.1  |    |
| Xie, Biao .....             | WeCT16.2  |    |
| Xie, Guangming .....        | TuCT20    | CC |
| .....                       | TuCT20.1  |    |
| Xie, Le .....               | WeBT7.1   |    |
| .....                       | WeCT12    | CC |
| Xie, Lihua .....            | ThAT18.5  |    |
| Xie, Mingyang .....         | TuAT17.2  |    |
| .....                       | FrWB-R4.1 |    |
| Xie, Shane .....            | ThAT20    | C  |
| .....                       | ThAT20.3  |    |
| Xie, Xu .....               | TuCT2.6   |    |
| Xie, Yangmin .....          | WeCT19.1  |    |
| Xihuan, Hou .....           | TuBT20.3  |    |
| Xin, Chen .....             | WeAT19.5  |    |
| Xin, Guiyang .....          | ThAT5.4   |    |
| Xin, Songyan .....          | TuAT13.6  |    |
| Xing, Huiming .....         | TuBT20.3  |    |
| Xiong, Minglei .....        | TuCT20.1  |    |
| Xiong, Rong .....           | TuCT10.6  |    |
| .....                       | TuCT18    | CC |

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| .....                    | TuCT18.5 |    |
| Xiong, Xiaobin .....     | TuBT4.1  |    |
| .....                    | WeCT13.4 |    |
| Xu, Danfei .....         | WeAT2.4  |    |
| Xu, Dongfang .....       | ThCT17.1 |    |
| Xu, Dongyan .....        | WeBT6.1  |    |
| Xu, Fan .....            | TuBT8.4  |    |
| .....                    | WeAT14.3 |    |
| Xu, Guanghua .....       | TuPS1.44 |    |
| Xu, Haipeng .....        | WeAT20.5 |    |
| Xu, Hongli .....         | ThCT14.1 |    |
| Xu, Huan .....           | ThBT15.6 |    |
| Xu, Jiaxuan .....        | WeDT2.6  |    |
| Xu, Kai .....            | TuBT16.1 |    |
| Xu, Kai .....            | TuCT11   | C  |
| .....                    | TuCT11.3 |    |
| .....                    | TuCT11.4 |    |
| Xu, Kecheng .....        | WeDT2.6  |    |
| Xu, Lan .....            | WeDT19.4 |    |
| Xu, Mingze .....         | TuAT7.4  |    |
| Xu, Qingsong .....       | WeAT4    | CC |
| .....                    | WeAT4.2  |    |
| Xu, Qingwen .....        | TuBT1.2  |    |
| .....                    | ThBT14.4 |    |
| Xu, Ruinian .....        | WeBT16.5 |    |
| Xu, Tiantian .....       | TuCT4.4  |    |
| .....                    | TuCT17.2 |    |
| .....                    | ThBT15   | CC |
| Xu, Wei .....            | TuPS1.2  |    |
| Xu, Wenfu .....          | ThAT4.3  |    |
| Xu, Yiliang .....        | WeBT8.2  |    |
| Xue, Chengqian .....     | ThCT3.1  |    |
| Xue, Jianru .....        | WeAT1    | C  |
| .....                    | WeAT1.6  |    |
| Xue, Yexiang .....       | ThBT8.1  |    |
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| Yabuki, Yoshiko .....    | ThBT17.1 |    |
| Yaconelli, Joseph .....  | TuAT2.4  |    |
| Yagi, Keisuke .....      | ThBT17.5 |    |
| Yakar, Rea .....         | TuCT13.4 |    |
| Yamada, Kenshiro .....   | WeDT9.2  |    |
| Yamada, Yasuyuki .....   | WeCT4.6  |    |
| .....                    | ThAT20.4 |    |
| Yamaguchi, Hiroki .....  | WePS2.55 |    |
| Yamaguchi, Koki .....    | ThAT13.4 |    |
| Yamaguchi, Tomoka .....  | ThAT4.4  |    |
| Yamakita, Masaki .....   | TuBT13.3 |    |
| Yamamoto, Ko .....       | TuBT13.1 |    |
| Yamamoto, Tomoyuki ..... | MoW-R4.1 |    |
| Yamamoto, Toru .....     | TuCT14.5 |    |
| Yamane, Katsu .....      | TuBT9    | C  |
| .....                    | TuBT9.2  |    |
| .....                    | WeAT13   | CC |
| Yamanobe, Natsuki .....  | WeBT3.6  |    |



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| Yamashita, Atsushi.....   | WePS2.14  |    |
| Yamashita, Koji.....      | TuCT14.5  |    |
| Yamashita, Takayoshi..... | WeDT19.5  |    |
| Yamazaki, Kimitoshi ..... | ThAT7.6   |    |
| Yamazaki, Ryuji .....     | ThCT9.2   |    |
| .....                     | ThCT9.5   |    |
| Yamazaki, Yoichiro .....  | TuCT14.5  |    |
| .....                     | WeAT17.5  |    |
| Yan, Gang .....           | ThCT16.1  |    |
| Yan, Tongxi.....          | ThCT13.3  |    |
| Yan, Wenzhong .....       | WeDT20.4  |    |
| Yan, Xudong .....         | ThBT7.1   |    |
| Yan, Xuejiao .....        | WeCT19.1  |    |
| Yang, Bo .....            | WeAT18.2  |    |
| Yang, Caiyun.....         | WeBT14.4  |    |
| Yang, Chenguang .....     | WeBT7.1   |    |
| .....                     | ThCT3.1   |    |
| Yang, Chenjie .....       | ThAT16.1  |    |
| .....                     | ThAT16.2  |    |
| Yang, Chi-Hung.....       | ThAT17.3  |    |
| Yang, Chizhao .....       | WeDT14.4  |    |
| Yang, Fangkai .....       | ThCT2.1   |    |
| Yang, Ganggang .....      | WeBT3.4   |    |
| Yang, Gengshan .....      | ThAT7.2   |    |
| Yang, Gi-Hun .....        | WeCT14.4  |    |
| .....                     | WePS2.62  |    |
| Yang, Guang-Zhong.....    | TuAT11    | C  |
| .....                     | TuAT11.2  |    |
| .....                     | TuAT11.5  |    |
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| .....                     | TuBT7     | C  |
| .....                     | TuBT7.1   |    |
| .....                     | WeAT11.3  |    |
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| .....                     | WeCT2.3   |    |
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| .....                     | WeDT11.1  |    |
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# KUKA



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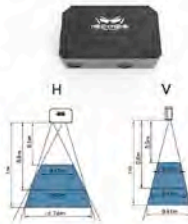
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Welcome to booth B13-B14 (Mech-Mind Robotics)

The mission of Meituan is "We help people eat better, live better". As China's leading e-commerce platform for services, Meituan operates well-known mobile apps in China, including Meituan, Dianping, Meituan Waimai, Meituan Bike and others. Meituan offers over 200 service categories, including catering, on-demand delivery, car-hailing, bike-sharing, hotel and travel booking, movie ticketing, and other entertainment and lifestyle services, and covers 2800 cities and counties across China.

Meituan Autonomous Delivery (MAD), the company's holistic solution to driverless delivery, serves to aid Meituan's core businesses, such as on-demand food delivery and intra-city courier services. MAD incorporates a trading platform, a dispatching system, and a corps of delivery vehicles. MAD exploits a variety of intelligent delivery devices such as drones, delivery robots, and self-driving cars, for various delivery scenarios such as inside buildings, in campus, or on municipal roads. MAD has been aiming to higher delivery efficiency, better user experience, and the vision to "use autonomous vehicles to deliver everything for everyone everywhere".

**Recruitment:** [mtdptech@meituan.com](mailto:mtdptech@meituan.com)



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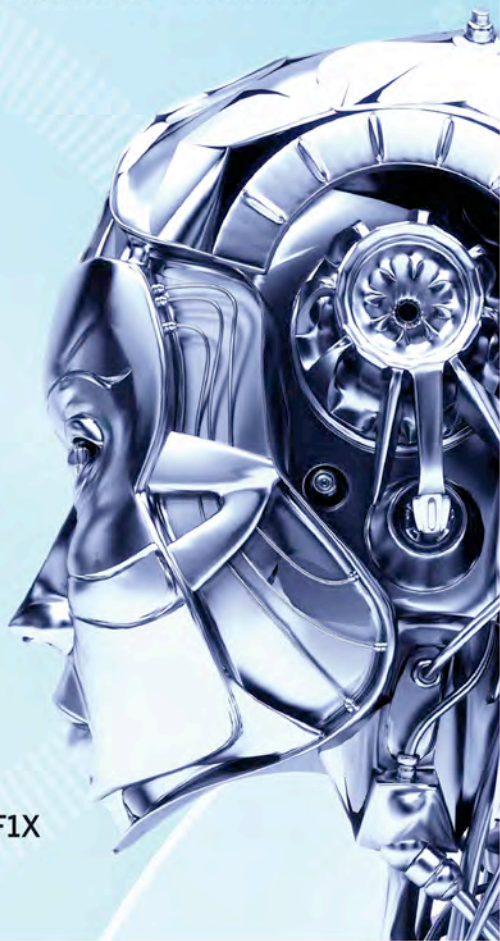
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# Program at a Glance

| Monday, Nov 4                                      |   | Tuesday, Nov 5  |   | Wednesday, Nov 6   |  | Thursday, Nov 7                                  |  | Friday, Nov 8                                      |  |
|--|---|---|---|--|--|--|--|--|--|
| WORKSHOPS & TUTORIALS                              |   | CONFERENCE  |   | CONFERENCE   |  | CONFERENCE                                       |  | WORKSHOPS & TUTORIALS                              |  |
| 9:00 – 18:00<br>Workshops & Tutorials<br>(L1 & LG) | 9:00 – 18:00<br>Robot Competitions (L3)                               |   |   |  |  |  |  |  |  |
|  | 8:30 – 9:00<br>Opening Ceremony (L3)                                  |   | 8:30 – 18:00<br>Exhibition (L1) & Robot Competitions (L3) |  |  |  |  |  |  |
|  | 9:00 – 10:30<br>Plenary Talks I & II<br>(L3)                          |   |   |  |  |  |  |  |  |
|  | 10:30 – 11:00<br>Coffee Break   |   |   |  |  |  |  |  |  |
|  | 11:00 – 12:30<br>Technical Sessions & Cutting Edge Forum<br>(L1 & LG) |   |   |  |  |  |  |  |  |
| 12:30 – 13:30<br>Lunch & Poster Session (L1)       |   | 9:00 – 10:00<br>Keynote Talks VII – XII<br>(L3)                       |   | 9:00 – 12:00<br>Robot Competitions (L3)                                |  | 9:00 – 10:30<br>Plenary Talks III & IV<br>(L3)   |  | 9:00 – 18:00<br>Workshops & Tutorials<br>(L1 & LG) |  |
| 13:30 – 14:30<br>Keynote Talks I – VI<br>(L3)      |   | 10:00 – 10:30<br>Coffee Break   |   | 10:30 – 11:00<br>Coffee Break  |  |  |  |  |  |
| 14:45 – 16:15<br>Technical Sessions<br>(L1 & LG)   |   | 10:30 – 12:00<br>Technical Sessions<br>(L1 & LG)                      |   | 11:00 – 12:30<br>Technical Sessions<br>Cutting Edge Forum<br>(L1 & LG) |  |  |  |  |  |
| 16:15 – 16:45<br>Coffee Break                      |   | 12:00 – 13:00<br>Lunch & Poster Session (L1)                          |   | 12:40 – 14:30<br>Awards Luncheon<br>(L3)                               |  |  |  |  |  |
| 16:45 – 18:15<br>Technical Sessions<br>(L1 & LG)   |   | 13:00 – 14:30<br>Technical Sessions & Cutting Edge Forum<br>(L1 & LG) |   | 14:45 – 16:15<br>Technical Sessions & Cutting Edge Forum<br>(L1 & LG)  |  | 9:00 – 17:00<br>Exhibition (L1)                  |  |  |  |
| 18:30 – 20:30<br>Welcome Reception<br>(L3)         |   | 16:00 – 18:00<br>Gov Forum<br>(L3)                                    |   | 14:45 – 16:15<br>Technical Sessions & Cutting Edge Forum<br>(L1 & LG)  |  | 16:45 – 18:15<br>Technical Sessions<br>(L1 & LG) |  | 9:00 – 17:00<br>Special Forum<br>(LG)              |  |
|  |   | 16:45 – 18:15<br>Technical Sessions<br>(L1 & LG)                      |   | 16:15 – 16:45<br>Coffee Break  |  | 16:45 – 18:15<br>Technical Sessions<br>(L1 & LG) |  |  |  |
|  |   | 19:00 – 21:30<br>Banquet – A Night in Venice<br>(L3)                  |   | 16:15 – 16:45<br>Coffee Break  |  | 18:30 – 20:30<br>Farewell Party<br>(L3)          |  |  |  |