IROS VANCOUVER 2017

IEEE/RSJ International Conference on
Intelligent Robots and Systems
Vancouver, BC, Canada
September 24 - 28, 2017

Conference Digest

IEEE RAS IES RSJ SICE NTF

IROS 2017 Technical Program

Sunday September 24, 2017 -- Day 1

	WS 1	WS 2	WS 3	WS 4	WS 5	WS 6	WS 7	WS 8	WS 9	WS 10	WS 11	WS 12	WS 13	WS 14	WS 15	WS 16	WS 17	WS 18
RM	109 & 110	111 &112	116 &117	114 &115	118-120	121	122	202 & 203	204	205 & 206	207	208 & 209	211-214	217-219	215 & 216	220	221 & 222	223 & 224
09:00 - 12:30	SuAW1 Human In-The-Loop Manipulation: On the Influence of the Human Role	SuAW2 Introspective Methods for Reliable Autonomy	SuAW3 Verification of Autonomous Systems Workshop	SuAW4 Shared Platforms for Medical Robotics Research	SuAW5 Planning Legged and Aerial Locomotion with Dynamic Motion Primitives	SuAW6 Workshop on Acoustic Based Navigation for Marine Robots	SuAW7 On the Energetic Economy of Robotics and Biological Systems: A Challenging Handicap to Overcome	SuAW8 (Tutorial) A* Planning and Model Predictive Control with Dynamics -Based and Multiple Heuristics	SuAW9 Gravity Offload Testbeds for Space Robotic Mission Simulation	SuAW10 Soft Morphological Design for Haptic Sensation, Interaction and Display	SuAW11 Towards an Artist-In-The-Lab Framework	SuAW12 Continuum Robots in Medicine – Design, Integration, and Applications	SuAW13 9th Workshop on Planning, Perception and Navigation for Intelligent Vehicles	SuAW14 Learning for Collaborative Robotics: Enabling Flexible, Redeployable and Agile Industrial Applications	SuAW15 Agile Robotics for Industrial Automation Competition (ARIAC) Workshop	SuAW16 Workshop on Perception and Planning for Robotic Inspection	SuAW17 2nd Workshop on Semantic Policy and Action Representations for Autonomous Robots	SuAW18 Human-Robot Interaction in Collaborative Manufacturing Environments
14:00 - 17:30	SuAW1 (cont.)	SuAW2 (cont.)	SuAW3 (cont.)	SuAW4 (cont.)	SuAW5 (cont.)		SuAW7 (cont.)	SuBW8 Development of Benchmarking Protocols for Robot Manipulation	SuAW9 (cont.)	SuAW10 (cont.)	SuAW11 (cont.)	SuAW12 (cont.)	SuAW13 (cont.)	SuAW14 (cont.)	SuAW15 (cont.)	SuBW16 Micro-Data: The New Frontier of Robot Learning?	SuAW17 (cont.)	SuAW18 (cont.)
19:00 - 21:00	**Welcome Reception** *Ballroom Foyer*																	

*** Coffee breaks will be provided 10:30-11:00 and 15:30 - 16:00.**

Thursday September 28, 2017 -- Day 5

	WS 1	WS 2	WS 3	WS 4	WS 5	WS 6	WS 7	WS 8	WS 9	WS 10	WS 11	WS 12	WS 13	WS 14	WS 15	WS 16	WS 17	WS 18
RM	109 & 110	111 &112	116 &117	114 &115	118-120	121	122	202 & 203	204	205 & 206	207	208 & 209	211-214	217-219	215 & 216	220	221 & 222	223 & 224
09:00 - 12:30	ThAW1 Vision-Based Agile Autonomous Navigation of UAVs	ThAW2 Workshop on Medical Imaging Robotics	ThAW3 Folding in Robotics	ThAW4 International Workshop on Lines, Planes and Manhattan Models for 3-D Mapping	ThAW5 Smart Mechanics: Fusion of Softness and Rigidity in Robot Mechanism	ThAW6 Adaptive Control Methods in Assistive Technologies	ThAW7 Synergies between Learning and Interaction	ThAW8 Shared Autonomy - Joint Learning in Human-Robot Collaboration	ThAW9 Best Practices in Designing Effective Roadmaps for Robotics Innovation	ThAW10 Robotics -Inspired Biology	ThAW11 Embodied Brain Systems Science –from Body Representation in Human Brain Toward Rehabilitation Technology–	ThAW12 Assistance and Service Robotics in a Human Environment	ThAW13 Agricultural Robotics: Learning from Industry 4.0 and Moving into the Future	ThAW14 Frontiers in Contact-Rich Robotic Interaction: Modeling, Optimization and Control Synthesis	ThAW15 Complex Collaborative Systems: Closing the Loop, Learning, and Self-Confidence	ThAW16 Human Movement Understanding for Humanoid and Wearable Robots	ThAW17 Workshop on Physical Human-Robot and Human-Telerobot Interaction: From Theory to Application for Neuro-Rehabilitation	ThAW18 The 2nd Workshop on Machine Learning Methods for High-Level Cognitive Capabilities in Robotics
14:00 - 17:30	ThAW1 (cont.)	ThAW2 (cont.)	ThAW3 (cont.)	ThAW4 (cont.)	ThBW5 (Tutorial) HoloLens As a Perception Platform for Robotics	ThAW6 (cont.)	ThAW7 (cont.)	ThAW8 (cont.)	ThAW9 (cont.)	ThAW10 (cont.)	ThAW11 (cont.)	ThAW12 (cont.)	ThBW13 Learning for Localization and Mapping	ThAW14 (cont.)	ThAW15 (cont.)	ThAW16 (cont.)	ThAW17 (cont.)	ThAW18 (cont.)

*** Coffee breaks will be provided 10:30-11:00 and 15:30 - 16:00.**

Monday September 25, 2017 -- Day 2

	Track 1	Track 2	Track 3	Track 4	Track 5	Track 6	Track 7	Track 8	Track 9	Track 10	Track 11	Track 12	Track 13	Track 14	Track 15	Track 16	Track 17	Track 18	Forum
RM	109 & 110	111 &112	116 &117	114 &115	118-120	121	122	202 & 203	204	205 & 206	207	208 & 209	211-214	217-219	215 & 216	220	221 & 222	223 & 224	201
09:00 - 10:00	MoPP **Plenary I** *Ballroom B, C & D* **Toward Robots That Understand People and Their Environments** **Dieter Fox**, *University of Washington*																		
10:00 - 10:30	MoAPo *Ballroom Foyer* Monday AM Poster Session and Coffee Break																		
10:30 - 12:00	MoAT1 Deep Learning in Robotics and Automation I	MoAT2 Learning and Adaptive Systems I	MoAT3 Autonomous Agents I	MoAT4 Force and Tactile Sensing	MoAT5 Medical Robots I	MoAT6 CP Multiple Aerial Vehicles	MoAT7 Grasping I	MoAT8 Underactuated Robots	MoAT9 Virtual Reality and Interfaces	MoAT10 Micro/Nano Robotics I	MoAT11 Flexible Robots	MoAT12 Soft Material Robotics I	MoAT13 Rehabilitation Robotics	MoAT14 Computer Vision for Automation I	MoAT15 Semantic Scene Understanding	MoAT16 Mapping I	MoAT17 Humanoid	MoAT18 Software and Middleware	
13:00 - 13:45	MoKA1 **Keynote 1** *Room 211-214* **Reliability and Robustness of Autonomous Systems** **Edwin Olson**, *University of Michigan*						MoKA2 **Keynote 2** *Room 109&110* **Fun! Free! Awesome! Advanced Robotics in the Era of Open Source Software** **Brian Gerkey**, *Open Source Robotics Foundation (OSRF)*						MoKA3 **Keynote 3** *Room 118-120* **Attention, Noise, and the Coordination of Robot Movements** **Frank Chongwoo *Park***, *Seoul National University*						
13:45 - 14:30	MoKB1 **Keynote 4** *Room 211-214* **Enhancing Human Capability with Intelligent Machine Teammates** **Julie Shah**, *MIT*						MoKB2 **Keynote 5** *Room 109&110* **Robots That Evolve, Develop, and Learn** **Josh Bongard**, *University of Vermont*						MoKB3 **Keynote 6** *Room 118-120* **Robust Robot Decision Making under Uncertainty: From Known Unknowns to Unknown Unknowns** **David Hsu**, *National University of Singapore*						
14:30 - 16:00	MoBT1 Deep Learning in Robotics and Automation II	MoBT2 Learning and Adaptive Systems II	MoBT3 Service Robots	MoBT4 Haptics and Haptic Interfaces	MoBT5 Medical Robots II	MoBT6 Aerial Systems Applications I	MoBT7 SLAM I	MoBT8 Wearable Robots I	MoBT9 Multi-Robots I	MoBT10 Automation at Micro-Nano Scale	MoBT11 Gripper and Other End-Effectors	MoBT12 Soft Material Robotics II	MoBT13 Dexterous Manipulation	MoBT14 Visual -Based Navigation	MoBT15 Collision Avoidance	MoBT16 Mapping II	MoBT17 Humanoid Sensing	MoBT18 Calibration I	MoFA1 Robotics and Automation in Nuclear Facilities & Environments
16:00 - 16:30	MoPPo *Burrard Foyer* Monday PM Poster Sessions and Coffee Break																		
16:30 - 18:00	MoCT1 Deep Learning in Robotics and Automation III	MoCT2 Learning and Adaptive Systems III	MoCT3 SLAM III	MoCT4 Industrial Robots	MoCT5 Medical Robots and Systems I	MoCT6 Aerial Systems Applications II	MoCT7 SLAM II	MoCT8 Wearable Robots II	MoCT9 Multi-Robots II	MoCT10 Micro/Nano Robotics II	MoCT11 Grasping II	MoCT12 Kinematics and Mechanisms	MoCT13 Motion and Path Planning I	MoCT14 Motion Control I	MoCT15 Biologically -Inspired Robots I	MoCT16 Autonomous Vehicle Navigation I	MoCT17 Force Control	MoCT18 Calibration II	MoFA1 (cont.)

Tuesday September 26, 2017 -- Day 3

	Track 1	Track 2	Track 3	Track 4	Track 5	Track 6	Track 7	Track 8	Track 9	Track 10	Track 11	Track 12	Track 13	Track 14	Track 15	Track 16	Track 17	Track 18	Forum
RM	109 & 110	111 &112	116 &117	114 &115	118-120	121	122	202 & 203	204	205&206	207	208 & 209	211-214	217-219	215 & 216	220	221 & 222	223 & 224	201
09:00 - 10:00	TuPP **Plenary II** *Ballroom B, C & D* **A Quest for Visual Intelligence** **Fei-Fei Li**, *Stanford University/Google*																		
10:00 - 10:30	TuAPo *Ballroom Foyer* Tuesday AM Poster Session and Coffee Break																		
10:30 - 12:00	TuAT1 Deep Learning in Robotics and Automation IV	TuAT2 Biologically -Inspired Robots II	TuAT3 Perception for Grasping and Manipulation I	TuAT4 Localization I	TuAT5 Medical Robots and Systems II	TuAT6 Telerobotics and Teleoperation I	TuAT7 Autonomous Vehicle Navigation II	TuAT8 Field Robotics	TuAT9 Search and Rescue Robots	TuAT10 Cellular Robots I	TuAT11 Social HRI	TuAT12 Motion Control II	TuAT13 Motion and Path Planning II	TuAT14 Soft Material Robotics III	TuAT15 Visual Servoing	TuAT16 Micro/Nano Robotics III	TuAT17 Dynamics	TuAT18 Human Factors and Human Performance Augmentation	
13:00 - 13:45	TuKA1 **Keynote 7** *Room 211-214* **Representations vs Algorithms: Symbols and Geometry in Robotics** **Nicholas Roy**, *MIT*						TuKA2 **Keynote 8** *Room 109&110* **Cooperating without Communicating: Achieving Teaming by Observation** **Lynne Parker**, *University of Tennessee*						TuKA3 **Keynote 9** *Room 118-120* **Robotics As the Path to Intelligence** **Oliver Brock**, *Technical University of Berlin*						
13:45 - 14:30	TuKB1 **Keynote 10** *Room 211-214* **Studies on Interactive Robots - Principles of Conversation** **Hiroshi Ishiguro**, *ATR*						TuKB2 **Keynote 11** *Room 109&110* **Mechanics of Tactile Perception and Haptic Interface Design** **Vincent Hayward**, *ISIR*						TuKB3 **Keynote 12** Room 118-120 **Static and Dynamic Multi-Camera Clusters for Localization and Mapping** **Steven Waslander**, *University of Waterloo*						
14:30 - 16:00	TuBT1 Learning from Demonstration I	TuBT2 Biologically -Inspired Robots III	TuBT3 Perception for Grasping and Manipulation II	TuBT4 Localization II	TuBT5 Legged Robots I	TuBT6 Telerobotics and Teleoperation II	TuBT7 Autonomous Vehicle Navigation III	TuBT8 Aerial Systems: Perception and Autonomy I	TuBT9 AI-Based Methods	TuBT10 Cellular Robots II	TuBT11 Physical HRI	TuBT12 Medical Robots and Systems III	TuBT13 Motion and Path Planning III	TuBT14 Soft Material Robotics IV	TuBT15 Visual Tracking	TuBT16 Space Robotics	TuBT17 Formal Methods for Robotics	TuBT18 Physically Assistive Devices	TuFA1 Entrepreneurship forum & Start-Up Competition
16:00 - 16:30	TuPPo *Burrard Foyer* Tuesday PM Poster Session and Coffee Break																		
16:30 - 18:00	TuCT1 Learning from Demonstration II	TuCT2 Biologically -Inspired Robots IV	TuCT3 Manipulation Planning	TuCT4 Localization III	TuCT5 Legged Robots II	TuCT6 Human Detection and Tracking	TuCT7 Marine Robotics I	TuCT8 Aerial Systems: Perception and Autonomy II	TuCT9 Recognition	TuCT10 Swarms	TuCT11 Cognitve and Physical HRI	TuCT12 Sensor Fusion	TuCT13 Motion and Path Planning IV	TuCT14 Intelligent Transportation	TuCT15 Biped Locomotion	TuCT16 Impedance and Adaptive Control	TuCT17 Physical Human-Robot Interaction	TuCT18 Assembly and Automation	TuFA1 (cont.)
19:00 - 22:00	**Conference Banquet** *Ballroom B, C & D*																		

Wednesday September 27, 2017 – Day 4

	Track 1	Track 2	Track 3	Track 4	Track 5	Track 6	Track 7	Track 8	Track 9	Track 10	Track 11	Track 12	Track 13	Track 14	Track 15	Track 16	Track 17	Track 18	Forum
RM	109 & 110	111 &112	116 &117	114 &115	118-120	121	122	202 & 203	204	205 & 206	207	208 & 209	211-214	217-219	215 & 216	220	221 & 222	223 & 224	201
09:00 - 10:00	WePP **Plenary III** *Ballroom B, C & D* **Automation vs. Augmentation: Defining the Future of Socially Assistive Robotics** **Maja Mataric**, *University of Southern California*																		WeFA1 08:30-12:00 Research and Practice Ethics in Robotics and Automation
10:00 - 10:30	WeAPo *Ballroom Foyer* Wednesday AM Poster Session and Coffee Break																		
10:30 - 12:00	WeAT1 Model Learning for Control	WeAT2 Compliant Joint/Mechanism I	WeAT3 Manipulation	WeAT4 Optimization and Optimal Control I	WeAT5 Legged Robots III	WeAT6 RGBD Perception I	WeAT7 Biomimetics I	WeAT8 Humanoid and Bipedal Locomotion I	WeAT9 Human Assistive Systems	WeAT10 Object Detection, Segementation, and Categorization I	WeAT11 Aerial Systems: Mechanics and Control I	WeAT12 Agricultural Robotics I	WeAT13 Motion and Path Planning V	WeAT14 Humanoid Locomotion	WeAT15 Aerial I	WeAT16 Reactive and Sensor-Based Planning I	WeAT17 Redundant Robotics	WeAT18 Failure Detection and Recovery	
12:00 - 13:45	**Awards Luncheon** *Ballroom B, C & D*																		
13:45 - 14:30	WeKB1 **Keynote 13** *Room 211-214* **Assembling Orders in Amazon's Robotic Warehouses** **Joey Durham**, *Amazon Robotics*						WeKB2 **Keynote 14** *Room 109&110* **Ultrasound and Ultrasound-Mediated Image Guidance for Robot Assisted Surgery** **Tim Salcudean**, *University of British Columbia*						WeKB3 **Keynote 15** *Room 118-120* **Robotics Goes Soft: Challenges and Achievements, for New Robotics Scenarios** **Cecilia Laschi**, *the BioRobotics Institute, Scuola Superiore Sant'Anna*						
14:30 - 16:00	WeBT1 Deep Learning	WeBT2 Compliant Joint/Mechanism II	WeBT3 Planning	WeBT4 Optimization and Optimal Control II	WeBT5 Surgical Robotics I	WeBT6 RGBD Perception II	WeBT7 Biomimetics II	WeBT8 Humanoid and Bipedal Locomotion II	WeBT9 Calibration and Identification	WeBT10 Object Detection, Segementation, and Categorization II	WeBT11 Aerial Systems: Mechanics and Control II	WeBT12 Agricultural Robtics II	WeBT13 Task Planning	WeBT14 Environment Monitoring	WeBT15 Computer Vision for Robotic Applications I	WeBT16 Reactive and Sensor-Based Planning II	WeBT17 Soft Material Robotics V	WeBT18 Marine Robotics II	
16:00 - 16:30	WePPo *Burrard Foyer* Wednesday PM Poster Session and Coffee Break																		
16:30 - 18:00	WeCT1 Mobile Manipulation and Path Planning	WeCT2 Mechanism Design	WeCT3 Force Control and Tactile Sensing	WeCT4 Simulation and Animation	WeCT5 Surgical Robotics II	WeCT6 RGBD Perception III	WeCT7 Climbing Robots	WeCT8 Social Human Robot Interaction	WeCT9 Sensor Network	WeCT10 Mapping and Localization	WeCT11 Sensing and Perception	WeCT12 SLAM IV	WeCT13 Planning, Scheduling, and Coordination	WeCT14 Aerial II	WeCT15 Computer Vision for Robotic Applications II	WeCT16 Wheeled Robotics	WeCT17 Kinematics	WeCT18 Social Aspects	
18:00 - 19:00	**Informal Talk by Jorge Cham** *Ballroom B, C & D*																		
19:00 - 21:00	**Farewell Reception** *Ballroom Foyer*																		


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iROS
VANCOUVER 2017

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Registration

The registration desk, located in the Vancouver Convention Centre Ballroom Foyer on the first level, will be open for general information, picking up your registration materials, and onsite registrations.

Registration hours are as follows:

Day	Time
Sunday, September 24	7:00 am – 8:00 pm
Monday, September 25	7:00 am – 6:00 pm
Tuesday, September 26	7:00 am – 6:00 pm
Wednesday, Sept. 27	7:00 am – 6:00 pm
Thursday, Sept. 28	7:00 am – 3:00 pm

On-Site Registration Fees

Category	Onsite
IEEE/RSJ/SICE Member	$900
Non-member	$1100
IEEE Student Member	$475
Student Non-member	$575
IEEE Life Member	Free

On-Site Workshops and Tutorials Registration Fees

Category	Onsite
IEEE/RSJ/SICE Member	$175
Non-member	$225
IEEE Student Member	$100
Student Non-member	$150
IEEE Life Member	Free

Exhibition

IROS 2017 Exhibits are located at the Vancouver Convention Centre in Ballroom A, on the first level. Exhibit hours are as follows:

Day	Time
Monday, September 25	8:00 am – 5:00 pm
Tuesday, September 26	8:00 am – 6:00 pm
Wednesday, Sept. 27	8:00 am – 3:00 pm

Conference Web App

IROS has partnered with design firm INFOVAYA to provide an interactive web app for the conference.

Please visit the following link to register and view the app:

https://events.infovaya.com/

Once logged in, you can:

- View your events
- Explore the program in full detail
- Plan your time at the event
- Set up your profile
- Browse other profiles
- Access conference documents
- View venue maps / floor plans
- Like your favorites
- Find the most popular presentations

Vancouver Convention Centre Floor Map

Conference Events on Level 1

Ballroom A: Exhibits
Ballrooms B, C & D: Plenary Talks, Receptions, and Conference Banquet
Parallel Technical Sessions: Tracks 1-7

Conference Events on Level 2

Parallel Technical Sessions: Tracks 8-18 Forums

Conference Events on Level 3

Society and Board Meetings
RSJ/SICE Luncheons, Tutorial

Welcome Message

A warm welcome to IROS 2017, the 30th anniversary of the IROS conference. Bienvenue au Canada, on the 150th anniversary of this young nation. With the strong support of the IROS community, we present to you a rich and exciting IROS 2017 program, consisting of plenary and keynote talks, parallel technical sessions, poster presentations, robot competitions and challenges, industrial exhibits, technical tours, and social events. We wish everyone a great time during the five-day program of IROS 2017 in the beautiful city of Vancouver, with the company of the best and brightest robotics researchers and engineers from around the world!

This year we received a total of 2164 paper submissions including 1874 regular paper submissions and, for the first time, 290 submissions to Robotics and Automation Letters (RA-L) with IROS option. Upon a careful review of the papers, a total of 970 papers were accepted into the IROS program, representing an acceptance rate of 45%. Arranged into 162 sessions, all regular papers will be presented orally in 18 parallel tracks over three days. In addition, 286 abstract-only submissions were received, of which 278 are included in the IROS program as poster presentations. A total of 63 workshop and tutorial proposals were submitted, and 39 workshops and two tutorials were accepted, and will take place on the two days before and after the main conference.

The IROS 2017 technical program is anchored by three plenary talks and sixteen keynote presentations from leaders in our field, on a wide range of topics representing the latest in robotics and intelligent systems research. In addition, three forums addressing pressing needs of our community are organized. In parallel with the technical talks, the program also includes three robot competitions and challenges: on robot grasping, humanoid robot applications, and drone racing. This year's conference also sees a strong industrial participation with over 50 industrial exhibits and sponsors at all levels of sponsorship from bronze to platinum. Technical tours to local industries and research labs at two local universities, UBC and SFU, have also been organized to further enrich the IROS program.

IROS has enjoyed in recent years a steady growth, and the management and the organization of the conference has

become a major undertaking, requiring the collective efforts of many individuals. We would like to take this opportunity and thank the large team of volunteers and supporters of the conference for their time and dedication. Our Conference Paper Review Board, that is 270+ members strong and led by Tony Maciejewski and his dedicated editors, has done an outstanding job with reviewing the papers and ensuring the technical quality of the accepted papers and the fairness of the review process. In addition, our inaugural partnership with RA-L was made smooth by its editor-in-chief, Antonio Bicchi and his Editorial Board, to allow IROS to bring this valuable and timely service to the IROS community. We would also like to express our gratitude to the members of the organizing committee whose tireless work managed the workflow and the many threads in organizing IROS 2017. Last but not least, we thank the authors and registrants for their contributions to IROS 2017. It is truly an amazing collective achievement, and we would like to congratulate everyone involved for a job well done.

IROS is 30 years old. From a humble beginning in 1988 as a workshop with just over 100 papers, to a leading multi-dimensional international conference attended by thousands, IROS has played a major role in shaping the future of intelligent robots and systems. With the explosive growth of robotics and the significant demand being placed on robotics researchers, we as a community must respond by continuing to thrive and meet the challenges before us. We wish IROS many more years of success in our mission to deliver benefits to the scientific and engineering communities and to society at large.

Once again, enjoy IROS 2017, and Bon séjour ą Vancouver!

Hong Zhang
University of Alberta
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About Vancouver

"To describe the beauties of this region will on some future occasion be a very grateful task to the pen of a skilled panegyrist.

The serenity of the climate, the innumerable pleasing landscapes, and the abundant fertility that unassisted nature puts forth, requires only to be enriched by the industry of man with villages, mansions, cottages, and other buildings."

Captain George Vancouver
British Explorer

Vancouver was originally a small sawmilling settlement, called Granville in the 1870s. It was incorporated as a city in April 1886 (just before it became the western terminus of the first trans-Canada railway, the Canadian Pacific) and was renamed to honour the English navigator George Vancouver, of the Royal Navy, who had explored and surveyed the coast in 1792. A disastrous fire just two months after incorporation destroyed the city in less than an hour. The city recovered, however, to become a prosperous port, aided in part by the opening of the Panama Canal (1914), which made it economically feasible to export grain and lumber from Vancouver to the east coast of the United States and to Europe. In 1929 two large suburbs to the south, Point Grey and South Vancouver, amalgamated with Vancouver, and its metropolitan area became the third most populous in Canada. By the 1930s Vancouver was Canada's major Pacific coast port. After World War II it developed into Canada's main business hub for trade with Asia and the Pacific Rim.

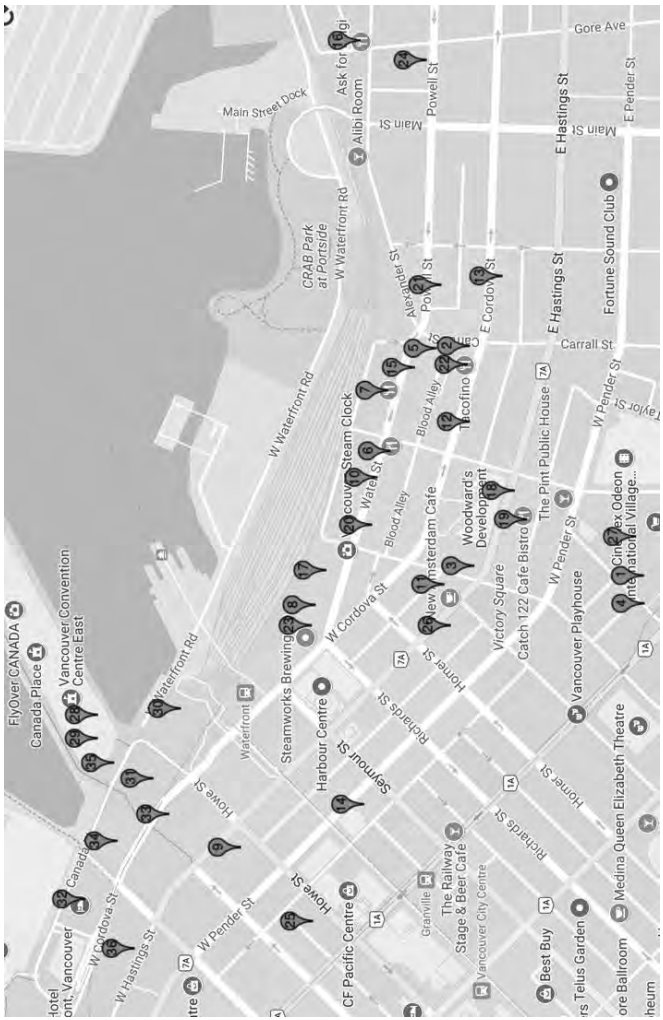
Today, the city is the industrial, commercial, and financial heart of British Columbia, with trade and transportation as basic components of its economy. Its ice-free deepwater port (on Burrard Inlet), Canada's largest, has extensive docks and grain elevator facilities; it handles freighters, a

fishing fleet, and some ferries. Major cargoes include bulk commodities (grain, coal, sulfur, potash, and petrochemicals), forest products, steel, and containers. It is also an important port for cruise ships, with Alaska as their most common destination.

The city has become a centre for high-technology industries and for television and film production. Indeed, in the early 21st century it ranked after Los Angeles and New York City as the third largest film-production location in North America, and many television programs are produced in the region. American film and TV companies are attracted to the city by its ability to “stand in” for other places, by its lower production costs, and by the professional expertise of the local crews.

The most popular tourist attraction in Vancouver is perhaps Stanley Park, within walking distance to the Vancouver Convention Centre. With its gardens and large public aquarium, Stanley Park occupies some 1,000 acres (400 hectares) of the downtown peninsula at the harbour entrance and is surrounded by a scenic 5.5-mile (8.8-km) seawall that is popular with strollers, joggers, and inline skaters. Lost Lagoon, at the entrance to the park, was named by poet Pauline Johnson, daughter of an Ontario Mohawk chief, for the tidal forces that regularly emptied the lagoon. Today its 41 acres (16.6 hectares) are enclosed, but the old name has been retained. The 55-acre (22-hectare) VanDusen Botanical Garden excels among many other parks and gardens in the city. Bloedel Floral Conservatory lies just to the east in Queen Elizabeth Park, named in 1939 for the Queen Mother. Cypress and Mount Seymour provincial parks are nearby.

Nearby Dining



1 Jam Café
2 Bauhaus Restaurant
3 Meat & Bread
4 Chambar
5 L'Abattoir Restaurant
6 The Flying Pig
7 Old Spaghetti Factory
8 Steamworks
9 Scoozi's
10 Water Street Café
11 Nuba
12 Tuc Craft Kitchen
13 Nicli Antica Pizzeria
14 Gyoza Bar
15 Meet In Gastown
16 Ask for Luigi
17 Al Porto Ristorante
18 Wildebeest
19 Catch 122
20 Pourhouse Restaurant
21 Rodney's Oyster House in Gastown
22 Tacofino
23 Momo Sushi
24 Cuchillo
25 Joyeaux Cafe & Restaurant
26 La Taqueria
27 Pizzeria Ludica
28 Starbucks
29 Five Sails Restaurant
30 Miku
31 ARC
32 Bella Gelateria & Gelato
33 Lions Pub
34 Fatburger
35 Cactus Club Café
36 Nightingale

IROS 2017 Dining Options

#	Title	Cost	Style
1	Jam Café	$$	Café
2	Bauhaus Restaurant	$$$$	European
3	Meat & Bread	$	Fast Food, Soups
4	Chambar	$$$$	Belgian
5	L'Abattoir Restaurant	$$$$	French
6	The Flying Pig	$$	American, Bar
7	Old Spaghetti Factory	$$$	Italian
8	Steamworks	$$	Pub
9	Scoozi's	$$	Greek
10	Water Street Café	$$	Canadian
11	Nuba	$$$	Lebanese
12	Tuc Craft Kitchen	$$	Canadian
13	Nicli Antica Pizzeria	$$	Italian
14	Gyoza Bar	$$$	Japanese
15	Meet In Gastown	$$	Canadian
16	Ask for Luigi	$$$	Italian
17	Al Porto Ristorante	$$$	Italian
18	Wildebeest	$$	Canadian
19	Catch 122	$$	Canadian
20	Pourhouse Restaurant	$$	American, Bar
21	Rodney's Oyster House in Gastown	$$$	Seafood, Bar
22	Tacofino	$$	Mexican
23	Momo Sushi	$	Japanese
24	Cuchillo	$$$	Mexican, Latin
25	Joyeaux Cafe & Restaurant	$	Vietnamese
26	La Taqueria	$	Mexican, Spanish
27	Pizzeria Ludica	$	Italian
28	Starbucks	$$$	Coffee
29	Five Sails Restaurant	$$$$	Seafood
30	Miku	$$$$	Japanese
31	ARC	$$$$	Canadian
32	Bella Gelateria & Gelato	$$	Desert
33	Lions Pub	$$	British, Bar
34	Fatburger	$	Fast Food
35	Cactus Club Café	$$$	Canadian
36	Nightingale	$$$	Canadian

Street Address	Phone	Distance from VCC
556 Beatty St	778-379-1992	1.3 KM
1 Cordova St W	604-974-1147	1.2 KM
370 Cambie St	604-566-9003	950 M
568 Beatty St	604-879-7119	1.3 KM
217 Carrall St	604-568-1701	1.2 KM
102 Water St	604-559-7968	1 KM
53 Water St	604-684-1288	1.1 KM
375 Water St	604-689-2739	700 M
445 Howe St	604-684-1009	500 M
300 Water St	604-689-2832	950 M
207 West Hastings Street	604-688-1655	1 KM
60 W Cordova St	604-559-8999	1.1 KM
62 E Cordova St	604-669-6985	1.1 KM
622 Pender St W	604-336-5563	750 M
12 Water St	604-688-3399	1.1 KM
305 Alexander St	604-428-2544	1.7 KM
321 Water St	604-683-8376	750 M
120 Hastings St W	604-687-6880	1.1 KM
122 Hastings St W	604-731-3474	1.1 KM
162 Water St	604-568-7022	850 M
52 Powell St	604-685-2005	1.3 KM
15 Cordova St W	604-899-7907	1.2 KM
375 Water St	604-683-7632	700 M
261 Powell St	604-559-7585	1.6 KM
551 Howe St	604-681-9168	650 M
322 Hastings St W	604-568-4406	1.2 KM
189 Keefer Place	604-669-5552	1.5 KM
999 Canada Place, #140	604-696-9909	0 KM
999 Canada Place, #300	604-844-2855	0 KM
70-200 Granville St	604-568-3900	450 M
900 Canada Place Way	604-691-1818	210 M
1001 Cordova St W	604-569-1010	400 M
888 Cordova St W	604-488-8602	300 M
200 Burrard St, #23	n/a	350 M
1085 Canada Pl	604-620-7410	0 KM
1017 West Hastings Street	604-695-9500	500 M

Social Events of the Conference

Welcome Reception
Sunday September 24, 19:00 - 21:00
Ballroom Foyer, Vancouver Convention Centre

IROS 2017 will welcome its participants with a two-hour reception, on Sunday September 24, in the Foyer and the Terrace section on Meeting Level 1 of the Vancouver Convention Centre. The participants will take in the spectacular view of North Vancouver from the waterfront Ballroom foyer, reconnect with old friends and meet new colleagues. 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 the five days of the conference, twice a day. Serving stations will be located conveniently outside the Session Rooms, the Ballrooms, and the Exhibit Hall.

OC & iCPRB Appreciation Dinner
(by invitation only)
Monday September 25, 19:00 - 21:00
Waterview, 1661 Granville St, Vancouver

Located on the downtown Vancouver waterfront directly overlooking Burrard Inlet with stunning views of False Creek, Granville Island and the surrounding cityscape and mountain backdrop.

For the IROS Conference Paper Review Board, IROS 2017 Organizing Committee, and sponsoring society VIPs.

RSJ-IAC Luncheon
Monday September 25, 12:00 - 13:00
Room 301, Vancouver Convention Centre

Because of time restriction, attendees in IROS 2017 could not visit all exhibition booths. The Robotics Society of Japan (RSJ) will hold an industry-academia cooperative luncheon introducing exhibitors' products and articles. This will help most IROS attendees not to miss informative exhibitions. This will also be a good opportunity of the start of your collaboration. Lunch boxes will be provided for attendees, but the number is limited (A first-come-first -served basis).

IEEE RAS Women in Engineering Leadership Lunch
Monday September 25, 12:00 - 13:30
Room 306, Vancouver Convention Centre

The 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, men are more than welcome to participate and enjoy the discussion.

IEEE RAS Lunch with Leaders - Student Lunch
Tuesday September 26, 12:00 - 13:30
Room 301, Vancouver Convention Centre

This luncheon is open to student attendees, offering the chance to meet and interact with leaders from RAS. Each table will be associated with a focus area and several discussion topics. Leaders will be paired with tables according to their interests and background.

IEEE RAS Young Professionals Lunch
Tuesday September 26, 12:00 - 13:30
Room 306, Vancouver Convention Centre

Under the umbrella of IEEE Young Professionals program, the Robotics & Automation Society (RAS) is further empowering its young professionals through the RAS Young Professionals (YP) group. 'Young Professionals' are IEEE members who have graduated with their first professional degree within the last 15 years, and who are not student members.

Conference Banquet
Tuesday September 26, 19:00 - 22:00
Ballrooms B, C & D, Vancouver Convention Centre

IROS 2017 Conference Banquet will be held on Tuesday, September 26, in Ballrooms B, C and D of the Vancouver Convention Centre. The evening will be dedicated to the celebration of 30 years of IROS conferences, with recognition of the people who have made significant contributions to IROS. The celebration activities will be light-hearted with cash-prize draws for the lucky few who happened to have registered for the IROS 2017 at the right moments. The delegates will also hear brief reports from the conference chairs with acknowledgment of people who have played key roles in the organization of IROS 2017. The dinner menu will feature western Canadian foods, accompanied by entertainment and completed with wine choices from the nearby BC Okanagan Valley. The evening will end with the introduction of IROS 2018.

Awards Lunch
Wednesday September 27, 12:00 - 13:45
Ballrooms B, C & D, Vancouver Convention Centre

As has been customary, we will announce winner of various IROS best paper awards at this ceremony where boxed lunch will be provided. A total of seven best paper awards will be handed out, including the Best Student Paper and the Best Conference Paper. Please come and join your colleagues in celebration of their achievements.

SICE Luncheon
Wednesday September 27, 12:00 - 13:30
Room 306, Vancouver Convention Centre

SICE Luncheon Seminar, sponsored by SICE (one of co-sponsors of IROS) provides the opportunity for academic and industry participants to exchange information and opinions, to build networks, and to foster entrepreneurship in robotics and systems.

Farewell Reception
Wednesday September 27, 19:00 - 21:00
Ballroom Foyer, Vancouver Convention Centre


By Philip Jama

IROS 2017 will bid its farewell to the participants in this two-hour reception, on Wednesday September 27, in the Foyer and the Terrace section on Meeting Level 1 of the Vancouver Convention Centre where the Welcome Reception is held. 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.

Vancouver Attractions

Landsea Tours & Adventures
https://vancouvertours.com/

Landsea Tours & Adventures provides half-day and full-day sightseeing excursions around Vancouver, Victoria, Whistler, the Sea to Sky corridor and Vancouver's North Shore. Our highly trained driver/guides host fun and informative tours conducted on our preferred mini-coaches. With hotel pick-up and drop-off, and a la carte adventure options, each tour is unique and allows for a more personalized experience. Fully narrated and inclusive of multiple stops with free time to capture the stunning scenery, you're sure to not miss a thing.

West Coast Sightseeing
https://westcoastsightseeing.com

What does your perfect Vancouver day look like? With our Hop-On, Hop-Off tour route, you get to decide. Cruise and choose from over 20 stops at world-class attractions. Enjoy a birds-eye view of Vancouver at your own pace, complete with one-of-a-kind commentary.

Vancouver Brewery Tours
https://vancouverbrewerytours.com

Vancouver Brewery Tours launched BC's first brewery tour company in June 2013, and since then, we've had thousands of beer lovers from all across the globe hop on tour with us. On our fun and informative brewery tours, you'll sample your way through Vancouver's best craft breweries, meet fellow beer lovers, chat with the brewery staff, and maybe even learn a thing or two! If you haven't been on a brewery tour, Vancouver is the place to start!

Sea Vancouver Tours
http://seavancouver.com/

Launching from the Westin Bayshore Hotel, our fleet of open-air, purpose built, zodiac-style vessels are Vancouver's fastest and safest way to view the city from the sea. Waterfront Sightseeing Adventures begin cruising along the Vancouver Inner Harbour, then soaring up to 55 Km/h as we cross the Burrard Inlet. Along the way our experienced, qualified and passionate skippers will provide a fascinating array of information, highlighting the sights of Vancouver's

Coal Harbour, Northshore, English Bay, False Creek and Stanley Park.

Sea to Sky Gondola
https://www.seatoskygondola.com/

The Sea to Sky Gondola is located on Highway 99 just south of Squamish, a scenic 45 minute drive from downtown Vancouver. A 10 minute gondola ride will take you up to a truly magical place with some of the most spectacular views you will ever see and activities for all interests and ages.

36800 Highway 99 Squamish, BC
Phone: 604.892.2550 , 1.855.732-8675

Vancouver Aquarium
http://www.vanaqua.org/

Penguins, sea otters & 50,000 other aquatic creatures await your arrival at Canada's largest aquarium. Enjoy the new sea lion exhibit, sea otter feeds, shark dives & the free-roaming animals found in the popular Amazon Gallery.

845 Avison Way Vancouver, BC
Phone: 604.659.3474

Stanley Park
http://vancouver.ca/parks-recreation-culture/stanley-park.aspx

Ideally situated on a peninsula at the northwestern edge of downtown Vancouver, Stanley Park is one of the city's main tourist destinations, attracting approximately 8 million visitors each year. Featuring lovely beaches, miles of well-maintained paved and dirt trails, Canada's largest aquarium and an array of can't-miss kid-friendly spots (including a pool, water park, miniature railway and more), this 400-hectare (1,000-acre) haven is recognized as one of the greatest urban parks in the world.

Discounts for IROS Attendees:SHOW YOUR BADGE
https://www.tourismvancouver.com/meetings/plan/show-your-badge/

Show Your Badge for Exclusive Discounts! Convention delegates are eligible to receive exclusive discounts at participating member businesses. Please note that many offers require you to book in person at Tourism Vancouver's Visitor Centre.

Transportation

From Vancouver Airport (YVR)
to the Vancouver Convention Centre

Skytrain

Cost: $9.10
Travel Time: 30 minutes

From the Vancouver Airport (YVR) , board the CANADA LINE / WATERFRONT train. Tickets may be purchased from Compass Vending Machines located in the Skytrain loading platforms.

Taxi

Cost: $45
Travel Time: 32 minutes

Airport taxis are available at Taxi stands on Level 2 of the domestic and international arrival area.

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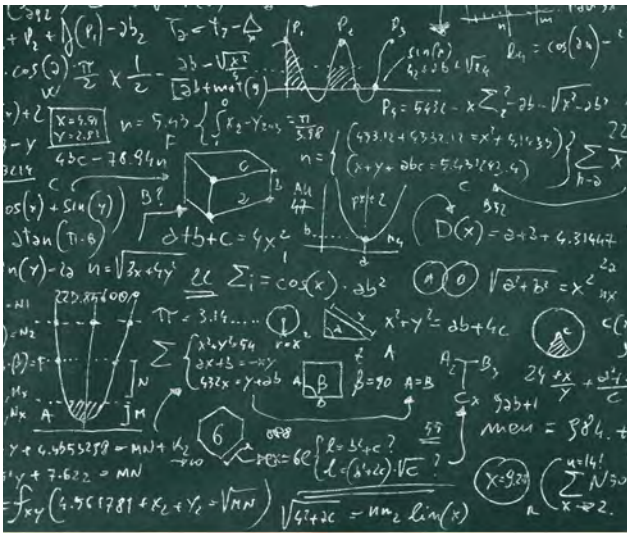
Plenaries & Keynotes

Plenaries

Dieter Fox, University of Washington

Fei-Fei Li, Stanford University/Google

Maja Mataric, University of Southern California



Keynotes

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Vincent Hayward, Institut des Systèmes Intelligents et de Robotique (ISIR)

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Plenary I

Unifying Model-based and Learning-based Robotics

Dieter Fox
University of Washington

Monday 25 September
09:00 - 10:00
Ballrooms B, C & D

Abstract
The predominant approach to perception, control, and planning in robotics is to design approximate models of the physics underlying a robot, its sensors, and its interactions with the environment. These model-based techniques often capture properties such as the propagation of light and sound, or the mass, momentum, shape, and surface friction of objects, and use these to generate controls that change the environment in a desirable way. While physics-based models are very general and have broad applicability, they can be brittle when not all relevant model parameters are known or observed with sufficient accuracy. Over the last years, deep learning has been applied successfully to various recognition and control learning tasks in robotics. While these approaches often result in state-of-the-art performance on specific test cases, they still lack the generalization capabilities of model-based approaches. In this talk, I will discuss the pros and cons of model-based and learning-based techniques using examples from the research done in my lab. Building on these experiences, I will present ideas on how these two paradigms can be unified. Rather than treating them as opposing solutions, I argue that their combination could inherit the benefits of both paradigms, thereby enabling progress toward the development of truly robust, autonomous systems.

Biography
Dieter Fox is a Professor in the Paul G. Allen School of Computer Science & Engineering at the University of Washington, where he heads the UW Robotics and State Estimation Lab. From 2009 to 2011, he was also Director of the Intel Research Labs Seattle. Dieter obtained his Ph.D. from the University of Bonn, Germany. His research is in robotics and artificial intelligence, with a focus on

state estimation and perception applied to problems such as mapping, object detection and tracking, manipulation, and activity recognition. He has published more than 180 technical papers and is the co-author of the textbook "Probabilistic Robotics." He is a Fellow of the IEEE and the AAAI, and he received several best paper awards at major robotics, AI, and computer vision conferences. He was an editor of the IEEE Transactions on Robotics, program co-chair of the 2008 AAAI Conference on Artificial Intelligence, and program chair of the 2013 Robotics: Science and Systems conference.

Plenary II

A Quest for Visual Intelligence

Fei-Fei Li
Stanford University/Google

Tuesday 26 September
09:00 - 10:00
Ballrooms B, C & D

Abstract
It took nature and evolution more than five hundred million years to develop a powerful visual system in humans. The journey for AI and computer vision is about half of a century. In this talk, I will briefly discuss the key ideas and the cutting edge advances in the quest for visual intelligences in computers, focusing on work done in our lab over the years.

Biography
Dr. Fei-Fei Li is currently on sabbatical as the Chief Scientist of AI/ML at Google Cloud. She is an Associate Professor in the Computer Science Department at Stanford, and the Director of the Stanford Artificial Intelligence Lab. Dr. Fei-Fei Li's main research areas are in machine learning, deep learning, computer vision and cognitive and computational neuroscience. She has published more than 150 scientific articles in top-tier journals and conferences, including Nature, PNAS, Journal of Neuroscience, CVPR, ICCV, NIPS, ECCV, IJCV, IEEE-PAMI, etc. Dr. Fei-Fei Li obtained her B.A. degree in physics from Princeton in 1999 with High Honors, and her PhD degree in electrical engineering from California Institute of Technology (Caltech) in 2005. She

joined Stanford in 2009 as an assistant professor, and was promoted to associate professor with tenure in 2012. Prior to that, she was on faculty at Princeton University (2007-2009) and University of Illinois Urbana-Champaign (2005-2006). Dr. Li is the inventor of ImageNet and the ImageNet Challenge, a critical large-scale dataset and benchmarking effort that has contributed to the latest developments in deep learning and AI. In addition to her technical contributions, she is a national leading voice for advocating diversity in STEM and AI. She is co-founder of Stanford's renowned SAILORS outreach program for high school girls and the national non-profit AI4ALL. For her work in AI, Dr. Li is a speaker at the TED2015 main conference, a recipient of the IAPR 2016 J.K. Aggarwal Prize, the 2016 nVidia Pioneer in AI Award, 2014 IBM Faculty Fellow Award, 2011 Alfred Sloan Faculty Award, 2012 Yahoo Labs FREP award, 2009 NSF CAREER award, the 2006 Microsoft Research New Faculty Fellowship and a number of Google Research awards. Work from Dr. Li's lab have been featured in a variety of popular press magazines and newspapers including New York Times, Wall Street Journal, Fortune Magazine, Science, Wired Magazine, MIT Technology Review, Financial Times, and more. She was selected as one of the "Great Immigrants: The Pride of America" in 2016 by the Carnegie Foundation, past winners include Albert Einstein, Yoyo Ma, and Sergey Brin.

Plenary III

Automation vs. Augmentation: Defining the Future of Socially Assistive Robotics

Maja J. Mataric
U of Southern California

Wednesday 27 September, 09:00 - 10:00
Ballrooms B, C & D

Abstract
Robotics has been driven by the desire to automate work, but automation raises concerns about the impact on the future of work. Less discussed but no more important are the implications on human health, as the science on longevity and resilience indicates that having the drive to work is key for health and wellness.

However, robots, machines that were originally invented to automate work, are also becoming helpful by not doing any physical work at all, but instead by motivating and coaching us to do our own work, based on evidence from neuroscience and behavioral science demonstrating that human behavior is most strongly influenced by physically embodied social agents, including robots.The field of socially assistive robotics (SAR) focuses on developing intelligent socially interactive machine that that provide assistance through social rather than physical means. The robot's physical embodiment is at the heart of SAR's effectiveness, as it leverages the inherently human tendency to engage with lifelike (but not necessarily human-like or otherwise biomimetic) agents. People readily ascribe intention, personality, and emotion to robots; SAR leverages this engagement to develop robots capable of monitoring, motivating, and sustaining user activities and improving human learning, training, performance and health outcomes. Human-robot interaction (HRI) for SAR is a growing multifaceted research field at the intersection of engineering, health sciences, neuroscience, social, and cognitive sciences, with rapidly growing commercial spinouts. This talk will describe research into embodiment, modeling and steering social dynamics, and long-term adaptation and learning for SAR, grounded in projects involving multi-modal activity data, modeling personality and engagement, formalizing social use of space and non-verbal communication, and personalizing the interaction with the user over a period of months, among others. SAR systems have been validated with a variety of user populations, including stroke patients, children with autism spectrum disorders, elderly with Alzheimers and other forms of dementia; this talk will cover the short, middle, and long-term commercial applications of SAR, as well as the frontiers of SAR research.

Biography

Maja Mataric is Chan Soon-Shiong Professor of Computer Science, Neuroscience, and Pediatrics at the University of Southern California, founding director of the USC Robotics and Autonomous Systems Center, and Vice Dean for Research in the Viterbi School of Engineering. Her PhD and MS are from MIT, and BS from the University of Kansas. She is Fellow of AAAS, IEEE, and AAAI, and received the Presidential Award for Excellence in Science, Mathematics and Engineering Mentoring, Anita Borg Institute Women of Vision Award in Innovation, the Okawa Foundation, NSF Career, MIT TR35, and IEEE RAS Early Career Awards. She has published extensively and is active in K-12 STEM outreach. A pioneer of socially assistive robotics, her research enables robots to help people through social

interaction in therapy, rehabilitation, training, and education, developing robot-assisted therapies for autism, stroke, Alzheimer's and other special needs, as well as wellness interventions http://robotics.usc.edu/interaction/. She is also founder and CSO of Embodied, Inc. www.embodied.me.

Keynote 1

Reliability and Robustness of Autonomous Systems

Edwin Olson
University of Michigan
Monday 25 September
13:00 - 13:45
Room 211

From self-driving cars to domestic robots, it's relatively easy to build a system that works well enough for the purposes of a video. Achieving high levels of reliability, on the other hand, is all-too-often viewed as an engineering step through which bugs are removed and corner cases are addressed. In some domains, however, the gap between the reliability demonstrated by today's system and the bar needed for real-world deployment remain many orders of magnitude apart. This is not a matter of engineering polish, but rather a need for fundamentally different ways of building our systems.

Biography: Edwin Olson is an Associate Professor of Computer Science and Electrical Engineering at the University of Michigan, and co-founder/CEO of May Mobility, Inc., which develops autonomous cars. He earned his PhD from MIT in 2008 for work in robot mapping.

He has worked on autonomous vehicles for the last 10 years, including the 2007 DARPA Urban Challenge, collaborating with Ford as a Principle Investigator on their autonomous vehicle program, serving as Co-Director for Autonomous Driving Development at Toyota Research Institute, and running the APRIL lab at the University of Michigan since 2008. His academic research includes work on perception, planning, and mapping. He was awarded a DARPA Young Faculty Award, named one of Popular Science's "Brilliant 10", and was winner of the 2010 MAGIC

robotics competition. He is perhaps best known for his work on AprilTags, SLAM using MaxMixtures and SGD, and Multi-Policy Decision Making.

Keynote 2

Fun! Free! Awesome! Advanced robotics in the era of Open Source Software

Brian Gerkey
Open Source Robotics Foundation (OSRF)
Monday 25 September
13:00 - 13:45 Room 109

After many years of it being “just around the corner,” we are now witnessing the beginning of a robot revolution. We hear about robots daily, from awe-inspiring technical achievements to breath-taking investments and acquisitions. Why? And, why now? In this session, I’ll explain how open source software, embedded computing, and new sensors have come together to change the landscape for robotics developers (and users).

Biography: Brian Gerkey is CEO of OSRF. Prior to joining OSRF, Brian was Director of Open Source Development at Willow Garage. Previously, Brian was a Computer Scientist in the Artificial Intelligence Center at SRI, and before that, a postdoctoral research fellow in the Artificial Intelligence Lab at Stanford University. Brian received his Ph.D. in Computer Science from the University of Southern California (USC) in 2003, his M.S. in Computer Science from USC in 2000, and his B.S.E. in Computer Engineering, with a secondary major in Mathematics and a minor in Robotics and Automation, from Tulane University in 1998. Brian is a strong believer in, frequent contributor to, and constant beneficiary of open source software. Since 2008, Brian has worked on the ROS Project, which develops and releases one of the most widely used robot software platforms in robotics research and education (and soon industry). He is founding and former lead developer on the open source Player Project, which continues to maintain widely used robot simulation and development tools. For his work on Player and ROS, Brian was recognized by MIT Technology Review with the TR35 award in 2011 and by Silicon Valley Business Journal with their 40 Under 40 award in 2016.

Keynote 3

Attention, Noise, and the Coordination of Robot Movements

Frank Chongwoo Park
Seoul National University
Monday 25 September
13:00 - 13:45
Room 118

As both robots and their tasks become more complex, strategies for perception, planning, and control must increasingly take into account the limits on a robot's computation and communication resources. Inspired by recent research on the role of attention in human motor control and visual perception, and more generally by the remarkable ability of humans to cope with noise while performing multiple tasks--both physical and cognitive--simultaneously, this talk will explore some ideas for quantifying attention and their use in robot perception, planning, and control. Some relevant notions of attention and control cost from the human motor control and optimal control theory literature are first introduced. Examples are then given of planning and control methods that make use of these concepts, ranging from simple kinematic feedback control laws based on the minimum variance principle that generate natural human-like motions, to combined feedback-forward control laws for ball catching and other skills that rely on sensory feedback. The implications of these results on the role of feedforward and feedback in learning, and whether attention and sparsity are meaningful objective functions for robot coordination and learning, are further discussed.

Biography: Frank Chongwoo Park received his B.S. in electrical engineering from MIT in 1985, and Ph.D. in applied mathematics from Harvard University in 1991. From 1991 to 1995 he was assistant professor of mechanical and aerospace engineering at the University of California, Irvine. Since 1995 he has been professor of mechanical and aerospace engineering at Seoul National University, where he is currently serving as department chair beginning June 2017. His research interests are in robot mechanics, planning and control, vision and image processing, machine learning, and related areas of applied mathematics. He

has been an IEEE Robotics and Automation Society Distinguished Lecturer, and received best paper awards for his work on visual tracking and parallel robot design. He has served on the editorial boards of the Springer Handbook of Robotics, Springer Advanced Tracts in Robotics (STAR), Robotica, and the ASME Journal of Mechanisms and Robotics. He has held adjunct faculty positions at the NYU Courant Institute, the Interactive Computing Department at Georgia Tech, and the Robotics Institute at HKUST. He is a fellow of the IEEE, current editor-in-chief of the IEEE Transactions on Robotics, developer of the EDX course Robot Mechanics and Control I, II, and author (with Kevin Lynch) of Modern Robotics: Mechanics, Planning and Control (2017 Cambridge University Press).

Keynote 4

Enhancing Human Capability with Intelligent Machine Teammates

Julie Shah
MIT
Monday 25 September
13:45 - 14:30
Room 211

Every team has top performers -- people who excel at working in a team to find the right solutions in complex, difficult situations. These top performers include nurses who run hospital floors, emergency response teams, air traffic controllers, and factory line supervisors. While they may outperform the most sophisticated optimization and scheduling algorithms, they cannot often tell us how they do it. Similarly, even when a machine can do the job better than most of us, it can't explain how. In this talk I share recent work investigating effective ways to blend the unique decision-making strengths of humans and machines. I discuss the development of computational models that enable machines to efficiently infer the mental state of human teammates and thereby collaborate with people in richer, more flexible ways. Our studies demonstrate statistically significant improvements in people's performance on military, healthcare and manufacturing tasks, when aided by intelligent machine teammates.

Biography: Julie Shah is an Associate Professor of Aeronautics and Astronautics at MIT and director of the Interactive Robotics Group, which aims to imagine the future of work by designing collaborative robot teammates that enhance human capability. As a current fellow of Harvard University's Radcliffe Institute for Advanced Study, she is expanding the use of human cognitive models for artificial intelligence. She has translated her work to manufacturing assembly lines, healthcare applications, transportation and defense. Before joining the faculty, she worked at Boeing Research and Technology on robotics applications for aerospace manufacturing. Prof. Shah has been recognized by the National Science Foundation with a Faculty Early Career Development (CAREER) award and by MIT Technology Review on its 35 Innovators Under 35 list. Her work on industrial human-robot collaboration was also in Technology Review's 2013 list of 10 Breakthrough Technologies. She has received international recognition in the form of best paper awards and nominations from the ACM/IEEE International Conference on Human-Robot Interaction, the American Institute of Aeronautics and Astronautics, the Human Factors and Ergonomics Society, the International Conference on Automated Planning and Scheduling, and the International Symposium on Robotics. She earned degrees in aeronautics and astronautics and in autonomous systems from MIT.

Keynote 5

Robots that Evolve, Develop, and Learn

Josh Bongard
University of Vermont
Monday 25 September
13:45 - 14:30
Room 109

Many organisms experience radical morphological and neurological change over evolutionary time, as well as their own lifetimes. Traditionally, this has been hard to do with rigid-body robots. The emerging field of soft robotics, however, is now making it relatively easy to create robots that change their body plans and controllers over multiple time scales. In this talk I will explore not just how to do this, but why one might choose to do so: I will show how such

robots are more adaptable than robots that cannot adapt body and brain over time.

Biography: Josh Bongard is a roboticist and professor in the Department of Computer Science at the University of Vermont. He was a Microsoft New Faculty Fellow (2006), an MIT Technology Review "Top Innovator under the Age of 35" (2007), and the recipient of a PECASE award (2011). His funded research covers the crowdsourcing of robotics, embodied cognition, human-robot interaction, autonomous machines that recover functionality after unanticipated damage, soft robotics, and white box machine learning. His work has been funded by NSF, DARPA, ARO, AFRL, and NASA. He is the co-author of the book How the Body Shapes the Way We Think: A New View of Intelligence.

Keynote 6

Robust Robot Decision Making under Uncertainty: From Known Unknowns to Unknown Unknowns

David Hsu
National University of Singapore
Monday 25 September,
13:45 - 14:30
Room 118

In the near future, robots will "live" with humans, providing a variety of services at homes, in workplaces, or on the road. For robots to become effective and reliable human collaborators, a core challenge is the inherent uncertainty in understanding human intentions, in addition to imperfect robot control and sensor noise. To achieve robust performance, robots must hedge against uncertainties and sometimes actively elicit information to reduce uncertainties. I will briefly review Partially Observable Markov Decision Process (POMDP) as a principled general model for planning under uncertainty and present our recent work that tackles the intractable POMDP planning problem and achieves near real-time performance in dynamic environments for autonomous vehicle navigation among many pedestrians. In practice, an outstanding challenge of

POMDP planning is model construction. I will also discuss how recent advances in deep learning can help bridge the gap and connect planning and learning.

Biography: David Hsu is a professor of computer science at the National University of Singapore (NUS), a member of NUS Graduate School for Integrative Sciences & Engineering, and deputy director of the Advanced Robotics Center. He received Ph.D. in computer science from Stanford University, USA. In recent years, he has been working on robot planning and learning under uncertainty.

He served as the General Co-Chair of IEEE International Conference on Robotics & Automation (ICRA) 2016, the Program Chair of Robotics: Science & Systems (RSS) 2015, a steering committee member of International Workshop on the Algorithmic Foundation of Robotics (WAFR), an editorial board member of Journal of Artificial Intelligence Research, and an associate editor of IEEE Transactions on Robotics. He, along with colleagues and students, won the Humanitarian Robotics and Automation Technology Challenge Award at ICRA 2015 and the RoboCup Best Paper Award at IEEE/RSJ International Conference on Intelligent Robots & Systems (IROS) 2015.

Keynote 7

Representations vs Algorithms: Symbols and Geometry in Robotics

Nicholas Roy
MIT
Tuesday 26 September
13:00 - 13:45
Room 211

In the last few years, the ability for robots to understand and operate in the world around them has advanced considerably. Examples include the growing number of self-driving car systems, the considerable work in robot mapping, and the growing interest in home and service robots. However, one obstacle to getting more widely useful robots is the difficulty that people have in interacting with robots. A major driver of this difficulty is that how robots reason about the world is still pretty different to how people reason. Robots think in terms of point features, dense

occupancy grids and action cost maps. People think in terms of landmarks, segmented objects and tasks (among other representations). There are good reasons why these are different, and robots are unlikely to ever reason about the world in the same way that people do. However, for effective operation, robots must be able to interact naturally with people around them and act as real team-mates.

I will talk about recent work in joint reasoning about semantic representations and physical representations, especially how such reasoning relates to natural language understanding, and how we can bridge the gap between low-level sensing and control, and higher-level semantic representations to create more capable robots.

Biography: Nicholas Roy is the Bisplinghoff Professor of Aeronautics & Astronautics at the Massachusetts Institute of Technology and a member of the Computer Science and Artificial Intelligence Laboratory (CSAIL) at MIT. He received his Ph. D. in Robotics from Carnegie Mellon University in 2003. His research interests include unmanned aerial vehicles, autonomous systems, human-computer interaction, decision-making under uncertainty and machine learning. He spent two years at Google [x] as the founder of Project Wing.

Keynote 8

Cooperating without Communicating: Achieving Teaming by Observation

Lynne Parker
University of Tennessee
Tuesday 26 September
13:00 - 13:45
Room 109

A long-term goal of research in both multi-robot and human-robot teams is to achieve a natural and intuitive collaboration, similar to the type of implicit cooperation demonstrated by many well-practiced human-only teams. In smoothly-operating human-only teams, individuals have trained together and understand intuitively how to interact with each other on the current task without the need for any explicit commands or conversations. A fundamental

research question is whether a similar level of teaming fluency can be created in multi-robot and human-robot teams. Such teams would consist of individuals that operate side-by-side in the same physical space, each performing physical actions based upon their individual skills and capabilities, while also collaborating seamlessly and implicitly with other teammates. Achieving this level of implicit interaction requires team member observation of the activities and actions of teammates, with appropriate action responses to ensure that the team collectively achieves its shared objectives. This talk explores the challenges and possible solutions for achieving team-based implicit cooperation without explicit communication, focusing on the collaborations that are possible through observation, modeling, inference, and implicit activity coordination in multi-robot and human-robot teams.

Biography: Dr. Lynne E. Parker is an Associate Dean in the Tickle College of Engineering at the University of Tennessee, Knoxville (UTK), and Professor in the Department of Electrical Engineering and Computer Science. She received her PhD in Computer Science from the Massachusetts Institute of Technology. Lynne is the founder and director of the Distributed Intelligence Laboratory at UTK. She has made significant research contributions in distributed and heterogeneous robot systems, machine learning, and human-robot interaction, and has received numerous awards for her research, teaching, and service, including the PECASE Award (U.S. Presidential Early Career Award for Scientists and Engineers), the IEEE RAS Distinguished Service Award, and many UTK Chancellors, College, and Departmental awards. Dr. Parker has been active in the IEEE Robotics and Automation Society for many years; she served as the General Chair for the 2015 IEEE International Conference on Robotics and Automation, as the Editor-in-Chief of the IEEE RAS Conference Editorial Board, as an Administrative Committee Member of RAS, and as Editor of IEEE Transactions on Robotics. She is a Fellow of IEEE.

Keynote 9

Robotics as the Path to Intelligence

Oliver Brock
Technical University of Berlin
Tuesday 26 September
13:00 - 13:45
Room 118

The historical promise robotics is to devise technological artifacts that replicate all human capabilities. This includes physical capabilities like locomotion and dexterity, intellectual capabilities like reasoning and learning, and also social capabilities like collaboration and training. Are we, as a discipline, still pursuing this objective? Is it even worthwhile or promising to do so? And if so, are we making good progress? I will portray my views on the importance for robotics to understand and replicate intelligence, including physical intelligence and social intelligence. By juxtaposing views from related disciplines with recent accomplishments of our field, e.g. soft robotics and deep learning, I will sketch a path towards a future generation of robots with human-like abilities.

Biography: Oliver Brock is the Alexander-von-Humboldt Professor of Robotics in the School of Electrical Engineering and Computer Science at the Technische Universität Berlin in Germany. He received his Diploma in Computer Science in 1993 from the Technische Universität Berlin and his Master's and Ph.D. in Computer Science from Stanford University in 1994 and 2000, respectively. He also held post-doctoral positions at Rice University and Stanford University. Starting in 2002, he was an Assistant Professor and Associate Professor in the Department of Computer Science at the University of Massachusetts Amherst, before to moving back to the Technische Universität Berlin in 2009. The research of Brock's lab, the Robotics and Biology Laboratory, focuses on mobile manipulation, interactive perception, grasping, manipulation, soft material robotics, interactive machine learning, deep learning, motion generation, and the application of algorithms and concepts from robotics to computational problems in structural molecular biology. He is the president of the Robotics: Science and Systems foundation.

Keynote 10

Studies on Interactive Robots - Principles of conversation

Hiroshi Ishiguro
Advanced Telecommunications Research Institute International (ATR)
Tuesday 26 September
13:45 - 14:30
Room 211

We have developed interactive robots and androids and studied principles of interaction and conversation between humans and robots in Osaka University and ATR. This talk introduces the robots and androids and discusses on our future society supported by them. In addition, this talk discusses on the fundamentals of human-robot interaction and conversation focusing on the feeling of presence given by robots and androids and conversations with two robots and touch panels.

Biography: Hiroshi Ishiguro (M') received a D.Eng. in systems engineering from the Osaka University, Japan in 1991. He is currently Professor of Department of Systems Innovation in the Graduate School of Engineering Science at Osaka University (2009-), and visiting Director (2014-) (group leader: 2002-2013) of Hiroshi Ishiguro Laboratories at the Advanced Telecommunications Research Institute and an ATR fellow. His research interests include distributed sensor systems, interactive robotics, and android science. He has published more than 300 papers in major journals and conferences, such as Robotics Research and IEEE PAMI. On the other hand, he has developed many humanoids and androids, called Robovie, Repliee, Geminoid, Telenoid, and Elfoid. These robots have been reported many times by major media, such as Discovery channel, NHK, and BBC. He has also received the best humanoid award four times in RoboCup. In 2011, he won the Osaka Cultural Award presented by the Osaka Prefectural Government and the Osaka City Government for his great contribution to the advancement of culture in Osaka. In 2015, he received the Prize for Science and Technology (Research Category) by the Minister of Education, Culture, Sports, Science and Technology (MEXT). He was also awarded the Sheikh Mohammed Bin Rashid Al Maktoum Knowledge Award in Dubai in 2015.

Keynote 11

Mechanics of Tactile Perception and Haptic Interface Design

Vincent Hayward
Institut des Systèmes Intelligents et de Robotique (ISIR)
Tuesday 26 September
13:45 - 14:30
Room 109

The physics of contact differ in fundamental ways from the physics of acoustics and optics. It should therefore be expected that the processing of somatosensory information be very different from the processing in other sensory modalities. The talk will describe some salients facts regarding the physics of touch and will continue with the description recent findings regarding the processing of time-evolving tactile inputs in second-order neurones in mammals. These ideas can be applied to the design of cost effective efficient tactile displays and tactile sensors.

Biography: Vincent Hayward is a professor (on leave) at the Université Pierre et Marie Curie (UPMC) in Paris. Before, he was with the Department of Electrical and Computer Engineering at McGill University, Montréal, Canada, where I became a full Professor in 2006 and was the Director of the McGill Centre for Intelligent Machines from 2001 to 2004. Hayward is interested in haptic device design, human perception, and robotics; and I am a Fellow of the IEEE. He was a European Research Council Grantee from 2010 to 2016. Since January 2017, Hayward is a Professor of Tactile Perception and Technology at the School of Advanced Studies of the University of London, supported by a Leverhulme Trust Fellowship.

Keynote 12

Static and Dynamic Multi-Camera Clusters for Localization and Mapping

Steven Waslander
University of Waterloo
Tuesday 26 September
13:45 - 14:30
Room 118

Multi-camera clusters provide significant advantages over monocular and stereo configurations for localization and mapping, particularly in complex environments with moving objects. The wide or omni-directional field of view afforded by multiple cameras allows the mitigation of detrimental effects from feature deprivation or occlusion. Where possible, large baselines between camera centres afford good sensitivity for scale resolution, without the need for overlap. In this talk, I will describe our work on multi-camera localization and mapping for both static clusters with rigidly mounted cameras and dynamic clusters with gimballed cameras. We evaluate conditions for degeneracy of the state estimation process for each type of cluster. We demonstrate performance results on unmanned aerial vehicles and automotive benchmark data.

Biography: Prof. Waslander received his B.Sc.E. in 1998 from Queen's University, his M.S. in 2002 and his Ph.D. in 2007, both from Stanford University in Aeronautics and Astronautics. He was a Control Systems Analyst for Pratt & Whitney Canada from 1998 to 2001. In 2008, he joined the Department of Mechanical and Mechatronics Engineering at the University of Waterloo in Waterloo, ON, Canada, as an Assistant Professor. He is the Director of the Waterloo Autonomous Vehicles Laboratory (WAVELab,http://wavelab.uwaterloo.ca. His research interests are in the areas of autonomous aerial and ground vehicles, simultaneous localization and mapping, nonlinear estimation and control, and multi-vehicle systems.

Keynote 13

Assembling Orders in Amazon's Robotic Warehouses

Joey Durham
Amazon Robotics
Wednesday 27 September
13:45 - 14:30
Room 211

Every day, Amazon is able to quickly pick, pack, and ship millions of items to customers from a network of fulfillment centers all over the globe. Each Amazon warehouse holds millions of items of inventory, most customer orders represent a unique combination of several items, and many orders need to be shipped within a couple hours of being placed to meet delivery promises. This would not be possible without leveraging cutting-edge advances in technology. This talk will describe the mobile robotic fleet that powers an Amazon warehouse and delivers inventory shelves to associates, including how we approach the interrelated problems of assigning tasks and planning paths for thousands of robots in dynamic warehouse environments. I will also present the results of the 2017 Amazon Robotics Challenge in manipulation and grasping, as well as a couple of big open problems in robotic warehousing.

Biography: Joey Durham is Manager of Research and Advanced Development at Amazon Robotics. His team focuses on resource allocation algorithms, machine learning, and path planning for robotic warehouses. He is also the Contest Chair for the Amazon Robotics Challenge, an annual robotic manipulation contest held most recently as part of RoboCup 2017. Joey joined Kiva Systems after completing his Ph.D. at the University of California at Santa Barbara in distributed coordination for teams of robots. He has been with the company through its acquisition and growth into Amazon Robotics. Previously he worked on path planning for autonomous vehicles for the Stanford University team that won the DARPA Grand Challenge.

Keynote 14

Ultrasound and ultrasound-mediated image guidance for robot assisted surgery

Tim Salcudean
University of British Columbia
Wednesday 27 September,
13:45 - 14:30
Room 109

Medical robotic systems present a great opportunity for integrating imaging with surgical navigation. Indeed, the instruments are localized and tracked in real time with respect to the camera view, so once registered to the patient, imaging can be used to display anatomy and pathology with respect to the robot camera and the instruments.

We present our approaches to integrating ultrasound and magnetic resonance imaging with the da Vinci medical robotic system for prostate surgery. We will summarize our calibration and registration techniques and our experience from a first patient study (N=27) in which this system was used.

Integration of ultrasound with medical robots enables new intra-operative ultrasound-based tissue characterization. We present our work in two areas: quantitative elastography to measure tissue shear storage and loss moduli ("objective palpation"), and photoacoustic imaging to measure blood oxygenation.

Biography: Tim Salcudean received his bachelor's and master's from McGill University and the doctorate from U.C. Berkeley, all in Electrical Engineering. From 1986 to 1989, he was a Research Staff Member in the robotics group at the IBM T.J. Watson Research Center. He then joined the Department of Electrical and Computer Engineering at the University of British Columbia, Vancouver, Canada, where he holds a Canada Research Chair and the Laszlo Chair in Biomedical Engineering.

Professor Salcudean's research contributions have been in the areas of medical imaging, medical robotics, simulation and virtual environments, haptics, teleoperation and optimization-based design. Several companies have

licensed his technology and his gland-contouring software for prostate cancer radiotherapy has become the standard of care in British Columbia, and has been used in well over 2000 patients. Prof. Salcudean has been a co-organizer of several research symposia and has served as a Technical and Senior Editor of the IEEE Transactions on Robotics and Automation. He is a Fellow of MICCAI, the IEEE, and the Canadian Academy of Engineering.

Keynote 15

Robotics goes soft: challenges and achievements, for new robotics scenarios

Cecilia Laschi
The BioRobotics Institute, Scuola Superiore Sant'Anna
Wednesday 27 September,
13:45 - 14:30
Room 118

Soft robotics is a young yet promising approach to develop deformable robots that can adapt to the environment and exploit interaction for accomplishing real-world tasks. Widely growing worldwide, soft robotics has produced already interesting achievements in terms of technologies for actuation, sensing,control, and many more. In addition to allowing more applications for robots, soft robotics technologies are enabling robot abilities that were not possible before, like morphing, stiffening, growing, self-healing,evolving. They open up new scenarios for robotics that brings towards more life-like robots, effectively and efficiently adaptable to their environments and tasks.

Biography: Cecilia Laschi is Full Professor of Biorobotics at the BioRobotics Institute of the Scuola Superiore Sant'Anna in Pisa, Italy, where she serves as Rector's delegate to Research. She graduated in Computer Science at the University of Pisa in 1993 and received the Ph.D. in Robotics from the University of Genoa in1998. In 2001-2002 she was JSPS visiting researcher at Waseda University in Tokyo. Her research interests are in the field of biorobotics and she is currently working on soft robotics, humanoid robotics, and neurodevelopmental engineering. She has been and currently is involved in many National and EU-funded projects, she was the coordinator of the ICT-FET OCTOPUS Integrating Project, leading to one of the first soft robots, and of the European Coordination Action on Soft Robotics RoboSoft. She has authored/co-authored more

than 200 papers, she is Chief Editor of the Specialty Section on Soft Robotics of Frontiers in Robotics and AI and she is in the Editorial Board of Bioinspiration & Biomimetics, IEEE Robotics and Automation Letters, Frontiers in Bionics and Biomimetics, Advanced Robotics, Social Robotics. She is member of the IEEE, of the Engineering in Medicine and Biology Society, and of the Robotics & Automation Society, where she served as elected AdCom member and currently is Co-Chair of the TC on Soft Robotics.

Keynote by Platinum Sponsor

Robot Economics on Ethereum Blockchain: Tasks Formulation and Proposed Solutions

Aleksandr Kapitonov
Airalab
Wednesday 27 September
12:00 - 12:10
Ballrooms B, C & D

It is inevitable that robots will be an essential part of every human's life. Machines are capable of performing tasks impossible for humans, they are more effective in many types of business activities and they are already saving people time every day.

The development of robotics has reached the point where the problem of communication has arisen between physically and logically separated autonomous agents (robots). Robots have capacity to decide which actions are appropriate within constantly changing environment. Technologies that are now being used in the world of machines constantly expand the set of decisions available to a robot, which increases its level of autonomy. And soon we'll control robots not at a low level but through capital flow and this'll be "Robot economics".

Biography: Aleksandr Kapitonov is a "Robot economics" academic society professor at Airalab. He is an assistant-professor of Control Systems and Computer Science at ITMO University, where he received his Ph.D. in industrial automation in 2014. His team focuses on navigation,

computer vision, control of mobile robots and communication for multi-agents systems. He is also the Coach of RoboCup teams. Aleksandr is a regional coordinator of Erasmus+ IOT-OPEN.EU project for researching and developing an IoT education practices, and an engineer in “Nonlinear Adaptive Control Systems” international laboratory at ITMO University.

Forums

Time	RM	Title	Organizers
14:30-16:00, 16:30-1800 Monday September 25	201	The Future of Robotics and Automation in Nuclear Facilities and Environments	Bill Hamel, Yoshi Nakamura, Hajime Asama, Raja Chatila, Mitch Pryor
14:30-16:00, 16:30-1800 Tuesday September 26		Entrepreneurship Forum and Start-up Competition (EFSC)	Erwin Prassler, Dominik Boesl, and Jianwei Zhang
08:30 - 12:00 Wednesday September 27		Research and Practice Ethics in Robotics and Automation	Raj Madhavan, Ludovic Righetti, Raja Chatila

OBJECTIVES

The general objective of this forum is to facilitate exchange between researchers, users, and decision makers of robotics and automation technologies in nuclear operations and facilities. The forum will be in cooperation with the Robotics and Remote Systems Division of the American Nuclear Society, and will include presentations and discussions about the challenges of normal and off-nominal operations, with particular interests in clean-up of legacy nuclear facilities around the world, and ongoing recovery operations at the Fukushima Daiichi site. This half-day forum will provide the opportunity for researchers and users to meet and discuss the recent results and emerging technology requirements. Specific objectives are to provide workshop participants with: Updates on key R&A technologies applicable to Nuclear Facilities from both academia and industry. Presentations and discussions regarding recent waste site clean-up uses of, and results with, R&A from around the world. Overviews and future plans robotics in waste clean-up programs in the US and other countries. Updates on the utilization of R&A technologies at the Fukushima Daiichi site.

Topics of interest:

- Robot mobility and navigation in harsh and unstructured environments
- Sensing, mapping, and surveillance/inspection in all phases of nuclear operations
- Tooling centric manipulation
- Human machine interfaces for effective remote operations
- Advanced teleperation, telerobotic, and autonomous system concepts for harsh and unstructured environments
- Resource allocation, networking, and signal transmission with multiple remote robotic systems in complex environments
- Data/knowledge management and coordination in multi-robot remote operations
- Power sources/transmission for mobile remote robotic systems in complex environments
- Operational experiences with remote robotics systems
- Radiation hardening of materials and components

ORGANIZERS

Professor Bill Hamel
University of Tennessee, Knoxville
Department of Mechanical, Aerospace, and Biomedical Engineering
(865) 806 -1073
whamel@utk.edu
Professor Yoshi Nakamura
Department of Mechano-Informatics
School of Information Science and Technology
University of Tokyo
nakamura@ynl.t.u-tokyo.ac.jp
Professor Hajime Asama
Department of Precision Engineering,
School of Engineering,
The University of Tokyo
Tel.+81-3-5841-6456
asama@robot.t.u-tokyo.ac.jp
Professor Raja Chatila
Institut des Systèmes Intelligents et de Robotique
Université Pierre et Marie CURIE
+33 (0) 1 44 27 28 76
chatila@isir.upmc.fr
Dr. Mitch Pryor, Research Scientist
Mechanical Engineering Department
University of Texas at Austin
Tel. +1 (512) 423 – 1685
mpryor@mail.utexas.edu

Entrepreneurship Forum and Start-up Competition (EFSC)

Purpose of the Event

To foster the entrepreneurial spirit and to provide a platform to encourage researchers and practitioners to transition ideas and prototypes to commercializable products, the IEEE Robotics and Automation Society (IEEE RAS) is inviting the robotics and automation community to participate in an Entrepreneurship Forum and Start-up Competition (EFSC) at the 2017 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS'17) in Vancouver, Canada.

The event is intended to inspire, educate, enable, and empower researchers, students, young professionals, and anyone else who has the 'start-up bug' in starting companies of their own but is not sure of how to go about it. We also believe that this event will create an ecosystem that will provide the much-needed support for start-ups to launch their initiatives while being realistic about their envisioned

ideas and products.

EFSC at IROS'17 will consist of three stages:

(1) In the first stage, submitted applications will be down-selected to arrive at a pool of qualified applicants based on a defined set of criteria developed by the organizers (see 'Application Form' information below).

(2) This will be followed by a remote stage where the selected applicants will be paired with coaches based on the proposal content and the expertise of the coaches. The coaches will then critique, and provide technical and professional assistance to refine the idea/product pitches.

(3) The final stage would allow for the refined pitches and content to be presented in front of a distinguished panel of venture capitalists, industry, and academic experts who have successfully funded, transitioned and have experience in commercialization of robotics and automation technologies.

Who Can Participate?

Anyone with an idea utilizing robotics and/or automation technology that has reached a proof of concept level is welcome to submit an application provided that the entity is 1) less than 3 years old, and 2) has not received any funding from angel investors or venture capitalists in the last 5 years.

How to Participate?

Interested applicants should complete the Application Form available for download from here: PDF, MS Word. Please email completed forms to efsc@iros2017.org.

Travel Support and Awards

We anticipate travel support for all qualified applicants invited to IROS'17 (~$1500/team) and awards for the top three finishers (pending funding approval at the time of this Call). Qualified applicants will further receive a free mini-booth in the IROS'17 exhibition area for an interactive presentation of their product (idea).

ORGANIZERS

Erwin Prassler
(H-BRS, IEEE RAS VP for Industrial Activities)

Dominik Boesl
(KUKA AG)
Jianwei Zhang
(U. Hamburg)

Research and Practice Ethics in Robotics and Automation

OBJECTIVES

Organized by the IEEE RAS Robotics and Automation Research and Practice Ethics Committee (RARPEC), this Forum is intended as a platform to exchange ideas and discuss the impacts and practice of robotics and automation (R&A) technologies in research, development, and deployment that appear to pose ethical questions for humanity.

With increased awareness and controversies surrounding R&A and AI, this Forum will focus on separating hype from reality by providing an objective and balanced treatment via invited presentations and two panel discussions. It is irrefutable that these technologies are evolving at a rapid pace and that they have the potential to transform and positively impact the lives of people. Perhaps equally undeniable are the fears and concerns associated with their development. While many concerns stem from the confusion surrounding such emerging (autonomous) technologies and a lack of understanding of current capabilities and limitations, their development also raises legitimate ethical and governance questions that should be debated within the community.

For this inaugural RARPEC Forum, we have chosen Autonomous Weapon Systems (AWS), Self Driving Cars (SDCs), and the Governance/Regulation concerns surrounding these issues as broad topics for discussions.

FORMAT

The Forum is anticipated to have the following schedule divided into two sessions:

- **Session 1: Autonomous Weapon Systems**
  8:30a – 10:00a (1 Keynote + 2 Regular Talks + Q&A)
  Coffee Break: 10:00a-10:30a
- **Session 2: Self-Driving Cars & Governance/ Regulation Practices of Emerging Technologies**
  10:30a-12:00p (1 Keynote + 2 Regular Talks + Q&A)

ORGANIZERS

Raj Madhavan
Founder & CEO, Humanitarian Robotics Technologies, USA
Chair, IEEE RAS Robotics and Automation Research and Practice Ethics Committee (RARPEC)
Chair, IEEE RAS Special Interest Group on Humanitarian Technology (RAS-SIGHT)
raj.madhavan@ieee.org
Ludovic Righetti
Independent Research Group Leader
Max-Planck Institute for Intelligent Systems, Germany
ludovic.righetti@tuebingen.mpg.de
Raja Chatila
Institut des Systèmes Intelligents et de Robotique
Université Pierre et Marie CURIE
chatila@isir.upmc.fr

Competition Overview

Time	Title	Organizers
Monday - Tuesday Sept. 25-26	2nd Robotic Grasping and Manipulation Competition Hall A	Yu Sun, Zoe Doulgeri, Erik Engeberg, Joseph Falco, Yunjiang Lou, Hyungpil Moon, Maximo Roa, Yasuyoshi Yokokohji
Tuesday - Wednesday Sept. 26-27	5th Humanoid Robot Application Challenge - Robot Magic Hall A	Jacky Baltes
Tuesday, Sept. 26	Autonomous Drone Racing in Mos Eisley Vancouver Arena Hall A	Hyungpil Moon, Sungkyunkwan U, Hyunchul Shim, KAIST, Si Jung Kim University of Nevada

2nd Robotic Grasping and Manipulation Competition

DESCRIPTION

The second Robotic Grasping and Manipulation Competition is sponsored by the IEEE-RAS TC on Robotic Hands, Grasping and Manipulation. The competition has received wide support from both academia and industry. This year, the competition has two tracks for two different scenarios: daily-living and manufacturing. The tasks in the competition will be randomly selected from a robotic grasping and manipulation task pool. Part of the task pool will be released on April 15, 2017. Teams from academia and industry are equally welcome to participate. For registration, each team will need to provide a one-page description about the team, one-page PowerPoint, and a short video to demonstrate the team's capability of participating in the competition. The detailed registration requirement is at http://www.rhgm.org/activities/competition_iros2017/.

ORGANIZERS

Yu Sun
U South Florida
yusun@cse.usf.edu
Zoe Doulgeri
Aristotle University of Thessaloniki, doulgeri@eng.auth.gr
Erik Engeberg
Florida Atlantic University
eengeberg@fau.edu
Joseph Falco
NIST
joseph.falco@nist.gov
Yunjiang Lou
Haerbin Institute of Technology at Shenzhen
louyj@hitsz.edu.cn
Hyungpil Moon
SungKyunKwan University
hyungpil@me.skku.ac.kr

Maximo Roa
DLR
Maximo.Roa@dlr.de
Yasuyoshi Yokokohji
Kobe University
yokokohji@mech.kobe-u.ac.jp

IMPORTANT DATES

Official Announcement	April 1, 2017
Registration Deadline	July 1, 2017
Acceptance Decision	July 15, 2017
Competition	Sept. 25-26, 2017

5th Humanoid Robot Application Challenge - Robot Magic

DESCRIPTION

The Humanoid Robot Magic Show will be held from the 24th to 28th of September at the 2017 IEEE International Conference for Robotic Systems in Vancouver, Canada. The Humanoid Robot Magic Show is the continuation of the humanoid robot application challenge which started in 2011. The idea of the humanoid application challenges was to create a competition which allowed teams more creative freedom to express themselves than other standard robot competitions (e.g., HuroCup or RoboCup). In previous years, we had humanoid robots re-enact the most important themes of Indiana Jones and showed skiing and golf playing humanoid robots. In 2017, the theme of the humanoid application challenge is robot magic. That is the use of a humanoid robot as either a magician, an assistant, and/or as a prop during the performance of a magic trick. For example, your robot may help you during a card trick or read the mind of the audience.

ORGANIZERS

Jacky Baltes
National Taiwan Normal U
jacky.baltes@ntnu.edu.tw

IMPORTANT DATES

- Submission of Qualification Material
  31st May 2017
- Announcement of Qualified Teams
  1st August 2017
- Registration and Travel Grant Applications
  9 August 2017
- Practice
  24th/25th September 2017
- Competition
  26th/27th September 2017
- IROS Demonstration
  28th September 2017

WEBSITE: https://www.facebook.com/humanoidchallenge

IROS 2017 Autonomous Drone Racing in Mos Eisley Vancouver Arena

DESCRIPTION

The IROS 2017 ADR in Mos Eisley Vancouver Arena (Racing) is a technical challenge sponsored by IROS 2017 Organizing Committee aimed to provide worldwide robotic researchers a technology showroom for autonomous flight and to promote solutions for the agile autonomous flight of drones in daring environments. Participants will bring their own flying robots in Mos Eisley Vancouver Arena and be asked to fly them autonomously through designated tracks in the circuit. The technical challenges combine the time optimal path planning for drones, flight and tracking control, obstacle detection, localization, and fault detection and recovery. Two racing times will be recorded and scored by its best flight time through the start and the finish line. Prospective participants must submit the registration form (Form A, available online) via email to drone.racing.iros2017@gmail.com with the title of “Drone Racing Registration: Your team name” by 04/15/2017. Although we have not finalized the size of the grant, registered teams may be eligible for travel grant if submitted the travel grant application form

(Form B, available online) by 06/01/2017 to drone.racing.iros2017@gmail.com with the title of “Drone Racing Travel Grant Application: Your team name”. Successfully registered teams must submit team information to the organizers via email by 09/01/2017. The conference registration policy for the competition-only participants will be announced later.

ORGANIZERS

Hyungpil Moon
Sungkyunkwan U
hyungpil@me.skku.ac.kr
Hyunchul Shim
KAIST
hcshim@kaist.ac.kr
Si Jung Kim
University of Nevada
Si.Kim@unlv.edu

IMPORTANT DATES

- Orientation and familiarization of the environment
  09/24/2017
- Dry-run
  09/25/2017
- Main event
  09/26/2017
- Award luncheon: (tentative)
  09/27/2017
- Demonstration to public (top rankers, tentative)
  09/27/2017

(Detailed timeline is subject to change and will be posted on the web as well as informed by the registered email.)

WEBSITE: http://ris.skku.edu/iros2017racing/

Conference Awards

IROS 2017 Awards Luncheon will be held in Ballrooms B, C and D, 12:00 – 13:45, on Wednesday September 27. Boxed lunch will be provided. The following is the list of awards to be announced.

JTCF Novel Technology Paper Award for Amusement Culture
This award recognizes practical technology contributing to toys, toy models, and amusement culture. Sponsored by the Japan Toy Culture Foundation.

RoboCup Best Paper Award
For work in localization, navigation, mobility, and teamwork technologies, with applications to areas such as team sports, search and rescue, personal and home robotics, education, and others. Sponsored by the RoboCup Federation.

IROS Best Paper Award on Cognitive Robotics Sponsored by KROS
To promote interdisciplinary research on cognition for technical systems and advancements of cognitive robotics in industry, home applications, and daily life

IROS Best Paper Award on Safety, Security, and Rescue Robotics
To promote advanced research on safety, security and rescue robotics (SSRR), in memory of Motohiro Kisoi

ICROS Best Application Paper Award
Sponsored by the Institute of Control, Robotics, and Systems (ICROS), this award is to recognize excellent robot application

IROS 2017 ABB Best Student Paper Award
This award recognizes the most outstanding paper authored primarily by, and presented by, a student. Sponsored by ABB.

IROS 2017 Best Paper Award
This award recognizes the most outstanding paper presented at the conference.

Technical Tours

Overview

IROS 2017 will feature tours to many local companies around Vancouver and the surrounding area, known as the “Lower Mainland”. These will be grouped into tours of academic labs at two of the region’s largest Universities (The University of British Columbia and Simon Fraser University) as well as tours to local industry of interest to robotics researchers. IROS has organized bus transportation to each tour site, which is an excellent opportunity for participants to experience the beautiful city of Vancouver and its surroundings while *en route* to the interesting technical demonstrations.

Schedule

The IROS 2017 Technical Tour program will occur in the afternoons of September 25th – 27th. Precise times for each tour are still being resolved as of the printing of this Conference Digest. Therefore, participants are asked to consult the Conference Website and the Registration Site for further details and in order to participate in the tour program.

Academic/University Tours

THE UNIVERSITY OF BRITISH COLUMBIA

UBC – September 25th, 2:30pm departure

The University of British Columbia is a global centre for research and teaching, consistently ranked among the 40 best universities in the world. Since 1915, UBC's West Coast spirit has embraced innovation and challenged the status quo. Its entrepreneurial perspective encourages students, staff and faculty to challenge convention, lead discovery and explore new ways of learning. At UBC, bold thinking is given a place to develop into ideas that can change the world.
During the IROS 2017 Technical Tour to UBC, participants will visit many exciting labs and facilities across the campus. For example:

Collaborative Advanced Robotics and Intelligent Systems Laboratory (CARIS): Lead by Dr. Elizabeth Croft

In the CARIS lab we pursue world-class experimental research to advance the science of human-robot interaction (HRI). Our positioning within one of the top universities in Canada and indeed in the world, combined with our excellent research facilities, including a Willow Garage PR2 (the only one in Canada), two Barrett WAM™ 7DOF robot arms and grippers, a unique robotic virtual reality environment to study human balance, and a room-sized integrated force and motion capture system, among other advanced sensing, control and actuation equipment, allow us to examine and answer impactful and novel research questions in HRI.

SFU SIMON FRASER UNIVERSITY
ENGAGING THE WORLD

SFU – September 26th, 2:30pm departure

In the place where innovative education, cutting-edge research and community outreach intersect, you'll find Simon Fraser University. Our vision? To be Canada's leading engaged university.

During the IROS 2017 Technical Tour to SFU, participants will visit many exciting labs and facilities across the campus. For example:

The SFU Autonomy Lab:
Lead by Dr. Richard Vaughan

The Autonomy Lab builds life-like machines. Our goal is to increase the autonomy (i.e. self-control and self-maintenance) of robots and other machines. Our research interests include:

- Highly autonomous, long-lived robots
- Large-population multi-robot systems
- Human-robot interaction
- Behaviour and sensing for outdoor natural and semi-structured environments
- Robot and animal foraging behaviour
- Behaviour for UAVs
- Robot simulation, programming and research tools

Company Tours

ZABER


Our headquarters in Vancouver, BC, Canada

At Zaber, we design and manufacture precision positioning devices that are affordable, integrated, and easy to use. Our devices are used in many different applications and markets, such as photonics and optics, life sciences, microscopy, and industrial automation.

Zaber was founded in 1997 by a group of friends. Back then, precision linear actuators all used DC motors with gearbox and encoders, and they required bulky controllers and a number of other accessories and supplies. Precision motion control was expensive and difficult to set up and use. Recognizing the need for affordable and integrated solutions for motion

control, Zaber released the world's first precision linear actuator with a built-in controller, the T-LA28 Series linear actuator. Based on a stepper motor instead of a combination of DC motor, gearbox, and encoder, the T-LA28 was the first device to feature all control and drive electronics in one compact package. The integration of all control and drive electronics in the same package became the foundation of Zaber's T-, A- and, later X-Series product lines.

ISTUARY

Istuary Innovation Group is a Canadian technology company with a mission to connect local technology to global markets for sustainable innovation. Istuary Robotics, a division of Istuary Innovation Labs, is dedicated to building robot software that is easy for everyone to use. Participants are invited to attend Istuary's Vancouver Head Office for an interactive site tour complete with presentations and live demonstrations including Human-Robot Interaction Methods and Live Portrait Drawing. Jean Su, VP of Engineering of Istuary Innovation Labs will be joined by robotics engineer Benjamin Blumer and machine learning analyst Eric Hsu.
The Istuary tour will include:

- Presentation Overview
- Live demonstrations including:
  - Human-robot interaction methods
  - Live portrait drawing
- Machine Learning:
  - Video Analytics
  - Deep Learning

Motion Metrics International Corp

At Motion Metrics, we employ the latest technologies to solve tough challenges for mines and quarries. We have

made it our mission to develop intelligent solutions to help them operate safely and efficiently.
With over 15 years of experience dedicated to perfecting rugged machine vision and sensor based solutions, we take pride in applying artificial intelligence and deep learning techniques to deliver advanced solutions with exceptional results. With 50+ employees across Canada, Chile and South Africa, we use technology and innovation to propel our business forward.

Dark Vision

Dark Vision Technologies Inc. was founded in 2013 by a group of experienced entrepreneurs that have expertise and a track record in developing and commercializing imaging technologies. The company has developed a new ultrasound-based imaging technology used to image the inside of oil and gas wells. With a clear picture of the inner working of their wells, oil and gas operators can make smart decisions that reduce operating costs, increase production, improve well integrity and minimize environmental impacts. Unlike camera technologies, DarkVision's high resolution ultrasound imaging system is able to image through opaque fluids that have inhibited the widespread use of cameras and optics as a downhole diagnostics tool.
The company's first field-ready tool uses a number of proprietary and patented technologies to go thousands of meters underground, bringing oil and gas operators incredibly high resolution 3D scans of their entire wells. DarkVision has already won numerous awards, including 1st prize in the 2014 NVBC competition for the top high-tech start-up in BC. With a number of North America's largest oil and gas companies already secured as early customers, DarkVision's flagship product is now making its debut in the field.

Kindred.ai

The company's central thesis is that human-like intelligence requires a human-like body. Since its founding in 2014, Kindred has been exploring and engineering systems that enable robots to understand and participate in our world,

with the ultimate goal of enabling a future where intelligent machines work together with people to create abundance shared by all.

Kindred has offices in San Francisco, Toronto, and Vancouver. Investors include Eclipse, GV, Data Collective, First Round Capital, AME Cloud Ventures, 11.2 Capital, Bold Capital Partners, Innovation Endeavors and Bloomberg Beta.

TRIUMF

TRIUMF is Canada's particle accelerator centre. From the hunt for the smallest particles in our universe, to research that advances the next generation of batteries or develops medical isotopes to diagnose and treat life-threatening disease, TRIUMF produces cutting-edge science that has a tangible impact on our daily lives. Founded in 1968 and located in Vancouver, our laboratory brings together some of the brightest, most innovative thinkers from across the country and around the world to further the frontiers of research. Areas of focus include the structure of matter, the origin of stars, the composition of quantum materials, and the development of new technologies for medicine. We also have a deep-seated commitment to the commercialization of our technologies. TRIUMF's multidisciplinary team of over 500 staff and 150 students collaborates with Canadian and international users who visit the laboratory to use our world-class facilities. From the abstract to the applied, we solve problems. We drive compelling research and develop ideas and innovations that benefit humanity.

D-Wave Systems Inc.

Despite the incredible power of today's supercomputers, there are many complex computing problems that can't be addressed by conventional systems. Our need to better understand everything, from the universe to our own DNA, leads us to seek new approaches to answer the most difficult questions.

While we are only at the beginning of this journey, quantum computing has the potential to help solve some of the most complex technical, scientific, national defense, and commercial problems that organizations face. We expect that quantum computing will lead to breakthroughs in science, engineering, modeling and simulation, healthcare, financial analysis, optimization, logistics, and national defense applications.

Founded in 1999, D-Wave Systems is the world's first quantum computing company and the leader in the development and delivery of quantum computing systems and software. Our mission is to unlock the power of quantum computing to solve the world's most challenging problems. Our systems are being used by world-class organizations and institutions including Lockheed Martin, Google, NASA, USC, USRA and Los Alamos National Laboratory. D-Wave has been granted over 140 U.S. patents and has published over 90 peer-reviewed papers in leading scientific journals.

D-Wave is a privately held company, with offices in Vancouver, British Columbia; Palo Alto, California; and Hanover, Maryland.

Workshops and Tutorials: Summaries

Full Day Workshop SuAW1

Sunday September 24, 09:00 – 17:30
Room 109&110

Human In-The-Loop Robotic Manipulation: On the Influence of the Human Role

Website: http://h2020sarafun.eu/iros2017_hr/

Organizers:
Yiannis Karayiannidis
Chalmers University of Technology, KTH, Sweden
Yasemin Bekiroglu
ABB Corporate Research, 156 Sweden
Anthony Remazeilles
Tecnalia Research and Innovation, Health division, Spain
Justus Piater
University of Innsbruck, Austria

Full Day Workshop SuAW2

Sunday September 24, 09:00 – 17:30
Room 111&112

Introspective Methods for Reliable Autonomy

Website: http://aass.oru.se/Agora/IROS2017_
Introspection/

Organizers:
Tomasz Piotr Kucner, tomasz.kucner@oru.se
Orebro University – AASS
Sören Schwertfeger, oerensch@ shanghaitech.edu.cn
ShanghaiTech University - STAR-Lab
Martin Magnusson, martin.magnusson@oru.se
Orebro University – AASS
Achim J. Lilenthal, achim.lilienthal@oru.se
Orebro University – AASS

Full Day Workshop SuAW3

Sunday September 24, 09:00 – 17:30
Room 116&117

Verification of Autonomous Systems Workshop

Website: http://pwp.gatech.edu/iros2017-vasw/

Organizers:
Stephen Balakirsky, Georgia Tech Research Institute, US
Robin D. Ashmore, DSTL, UK
Elizabeth Leonard, NRL, US

Constance Heitmeyer, NRL, US
Don Sofge, NRL, US
Signe Redfield, NRL, US
Calin Belta, Boston University, US
Craig Schlenoff, NIST, US
David Scheidt, Weather Gage Technologies, LLC, US
John Sustersic, Penn State, US
Marc Steinberg, ONR, US
David Sparrow, Poornima Madhavan, IDA, US

Full Day Workshop SuAW4

Sunday September 24, 09:00 – 17:30
Room 114&115

Shared Platforms for Medical Robotics Reseach

Website: http://aass.oru.se/Agora/IROS2017_Introspection/

Organizers:
Peter Kazanzides, pkaz@jhu.edu
Johns Hopkins University
Gregory S. Fischer, gfischer@wpi.edu
Worcester Polytechnic Institute
Simon DiMaio, simon.dimaio@intusurg.com
Intuitive Surgical, Inc.
Tamás Haidegger, haidegger@irob.uni-obuda.hu
Óbuda University
Blake Hannaford, blake@ee.washington.edu
University of Washington

Full Day Workshop SuAW5

Sunday September 24, 09:00 – 17:30
Room 118&120

Planning Legged and Aerial Locomotion with Dynamic Motion Primitives

Website: https://sites.google.com/udel.edu/iros17-dynamic-planning/

Organizers:
Ioannis Poulakakis
Associate Professor, University of Delaware
Katie Byl
Associate Professor, University of California Santa Barbara
Sushant Veer
PhD Candidate, University of Delaware

Half Day Workshop SuAW6

Sunday September 24, 09:00 – 12:30
Room 121

Workshop on Acoustic Based Navigation for Marine Robots

Website: https://sites.google.com/site/mrw4iros17/home

Organizers:
Hyun Choi, htchoi@kriso.re.kr / htchoiphd@gmail.com
Ph.D., Director, Ocean System Engineering Research Division, Korea Research Institute of Ships and Ocean Engineering (KRISO), Korea
Ryan N. Smith, rnsmith@fortlewis.edu
Ph.D., Associate Professor, Physics and Engineering, Fort Lewis College, USA
Mandar Chitre, mandar@nus.edu.sg
Ph.D., Associate Professor, Department of Electrical & Computer Engineering, National University of Singapore, Singapore
Ayoung Kim, ayoungk@kaist.ac.kr
Ph.D., Assistant Professor, Civil and Environmental Engineering, Korea Advanced Institute of Science Technology (KAIST), Korea.

Half Day Workshop SuBW6

Sunday September 24, 14:00 – 17:30
Room 121

Robot-Assisted Therapy in Stroke Rehabilitation (Canceled)

Website: https://aradrex.wixsite.com/ratsr-iros-workshop

Organizer:
Alireza Rastegarpanah, a.rastegarpanah@ucl.ac.uk
Corresponding organizer, Research Associate, Aspire CREATe - Centre for Rehabilitation Engineering and Assistive Technology, UCL Institute of Orthopaedics and Musculoskeletal Sciences(IOMS), Royal National Orthopaedic Hospital (RNOH) Brockley Hill Stanmore, HA7 4LP

Full Day Workshop SuAW7

Sunday September 24, 09:00 – 17:30
Room 122

Biological Systems: A Challenging Handicap To Overcome

Website: https://energeticeconomyrobotics.wordpress.com/organizers/

Organizers:
Navvab Kashiri, Department of Advanced Robotics, Istituto Italiano di Tecnologia
Bram Vanderborght, Robotics & Multibody Mechanics research group, Vrije Universiteit Brussel
Jörn Malzahn, Department of Advanced Robotics, Istituto Italiano di Tecnologia
Monica Daley, Structure & Motion Laboratory, The Royal Veterinary College
Nikos Tsagarakis, Department of Advanced Robotics, Istituto Italiano di Tecnologia

Half Day Tutorial SuAW8

Sunday September 24, 09:00 – 12:30
Room 202&203

A* Planning and Model Predictive Control with Dynamics-based and Multiple Heuristics

Website: https://www.ciscor.org/iros-2017

Speakers:
Emmanuel Collins, ecollins@eng.famu.fsu.edu
Department of Mechanical Engineering, Florida A&M University – Florida State University College of Engineering
Maximum Likhachev, maxim@cs.cmu.edu
Robotics InstituteCarnegie Melon University

Half Day Workshop SuBW8

Sunday September 24, 14:00 – 17:30
Room 202&203

Development of Benchmarking Protocols for Robot Manipulation

Website: http://ycbbenchmarks.org/IROS2017workshop.html

Organizers:
Dr. Berk Calli
Yale University, berk.calli@yale.edu
Prof. Aaron Dollar
Yale University, aaron.dollar@yale.edu
Prof. Siddhartha Srinivasa
Carnegie Mellon University, siddh@cmu.edu
Dr. Maximo Roa
German Aerospace Center (DLR), maximo.roa@dlr.de

Full Day Workshop SuAW9

Sunday September 24, 09:00 – 17:30
Room 204

Gravity Offload Testbeds for Space Robotic Mission Simulation

Website: http://hq.wvrtc.com/iros2017/index.shtml

Organizers:
CRAIG CARIGNAN
Space Systems Laboratory, Univ. of Maryland, College Park, MD, USA
GIACOMO MARANI
WVRTC, West Virginia Univ., WV, USA
ANDRÉ SCHIELE
ESA, Noordwijk, The Netherlands

Full Day Workshop SuAW10

Sunday September 24, 09:00 – 17:30
Room 205&206

Soft Morphological Design for Haptic Sensation, Interaction and Display

Website: https://sites.google.com/site/iros17softhaptic/

Organizers:
Hongbin Liu, King's College London, UK
Van Anh Ho, Japan Advanced Institute of Science and Technology (JAIST), Japan.

Full Day Workshop SuAW11

Sunday September 24, 09:00 – 17:30
Room 207

Towards an artist-in-the-lab Framework

Website: http://www.roboticart.org/iros2017/

Organizers:
David St-Onge, david.st-onge@polymtl.ca
Post-doctoral researcher at MIST, École Polytechnique de Montréal.
Damith Herath, Damith.Herath@canberra.edu.au
Assistant Professor, Centered Computing Laboratory at the Faculty of Education, Science, Technology and Mathematics.
William D. Smart, bill.smart@oregonstate.edu
Professor in the Robotics Program at the Oregon State University, US.

Full Day Workshop SuAW12

Sunday September 24, 09:00 – 17:30
Room 208&209

Continuum Robots in Medicine – Design, Integration, and Applications

Website: https://sites.google.com/udel.edu/iros17-dynamic-planning/

Organizers:
Mahdi Tavakoli, mahdi.tavakoli@ualberta.ca
Professor, PhD, P.Eng. Department of Electrical & Computer Engineering, University of Alberta.
Rajni Patel, rvpatel@uwo.ca
Professor, PhD, P.Eng. Canadian Surgical Technologies & Advanced Robotics (CSTAR), Electrical & Computer Engineering Department, University of Western Ontario.
Sarthak Misra, s.misra@utwente.nl
Associate Professor, PhD, Department of Biomechanical Engineering, University of Twente.
Michael Yip, yip@ece.ucsd.edu
Assistant Professor, PhD, Department of Electrical and Computer Engineering, University of California San Diego.
Mohsen Khadem, mohsen.khadem@ualberta.ca
PhD, Department of Electrical & Computer Engineering, University of Alberta.

Full Day Workshop SuAW13

Sunday September 24, 09:00 – 17:30
Room 211-214

9th Workshop on Planning, Perception and Navigation for Intelligent Vehicles

Website: http://ppniv17.irccyn.ec-nantes.fr/

Organizers:
Professor Philippe Martinet, Philippe.Martinet@irccyn.ec-nantes.fr
LS2N-CNRS Laboratory, Ecole Centrale de Nantes, 1 rue de la Noë, 44321 Nantes Cedex 03, France.
Research Director Christian Laugier, Christian.Laugier@inrialpes.fr
INRIA, Emotion project, INRIA Rhône-Alpes, 655 Avenue de l'Europe, 38334 Saint Ismier Cedex, France.
Professor Urbano Nunes, urbano@deec.uc.pt
Department of Electrical and Computer Engineering of the Faculty of Sciences and Technology of University of Coimbra, 3030-290 Coimbra, Portugal, GABINETE 3A.10.
Professor Christoph Stiller, stiller@kit edu
Institut für Mess- und Regelungstechnik, Karlsruher Institut für Technologie (KIT), Engler-Bunte-Ring 21, Gebäude: 40.32, 76131 Karlsruhe, Germany.

Full Day Workshop SuAW14

Sunday September 24, 09:00 – 17:30
Room 217-219

Learning for Collaborative Robotics: Enabling Flexible, Redeployable and Agile Industrial Applications

Website: http://www.mobilemanipulation.org/cobots-IROS-2017/

Organizers:
Luca Colasanto, Robert Bosch LLC, Palo Alto USA
luca.colasanto@us.bosch.com
Juergen Hess, Robert Bosch LLC, Palo Alto USA
Juergen.Hess2@us.bosch.com
Lorenzo Riano, Robert Bosch LLC, Palo Alto USA
Lorenzo.Riano@us.bosch.com
Arash Ajoudani, Istituto Italiano di Tecnologia, Italy
Arash.Ajoudani@iit.it
Tadej Petric, Jozef Stefan Institute, Slovenia
tadej.petric@ijs.si
Clemens Eppner, Technische Universität Berlin, Germany
clemens.eppner@tu-berlin.de
Benjamin Rosman, Council for Scientific and Industrial Research, and University of Witwatersrand, South Africa
brosman@csir.co.za
Sylvain Calinon, Idiap Research Institute, Switzerland
sylvain.calinon@idiap.ch

Full Day Workshop SuAW15

Sunday September 24, 09:00 – 17:30
Room 215&216

Agile Robotics for Industrial Automation Competition (ARIAC) Workshop

Website: https://www.nist.gov/el/intelligent-systems-division-73500/agile-robotics-industrial-automation-competition-ariac/

Organizers:
Dr. Craig Schlenoff, craig.schlenoff@nist.gov
Competition Chair. National Institute of Standards and Technology (NIST) 100 Bureau Drive, Stop 8230 Gaithersburg, MD 20877
Anthony Downs, anthony.downs@nist.gov
Co-Organizers, National Institute of Standards and Technology (NIST) 100 Bureau Drive, Stop 8230 Gaithersburg, MD 20877
Dr. William Harrison, william.harrison@nist.gov
Co-Organizers, National Institute of Standards and Technology (NIST) 100 Bureau Drive, Stop 8230 Gaithersburg, MD 20877

Half Day Workshop SuAW16

Sunday September 24, 09:00 – 12:30
Room 220

Workshop on Perception and Planning for Robotic Inspection

Website:

Organizers:
Pratap Tokekar
Daniel Stilwell
Craig Woolsey
Ryan Williams
Matthew Hebdon

Half Day Workshop SuBW16

Sunday September 24, 14:00 – 17:30
Room 220

Micro-Data: The New Frontier of Robot Learning?

Website: http://homepages.loria.fr/JBMouret/www-microdata

Organizers:
Jean-Baptiste Mouret, jean-baptiste.mouret@inria.fr
Associate Researcher, Inria Larsen team
Freek Stulp
Head of Department, Department of Cognitive Robotics
Institute of Robotics and Mechatronics, DLR - Deutsches Zentrum für Luft- und Raumfahrt e.V. (German Aerospace Center)
Sylvain Calinon
Idiap / EPFL, Switzerland University

Full Day Workshop SuAW17

Sunday September 24, 09:00 – 17:30
Room 221&222

2nd Workshop on Semantic Policy and Action Representations for Autonomous Robots

Website: https://www.ics.ei.tum.de/workshop-iros-spar17/

Organizers:
Karinne Ramirez-Amaro
Technische Universität München, Germany
Yezhou Yang
Arizona State University, USA
Neil T. Dantam
Rice University, USA
Eren Erdal Aksoy
Karlsruhe Institute of Technology, Germany
Gordon Cheng
Technische Universität München, Germany

Full Day Workshop SuAW18

Sunday September 24, 09:00 – 17:30
Room 223&224

Human-Robot Interaction in Collaborative Manufacturing Environments

Website: http://caris.mech.ubc.ca/iros-2017-workshop/

Organizers:
Sara Sheikholeslami, s.sheikholeslami@alumni.ubc.ca
Researcher, Collaborative Advanced Robotics and Intelligent Systems (CARIS) Laboratory, Department of Mechanical Engineering, University of British Columbia
Ross Mead, ross@semio.ai
PhD, Founder and CEO, Semio
Prof. Elizabeth A. Croft, elizabeth.croft@ubc.ca

Director, Collaborative Advanced Robotics and Intelligent Systems (CARIS) Laboratory, Department of Mechanical Engineering, University of British Columbia
Florian Krebs, florian.krebs@dlr.de
Team Leader, Flexible Automation Systems, Institute for Structures and Design / Center for Lightweight Production Technology (ZLP), German Aerospace Center (DLR)
Manfred Schöenheits, manfred.schoenheits@dlr.de
Scientist, Institute for Structures and Design / Center for Lightweight Production Technology (ZLP), German Aerospace Center (DLR)

Full Day Workshop ThAW1

Thursday September 28, 09:00 – 17:30
Room 109 & 110

Vision-Based Agile Autonomous Navigation of UAVs

Website: http://www.seas.upenn.edu/~loiannog/workshopIROS2017uav/index.html#organizers

Organizers:
Giuseppe Loianno, University of Pennsylvania
Davide Scaramuzza, University of Zurich
Vijay Kumar, University of Pennsylvania

Full Day Workshop ThAW2

Thursday September 28, 09:00 – 17:30
Room 111 & 112

Workshop on Medical Imaging Robotics

Website: http://robotic-imaging.com/

Organizers:
Christoph Hennersperger
Danail Stoyanov
Alexandre Krupa

Full Day Workshop ThAW3

Thursday September 28, 09:00 – 17:30
Room 116 & 117

Folding in Robotics

Website: http://idealab.asu.edu/folding_in_robotics/

Organizers:
Samuel Felton, Northeastern University
Dan Aukes, Arizona State University

Mike Tolley, University of California, San Diego
Onur Ozcan Bilkent University
Kyujin Cho, Seoul National University
Jamie Paik, EPFl

Full Day Workshop ThAW4

Thursday September 28, 09:00 – 17:30
Room 114 & 115

International Workshop on Lines, Planes and Manhattan Models for 3-D Mapping

Website: http://seis.bris.ac.uk/~csadc/LPM17/index.html

Organizers:
Andrew Calway, University of Bristol, UK
Michael Kaess, Carnegie Mellon University, USA
Srikumar Ramalingam, University of Utah, USA

Half Day Workshop ThAW5

Thursday September 28, 09:00 – 12:30
Room 118 - 120

Smart Mechanics: Fusion of Softness and Rigidity in Robot Mechanism

Website: http://www.frlab.iit.tsukuba.ac.jp/IROS2017_SmartMechanics/

Organizers:
Hiromi Mochiyama, University of Tsukuba
Kenji Suzuki, University of Tsukuba
Yasumichi Aiyama, University of Tsukuba

Half Day Tutorial ThBW5

Thursday September 28, 14:00 – 17:30
Room 118 - 120

(Tutorial) HoloLens As a Perception Platform for Robotics

Website: https://developer.microsoft.com/en-us/windows/mixed-reality/event_-_using_hololens_for_perception_at_iros_2017

Organizers:
Marc Pollefeys

Full Day Workshop ThAW6

Thursday September 28, 09:00 – 17:30
Room 121

Adaptive Control Methods in Assistive Technologies

Website: http://iros2017.mtu.edu/

Organizers:
Houman Dallali, Michigan Technological University
Emel Demircan, California State University Long Beach
Mo Rastgaar, Michigan Technological University

Full Day Workshop ThAW7

Thursday September 28, 09:00 – 17:30
Room 122

Synergies between Learning and Interaction

Website: https://sites.google.com/view/iros17sbli

Organizers:
Barş Akgün, Koc University
Kalesha Bullard, Georgia Institute of Technology
Vivian Chu, Georgia Institute of Technology
Tesca Fitzgerald, Georgia Institute of Technology
Matthew Gombolay, MIT
Chien-Ming Huang, Yale University
Brian Scassellati, Yale University

Full Day Workshop ThAW8

Thursday September 28, 09:00 – 17:30
Room 202 & 203

Shared Autonomy - Joint Learning in Human-Robot Collaboration

Website: https://aiweb.techfak.uni-bielefeld.de/iros2017_workshop_shared_autonomy/program.html

Organizers:
Malte Schilling
Wolfram Burgard
Przemyslaw Lasota
Helge Ritter
Julie Shah
Britta Wrede

Full Day Workshop ThAW9

Thursday September 28, 09:00 – 17:30
Room 204

Best Practices in Designing Effective Roadmaps for Robotics Innovation

Website: http://canadianroboticsnetwork.com/iros-workshop/

Organizers:
Hallie Siegel
AJung Moon
Elizabeth A. Croft
Gregory Dudek
Clément Gosselin
Paul Johnston
Jonathan Kelly
Dana Kulić
Angela Schoellig

Full Day Workshop ThAW10

Thursday September 28, 09:00 – 17:30
Room 205 & 206

Robotics -Inspired Biology

Website: http://gravishlab.ucsd.edu/iros2017/

Organizers:
Nick Gravish, UCSD
Chen Li, Johns Hopkins
Hamid Marvi, ASU
Henry Astley, University of Akron
Kaushik Jayaram, Harvard University

Full Day Workshop ThAW11

Thursday September 28, 09:00 – 17:30
Room 207

Embodied Brain Systems Science –from Body Representation in Human Brain toward Rehabilitation Technology-

Website: http://www.robot.t.u-tokyo.ac.jp/~an/IROS2017_WS.html

Organizers:
Qi An
Jun Ota
Hajime Asama,
Toshiyuki Kondo

Full Day Workshop ThAW12

Thursday September 28, 09:00 – 17:30
Room 208 & 209

Assistance and Service Robotics in a Human Environment

Website: http://www.lissi.fr/iros-ar2017/doku.php/start

Organizers:
Francis COLAS, INRIA Nancy, France
Yacine AMIRAT, LISSI-UPEC, France
David DANEY, INRIA Bordeaux, France
Ren LUO, NTU University, Taiwan
Samer MOHAMMED, LISSI-UPEC, France

Half Day Workshop ThAW13

Thursday September 28, 09:00 – 12:30
Room 211 - 214

Agricultural Robotics: Learning from Industry 4.0 and Moving into the Future

Website: https://agrifoodroboticsworkshop.com/

Organizers:
Tsampikos Kounalakis, Aalborg University Copenhagen,
Frits van Evert, Wageningen Research
David Michael Ball, Robert Bosch Startup Deepfield Robotics
Gert Kootstra, Wageningen University
Lazaros Nalpantidis, Aalborg University Copenhagen

Half Day Workshop ThBW13

Thursday September 28, 14:00 – 17:30
Room 211 - 214

Learning for Localization and Mapping

Website: https://sites.google.com/site/learningforslam/home

Organizers:
Cesar Cadena, ETH Zurich
Igor Gilitschenski, ETH Zurich
John Leonard, MIT
Sudeep Pillai, MIT
Fabio Ramos, University of Sydney
Niko Suenderhauf, QUT

Full Day Workshop ThAW14

Thursday September 28, 09:00 – 17:30
Room 217 - 219

Frontiers in Contact-Rich Robotic Interaction: Modeling, Optimization and Control Synthesis

Website: https://contactrobotics.wordpress.com/

Organizers:
Jiaji Zhou, Carnegie Mellon University
Matthew Mason, Carnegie Mellon University
Michael Posa, MIT

Full Day Workshop ThAW15

Thursday September 28, 09:00 – 17:30
Room 215 - 216

Complex Collaborative Systems: Closing the Loop, Learning, and Self-Confidence

Website: http://theairlab.org/iros2017_workshop/index.html

Organizers:
Zohaib Mian, United Technologies Research
Sebastian Scherer, Carnegie Mellon University
Sanjiban Choudhury, Carnegie Mellon University

Full Day Workshop ThAW16

Thursday September 28, 09:00 – 17:30
Room 220

Human Movement Understanding for Humanoids and Wearable Robots

Website: https://iros2017wshumanmovementunderstanding.wordpress.com/

Organizers:
Dana Kulić, University of Waterloo
Katja Mombaur, University of Heidelberg

Full Day Workshop ThAW17

Thursday September 28, 09:00 – 17:30
Room 221 & 222

Workshop on Physical Human-Robot and Human-Telerobot Interaction: From Theory to Application for Neuro-Rehabilitation

Website: https://docs.google.com/document/d/1--sOHdnXbtwNzXQa5krpLNDqSy1n4DtqIHTmH9P12Uw/pub

Organizers:
S. Farokh Atashzar, Western University
Mahya Shahbazi, Western University
Mahdi Tavakoli, University of Alberta
Rajni Patel, Western University

Full Day Workshop ThAW18

Thursday September 28, 09:00 – 17:30
Room 223 & 224

The 2nd Workshop on Machine Learning Methods for High-Level Cognitive Capabilities in Robotics

Website: https://sites.google.com/site/mlhlcr2017/home

Organizers:
Tetsunari Inamura, National Institute of Informatics
Hiroki Yokoyama, University of Tamagawa
Emre Ugur, Bogazici University
Xavier Hinaut, INRIA
Tadahiro Taniguchi, Ritsumeikan University / Panasonic

RSJ Tutorial

Monday September 25, 14:30 - 17:30
Room 301

Lecturer: Prof. Tetsuya Ogata (Faculty of Science and Engineering, Waseda University)

Deep Learning for Robotics toward Deep Cognitive Systems

Profile: Tetsuya Ogata received the B.S., M.S., and D.E. degrees in mechanical engineering from Waseda University, Tokyo, Japan, in 1993, 1995, and 2000, respectively. He was a Research Associate with Waseda University from 1999 to 2001. From 2001 to 2003, he was a Research Scientist with the RIKEN Brain Science Institute, Saitama, Japan. From 2003 to 2012, he was an Associate Professor with the Graduate School of Informatics, Kyoto University, Kyoto,

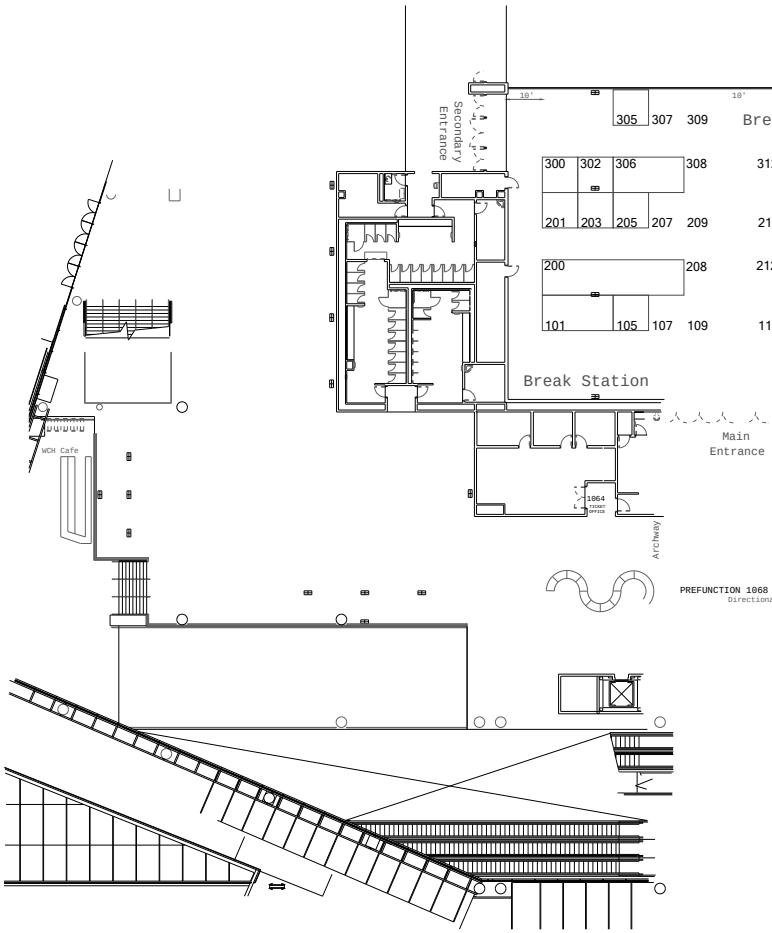
Japan. Since 2012, he has been a Professor with the Faculty of Science and Engineering, Waseda University. From 2009 to 2015, he was a JST (Japan Science and Technology Agency) PREST Researcher. He is currently an Invited Researcher with the Artificial Intelligence Research Center, National Institute of Advanced Industrial Science and Technology, Tokyo. His current research interests include deep learning for robot motion control, human–robot interaction, and dynamics of human–robot mutual adaptation.

Abstract: In recent years, image recognition, speech recognition, and language processing systems, etc., particularly systems using deep learning are developed, and their greatly improved performance, which is beyond what was previously possible, is attracting attention. However, most of these systems use large-scale data that is already in the computerized cloud, and application to the real world is at an embryonic stage. There are already examples of applications of deep learning in real world systems, such as robots, but these are mainly centered on only the use of image processing such as object recognition, position recognition, etc.

In this tutorial, we first outline the basic methods of deep learning and introduce some tools. In addition, after introducing examples of application in each field such as image recognition and speech recognition, we will explain the application of multi-modal application etc. In addition, we will introduce regarding the essential discussion of intelligence, the “cognitive developmental robotics” which is the process of development of a real-world cognition mechanism based on “embodiment” and a model explaining the cognition process of human beings.

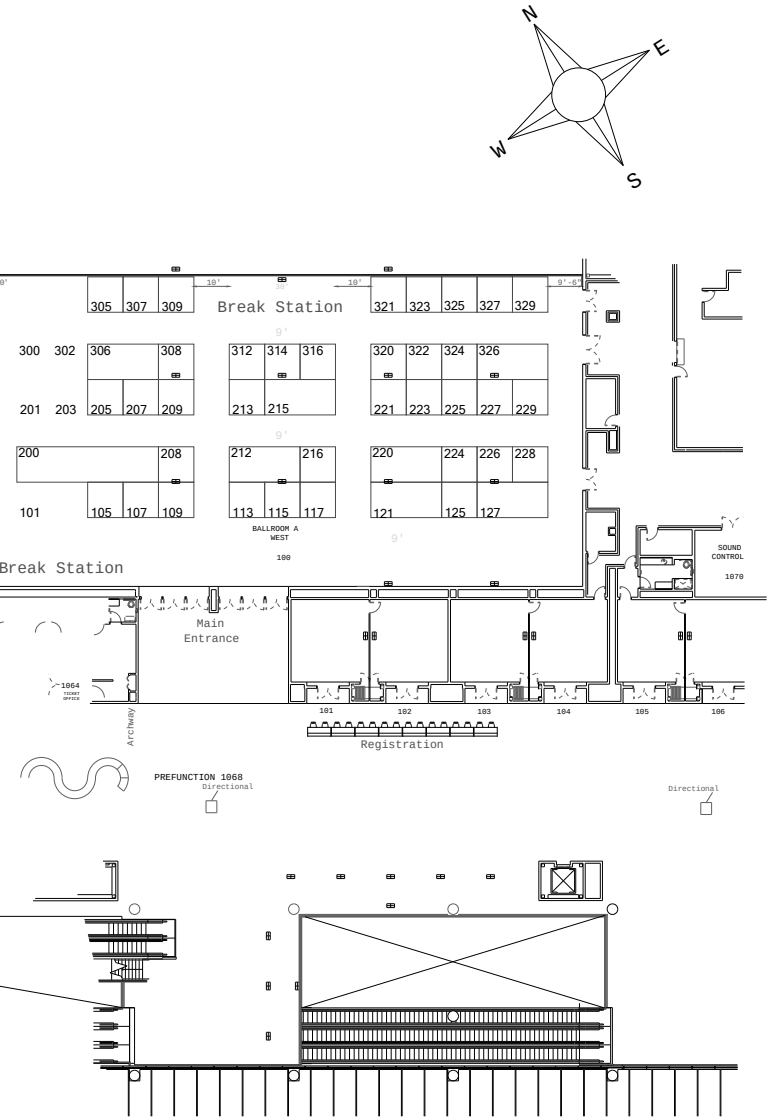
Then we will show the concept of “deep cognitive system” which enhances the concept of “cognitive developmental robotics” with deep learning, with our robot’s studies such as a language learning model and the application to flexible object handling of humanoid robots etc.

Exhibitor Booth Map



Vancouver Convention

West Building



& Exhibition Centre

Level 1

Exhibitors

AAAS/Science, Robotics
Booth 209
http://robotics.sciencemag.org

Science Robotics published by the American Association for the Advancement of Science (AAAS)-now publishing the original, peer-reviewed, science and engineering-based research articles that advance the field of robotics bearing the quality hallmark of the Science family of journals.

AIRA
Booth 200
http://aira.life

Airalab concerns itself with putting the idea of robot economics into life. The team puts its heart and soul into the project AIRA (Autonomous Intelligent Robot Agent) which allows plugging robots into the liability market existing in Ethereum for direct data sales from robot sensors, service order of unmanned transport logistics and order of individual goods at a robot-based plant.

Amazon
Booth 127
https://amazon.com

Amazon strives to be Earth's most customer-centric company where people can find and discover virtually anything they want to buy online. The world's brightest technology minds come to Amazon.com to research and develop technology that improves the lives of shoppers, sellers and developers.

Applied Dexterity, Inc.
Booth 307
http://applieddexterity.com

Applied Dexterity was formed to commercialize the RAVEN-IITM surgical robot. This robot, currently placed at over eighteen research centers, is being sold as a test bed to facilitate research in robotically assisted surgery and to train both roboticists and surgeons. The low-level control software is open-source and interfaces seamlessly with ROS.

ATI Industrial Automation
Booth 109
http://ati-ia.com

ATI Industrial Automation is the world-leading engineering-

based developer of robotic accessories and robot arm tooling, including Automatic Tool Changers, Multi-Axis Force/Torque Sensing Systems, Utility Couplers, Robotic Deburring Tools, Robotic Collision Sensors, Manual Tool Changers, and Compliance Devices. Our end-effector products are found in thousands of successful applications around the world.

Barrett Technology LLC
Booth 314
http://barrett.com

Barrett Technology is a 20+ year leader in the robotics industry. Located just outside of Boston in Newton, MA, Barrett is known globally in leading academic robotics research programs and throughout industry for applications requiring close human-robot interactions. Barrett's core products include the 7DOF WAM, Barrett Hand, and P3 motor controller. Recently, Barrett launched BURT (Barrett Upper-extremity Robotic Trainer) to help patients retrain arm function in rehabilitation settings.

Cambridge University Press
Booth 207
http://cambridge.org/academic

Cambridge University Press' publishing in books and journals combines state-of-the-art content with the highest standards of scholarship, writing and production. Visit our stand to browse new titles, available at 20% discount, and to pick up sample copies of our journals. Visit our website to find out more about what we do: www.cambridge.org/academic

Cepton Technologies, Inc.
Booth 227
http://cepton.com

Cepton is a 3D sensing solutions provider that is shipping next generation LiDAR products for the automotive, industrial and mapping markets. Cepton's LiDAR technology delivers unrivaled performance and resolution at low cost, to enable perception for the smart machines of tomorrow. For more information, visit www.ceptontech.com.

Clearpath Robotics
Booth 212
https://clearpathrobotics.com

Clearpath Robotics is a global leader in unmanned vehicle robotics for research and development, and provides hardware, software and services to enable self-driving vehicle development, deployment, and operation. Clearpath works with over 500 of the world's most innovative brands in over 40 countries, serving markets that span industrial materials handling, mining, military, agriculture, aerospace, and academia.

Elsevier B.V.
Booth 117
http://elsevier.com/physical-sciences/computer-science

Elsevier will be presenting key titles across Computer Science, Robotics and Systems Journals. Visit us at booth 117, meet the publishers and editors in person, and take the opportunity to ask any questions you may have about submitting research to our journals. In addition, learn more about our author services, open access options and content innovation.

FLIR Systems, Inc.
Booth 224
http://flir.com/mv

FLIR Integrated Imaging Solutions Inc., formerly Point Grey Research., is a global leader in the design and manufacture of innovative, high-performance digital cameras for industrial, medical and life science, traffic, biometric, GIS, and people counting applications.

Genesis Robotics
Booth 325
http://genesis-robotics.com

Genesis Robotics is a research and development company focused on inventing new solutions to some of the significant challenges of our time. Genesis Robotics has a team of 50+ individuals focused on the development of its LiveDrive technology. *LiveDrive is the world's highest performance direct-drive motor, powering the fastest, safest and most versatile robots.*

Haption SA
Booth 308
http://haption.com/site/index.php/fr

HAPTION designs, manufactures and sells haptic devices with professional quality, suited to the needs of its customers, both industrial and academic.
One of the big market is Tele-operation control command, we are compliant with ROS, or we develop direct interface. We develop solution for Research, Medical and also Nuclear.
From small to large workspace, from light to strong force.

Harmonic Drive LLC
Booth 107
http://harmonicdrive.net

Harmonic Drive designs and manufactures high precision servo actuators, gearheads and gear component sets. We work with companies of all sizes to provide the right solution, whether it is a standard catalog product, or fully customized integrated solution. Known for our expert engineering and manufacturing, Harmonic Driver products are relied upon every day throughout the robotics industry.

HEBI Robotics, Inc.
Booth 321
http://hebirobotics.com

HEBI Robotics is a spin-off from Carnegie Mellon University in Pittsburgh that produces Lego-like robotic building blocks. The HEBI platform consists of hardware and software that make it easy to create world class robots, of virtually any configuration, quickly and easily.

Hokuyo Automation Co. Ltd.
Booth 223
https://hokuyo-aut.jp

Founded in 1946 in Osaka, Japan, HOKUYO is a leading manufacturer of automatic control equipment, including photoelectric switches and optical data transmission devices for advanced technology industries. HOKUYO introduced several series of compact optical obstacle detection sensors for automated guided vehicles (AGV) for the first time in 1991. In 2004, HOKUYO created the smallest laser range finders series for object detection called “URG”. Since then, HOKUYO laser range finders

have been gaining popularity among robotics researchers and companies around the world.

Honda Research Institute USA, Inc.
Booth 213
http://usa.honda-ri.com

Honda Research Institute provides excellence and expertise in the core technologies that are required for Honda to lead the transition to an Intelligent Cyber-Physical society. Our group of scientists and engineers in Japan, United States and Germany maintain a commitment to high quality and innovative research and promote partnerships with academia and industry.

iniLabs, GmbH
Booth 225
https://inilabs.com

iniLabs invents, produces and sells neuromorphic technologies for research. Our founders have invented some of the key foundations of the field, and we continue to lead the world in applications of neuromorphic engineering. iniLabs technologies are now in use at over 150 labs and companies around the world including aerospace, automotive, consumer electronics, industrial vision and security.

Intel Corporation
Booth 329
http://intel.com

Intel (NASDAQ: INTC) expands the boundaries of technology to make the most amazing experiences possible. Information about Intel can be found at newsroom.intel.com and intel.com.

Intuitive Surgical
Booth 121
http://intuitivesurgical.com

The idea of surgical robotics was little more than a curiosity until 1999, the year Intuitive Surgical introduced the da Vinci® Surgical System. Today, Intuitive Surgical is the global leader in the rapidly emerging field of robotic-assisted minimally invasive surgery.
The Company's da Vinci® Surgical System enables surgeons to operate minimally invasively through a few small incisions or the belly button from a nearby ergonomic console. The da Vinci System features a magnified 3D HD vision system and tiny wristed instruments that bend

and rotate far greater than the human hand. As a result of this technology, da Vinci enables surgeons to operate with enhanced vision, precision and control. Intuitive Surgical designed the da Vinci Xi System with the goal of further advancing the technology used in minimally invasive surgery for complex diseases and conditions.

IOP Publishing
Booth 208
http://ioppublishing.org

IOP Publishing provides a range of journals, books, websites, magazines, conference proceedings and services through which leading-edge scientific research is distributed worldwide. Extending to more than 20 journals IOP biosciences is dedicated to providing the essential content covering all areas of medical physics, biophysics and biomedical engineering. Visit iopscience. org/biosciences.

iRobot Corporation
Booth 228
http://irobot.com

iRobot Corporation, with a mission of “”empowering people to do more”” is at the forefront of the development of robotics and artificial intelligence technologies. iRobot has become one of the world’s preeminent specialist designers and builders of consumer robots. iRobot invests in the development and growth of its people, in a culture of empowerment, innovation and fun.

Khalifa University
Booth 309
http://kustar.ac.ae

The Mohamed Bin Zayed International Robotics Challenge (MBZIRC) is an international robotics competition, to be held every two years with the total prize and team sponsorship of USD 5 Million. Robotics has the potential to have an impact that is as transformative as the Internet, with robotics technology poised to fuel a broad range of next-generation products and applications in a diverse array of fields. Robotic competitions in the past few decades have been a catalyst that has accelerated the rate of technological advancements in the field of robotics and autonomous systems. MBZIRC aims to provide an ambitious, science-based, and technologically demanding set of challenges in Robotics, open to a large number of international teams. It is intended to demonstrate the current state of the art in robotics regarding scientific and

technological accomplishments and to inspire the future of robotics. Similar to other major competitions, the MBZIRC aims to provide an environment that harbors innovation and technical excellence, while encouraging spectacular performance with robotics technologies.

Kinova Robotics
Booth 306
http://kinovarobotics.com

Kinova is a Canadian company that designs and manufactures robotics platforms that are simple, sexy and safe. We work so that robots evolve from improving manufacturing capability to empowering people. Assistive Robotics empowers people with disabilities to push beyond their current boundaries. Innovation Robotics empowers people in industry and research to interact with their environment more efficiently and safely.

KUKA AG
Booth 215
http://kuka.com

KUKA is a global automation corporation with sales of around 3 billion euro and around 13,200 employees. As leading global supplier of intelligent automation solutions, KUKA offers its customers in the automotive, electronics, consumer goods, metalworking, logistics/e-commerce, healthcare, and service robotics industries everything they need from a single source: from components and cells to fully automated systems. The KUKA Group is headquartered in Augsburg.

MathWorks
Booth 316
http://mathworks.com/robotics

The MATLAB and Simulink product families are fundamental applied math and computational tools adopted by more than 5000 universities and colleges. MathWorks products help prepare students for careers in industry, where the tools are widely used for data analysis, mathematical modeling, and algorithm development in collaborative research and new product development.

MIT Press
Booth 205
https://mitpress.mit.edu

The MIT Press is the only university press in the United States whose list is based in science and technology.

Science and engineering are not all we publish: we are committed to the edges and frontiers of the world—to exploring new fields and new modes of inquiry. Our goal is to create content that is challenging, creative, attractive, and yet affordable to individual readers.

New Dexterity
Booth 201
http://newdexterity.org

Kia ora! New Dexterity provides robotics solutions to everyday life problems, modeling, designing and controlling novel robotics and bionics hardware (specializes on robot grippers and hands, robot grasping and dexterous, in-hand manipulation). The New Dexterity research team is affiliated with the Department of Mechanical Engineering at the University of Auckland, New Zealand. The goal of the team is to provide a new class of adaptive mechanisms that will help robots to interact.

NextAI
Booth 324
http://nextai.com

NextAI is a startup accelerator located in Toronto, Canada for entrepreneurs, researchers and scientists looking to launch AI-enabled ventures. We provide up to $200K seed funding, dedicated workspace and in-depth business and technical education taught by award-winning global faculty and entrepreneurs. Come build your company in one of the global hotspots for AI research and commercialization.
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NVIDIA
Booth 302
http://nvidia.com

NVIDIA's invention of the GPU in 1999 sparked the growth of the PC gaming market, redefined modern computer graphics, and revolutionized parallel computing. More recently, GPU deep learning ignited modern AI — the next era of computing — with the GPU acting as the brain of computers, robots, and self-driving cars that can perceive and understand the world.

Occam Vision Group
Booth 115
http://occamvisiongroup.com

Occam Vision Group specializes in multi-sensor camera systems, including fully integrated omni-directional

cameras, stereo cameras, and board level cameras designed for easy multi-sensor integrations. Come check out live demos of our Omni 60 (5-sensor omni-directional camera), Omni Stereo (10-sensor omni-directional stereo camera), and Array board cameras at our booth!

Office of Naval Research Global
Booth 101
https://www.onr.navy.mil

The Office of Naval Research Global (ONRG) acts as a bridge linking the Navy's research community to naval forces, international science and technology (S&T) communities, foreign military partners, and federal agencies. From research to technology transition, ONRG supports the Department of the Navy's research, development, test, and evaluation through its International Science, ScienceAdvisor and Naval S&T Cooperation Programs

OptiTrack
Booth 113
http://optitrack.com

OptiTrack, a Leyard Company, has established itself as the worldwide leader in 3D tracking systems by delivering the very best in 3D precision, low latency output, easy to use workflows, and a host of developer tools. Serving primary markets in Virtual Reality (VR) tracking, drone and ground robot tracking, movement science studies, and character animation for film and games.

Oxford Lasers, Inc.
Booth 300
https://oxfordlasers.com

Oxford Lasers provides high precision laser micromachining systems and services. With a wealth of knowledge and experience in the design and use of short pulse and ultra-short pulse laser systems (nano, pico and femtosecond pulses) Oxford Lasers systems are able to ablate material without debris, burr or heat affected zones, creating extremely precise features which are critical in manufacturing miniaturized components.

PAL Robotics
Booth 320
www.pal-robotics.com

PAL Robotics' designs, builds and manufactures collaborative service robots that have the power to improve our daily lives. From state of the art humanoid bipeds to

versatile mobile manipulators and inventory-taking robots, PAL Robotics builds robotic platforms that can work alongside humans in the home, at work, in shops and in warehouses to improve our quality of life.

PerceptIn, Inc.
Booth 305
https://www.perceptin.io

Founded in 2016, PerceptIn is a full-stack robotics artificial intelligence company, which develops scalable hardware/ software integrated solutions for autonomous robotic systems. PerceptIn's accurate and efficient vision-based robotic systems enable different form factors of robots to perceive the environment with simultaneous localization and mapping, and to perform path planning, obstacle avoidance, and advanced scene understanding.

Phoenix Technologies Inc.
Booth 323
www.ptiphoenix.com

Phoenix Technologies Inc. manufactures the fastest active, real-time 3D motion-tracking systems currently available -sampling multiple markers with unique IDs at 10,000 Hz with a precision of 15 micrometers. Superior patented technology ensures maximum reliability and uniform data latency, which is essential for high quality dynamic feedback control performance.

Rethink Robotics
Booth 216
http://www.rethinkrobotics.com

Rethink Robotics has pioneered the development of smart, collaborative robots that can operate safely next to people in a wide range of manufacturing, production and research & education environments. Founded in 2008 by renowned roboticist Rodney Brooks, the company is successfully introducing robots into organizations and applications for which robots have historically been impractical.

ROBOTIS
Booth 220
http://robotis.com

ROBOTIS is a world leading robotics solution provider for all customer ranges. For children, teaching tools to develop on creativity, and for experts, the solution to materialize creative ideas into real robots. ROBOTIS products are

sold in over 60 countries globally, and is used for various field such as; Kinetic Art, STEAM Education, Robot Sports, Rescue/Surveillance,Medical/Military, etc.

Robotnik Automation
Booth 322
http://robotnik.eu

Robotnik is a company specialized in Mobile Service Robotics. Our main specialties are: Autonomous indoor/outdoor mobile robots and mobile manipulators. Field service robotics applications (logistics, inspection,educational). R&D Robotics projects. We offer high-quality services for national and international reach and are certified in: ISO 9001:08 - Design, manufacturing, and commercialization of products and systems based on robotics technology. UNE 166002:06 - R&D management"

SEAMOR Marine Ltd.
Booth 327
http://seamor.com

SEAMOR Marine designs top quality remotely operated vehicles (ROV) for industrial and research applications. Our ROVs are an ideal platform for underwater research. With many upgrades and customizations available, SEAMOR ROVs are easily (and cost-effectively) modified to meet new project demands. SEAMOR Marine serves the world-wide market as an industrial supplier providing custom integration and OEM parts for underwater robotics.

Shadow Robot Company
Booth 125
http://shadowrobot.com

Robots need to be able to pick up and hold a wide rangeof objects. Shadow has evolved the Smart Grasping Systemfrom 20 years R&Don hands for robots, and it makes picking up and handling objects easy and automatic. This will enable a new generation of robots to solve real commercial challenges.

SICK Sensors
Booth 312
http://sick.com/us/en

SICK - Leading industrial sensor intelligence for over 70 years. This year, SICK is going big on multi-layer 3D

LiDARs. Come see the broadest range of 2D and 3D LiDARs on the planet - from the small TiM 2D LiDAR, to the brand new mid-range 4-layer MRS1000, to the 300m 4-layer LD-MRS UAV, and beyond. http://sick.com

Springer Nature
Booth 105
http://springernature.com

Springer Nature is one of the world's leading global research, educational and professional publishers, home to an array of respected and trusted brands providing quality content through a range of innovative products and services. Springer Nature is the world's largest academic book publisher and numbers almost 13,000 staff in over 50 countries.

Swarm Technology
Booth 229
http://swarmtechnology.us

We invented intent-based robotics. Our architecture demonstrates the five principles of swarm intelligence in robotics: Awareness, Autonomy, Solidarity, Expandability, and Resiliency; those attributes are essential for collective behavior of decentralized, self-organized systems. Swarm Technology's IP portfolio covers: Intent-based Edge Processing and Multi-Agent Artificial Intelligence. We seek to partner with an established company poised to benefit from swarm intelligence technology.

Universal Robots USA, Inc.
Booth 203
http://universal-robots.com

Universal Robots (now part of Teradyne, Inc.) was co-founded in 2005 to make robot technology accessible to all industries by developing small, user-friendly, reasonably priced, flexible, industrial collaborative robots (cobots). When we say the UR robot can automate virtually anything we mean virtually anything – from assembly to painting, screw driving to labeling, injection molding to welding and packaging to polishing.

UVify Inc.
Booth 226
http://UVify.com

Developer of autonomous unmanned drones. The company is engaged in the design, research and development of unmanned drones to conduct real-time, image-based monitoring of the environment.

World Robot Summit
Booth 221

The World Robot Summit hosted by Japan is a “Challenge and Expo” that brings together Robot Excellence from around the world, to promote a world where robots and humans successfully live and work together. Participants from all over the world will come together in one location with the aim of accelerating the R&D and practical implementation of robots in society.

Technical Sessions
Monday September 25, 2017

SuFW1 109

Human In-The-Loop Manipulation: On the Influence of the Human Role (Workshop)

Chair: Karayiannidis, Yiannis — Chalmers Univ. of Tech. & KTH Royal Insitute of Tech

09:00-17:30 SuFW1.1

Karayiannidis, Yiannis (Chalmers Univ. of Tech. & KTH Royal Insitute of Tech.), Bekiroglu, Yasemin (ABB Corp. Res.), Remazeilles, Anthony (Tecnalia Res. and Innovation), Piater, Justus (Univ. of Innsbruck)

SuFW2 111

Introspective Methods for Reliable Autonomy (Workshop)

Chair: Kucner, Tomasz Piotr — Örebro Univ

09:00-17:30 SuFW2.1

Kucner, Tomasz Piotr (Örebro Univ.), Schwertfeger, Sören (ShanghaiTech Univ.), Magnusson, Martin (Örebro Univ.), Lilienthal, Achim J. (Örebro Univ.)

SuFW3 117

Verification of Autonomous Systems Workshop (Workshop)

Chair: Balakirsky, Stephen — Georgia Tech

09:00-17:30 SuFW3.1

Balakirsky, Stephen (Georgia Tech.)

SuFW4 114

Shared Platforms for Medical Robotics Research (Workshop)

Chair: Kazanzides, Peter — Johns Hopkins Univ

09:00-17:30 SuFW4.1

Kazanzides, Peter (Johns Hopkins Univ.), Fischer, Gregory Scott (Worcester Pol. Inst. WPI), DiMaio, Simon P. (Intuitive Surgical Inc.), Haidegger, Tamas (Obuda Univ. (OU)), Hannaford, Blake (Univ. of Washington)

SuFW5 118

Planning Legged and Aerial Locomotion with Dynamic Motion Primitives (Workshop)

Chair: Poulakakis, Ioannis — Univ. of Delaware

09:00-17:30 SuFW5.1

Poulakakis, Ioannis (Univ. of Delaware), Byl, Katie (UCSB), Veer, Sushant (Univ. of Delaware)

SuAW6 121

Workshop on Acoustic Based Navigation for Marine Robots (Workshop)

Chair: Choi, Hyun-Taek — Korea Inst. of Oceans Science and Tech

09:00-12:30 SuAW6.1

Choi, Hyun-Taek (Korea Inst. of Oceans Science and Tech.)

SuFW7 122

On the Energetic Economy of Robotics and Biological Systems: A Challenging Handicap to Overcome (Workshop)

Chair: Kashiri, Navvab — Istituto Italiano Di Tecnologia

09:00-17:30 — SuFW7.1

Kashiri, Navvab (Istituto Italiano di Tecnologia), Vanderborght, Bram (Vrije Univ. Brussel), Malzahn, Jörn (Istituto Italiano di Tecnologia), Daley, Monica (Royal Veterinary Coll. Structure and Motion Lab.), Tsagarakis, Nikos (Istituto Italiano di Tecnologia)

SuAW8 202

A* Planning and Model Predictive Control with Dynamics-Based and Multiple Heuristics (Tutorial)

Chair: Collins, Emmanuel — FAMU-FSU Coll. of Engineering

09:00-12:30 — SuAW8.1

Collins, Emmanuel (FAMU-FSU Coll. of Engineering), Likhachev, Maxim (Carnegie Mellon Univ.)

SuFW9 204

Gravity Offload Testbeds for Space Robotic Mission Simulation (Workshop)

Chair: Carignan, Craig — Univ. of Maryland

09:00-17:30 — SuFW9.1

Carignan, Craig (Univ. of Maryland), Schiele, Andre (European Space Agency), Marani, Giacomo (West Virginia Univ.)

SuFW10 205

Soft Morphological Design for Haptic Sensation, Interaction and Display (Workshop)

Chair: Liu, Hongbin — King's Coll. London

09:00-17:30 — SuFW10.1

Liu, Hongbin (King's Coll. London), Ho, Van (Japan Advanced Inst. of Science and Tech.)

SuFW11 207

Towards an Artist-In-The-Lab Framework (Workshop)

Chair: St-Onge, David — Ec. Pol. De Montreal

09:00-17:30 — SuFW11.1

St-Onge, David (Ec. Pol. de Montreal), Herath, Damitha Chandana (MARCS Auditory Lab.), Smart, William (Oregon State Univ.)

SuFW12 208

Continuum Robots in Medicine – Design, Integration, and Applications (Workshop)

Chair: Tavakoli, Mahdi — Univ. of Alberta

09:00-17:30 — SuFW12.1

Tavakoli, Mahdi (Univ. of Alberta), Patel, Rajnikant V. (The Univ. of Western Ontario), Misra, Sarthak (Univ. of Twente), Yip, Michael C. (Univ. of California, San Diego), Khadem, Mohsen (Univ. of Alberta)

SuFW13 211
9th Workshop on Planning, Perception and Navigation for Intelligent Vehicles (Workshop)

Chair: Martinet, Philippe — Ec. Centrale De Nantes

09:00-17:30 SuFW13.1

Martinet, Philippe (Ec. Centrale de Nantes), Laugier, Christian (INRIA), Stiller, Christoph (Karlsruhe Inst. of Tech.), Nunes, Urbano (Inst. de Sistemas e Robotica)

SuFW14 217
Learning for Collaborative Robotics: Enabling Flexible, Redeployable and Agile Industrial Applications (Workshop)

09:00-17:30 SuFW14.1

Colasanto, Luca (Robert Bosch LLC), Hess, Juergen Michael (Robert Bosch LLC), Riano, Lorenzo (Robert Bosch LLC), Ajoudani, Arash (Advanced Robotics Department), Petric, Tadej (Jozef Stefan Inst.), Calinon, Sylvain (Idiap Res. Inst.), Rosman, Benjamin (CSIR), Eppner, Clemens (Tech. Univ. Berlin)

SuFW15 215
Agile Robotics for Industrial Automation Competition (ARIAC) Workshop (Workshop)

Chair: Schlenoff, Craig — NIST

09:00-17:30 SuFW15.1

Schlenoff, Craig (NIST), Harrison, William (Univ. of Michigan), Downs, Anthony (NIST)

SuAW16 220
Workshop on Perception and Planning for Robotic Inspection (Workshop)

Chair: Tokekar, Pratap — Virginia Tech

09:00-12:30 SuAW16.1

Tokekar, Pratap (Virginia Tech.), Stilwell, Daniel (Virginia Tech.), Woolsey, Craig (Virginia Tech.), Williams, Ryan (Virginia Pol. Inst. and State Univ.), Hebdon, Matthew (Virginia Tech.)

SuFW17 221
2nd Workshop on Semantic Policy and Action Representations for Autonomous Robots (Workshop)

Chair: Ramirez-Amaro, Karinne — Inst. for Cognitive Systems. Tech. Univ. München

09:00-17:30 SuFW17.1

Ramirez-Amaro, Karinne (Inst. for Cognitive Systems. Tech. Univ. München.), Yang, Yezhou (Arizona State Univ.), Dantam, Neil (Colorado School of Mines),

Aksoy, Eren Erdal (Karlsruhe Inst. of Tech. (KIT)), Cheng, Gordon (Tech. Univ. of Munich)

SuFW18 223

Human-Robot Interaction in Collaborative Manufacturing Environments (Workshop)

Chair: Sheikholeslami, Sara — Univ. of British Columbia

09:00-17:30 — SuFW18.1

Sheikholeslami, Sara (Univ. of British Columbia), Mead, Ross (Semio)

SuBW8 202

Development of Benchmarking Protocols for Robot Manipulation (Workshop)

Chair: Calli, Berk — Yale Univ

14:00-17:30 — SuBW8.1

Calli, Berk (Yale Univ.), Dollar, Aaron (Yale Univ.), Srinivasa, Siddhartha (Carnegie Mellon Univ.), Roa, Maximo A. (German Aerospace Center, DLR)

SuBW16 220

Micro-Data: The New Frontier of Robot Learning? (Workshop)

Chair: Mouret, Jean-Baptiste — Inria

14:00-17:30 — SuBW16.1

Mouret, Jean-Baptiste (Inria), Stulp, Freek (DLR - Deutsches Zentrum für Luft- und Raumfahrt e.V.), Calinon, Sylvain (Idiap Res. Inst.)

MoAT1	Room 109
Deep Learning in Robotics and Automation I	
Chair: Girdhar, Yogesh	Woods Hole Oceanographic Inst
Co-Chair: Liu, Ming	Hong Kong Univ. of Science and Tech

10:30-10:45 MoAT1.1

Feature Discovery and Visualization of Robot Mission Data Using Convolutional Autoencoders and Bayesian Nonparametric Topic Modeling.

Flaspohler, Genevieve (Massachusetts Inst. of Tech), Roy, Nicholas (Massachusetts Inst. of Tech), Girdhar, Yogesh (Woods Hole Oceanographic Inst)

10:45-11:00 MoAT1.2

Only Look Once, Mining Distinctive Landmarks from ConvNet for Visual Place Recognition.

Chen, Zetao (ETH Zurich), Maffra, Fabiola (ETH), Sa, Inkyu (ETH Zurich), Chli, Margarita (ETH Zurich)

11:00-11:15 MoAT1.3

GeoCueDepth: Exploiting Geometric Structure Cues to Estimate Depth from a Single Image.

Zeng, Yiming (Inst. of Computing Tech. Chinese Acad. of Sciences), Hu, Yu (Inst. of Computing Tech. Chinese Acad. of Sciences), Liu, Shice (Inst. of Computing Tech. Chinese Acad. of Sciences), Tang, Qiankun (The Inst. of Computing Tech. of the Chinese Acad. Of), Ye, Jing (Inst. of Computing Tech. Chinese Acad. of Sciences), Li, Xiaowei (Inst. of Computing Tech. Chinese Acad. of Sciences)

11:15-11:30 MoAT1.4

Domain Randomization for Transferring Deep Neural Networks from Simulation to the Real World.

Tobin, Joshua (UC Berkeley), Schneider, Jonas (OpenAI), Zaremba, Wojciech (OpenAI), Abbeel, Pieter (UC Berkeley)

11:30-11:45 MoAT1.5

Virtual-To-Real Deep Reinforcement Learning: Continuous Control of Mobile Robots for Mapless Navigation.

Tai, Lei (City Univ. of Hong Kong), Paolo, Giuseppe (Department of Mechanical and Process Engineering, ETH Zurich), Liu, Ming (Hong Kong Univ. of Science and Tech)

11:45-12:00 MoAT1.6

Acquiring Social Interaction Behaviours for Telepresence Robots Via Deep Learning from Demonstration.

Shiarlis, Kyriacos (Univ. of Amsterdam)

MoAT2	Room 111
Learning and Adaptive Systems I	
Co-Chair: Mouret, Jean-Baptiste	Inria
10:30-10:45	MoAT2.1
A Generative Model for Intention Recognition and Manipulation Assistance in Teleoperation.	
Tanwani, Ajay Kumar (Idiap Res. Inst. Ec. Pol. Federale De Lausan), Calinon, Sylvain (Idiap Res. Inst)	
10:45-11:00	MoAT2.2
Black-Box Data-Efficient Policy Search for Robotics.	
Chatzilygeroudis, Konstantinos (Inria Nancy Grand-Est), Rama, Roberto (Inria Nancy Grand-Est), Kaushik, Rituraj (INRIA - Nancy Grand Est, France), Goepp, Dorian (INRIA Nancy - Grand Est), Vassiliades, Vassilis (Inria Nancy Grand-Est), Mouret, Jean-Baptiste (Inria)	
11:00-11:15	MoAT2.3
Gaussian Mixture Regression on Symmetric Positive Definite Matrices Manifolds: Application to Wrist Motion Estimation with Semg.	
Jaquier, Noémie (Idiap Res. Inst), Calinon, Sylvain (Idiap Res. Inst)	
11:15-11:30	MoAT2.4
Active Learning with Query Paths for Tactile Object Shape Exploration.	
Driess, Danny (Univ. of Stuttgart), Englert, Peter (U Stuttgart), Toussaint, Marc (Univ. of Stuttgart)	
11:30-11:45	MoAT2.5
Learning Task-Space Synergies Using Riemannian Geometry.	
Zeestraten, Martijn J.A. (Istituto Italiano Di Tecnologia), Havoutis, Ioannis (Univ. of Oxford), Calinon, Sylvain (Idiap Res. Inst), Caldwell, Darwin G. (Istituto Italiano Di Tecnologia)	
11:45-12:00	MoAT2.6
Collective Robot Reinforcement Learning with Distributed Asynchronous Guided Policy Search.	
Yahya, Ali (X), Li, Adrian (X), Kalakrishnan, Mrinal (Google Inc), Chebotar, Yevgen (Univ. of Southern California), Levine, Sergey (UC Berkeley)	

MoAT3	Room 116
Autonomous Agents I	
Chair: Merino, Luis	Pablo De Olavide Univ
Co-Chair: Wan, Weiwei	National Inst. of AIST

10:30-10:45 MoAT3.1

Towards Real-Time Search Planning in Subsea Environments.

McMahon, James (The Naval Res. Lab), Yetkin, Harun (Virginia Tech), Wolek, Artur (Naval Res. Lab), Waters, Zachary (US Naval Res. Lab), Stilwell, Daniel (Virginia Tech)

10:45-11:00 MoAT3.2

Autonomous Skill-Centric Testing Using Deep Learning.

Hangl, Simon (Univ. of Innsbruck), Stabinger, Sebastian (Innsbruck Univ), Piater, Justus (Univ. of Innsbruck)

11:00-11:15 MoAT3.3

Programming Robotic Agents with Action Descriptions.

Kazhoyan, Gayane (Univ. of Bremen), Beetz, Michael (Univ. of Bremen)

11:15-11:30 MoAT3.4

Autonomous Mobile Robot Navigation in Uneven and Unstructured Indoor Environments.

Wang, Chaoqun (The Chinese Univ. of HongKong), Meng, Lili (Univ. of British Columbia), She, Sizhen (The Univ. of British Columbia), Mitchell, Ian (Univ. of British Columbia), Li, Teng (Univ. of British Columbia), Tung, Frederick (Univ. of British Columbia), Wan, Weiwei (National Inst. of AIST), Meng, Max Q.-H. (The Chinese Univ. of Hong Kong), de Silva, Clarence (The Univ. of British Columbia)

11:30-11:45 MoAT3.5

Approximating Reachable Belief Points in POMDPs.

Wray, Kyle (Univ. of Massachusetts Amherst), Zilberstein, Shlomo (Univ. of Massachusetts)

11:45-12:00 MoAT3.6

Online Information Gathering Using Sampling-Based Planners and GPs: An Information Theoretic Approach.

Viseras, Alberto (German Aerospace Center (DLR)), Shutin, Dmitriy (German Aerospace Center), Merino, Luis (Pablo De Olavide Univ)

MoAT4	Room 114
Force and Tactile Sensing	
Chair: Cannata, Giorgio	Univ. of Genova
Co-Chair: Stoyanov, Danail	Univ. Coll. London

10:30-10:45 MoAT4.1

A Novel Force Sensing Integrated into the Trocar for Minimally Invasive Robotic Surgery.

Fontanelli, Giuseppe Andrea (Univ. of Naples Federico II), Buonocore, Luca Rosario (Univ. Degli Studi Di Napoli Federico II), Ficuciello, Fanny (Univ. Di Napoli Federico II), Villani, Luigi (Univ. Di Napoli Federico II), Siciliano, Bruno (Univ. Napoli Federico II)

10:45-11:00 MoAT4.2

Improved GelSight Tactile Sensor for Measuring Geometry and Slip.

Dong, Siyuan (MIT), Yuan, Wenzhen (MIT), Adelson, Edward (MIT)

11:00-11:15 MoAT4.3

Body Wall Force Sensor for Simulated Minimally Invasive Surgery: Application to Fetal Surgery.

Javaux, Allan (KU Leuven), Esteveny, Laure (KU Leuven), Bouget, David (KU Leuven), Gruijthuijsen, Caspar (KU Leuven, Department of Mechanical Engineering), Stoyanov, Danail (Univ. Coll. London), Vercauteren, Tom (Univ. Coll. London (UCL)), Ourselin, Sebastien (Univ. Coll. London), Reynaerts, Dominiek (Div. Production Engineering, Machine Design Andautomation, K), Denis, Kathleen (KU Leuven), Deprest, Jan (Univ. Hospital Leuven), Vander Poorten, Emmanuel B (Katholieke Univ. Leuven)

11:15-11:30 MoAT4.4

Towards Autonomous Robotic Skin Spatial Calibration: A Framework Based on Vision and Self-Touch.

Albini, Alessandro (Univ. of Genova), Denei, Simone (Univ. of Genova), Cannata, Giorgio (Univ. of Genova)

11:30-11:45 MoAT4.5

Sight to Touch: 3D Diffeomorphic Deformation Recovery with Mixture Components for Perceiving Forces in Robotic-Assisted Surgery.

Aviles, Angelica I. (Univ. Pol. De Catalunya), Alsaleh, Samar (Department of Computer Science, George Washington Univ. Wa), Casals, Alicia (Inst. for Bioengineering of Catalonia and Univ)

11:45-12:00 MoAT4.6

Event-Driven Encoding of Off-The-Shelf Tactile Sensors for Compression and Latency Optimisation for Robotic Skin.

Bartolozzi, Chiara (Istituto Italiano Di Tecnologia), Motto Ros, Paolo (Istituto Italiano Di Tecnologia), Diotalevi, Francesco (Italian Inst. of Tech), Jamali, Nawid (Istituto Italiano Di Tecnologia), Natale, Lorenzo (Istituto Italiano Di Tecnologia), Crepaldi, Marco (Istituto Italiano Di Tecnologia), Demarchi, Danilo (Istituto Italiano Di Tecnologia@Pol. and Department of Electro)

MoAT5 Room 118

Medical Robots I

Chair: Hawkes, Elliot Wright — Univ. of California, Santa Barbara

Co-Chair: Iwata, Hiroyasu — Waseda Univ

10:30-10:45 MoAT5.1

Design of a Soft Catheter for Low-Force and Constrained Surgery.

Slade, Patrick (Stanford Univ), Gruebele, Alexander (Stanford Univ), Hammond, Zachary (Stanford Univ), Raitor, Michael (Stanford Univ), Okamura, Allison M. (Stanford Univ), Hawkes, Elliot Wright (Univ. of California, Santa Barbara)

10:45-11:00 MoAT5.2

A Variable Stiffness Catheter Controlled with an External Magnetic Field.

Chautems, Christophe (ETH Zurich), Tonazzini, Alice (Ec. Pol. Federale De Lausanne (EPFL)), Floreano, Dario (Ec. Pol. Federal, Lausanne), Nelson, Bradley J. (ETH Zurich)

11:00-11:15 MoAT5.3

Insertion Method for Minimizing Fine Needle Deflection in Bowel Insertion Based on Experimental Analysis.

Tsumura, Ryosuke (Waseda Univ), Shitashima, Kai (Waseda Univ), Iwata, Hiroyasu (Waseda Univ)

11:15-11:30 MoAT5.4

Implicit Active Constraints for Concentric Tube Robots Based on Analysis of the Safe and Dexterous Workspace.

Leibrandt, Konrad (Imperial Coll. London), Bergeles, Christos (Univ. Coll. London), Yang, Guang-Zhong (Imperial Coll. London)

11:30-11:45 MoAT5.5

Shape Determination During Needle Insertion with Curvature Measurements.

Kim, Jin Seob (Johns Hopkins Univ), Guo, Jiangzhen (Beihang Univ), Chatrasingh, Maria (Mahidol Univ), Kim, Sungmin (Johns Hopkins Univ), Iordachita, Ioan Iulian (Johns Hopkins Univ)

11:45-12:00 MoAT5.6

Master Manipulator Designed for Highly Articulated Robotic Instruments in Single Access Surgery.

Wisanuvej, Piyamate (Imperial Coll. London), Gras, Gauthier (Imperial Coll. London), Leibrandt, Konrad (Imperial Coll. London), Giataganas, Petros (Imperial Coll. London), Seneci, Carlo Alberto (Imperial Coll. London), Liu, Jindong (Imperial Coll. London), Yang, Guang-Zhong (Imperial Coll. London)

MoAT6	Room 121
CP Multiple Aerial Vehicles	
Chair: Schoellig, Angela P.	Univ. of Toronto
Co-Chair: de Croon, Guido	TU Delft / ESA

10:30-10:45 MoAT6.1

Real-Time Trajectory Replanning for MAVs Using Uniform B-Splines and a 3D Circular Buffer.

Usenko, Vladyslav (TU Munich), von Stumberg, Lukas (Tech. Univ. München), Pangercic, Andrej (TU Munich), Cremers, Daniel (Tech. Univ. of Munich)

10:45-11:00 MoAT6.2

A Framework for Multi-Vehicle Navigation Using Feedback-Based Motion Primitives.

Vukosavljev, Marijan (Univ. of Toronto), Kroeze, Zachary (Univ. of Toronto), Broucke, Mireille (Univ. of Toronto), Schoellig, Angela P. (Univ. of Toronto)

11:00-11:15 MoAT6.3

Short and Full Horizon Motion Planning for Persistent Multi-UAV Surveillance with Energy and Communication Constraints.

Scherer, Jürgen (Klagenfurt Univ), Rinner, Bernhard (Klagenfurt Univ)

11:15-11:30 MoAT6.4

Robust Collision Avoidance for Multiple Micro Aerial Vehicles Using Nonlinear Model Predictive Control.

Kamel, Mina (Autonomous Systems Lab, ETH Zurich), Alonso-Mora, Javier (Delft Univ. of Tech), Siegwart, Roland (ETH Zurich), Nieto, Juan (ETH Zürich)

11:30-11:45 MoAT6.5

Towards Autonomous Navigation of Multiple Pocket-Drones in Real-World Environments.

McGuire, Kimberly (Delft Univ. of Tech), Coppola, Mario (Delft Univ. of Tech), de Croon, Guido (TU Delft / ESA), De Wagter, Christophe (Delft Univ. of Tech)

11:45-12:00 MoAT6.6

Downwash-Aware Trajectory Planning for Large Quadrotor Teams.

Preiss, James (USC), Hoenig, Wolfgang (Univ. of Southern California), Ayanian, Nora (Univ. of Southern California), Sukhatme, Gaurav (Univ. of Southern California)

MoAT7	Room 122
Grasping I	
Chair: Brock, Oliver	Tech. Univ. Berlin
10:30-10:45	MoAT7.1
Viewpoint Selection for Grasp Detection.	
Gualtieri, Marcus (Northeastern Univ), Platt, Robert (Northeastern Univ)	
10:45-11:00	MoAT7.2
On the Relevance of Grasp Metrics for Predicting Grasp Success.	
Rubert, Carlos (Univ. Jaume I), Kappler, Daniel (Max-Planck Inst. for Intelligent Systems), Morales, Antonio (Univ. Jaume I), Bohg, Jeannette (Max-Planck Inst. for Intelligent Systems), Schaal, Stefan (MPI Intelligent Systems & Univ. of Southern California)	
11:00-11:15	MoAT7.3
Visual Detection of Opportunities to Exploit Contact in Grasping Using Contextual Multi-Armed Bandits.	
Eppner, Clemens (Tech. Univ. Berlin), Brock, Oliver (Tech. Univ. Berlin)	
11:15-11:30	MoAT7.4
Automatic Page-Turning Mechanism with Near-Field Electroadhesive Force for Linearly Correctable Imaging.	
Lee, Junseok (Yonsei Univ), Jeon, Wonseok (Yonsei Univ), Cha, Youngsu (Korea Inst. of Science and Tech), Yang, Hyunseok (Yonsei Univ)	
11:30-11:45	MoAT7.5
Grasp Stability Assessment through the Fusion of Proprioception and Tactile Signals Using Convolutional Neural Networks.	
Kwiatkowski, Jennifer (École De Tech. Supérieure), Cockburn, Deen Stephen (École De Tech. Supérieure), Duchaine, Vincent (Ec. De Tech. Superieure)	
11:45-12:00	MoAT7.6
Learning the Post-Contact Reconfiguration of the Hand Object System for Adaptive Grasping Mechanisms.	
Liarokapis, Minas (The Univ. of Auckland), Dollar, Aaron (Yale Univ)	

MoAT8	Room 202
Underactuated Robots	
Chair: Fearing, Ronald	Univ. of California at Berkeley
Co-Chair: Asano, Fumihiko	Japan Advanced Inst. of Science and Tech

10:30-10:45 MoAT8.1

Design and Experimental Implementation of a Quasi-Direct-Drive Leg for Optimized Jumping.

Ding, Yanran (Univ. of Illinois at Urbana-Champaign), Park, Hae-Won (Univ. of Illinois at Urbana Champaign)

10:45-11:00 MoAT8.2

Soft Actuation and Sensing towards Robot-Assisted Facial Rehabilitation.

Firouzeh, Amir (EPFL), Paik, Jamie (Ec. Pol. Federale De Lausanne)

11:00-11:15 MoAT8.3

Dynamic Terrestrial Self-Righting with a Minimal Tail.

Casarez, Carlos (Univ. of California, Berkeley), Fearing, Ronald (Univ. of California at Berkeley)

11:15-11:30 MoAT8.4

HERI Hand: A Quasi Dexterous and Powerful Hand with Asymmetrical Finger Dimensions and under Actuation.

Ren, Zeyu (Istituto Italiano Di Tecnologia), Zhou, Chengxu (Fondazione Istituto Italiano Di Tecnologia), Xin, Songyan (Istituto Italiano Di Tecnologia (IIT)), Tsagarakis, Nikos (Istituto Italiano Di Tecnologia)

11:30-11:45 MoAT8.5

Influence of Fingertip and Object Shape on the Manipulation Ability of Underactuated Hands.

Ospina, Diego (Univ. of Calgary), Ramirez-Serrano, Alejandro (4Front Robotics)

11:45-12:00 MoAT8.6

Control of Underactuated Rimless Wheel That Walks on Steep Slope.

Asano, Fumihiko (Japan Advanced Inst. of Science and Tech), KIKUCHI, Yasunori (Japan Advanced Inst. of Science and Tech), Xiao, Xuan (Tsinghua Univ)

MoAT9	Room 204
Virtual Reality and Interfaces	
Chair: Croft, Elizabeth	Univ. of British Columbia
Co-Chair: Kurazume, Ryo	Kyushu Univ

10:30-10:45 MoAT9.1

``Is This the Real Life? Is This Just Fantasy?": Human Proxemic Preferences for Recognizing Robot Gestures in Physical Reality and Virtual Reality.

El-Shawa, Sahba (Univ. of British Columbia), Kraemer, Noah (Univ. of Queensland), Sheikholeslami, Sara (Univ. of British Columbia), Mead, Ross (Semio), Croft, Elizabeth (Univ. of British Columbia)

10:45-11:00 MoAT9.2

Rendering 3D Virtual Objects in Mid-Air Using Controlled Magnetic Fields.

Adel, Alaa (German Univ. in Cairo), Abou Seif, Mohamed (German Univ. in Cairo), Hoelzl, Gerold (Univ. of Passau), Kranz, Matthias (Univ. of Passau), Abdennadher, Slim (German Univ. in Cairo), Khalil, Islam S.M. (German Univ. in Cairo)

11:00-11:15 MoAT9.3

Direct Hand Manipulation of Constrained Virtual Objects.

Kim, Jun-Sik (Korea Inst. of Science & Tech), Park, Jung-Min (Korea Inst. of Science and Tech)

11:15-11:30 MoAT9.4

ARK: Augmented Reality for Kilobots.

Reina, Andreagiovanni (Univ. of Sheffield), Cope, Alexander (Univ. of Sheffield), Nikolaidis, Eleftherios (Alexander Tech. Inst. of Thessaloniki), Marshall, James A. R. (Univ. of Sheffield), Sabo, Chelsea (Univ. of Sheffield)

11:30-11:45 MoAT9.5

Previewed Reality: Near-Future Perception System.

Horikawa, Yuta (Kyushu Univ), Egashira, Asuka (Kyushu Univ), Nakashima, Kazuto (Kyushu Univ), Kawamura, Akihiro (Kyushu Univ), Kurazume, Ryo (Kyushu Univ)

11:45-12:00 MoAT9.6

Bipedal Oriented Whole Body Master-Slave System for Dynamic Secured Locomotion with LIP Safety Constraints.

Ishiguro, Yasuhiro (The Univ. of Tokyo), Kojima, Kunio (The Univ. of Tokyo), Sugai, Fumihito (The Univ. of Tokyo), Nozawa, Shunichi (The Univ. of Tokyo), Kakiuchi, Yohei (The Univ. of Tokyo), Okada, Kei (The Univ. of Tokyo), Inaba, Masayuki (The Univ. of Tokyo)

MoAT10 Room 205

Micro/Nano Robotics I

Chair: Khalil, Islam S.M. German Univ. in Cairo

Co-Chair: Becker, Aaron Univ. of Houston

10:30-10:45 MoAT10.1

A Regularized On-Line Sequential Extreme Learning Machine with Forgetting Property for Fast Dynamic Hysteresis Modeling.

Tang, Hui (Guangdong Univ. of Tech), Wu, Zelong (Guangdong Univ. of Tech), He, Sifeng (Guangdong Univ. of Tech), Gao, Jian (Guangdong Univ. of Tech), Chen, Xin (Guangdong Univ. of Tech), Cui, Chengqiang (Guangdong Univ. of Tech), He, Yunbo (Guangdong Univ. of Tech), Zhang, Kai (Guangdong Univ. of Tech), Li, Huawei (Guangdong Univ. of Tech), Li, Yangmin (Univ. of Macau)

10:45-11:00 MoAT10.2

Calibration of Magnetic Platform Prototype for Vision-Based Drugs Delivery Inside Human Cochlea.

Zarrouk, Azaddien (INSA Centre Val De Loire), Belharet, Karim (Hautes Etudes D'ingénieur - HEI Campus Centre), Tahri, Omar (INSA Centre Val-De-Loire)

11:00-11:15 MoAT10.3

Design and Prototyping of a Magnetic Actuator Based Permanent Magnets for Microbead Navigation in Viscous Environment.

Amokrane, Walid (Hautes études D'ingénieur (HEI)), Belharet, Karim (Hautes Etudes D'ingénieur - HEI Campus Centre), souissi, mouna (Prisme-HEI), Bozorg Grayeli, Alexis (UMR-S 867 Inserm / Univ. Paris 7 Denis Diderot / AP-HP, Hôp), Ferreira, Antoine (INSA Centre Val De Loire)

11:15-11:30 MoAT10.4

The HyBrid System with a Large Workspace towards Magnetic Micromanipulation within the Human Head.

Manamanchaiyaporn, Laliphat (SHENZHEN Inst. OF ADVANCED Tech), Xu, Tiantian (Chinese Acad. of Sciences), Wu, Xinyu (CAS/CUHK)

11:30-11:45 MoAT10.5

1D Manipulation of a Micrometer Size Particle Actuated Via Thermocapillary Convective Flows.

Terrazas Mallea, Ronald (Univ. Libre De Bruxelles), Bolopion, Aude (Femto-St Inst), Beugnot, Jean-Charles (CNRS/FEMTO-ST), Lambert, Pierre (Univ. Libre De Bruxelles), Gauthier, Michael (FEMTO-ST Inst)

11:45-12:00 MoAT10.6

Path Planning and Aggregation for a Microrobot Swarm in Vascular Networks Using a Global Input.

Huang, Li (Univ. of Houston), Rogowski, Louis (Southern Methodist Univ), Kim, MinJun (Southern Methodist Univ), Becker, Aaron (Univ. of Houston)

MoAT11	Room 207
Flexible Robots	
Chair: Xiao, Jing	UNC Charlotte
Co-Chair: Mochiyama, Hiromi	Univ. of Tsukuba

10:30-10:45 MoAT11.1

Velocity Estimation for Ultra Lightweight Tendon Driven Series Elastic Robots.

Kirchhoff, Jérôme (Tech. Univ. Darmstadt), von Stryk, Oskar (Tech. Univ. Darmstadt)

10:45-11:00 MoAT11.2

Passivity-Based Control of Manipulator-Stage Systems on Vertical Flexible Beam.

Ha, ChangSu (Seoul National Univ), Kim, Hackchan (Seoul National Univ), Lee, Dongjun (Seoul National Univ)

11:00-11:15 MoAT11.3

A Wire-Driven Continuum Manipulator Model without Assuming Shape Curvature Constancy.

Hsiao, Kai-Wen (Univ. of Tsukuba), Mochiyama, Hiromi (Univ. of Tsukuba)

11:15-11:30 MoAT11.4

Adaptive Input Shaper Design for Flexible Robot Manipulators.

Solatges, Thomas (SITIA), Rubrecht, Sebastien (SITIA), ROGNANT, Mathieu (ONERA), Bidaud, Philippe (ONERA)

11:30-11:45 MoAT11.5

Design of a Spherical Tensegrity Robot for Dynamic Locomotion.

Kim, Kyunam (UC Berkeley), Moon, Deaho (UC Berkeley), Bin, Jae Young (UC Berkeley), Agogino, Alice (Univ. of California Berkeley)

11:45-12:00 MoAT11.6

Shape-Based Object Classification and Recognition through Continuum Manipulation.

Mao, Huitan (Univ. of North Carolina at Charlotte), Zhang, Mabel M. (Univ. of Pennsylvania), Xiao, Jing (UNC Charlotte), Daniilidis, Kostas (Univ. of Pennsylvania)

MoAT12	Room 208
Soft Material Robotics I	
Chair: Zhao, Jianguo	Colorado State Univ
Co-Chair: Liu, Xinyu	McGill Univ

10:30-10:45 MoAT12.1

Morphological Computation: The Good, the Bad, and the Ugly.

Ghazi-Zahedi, Keyan (Max Planck Inst. for Mathematics in the Sciences), Deimel, Raphael (TU Berlin), Montufar, Guido (Max Planck Inst. for Mathematics in the Sciences), Wall, Vincent (TU Berlin), Brock, Oliver (Tech. Univ. Berlin)

10:45-11:00 MoAT12.2

Active Suction Cup Actuated by ElectroHydroDynamics Phenomenon.

Kuwajima, Yu (Shibaura Inst. Tech), Shigemune, Hiroki (Waseda Univ), Cacucciolo, Vito (Scuola Superiore Sant'Anna), Cianchetti, Matteo (Scuola Superiore Sant'Anna), Laschi, Cecilia (Scuola Superiore Sant'Anna), Maeda, Shingo (Shibaura Inst. of Tech)

11:00-11:15 MoAT12.3

Soft Foam Robot with Caterpillar-Inspired Gait Regimes for Terrestrial Locomotion.

Donatelli, Cassandra M. (Tufts Univ), Serlin, Zachary (Boston Univ), Echols-Jones, Piers (Tufts Univ), Scibelli, Anthony (Tufts Univ), Cohen, Alexandra A (Tufts Univ), Musca, Jeanne-Marie (Tufts Univ), Rozen-Levy, Shane (Tufts Univ), Buckingham, David (Tufts Univ), White, Robert David (Tufts Univ), Trimmer, Barry (Tufts Univ)

11:15-11:30 MoAT12.4

Twisted and Coiled Sensor for Shape Estimation of Soft Robots.

Abbas, Ali (Colorado State Univ), Zhao, Jianguo (Colorado State Univ)

11:30-11:45 MoAT12.5

Regulating Surface Traction of a Soft Robot through Electrostatic Adhesion Control.

Wu, Qiyang (McGill Univ), Diaz Jimenez, Tomas (McGill Univ), Qu, Juntian (McGill Univ), Zhao, Chen (McGill Univ), Liu, Xinyu (McGill Univ)

11:45-12:00 MoAT12.6

Custom Soft Robotic Gripper Sensor Skins for Haptic Object Visualization.

Shih, Benjamin (Univ. of California, San Diego), Drotman, Dylan (Univ. of California, San Diego), Christianson, Caleb (UC San Diego), Huo, Zhaoyuan (Univ. of California, San Diego), White, Ruffin (Georgia Inst. of Tech), Christensen, Henrik Iskov (UC San Diego), Tolley, Michael Thomas (Univ. of California, San Diego)

MoAT13	Room 211
Rehabilitation Robotics	
Chair: Arata, Jumpei	Kyushu Univ
Co-Chair: Tsuji, Toshiaki	Saitama Univ

10:30-10:45 MoAT13.1

Nonlinear Model Predictive Control of an Upper Extremity Rehabilitation Robot Using a Two-Dimensional Human-Robot Interaction Model.

Ghannadi, Borna (Univ. of Waterloo), Mehrabi, Naser (Univ. of Waterloo), Sharif Razavian, Reza (Univ. of Waterloo), McPhee, John J. (Univ. of Waterloo)

10:45-11:00 MoAT13.2

NREL-Exo: A 4-DoFs Wearable Hip Exoskeleton for Walking and Balance Assistance in Locomotion.

Zhang, Ting (North Carilina State Univ), Tran, Minh (NCSU), Huang, He (North Carolina State Univ)

11:00-11:15 MoAT13.3

Low-Profile Two-Degree-Of-Freedom Wrist Exoskeleton Device Using Multiple Spring Blade.

Higuma, Tomohito (Kyushu Univ), Kiguchi, Kazuo (Kyushu Univ), Arata, Jumpei (Kyushu Univ)

11:15-11:30 MoAT13.4

Adaptive Walking Load Control for Training Physical Strength Using Cane-Type Robot.

Itadera, Shunki (Nagoya Univ), Hasegawa, Yasuhisa (Nagoya Univ), Fukuda, Toshio (Meijo Univ), Tanimoto, Masanori (National Center for Geriatrics and Gerontology), Izumi, Kondo (National Center for Geriatrics and Gerontology)

11:30-11:45 MoAT13.5

Home Rehabilitation Assist Robot to Facilitate Isolated Movements for Hemiplegia Patients.

Ogata, Kunihiro (National Inst. of Advanced Industrial Science and Tech), Hirabayashi, Yuto (Saitama Univ), Kubota, Keisuke (Saitama Prefectural Univ), Tsuji, Toshiaki (Saitama Univ)

11:45-12:00 MoAT13.6

A Novel, Soft, Bending Actuator for Use in Power Assist and Rehabilitation Exoskeletons.

Al-Fahaam, Hassanin (Univ), Davis, Steven (Univ. of Salford), Nefti-Meziani, Samia (Univ. of Salford)

MoAT14	Room 217
Computer Vision for Automation I	
Chair: Bekris, Kostas E.	Rutgers, the State Univ. of New Jersey
Co-Chair: Kaneko, Alex Masuo	Hitachi, Ltd

10:30-10:45 MoAT14.1

Silhouette-Based Pose Estimation for Deformable Organs Application to Surgical Augmented Reality.

ADAGOLODJO, Yinoussa (Univ. of Strasbourg), Trivisonne, Raffaella (Inria), Haouchine, Nazim (INRIA), Cotin, Stephane (INRIA), Courtecuisse, Hadrien (AVR, CNRS Strasbourg)

10:45-11:00 MoAT14.2

A Self-Supervised Learning System for Object Detection Using Physics Simulation and Multi-View Pose Estimation.

Mitash, Chaitanya (Rutgers Univ), Bekris, Kostas E. (Rutgers, the State Univ. of New Jersey), Boularias, Abdeslam (Carnegie Mellon Univ)

11:00-11:15 MoAT14.3

3D Object Instance Recognition and Pose Estimation Using Triplet Loss with Dynamic Margin.

Zakharov, Sergey (Tech. Univ. of Munich), Kehl, Wadim (Toyota Res. Inst), Planche, Benjamin (Siemens AG), Hutter, Andreas (Siemens AG), Ilic, Slobodan (Tech. Univ. Munchen)

11:15-11:30 MoAT14.4

Structured Prediction with Short/Long-Range Dependencies for Human Activity Recognition from Depth Skeleton Data.

Arzani, Mohammad Mahdi (Iran Univ. of Science and Tech), Fathy, Mahmood (Iran Univ. of Science and Tech), Aghajan, Hamid (Gent Univ), Akbari Azirani, Ahmad (Iran Univ. of Science and Tech), Raahemifar, Kaamran (Ryerson Univ), Adeli, Ehsan (Stanford Univ)

11:30-11:45 MoAT14.5

Solving Pose Ambiguity of Planar Visual Marker by Wavelike Two-Tone Patterns.

Tanaka, Hideyuki (National Inst. of AIST), Ogata, Kunihiro (National Inst. of Advanced Industrial Science and Tech), Matsumoto, Yoshio (AIST)

11:45-12:00 MoAT14.6

Monocular Depth Estimation by Two-Frame Triangulation Using Flat Surface Constraints.

Kaneko, Alex Masuo (Hitachi, Ltd), Yamamoto, Kenjiro (Hitachi, Ltd)

MoAT15	Room 215
Semantic Scene Understanding	
Chair: He, Hongsheng	Univ. of Tennessee
Co-Chair: Magnusson, Martin	Örebro Univ

10:30-10:45 MoAT15.1

SMSnet: Semantic Motion Segmentation Using Deep Convolutional Neural Networks.

Vertens, Johan (Univ. of Freiburg), Valada, Abhinav (Univ. of Freiburg), Burgard, Wolfram (Univ. of Freiburg)

10:45-11:00 MoAT15.2

Semantic 3D Occupancy Mapping through Efficient High Order CRFs.

Yang, Shichao (Carnegie Mellon Univ), Huang, Yulan (Carnegie Mellon Univ), Scherer, Sebastian (Carnegie Mellon Univ)

11:00-11:15 MoAT15.3

Multi-View Deep Learning for Consistent Semantic Mapping with RGB-D Cameras.

Ma, Lingni (Tech. Univ. München), Stückler, Jörg (RWTH Aachen Univ), Kerl, Christian (Tech. Univ. Munich), Cremers, Daniel (Tech. Univ. of Munich)

11:15-11:30 MoAT15.4

Incomplete 3D Motion Trajectory Segmentation and 2D-To-3D Label Transfer for Dynamic Scene Analysis.

Jiang, Cansen (Univ. of Burgundy), Paudel, Danda Pani (Univ. of Burgundy), Fougerolle, Yohan (Univ. of Burgundy, Le2i Lab. FRE CNRS 2005, 71200 Le), Fofi, David (Univ. of Burgundy), Demonceaux, Cédric (Univ. De Bourgogne)

11:30-11:45 MoAT15.5

Underwater 3D Structures As Semantic Landmarks in SONAR Mapping.

Guerneve, Thomas (Heriot Watt Univ), Subr, Kartic (The Univ. of Edinburgh), Petillot, Yvan R. (Heriot-Watt Univ)

11:45-12:00 MoAT15.6

Semi-Supervised 3D Place Categorisation by Descriptor Clustering.

Magnusson, Martin (Örebro Univ), Kucner, Tomasz Piotr (Örebro Univ), Gholami Shahbandi, Saeed (Halmstad Univ), Andreasson, Henrik (Örebro Univ), Lilienthal, Achim J. (Örebro Univ)

MoAT16	Room 220
Mapping I	
Chair: Surmann, Hartmut	Univ. of Applied Science Gelsenkircehn
Co-Chair: Dabeer, Onkar	Qualcomm Tech. Inc

10:30-10:45 MoAT16.1

3D Mapping for Multi Hybrid Robot Cooperation.

Surmann, Hartmut (Univ. of Applied Science Gelsenkircehn), Berninger, Nils (Fraunhofer IAIS), Worst, Rainer (Fraunhofer IAIS)

10:45-11:00 MoAT16.2

An End-To-End System for Crowdsourced 3d Maps for Autonomous Vehicles: The Mapping Component.

Dabeer, Onkar (Qualcomm Tech. Inc), Gowaiker, Radhika (Qualcomm Tech. Inc), Grzechnik, Slawomir (Qualcomm Tech. Inc), Lakshman, Mythreya (Qualcomm Tech. Inc), Reitmayr, Gerhard (Qualcomm Tech. Inc), Somasundaram, Kiran (Qualcomm Tech. Inc), Sukhavasi, Ravi Teja (Qualcomm), Wu, Xinzhou (Qualcomm Tech. Inc), Ding, Wei (Qualcomm), Sharma, Arunandan (Qualcomm), Lee, Sean (Qualcomm Tech. Inc)

11:00-11:15 MoAT16.3

Robot Localization with Sparse Scan-Based Maps.

Schiotka, Alexander (Univ. of Freiburg), Suger, Benjamin (Univ. of Freiburg), Burgard, Wolfram (Univ. of Freiburg)

11:15-11:30 MoAT16.4

Place Recognition of 3D Landmarks Based on Geometric Relations.

Lodi Rizzini, Dario (Univ. of Parma)

11:30-11:45 MoAT16.5

Context-Coherent Scenes of Objects for Camera Pose Estimation.

Li, Jimmy (McGill Univ), Meger, David Paul (McGill Univ), Dudek, Gregory (McGill Univ)

11:45-12:00 MoAT16.6

Semantic Segmentation of Urban Scenes with a Location Prior Map Using Lidar Measurements.

Wang, Jeonghyeon (KAIST), Kim, JinWhan (KAIST)

MoAT17	Room 221
Humanoid	
Chair: De Luca, Alessandro	Sapienza Univ. of Rome
Co-Chair: Parmiggiani, Alberto	Fondazione Istituto Italiano Di Tecnologia (IIT)

10:30-10:45 MoAT17.1

Walking Stabilization Using Step Timing and Location Adjustment on the Humanoid Robot, Atlas.

Griffin, Robert J. (Inst. for Human and Machine Cognition), Wiedebach, Georg (Inst. for Human and Machine Cognition), Bertrand, Sylvain (Inst. for Human and Machine Cognition), Leonessa, Alexander (Virginia Tech), Pratt, Jerry (Inst. for Human and Machine Cognition)

10:45-11:00 MoAT17.2

The Design and Validation of the R1 Personal Humanoid.

Parmiggiani, Alberto (Fondazione Istituto Italiano Di Tecnologia (IIT)), Fiorio, Luca (Istituto Italiano Di Tecnologia), Scalzo, Alessandro (Italian Inst. of Tech), Vazhapilli Sureshbabu, Anand (Istituto Italiano Di Tecnologia), Randazzo, Marco (Istituto Italiano Di Tecnologia), Maggiali, Marco (Italian Inst. of Tech), Pattacini, Ugo (Istituto Italiano Di Tecnologia), Lehmann, Hagen (Istituto Italiano Di Tecnologia (IIT)), Tikhanoff, Vadim (Italian Inst. of Tech), Domenichelli, Daniele E. (Istituto Italiano Di Tecnologia), Cardellino, Alberto (Italian Inst. of Tecnology), Congiu, Pierpaolo (Drop - Design for Innovation, Castella 33 Esc B2 2do 3era, 08018), Pagnin, Andrea (6punto14 Creative Licensing, Via P. Lomazzo 19 C/o JWT, 20154 Mi), Cingolani, Roberto (Fondazione Istituto Italiano Di Tecnologia (IIT)), Natale, Lorenzo (Istituto Italiano Di Tecnologia), Metta, Giorgio (Istituto Italiano Di Tecnologia (IIT))

11:00-11:15 MoAT17.3

A Parallel Kinematic Mechanism for the Torso of a Humanoid Robot: Design, Construction and Validation.

Fiorio, Luca (Istituto Italiano Di Tecnologia), Scalzo, Alessandro (Italian Inst. of Tech), Natale, Lorenzo (Istituto Italiano Di Tecnologia), Metta, Giorgio (Istituto Italiano Di Tecnologia (IIT)), Parmiggiani, Alberto (Fondazione Istituto Italiano Di Tecnologia (IIT))

11:15-11:30 MoAT17.4

Development of Life-Size Humanoid Robot Platform with Robustness for Falling Down, Long Time Working and Error Occurrence.

Kakiuchi, Yohei (The Univ. of Tokyo), Kamon, Masayuki (Kawasaki Heavy Industries, Ltd), Shimomura, Nobuyasu (Kawasaki Heavy Industries, Ltd), Yukizaki, Soh (Univ. of Tokyo), Takasugi, Noriaki (The Univ. of Tokyo), Nozawa, Shunichi (The Univ. of Tokyo), Okada, Kei (The Univ. of Tokyo), Inaba, Masayuki (The Univ. of Tokyo)

11:30-11:45 MoAT17.5

Multi-Contact Balancing of Humanoid Robots in Confined Spaces: Utilizing Knee Contacts.

Henze, Bernd (German Aerospace Center (DLR)), Dietrich, Alexander (German Aerospace Center (DLR)), Roa, Maximo A. (German Aerospace Center, DLR), Ott, Christian (German Aerospace Center (DLR))

11:45-12:00 MoAT17.6

Actuator Design of Compliant Walkers Via Optimal Control.

Buondonno, Gabriele (Sapienza Univ. of Rome), Carpentier, Justin (LAAS-CNRS), Saurel, Guilhem (LAAS-CNRS), Mansard, Nicolas (CNRS), De Luca, Alessandro (Sapienza Univ. of Rome), Laumond, Jean-Paul (LAAS-CNRS)

MoAT18	Room 223
Software and Middleware	
Chair: Rickert, Markus	Fortiss, An-Inst. Tech. Univ. München
Co-Chair: Millard, Alan Gregory	Univ. of York

10:30-10:45 MoAT18.1

Dimensional Inconsistencies in Code and ROS Messages: A Study of 5.9M Lines of Code.

Ore, John-Paul (Univ. of Nebraska-Lincoln), Elbaum, Sebastian (Univ. of Nebraska - Lincoln), Detweiler, Carrick (Univ. of Nebraska-Lincoln)

10:45-11:00 MoAT18.2

FROST: Fast Robot Optimization and Simulation Toolkit.

Hereid, Ayonga (Univ. of Michigan), Ames, Aaron (California Inst. of Tech)

11:00-11:15 MoAT18.3

Behaviour-Data Relations Modelling Language for Multi-Robot Control Algorithms.

Pitonakova, Lenka (Univ. of Southampton), Crowder, Richard (Univ. of Southampton), Bullock, Seth (Univ. of Bristol)

11:15-11:30 MoAT18.4

Robotics Library: An Object-Oriented Approach to Robot Applications.

Rickert, Markus (Fortiss, An-Inst. Tech. Univ. München), Gaschler, Andre K. (Fortiss Tech. Univ. Muenchen)

11:30-11:45 MoAT18.5

The Pi-Puck Extension Board: A Raspberry Pi Interface for the E-Puck Robot Platform.

Millard, Alan Gregory (Univ. of York), Joyce, Russell (Univ. of York), Hilder, James (Univ. of York), Fleseriu, Cristian (Univ. of York), Newbrook, Leonard (Univ. of York), Li, Wei (Univ. of York), McDaid, Liam (Ulster Univ), Halliday, David (Univ. of York)

MoBT1 Room 109

Deep Learning in Robotics and Automation II

Chair: Najjaran, Homayoun Univ. of British Columbia

Co-Chair: Pronobis, Andrzej Univ. of Washington

14:30-14:45 MoBT1.1

Car Detection for Autonomous Vehicle: LIDAR and Vision Fusion Approach through Deep Learning Framework.

DU, XINXIN (Singapore-MIT Alliance for Res. and Tech. (SMART)), Ang Jr, Marcelo H (National Univ. of Singapore), Rus, Daniela (MIT)

14:45-15:00 MoBT1.2

Learning Deep Generative Spatial Models for Mobile Robots.

Pronobis, Andrzej (Univ. of Washington), Rao, Rajesh P. N. (Univ. of Washington)

15:00-15:15 MoBT1.3

Deep Learning for 2D Scan Matching and Loop Closure.

Li, Jiaxin (National Univ. of Singapore), ZHAN, Huangying (The Univ. of Adelaide), Chen, Ben M. (National Univ. of Singapore), Reid, Ian (Univ. of Adelaide), Lee, Gim Hee (National Univ. of Singapore)

15:15-15:30 MoBT1.4

Robotic Grasp Detection Using Deep Convolutional Neural Networks.

Kumra, Sulabh (Rochester Inst. of Tech), Kanan, Christopher (Rochester Inst. of Tech)

15:30-15:45 MoBT1.5

Deep Learning Lane Marker Segmentation from Automatically Generated Labels.

Behrendt, Karsten (Robert Bosch LLC), Witt, Jonas (X, the Moonshot Factory (formerly Google X))

15:45-16:00 MoBT1.6

3D Object Classification with Point Convolution Network.

Chen, Xuzhan (Huazhong Univ. of Science and Tech), Chen, Youping (Huazhong Univ. of Science and Tech), Najjaran, Homayoun (Univ. of British Columbia)

MoBT2 Room 111

Learning and Adaptive Systems II

Chair: Oh, Songhwai — Seoul National Univ

Co-Chair: Inamura, Tetsunari — National Inst. of Informatics

14:30-14:45 MoBT2.1

An Information-Theoretic On-Line Update Principle for Perception-Action Coupling.

Peng, Zhen (Max Planck Inst. for Biological Cybernetics), Genewein, Tim (Robert Bosch GmbH), Leibfried, Felix (Max Planck Inst. for Intelligent Systems), Braun, Daniel Alexander (Ulm Univ)

14:45-15:00 MoBT2.2

Design-Time Improvement Using a Functional Approach to Specify GraphSLAM with Deterministic Performance on an FPGA.

Appel, Robin (Univ. of Twente), Folmer, Hendrik (Univ. of Twente), Kuper, Jan (Univ. of Twente), Wester, Rinse (Univ. of Twente), Broenink, Jan (Univ. of Twente)

15:00-15:15 MoBT2.3

Simultaneous Active Parameter Estimation and Control Using Sampling-Based Bayesian Reinforcement Learning.

Slade, Patrick (Stanford Univ), Culbertson, Preston (Stanford Univ), Sunberg, Zachary (Stanford Univ), Kochenderfer, Mykel (Stanford Univ)

15:15-15:30 MoBT2.4

Online Spatial Concept and Lexical Acquisition with Simultaneous Localization and Mapping.

Taniguchi, Akira (Ritsumeikan Univ), Hagiwara, Yoshinobu (Ritsumeikan Univ), Taniguchi, Tadahiro (Ritsumeikan Univ), Inamura, Tetsunari (National Inst. of Informatics)

15:30-15:45 MoBT2.5

Deep Reinforcement Learning for High Precision Assembly Tasks.

Inoue, Tadanobu (IBM Japan), De Magistris, Giovanni (IBM Japan), Munawar, Asim (IBM Japan), Yokoya, Tsuyoshi (Yaskawa Electric Corp), Tachibana, Ryuki (IBM Japan)

15:45-16:00 MoBT2.6

Online Learning to Approach a Person with No-Regret.

Ahn, Hyemin (Seoul National Univ), Oh, Yoonseon (Seoul National Univ), Choi, Sungjoon (Seoul National Univ), Tomlin, Claire (UC Berkeley), Oh, Songhwai (Seoul National Univ)

MoBT3	Room 116
Service Robots	
Chair: Bellotto, Nicola	Univ. of Lincoln
Co-Chair: Yim, Mark	Univ. of Pennsylvania

14:30-14:45 MoBT3.1

Learning User Preferences for Robot-Human Handovers.

Huaman, Ana (Georgia Inst. of Tech), Martinson, Eric (Toyota InfoTechnology Center, USA), Oguchi, Kentaro (Toyota InfoTechnology Center, USA)

14:45-15:00 MoBT3.2

Evaluating Older Adults' Interaction with a Mobile Assistive Robot.

Rodrigues Mucchiani, Caio Cesar (Univ. of Pennsylvania), Sharma, Suneet (Univ. of Pennsylvania), Johnson, Megan (Univ. of Pennsylvania), Sefcik, Justine (Univ. of Pennsylvania), Vivio, Nicholas (Columbia Univ), Huang, Justin (Univ. of Washington), Cacchione, Pamela (Univ. of Pennsylvania), Johnson, Michelle J. (Univ. of Pennsylvania), Rai, Roshan (Univ. of Pennsylvania), Canoso, Adrian (Savioke Inc), Lau, Tessa (Savioke), Yim, Mark (Univ. of Pennsylvania)

15:00-15:15 MoBT3.3

Multidimensional Time Series Shapelets Reliably Detect and Classify Contact Events in Force Measurements of Wiping Actions.

Stelter, Simon (Univ. Bremen), Bartels, Georg (Univ. Bremen), Beetz, Michael (Univ. of Bremen)

15:15-15:30 MoBT3.4

Path Following with Authority Sharing between Humans and Passive Robotic Walkers Equipped with Low-Cost Actuators.

Andreetto, Marco (Univ. of Trento), Divan, Stefano (Univ), Fontanelli, Daniele (Univ. of Trento), Palopoli, Luigi (Univ. of Trento)

15:30-15:45 MoBT3.5

Online Learning for Human Classification in 3D LiDAR-Based Tracking.

Yan, Zhi (Univ. of Lincoln), Duckett, Tom (Univ. of Lincoln), Bellotto, Nicola (Univ. of Lincoln)

15:45-16:00 MoBT3.6

On-Line Adaptive Side-By-Side Human Robot Companion in Dynamic Urban Environments.

Repiso, Ely (Inst. De Robòtica I Informàtica Industrial, CSIC-UPC), Ferrer, Gonzalo (Univ. of Michigan), Sanfeliu, Alberto (Univ. Pol. De Cataluyna)

MoBT4	Room 114
Haptics and Haptic Interfaces	
Chair: Ryu, Jee-Hwan	Korea Univ. of Tech. and Education
Co-Chair: Choi, Hyouk Ryeol	Sungkyunkwan Univ

14:30-14:45 MoBT4.1

A Tactile Shirt for Teaching Human Motion Tasks.

Balkcom, Devin (Dartmouth Coll), Kavathekar, Paritosh (Dartmouth Coll)

14:45-15:00 MoBT4.2

Interactive Haptic Display Based on Soft Actuator and Soft Sensor.

Phung, Hoa (Sungkyunkwan Univ), Hoang, Phi Tien (Sungkyunkwan Univ), Nguyen, Canh Toan (Sungkyunkwan Univ), Nguyen, Tien Dat (Sungkyunkwan Univ), Jung, Hosang (Sungkyunkwan Univ), Kim, Uikyum (SungKyunKwan Univ), Choi, Hyouk Ryeol (Sungkyunkwan Univ)

15:00-15:15 MoBT4.3

User-Interface for Teleoperation with Mixed-Signal Haptic Feedback.

Thiem, Daniel B (Tech. Univ. Darmstadt), Neupert, Carsten (Tech. Univ. Darmstadt), Matich, Sebastian (Tech. Univ. Darmstadt), Hessinger, Markus (Tech. Univ. Darmstadt), Bilz, Johannes (Tech. Univ. Darmstadt), Polzin, Julian (Tech. Univ. Darmstadt), Werthschützky, Roland (Univ. of Tech. Darmstadt), Kupnik, Mario (Tech. Univ. Darmstadt), Schlaak, Helmut F. (Tech. Univ. Darmstadt), Kirschniak, Andreas (Univ. Hospital Tuebingen), Hatzfeld, Christian (Tech. Univ. Darmstadt, Germany)

15:15-15:30 MoBT4.4

A Novel Haptic Fmri Interface for Five-Axis Force and Motion Neuroimaging Experiments.

Menon, Samir (Stanford Univ), Soviche, Amaury (EPFL - Ec. Pol. Fédérale De Lausanne, Switzerland), Subbarao, Alok (San Jose State Univ), Mithrakumar, Jananan (Stanford Univ), Khatib, Oussama (Stanford Univ)

15:30-15:45 MoBT4.5

Development of an Inexpensive Tri-Axial Force Sensor for Minimally Invasive Surgery.

Li, Lu (Carnegie Mellon Univ), Yu, Bocheng (Carnegie Mellon Univ), Yang, Chen (1993), Vagdargi, Prasad (Carnegie Mellon Univ), Rangaprasad, Arun Srivatsan (Carnegie Mellon Univ), Choset, Howie (Carnegie Mellon Univ)

15:45-16:00 MoBT4.6

Realizing Low-Impedance Rendering in Admittance-Type Haptic Interfaces Using the Input-To-State Stable Approach.

Nabeel, Muhammad (Korea Univ. of Tech. and Education), Jafari, Aghil (Univ. of the West of England), Ryu, Jee-Hwan (Korea Univ. of Tech. and Education)

MoBT5	Room 118
Medical Robots II	
Chair: Ren, Hongliang	Faculty of Engineering, National Univ. of Singapore
Co-Chair: Kowalewski, Timothy	Univ. of Minnesota

14:30-14:45 MoBT5.1

Pop-Up Tissue Retraction Mechanism for Endoscopic Surgery.

Becker, Samuel (Harvard Univ), Ranzani, Tommaso (Harvard School of Engineering and Applied Science, Wyss Inst), Russo, Sheila (Harvard Univ. School of Engineering and Applied Sciences), Wood, Robert (Harvard Univ)

14:45-15:00 MoBT5.2

Design and Characterization of Stormram 4: An MRI-Compatible Robotic System for Breast Biopsy.

Groenhuis, Vincent (Univ. of Twente), Siepel, Françoise J (Univ. of Twente), Veltman, Jeroen (ZGT), Stramigioli, Stefano (Univ. of Twente)

15:00-15:15 MoBT5.3

3D Bioprinting Directly Onto Moving Human Anatomy.

ONeill, John (Univ. of Minnesota), Johnson, Reed (Univ. of Minnesota), Dockter, Rodney (Univ. of Minnesota), Kowalewski, Timothy (Univ. of Minnesota)

15:15-15:30 MoBT5.4

Distributed Navigated Control for Active Instruments in a Real-Time Networked Operating Room.

Pfeiffer, Jonas H. (Tech. Univ. Munich), Moser, Tim Fabian (Tech. Univ. Munich), Dietz, Christian (Tech. Univ. München), Krieger, Yannick S. (Tech. Univ. München), Lueth, Tim C. (Tech. Univ. München)

15:30-15:45 MoBT5.5

Shape Sensing of Small Continuum Robots Using Optical Fibers.

Schmitz, Andreas (Imperial Coll. London), Thompson, Alexander James (Imperial Coll. London), Berthet-Rayne, Pierre (Imperial Coll. London), Seneci, Carlo Alberto (Imperial Coll. London), Wisanuvej, Piyamate (Imperial Coll. London), Yang, Guang-Zhong (Imperial Coll. London)

15:45-16:00 MoBT5.6

TTRE: A New Type of Error to Evaluate the Accuracy of a Paired-Point Rigid Registration.

Min, Zhe (The Chinese Univ. of Hong Kong), Ren, Hongliang (Faculty of Engineering, National Univ. of Singapore), Meng, Max Q.-H. (The Chinese Univ. of Hong Kong)

MoBT6	Room 121
Aerial Systems Applications I	
Chair: Ollero, Anibal	Univ. of Seville
Co-Chair: Aoyama, Tadayoshi	Nagoya Univ

14:30-14:45 MoBT6.1

Design and Implementation of Multirotor Aerial-Underwater Vehicles with Experimental Results.

Maia, Marco (Rutgers, the State Univ. of New Jersey), Mercado Ravell, Diego Alberto (UTC), Diez, F. Javier (Rutgers Univ)

14:45-15:00 MoBT6.2

A Distributed Algorithm for Aerial Data Collection from Wireless Sensors Networks by UAVs.

Olivieri de Souza, Bruno José (Pontifical Catholic Univ. of Rio De Janeiro), Endler, markus (PUC-Rio - Pontifical Catholic Univ. of Rio De Janeiro)

15:00-15:15 MoBT6.3

Development of a Power Line Inspection Robot with Hybrid Operation Modes.

Chang, Wenkai (Inst. of Automation Chinese Acad. of Sciences), Yang, Guodong (Inst. of Automation, Chinese Acad. of Sciences), Yu, Junzhi (Chinese Acad. of Sciences), liang, zize (Inst. of Automation, Chinese Acad. of Sciences), Cheng, Long (Chinese Acad. of Sciences), Zhou, Chao (Chinese Acad. of Sciences)

15:15-15:30 MoBT6.4

Quadrotor-UAV Optimal Coverage Path Planning in Cluttered Environment with a Limited Onboard Energy.

BOUZID, Yasser (Univ. D'evry Val D'essonne), Bestaoui, Yasmina (Univ. of Evry), SIGUERDIDJANE, Houria (CentraleSupelec)

15:30-15:45 MoBT6.5

Development of a 4-Joint 3-DOF Robotic Arm with Anti-Reaction Force Mechanism for a Multicopter.

Ohnishi, Yoshinori (Hiroshima Univ), Takaki, Takeshi (Hiroshima Univ), Aoyama, Tadayoshi (Nagoya Univ), Ishii, Idaku (Hiroshima Univ)

15:45-16:00 MoBT6.6

Anthropomorphic, Compliant and Lightweight Dual Arm System for Aerial Manipulation.

Suarez, Alejandro (Univ. of Seville), Ramon Soria, Pablo (Univ. of Seville), Heredia, Guillermo (Univ. of Seville), Arrue, Begoña C. (Univ. De Sevilla), Ollero, Anibal (Univ. of Seville)

MoBT7	Room 122
Slam I	
Chair: Markovic, Ivan	Univ. of Zagreb, Faculty of Electrical Engineering and Computing
Co-Chair: Yang, Ming	Shanghai Jiao Tong Univ

14:30-14:45 MoBT7.1

Gaussian Mixture Model-Signature Quadratic Form Distance Based Point Set Registration.

Li, Liang (Shanghai Jiaotong Univ), Yang, Ming (Shanghai Jiao Tong Univ), Wang, Chunxiang (Shanghai Jiaotong Univ), Wang, Bing (Shanghai Jiao Tong Univ)

14:45-15:00 MoBT7.2

An Online Multi-Robot SLAM System for 3D LiDARs.

Dubé, Renaud (ETH Zürich), Gawel, Abel Roman (Autonomous Systems Lab, ETH Zurich), Sommer, Hannes (ETH Zürich), Nieto, Juan (ETH Zürich), Siegwart, Roland (ETH Zurich), Cadena Lerma, Cesar (ETH Zurich)

15:00-15:15 MoBT7.3

Revival of Filtering Based SLAM? Exactly Sparse Delayed State Filter on Lie Groups.

Lenac, Kruno (Univ. of Zagreb, Faculty of Electrical Engineering and Comp), Cesic, Josip (Univ. of Zagreb, Faculty of Electrical Engineering and Comp), Markovic, Ivan (Univ. of Zagreb, Faculty of Electrical Engineering and Comp), Cvišić, Igor (Univ. of Zagreb, Faculty of Electrical Engineering and Comp), Petrovic, Ivan (Univ. of Zagreb)

15:15-15:30 MoBT7.4

Multi-Trajectory Pose Correspondences Using Scale-Dependent Topological Analysis of Pose-Graphs.

Datta, Sayantan (International Inst. of Information Tech. Hyderabad), Sharma, Avinash (International Inst. of Information Tech), Krishna, Madhava (IIIT Hyderabad)

15:30-15:45 MoBT7.5

Joint Perception and Planning for Efficient Obstacle Avoidance Using Stereo Vision.

Ghosh, Sourish (Indian Inst. of Tech. Kharagpur), Biswas, Joydeep (Univ. of Massachusetts Amherst)

15:45-16:00 MoBT7.6

Cartan-Sync: Fast and Global SE(d)-Synchronization.

Briales, Jesus (Univ. of Málaga), González-Jiménez, Javier (Univ. of Málaga)

MoBT8	Room 202
Wearable Robots I	
Chair: Bae, Joonbum	UNIST
Co-Chair: Choi, Byung June	Samsung Advanced Inst. of Tech

14:30-14:45 MoBT8.1

A Pneumatic Power Source Using a Sodium Bicarbonate and Citric Acid Reaction with Pressure Booster for Use in Mobile Devices.

Okui, Manabu (Chuo Univ), Nagura, Yuki (Chuo Univ), Iikawa, Shingo (Chuo Univ), Yamada, Yasuyuki (Chuo Univ), Nakamura, Taro (Chuo Univ)

14:45-15:00 MoBT8.2

External Control of Walking Direction, Using Cross-Wire Mobile Assist Suit.

Murakami, Kenta (Panasonic Corp), John, Stephen William (Panasonic Corp), Komatsu, Mayumi (Panasonic Corp), Adachi, Shinobu (Panasonic Corp)

15:00-15:15 MoBT8.3

A Wearable Hand System for Virtual Reality.

Park, Yeon gyu (UNIST(Ulsan National Inst. of Science and Tech), Jo, Inseong (UNIST), Lee, Jeongsoo (UNIST), Bae, Joonbum (UNIST)

15:15-15:30 MoBT8.4

A Flexible Exoskeleton for Hip Assistance.

Lee, Younbaek (Samsung Electronics Co., Ltd), Roh, Se-gon (Samsung Electronics Co., Ltd), Lee, Minhyung (Samsung Advanced Inst. of Tech), Choi, Byung June (Samsung Advanced Inst. of Tech), Lee, Jongwon (Samsung Advanced Inst. of Tech), Kim, Jeonghun (Samsung Advanced Inst. of Tech), Choi, Hyundo (Samsung Electronics), Shim, Youngbo (Samsung Electronics), Kim, Yong-Jae (Korea Univ. of Tech. and Education)

15:30-15:45 MoBT8.5

Design, Development, and Bench-Top Testing of a Powered Polycentric Ankle Prosthesis.

Cempini, Marco (Rehabilitation Inst. of Chicago), Hargrove, Levi (Rehabilitation Inst. of Chicago), Lenzi, Tommaso (Univ. of Utah)

15:45-16:00 MoBT8.6

A 3D-Printed Soft Robotic Glove with Enhanced Ergonomics and Force Capability.

Yi, Juan (The Univ. of Hong Kong), Chen, Xiaojiao (The Univ. of Hong Kong), Wang, Zheng (The Univ. of Hong Kong)

MoBT9	Room 204
Multi-Robots I	
Chair: Secchi, Cristian	Univ. of Modena & Reggio Emilia
Co-Chair: Becker, Aaron	Univ. of Houston

14:30-14:45 MoBT9.1

Infinitesimally Shape-Similar Motions Using Relative Angle Measurements.

Buckley, Ian (Georgia Inst. of Tech), Egerstedt, Magnus (Georgia Inst. of Tech)

14:45-15:00 MoBT9.2

Optimized Simultaneous Conflict-Free Task Assignment and Path Planning for Multi-AGV Systems.

Sabattini, Lorenzo (Univ. of Modena and Reggio Emilia), Digani, Valerio (Elettric80 Spa), Secchi, Cristian (Univ. of Modena & Reggio Emilia), Fantuzzi, Cesare (Univ. Di Modena E Reggio Emilia)

15:00-15:15 MoBT9.3

PRVO: Probabilistic Reciprocal Velocity Obstacle for Multi Robot Navigation under Uncertainty.

Singh, Arun Kumar (NTU, Singapore), GOPALAKRISHNAN, BHARATH (Iiit Hyderabad), Kaushik, Meha (International Inst. of Information Tech), Krishna, Madhava (IIIT Hyderabad), Manocha, Dinesh (Univ. of North Carolina at Chapel Hill)

15:15-15:30 MoBT9.4

Mapping and Coverage with a Particle Swarm Controlled by Uniform Inputs.

Mahadev, Arun (Univ. of Houston), Krupke, Dominik Michael (TU Braunschweig), Fekete, Sándor (Tech. Univ. Braunschweig), Becker, Aaron (Univ. of Houston)

15:30-15:45 MoBT9.5

Market-Based Coordination in Dynamic Environments Based on the Hoplites Framework.

Talebpour, Zeynab (École Pol. Fédérale De Lausanne), Savarè, Stefano (EPFL), Martinoli, Alcherio (EPFL)

15:45-16:00 MoBT9.6

Intra-Robot Replanning to Enable Team Member Conditions.

Cooksey, Philip (Carnegie Mellon Univ), Veloso, Manuela (Carnegie Mellon Univ)

MoBT10	Room 205
Automation at Micro-Nano Scale	
Chair: Arai, Fumihito	Nagoya Univ
Co-Chair: Sun, Dong	City Univ. of Hong Kong

14:30-14:45 MoBT10.1

Parallel Self-Assembly of Polyominoes under Uniform Control Inputs.

Manzoor, Sheryl (Univ. of Houston), Sheckman, Sam (Southern Methodist Univ), Lonsford, Jarrett (Univ. of Houston), Kim, Hoyeon (Southern Methodist Univ), Kim, MinJun (Southern Methodist Univ), Becker, Aaron (Univ. of Houston)

14:45-15:00 MoBT10.2

Self-Initialization and Recovery for Uninterrupted Tracking in Vision-Guided Micromanipulation.

Yang, Liangjing (Massachusetts Inst. of Tech), Paranawithana, Ishara (Singapore Univ. of Tech. & Design), Youcef-Toumi, Kamal (Massachusetts Inst. of Tech), Tan, U-Xuan (Singapore Univ. of Tech. and Design)

15:00-15:15 MoBT10.3

Full 3D Rotation Estimation in Scanning Electron Microscope.

Kudryavtsev, Andrey V. (FEMTO-ST Inst), Dembélé, Sounkalo (Univ. of Franche Comté), Lefort-Piat, Nadine (Lab. D'automatique De Besançon)

15:15-15:30 MoBT10.4

View Expansion System for Microscope Photography Based on Viewpoint Movement Using Galvano Mirror.

Aoyama, Tadayoshi (Nagoya Univ), Kaneishi, Mamoru (Hiroshima Univ), Takaki, Takeshi (Hiroshima Univ), Ishii, Idaku (Hiroshima Univ)

15:30-15:45 MoBT10.5

Design of an Automated Controller with Collision-Avoidance Capability for In-Vivo Transportation of Biological Cells.

Li, Xiaojian (City Univ. of Hong Kong), Chen, Shuxun (City Univ. of Hong Kong), Wang, Yong (Univ. of Science and Tech. of China), Sun, Dong (City Univ. of Hong Kong)

15:45-16:00 MoBT10.6

Large Indentation Method to Measure Elasticity of Cell in Robot Integrated Microfluidic Chip.

Sugiura, Hirotaka (Nagoya Univ), Sakuma, Shinya (Nagoya Univ), Kaneko, Makoto (Osaka Univ), Arai, Fumihito (Nagoya Univ)

MoBT11 Room 207

Gripper and Other End-Effectors

Chair: Thakor, Nitish — National Univ. of Singapore

14:30-14:45 MoBT11.1

Design of a Stewart Platform-Inspired Dexterous Hand for 6-DOF Within-Hand Manipulation.

McCann, Connor (Yale Univ), Dollar, Aaron (Yale Univ)

14:45-15:00 MoBT11.2

A Three-Fingered Hand with a Suction Gripping System for Picking Various Objects in Cluttered Narrow Space.

Hasegawa, Shun (The Univ. of Tokyo), Wada, Kentaro (The Univ. of Tokyo), Niitani, Yusuke (The Univ. of Tokyo), Okada, Kei (The Univ. of Tokyo), Inaba, Masayuki (The Univ. of Tokyo)

15:00-15:15 MoBT11.3

An Electrostatic Gripper for Flexible Objects.

Schaler, Ethan W. (Univ. of California, Berkeley), Ruffatto III, Donald (Illinois Inst. of Tech), Glick, Paul (UCSD Bioinspired Robotics and Design Lab), White, Victor (Jet Propulsion Labs), Parness, Aaron (Nasa Jet Propulsion Lab)

15:15-15:30 MoBT11.4

A Bidirectional Soft Pneumatic Fabric-Based Actuator for Grasping Applications.

Low, Jin Huat (National Univ. of Singapore), Cheng, Nicholas (National Univ. of Singapore), Khin, Phone May (National Univ. of Singapore), Thakor, Nitish (National Univ. of Singapore), Kukreja, Sunil, L. (National Univ. of Singapore), Ren, Hongliang (Faculty of Engineering, National Univ. of Singapore), Yeow, Chen-Hua (National Univ. of Singapore)

15:30-15:45 MoBT11.5

High-Power, Flexible, Robust Hand: Development of Musculoskeletal Hand Using Machined Springs and Realization of Self-Weight Supporting Motion with Humanoid.

Makino, Shogo (The Univ. of Tokyo), Kawaharazuka, Kento (The Univ. of Tokyo), Kawamura, Masaya (The Univ. of Tokyo), Asano, Yuki (The Univ. of Tokyo), Okada, Kei (The Univ. of Tokyo), Inaba, Masayuki (The Univ. of Tokyo)

15:45-16:00 MoBT11.6

Design of Passive Joint of Underactuated Modular Soft Hands for Fingertip Trajectory Tracking.

Salvietti, Gionata (Univ. of Siena), Hussain, Irfan (Univ. of Siena, SIRS Lab), Malvezzi, Monica (Univ. of Siena), Prattichizzo, Domenico (Univ. Di Siena)

MoBT12	Room 208
Soft Material Robotics II	
Chair: Yeow, Chen-Hua	National Univ. of Singapore
Co-Chair: Deimel, Raphael	TU Berlin

14:30-14:45 MoBT12.1

Designing Systems of Fiber Reinforced Pneumatic Actuators Using a Pseudo-Rigid Body Model.

Satheeshbabu, Sreeshankar (Univ. of Illinois Urbana Champaign), Krishnan, Girish (Univ. of Illinois Urbana Champaign)

14:45-15:00 MoBT12.2

Toward a New Force Sensor for Twisted String Actuator: A Study about the Force on Separator.

Gu, Yunjin (KTH Royal Inst. of Tech), Ingvast, Johan (Bioservo Tech. AB), Wikander, Jan (Royal Inst. of Tech. -KTH)

15:00-15:15 MoBT12.3

Automated Co-Design of Soft Hand Morphology and Control Strategy for Grasping.

Deimel, Raphael (TU Berlin), Irmisch, Patrick (Tech. Univ. Berlin), Wall, Vincent (TU Berlin), Brock, Oliver (Tech. Univ. Berlin)

15:15-15:30 MoBT12.4

Print-It-Yourself (PIY) Glove: A Fully 3D Printed Soft Robotic Hand Rehabilitative and Assistive Exoskeleton for Stroke Patients.

Ang, Benjamin Wee Keong (NUS), Yeow, Chen-Hua (National Univ. of Singapore)

15:30-15:45 MoBT12.5

Practical Control Methods for Vacuum Driven Soft Actuator Modules.

Robertson, Matthew (EPFL), Paik, Jamie (Ec. Pol. Federale De Lausanne)

15:45-16:00 MoBT12.6

Fatigue Strength of Laser Sintered Flexure Hinge Structures for Soft Robotic Applications.

Krieger, Yannick S. (Tech. Univ. München), Kuball, Clara-Maria (Tech. Univ. München), Rumschoettel, Dominik (Tech. Univ. München), Dietz, Christian (Tech. Univ. München), Pfeiffer, Jonas H. (Tech. Univ. Munich), Roppenecker, Daniel B. (Tech. Univ. München), Lueth, Tim C. (Tech. Univ. München)

MoBT13	Room 211
Dexterous Manipulation	
Chair: Watanabe, Tetsuyou	Kanazawa Univ
Co-Chair: Smith, Claes Christian	KTH Royal Inst. of Tech

14:30-14:45 MoBT13.1

Thin Plate Manipulation by an Under-Actuated Robotic Soft Gripper Utilizing the Environment.

Nishimura, Toshihiro (Kanazawa Univ), Mizushima, Kaori (Kanazawa Univ), Suzuki, Yosuke (Kanazawa Univ), Tsuji, Tokuo (Kanazawa Univ), Watanabe, Tetsuyou (Kanazawa Univ)

14:45-15:00 MoBT13.2

In-Hand Manipulation Using Three-Stages Open Loop Pivoting.

Cruciani, Silvia (KTH Royal Inst. of Tech), Smith, Claes Christian (KTH Royal Inst. of Tech)

15:00-15:15 MoBT13.3

Feedback Motion Planning for Liquid Pouring.

Pan, Zherong (The Univ. of North Carolina at Chapel Hill), Manocha, Dinesh (Univ. of North Carolina at Chapel Hill)

15:15-15:30 MoBT13.4

Precise Dispensing of Liquids Using Visual Feedback.

Kennedy, Monroe (Univ. of Pennsylvania), Queen, Kendall (Univ. of Pennsylvania), Thakur, Dinesh (Univ. of Pennsylvania), Daniilidis, Kostas (Univ. of Pennsylvania), Kumar, Vijay (Univ. of Pennsylvania)

15:30-15:45 MoBT13.5

Real-Time Robust Finger Gaits Planning under Object Shape and Dynamics Uncertainties.

Fan, Yongxiang (Univ. of California, Berkeley), Tang, Te (Univ. of California, Berkeley), Lin, Hsien-Chung (Univ. of California, Berkeley), Zhao, Yu (Univ. of California, Berkeley), Tomizuka, Masayoshi (Univ. of California)

15:45-16:00 MoBT13.6

Covering a Robot Fingertip with Uskin: A Soft Electronic Skin with Distributed 3-Axis Force Sensitive Elements for Robot Hands.

Tomo, Tito Pradhono (Waseda Univ), Schmitz, Alexander (Waseda Univ), Wong, Wai Keat (Waseda Univ), Kristanto, Harris (Waseda Univ), Somlor, Sophon (Waseda Univ), Hwang, Jinsun (Waseda Univ), Jamone, Lorenzo (Queen Mary Univ. London), Sugano, Shigeki (Waseda Univ)

MoBT14	Room 217
Visual-Based Navigation	
Chair: Bauer-Wersing, Ute	Frankfurt Univ. of Applied Sciences
Co-Chair: Kakogawa, Atsushi	Ritsumeikan Univ

14:30-14:45 MoBT14.1

Visual Homing by Robust Interpolation for Sparse Motion Flow.

Zhao, Ji (ReadSense Ltd), Ma, Jiayi (Wuhan Univ)

14:45-15:00 MoBT14.2

Combining Points and Lines for Camera Pose Estimation and Optimization in Monocular Visual Odometry.

Li, Haoang (Wuhan Univ), Yao, Jian (Wuhan Univ), Lu, Xiaohu (Wuhan Univ), Wu, Junlin (Wuhan Univ)

15:00-15:15 MoBT14.3

Robust Edge-Based Visual Odometry Using Machine-Learned Edges.

Schenk, Fabian (Graz Univ. of Tech), Fraundorfer, Friedrich (Graz Univ. of Tech)

15:15-15:30 MoBT14.4

Anisotropic Shadow-Based Operation Assistant for a Pipeline-Inspection Robot Using a Single Illuminator and Camera.

Kakogawa, Atsushi (Ritsumeikan Univ), Komurasaki, Yuki (Ritsumeikan Univ), Ma, Shugen (Ritsumeikan Univ)

15:30-15:45 MoBT14.5

Efficient Navigation Using Slow Feature Gradients.

Metka, Benjamin (Frankfurt Univ. of Applied Sciences), Franzius, Mathias (Honda Res. Inst. Europe (HRI-EU)), Bauer-Wersing, Ute (Frankfurt Univ. of Applied Sciences)

15:45-16:00 MoBT14.6

Omnidirectional Visual-Inertial Odometry Using Multi-State Constraint Kalman Filter.

Ramezani, Milad (The Univ. of Melbourne), Khoshelham, Kourosh (The Univ. of Melbourne), Kneip, Laurent (ANU)

MoBT15	Room 215
Collision Avoidance	
Co-Chair: Liu, Miao	IBM
14:30-14:45	MoBT15.1
DROAN – Disparity-Space Representation for Obstacle AvoidaNce.	
Dubey, Geetesh (Carnegie Mellon Univ), Arora, Sankalp (Carnegie Mellon Univ), Scherer, Sebastian (Carnegie Mellon Univ)	
14:45-15:00	MoBT15.2
Tentacle-Based Moving Obstacle Avoidance for Omnidirectional Robots with Visibility Constraints.	
KHELLOUFI, Abdellah (Centre De Développement Des Tech. Avancées CDTA), Achour, Nouara (USTHB), Passama, Robin (LIRMM (CNRS, Univ. Montpellier 2)), Cherubini, Andrea (LIRMM - Univ. De Montpellier CNRS)	
15:00-15:15	MoBT15.3
Real-Time Pose Estimation on Elevation Maps for Wheeled Vehicles.	
Jordan, Julian (Univ. of Tuebingen), Zell, Andreas (Univ. of Tübingen)	
15:15-15:30	MoBT15.4
Socially Aware Motion Planning with Deep Reinforcement Learning.	
Chen, Yufan (Massachusetts Inst. of Tech), Everett, Michael (Massachusetts Inst. of Tech), Liu, Miao (MIT), How, Jonathan Patrick (Massachusetts Inst. of Tech)	
15:30-15:45	MoBT15.5
Provably Safe Motion of Mobile Robots in Human Environments.	
Liu, Stefan Boson (Tech. Univ. München), Roehm, Hendrik (Robert Bosch GmbH), Heinzemann, Christian (Robert Bosch GmbH), Lütkebohle, Ingo (Robert Bosch GmbH), Oehlerking, Jens (Robert Bosch GmbH), Althoff, Matthias (Tech. Univ. München)	
15:45-16:00	MoBT15.6
Aggressive Collision Avoidance with Limited Field-Of-View Sensing.	
Lopez, Brett (Massachusetts Inst. of Tech), How, Jonathan Patrick (Massachusetts Inst. of Tech)	

MoBT16	Room 220
Mapping II	
Chair: Vidal-Calleja, Teresa A.	Univ. of Tech. Sydney
Co-Chair: Lilienthal, Achim J.	Örebro Univ

14:30-14:45 MoBT16.1

Voxblox: Incremental 3D Euclidean Signed Distance Fields for On-Board MAV Planning.

Oleynikova, Helen (ETH Zürich), Taylor, Zachary Jeremy (ETH Zürich), Fehr, Marius (ETH Zürich), Siegwart, Roland (ETH Zurich), Nieto, Juan (ETH Zürich)

14:45-15:00 MoBT16.2

Building Maps for Autonomous Navigation Using Sparse Visual SLAM Features.

Ling, Yonggen (The Hong Kong Univ. of Science and Tech), Shen, Shaojie (Hong Kong Univ. of Science and Tech)

15:00-15:15 MoBT16.3

Multiresolution Mapping and Informative Path Planning for UAV-Based Terrain Monitoring.

Popovic, Marija (ETH Zurich), Vidal-Calleja, Teresa A. (Univ. of Tech. Sydney), Hitz, Gregory (ETH Zurich), Sa, Inkyu (ETH Zurich), Siegwart, Roland (ETH Zurich), Nieto, Juan (ETH Zürich)

15:15-15:30 MoBT16.4

Incorporating Ego-Motion Uncertainty Estimates in Range Data Registration.

Andreasson, Henrik (Örebro Univ), Adolfsson, Daniel (Örebro Univ), Stoyanov, Todor (Örebro Univ), Magnusson, Martin (Örebro Univ), Lilienthal, Achim J. (Örebro Univ)

15:30-15:45 MoBT16.5

Autonomous Robotic Exploration Based on Multiple Rapidly-Exploring Randomized Trees.

Umari, Hassan (American Univ. of Sharjah), Mukhopadhyay, Shayok (American Univ. of Sharjah)

15:45-16:00 MoBT16.6

Mapping under Changing Trajectory Estimates.

Llofriu, Martin (Univ. of South Florida), Fong, Philip (Irobot), Karapetyan, Vazgen (Irobot), Munich, Mario Enrique (Irobot)

MoBT17 Room 221

Humanoid Sensing

Co-Chair: Fantacci, Claudio Istituto Italiano Di Tecnologia

14:30-14:45 MoBT17.1

Visual End-Effector Tracking Using a 3D Model-Aided Particle Filter for Humanoid Robot Platforms.

Fantacci, Claudio (Istituto Italiano Di Tecnologia), Pattacini, Ugo (Istituto Italiano Di Tecnologia), Tikhanoff, Vadim (Italian Inst. of Tech), Natale, Lorenzo (Istituto Italiano Di Tecnologia)

14:45-15:00 MoBT17.2

Direct Visual SLAM Fusing Proprioception for a Humanoid Robot.

Scona, Raluca (Univ. of Edinburgh), Nobili, Simona (Univ. of Edinburgh), Petillot, Yvan R. (Heriot-Watt Univ), Fallon, Maurice (Univ. of Edinburgh)

15:00-15:15 MoBT17.3

Autonomous View Selection and Gaze Stabilization for Humanoid Robots.

Grotz, Markus (Karlsruhe Inst. of Tech. (KIT)), Habra, Timothee (UCL), Ronsse, Renaud (Univ. Catholique De Louvain), Asfour, Tamim (Karlsruhe Inst. of Tech. (KIT))

15:15-15:30 MoBT17.4

A Torque-Controlled Humanoid Robot Riding on a Two-Wheeled Mobile Platform.

Xin, Songyan (Istituto Italiano Di Tecnologia (IIT)), You, Yangwei (Istituto Italiano Di Tecnologia), Zhou, Chengxu (Fondazione Istituto Italiano Di Tecnologia), Fang, Cheng (Fondazione Istituto Italiano Di Tecnologia), Tsagarakis, Nikos (Istituto Italiano Di Tecnologia)

15:30-15:45 MoBT17.5

A Method for Robust Robotic Bipedal Walking on Rough Terrain: L1-Optimal Event-Based Feedback Controller.

Lee, Jongwoo (Korea Inst. of Science and Tech), Kim, Jung Hoon (Korea Inst. of Science and Tech), Oh, Yonghwan (Korea Inst. of Science & Tech. (KIST))

15:45-16:00 MoBT17.6

Real-Time Path Planning in Unknown Environments for Bipedal Robots.

Hildebrandt, Arne-Christoph (Tech. Univ. München), Klischat, Moritz (Tech. Univ. of Munich), Wahrmann, Daniel (Tech. Univ. München), Wittmann, Robert (Tech. Univ. München), Sygulla, Felix (Tech. Univ. of Munich), Seiwald, Philipp (Tech. Univ. of Munich), Rixen, Daniel (Tech. Univ. München), Buschmann, Thomas (Google, Inc)

MoBT18	Room 223
Calibration I	
Chair: Waslander, Steven Lake	Univ. of Waterloo
Co-Chair: Siciliano, Bruno	Univ. Napoli Federico II

14:30-14:45 MoBT18.1

Mirror-Assisted Calibration of a Multi-Modal Sensing Array with a Ground Penetrating Radar and a Camera.

Chou, Chieh (Texas A&M Univ), Yeh, Shu-Hao (Texas A&M Univ), Song, Dezhen (Texas A&M Univ)

14:45-15:00 MoBT18.2

Modelling and Identification of the Da Vinci Research Kit Robotic Arms.

Fontanelli, Giuseppe Andrea (Univ. of Naples Federico II), Ficuciello, Fanny (Univ. Di Napoli Federico II), Villani, Luigi (Univ. Di Napoli Federico II), Siciliano, Bruno (Univ. Napoli Federico II)

15:00-15:15 MoBT18.3

Simultaneous Hand-Eye Calibration and Reconstruction.

Zhi, Xiangyang (ShanghaiTech Univ), Schwertfeger, Sören (ShanghaiTech Univ)

15:15-15:30 MoBT18.4

New Method for Decoupling the Articular Stiffness Identification : Application to an Industrial Robot with Double Encoding System on Its 3 First Axis.

Ambiehl, Alexandre (Univ. of Nantes/IRCCyN), Garnier, Sébastien (LS2N/Univ. of Nantes), Subrin, Kévin (Univ. De Nantes / LS2N), Furet, Benoît (IRCCyN)

15:30-15:45 MoBT18.5

Autonomous Active Calibration of a Dynamic Camera Cluster Using Next-Best-View.

Rebello, Jason (Univ. of Waterloo), Das, Arun (Univ. of Waterloo), Waslander, Steven Lake (Univ. of Waterloo)

15:45-16:00 MoBT18.6

Extrinsic Multi-Sensor Calibration for Mobile Robots Using the Gauss-Helmert Model.

Huang, Kaihong (Univ. of Bonn), Stachniss, Cyrill (Univ. of Bonn)

MoCT1 Room 109

Deep Learning in Robotics and Automation III

Chair: Khorrami, Farshad — New York Univ. Tandon School of Engineering

Co-Chair: Ryoo, Michael S. — Indiana Univ. Bloomington

16:30-16:45 MoCT1.1

Learning Robot Activities from First-Person Human Videos Using Convolutional Future Regression.

Lee, Jangwon (Indiana Univ), Ryoo, Michael S. (Indiana Univ. Bloomington)

16:45-17:00 MoCT1.2

Joint Prediction of Depths, Normals and Surface Curvature from RGB Images Using CNNs.

Dharmasiri, Thanuja (Monash Univ), Spek, Andrew (Monash Univ), Drummond, Tom (Monash Univ)

17:00-17:15 MoCT1.3

3D Fully Convolutional Network for Vehicle Detection in Point Cloud.

Li, Bo (Trunk Inc)

17:15-17:30 MoCT1.4

Recursive Neural Network Based Semantic Navigation of an Autonomous Mobile Robot through Understanding Human Verbal Instructions.

Luo, Ren (National Taiwan Univ), Chen, Chang-Jiun (National Taiwan Univ)

17:30-17:45 MoCT1.5

Deep Regression for Monocular Camera-Based 6-DoF Global Localization in Outdoor Environments.

Naseer, Tayyab (Univ. of Freiburg), Burgard, Wolfram (Univ. of Freiburg)

17:45-18:00 MoCT1.6

Sensor Modality Fusion with CNNs for UGV Autonomous Driving in Indoor Environments.

Patel, Naman (New York Univ. Tandon School of Engineering), Choromanska, Anna (New York Univ. Tandon School of Engineering), Krishnamurthy, Prashanth (New York Univ. Tandon School of Engineering), Khorrami, Farshad (New York Univ. Tandon School of Engineering)

MoCT2	Room 111
Learning and Adaptive Systems III	
Chair: Smart, William	Oregon State Univ
Co-Chair: Clavera, Ignasi	Univ. of California, Berkeley

16:30-16:45 MoCT2.1

Policy Transfer Via Modularity and Reward Guiding.

Clavera, Ignasi (Univ. of California, Berkeley), Held, David (Univ. of California, Berkeley), Abbeel, Pieter (UC Berkeley)

16:45-17:00 MoCT2.2

Deep Dynamic Policy Programming for Robot Control with Raw Images.

Tsurumine, Yoshihisa (Nara Inst. of Science and Tech), CUI, Yunduan (Nara Inst. of Science and Tech), Uchibe, Eiji (ATR Computational Neuroscience Labs), Matsubara, Takamitsu (NAIST/ATR)

17:00-17:15 MoCT2.3

Addressing Appearance Change in Outdoor Robotics with Adversarial Domain Adaptation.

Wulfmeier, Markus (Univ. of Oxford), Bewley, Alex (Univ. of Oxford), Posner, Ingmar (Oxford Univ)

17:15-17:30 MoCT2.4

Autoencoders for Incremental Dimensionality Reduced Reinforcement Learning.

Curran, William (Oregon State Univ), Pocius, Rey (Oregon State Univ), Smart, William (Oregon State Univ)

17:30-17:45 MoCT2.5

Object Recall Using an Experience Database to Accelerate Robot Action Planning.

Redpath, Richard (Univ. of York), Timmis, Jon (Univ. of York), Trefzer, Martin (Univ. of York)

17:45-18:00 MoCT2.6

Tactile Motion Recognition with Convolutional Neural Networks.

Wu, Haoying (Wuhan Univ. of Tech), Jiang, Daimin (Wuhan Univ. of Tech), Gao, Hao (Wuhan Univ. of Tech)

MoCT3	Room 116
Slam Iii	
Chair: Liu, Yong	Zhejiang Univ
Co-Chair: Chen, Jian	Zhejiang Univ

16:30-16:45 MoCT3.1

An Invariant-EKF VINS Algorithm for Improving Consistency.

WU, KANZHI (Univ. of Tech. Sydney), Zhang, Teng (Univ. of Tech. Sydney), Su, Daobilige (Univ. of Sydney), Huang, Shoudong (Univ. of Tech. Sydney), Dissanayake, Gamini (Univ. of Tech. Sydney)

16:45-17:00 MoCT3.2

Large-Scale, Drift-Free SLAM Using Highly Robustified Building Model Constraints.

Salehi, Achkan (Commissariat à L'énergie Atomique), GAY-BELLILE, VINCENT (Cea List), BOURGEOIS, STEVE (Cea List), Allezard, Nicolas (Cea List), CHAUSSE, Frédéric (Inst. Pascal)

17:00-17:15 MoCT3.3

SPLODE: Semi-Probabilistic Point and Line Odometry with Depth Estimation from RGB-D Camera Motion.

Proença, Pedro F. (Univ. of Surrey), Gao, Yang (Univ. of Surrey)

17:15-17:30 MoCT3.4

Ultra-Wideband Aided Fast Localization and Mapping System.

Wang, Chen (Nanyang Tech. Univ), Zhang, Handuo (Nanyang Tech. Univ), Nguyen, Thien-Minh (Nanyang Tech. Univ), Xie, Lihua (NanyangTechnological Univ)

17:30-17:45 MoCT3.5

A 2-Point Pose Estimation Algorithm for Monocular Visual Odometry of Ground Vehicles.

Gao, Yanyan (Zhejiang Univ), Chen, Jian (Zhejiang Univ), Zhang, Kaixiang (Zhejiang Univ), Jia, Bingxi (Zhejiang Univ)

17:45-18:00 MoCT3.6

Exploring the Effect of Meta-Structural Information on the Global Consistency of SLAM.

Henein, Mina (Australian National Univ), Abello, Montiel Gerardo (Australian National Univ), Ila, Viorela (Australian National Univ), Mahony, Robert (Australian National Univ)

MoCT4	Room 114
Industrial Robots	
Chair: Maciejewski, Anthony A.	Colorado State Univ
Co-Chair: Guan, Yisheng	Guangdong Univ. of Tech

16:30-16:45 MoCT4.1

Design of a Collaborative Architecture for Human-Robot Assembly Tasks.

El Makrini, Ilias (Vrije Univ. Brussel), Merckaert, Kelly (Vrije Univ. Brussel (VUB)), Lefeber, Dirk (Vrije Univ. Brussel - VUB), Vanderborght, Bram (Vrije Univ. Brussel)

16:45-17:00 MoCT4.2

Adjustable Interaction Control Using Genetic Algorithm for Enhanced Coupled Dynamics in Tool-Part Contact.

Giardini Lahr, Gustavo Jose (Univ. of Sao Paulo), Garcia, Henrique Borges (Univ. of Sao Paulo), Savazzi, Jose Otavio (EMBRAER), Moretti, Caio Benatti (Univ. of Sao Paulo), Aroca, Rafael (Federal Univ. of São Carlos), Pedro, Leonardo Marquez (Federal Univ. of São Carlos), Franco Barbosa, Gustavo (Federal Univ. of Sao Carlos), Caurin, Glauco Augusto de Paula (Eesc - Usp)

17:00-17:15 MoCT4.3

Inverse Model Command Shaper for a Flexible Gantry Robot.

Tekles, Nikolas (German Aerospace Center), Krebs, Florian (German Aerospace Center), Reiner, Matthias (German Aerospace Center)

17:15-17:30 MoCT4.4

Robust Recognition of Tactile Gestures for Intuitive Robot Programming.

Kubus, Daniel (Tech. Univ. Braunschweig), Muxfeldt, Arne (Tech. Univ. Braunschweig), Kissener, Konrad (Tech. Univ. Braunschweig), Haus, Jan Niklas (Tech. Univ. Braunschweig), Steil, Jochen J. (Tech. Univ. Braunschweig)

17:30-17:45 MoCT4.5

Cooperative Robotic Soldering of Flexible PCBs.

LI, Xiang (The Chinese Univ. of Hong Kong), Su, Xing (The Chinese Univ. of Hong Kong), Liu, Yunhui (Chinese Univ. of Hong Kong)

17:45-18:00 MoCT4.6

Algebraic Estimation and Control of Single-Link Flexible Joint Robots.

Assanimoghaddam, Mehran (DLR, German Aerospace Center), Acquatella, Paul (DLR, German Aerospace Center)

MoCT5 Room 118

Medical Robots and Systems I

Chair: Kazanzides, Peter — Johns Hopkins Univ

Co-Chair: Desai, Jaydev P. — Georgia Inst. of Tech

16:30-16:45 MoCT5.1

An Online System for Tracking the Performance of Parkinson's Patients.

Kuhner, Andreas (Univ. Freiburg), Schubert, Tobias (AIS Univ. Freiburg), Maurer, Christoph (Univ. of Freiburg Medical Center), Burgard, Wolfram (Univ. of Freiburg)

16:45-17:00 MoCT5.2

Development of a Double Arm Endoscopic Mini-Manipulator System for Transurethral Resection of Bladder Tumors (TURBT).

Coemert, Suat (Tech. Univ. of Munich), Kollmer, Markus (Tech. Univ. München), Olmeda, Mar (Tech. Univ. München), Krieger, Yannick S. (Tech. Univ. München), Brecht, Sandra V. (Tech. Univ. München), Lueth, Tim C. (Tech. Univ. München)

17:00-17:15 MoCT5.3

Mechanical Validation of an MRI Compatible Stereotactic Neurosurgery Robot in Preparation for Pre-Clinical Trials.

Nycz, Christopher J (Worcester Pol. Inst), Gondokaryono, Radian (Worcester Pol. Inst), Carvalho, Paulo (Worcester Pol. Inst), Patel, Niravkumar (WORCESTER Pol. Inst), Wartenberg, Marek (Worcester Pol. Inst), Pilitsis, Julie (Albany Medical Center), Fischer, Gregory Scott (Worcester Pol. Inst. WPI)

17:15-17:30 MoCT5.4

Design and Analysis of a Remotely-Actuated Cable-Driven Neurosurgical Robot.

Cheng, Shing Shin (Univ. of Maryland Coll. Park), Wang, Xuefeng (Georgia Inst. of Tech), Desai, Jaydev P. (Georgia Inst. of Tech)

17:30-17:45 MoCT5.5

Vision-Based Calibration of Dual RCM-Based Robot Arms in Human-Robot Collaborative Minimally Invasive Surgery.

Wang, Zerui (The Chinese Univ. of Hong Kong), Liu, Ziwei (The Chinese Univ. of Hong Kong), Ma, Qianli (The Johns Hopkins Univ), Cheng, Alexis (Johns Hopkins Univ), Liu, Yunhui (Chinese Univ. of Hong Kong), Kim, Sungmin (Johns Hopkins Univ), Deguet, Anton (Johns Hopkins Univ), Reiter, Austin (Johns Hopkins Univ), Kazanzides, Peter (Johns Hopkins Univ), Taylor, Russell H. (The Johns Hopkins Univ)

17:45-18:00 MoCT5.6

Improved Assistive Profile Tracking of Soft Exosuits for Walking and Jogging with Off-Board Actuation.

Lee, Giuk (Harvard Univ), Ding, Ye (Harvard Univ), Galiana, Ignacio (Harvard Univ), Karavas, Nikolaos (Harvard Univ), Zhou, Yu Meng (Harvard Univ), Walsh, Conor James (Harvard Univ)

MoCT6	Room 121
Aerial Systems Applications II	
Chair: larrieu, nicolas	Enac
Co-Chair: Ollero, Anibal	Univ. of Seville

16:30-16:45 MoCT6.1

Design of a Robust Controller/Observer for TCP/AQM Network: First Application to Intrusion Detection Systems for Drone Fleet.

larrieu, nicolas (Enac), Condomines, Jean-Philippe (ENAC Univ), Miquel, Thierry (ENAC), CHEMALI, Riad (Ec. Nationale De L'aviation Civile)

16:45-17:00 MoCT6.2

Tethered Flight Control of a Small Quadrotor Robot for Stippling.

Kry, Paul G. (McGill Univ. School of Computer Science), Galea, Brendan (McGill Univ)

17:00-17:15 MoCT6.3

Locally Optimal Trajectory Planning for Aerial Manipulation in Constrained Environments.

Seo, Hoseong (Seoul National Univ), Kim, Suseong (Seoul National Univ), Kim, H. Jin (Seoul National Univ)

17:15-17:30 MoCT6.4

REDBEE: A Visual-Inertial Drone System for Real-Time Moving Object Detection.

Huang, Chong (Univ. of California, Santa Barbara), Chen, Peng (Zhejiang Univ. of Tech), Yang, Xin (Huazhong Univ. of Science and Tech), Cheng, Kwang-Ting (Tim) (Hong Kong Univ. of Science and Tech)

17:30-17:45 MoCT6.5

An Autonomous Vision-Based Target Tracking System for Rotorcraft Unmanned Aerial Vehicles.

Cheng, Hui (Sun Yat-Sen Univ), Lin, Lishan (Sun Yet-Sen Univ), Zheng, Zhuoqi (Sun Yat-Sen Univ), Guan, Yuwei (Sun Yet-Sen Univ), Liu, Zhongchang (Sun Yat-Sen Univ)

17:45-18:00 MoCT6.6

Energy-Efficient Trajectory Generation with Spline Curves Considering Environmental and Dynamic Constraints for Small UAS.

Rodriguez Salazar, Leopoldo (Univ. De Sevilla), Balampanis, Fotios (Univ. De Sevilla), Cobano, Jose A. (Univ. of Seville), Maza, Ivan (Univ. of Seville), Ollero, Anibal (Univ. of Seville)

MoCT7	Room 122
Slam Ii	
Chair: Civera, Javier	Univ. De Zaragoza
Co-Chair: Yang, Ming	Shanghai Jiao Tong Univ

16:30-16:45 MoCT7.1

Direct Visual Odometry for a Fisheye-Stereo Camera.

Liu, Peidong (ETH Zurich), Heng, Lionel (DSO National Lab), Sattler, Torsten (ETH Zurich), Geiger, Andreas (Max Planck Inst. for Intelligent Systems, Tübingen), Pollefeys, Marc (ETH Zurich)

16:45-17:00 MoCT7.2

Single-View and Multi-View Depth Fusion.

Fácil, José M. (Univ. De Zaragoza), Concha, Alejo (Univ. De Zaragoza), Montesano, Luis (Univ. De Zaragoza), Civera, Javier (Univ. De Zaragoza)

17:00-17:15 MoCT7.3

Depth Enhanced Visual-Inertial Odometry Based on Multi-State Constraint Kalman Filter.

Pang, Fumin (Segway Robotics Inc), Chen, Zichong (Segway Robotics Inc), Pu, Li (Segway Robotics Inc), Wang, Tianmiao (Beihang Univ)

17:15-17:30 MoCT7.4

Shape Priors for Real-Time Monocular Object Localization in Dynamic Environments.

Jatavallabhula, Krishna Murthy (International Inst. of Information Tech. Hyderabad), Sharma, Sarthak (International Inst. of Information Tech), Krishna, Madhava (IIIT Hyderabad)

17:30-17:45 MoCT7.5

Robust Visual SLAM with Point and Line Features.

Zuo, Xingxing (Zhejiang Univ), Xie, Xiaojia (Zhejiang Univ), Liu, Yong (Zhejiang Univ), Huang, Guoquan (Univ. of Delaware)

17:45-18:00 MoCT7.6

Model-Aided Monocular Visual-Inertial State Estimation and Dense Mapping.

Qiu, Kejie (The Hong Kong Univ. of Science and Tech), Shen, Shaojie (Hong Kong Univ. of Science and Tech)

MoCT8 Room 202

Wearable Robots II

Chair: Tan, Jindong — Univ. of Tennessee, Knoxville

Co-Chair: Hessinger, Markus — Tech. Univ. Darmstadt

16:30-16:45 MoCT8.1

Development of Adjustable Knee Joint for Walking Assistance Devices.

Choi, Byung June (Samsung Advanced Inst. of Tech), Lee, Younbaek (Samsung Electronics Co., Ltd), Kim, Yong-Jae (Korea Univ. of Tech. and Education), Lee, Jongwon (Samsung Advanced Inst. of Tech), Lee, Minhyung (Samsung Advanced Inst. of Tech), Roh, Se-gon (Samsung Electronics Co., Ltd), Park, Young Jin (Samsung Advanced Inst. of Tech. (SAIT)), Kim, Kyungrock (Samsung Advanced Inst. of Tech. (SAIT)), Shim, Youngbo (Samsung Electronics)

16:45-17:00 MoCT8.2

Hybrid Carbon Fiber-Textile Compliant Force Sensors for High-Load Sensing in Soft Exosuits.

Araromi, Oluwaseun Adelowo (Harvard Univ), Walsh, Conor James (Harvard Univ), Wood, Robert (Harvard Univ)

17:00-17:15 MoCT8.3

A Multi-Functional Ankle Exoskeleton for Mobility Enhancement of Gait-Impaired Individuals and Seniors.

Choi, Hyundo (Samsung Electronics), Park, Young Jin (Samsung Advanced Inst. of Tech. (SAIT)), Seo, Keehong (Samsung Electronics Co., Ltd), Lee, Jusuk (Samsung Electronics Co., Ltd), Lee, Sang-Eui (Samsung Advanced Inst. of Tech), Shim, Youngbo (Samsung Electronics)

17:15-17:30 MoCT8.4

A Facial Wearable Robot for Supporting Eye Opening and Closure Movement.

Kozaki, Yuta (Univ. of Tsukuba), Suzuki, Kenji (Univ. of Tsukuba)

17:30-17:45 MoCT8.5

Kinematic Chain Based Multi-Joint Capturing Using Monocular Visual-Inertial Measurements.

Zhang, Yinlong (Shenyang Inst. of Automation, Chinese Acad. of Sciences), Wei, Liang (Shenyang Inst. of Automation, Chinese Acad. of Sciences), He, Hongsheng (Univ. of Tennessee), Tan, Jindong (Univ. of Tennessee, Knoxville)

17:45-18:00 MoCT8.6

Hybrid Position/Force Control of an Upper-Limb Exoskeleton for Assisted Drilling.

Hessinger, Markus (Tech. Univ. Darmstadt), Pingsmann, Markus (Tech. Univ. Darmstadt), Perry, Joel C. (Univ. of Idaho), Werthschützky, Roland (Univ. of Tech. Darmstadt), Kupnik, Mario (Tech. Univ. Darmstadt)

MoCT9	Room 204
Multi-Robots II	
Chair: Prorok, Amanda	Univ. of Pennsylvania
Co-Chair: Rekleitis, Ioannis	Univ. of South Carolina

16:30-16:45 MoCT9.1

Intrusion Detection for Stochastic Task Allocation in Robot Swarms.

Maushart, Florian (EPFL), Prorok, Amanda (Univ. of Pennsylvania), Hsieh, M. Ani (Univ. of Pennsylvania), Kumar, Vijay (Univ. of Pennsylvania)

16:45-17:00 MoCT9.2

Cooperative Coverage for Surveillance of 3D Structures.

Adaldo, Antonio (KTH Royal Inst. of Tech), Sharif Mansouri, Sina (Lulea Univ), Kanellakis, Christoforos (LTU), Dimarogonas, Dimos V. (KTH Royal Inst. of Tech), Johansson, Karl H. (Royal Inst. of Tech), Nikolakopoulos, George (Luleå Univ. of Tech)

17:00-17:15 MoCT9.3

Efficient Multi-Robot Coverage of a Known Environment.

Karapetyan, Nare (Univ. of South Carolina), Benson, Kelly (Univ. of South Carolina), McKinney, Chris (Univ. of South Carolina), Taslakian, Perouz (American Univ. of Armenia), Rekleitis, Ioannis (Univ. of South Carolina)

17:15-17:30 MoCT9.4

Learning for Multi-Robot Cooperation in Partially Observable Stochastic Environments with Macro-Actions.

Liu, Miao (MIT), Sivakumar, Kavinayan (Princeton Univ), Omidshafiei, Shayegan (Massachusetts Inst. of Tech), Amato, Christopher (Northeastern Univ), How, Jonathan Patrick (Massachusetts Inst. of Tech)

17:30-17:45 MoCT9.5

Simultaneous Task Allocation, Data Routing, and Transmission Scheduling in Mobile Multi-Robot Teams.

FEO, EDUARDO (DALLE MOLLE Inst. FOR ARTIFICIAL INTELLIGENCE (IDSIA)), Gambardella, Luca (USI-SUPSI), Di Caro, Gianni (Carnegie Mellon Univ. (CMU))

17:45-18:00 MoCT9.6

Privacy-Preserving Vehicle Assignment for Mobility-On-Demand Systems.

Prorok, Amanda (Univ. of Pennsylvania), Kumar, Vijay (Univ. of Pennsylvania)

MoCT10	Room 205
Micro/Nano Robotics II	
Chair: Régnier, Stéphane	Univ. Pierre Et Marie Curie
Co-Chair: Yoon, Jungwon	Gyeongsang National Univ

16:30-16:45 MoCT10.1

3D Closed-Loop Motion Control of Swimmer with Flexible Flagella at Low Reynolds Numbers.

Oulmas, Ali (Univ. of Pierre and Marie Curie), Andreff, Nicolas (Univ. De Franche Comté), Régnier, Stéphane (Univ. Pierre Et Marie Curie)

16:45-17:00 MoCT10.2

Image-Based Visual Servoing of Helical Microswimmers for Arbitrary Planar Path Following at Low Reynolds Numbers.

Guan, Yanming (Shenzhen Inst. of Advanced Tech. Chinese Acad. of Sc), Xu, Tiantian (Chinese Acad. of Sciences), Liu, Jia (ShenZhen Inst. of Advanced Tech. Chinese Acad. of S), Wu, Xinyu (CAS/CUHK)

17:00-17:15 MoCT10.3

High-Bandwidth 3D Force Feedback Optical Tweezers for Interactive Bio-Manipulation.

Yin, Munan (Univ. Pierre Et Marie Curie), Gerena, Edison (Univ. Pierre Et Mairie Curie), Pacoret, Cécile (Univ. Paris 6), HALIYO, Dogan Sinan (Univ. Pierre Et Marie Curie - Paris 6 - CNRS), Régnier, Stéphane (Univ. Pierre Et Marie Curie)

17:15-17:30 MoCT10.4

Development of a Real-Time 2D Magnetic Particle Imaging for Targeted Drug Delivery.

Lê, Tuấn Anh (School of Mechanical Engineering Gyeongsang National Univ), zhang, xingming (School of Mechanical Engineering Gyeongsang National Univ), Kafash Hoshiar, Ali (Gyeongsang National Univ), Yoon, Jungwon (Gyeongsang National Univ)

17:30-17:45 MoCT10.5

Rotational Nanorobotic Manipulation System for Multi-Directional Defect Characterization Inside SEM.

wan, wenfeng (City Univ. of Hong Kong), Lu, Haojian (City Univ. of Hong Kong), Shen, Yajing (City Univ. of Hong Kong)

17:45-18:00 MoCT10.6

Swimming in Low Reynolds Numbers Using Planar and Helical Flagellar Waves.

Khalil, Islam S.M. (German Univ. in Cairo), Tabak, Ahmet Fatih (Max Planck Inst. for Intelligent Systems - Stuttgart), Abou Seif, Mohamed (German Univ. in Cairo), Klingner, Anke (German Univ. in Cairo), Adel, Barbara (German Univ. in Cairo), Sitti, Metin (Max-Planck Inst. for Intelligent Systems)

MoCT11	Room 207
Grasping II	
Chair: Liarokapis, Minas	The Univ. of Auckland
Co-Chair: Cannella, Ferdinando	Istituto Italiano Di Tecnologia

16:30-16:45 MoCT11.1

Dexterous Manipulation with Compliant Grasps and External Contacts.

Almeida, Diogo (Royal Inst. of Tech. KTH), Karayiannidis, Yiannis (Chalmers Univ. of Tech. & KTH Royal Insitute of Tech)

16:45-17:00 MoCT11.2

Surface Texture of Deformable Robotic Fingertips for a Stable Grasp under Both Dry and Wet Conditions.

Mizushima, Kaori (Kanazawa Univ), Nishimura, Toshihiro (Kanazawa Univ), Suzuki, Yosuke (Kanazawa Univ), Tsuji, Tokuo (Kanazawa Univ), Watanabe, Tetsuyou (Kanazawa Univ)

17:00-17:15 MoCT11.3

Regrasp Planning Using 10, 000s of Grasps.

Wan, Weiwei (National Inst. of AIST), Harada, Kensuke (Osaka Univ)

17:15-17:30 MoCT11.4

Analysis of Precision Grip Force for Ugripp (Underactuated Gripper for Power and Precision Grasp).

Kobayashi, Akinari (Tohoku Univ), Yamaguchi, Kengo (Tohoku Univ), Kinugawa, Jun (Tohoku Univ), Arai, Shogo (Tohoku Univ), Hirata, Yasuhisa (Tohoku Univ), Kosuge, Kazuhiro (Tohoku Univ)

17:30-17:45 MoCT11.5

Dexclar: A Gripper Platform for Payload-Centric Manipulation and Dexterous Applications.

Rahman, Nahian (Istituto Italiano Di Tecnologia), Carbonari, Luca (Univ. Pol. Delle Marche), Canali, Carlo (Department of Advanced Robotics, Istituto Italiano Di Tecnologia), Caldwell, Darwin G. (Istituto Italiano Di Tecnologia), Cannella, Ferdinando (Istituto Italiano Di Tecnologia)

17:45-18:00 MoCT11.6

Deriving Dexterous, In-Hand Manipulation Primitives for Adaptive Robot Hands.

Liarokapis, Minas (The Univ. of Auckland), Dollar, Aaron (Yale Univ)

MoCT12	Room 208
Kinematics and Mechanisms	
Chair: Felton, Samuel	Northeastern Univ
Co-Chair: Markovic, Ivan	Univ. of Zagreb, Faculty of Electrical Engineering and Computing

16:30-16:45 MoCT12.1

Sensor Concept for Solving the Direct Kinematics Problem of the Stewart-Gough Platform.

Schulz, Stefan (Hamburg Univ. of Tech), Seibel, Arthur (Hamburg Univ. of Tech), Schreiber, Daniel (Hamburg Univ. of Tech), Schlattmann, Josef (Hamburg Univ. of Tech)

16:45-17:00 MoCT12.2

Human Motion Estimation on Lie Groups Using IMU Measurements.

Joukov, Vladimir (Univ. of Waterloo), Cesic, Josip (Univ. of Zagreb, Faculty of Electrical Engineering and Comp), Westermann, Kevin (Univ. of Waterloo), Markovic, Ivan (Univ. of Zagreb, Faculty of Electrical Engineering and Comp), Kulic, Dana (Univ. of Waterloo), Petrovic, Ivan (Univ. of Zagreb)

17:00-17:15 MoCT12.3

An Analytic Approach to Converting POE Parameters into D-H Parameters for Serial-Link Robots.

Wu, Liao (Queensland Univ. of Tech), Crawford, Ross (Queensland Univ. of Tech), Roberts, Jonathan (Queensland Univ. of Tech)

17:15-17:30 MoCT12.4

A Self-Folding Robot Arm for Load-Bearing Operations.

Liu, Chang (Northeastern Univ), Felton, Samuel (Northeastern Univ)

17:30-17:45 MoCT12.5

Design and Analysis of the Bearingless Planetary Gearbox.

Georgiev, Nikola (Caltech), Burdick, Joel (California Inst. of Tech)

17:45-18:00 MoCT12.6

Planar Omnidirectional Crawler Mobile Mechanism - Development of Actual Mechanical Prototype and Basic Experiments -.

Tadakuma, Kenjiro (Tohoku Univ), Takane, Eri (Tohoku Univ), Fujita, Masahiro (Tohoku Univ), Komatsu, Hirone (Tohoku Univ), Nomura, Akito (Tohoku Univ), Konyo, Masashi (Tohoku Univ), Tadokoro, Satoshi (Tohoku Univ)

MoCT13	Room 211
Motion and Path Planning I	
Chair: Bhattacharya, Sourabh	Iowa State Univ
Co-Chair: Seegmiller, Neal A.	Argo AI

16:30-16:45 MoCT13.1

Efficient Sampling-Based Bottleneck Pathfinding Over Cost Maps.

Solovey, Kiril (Tel Aviv Univ), Halperin, Dan (Tel Aviv Univ)

16:45-17:00 MoCT13.2

RCAMP: A Resilient Communication-Aware Motion Planner for Mobile Robots with Autonomous Repair of Wireless Connectivity.

Caccamo, Sergio (KTH Royal Inst. of Tech), Parasuraman, Ramviyas (Purdue Univ), Freda, Luigi (Univ. of Rome "La Sapienza"), Gianni, Mario (La Sapienza Univ. of Rome), Ogren, Petter (Royal Inst. of Tech. (KTH))

17:00-17:15 MoCT13.3

The Maverick Planner: An Efficient Hierarchical Planner for Autonomous Vehicles in Unstructured Environments.

Seegmiller, Neal A. (Southwest Res. Inst), Johnson, Elliot (Northwestern Univ), Gassaway, Jason (Southwest Res. Inst), Towler, Jerry (Southwest Res. Inst)

17:15-17:30 MoCT13.4

Planning Energy-Efficient Trajectories in Strong Disturbances.

Jones, Dylan (Oregon State Univ), Hollinger, Geoffrey (Oregon State Univ)

17:30-17:45 MoCT13.5

Legged Motion Planning in Complex 3D Environments.

Short, Andrew (Univ. of Wollongong), Bandyopadhyay, Tirthankar (CSIRO)

17:45-18:00 MoCT13.6

Visibility-Based Target-Tracking Game: Bounds and Tracking Strategies.

Emadi, Hamid (Iowa State Univ), Gao, Tianshuang (Iowa State Univ), Bhattacharya, Sourabh (Iowa State Univ)

MoCT14	Room 217
Motion Control I	
Chair: Lou, Yunjiang	Harbin Inst. of Tech. Shenzhen Graduate School
Co-Chair: Missura, Marcell	Univ. of Bonn

16:30-16:45 MoCT14.1

Visual Feedback Control of Tensegrity Robotic Systems.

Karnan, Haresh (Texas A&M Univ), Goyal, Raman (Texas A&M Univ), Majji, Manoranjan (Texas A&M Univ), Skelton, Robert E. (Univ. of California, San Diego), Singla, Puneet (State Univ. of New York at Buffalo)

16:45-17:00 MoCT14.2

Propagation of Joint Space Quantization Error to Operational Space Coordinates and Their Derivatives.

Colonnese, Nick (Oculus Res), Okamura, Allison M. (Stanford Univ)

17:00-17:15 MoCT14.3

Contouring Error Vector and Cross-Coupled Control of Multi-Axis Servo System.

Shi, Ran (School of Mechatronics Engineering and Automation, Harbin Inst), Lou, Yunjiang (Harbin Inst. of Tech. Shenzhen Graduate School), Zhang, Xiang (Harbin Inst. of Tech. Shenzhen)

17:15-17:30 MoCT14.4

Acceleration Control for Dynamic Manipulation of a Robot Turning Over Objects.

Tsuji, Toshiaki (Saitama Univ), Kutsuzawa, Kyo (Saitama Univ), Sakaino, Sho (Saitama Univ)

17:30-17:45 MoCT14.5

The Synchronized Holonomic Model: A Framework for Efficient Generation of Motion.

Missura, Marcell (Univ. of Bonn), Lee, Daniel D. (Univ. of Pennsylvania), von Stryk, Oskar (Tech. Univ. Darmstadt), Bennewitz, Maren (Univ. of Bonn)

17:45-18:00 MoCT14.6

Adaptive Trajectory Tracking Control for the Ball-Pendulum System with Time-Varying Uncertainties.

Bai, Yang (Kyushu Univ), Svinin, Mikhail (Ritsumeikan Univ), Yamamoto, Motoji (Kyushu Univ)

MoCT15	Room 215
Biologically-Inspired Robots I	
Chair: Onal, Cagdas	WPI
Co-Chair: Kurabayashi, Daisuke	Tokyo Inst. of Tech

16:30-16:45 MoCT15.1

Active-Braid, a Bio-Inspired Continuum Manipulator.

Hassan, Taimoor (Scuola Superiore Sant Anna), Cianchetti, Matteo (Scuola Superiore Sant'Anna), Mazzolai, Barbara (Istituto Italiano Di Tecnologia), Laschi, Cecilia (Scuola Superiore Sant'Anna), Dario, Paolo (Scuola Superiore Sant'Anna)

16:45-17:00 MoCT15.2

Design and Analysis of an Origami Continuum Manipulation Module with Torsional Strength.

Santoso, Junius (WPI), Skorina, Erik (Worcester Pol. Inst), Luo, Ming (Worcester Pol. Inst), Yan, Ruibo (Worcester Pol. Inst), Onal, Cagdas (WPI)

17:00-17:15 MoCT15.3

Index Finger of a Human-Like Robotic Hand Using Thin Soft Muscles.

Mohd Faudzi, Ahmad `Athif (Univ. Teknologi Malaysia), Ooga, Jun'ichiro (Toshiba Corp), GOTO, TATSUHIKO (Toshiba Corp), Takeichi, Masashi (Tokyo Inst. of Tech), Suzumori, Koichi (Tokyo Inst. of Tech)

17:15-17:30 MoCT15.4

Time-Varying Moth-Inspired Algorithm for Chemical Plume Tracing in Turbulent Environment.

Shigaki, Shunsuke (Tokyo Inst. of Tech), Sakurai, Takeshi (The Univ. of Tokyo), Ando, Noriyasu (Univ. of Tokyo), Kurabayashi, Daisuke (Tokyo Inst. of Tech), Kanzaki, Ryohei (The Univ. of Tokyo)

17:30-17:45 MoCT15.5

The Effect of Spine Morphology on Rapid Acceleration in Quadruped Robots.

Fisher, Callen (Univ. of Cape Town), Shield, Stacey Leigh (Univ. of Cape Town), Patel, Amir (Univ. of Cape Town)

17:45-18:00 MoCT15.6

Discrete Binary Muscle-Inspired Actuation with Motor Unit Overpowering and Binary Control Strategy.

Mathijssen, Glenn (Vrije Univ. Brussel), Furnémont, Raphaël (Vrije Univ. Brussel), Saerens, Elias (Vrije Univ. Brussel), Lefeber, Dirk (Vrije Univ. Brussel), Vanderborght, Bram (Vrije Univ. Brussel)

MoCT16	Room 220
Autonomous Vehicle Navigation I	
Chair: Richards, Arthur	Univ. of Bristol
Co-Chair: Wickenheiser, Adam	The George Washington Univ

16:30-16:45 MoCT16.1

Rapid Exploration with Multi-Rotors: A Frontier Selection Method for High Speed Flight.

Cieslewski, Titus (Univ. of Zurich), Kaufmann, Elia Marc (ETH Zürich), Scaramuzza, Davide (Univ. of Zurich)

16:45-17:00 MoCT16.2

Alignment of 3D Point Clouds with a Dominant Ground Plane.

Pandey, Gaurav (IIT - Kanpur), Giri, Shashank (Indian Inst. of Tech. Kanpur), McBride, James (Ford Motor Company)

17:00-17:15 MoCT16.3

Reactive Trajectory Generation in an Unknown Environment.

Cole, Kenan (The George Washington Univ), Wickenheiser, Adam (The George Washington Univ)

17:15-17:30 MoCT16.4

Cooperative Transport of a Buoyant Load: A Differential Geometric Approach.

Hajieghrary, Hadi (Drexel Univ), Kularatne, Dhanushka (Drexel Univ), Hsieh, M. Ani (Univ. of Pennsylvania)

17:30-17:45 MoCT16.5

An Aerodynamic Model-Aided State Estimator for Multi-Rotor UAVs.

wang, Rongzhi (Shang Hai Jiao Tong Univ), Zou, Danping (Shanghai Jiao Ton Univ), xu, changqing (Shang Hai Jiao Tong Univ), Pei, Ling (Shanghai Jiao Tong Univ), Liu, Peilin (Shanghai Jiao Tong Univ), Yu, Wenxian (Shanghai Jiao Tong Univ)

17:45-18:00 MoCT16.6

Robot Navigation Using Convex Model Predictive Control and Approximate Operating Region Optimization.

Bali, Csaba (Univ. of Bristol), Richards, Arthur (Univ. of Bristol)

MoCT17 Room 221

Force Control

Co-Chair: Ryu, Jee-Hwan — Korea Univ. of Tech. and Education

16:30-16:45 MoCT17.1

New Passivity Observers for Improved Robot Force Control.

Jorda, Mikael (Stanford Univ), Balachandran, Ribin (DLR), Ryu, Jee-Hwan (Korea Univ. of Tech. and Education), Khatib, Oussama (Stanford Univ)

16:45-17:00 MoCT17.2

Momentum Control of Humanoid Robots with Series Elastic Actuators.

Nava, Gabriele (Istituto Italiano Di Tecnologia), Pucci, Daniele (Italian Inst. of Tech), Nori, Francesco (Istituto Italiano Di Tecnologia)

17:00-17:15 MoCT17.3

Enhancing the Performance of Adaptive Iterative Learning Control with Reinforcement Learning.

Nemec, Bojan (Jozef Stefan Inst), Simonič, Mihael (Univ. of Tübingen), Likar, Nejc (Jozef Stefan Inst), Ude, Ales (Jozef Stefan Inst)

17:15-17:30 MoCT17.4

Robot Self-Protection by Virtual Actuator Fatigue: Application to Tendon-Driven Dexterous Hands During Grasping.

Walck, Guillaume (Bielefeld Univ), Haschke, Robert (Bielefeld Univ), Meier, Martin (Bielefeld Univ), Ritter, Helge Joachim (Bielefeld Univ)

17:30-17:45 MoCT17.5

A Robust Force Controller Design for Series Elastic Actuators.

SARIYILDIZ, Emre (Univ. of Wollongong), Yu, Haoyong (National Univ. of Singapore)

17:45-18:00 MoCT17.6

BLDC Motor Current Control Using Filtered Single DC Link Current Based on Adaptive Extended Kalman Filter.

Oh, Jaesung (KAIST), Bae, Hyoln (KAIST, HuboLab), Jeong, Hyobin (KAIST), Lee, Kang Kyu (KAIST Hubolab), Oh, Jun Ho (Korea Advanced Inst. of Sci. and Tech)

MoCT18	Room 223
Calibration II	
Chair: Behnke, Sven	Univ. of Bonn
Co-Chair: Ajoudani, Arash	Advanced Robotics Department

16:30-16:45 MoCT18.1

A Low-Cost System for High-Rate, High-Accuracy Temporal Calibration for LIDARs and Cameras.

Sommer, Hannes (ETH Zürich), Khanna, Raghav (ETH Zurich), Gilitschenski, Igor (ETH Zurich), Taylor, Zachary Jeremy (ETH Zürich), Siegwart, Roland (ETH Zurich), Nieto, Juan (ETH Zürich)

16:45-17:00 MoCT18.2

Online Depth Calibration for RGB-D Cameras Using Visual SLAM.

Quenzel, Jan (Univ. of Bonn), Rosu, Radu Alexandru (Univ. of Bonn), Houben, Sebastian (Univ. of Bonn), Behnke, Sven (Univ. of Bonn)

17:00-17:15 MoCT18.3

Automatic Extrinsic Calibration of Depth Sensors with Ambiguous Environments and Restricted Motion.

Holtz, Jarrett (Univ. of Massachusetts, Amherst), Biswas, Joydeep (Univ. of Massachusetts Amherst)

17:15-17:30 MoCT18.4

Simultaneous Self-Calibration of Nonorthogonality and Nonlinearity of Cost-Effective Multi-Axis Inertially Stabilized Gimbal Systems.

Zhang, Fu (Hong Kong Univ. of Science and Tech)

17:30-17:45 MoCT18.5

Generalized Hebbian Algorithm for Wearable Sensor Rotation Estimation.

Joukov, Vladimir (Univ. of Waterloo), Lin, Jonathan (Univ. of Waterloo), Kulic, Dana (Univ. of Waterloo)

17:45-18:00 MoCT18.6

Online Model Based Estimation of Complete Joint Stiffness of Human Arm.

Fang, Cheng (Fondazione Istituto Italiano Di Tecnologia), Ajoudani, Arash (Advanced Robotics Department), Bicchi, Antonio (Istituto Italiano Di Tecnologia), Tsagarakis, Nikos (Istituto Italiano Di Tecnologia)

MoAmPo Ballroom Foyer

Monday Posters AM

Chair: Lim, Angelica — SoftBank Robotics Europe

10:00-10:30 — MoAmPo.1

Haptic-Laparo Surgical Training System.

Nillahoot, Nantida (Mahidol Univ), Suthakorn, Jackrit (Mahidol Univ)

10:00-10:30 — MoAmPo.2

Motion Segmentation Based on On-Line Non-Parametric Learning Using RGB-D Data.

Sun, Yuxiang (The Chinese Univ. of Hong Kong), Meng, Max Q.-H. (The Chinese Univ. of Hong Kong)

10:00-10:30 — MoAmPo.3

Single Actuator Steerable Hexapod Robot with One-Way Bearing Transmission.

Jaeyoung, Jung (Yeungnam Univ), Junyeong, Jo (Yeungnam Univ), Kangmok, Lee (Yeungnam Univ), Suwon, Lee (Yeungnam Univ), Hongmin, Lee (Yeungnam Univ), Wonseok, Choi (Yeungnam Univ), Seo, TaeWon (Yeungnam Univ)

10:00-10:30 — MoAmPo.4

Internal Transition of a Wall-Climbing Robot Using Detachable Connection.

Changmin, Park (Yeungnam Univ), Si Jun, Ryu (Yeungnam Univ), Liu, Yanheng (YeungNam Univ), Hyeyun, Jeong (Yeungnam Univ), Seolgi, Song (Yeungnam Univ), Sangdo, Woo (Yeungnam Univ), Seo, TaeWon (Yeungnam Univ)

10:00-10:30 — MoAmPo.5

Sparse Tracking and Dense Mapping in a Cloud Framework.

Zheng, Yali (Univ. of Electronic Science and Tech. of China), Chen, Shinan (UESTC), Cheng, Hong (Univ. of Electronic Science and Tech), Wang, Yang (UESTC)

10:00-10:30 — MoAmPo.6

An Orientation-Independent, Soft Branch Climbing Robot Based Off Manduca Sexta.

Rozen-Levy, Shane (Tufts Univ), Trimmer, Barry (Tufts Univ)

10:00-10:30 — MoAmPo.7

Active Position-Pose Estimation of Nuts Using a Monocular Eye-In-Hand System.

Feng, Junbing (Shandong Univ), Ma, Xin (Shandong Univ), Tan, Jindong (Univ. of Tennessee, Knoxville), Tian, Guohui (Shandong Univ), Gu, Jason (Dalhousie Univ), Li, Yibin (Shandong Univ)

10:00-10:30 — MoAmPo.8

Design of a Smart Passive Compliance Device with a Displacement Measurement Function for Robotic Assembly.

Kim, Hwi-su (Korea Inst. of Machinery & Materials), Park, Dongil (Korea Inst. of Machinery and Materials (KIMM)), Park, Chanhun (KIMM)

10:00-10:30 — MoAmPo.9

A Robot Motion Planning Algorithm in the Human Robot Coexisting Environment.

Chi, Wenzheng (The Chinese Univ. of Hong Kong), Meng, Max Q.-H. (The

Chinese Univ. of Hong Kong)

10:00-10:30 MoAmPo.10

Fast Motion on Cartesian Paths by Exploiting Robot Redundancy at the Acceleration Level.

Al Khudir, Khaled (Sapienza Univ. of Rome), Gaz, Claudio Roberto (Sapienza Univ. of Rome), De Luca, Alessandro (Sapienza Univ. of Rome)

10:00-10:30 MoAmPo.11

Intuitive and Safe Teaching Device for Efficient Human-Robot Collaboration.

Do, Hyun Min (Korea Inst. of Machinery and Materials), Kim, Hwi-su (Korea Inst. of Machinery & Materials), Park, Dongil (Korea Inst. of Machinery and Materials (KIMM)), Choi, Taeyong (KIMM), Park, Chanhun (KIMM)

10:00-10:30 MoAmPo.12

A Methodology for Enabling Autonomy in Small-Scale Underwater Vehicles.

Tan, Yu Herng (National Univ. of Singapore), LIU, XIAODONG (Univ. of Singapore), Chen, Ben M. (National Univ. of Singapore)

10:00-10:30 MoAmPo.13

Experimental Evaluation of Aerial Attitude Control Unit with Reaction Wheels for Hopping Robots.

Nomura, Yurika (Tokyo Denki Univ), Ishikawa, Jun (Tokyo Denki Univ)

10:00-10:30 MoAmPo.14

TaskForce: A Framework for Task Design and Execution.

Strawser, Philip (NASA), Farrell, Logan (NASA: Johnson Space Center), Hambuchen, Kimberly (NASA Johnson Space Center), Goza, S. Michael (Nasa - Jsc), Azimi, Shaun (NASA), Badger, Julia (NASA Johnson Space Center)

10:00-10:30 MoAmPo.15

Autonomous Photometric 3D Surface Construction by Potential Field Motion Planning.

Um, Dugan (Texas A&M Univ. - CC), Grant, Darion (Univ. of East London), Shin, Jeongsik (The Univ. of Texas at Arlington), Lee, W.-H. (Corusen)

10:00-10:30 MoAmPo.16

CT Image-Based Urinary System Virtual Endoscopy.

Dai, Yu (Nankai Univ), Zhang, Jianxun (Nankai Univ)

10:00-10:30 MoAmPo.17

Subspace Projection-Based Collision Detection for Collaborative Robots While Conducting Interaction Tasks.

Ahn, Kuk Hyun (Korea Univ), Lee, Sang-Duck (Korea Univ), Song, Jae-Bok (Korea Univ)

10:00-10:30 MoAmPo.18

Surface Component Ratio Histogram for RGB-D SLAM in Indoor Environments with Low-Textured Scenes.

Chae, Hee-Won (Korea Univ), Yu, Hyejun (Korea Univ. Intelligent Robotics Lab), Song, Jae-Bok (Korea Univ)

10:00-10:30 MoAmPo.19

Roll It Up! a New Design Process for Miniaturized Force/Torque Sensors.

Hessinger, Markus (Tech. Univ. Darmstadt), Matich, Sebastian (Tech. Univ. Darmstadt), Werthschützky, Roland (Univ. of Tech. Darmstadt), Kupnik, Mario (Tech. Univ. Darmstadt), Hatzfeld, Christian (Tech. Univ. Darmstadt,

Germany)

10:00-10:30 MoAmPo.20

Keypoint Matching with 3D3P Histogram Voting for Outlier Removal.

ZHENG, Fan (The Chinese Univ. of Hong Kong), Liu, Yunhui (Chinese Univ. of Hong Kong)

10:00-10:30 MoAmPo.21

A Use Case of Telepresence Robots for Science Communication.

Makita, Satoshi (National Inst. of Tech. Sasebo Coll), Maeda, Takanobu (National Inst. of Tech. Sasebo Coll)

10:00-10:30 MoAmPo.22

BRECCIA: Unified Probabilistic Dynamic Geospatial Intelligence.

Sacharny, David (Univ. of Utah), Henderson, Thomas C. (Univ. of Utah), Simmons, Robert (Univ. of Utah), Mitiche, Amar (Inst. National De La Recherche Scientifique (INRS)), Fan, Xiuyi (Nanyang Tech. Univ), Welker, Taylor (Univ. of Utah)

10:00-10:30 MoAmPo.23

Model-Free Policy Gradients for Multi-Agent Shape Formation.

Boroson, Elizabeth (Univ. of Southern California), Sha, Fei (Univ. of Southern California), Ayanian, Nora (Univ. of Southern California)

10:00-10:30 MoAmPo.24

A Collaborative Visual Assistant for Robot Operations in Unstructured or Confined Environments.

Xiao, Xuesu (Texas A&M Univ), Murphy, Robin (Texas A&M)

10:00-10:30 MoAmPo.25

Robotic Interventions in CERN Accelerators Harsh Environments.

DI CASTRO, Mario (CERN, European Organization for Nuclear Res), Masi, Alessandro (CERN (European Organization for Nuclear Res), Gilardoni, Simone (CERN (European Organization for Nuclear Res)

10:00-10:30 MoAmPo.26

Visual Shape Servoing of Deformable Objects: The Fundamentals.

Navarro-Alarcon, David (The Hong Kong Pol. Univ)

10:00-10:30 MoAmPo.27

Comparison of Mixed Linear Complementarity Problem Solvers in Multibody Simulations with Contact.

Enzenhofer, Andreas (McGill Univ), Andrews, Sheldon (McGill Univ), Teichmann, Marek (CMLabs Simulations Inc), Kovecses, Jozsef (McGill Univ)

10:00-10:30 MoAmPo.28

Kinematics Features for 3D Action Recognition Using CNN.

Wang, Jiangliu (The Chinese Univ. of Hong Kong), Liu, Yunhui (Chinese Univ. of Hong Kong)

10:00-10:30 MoAmPo.29

Change Detection in 3D Models Based on Camera Images.

Palazzolo, Emanuele (Univ. of Bonn), Stachniss, Cyrill (Univ. of Bonn)

10:00-10:30 MoAmPo.30

Networked Soft Actuators with Programmable Deformations.

Chen, Feifei (National Univ. of Singapore), Cao, Jiawei (NUS), Wang, Michael Yu (Hong Kong Univ. of Science & Tech), ZHU, Jian (National Univ. of

Singapore), Zhang, Yunfeng (National Univ. of Singapore)

10:00-10:30 MoAmPo.31

Bidding for Attention: The Role of Mutual Gaze in Human-Humanoid Joint Attention.

Kompatsiari, Kyveli (Istituto Italiano Di Tecnologia), Tikhanoff, Vadim (Italian Inst. of Tech), Ciardo, Francesca (Istituto Italiano Di Tecnologia), Metta, Giorgio (Istituto Italiano Di Tecnologia (IIT)), Wykowska, Agnieszka (Ludwig-Maximilians-Univ. München and Tech. Univ)

10:00-10:30 MoAmPo.32

Dynamic Localization of Ambiguous Sounds by Drones.

Basiri, Meysam (IST-ID, Inst. Superior Tecnico), Floreano, Dario (Ec. Pol. Federal, Lausanne), Lima, Pedro U. (Inst. Superior Técnico - Inst. for Systems and Robotics)

10:00-10:30 MoAmPo.33

Exploring DeepQ Learning for Micro UAV Tree Avoidance.

Schmittle, Matt (Univ. of Delaware), Rasmussen, Christopher (Univ. of Delaware)

10:00-10:30 MoAmPo.34

Reducing the Risk of Slip While Transporting an Object in a Micro-Gravity Environment.

Carabis, David (1991), Wen, John (Rensselaer Pol. Inst)

10:00-10:30 MoAmPo.35

Discretized Caging Set of Three Dimensional Arbitrary Rigid Bodies and Multifingered Hands.

Makita, Satoshi (National Inst. of Tech. Sasebo Coll), Otsubo, Takuya (National Inst. of Tech. Sasebo Coll)

10:00-10:30 MoAmPo.36

Reinforcement Learning with Functional Module Network for Human Robot Interaction.

Ren, Haibing (Intel Labs China), Chen, Hu (Intel Labs China), Liu, Zhongxuan (Intel Labs China), Zhang, Yimin (Intel Corp)

10:00-10:30 MoAmPo.37

Design of a Large-Scale Soft Tactile Skin Using CNT-Coated Porous PDMS with a Trench Structure.

park, kyungseo (KAIST), Lee, Hyosang (KAIST), Kim, Jung (KAIST)

10:00-10:30 MoAmPo.38

Multi-Directional Controlled Actuator for Industrial and Bio-Medical Applications.

Gul, Jahan Zeb (Jeju National Univ), Choi, Kyung (Jeju National Univ)

10:00-10:30 MoAmPo.39

Development of the Inspection Robots for Power Transmission Lines from CASIA.

Yang, Guodong (Inst. of Automation, Chinese Acad. of Sciences), Chang, Wenkai (Inst. of Automation Chinese Acad. of Sciences), li, en (Inst. of Automation, Chinese Acad. of Sciences), liang, zize (Inst. of Automation, Chinese Acad. of Sciences)

10:00-10:30 MoAmPo.40

Development of Autonomous Palm-Sized Drone System for Chemical Leakage Source Search.

Shigaki, Shunsuke (Tokyo Inst. of Tech), Fikri, Muhamad Rausyan (Tokyo Inst. of Tech), Kurabayashi, Daisuke (Tokyo Inst. of Tech)

10:00-10:30 MoAmPo.41

Friendly Robotic Arms Which Controlled by Electroencephalography.

Wei, Yifan (Farragut High School), Jing, Yuchen (Farragut High School), Tan, Jindong (Univ. of Tennessee, Knoxville)

10:00-10:30 MoAmPo.42

Large Scale Deep Learning Based Camera Re-Localization Guided by Human's Map.

Liu, Zhongxuan (Intel Labs China)

10:00-10:30 MoAmPo.43

A Ring-Type Tactile Display with a Compact Pneumatic Drive Unit for a Laparoscopic Palpation System.

Fukuda, Tomohiro (Nagoya Inst. of Tech), Tanaka, Yoshihiro (Nagoya Inst. of Tech), Fujiwara, Michitaka (Nagoya Univ. Graduate School of Medicine), Sano, Akihito (Nagoya Inst. of Tech)

10:00-10:30 MoAmPo.44

Development of a Robot System Operated by Task-Level Commands for Power Distribution Line Maintenance.

Tatsuno, Kyoichi (Meijo Univ)

10:00-10:30 MoAmPo.45

Studying Effect of Expressive Light Animation on Human Perception and Behavior of Human-Machine Interaction.

Song, Sichao (The Graduate Univ. for Advanced Studies (SOKENDAI)), Yamada, Seiji (National Inst. of Informatics)

10:00-10:30 MoAmPo.46

Mechanism of a Wheel-Chair Type Mobility Robot Adapted to Escalators and Low-Floor Buses.

Takahata, Tomoyuki (The Univ. of Tokyo), Shimoyama, Isao (Univ. of Tokyo)

MoPmPo	Ballroom Foyer
Monday Posters PM	
Chair: Lim, Angelica	SoftBank Robotics Europe

16:00-16:30 MoPmPo.1

Robot Programming Using Tactile Gestures - a Preliminary Performance Comparison with MCP Programming.

Muxfeldt, Arne (Tech. Univ. Braunschweig), Kubus, Daniel (Tech. Univ. Braunschweig), Kissener, Konrad (Tech. Univ. Braunschweig), Steil, Jochen J. (Tech. Univ. Braunschweig)

16:00-16:30 MoPmPo.2

Extended Abstract: Visual Relocalization under Substantial Appearance Changes Using Hashing.

Vysotska, Olga (Univ. of Bonn), Stachniss, Cyrill (Univ. of Bonn)

16:00-16:30 MoPmPo.3

Multi-Modal Adaptive Person Identification.

Zhang, Pei (Intel), Duan, Fei (Intel), Sun, Hongmei (Intel), Zhang, Yimin (Intel Corp)

16:00-16:30 MoPmPo.4

Indoor Quadrotor Teleoperation: On-Board State-Estimation and Obstacle Avoidance.

Odelga, Marcin (Max Planck Inst. for Biological Cybernetics; Univ. of T), Stegagno, Paolo (Univ. of Rhode Island), Kochanek, Nicholas (Harvard Univ), Buelthoff, Heinrich H. (Max Planck Inst. for Biol. Cybernetics)

16:00-16:30 MoPmPo.5

Design and Control of a Squatting Assistance Knee Exoskeleton with Foot Pressure Sensors and Polycentric Joint.

Chen, Sung-Hua (Taiwan Univ), Chang, Jie-Min (National Chung-Shan Inst. of Science and Tech. Taiwan), Chang, Hsiao-Chung (National Chung-Shan Inst. of Science and Tech. Taiwan), Wang, Ting-Kuo (National Chung-Shan Inst. of Science and Tech. Taiwan)

16:00-16:30 MoPmPo.6

Wheeled Hopping Robot with Combustion Powered Actuator.

Mo, Jixue (Shenzhen Graduate School, Harbin Inst. of Tech), Miao, Zhihuai (Shenzhen Graduate School, Harbin Inst. of Tech), Li, Bing (Shenzhen Graduate School, Harbin Inst. of Tech), HU, Ying (Shenzhen Inst. of Advanced Tech. ShenZhen, China)

16:00-16:30 MoPmPo.7

Real-Time Video Stabilization for UAVs Based Only on IMU Data.

Odelga, Marcin (Max Planck Inst. for Biological Cybernetics; Univ. of T), Kochanek, Nicholas (Harvard Univ), Buelthoff, Heinrich H. (Max Planck Inst. for Biol. Cybernetics)

16:00-16:30 MoPmPo.8

Observations of Feedback-Based Minimum Jerk Trajectories in Swing Gait Control.

Quinn, Nathan (Univ. of New Brunswick), Carretero, Juan A. (Univ. of New Brunswick), Sensinger, Jonathon (Univ. of New Brunswick)

16:00-16:30 MoPmPo.9

Design of a Multifingered Robotic Hand with a Large Thenar Link for a Special Power Grip.

Yoneda, Tomoo (Ritsumeikan Univ), Morihiro, Daiki (Ritsumeikan Univ), Ozawa, Ryuta (Ritsumeikan Univ)

16:00-16:30 MoPmPo.10

After You: Social Door Negotiation for Human-Human, Human-Robot and Robot-Robot Interaction.

Thomas, Jack (Simon Fraser Univ), Vaughan, Richard (Simon Fraser Univ)

16:00-16:30 MoPmPo.11

Collaborative Manipulation with Multiple Dual-Arm Robots under Human Guidance.

Peng, Yuan-Chih (Rensselaer Pol. Inst), Carabis, David (1991), Wen, John (Rensselaer Pol. Inst)

16:00-16:30 MoPmPo.12

Active Hearing and Automatic Speech Recognition for the MiRo Robot.

Mokaram, Saeid (The Univ. of Sheffield), Fernando, Samuel (The Univ. of Sheffield), Kerdegari, Hamideh (The Univ. of Sheffield), Barker, Jon (Univ. of Sheffield), Christensen, Heidi (Univ. of Sheffield), Prescott, Tony J (Univ. of Sheffield)

16:00-16:30 MoPmPo.13

Laser Micro-Machining As a Fabrication Method for Micro-Robots.

Ferguson, Alan (Oxford Lasers Ltd), Teitelman, Ted (Oxford Lasers, Inc), Coscia, Brian (Oxford Lasers Inc), Knowles, Martyn Richard Huw (Oxford Lasers Ltd)

16:00-16:30 MoPmPo.14

Flying Face Engagement: Aligning a UAV to Directly Face a Moving Uninstrumented User.

Nagy, Geoff (Simon Fraser Univ), Vaughan, Richard (Simon Fraser Univ)

16:00-16:30 MoPmPo.15

Information Model of Task Difficulty towards Intuitive Unstructured Human-In-Loop Robot Control.

Wang, Ziheng (The Univ. of Texas at Dallas), Majewicz, Ann (Univ. of Texas at Dallas)

16:00-16:30 MoPmPo.16

Online Detection of Needle Buckling During Robotic Needle Steering.

Narayan, Meenakshi (The Univ. of Texas at Dallas), Majewicz, Ann (Univ. of Texas at Dallas)

16:00-16:30 MoPmPo.17

A Robotic Framework to Overcome Sensory Overload in Children on the Autism Spectrum: A Pilot Study.

Javed, Hifza (George Washington Univ), Bevill, Rachael (The George Washington Univ), Jeon, Myounghoon (Michigan Tech. Univ), Howard, Ayanna (Georgia Inst. of Tech), Park, Chung Hyuk (George Washington Univ)

16:00-16:30 MoPmPo.18

Direct Sparse Depth Based Object Classification Method for Loop Closure Detection and Localization.

Yang, Eun-Sung (Chungbuk National Univ), Kim, Gon-Woo (Chungbuk National Univ)

16:00-16:30 MoPmPo.19

A Reduced Model for Dynamic Multi-Contact Locomotion of Humanoid Robots.

Seiwald, Philipp (Tech. Univ. of Munich), Hildebrandt, Arne-Christoph (Tech. Univ. München), Sygulla, Felix (Tech. Univ. of Munich), Rixen, Daniel (Tech. Univ. München)

16:00-16:30 MoPmPo.20

Learning Oriented 3D Object Proposals in RGBD Scenes.

Gao, Ge (Univ. of Hamburg), Lauri, Mikko (Univ. of Hamburg), Görner, Michael (Univ. of Hamburg), Zhang, Jianwei (Univ. of Hamburg), Frintrop, Simone (Univ. of Hamburg)

16:00-16:30 MoPmPo.21

A Reconfigurable Robot with Adaptive Shape Based on Tetrahedral Cells.

Pieber, Michael (Univ. Innsbruck), Gerstmayr, Johannes (Univ. Innsbruck, Inst. of Mechatronics)

16:00-16:30 MoPmPo.22

MURAB: A New Robotic System for High Precision Biopsy.

Maris, Bogdan Mihai (Univ. of Verona), Siepel, Françoise J (Univ. of Twente), Dall'Alba, Diego (Univ. of Verona), Groenhuis, Vincent (Univ. of Twente), Fiorini, Paolo (Univ. of Verona), Stramigioli, Stefano (Univ. of Twente)

16:00-16:30 MoPmPo.23

A Cable Driven Mechanism for a Continuously Tunable Stiffness Arm towards Safe Human-Robot Interactions.

She, Yu (The Ohio State Univ), Gu, Zhaoyuan (Tsinghua Univ), Su, Hai-Jun (The Ohio State Univ)

16:00-16:30 MoPmPo.24

Combining Gaussian Processes and Model Identification for Fast Robot Learning.

Chatzilygeroudis, Konstantinos (Inria Nancy Grand-Est), Mouret, Jean-Baptiste (Inria)

16:00-16:30 MoPmPo.25

Encroachment Detection with Monocular Vision for Small, Low-Cost, Compute-Constrained Platforms.

Johnson, Jeffrey (Indiana Univ)

16:00-16:30 MoPmPo.26

Wheel-Rail Adherence Evaluation Using Multispectral Approach.

NICODEME, Claire (Mines ParisTech), Stanciulescu, Bogdan (Mines - ParisTech)

16:00-16:30 MoPmPo.27

The Energetic Effect of a Flexible Spine in Quadrupedal Robots.

Yesilevskiy, Yevgeniy (Univ. of Michigan, RAMLab), Remy, C. David (Univ. of Michigan)

16:00-16:30 MoPmPo.28

A Novel Design of a Multi-Section Continuum Surgical Robot with Ability of Varying Section Sizes.

Singh, Akash (Visvesvaraya National Inst. of Tech), Sachdeva, Enna (IIIT Hyderabad)

16:00-16:30 MoPmPo.29

Dense Scene Depth Estimation Using an IMU Aided Monocular Camera.

Li, Yan (Univ. of Tennessee, Knoxville), He, Hongsheng (Univ. of Tennessee), Tan, Jindong (Univ. of Tennessee, Knoxville)

16:00-16:30 MoPmPo.30

A Bio-Inspired Celestial Compass for a Hexapod Walking Robot in Outdoor Environment.

Dupeyroux, Julien (Aix-Marseille Univ), Diperi, Julien (Aix-Marseille Univ. Biorobotic Dept. CNRS, ISM UMR 7287), Boyron, Marc (Aix-Marseille Univ. Biorobotic Dept. CNRS, ISM UMR 7287), Viollet, Stephane (Aix-Marseille Univ), serres, Julien (CNRS/ Univ. De La Mediterranée)

16:00-16:30 MoPmPo.31

Multi-Level Feature Extraction for 3D Lidar Based Graph-SLAM.

Kim, Do-Hyeong (Chungbuk National Univ), Kim, Gon-Woo (Chungbuk National Univ)

16:00-16:30 MoPmPo.32

Dual-Expanded Guide Circle Method for Passing through the Narrow Passage.

Yoo, Joong-Sun (Chungbuk National Univ), Kim, Gon-Woo (Chungbuk National Univ)

16:00-16:30 MoPmPo.33

Learning Tasks with Primitives Learning and Human Hand Tracking.

Feng, Rong (Univ. of Alberta), Perez Quintero, Camilo Alfonso (Univ. of Alberta), Valipour, Sepehr (Univ. of Alberta), Zhang, Hong (Univ. of Alberta), Jagersand, Martin (Univ. of Alberta)

16:00-16:30 MoPmPo.34

Analysis of Human Behavior for the Peg-In-Hole Assembly Extraction of Conscious and Unconscious Behaviors.

Hyung, Hyun-Jun (Korea Univ. of Science & Tech), Hogil, Lee (Korea Inst. of Industrial Tech), Dongwook, Lee (Korea Inst. of Industrial Tech)

16:00-16:30 MoPmPo.35

Disturbance Compensation Algorithm of a Dual-Arm Underwater Vehicle-Manipulator System with Redundant Mechanism Theory.

Bae, Jangho (The School of Mechanical and Aerospace Engineering, Seoul Nation), BAK, Jeongae (Seoul National Univ), Jin, Sangrok (Seoul National Univ), Kim, Jongwon (Seoul National Univ), Seo, TaeWon (Yeungnam Univ)

16:00-16:30 MoPmPo.36

Continuous Wrist Joint Control Using Muscle Deformation Measured on Forearm Skin.

Kato, Akira (Waseda Univ), Hirabayashi, Masato (Waseda Univ), Matsumoto, Yuya (Waseda Univ), Kobayashi, Yo (Osaka Univ), Fujie, Masakatsu G. (Waseda Univ), Sugano, Shigeki (Waseda Univ)

16:00-16:30 MoPmPo.37

Multi-Legged Robot with Suckers to Climb a Wall -Autonomous Control Using Passivity.

Saito, Asuki (Hosei Univ), Nagayama, Kazuki (Hosei Univ), ito, kazuyuki (Hosei Univ), Oomichi, Takeo (Meijo Univ), Ashizawa, Reiji (Meijo Univ), Matsuno, Fumitoshi (Kyoto Univ)

16:00-16:30 MoPmPo.38

Motion Path Planning for Ground Mobile Robot by Using Improved RRT Algorithm*.

Xu, Xiangrong (Anhui Univ. of Tech)

16:00-16:30 MoPmPo.39

Extracting Invariant Movement Signatures of a Robot-Link from IMU Sensor Cluster.

Krishnan, Rakesh (KTH (Royal Inst. of Tech), Cruciani, Silvia (KTH Royal Inst. of Tech), Björsell, Niclas (Univ. of Gävle), M. Gutierrez-Farewik, Elena (KTH Royal Inst. of Tech), Smith, Claes Christian (KTH Royal Inst. of Tech)

16:00-16:30 MoPmPo.40

Improved Discrete RRT for Coordinated Multi-Robot Planning.

Hvězda, Jakub (Czech Tech. Univ. in Prague), Kulich, Miroslav (Czech Tech. Univ. in Prague), Preucil, Libor (Czech Tech. Univ. in Prague)

16:00-16:30 MoPmPo.41

Human-Powered Stair Travelling Mobility Vehicle with Posture Transition Mechanism.

Sasaki, Kai (Univ. of Tsukuba), Suzuki, Kenji (Univ. of Tsukuba)

16:00-16:30 MoPmPo.42

Deep Concrete Inspection Using Unmanned Aerial Vehicle towards CSSC Database.

Yang, Liang (City Coll. of New York, CUNY), Li, Bing (The City Coll. the City Univ. of New York), Li, Wei (CUNY City Coll), Liu, Zhaoming (Shenyang Inst. of Automation, Chinese Acad. of Sciences), Yang, Guoyong (Chineses Acad. of Sciences), Xiao, Jizhong (The City Coll. of New York)

16:00-16:30 MoPmPo.43

Proposal of New Navigation Method Using Personal Mobility and Development of Optimal Personal Mobility.

Yamanaka, Kai (Shibaura Inst. of Tech), Sasaki, Takeshi (Shibaura Inst. of Tech), ISHII, Shinji (CHUO Univ), Hashimoto, Hideki (Chuo Univ)

16:00-16:30 MoPmPo.44

DehazeGAN: Simultaneous Hazing and Dehazing Networks Using Unpaired Image-To-Image Translation.

Cho, Younggun (Korea Advanced Inst. of Science and Tech), Malav, Ramavtar (IIT), Pandey, Gaurav (IIT - Kanpur), Kim, Ayoung (Korea Advanced Inst. of Science Tech)

16:00-16:30 MoPmPo.45

An Approach to Lower Limb Exoskeleton Control.

Yatsun, Sergey (Kursk State Tech. Univ.), Savin, Sergei (Southwest State Univ.), Yatsun, Andrey (Kursk state Tech. Univ.)

16:00-16:30 MoPmPo.46

On the Solvability of Dynamic Formulations for Multibody Systems with Contacts and Coulomb Friction.

Peiret, Albert (McGill Univ), Kovecses, Jozsef (McGill Univ), Font-Llagunes, Josep Maria (Univ. Pol. De Catalunya)

16:00-16:30 MoPmPo.47

Modelling Collectives Using RoboChart.

Miyazawa, Alvaro (Univ. of York), Cavalcanti, Ana (Univ. of York), Sampaio, Augusto (Univ. Federal De Pernambuco), Li, Wei (Univ. of York), Ribeiro, Pedro (Univ. of York), Timmis, Jon (Univ. of York)

Technical Sessions
Tuesday September 26, 2017

TuAT1	Room 109
Deep Learning in Robotics and Automation IV	
Chair: Englot, Brendan	Stevens Inst. of Tech
Co-Chair: Chen, Zetao	ETH Zurich
10:30-10:45	TuAT1.1
Deep Predictive Policy Training Using Reinforcement Learning.	
Ghadirzadeh, Ali (KTH Royal Inst. of Tech), Maki, Atsuto (KTH Royal Inst. of Tech), Kragic, Danica (KTH), Björkman, Mårten (KTH)	
10:45-11:00	TuAT1.2
Transform Invariant Auto-Encoder.	
Matsuo, Tadashi (Ritsumeikan Univ), Fukuhara, Hiroya (Ritsumeikan Univ), SHIMADA, NOBUTAKA (Ritsumeikan Univ)	
11:00-11:15	TuAT1.3
Sensor Fusion for Robot Control through Deep Reinforcement Learning.	
Bohez, Steven (Ghent Univ. - Imec), Verbelen, Tim (Ghent Univ. - Imec), De Coninck, Elias (Ghent Univ. - Imec), Vankeirsbilck, Bert (Ghent Univ. - Imec), Simoens, Pieter (Ghent Univ. - Imec), Dhoedt, Bart (Ghent Univ. - Imec)	
11:15-11:30	TuAT1.4
Deep Reinforcement Learning with Successor Features for Navigation across Similar Environments.	
Zhang, Jingwei (Albert Ludwigs Univ. of Freiburg), Springenberg, Jost Tobias (Albert-Ludwigs Univ. Freiburg), Boedecker, Joschka (Univ. of Freiburg), Burgard, Wolfram (Univ. of Freiburg)	
11:30-11:45	TuAT1.5
Toward Autonomous Mapping and Exploration for Mobile Robots through Deep Supervised Learning.	
Bai, Shi (Stevens Inst. of Tech), Chen, Fanfei (Stevens Inst. of Tech), Englot, Brendan (Stevens Inst. of Tech)	
11:45-12:00	TuAT1.6
Exercise Motion Classification from Large-Scale Wearable Sensor Data Using Convolutional Neural Networks.	
Um, Terry Taewoong (Univ. of Waterloo), Babakeshizadeh, Vahid (Chief Algorithms Officer, PUSH Design Solutions Inc), Kulic, Dana (Univ. of Waterloo)	

TuAT2	Room 111
Biologically-Inspired Robots II	
Chair: Shen, Yantao	Univ. of Nevada, Reno
Co-Chair: Choi, Hyouk Ryeol	Sungkyunkwan Univ

10:30-10:45 TuAT2.1

The Deformable Quad-Rotor: Design, Kinematics and Dynamics Characterization, and Flight Performance Validation.

Zhao, Na (Univ. of Nevada, Reno), Luo, Yudong (Univ. of Nevada, Reno), deng, hongbin (Beijing Inst. of Tech), Shen, Yantao (Univ. of Nevada, Reno)

10:45-11:00 TuAT2.2

Motion Evaluation of a Modified Multi-Link Robotic Rat.

Li, Chang (Beijing Inst. of Tech), Shi, Qing (Beijing Inst. of Tech), Li, Kang (Beijing Inst. of Tech), Zou, Mingjie (Beijing Inst. of Tech), ISHII, Hiroyuki (Waseda Univ), Takanishi, Atsuo (Waseda Univ), Huang, Qiang (Beijing Inst. of Tech), Fukuda, Toshio (Meijo Univ)

11:00-11:15 TuAT2.3

A Frog-Inspired Swimming Robot Based on Dielectric Elastomer Actuators.

Tang, Yucheng (Nanjing Univ. of Science & Tech. & National Univ), QIN, LEI (National Univ. of Singapore), Li, Xiaoning (Nanjing Univ. of Science and Tech), Chew, Chee Meng (National Univ. of Singapore), ZHU, Jian (National Univ. of Singapore)

11:15-11:30 TuAT2.4

Study on Quadruped Bounding with a Passive Compliant Spine.

Phan, Luong Tin (Sungkyunkwan Univ), Lee, Yoon Haeng (Sungkyunkwan Univ), Lee, Young Hun (Sungkyunkwan Univ), Lee, Hyunyong (Sungskyunkwan Univ), Kang, Hansol (Sungkyunkwan Univ), Choi, Hyouk Ryeol (Sungkyunkwan Univ)

11:30-11:45 TuAT2.5

CSMA/CA-Based Electrocommunication System Design for Underwater Robot Groups.

Zhang, Han (Peking Univ), Wang, Wei (Massachusetts Inst. of Tech), Zhou, Yang (Guangxi Univ. of Science and Tech), Wang, Chen (Peking Univ), Fan, Ruifeng (Peking Univ), Xie, Guangming (Peking Univ)

11:45-12:00 TuAT2.6

Design, Modeling and Experimental Validation of a Scissor Mechanisms Enabled Compliant Modular Earthworm-Like Robot.

Luo, Yudong (Univ. of Nevada, Reno), Zhao, Na (Univ. of Nevada, Reno), Wang, Hesheng (Shanghai Jiao Tong Univ), Kim, Kwang (Univ. of Nevada Reno), Shen, Yantao (Univ. of Nevada, Reno)

TuAT3 Room 116

Perception for Grasping and Manipulation I

Chair: Hlavac, Vaclav — Czech Tech. Univ. in Prague

Co-Chair: Pfanne, Martin — DLR German Aerospace Center

10:30-10:45 TuAT3.1

State Estimation for Deformable Objects by Point Registration and Dynamic Simulation.

Tang, Te (Univ. of California, Berkeley), Fan, Yongxiang (Univ. of California, Berkeley), Lin, Hsien-Chung (Univ. of California, Berkeley), Tomizuka, Masayoshi (Univ. of California)

10:45-11:00 TuAT3.2

Associating Grasp Configurations with Hierarchical Features in Convolutional Neural Networks.

Ku, Li Yang (Umass Amherst), Learned-Miller, Erik (Univ. of Massachusetts, Amherst), Grupen, Rod (Univ. of Massachusetts)

11:00-11:15 TuAT3.3

Shape Completion Enabled Robotic Grasping.

Varley, Jacob (Columbia Univ), DeChant, Chad (Columbia Univ), Richardson, Adam (Columbia Univ), Ruales, Joaquín (Columbia Univ), Allen, Peter (Columbia Univ)

11:15-11:30 TuAT3.4

Improved Object Pose Estimation Via Deep Pre-Touch Sensing.

Lancaster, Patrick (Univ. of Washington), Yang, Boling (Univ. of Washington), Smith, Joshua R. (Univ. of Washington)

11:30-11:45 TuAT3.5

Estimating Contact Forces from Postural Measures in a Class of Under-Actuated Robotic Hands.

Della Santina, Cosimo (Univ. of Pisa), Piazza, Cristina (Univ. Di Pisa), Santaera, Gaspare (Univ. of Pisa, Centro Di Ricerca "E. Piaggio"), Grioli, Giorgio (Istituto Italiano Di Tecnologia), Catalano, Manuel Giuseppe (Istituto Italiano Di Tecnologia), Bicchi, Antonio (Istituto Italiano Di Tecnologia)

11:45-12:00 TuAT3.6

EKF-Based In-Hand Object Localization from Joint Position and Torque Measurements.

Pfanne, Martin (DLR German Aerospace Center), Chalon, Maxime (German Aerospace Center (DLR))

TuAT4	Room 114
Localization I	
Co-Chair: Suh, Il Hong	Hanyang Univ

10:30-10:45 TuAT4.1

Unified Image Retrieval and Keypoint Matching by Local Geometric Consistency and Non-Linear Diffusion.

Lee, Sehyung (Hanyang Univ), Lim, Jongwoo (Hanyang Univ), Suh, Il Hong (Hanyang Univ)

10:45-11:00 TuAT4.2

Localization of RW-UAVs Using Particle Filtering Over Distributed Microphone Arrays.

Lauzon, Jean-Samuel (Univ. De Sherbrooke), Grondin, Francois (Univ. De Sherbrooke), Létourneau, Dominic (Univ. De Sherbrooke), Lussier Desbiens, Alexis (Univ. De Sherbrooke), Michaud, Francois (Univ. De Sherbrooke)

11:00-11:15 TuAT4.3

Unscented Kalman Filtering on Lie Groups.

Brossard, Martin (Mines ParisTech), Bonnabel, Silvere (Mines ParisTech), Condomines, Jean-Philippe (ENAC Univ)

11:15-11:30 TuAT4.4

Sampling-Based Methods for Visual Navigation in 3D Maps by Synthesizing Depth Images.

Neubert, Peer (Chemnitz Univ. of Tech), Schubert, Stefan (Chemnitz Univ. of Tech), Protzel, Peter (Chemnitz Univ. of Tech)

11:30-11:45 TuAT4.5

Iterative Weighted 2D Orientation Averaging That Minimizes Arc-Length between Vectors.

Kazakova, Vera (Univ. of Central Florida), Wu, Annie (Univ. of Central Florida)

11:45-12:00 TuAT4.6

A Framework for Enhanced Localization of Marine Mammals Using Auto-Detected Video and Wearable Sensor Data Fusion.

Gabaldon, Joaquin (Univ. of Michigan Ann Arbor), Zhang, Ding (Univ. of Michigan, Ann Arbor), Barton, Kira (Univ. of Michigan at Ann Arbor), Johnson-Roberson, Matthew (Univ. of Michigan), Shorter, Alex (Univ. of Michigan)

TuAT5	Room 118
Medical Robots and Systems II	
Chair: Desai, Jaydev P.	Georgia Inst. of Tech
Co-Chair: Hannaford, Blake	Univ. of Washington

10:30-10:45 TuAT5.1

A Skull-Mounted Robotic Headframe for a Neurosurgical Robot.

Sheng, Jun (Georgia Inst. of Tech), Desai, Jaydev P. (Georgia Inst. of Tech)

10:45-11:00 TuAT5.2

Preliminary Study on Magnetic Tracking Based Navigation for Wire-Driven Flexible Robot.

Zhang, Changchun (Harbin Inst. of Tech. (Shenzhen)), Lu, Yi (Harbin Inst. of Tech), Qiu, Xiaoxiao (Harbin Inst. of Tech. (Shenzhen)), Song, Shuang (Harbin Inst. of Tech. Shenzhen Graduate School), Liu, Li (School of Biomedical Engineering, Health Science Center, Shenzhe), Meng, Max Q.-H. (The Chinese Univ. of Hong Kong)

11:00-11:15 TuAT5.3

3D Printing of Improved Needle Grasping Instrument for Flexible Robotic Surgery.

Seneci, Carlo Alberto (Imperial Coll. London), Gras, Gauthier (Imperial Coll. London), Wisanuvej, Piyamate (Imperial Coll. London), Shang, Jianzhong (Imperial Coll. London), Yang, Guang-Zhong (Imperial Coll. London)

11:15-11:30 TuAT5.4

Force Sensing in Continuum Manipulators Using Fiber Bragg Grating Sensors.

Khan, Fouzia (Univ. of Twente), Roesthuis, Roy (Univ. of Twente), Misra, Sarthak (Univ. of Twente)

11:30-11:45 TuAT5.5

Continuum Robots for Multi-Scale Motion: Micro-Scale Motion through Equilibrium Modulation.

Del Giudice, Giuseppe (Vanderbilt Univ), Wang, Long (Vanderbilt Univ), Shen, Jin-Hui (Vanderbilt Univ), Joos, Karen (Vanderbilt Univ), Simaan, Nabil (Vanderbilt Univ)

11:45-12:00 TuAT5.6

Integrated Asymmetric Stop Operator Based Model for Strain Stress Hysteresis Characteristics of Cable Driven Robots Loaded Longitudinally.

Omar, Aljanaideh (Univ. of Washington), Miyasaka, Muneaki (Univ. of Washington), Hannaford, Blake (Univ. of Washington)

TuAT6	Room 121
Telerobotics and Teleoperation I	
Chair: Hauser, Kris	Duke Univ
Co-Chair: Bohren, Jonathan	Honeybee Robotics, Ltd

10:30-10:45 TuAT6.1

Teleoperating Robots from Arbitrary Viewpoints in Surgical Contexts.

Draelos, Mark (Duke Univ), Keller, Brenton (Duke Univ), Toth, Cynthia (Duke Univ), Kuo, Anthony (Duke Univ), Hauser, Kris (Duke Univ), Izatt, Joseph (Duke Univ)

10:45-11:00 TuAT6.2

Robot Team Teleoperation for Cooperative Manipulation Using Wearable Haptics.

Musić, Selma (Tech. Univ. München), Salvietti, Gionata (Univ. of Siena), Budde genannt Dohmann, Pablo (Tech. Univ. Munich), Chinello, Francesco (Aarhus Univ), Prattichizzo, Domenico (Univ. of Siena), Hirche, Sandra (Tech. Univ. München)

11:00-11:15 TuAT6.3

Tele-Impedance with Force Feedback under Communication Time Delay.

Laghi, Marco (Istituito Italiano Di Tecnologia / Univ. Di Pisa), Ajoudani, Arash (Advanced Robotics Department), Catalano, Manuel Giuseppe (Istituto Italiano Di Tecnologia), Bicchi, Antonio (Istituto Italiano Di Tecnologia)

11:15-11:30 TuAT6.4

Interactive Scene Segmentation for Efficient Human-In-The-Loop Robot Manipulation.

Butler, Daniel J. (Univ. of Washington, Seattle, WA, USA), Elliott, Sarah (Univ. of Washington), Cakmak, Maya (Univ. of Washington)

11:30-11:45 TuAT6.5

An Assisted Bilateral Control Strategy for 3D Pose Estimation of Visual Features.

Battilani, Nicola (Univ. of Modena and Reggio Emilia), Spica, Riccardo (Stanford Univ), Robuffo Giordano, Paolo (Centre National De La Recherche Scientifique (CNRS)), Secchi, Cristian (Univ. of Modena & Reggio Emilia)

11:45-12:00 TuAT6.6

A Preliminary Study of an Intent-Recognition-Based Traded Control Architecture for High Latency Telemanipulation.

Bohren, Jonathan (Honeybee Robotics, Ltd), Whitcomb, Louis (The Johns Hopkins Univ)

TuAT7	Room 122
Autonomous Vehicle Navigation II	
Chair: Manocha, Dinesh	Univ. of North Carolina at Chapel Hill
Co-Chair: Borges, Paulo Vinicius Koerich	CSIRO

10:30-10:45 TuAT7.1

Robust Attitude Estimation Method for Underwater Vehicles with External and Internal Magnetic Noise Rejection Using Adaptive Indirect Kalman Filter.

Widy, Andreas (HKUST), Woo, Kam Tim (The Hong Kong Univ. of Science and Tech)

10:45-11:00 TuAT7.2

Real-Time Autonomous Ground Vehicle Navigation in Heterogeneous Environments Using a 3D LiDAR.

Pfrunder, Andreas (ETH Zurich), Borges, Paulo Vinicius Koerich (CSIRO), Rechy Romero, Adrian (CSIRO), Catt, Gavin (CSIRO), Elfes, Alberto (CSIRO)

11:00-11:15 TuAT7.3

Neural Network Modeling for Steering Control of an Autonomous Vehicle.

Garimella, Gowtham (Johns Hopkins Univ), Funke, Joseph (Stanford Univ), Wang, Chuang (Zoox), Kobilarov, Marin (Johns Hopkins Univ)

11:15-11:30 TuAT7.4

Active Online Visual-Inertial Navigation and Sensor Calibration Via Belief Space Planning and Factor Graph Based Incremental Smoothing.

Ben Elisha, Yair (Tech. - Israel Inst. of Tech), Indelman, Vadim (Tech. - Israel Inst. of Tech)

11:30-11:45 TuAT7.5

Deriving Overtaking Strategy from Nonlinear Model Predictive Control for a Race Car.

Buyval, Alexander (Innopolis Univ), Gabdullin, Aidar (Innopolis Unversity), Mustafin, Ruslan (Innopolis Univ), Shimchik, Ilya (Innopolis Univ)

11:45-12:00 TuAT7.6

AutonoVi: Autonomous Vehicle Planning with Dynamic Maneuvers and Traffic Constraints.

Best, Andrew (Univ. of North Carolina at Chapel Hill), Narang, Sahil (Univ. of North Carolina at Chapel Hill), Barber, Daniel (Univ. of Central Florida), Manocha, Dinesh (Univ. of North Carolina at Chapel Hill)

TuAT8	Room 202
Field Robotics	
Chair: Nagatani, Keiji	Tohoku Univ
Co-Chair: La, Hung	Univ. of Nevada at Reno

10:30-10:45 TuAT8.1

Design and Development of a Tethered Mobile Robot to Traverse on Steep Slope Based on an Analysis of Its Slippage and Turnover.

Nagatani, Keiji (Tohoku Univ), Tatano, So (Tohoku Univ), Ikeda, Keisuke (Tohoku Univ), Watanabe, Atsushi (Tohoku Univ), Kuri, Miwa (Tohoku Univ)

10:45-11:00 TuAT8.2

Industrial-Scale Autonomous Wheeled-Vehicle Path Following by Combining Iterative Learning Control with Feedback Linearization.

Dekker, Lukas G. (Queen's Univ), Marshall, Joshua A. (Queen's Univ), Larsson, Johan (Örebro Univ)

11:00-11:15 TuAT8.3

Autonomous Navigation and Mapping for Inspection of Penstocks and Tunnels with MAVs.

Ozaslan, Tolga (Univ. of Pennsylvania), Loianno, Giuseppe (Univ. of Pennsylvania), Keller, James (Univ. of Pennsylvania), Taylor, Camillo Jose (Univ. of Pennsylvania), Kumar, Vijay (Univ. of Pennsylvania)

11:15-11:30 TuAT8.4

Planning and Control for Autonomous Excavation.

Jud, Dominic (ETH Zurich), Hottiger, Gabriel (ETH Zurich), Leemann, Philipp (ETH Zurich), Hutter, Marco (ETH Zurich)

11:30-11:45 TuAT8.5

Structured Light-Based Hazard Detection for Planetary Surface Navigation.

Nefian, Ara (NASA Ames Res. Center), Wong, Uland (NASA Ames Res. Center), Dille, Michael (SGT Inc. / NASA Ames Res. Center), Bouyssounouse, Xavier (NASA Ames Res. Center), Edwards, Laurence (NASA Ames Res. Center), To, Vinh (Stinger Ghaffarian Tech), Deans, Matthew (NASA Ames Res. Center), Fong, Terrence (NASA Ames Res. Center (ARC))

11:45-12:00 TuAT8.6

A Multi-Functional Inspection Robot for Civil Infrastructure Evaluation and Maintenance.

Spencer, Gibb (Univ. of Nevada, Reno), Le, Tuan (Univ. of Nevada, Reno), La, Hung (Univ. of Nevada at Reno), Schmid, Ryan (Univ. of Nevada, Reno), Tony, Berendsen (Univ. of Nevada, Reno)

TuAT9	Room 204
Search and Rescue Robots	
Chair: Suzumori, Koichi	Tokyo Inst. of Tech
Co-Chair: Endo, Gen	Tokyo Inst. of Tech

10:30-10:45 TuAT9.1

Geometric and Visual Terrain Classification for Autonomous Mobile Navigation.

Schilling, Fabian (KTH Royal Inst. of Tech), Chen, Xi (KTH), Folkesson, John (KTH), Jensfelt, Patric (KTH - Royal Inst. of Tech)

10:45-11:00 TuAT9.2

Modeling Structure and Aerosol Concentration with Fused Radar and LiDAR Data in Environments with Changing Visibility.

Fritsche, Paul (Leibniz Univ. Hannover), Wagner, Bernardo (Leibniz Univ. Hannover)

11:00-11:15 TuAT9.3

Challenges in Visual and Inertial Information Gathering for a Sprawling Posture Robot.

Parsapour, Mahsa (EPFL), Melo, Kamilo (EPFL), Horvat, Tomislav (EPFL), Ijspeert, Auke (EPFL)

11:15-11:30 TuAT9.4

Towards Autonomous Locomotion: Slithering Gait Design of Snake-Like Robot for Target Observation and Tracking.

Bing, Zhenshan (Tech. Univ. of Munich), Cheng, Long (Tech. Univ. of Munich), Huang, Kai (Sun Yat-Sen Univ), Jiang, Zhuangyi (Tech. Univ. of Munich), Chen, Guang (Tech. Univ. of Munich), Roehrbein, Florian (Tech. Univ. of Munich), Knoll, Alois (Tech. Univ. Muenchen TUM)

11:30-11:45 TuAT9.5

A Semi-Autonomous Compound Motion Pattern Using Multi-Flipper and Multi-Arm for Unstructured Terrain Traversal.

Chen, Kui (Waseda Univ), Kamezaki, Mitsuhiro (Waseda Univ), Katano, Takahiro (Waseda Univ), Kaneko, Taisei (Waseda Univ), Azuma, Kohga (Waseda Univ), Ishida, Tatsuzo (Waseda Univ), Seki, Masatoshi (Kikuchi Seisakusho Co., Ltd), Ken, Ichiryu (Kikuchi Seisakusho Co., Ltd), Sugano, Shigeki (Waseda Univ)

11:45-12:00 TuAT9.6

Development of a 20-M-Long Giacometti Arm with Balloon Body Based on Kinematic Model with Air Resistance.

Takeichi, Masashi (Tokyo Inst. of Tech), Suzumori, Koichi (Tokyo Inst. of Tech), Endo, Gen (Tokyo Inst. of Tech), Nabae, Hiroyuki (Tokyo Inst. of Tech)

TuAT10	Room 205
Cellular Robots I	
Chair: Yim, Mark	Univ. of Pennsylvania
Co-Chair: Guan, Yisheng	Guangdong Univ. of Tech

10:30-10:45 TuAT10.1

Variable Topology Truss: Design and Analysis.

Spinos, Alexander (Univ. of Pennsylvania), Carroll, Devin (Univ. of Pennsylvania), Kientz, Terry (Univ. of Pennsylvania), Yim, Mark (Univ. of Pennsylvania)

10:45-11:00 TuAT10.2

Generating Gaits for Simultaneous Locomotion and Manipulation.

Whitman, Julian (Carnegie Mellon Univ), Su, Shuang (Carnegie Mellon Univ), Coros, Stelian (Carnegie Mellon Univ), Ansari, Alexander (Carnegie Mellon Univ), Choset, Howie (Carnegie Mellon Univ)

11:00-11:15 TuAT10.3

Design and Testing of FERVOR: FlexiblE and Reconfigurable Voxel-Based Robot.

Cramer, Nicholas (Stinger Ghaffarian Tech. Inc), Tebyani, Maryam (Univ. of California, Santa Cruz), Stone, Katelyn (Univ. of California, Santa Cruz), Cellucci, Daniel (Cornell Univ), Cheung, Kenneth C. (National Aeronautics and Space Administration (NASA)), Swei, Sean (NASA Ames Res. Center), Teodorescu, Mircea (UCSC)

11:15-11:30 TuAT10.4

A Decentralized Algorithm for Assembling Structures with Modular Robots.

Saldana, David Julian (Univ. Federal De Minas Gerais), Teles Gabrich, Bruno (Univ. of Pennsylvania), Whitzer, Michael (Univ. of Pennsylvania), Prorok, Amanda (Univ. of Pennsylvania), Campos, Mario Montenegro (Univ. Federal De Minas Gerais), Yim, Mark (Univ. of Pennsylvania), Kumar, Vijay (Univ. of Pennsylvania)

11:30-11:45 TuAT10.5

Fabric-Based Actuator Modules for Building Soft Pneumatic Structures with High Payload-To-Weight Ratio.

Khin, Phone May (National Univ. of Singapore), Yap, Hong Kai (National Univ. of Singapore), Ang Jr, Marcelo H (National Univ. of Singapore), Yeow, Chen-Hua (National Univ. of Singapore)

11:45-12:00 TuAT10.6

A Vision-Based Scheme for Kinematic Model Construction of Re-Configurable Modular Robots.

Lin, Kewei (Guangdong Univ. of Tech), Rojas, Juan (Guangdong Univ. of Tech), Guan, Yisheng (Guangdong Univ. of Tech)

TuAT11	Room 207
Social HRI	
Chair: Fu, Li-Chen	National Taiwan Univ
Co-Chair: Jagersand, Martin	Univ. of Alberta

10:30-10:45 TuAT11.1

Investigation of Human-Robot Comfort with a Small Unmanned Aerial Vehicle Compared to a Ground Robot.

Acharya, Urja (Univ. of Nebraska, Lincoln), Bevins, Alisha (Univ. of Nebraska, Lincoln), Duncan, Brittany (Univ. of Nebraska, Lincoln)

10:45-11:00 TuAT11.2

A Study on the Social Acceptance of a Robot in a Multi-Human Interaction Using an F-Formation Based Motion Model.

Yang, Shih-An (National Taiwan Univ), Gamborino, Edwinn (National Taiwan Univ), Yang, Chun-Tang (National Taiwan Univ), Fu, Li-Chen (National Taiwan Univ)

11:00-11:15 TuAT11.3

Incremental Learning for Robot Perception through HRI.

Valipour, Sepehr (Univ. of Alberta), Perez Quintero, Camilo Alfonso (Univ. of Alberta), Jagersand, Martin (Univ. of Alberta)

11:15-11:30 TuAT11.4

Postural Optimization for an Ergonomic Human-Robot Interaction.

Busch, Baptiste (INRIA), Maeda, Guilherme Jorge (Tech. Univ. Darmstadt), Mollard, Yoan (Inria), Demangeat, Marie (Inria), Lopes, Manuel (Inst. Superior Tecnico)

11:30-11:45 TuAT11.5

A Simple Bi-Layered Architecture to Enhance the Liveness of a Robot.

Takimoto, Yusuke (Keio Univ), Hasegawa, Komei (Keio Univ), Sono, Taichi (Keio Univ), Imai, Michita (Keio Univ)

11:45-12:00 TuAT11.6

``*Me and You Together'': Movement Impact in Multi-User Collaboration Tasks*.

Faria, Miguel (INESC-ID and Inst. Superior Técnico, Tech. Univ. Of), Silva, Rui (Carnegie Mellon Univ. and Inst. Superior Tecnico), Alves-Oliveira, Patrícia (INESC-ID & Inst. Superior Técnico, Univ. of Lisbon), Melo, Francisco S. (Inst. Superior Tecnico), Paiva, Ana (INESC-ID and Inst. Superior Técnico, Tech. Of)

TuAT12	Room 208
Motion Control II	
Chair: Secchi, Cristian	Univ. of Modena & Reggio Emilia
Co-Chair: Kinugawa, Jun	Tohoku Univ

10:30-10:45 TuAT12.1

Learning to Navigate Cloth Using Haptics.

Clegg, Alexander (Georgia Inst. of Tech), Yu, Wenhao (Georgia Inst. of Tech), Erickson, Zackory (Georgia Inst. of Tech), Tan, Jie (Georgia Inst. of Tech), Liu, Karen (Georgia Tech), Turk, Greg (Georgia Inst. of Tech)

10:45-11:00 TuAT12.2

A Passive Integration Strategy for Rendering Rotational Rigid-Body Dynamics on a Robotic Simulator.

De Stefano, Marco (DLR - German Aerospace Center), Artigas, Jordi (DLR - German Aerospace Center), Secchi, Cristian (Univ. of Modena & Reggio Emilia)

11:00-11:15 TuAT12.3

Applicability Analysis of Generalized Inverse Kinematics Algorithms with Respect to Manipulator Geometric Uncertainties.

Wang, Yuquan (Royal Inst. of Tech. (KTH)), Wang, Lihui (KTH Royal Inst. of Tech)

11:15-11:30 TuAT12.4

Disturbance-Observer-Based PD Control of Electro-Hydrostatically Actuated Flexible Joint Robots.

Lee, Woongyong (POSTECH), Kim, Min Jun (DLR), Chung, Wan Kyun (POSTECH)

11:30-11:45 TuAT12.5

Control Method of Power-Assisted Cart with One Motor, a Differential Gear, and Brakes Based on Motion State of the Cart.

Seino, Akira (Tohoku Univ), Wakabayashi, Yuta (Tohoku Univ), Kinugawa, Jun (Tohoku Univ), Kosuge, Kazuhiro (Tohoku Univ)

11:45-12:00 TuAT12.6

Formalization and Analysis of Jacobian Matrix in Screw Theory and Its Application in Kinematic Singularity.

Wu, Aixuan (Capital Normal Univ), shi, zhiping (Capital Normal Univ), Yang, Xiumei (Capital Normal Univ), guan, yong (Capital Normal Univ), Li, Yong-Dong (Beihang Univ), Song, Xiaoyu (Portland State Univ)

TuAT13	Room 211
Motion and Path Planning II	
Chair: Ruml, Wheeler	Univ. of New Hampshire
Co-Chair: Gupta, Kamal	Simon Fraser Univ

10:30-10:45 TuAT13.1

Efficient Humanoid Motion Planning on Uneven Terrain Using Paired Forward-Inverse Dynamic Reachability Maps.

Yang, Yiming (Univ. of Edinburgh), Merkt, Wolfgang Xaver (The Univ. of Edinburgh), Ferrolho, Henrique (Faculty of Engineering of the Univ. of Porto), Ivan, Vladimir (Univ. of Edinburgh), Vijayakumar, Sethu (Univ. of Edinburgh)

10:45-11:00 TuAT13.2

Repetition Sampling for Efficiently Planning Similar Constrained Manipulation Tasks.

Lehner, Peter (German Aerospace Center (DLR)), Albu-Schäffer, Alin (DLR - German Aerospace Center)

11:00-11:15 TuAT13.3

Efficient Path Planning in Belief Space for Safe Navigation.

Schirmer, Robert (Robert Bosch GmbH), Biber, Peter (Robert Bosch GmbH), Stachniss, Cyrill (Univ. of Bonn)

11:15-11:30 TuAT13.4

An Effort Bias for Sampling-Based Motion Planning.

Kiesel, Scott (Univ. of New Hampshire), Gu, Tianyi (Univ. of New Hampshire), Ruml, Wheeler (Univ. of New Hampshire)

11:30-11:45 TuAT13.5

Search-Based Motion Planning for Quadrotors Using Linear Quadratic Minimum Time Control.

Liu, Sikang (Univ. of Pennsylvania), Atanasov, Nikolay (Univ. of Pennsylvania), Mohta, Kartik (Univ. of Pennsylvania), Kumar, Vijay (Univ. of Pennsylvania)

11:45-12:00 TuAT13.6

Planning High-Speed Safe Trajectories in Confidence-Rich Maps.

Heiden, Eric (Univ. of Southern California), Hausman, Karol (Univ. of Southern California), Sukhatme, Gaurav (Univ. of Southern California), Agha-mohammadi, Ali-akbar (Qualcomm Res)

TuAT14	Room 217
Soft Material Robotics III	
Chair: Hirai, Shinichi	Ritsumeikan Univ
Co-Chair: Liu, Hongbin	King's Coll. London

10:30-10:45 TuAT14.1

A Prestressed Soft Gripper: Design, Modeling, Fabrication, and Tests for Food Handling.

Wang, Zhongkui (Ritsumeikan Univ), Hirai, Shinichi (Ritsumeikan Univ)

10:45-11:00 TuAT14.2

Visual Servoing Control of Soft Robots Based on Finite Element Model.

ZHANG, ZHONGKAI (INRIA, Univ. of Lille, France), Morales Bieze, Thor Enrique (Univ. of Lille), Dequidt, Jeremie (Univ. of Lille 1), Kruszewski, Alexandre (Ec. Centrale De Lille), Duriez, Christian (INRIA)

11:00-11:15 TuAT14.3

Design and Prototyping of a Soft Magnetic Anchored and Guidance Endoscope System.

Cheng, Truman (The Chinese Univ. of Hong Kong), Ng, Sze Hang (The Chinese Univ. of Hong Kong), Chiu, WAI, YAN Philip (Chinese Univ. of Hong Kong), li, zheng (The Chinese Univ. of Hong Kong)

11:15-11:30 TuAT14.4

Model-Free Control for Soft Manipulators Based on Reinforcement Learning.

You, Xuanke (Univ. of Science and Tech. of China), Zhang, Yixiao (Univ. of Science and Tech. of China), Chen, Xiaotong (Univ. of Science and Tech. of China), Liu, Xinghua (Univ. of Science and Tech. of China), Wang, Zhanchi (Univ. of Science and Tech. of China), Jiang, Hao (Univ. of Science and Tech. of China), Chen, Xiaoping (Univ. of Science and Tech. of China)

11:30-11:45 TuAT14.5

Model-Less Feedback Control for Soft Manipulators.

Jin, Yusong (Univ. of Science and Tech. of China), Wang, Yufei (Univ. of Science and Tech. of China), Chen, Xiaotong (Univ. of Science and Tech. of China), Wang, Zhanchi (Univ. of Science and Tech. of China), Liu, Xinghua (Univ. of Science and Tech. of China), Jiang, Hao (Univ. of Science and Tech. of China), Chen, Xiaoping (Univ. of Science and Tech. of China)

11:45-12:00 TuAT14.6

Intrinsic Force Sensing Capabilities in Compliant Robots Comprising Hydraulic Actuation.

Lindenroth, Lukas (King's Coll. London), Duriez, Christian (INRIA), Back, Jungwhan (King's Coll. London), Rhode, Kawal (King's Coll. London), Liu, Hongbin (King's Coll. London)

TuAT15	Room 215
Visual Servoing	
Chair: Chaumette, Francois	Inria Rennes-Bretagne Atlantique
Co-Chair: Marchand, Eric	Univ. De Rennes 1, IRISA, INRIA Rennes

10:30-10:45 TuAT15.1

Characterisation and Image-Based Flight Control of an Autonomous Free Fall Skydiving Robot.

Alatorre Troncoso, David (Univ. of Nottingham), Branson, David (Univ. of Nottingham)

10:45-11:00 TuAT15.2

Visual Servoing from Lines Using a Planar Catadioptric System.

Marchand, Eric (Univ. De Rennes 1, IRISA, INRIA Rennes), Fasquelle, Benjamin (ENS Rennes)

11:00-11:15 TuAT15.3

Strain Estimation of Moving Tissue Based on Automatic Motion Compensation by Ultrasound Visual Servoing.

Patlan Rosales, Pedro Alfonso (INRIA Rennes - Bretagne Atlantique, Univ. De Rennes I), Krupa, Alexandre (INRIA Rennes - Bretagne Atlantique)

11:15-11:30 TuAT15.4

Active Vision for Pose Estimation Applied to Singularity Avoidance in Visual Servoing.

Agravante, Don Joven (INRIA Rennes - Bretagne Atlantique), Chaumette, Francois (Inria Rennes-Bretagne Atlantique)

11:30-11:45 TuAT15.5

Pose Induction for Visual Servoing to a Novel Object Instance.

Kumar, Gourav (International Inst. of Information Tech. Hyderabad, In), Pandya, Harit (IIIT Hyderabad), Gaud, Ayush (International Inst. of Information Tech. Hyderabad), Krishna, Madhava (IIIT Hyderabad)

11:45-12:00 TuAT15.6

Combining Line Segments and Points for Appearance-Based Indoor Navigation by Image Based Visual Servoing.

Bista, Suman Raj (Inria Rennes Bretagne Atlantique), Robuffo Giordano, Paolo (Centre National De La Recherche Scientifique (CNRS)), Chaumette, Francois (Inria Rennes-Bretagne Atlantique)

TuAT16	Room 220
Micro/Nano Robotics III	
Chair: Hwang, Gilgueng	CNRS, Univ. Paris-Sud, Univ. of Paris-Saclay
Co-Chair: Rabenorosoa, Kanty	Univ. Bourgogne Franche-Comté, CNRS

10:30-10:45 TuAT16.1

3000 Hz Cell Manipulation in a Microfluidic Channel.

Tsai, Chia-Hung Dylan (Osaka Univ), Teramura, Kaoru (Osaka Univ), Hosokawa, Naoya (Osaka Univ), Mizoue, Kouji (MIZOUE PROJECT JAPAN Corp), Takayama, Toshio (Tokyo Inst. of Tech), Kaneko, Makoto (Osaka Univ)

10:45-11:00 TuAT16.2

Automated Cell Transportation for Batch-Cell Manipulation.

Wang, Xuefeng (Nankai Univ), Liu, Yaowei (Nankai Univ), Li, Shibao (Nankai Univ), Cui, Maosheng (Tianjin Animal Science), Sun, Mingzhu (Nankai Univ), Zhao, Xin (Nankai Univ)

11:00-11:15 TuAT16.3

On-Chip Fabrication of Movable Toroidal Cell Structures Using Photo-Crosslinkable Biodegradable Hydrogel.

Takeuchi, Masaru (Nagoya Univ), Nakamura, Yuki (Meijo Univ), Ichikawa, Akihiko (Meijo Univ), Hasegawa, Akiyuki (Meijo Univ), Hasegawa, Yasuhisa (Nagoya Univ), Fukuda, Toshio (Meijo Univ)

11:15-11:30 TuAT16.4

Realtime Vision Based Dynamic Power Management of In-Plane Magnetic Mobile Microrobots for Avoidance of Excessive Surface Stiction.

Dorazio, Silvia (C2N-CNRS), Couraud, Laurent (C2N), Ollivier, Yannick (LPN-CNRS), Hwang, Gilgueng (CNRS, Univ. Paris-Sud, Univ. of Paris-Saclay)

11:30-11:45 TuAT16.5

Depth Estimation of Optically Transparent Laser-Driven Microrobots.

Grammatikopoulou, Maria (Imperial Coll. London), Zhang, Lin (Imperial Coll. London), Yang, Guang-Zhong (Imperial Coll. London)

11:45-12:00 TuAT16.6

Preliminary Results on OCT-Based Position Control of a Concentric Tube Robot.

Baran, Yann (FEMTO-ST Inst. Bourgogne Franche Comté - CNRS/ENSMM), Rabenorosoa, Kanty (Univ. Bourgogne Franche-Comté, CNRS), Laurent, Guillaume J. (Univ. Bourgogne Franche-Comté, ENSMM), Rougeot, Patrick (Univ. of Franche-Comté, FEMTO-ST Inst), Andreff, Nicolas (Univ. De Franche Comté), TAMADAZTE, Brahim (Cnrs, Ufc/ensmm/utbm)

TuAT17	Room 221
Dynamics	
Chair: De Luca, Alessandro	Sapienza Univ. of Rome
Co-Chair: Wensing, Patrick	Univ. of Notre Dame

10:30-10:45 TuAT17.1

Classification Error Correction: A Case Study in Brain-Computer Interfacing.

Poonawala, Hasan A. (Univ. of Texas at Austin), Alshiekh, Mohammed (Univ. of Texas at Austin), Niekum, Scott (Univ. of Texas at Austin), Topcu, Ufuk (Univ. of Pennsylvania)

10:45-11:00 TuAT17.2

Elastic Rod Dynamics: Validation of a Real-Time Implicit Approach.

Till, John (Univ. of Tennessee, Knoxville), Rucker, Caleb (Univ. of Tennessee)

11:00-11:15 TuAT17.3

Periodic Trajectories of Mobile Robots.

Nilles, Alexandra (Univ. of Illinois - Champaign-Urbana), Becerra, Israel (Centro De Investigacion En Matematicas), LaValle, Steven M (Univ. of Illinois)

11:15-11:30 TuAT17.4

A Friction Model with Velocity, Temperature and Load Torque Effects for Collaborative Industrial Robot Joints.

Gao, Liming (Shanghai Jiao Tong Univ), Yuan, Jianjun (Shanghai Jiao Tong Univ. China), Han, Zhedong (Shanghai Jiao Tong Univ), Wang, Shuai (Shanghai JiaoTong Univ), Wang, Ning (Shanghai Jiao Tong Univ)

11:30-11:45 TuAT17.5

Payload Estimation Based on Identified Coefficients of Robot Dynamics --With an Application to Collision Detection.

Gaz, Claudio Roberto (Sapienza Univ. of Rome), De Luca, Alessandro (Sapienza Univ. of Rome)

11:45-12:00 TuAT17.6

Linear Matrix Inequalities for Physically-Consistent Inertial Parameter Identification: A Statistical Perspective on the Mass Distribution.

Wensing, Patrick (Univ. of Notre Dame), Kim, Sangbae (Massachusetts Inst. of Tech), Slotine, Jean-Jacques E. (Massachusetts Inst. of Tech)

TuAT18	Room 223
Human Factors and Human Performance Augmentation	
Chair: Gosselin, Clement	Univ. Laval
Co-Chair: Morales Saiki, Luis Yoichi	Nagoya Univ

10:30-10:45 TuAT18.1

Visual Perception of Limb Stiffness.

Huber, Meghan (Massachusetts Inst. of Tech), Folinus, Charlotte (Massachusetts Inst. of Tech), Hogan, Neville (Massachusetts Inst. of Tech)

10:45-11:00 TuAT18.2

Analysis of Navigational Habituation.

Morales Saiki, Luis Yoichi (Nagoya Univ), Even, Jani (ATR), Abdur-Rahim, Jamilah (EuroMov Univ. Montpellier), Watanabe, Atsushi (Tohoku Univ)

11:00-11:15 TuAT18.3

User-Robot Collaborative Excitation for PAM Model Identification in Exoskeleton Robots.

Hamaya, Masashi (ATR Computational Neuroscience Labs / Osaka Univ), Matsubara, Takamitsu (NAIST/ATR), Noda, Tomoyuki (ATR Computational Neuroscience Lab), Teramae, Tatsuya (ATR Computational Neuroscience Lab), Morimoto, Jun (ATR Computational Neuroscience Labs)

11:15-11:30 TuAT18.4

Passive Knee Exoskeleton Using Torsion Spring for Cycling Assistance.

Chaichaowarat, Ronnapee (Tohoku Univ), Paez Granados, Diego Felipe (Tohoku Univ), Kinugawa, Jun (Tohoku Univ), Kosuge, Kazuhiro (Tohoku Univ)

11:30-11:45 TuAT18.5

An Anticipative Kinematic Limitation Avoidance Algorithm for Collaborative Robots: Three-Dimensional Case.

Lebel, Philippe (Univ. Laval), Gosselin, Clement (Univ. Laval), Campeau-Lecours, Alexandre (Univ. Laval)

11:45-12:00 TuAT18.6

Sequential Recognition of In-Hand Object Shape Using a Collection of Neural Forests.

VASQUEZ, Alex (Sorbone Univ. UPMC Univ. Paris 06), dapogny, arnaud (UPMC), Bailly, Kevin (Sorbonne Univ. UPMC Univ. Paris 06, CNRS), Perdereau, Véronique (Univ. Pierre Et Marie Curie - Paris 6)

TuBT1 Room 109

Learning from Demonstration I

Co-Chair: Asfour, Tamim Karlsruhe Inst. of Tech. (KIT)

14:30-14:45 TuBT1.1

Metric Learning for Generalizing Spatial Relations to New Objects.

Mees, Oier (Albert-Ludwigs-Univ), Abdo, Nichola (Univ. of Freiburg), Mazuran, Mladen (Univ. of Freiburg), Burgard, Wolfram (Univ. of Freiburg)

14:45-15:00 TuBT1.2

Learning Manipulability Ellipsoids for Task Compatibility in Robot Manipulation.

Rozo, Leonel (Istituto Italiano Di Tecnologia), Jaquier, Noémie (Idiap Res. Inst), Calinon, Sylvain (Idiap Res. Inst), Caldwell, Darwin G. (Istituto Italiano Di Tecnologia)

15:00-15:15 TuBT1.3

Demonstration-Free Contextualized Probabilistic Movement Primitives, Further Enhanced with Obstacle Avoidance.

Colomé, Adrià (Inst. De Robòtica I Informàtica Industrial (CSIC-UPC), Q28180), Torras, Carme (Csic - Upc)

15:15-15:30 TuBT1.4

Learning Mobile Manipulation Actions from Human Demonstrations.

Welschehold, Tim (Albert-Ludwigs-Univ. Freiburg), Dornhege, Christian (Univ. of Freiburg), Burgard, Wolfram (Univ. of Freiburg)

15:30-15:45 TuBT1.5

Task-Oriented Generalization of Dynamic Movement Primitive.

Zhou, You (Karlsruhe Inst. of Tech. (KIT)), Asfour, Tamim (Karlsruhe Inst. of Tech. (KIT))

15:45-16:00 TuBT1.6

Detecting Insertion Tasks Using Convolutional Neural Networks During Robot Teaching-By-Demonstration.

Roberge, Etienne (École De Tech. Supérieure), Duchaine, Vincent (Ec. De Tech. Superieure)

TuBT2	Room 111
Biologically-Inspired Robots III	
Chair: Niemeyer, Günter	Disney Res
Co-Chair: Bae, Joonbum	UNIST

14:30-14:45 TuBT2.1

Skimming and Steering of a Non-Tethered Miniature Robot on the Water Surface Using Marangoni Propulsion.

Kwak, Bokeon (Ulsan National Inst. of Science and Tech. (UNIST)), Bae, Joonbum (UNIST)

14:45-15:00 TuBT2.2

Falling with Style: Sticking the Landing by Controlling Spin During Ballistic Flight.

Pope, Morgan (Disney Res), Niemeyer, Günter (Disney Res)

15:00-15:15 TuBT2.3

Planar Hopping Control Strategy for Tail-Actuated SLIP Model Traversing Varied Terrains.

Yu, Haitao (Harbin Inst. of Tech), Li, Cao (Beijing Inst. of Astronautical Systems Engineering), Yuan, Baofeng (Beijing Inst. of Spacecraft System Engineering), Gao, Haibo (Harbin Inst. of Tech), Deng, Zongquan (Harbin Inst. of Tech)

15:15-15:30 TuBT2.4

Development of a Flapping Wing Micro Air Vehicle Capable of Autonomous Hovering with Onboard Measurements.

Ryu, Seungwan (Seoul National Univ), Kim, H. Jin (Seoul National Univ)

15:30-15:45 TuBT2.5

Trajectory Tracking Using Motion Primitives for the Purcell's Swimmer.

Kadam, Sudin (Indian Inst. of Tech. Bombay), Joshi, Kedar (IIT Bombay), Gupta, Naman (Indian Inst. of Tech. Bombay), Katdare, Pulkit (IIT Bombay), Banavar, Ravi N (I. I. T. Bombay)

15:45-16:00 TuBT2.6

Efficient Topological Distances and Comparable Metric Ranges.

Haque, Musad (Johns Hopkins Univ. Applied Physics Lab), Abbas, Waseem (Vanderbilt Univ), Rafter, Abigail (Vanderbilt Univ), Adams, Julie (Oregon State Univ)

TuBT3	Room 116
Perception for Grasping and Manipulation II	
Chair: Brock, Oliver	Tech. Univ. Berlin
14:30-14:45	TuBT3.1
Active End-Effector Pose Selection for Tactile Object Recognition through Monte Carlo Tree Search.	
Zhang, Mabel M. (Univ. of Pennsylvania), Atanasov, Nikolay (Univ. of Pennsylvania), Daniilidis, Kostas (Univ. of Pennsylvania)	
14:45-15:00	TuBT3.2
Task-Oriented Grasping with Semantic and Geometric Scene Understanding.	
Detry, Renaud (Jet Propulsion Lab), Papon, Jeremie (Jet Propulsion Lab), Matthies, Larry (Jet Propulsion Lab)	
15:00-15:15	TuBT3.3
Model-Free Approach to Garments Unfolding Based on Detection of Folded Layers.	
Stria, Jan (Czech Tech. Univ. in Prague), Petrik, Vladimir (Czech Tech. Univ. in Prague), Hlavac, Vaclav (Czech Tech. Univ. in Prague)	
15:15-15:30	TuBT3.4
SUM: Sequential Scene Understanding and Manipulation.	
Sui, Zhiqiang (Univ. of Michigan), Zhou, Zheming (Univ. of Michigan), Zeng, Zhen (Univ. of Michigan), Jenkins, Odest Chadwicke (Univ. of Michigan)	
15:30-15:45	TuBT3.5
Cross-Modal Interpretation of Multi-Modal Sensor Streams in Interactive Perception Based on Coupled Recursion.	
Martín-Martín, Roberto (Tech. Univ. Berlin), Brock, Oliver (Tech. Univ. Berlin)	
15:45-16:00	TuBT3.6
Flexible User Specification of Perceptual Landmarks for Robot Manipulation.	
Huang, Justin (Univ. of Washington), Cakmak, Maya (Univ. of Washington)	

TuBT4	Room 114
Localization II	
Chair: Alejo, David	Univ. Pablo De Olavide
Co-Chair: Ito, Seigo	Toyota Central R&d Labs., Inc

14:30-14:45 TuBT4.1

Look No Further: Adapting the Localization Sensory Window to the Temporal Characteristics of the Environment.

Bruce, Jake (Queensland Univ. of Tech), Jacobson, Adam (Queensland Univ. of Tech), Milford, Michael J (Queensland Univ. of Tech)

14:45-15:00 TuBT4.2

SPAD DCNN: Localization with Small Imaging LIDAR and DCNN.

Ito, Seigo (Toyota Central R&d Labs., Inc), Hiratsuka, Shigeyoshi (Toyota Central R&d Labs., Inc), Ohta, Mitsuhiko (Toyota Central R&d Labs., Inc), Matsubara, Hiroyuki (Toyota Central R&d Labs., Inc), Ogawa, Masaru (Toyota Central R&d Labs., Inc)

15:00-15:15 TuBT4.3

Robust LiDAR-Based Localization in Architectural Floor Plans.

Boniardi, Federico (Univ. of Freiburg), Caselitz, Tim (Univ. of Freiburg), Kuemmerle, Rainer (KUKA Roboter GmbH), Burgard, Wolfram (Univ. of Freiburg)

15:15-15:30 TuBT4.4

The Datum Particle Filter: Localization for Objects with Coupled Geometric Datums.

Chen, Shiyuan (Carnegie Mellon Univ), Saund, Brad (Carnegie Mellon), Simmons, Reid (Carnegie Mellon Univ)

15:30-15:45 TuBT4.5

Probabilistic Normal Distributions Transform Representation for Accurate 3D Point Cloud Registration.

Hong, Hyunki (Seoul National Univ), Lee, Beom-Hee (Seoul National Univ)

15:45-16:00 TuBT4.6

Topological Localization Using Wi-Fi and Vision Merged into FABMAP Framework.

Nowakowski, Mathieu (MINES ParisTech - PSL Res. Univ), JOLY, Cyril (Mines ParisTech, PSL Res. Univ), Dalibard, Sebastien (SoftBank Robotics Europe), Garcia, Nicolas (Softbank Robotics Europe), Moutarde, Fabien (MINES ParisTech - PSL Res. Univ)

TuBT5	Room 118
Legged Robots I	
Chair: Fearing, Ronald	Univ. of California at Berkeley
Co-Chair: Degani, Amir	Tech. - Israel Inst. of Tech

14:30-14:45 TuBT5.1

Repetitive Extreme-Acceleration (14-G) Spatial Jumping with Salto-1P.

Haldane, Duncan (Univ. of California, Berkeley), Yim, Justin K. (Univ. of California, Berkeley), Fearing, Ronald (Univ. of California at Berkeley)

14:45-15:00 TuBT5.2

Swing Leg Retraction Using Virtual Apex Method for the ParkourBot Climbing Robot.

Nir, Omer (Tech. – Israel Inst. of Tech), Gaathon, Adar (Tech. - Israel Inst. of Tech), Degani, Amir (Tech. - Israel Inst. of Tech)

15:00-15:15 TuBT5.3

Dynamic Locomotion and Whole-Body Control for Quadrupedal Robots.

Bellicoso, C. Dario (ETH Zurich), Jenelten, Fabian (ETH Zurich), Fankhauser, Péter (ETH Zurich), Gehring, Christian (ETH Zurich), Hwangbo, Jemin (Swiss Federal Inst. of Tech. Zurich), Hutter, Marco (ETH Zurich)

15:15-15:30 TuBT5.4

NABi-S: A Compliant Robot with a CPG for Locomotion.

Pogue, Alexandra (UCLA), Bianes, Alana (UCLA), Hong, Dennis (UCLA), Iwasaki, Tetsuya (UCLA)

15:30-15:45 TuBT5.5

Model Predictive Control Based Framework for CoM Control of a Quadruped Robot.

Horvat, Tomislav (EPFL), Melo, Kamilo (EPFL), Ijspeert, Auke (EPFL)

15:45-16:00 TuBT5.6

Standing Posture Control for a Low-Cost Commercially Available Hexapod Robot.

Tikam, Mayur (Univ. of Pretoria, CSIR South Africa), Withey, Daniel (CSIR), Theron, Nicolaas Johannes (Univ. of Pretoria)

TuBT6	Room 121
Telerobotics and Teleoperation II	
Chair: Ryu, Jee-Hwan	Korea Univ. of Tech. and Education
Co-Chair: Robuffo Giordano, Paolo	Centre National De La Recherche Scientifique (CNRS)

14:30-14:45 TuBT6.1

Human-In-The-Loop Optimisation: Mixed Initiative Grasping for Optimally Facilitating Post-Grasp Manipulative Actions.

Ghalamzan Esfahani, Amir Masoud (Univ. of Birmingham), Abi-Farraj, Firas (CNRS-Irisa), Robuffo Giordano, Paolo (Centre National De La Recherche Scientifique (CNRS)), Stolkin, Rustam (Univ. of Birmingham)

14:45-15:00 TuBT6.2

User Study on Remotely Controlled UAVs with Focus on Interfaces and Data Link Quality.

Riestock, Maik (Otto-Von-Guericke-Univ. Magdeburg), Engelhardt, Frank (Otto-Von-Guericke-Univ. Magdeburg), Zug, Sebastian (Otto-Von-Guericke-Univ. Magdeburg), Hochgeschwender, Nico (Bonn-Rhein-Sieg Univ. of Applied Sciences, Germany)

15:15-15:30 TuBT6.4

Teleoperation in Cluttered Environments Using Wearable Haptic Feedback.

Bimbo, Joao (Istituto Italiano Di Tecnologia), Pacchierotti, Claudio (Centre National De La Recherche Scientifique (CNRS)), Aggravi, Marco (Univ. of Siena), Tsagarakis, Nikos (Istituto Italiano Di Tecnologia), Prattichizzo, Domenico (Univ. of Siena)

15:30-15:45 TuBT6.5

Baxter's Homunculus: Virtual Reality Spaces for Teleoperation in Manufacturing.

Lipton, Jeffrey (MIT), Fay, Aidan (Mit Csail), Rus, Daniela (MIT)

15:45-16:00 TuBT6.6

Towards Mobile Mixed-Reality Interaction with Multi-Robot Systems.

Frank, Jared (NYU Tandon School of Engineering), Krishnamoorthy, Sai (NYU Tandon School of Engineering), Kapila, Vikram (NYU Tandon School of Engineering)

TuBT7	Room 122
Autonomous Vehicle Navigation III	
Chair: Morales Saiki, Luis Yoichi	Nagoya Univ
Co-Chair: Matteucci, Matteo	Pol. Di Milano

14:30-14:45 TuBT7.1

On the Uncertainty Propagation: Why Uncertainty on Lie Groups Preserves Monotonicity?.

Kim, Youngji (Korea Advanced Inst. of Science and Tech), Kim, Ayoung (Korea Advanced Inst. of Science Tech)

14:45-15:00 TuBT7.2

Outdoor Person Following at Higher Speeds Using a Skid-Steered Mobile Robot.

Huskić, Goran (Univ. of Tübingen), Buck, Sebastian (Univ. of Tübingen), Ibargüen González, Luis Azareel (Eberhard Karls Univ. Tübingen), Zell, Andreas (Univ. of Tübingen)

15:00-15:15 TuBT7.3

A Novel Insect-Inspired Optical Compass Sensor for a Hexapod Walking Robot.

Dupeyroux, Julien (Aix-Marseille Univ), Diperi, Julien (Aix-Marseille Univ. Biorobotic Dept. CNRS, ISM UMR 7287), Boyron, Marc (Aix-Marseille Univ. Biorobotic Dept. CNRS, ISM UMR 7287), Viollet, Stephane (Aix-Marseille Univ), serres, Julien (CNRS/ Univ. De La Mediterranée)

15:15-15:30 TuBT7.4

Decentralized Navigation of Multiple Agents Based on ORCA and Model Predictive Control.

Cheng, Hui (Sun Yat-Sen Univ), Zhu, Qiyuan (Sun YatSen Univ), Liu, Zhongchang (Sun Yat-Sen Univ), Xu, Tianye (SUN YAT-SEN Univ), Lin, Liang (Sun Yat-Sen Univ)

15:30-15:45 TuBT7.5

Autonomous Predictive Driving for Blind Intersections.

Yoshihara, Yuki (Nagoya Univ), Morales Saiki, Luis Yoichi (Nagoya Univ), Akai, Naoki (Nagoya Univ), Takeuchi, Eijiro (Nagoya Univ), Ninomiya, Yoshiki (Toyota Central R & D Labs., Inc)

15:45-16:00 TuBT7.6

Mesh-Based 3D Textured Urban Mapping.

Romanoni, Andrea (Pol. Di Milano), Fiorenti, Daniele (Pol. Di Milano), Matteucci, Matteo (Pol. Di Milano)

TuBT8	Room 202
Aerial Systems: Perception and Autonomy I	
Chair: Merino, Luis	Pablo De Olavide Univ
Co-Chair: Caballero, Fernando	Univ. of Seville

14:30-14:45 TuBT8.1

Linear Velocity from Commotion Motion.

Dong, Wenbo (Univ. of Minnesota), Isler, Volkan (Univ. of Minnesota)

14:45-15:00 TuBT8.2

Sense and Avoid Based on Visual Pose Estimation for Small UAS.

Kang, Changkoo (Virginia Tech), Davis, Jason (Virginia Tech), Woolsey, Craig (Virginia Tech), Choi, Seongim (Virginia Tech)

15:00-15:15 TuBT8.3

Onboard Real-Time Dense Reconstruction of Large-Scale Environments for UAV.

Vempati, Anurag Sai (ETH Zurich, Disney Res. Zurich), Gilitschenski, Igor (ETH Zurich), Nieto, Juan (ETH Zürich), Beardsley, Paul (Disney Res. Zurich), Siegwart, Roland (ETH Zurich)

15:15-15:30 TuBT8.4

Wire Detection Using Synthetic Data and Dilated Convolutional Networks for Unmanned Aerial Vehicles.

Madaan, Ratnesh (Carnegie Mellon Univ), Maturana, Daniel (Carnegie Mellon Univ), Scherer, Sebastian (Carnegie Mellon Univ)

15:30-15:45 TuBT8.5

Multi-Modal Mapping and Localization of Unmanned Aerial Robots Based on Ultra-Wideband and RGB-D Sensing.

Perez Grau, Francisco Javier (Center for Advanced Aerospace Tech), Caballero, Fernando (Univ. of Seville), Merino, Luis (Pablo De Olavide Univ), Viguria, Antidio (Center for Advanced Aerospace Tech. (CATEC))

15:45-16:00 TuBT8.6

Autonomous Meta-Classifier for Surface Hardness Classification from UAV Landings.

Basha, Elizabeth (Univ. of the Pacific), Watts-Willis, Tristan (Univ. of the Pacific), Detweiler, Carrick (Univ. of Nebraska-Lincoln)

TuBT9	Room 204
AI-Based Methods	
Chair: Hannaford, Blake	Univ. of Washington
Co-Chair: Inamura, Tetsunari	National Inst. of Informatics

14:30-14:45 TuBT9.1

On-Line Simultaneous Learning and Recognition of Everyday Activities from Virtual Reality Performances.

Bates, Tamas (Tech. Univ. of Munich), Ramirez-Amaro, Karinne (Inst. for Cognitive Systems. Tech. Univ. München), Inamura, Tetsunari (National Inst. of Informatics), Cheng, Gordon (Tech. Univ. of Munich)

14:45-15:00 TuBT9.2

Learning Magnetic Field Distortion Compensation for Robotic Systems.

Christensen, Leif (DFKI), Krell, Mario Michael (Univ. of Bremen), Kirchner, Frank (Univ. of Bremen)

15:00-15:15 TuBT9.3

Multi Vehicle Routing with Nonholonomic Constraints and Dense Dynamic Obstacles.

Mansouri, Masoumeh (Örebro Univ), Lagriffoul, Fabien (Örebro Univ), Pecora, Federico (Örebro Univ)

15:15-15:30 TuBT9.4

Feeling the Force: Integrating Force and Pose for Fluent Discovery through Imitation Learning to Open Medicine Bottles.

Gao, Feng (Univ. of California, Los Angeles), Edmonds, Mark (Univ. of California, Los Angeles), Xie, Xu (UCLA), Liu, Hangxin (Univ. of California, Los Angeles), ZHU, YIXIN (Univ. of California, Los Angeles), QI, SIYUAN (Univ. of California, Los Angeles), Rothrock, Brandon (Jet Propulsion Lab. California Inst. of Tech), Zhu, Song-Chun (UCLA)

15:30-15:45 TuBT9.5

Improving Control Precision and Motion Adaptiveness for Surgical Robot with Recurrent Neural Network.

Li, Yangming (Univ. of Washington), Li, Shuai (Hong Kong Pol. Univ), Caballero, David (Univ. of Washington), Miyasaka, Muneaki (Univ. of Washington), Lewis, Andrew (Applied Dexterity), Hannaford, Blake (Univ. of Washington)

15:45-16:00 TuBT9.6

Deep Semantic Classification for 3D LiDAR Data.

Dewan, Ayush (Univ. of Freibug), Oliveira, Gabriel (Univ. of Freiburg), Burgard, Wolfram (Univ. of Freiburg)

TuBT10 Room 205

Cellular Robots II

Co-Chair: Nelson, Carl — Univ. of Nebraska-Lincoln

14:30-14:45 TuBT10.1

Modular Robot Connector Area of Acceptance from Configuration Space Obstacles.

Eckenstein, Nick (Univ. of Pennsylvania), Yim, Mark (Univ. of Pennsylvania)

14:45-15:00 TuBT10.2

Adaptive Locomotion Learning in Modular Self-Reconfigurable Robots: A Game Theoretic Approach.

Dutta, Ayan (Univ. of Nebraska at Omaha), Dasgupta, Prithviraj (Raj) (Univ. of Nebraska, Omaha), Nelson, Carl (Univ. of Nebraska-Lincoln)

15:00-15:15 TuBT10.3

Evolutionary Cost-Optimal Composition Synthesis of Modular Robots Considering a Given Task.

Icer, Esra (Tech. Univ. München), Hassan, Heba (German Univ. in Cairo), El-Ayat, Khaled (American Univ. Cairo), Althoff, Matthias (Tech. Univ. München)

15:15-15:30 TuBT10.4

Shape Control of Compliant, Articulated Meshes: Towards Modular Active-Cell Robots (MACROs).

Nawroj, Ahsan (Yale Univ), Dollar, Aaron (Yale Univ)

15:30-15:45 TuBT10.5

Rearranging Agents in a Small Space Using Global Controls.

Zhang, Yinan (Dartmouth Coll), Chen, Xiaolei (Dartmouth Coll), Qi, Hang (Dartmouth Coll), Balkcom, Devin (Dartmouth Coll)

15:45-16:00 TuBT10.6

Predictive Routing for Autonomous Mobility-On-Demand Systems with Ride-Sharing.

Alonso-Mora, Javier (Delft Univ. of Tech), Wallar, Alexander (Massachusetts Inst. of Tech), Rus, Daniela (MIT)

TuBT11 Room 207

Physical HRI

Chair: Demiris, Yiannis — Imperial Coll. London

Co-Chair: Secchi, Cristian — Univ. of Modena & Reggio Emilia

14:30-14:45 TuBT11.1

Improving Transparency in Physical Human-Robot Interaction Using an Impedance Compensator.

Lee, Kyeong Ha (Sungkyunkwan Univ), Baek, Seung Guk (Sungkyunkwan Univ), Lee, Hyuk Jin (SungKyunKwan Univ), Choi, Hyouk Ryeol (Sungkyunkwan Univ), Moon, Hyungpil (Sungkyunkwan Univ), Koo, Ja Choon (Sungkyunkwan Univ)

14:45-15:00 TuBT11.2

Modeling Human Reaching Phase in Human-Human Object Handover with Application in Robot-Human Handover.

Parastegari, Sina (Univ. of Illinois at Chicago), Abbasi, Bahareh (Univ. of Illinois at Chicago), Noohi, Ehsan (Univ. of Illinois at Chicago), Zefran, Milos (Univ. of Illinois at Chicago)

15:00-15:15 TuBT11.3

Personalized Robot-Assisted Dressing Using User Modeling in Latent Spaces.

Zhang, Fan (Imperial Coll. London), Cully, Antoine (Imperial Coll. London), Demiris, Yiannis (Imperial Coll. London)

15:15-15:30 TuBT11.4

Variable Admittance Control Preventing Undesired Oscillating Behaviors in Physical Human-Robot Interaction.

Talignani Landi, Chiara (Univ. of Modena and Reggio Emilia), Ferraguti, Federica (Univ. Degli Studi Di Modena E Reggio Emilia), Sabattini, Lorenzo (Univ. of Modena and Reggio Emilia), Secchi, Cristian (Univ. of Modena & Reggio Emilia), Bonfe, Marcello (Univ. of Ferrara), Fantuzzi, Cesare (Univ. Di Modena E Reggio Emilia)

15:30-15:45 TuBT11.5

Adaptive Indirect Control through Communication in Collaborative Human-Robot Interaction.

Silva, Rui (Carnegie Mellon Univ. and Inst. Superior Tecnico), Faria, Miguel (INESC-ID and Inst. Superior Técnico, Tech. Of), Melo, Francisco S. (Inst. Superior Tecnico), Veloso, Manuela (Carnegie Mellon Univ)

15:45-16:00 TuBT11.6

Impedance Control with Structural Compliance and a Sensorless Strategy for Contact Tasks.

Kim, Dongwon (Univ. of Michigan), Kang, Sang Hoon (Ulsan National Inst. of Science and Tech. / Nort), Gu, Gwang Min (KAIST), Jin, Maolin (Korea Inst. of Robot and Convergence)

TuBT12 Room 208

Medical Robots and Systems III

Chair: Tan, Jindong Univ. of Tennessee, Knoxville

Co-Chair: Gans, Nicholas (Nick) Univ. Texas at Dallas

14:30-14:45 TuBT12.1

Distal Proprioceptive Sensor for Motion Feedback in Endoscope-Based Modular Robotic Systems.

Gafford, Joshua (Harvard Univ), Aihara, Hiroyuki (Brigham and Women's Hospital), Thompson, Christopher (Brigham and Women's Hospital), Wood, Robert (Harvard Univ), Walsh, Conor James (Harvard Univ)

14:45-15:00 TuBT12.2

Spatial Semg Pattern-Based Finger Motion Estimation in a Small Area Using a Microneedle-Based High-Density Interface.

Kim, Minjae (POSTECH), Chung, Wan Kyun (POSTECH)

15:00-15:15 TuBT12.3

Magnetic Hammer Actuation for Tissue Penetration Using Millirobots.

Leclerc, Julien (Univ. of Houston), Ramakrishnan, Ashwin (Univ. of Houston), Tsekos, Nikolaos (Univ. of Houston), Becker, Aaron (Univ. of Houston)

15:15-15:30 TuBT12.4

Semiautonomous Electrosurgery for Tumor Resection Using a Multi-Degree of Freedom Electrosurgical Tool and Visual Servoing.

Opfermann, Justin (Children's National Medical Center), Leonard, Simon (The Johns Hopkins Univ), Decker, Ryan (Children's National Medical Center), Uebele, Nicholas (Johns Hopkins Univ), Bayne, Christopher (Children's National Medical Center), Joshi, Arjun (George Washington Univ), Krieger, Axel (Univ. of Maryland)

15:30-15:45 TuBT12.5

Soft-NeuroAdapt: A 3-DOF Neuro-Adaptive Patient Pose Correction System for Frameless and Maskless Cancer Radiotherapy.

Ogunmolu, Olalekan (Univ. of Texas at Dallas), Kulkarni, Adwait (Univ. of Texas at Dallas), Tadesse, Yonas (Univ. of Texas at Dallas), Gu, Xuejun (Univ. of Texas at Dallv), jiang, Steve (Univ. of Texas Southwestern Medical Center), Gans, Nicholas (Nick) (Univ. Texas at Dallas)

15:45-16:00 TuBT12.6

A Novel Laparoscopic Camera Robot with In-Vivo Lens Cleaning and Debris Prevention Modules.

Yazdanpanah Abdolmalaki, Reza (Univ. of Tennessee, Knoxville), Liu, Xiaolong (Univ. of Tennessee, Knoxville), Li, Ning (The Univ. of Tennessee), Tan, Jindong (Univ. of Tennessee, Knoxville)

TuBT13 Room 211

Motion and Path Planning III

Chair: Arslan, Omur — Univ. of Pennsylvania

14:30-14:45 TuBT13.1

An Optimization Approach to Trajectory Generation for Autonomous Vehicle Following.

Fassbender, Dennis (Univ. of the Bundeswehr Munich), Heinrich, Benjamin C. (Univ. of the Bundeswehr Munich), Luettel, Thorsten (Univ. of the Bundeswehr Muenchen), Wuensche, Hans J (UniBw Munich)

14:45-15:00 TuBT13.2

Gradient-Based Online Safe Trajectory Generation for Quadrotor Flight in Complex Environments.

Gao, Fei (Hong Kong Univ. of Science and Tech), Lin, Yi (Hong Kong Univ. of Science and Tech), Shen, Shaojie (Hong Kong Univ. of Science and Tech)

15:00-15:15 TuBT13.3

Optimal Control-Based Online Maneuver Planning for Cooperative Lane Change of Connected and Automated Vehicles.

Li, Bai (Zhejiang Univ), Zhang, Youmin (Concordia Univ), Ge, Yuming (China Acad. of Information and Communications Tech), Shao, Zhijiang (Zhejiang Univ), Li, Pu (Department of Simulation and Optimal Processes, Inst. of Aut)

15:15-15:30 TuBT13.4

High Precision Trajectory Planning on Freeform Surfaces for Robotic Manipulators.

Salles de Freitas, Renan (Federal Univ. of Rio De Janeiro), Elael de Melo Soares, Eduardo (Federal Univ. of Rio De Janeiro), Costa, Ramon (Federal Univ. of Rio De Janeiro), Bellinati de Carvalho, Breno (Energia Sustentável Do Brasil)

15:30-15:45 TuBT13.5

A Kinodynamic Steering-Method for Legged Multi-Contact Locomotion.

Fernbach, Pierre (Cnrs - Laas), Tonneau, Steve (Cnrs - Laas), Del Prete, Andrea (CNRS), Taïx, Michel (LAAS-CNRS/Univ. Paul Sabatier)

15:45-16:00 TuBT13.6

Sensory Steering for Sampling-Based Motion Planning.

Arslan, Omur (Univ. of Pennsylvania), Pacelli, Vincent (Univ. of Pennsylvania), Koditschek, Daniel (Univ. of Pennsylvania)

TuBT14 Room 217

Soft Material Robotics IV

Chair: de Almeida, Anibal — IROS 2012 General Chair

Co-Chair: Tavakoli, Mahmoud — Univ. of Coimbra

14:30-14:45 TuBT14.1

Design of a Soft, Parallel End-Effector Applied to Robot-Guided Ultrasound Interventions.

Lindenroth, Lukas (King's Coll. London), Soor, Avinash (King's Coll. London), Hutchinson, Jack (King's Coll. London), Shafi, Amber (King's Coll. London), Back, Jungwhan (King's Coll. London), Rhode, Kawal (King's Coll. London), Liu, Hongbin (King's Coll. London)

14:45-15:00 TuBT14.2

Development of a Soft-Inflatable Exosuit for Knee Rehabilitation.

Sridar, Saivimal (Arizona State Univ), Pham, Huy Nguyen (Arizona State Univ), Zhu, Mengjia (Arizona State Univ), Lam, Quoc (Arizona State Univ), Polygerinos, Panagiotis (Arizona State Univ)

15:00-15:15 TuBT14.3

A Move-And-Hold Pneumatic Actuator Enabled by Self-Softening Variable Stiffness Materials.

Buckner, Trevor (Purdue Univ), White, Edward (Purdue Univ), Yuen, Michelle Ching-Sum (Purdue Univ), Kramer, Rebecca (Purdue Univ), Bilodeau, Raymond Adam (Purdue Univ)

15:15-15:30 TuBT14.4

Soft-Matter Sensor for Proximity, Tactile and Pressure Detection.

Rocha, Rui (Univ. of Coimbra), Lopes, Pedro Filipe Alhais (ISR-UC Inst. of Systems and Robotics - Univ. of Coimbra), Tavakoli, Mahmoud (Univ. of Coimbra), de Almeida, Anibal (IROS 2012 General Chair), Majidi, Carmel (Carnegie Mellon Univ)

15:30-15:45 TuBT14.5

Fabrication, Modeling, and Control of Plush Robots.

Bern, James (Carnegie Mellon Univ), Kumagai, Grace (Univ. of Toronto), Coros, Stelian (Carnegie Mellon Univ)

15:45-16:00 TuBT14.6

Multi-Objective Optimization for Stiffness and Position Control in a Soft Robot Arm Module.

Ansari, Yasmin (Scuola Superiore Sant Anna), Manti, Mariangela (Scuola Superiore Sant'Anna, Pisa, Italy), Falotico, Egidio (Scuola Superiore Sant'Anna), Cianchetti, Matteo (Scuola Superiore Sant'Anna), Laschi, Cecilia (Scuola Superiore Sant'Anna)

TuBT15	Room 215
Visual Tracking	
Chair: Jagersand, Martin	Univ. of Alberta
14:30-14:45	TuBT15.1
On-Road Vehicle Tracking Using Part-Based Particle Filter.	
Fang, Yongkun (Peking Univ), Wang, Chao (Peking Univ), Zhao, Huijing (Peking Univ), Zha, Hongbin (Peking Univ)	
14:45-15:00	TuBT15.2
Visual Coordination Task for Human-Robot Collaboration.	
Khatib, Maram (Sapienza Univ. of Rome), Al Khudir, Khaled (Sapienza Univ. of Rome), De Luca, Alessandro (Sapienza Univ. of Rome)	
15:00-15:15	TuBT15.3
Robust Visual Tracking with a Freely-Moving Event Camera.	
Glover, Arren (Istituto Italiano Di Tecnologia), Bartolozzi, Chiara (Istituto Italiano Di Tecnologia)	
15:15-15:30	TuBT15.4
RGB-D SLAM in Dynamic Environments Using Static Point Weighting.	
Li, Shile (Tech. Univ. München), Lee, Dongheui (Tech. Univ. of Munich)	
15:30-15:45	TuBT15.5
Modular Tracking Framework: A Fast Library for High Precision Tracking.	
Singh, Abhineet (Univ. of Alberta), Jagersand, Martin (Univ. of Alberta)	
15:45-16:00	TuBT15.6
Model-Based Visual Tracking of Orbiting Satellites Using Edges.	
Lourakis, Manolis (Inst. of Computer Science - FOundation for Res. Andtechn), Zabulis, Xenophon (FORTH)	

TuBT16	Room 220
Space Robotics	
Chair: Kazanzides, Peter	Johns Hopkins Univ
Co-Chair: Baker, William	Houston Mechatronics Inc

14:30-14:45 TuBT16.1

Supervisory Control of a Humanoid Robot in Microgravity for Manipulation Tasks.

Farrell, Logan (NASA: Johnson Space Center), Strawser, Philip (NASA), Hambuchen, Kimberly (NASA Johnson Space Center), Baker, William (Houston Mechatronics Inc), Badger, Julia (NASA Johnson Space Center)

14:45-15:00 TuBT16.2

An Approach to Autonomous Science by Modeling Geological Knowledge in a Bayesian Framework.

Arora, Akash (Univ. of Sydney), Fitch, Robert (Univ. of Tech. Sydney), Sukkarieh, Salah (Univ. of Sydney)

15:00-15:15 TuBT16.3

Planetary Robotic Exploration Driven by Science Hypotheses for Geologic Mapping.

Candela, Alberto (Carnegie Mellon Univ), Thompson, David (Jet Propulsion Lab. / California Inst. of Tech), Noe Dobrea, Eldar (Planetary Science Inst), Wettergreen, David (Carnegie Mellon Univ)

15:15-15:30 TuBT16.4

Science-Aware Exploration Using Entropy-Based Planning.

Gautam, Shivam (Carnegie Mellon Univ), Sinha Roy, Bishwamoy (Carnegie Mellon Univ), Candela, Alberto (Carnegie Mellon Univ), Wettergreen, David (Carnegie Mellon Univ)

15:30-15:45 TuBT16.5

Augmented Virtuality for Model-Based Teleoperation.

Vagvolgyi, Balazs (Johns Hopkins Univ), Niu, Wenlong (National Space Science Center, Univ. of Chinese Acad. Of), Chen, Zihan (Johns Hopkins Univ), Wilkening, Paul (Johns Hopkins Univ), Kazanzides, Peter (Johns Hopkins Univ)

TuBT17	Room 221
Formal Methods for Robotics	
Chair: Petersen, Henrik Gordon	Univ. of Southern Denmark
Co-Chair: Vasile, Cristian Ioan	Massachusetts Inst. of Tech

14:30-14:45 TuBT17.1

Reinforcement Learning with Temporal Logic Rewards.

Li, Xiao (Boston Univ), Vasile, Cristian Ioan (Massachusetts Inst. of Tech), Belta, Calin (Boston Univ)

14:45-15:00 TuBT17.2

Sampling-Based Synthesis of Maximally-Satisfying Controllers for Temporal Logic Specifications.

Vasile, Cristian Ioan (Massachusetts Inst. of Tech), Raman, Vasumathi (California Inst. of Tech), Karaman, Sertac (Massachusetts Inst. of Tech)

15:00-15:15 TuBT17.3

A Framework for Handling and Combining Inaccuracy Propagation in Robot Subtasks for Industrial Assembly.

Buch, Jacob Pørksen (Univ. of Southern Denmark), Petersen, Henrik Gordon (Univ. of Southern Denmark)

15:15-15:30 TuBT17.4

Mining the Usage Patterns of ROS Primitives.

Santos, André (Univ. of Minho), Cunha, Alcino (Univ. of Minho), Macedo, Nuno (Univ. of Minho), Arrais, Rafael (Inesc Tec), Neves dos Santos, Filipe (Inesc Tec)

15:30-15:45 TuBT17.5

Space-Efficient Filters for Mobile Robot Localization from Discrete Limit Cycles.

Alam, Tauhidul (Florida International Univ), Bobadilla, Leonardo (Florida International Univ), Shell, Dylan (Texas A&M Univ)

15:45-16:00 TuBT17.6

Automatic Property Checking of Robotic Applications.

Miyazawa, Alvaro (Univ. of York), Ribeiro, Pedro (Univ. of York), Li, Wei (Univ. of York), Cavalcanti, Ana (Univ. of York), Timmis, Jon (Univ. of York)

TuBT18	Room 223
Physically Assistive Devices	
Chair: Hirata, Yasuhisa	Tohoku Univ
Co-Chair: Kaneko, Makoto	Osaka Univ

14:30-14:45 TuBT18.1

A Five Degree-Of-Freedom Body-Machine Interface for Children with Severe Motor Impairments.

Chau, Sheryl (Michigan State Univ), Aspelund, Sanders (Michigan State Univ), Mukherjee, Ranjan (Michigan State Univ), Lee, Mei-Hua (Michigan State Univ), Ranganathan, Rajiv (Michigan State Univ), Kagerer, Florian (Michigan State Univ)

14:45-15:00 TuBT18.2

Development of a Soft Robotic Glove with High Gripping Force Using Force Distributing Compliant Structures.

Kim, Yong-Jae (Korea Univ. of Tech. and Education), Jeong, YongJun (Department of Electrical, Electronics Engineering & Communicatio), Jeon, Hyeong-Seok (Korea Univ. of Tech. and Education), Lee, Deok-Won (Korea Univ. of Tech. and Education), Kim, Jong-In (Korea Univ. of Tech. and Education)

15:00-15:15 TuBT18.3

Quantifying Performance of Bipedal Standing with Multi-Channel EMG.

Sui, Yanan (California Inst. of Tech), Kim, Kun ho (California Inst. of Tech), Burdick, Joel (California Inst. of Tech)

15:15-15:30 TuBT18.4

Variable Viscoelastic Joint System and Its Application to Exoskeleton.

Okui, Manabu (Chuo Univ), Iikawa, Shingo (Chuo Univ), Yamada, Yasuyuki (Chuo Univ), Nakamura, Taro (Chuo Univ)

15:30-15:45 TuBT18.5

A Phantom-Sensation Based Paradigm for Continuous Vibrotactile Wrist Guidance in 2D Space.

Salazar Luces, Jose Victorio (Tohoku Univ), Okabe, Keisuke (Tohoku Univ), Murao, Yoshiki (Tohoku Univ), Hirata, Yasuhisa (Tohoku Univ)

15:45-16:00 TuBT18.6

An Active Neck Brace Controlled by a Joystick to Assist Head Motion.

Zhang, Haohan (Columbia Univ), Agrawal, Sunil (Columbia Univ)

TuCT1	Room 109
Learning from Demonstration II	
Chair: Oh, Songhwai	Seoul National Univ
Co-Chair: Asfour, Tamim	Karlsruhe Inst. of Tech. (KIT)

16:30-16:45 TuCT1.1

Looking High and Low: Learning Place-Dependent Gaussian Mixture Height Models for Terrain Assessment.

Berczi, Laszlo-Peter (Univ. of Toronto), Barfoot, Timothy (Univ. of Toronto)

16:45-17:00 TuCT1.2

Scalable Robust Learning from Demonstration with Leveraged Deep Neural Networks.

Choi, Sungjoon (Seoul National Univ), Lee, Kyungjae (Seoul National Univ), Oh, Songhwai (Seoul National Univ)

17:00-17:15 TuCT1.3

Adversarially Robust Policy Learning through Active Construction of Physically-Plausible Perturbations.

Mandlekar, Ajay Uday (Stanford Univ), Zhu, Yuke (Stanford Univ), Garg, Animesh (Stanford Univ), Fei-Fei, Li (Stanford Univ), Savarese, Silvio (Stanford Univ)

17:15-17:30 TuCT1.4

Learning a Unified Control Policy for Safe Falling.

C V Kumar, Visak (Georgia Inst. of Tech), Ha, Sehoon (Disney Res), Liu, Karen (Georgia Tech)

17:30-17:45 TuCT1.5

Learning to Fly by Crashing.

Gandhi, Dhiraj (Carnegie Mellon Univ), Pinto, Lerrel Joseph (Carnegie Mellon Univ), Gupta, Abhinav (Carnegie Mellon Univ)

17:45-18:00 TuCT1.6

Learning Externally Modulated Dynamical Systems.

SOMMER, Nicolas (Ec. Pol. Federale De Lausanne (EPFL)), Kronander, Klas (Learning Algorithms and Systems Lab. EPFL), Billard, Aude (EPFL)

TuCT2	Room 111
Biologically-Inspired Robots IV	
Co-Chair: Guan, Yisheng	Guangdong Univ. of Tech

16:30-16:45 TuCT2.1

A High Speed Motion Capture Method and Performance Metrics for Studying Gaits on an Insect-Scale Legged Robot.

Goldberg, Benjamin (Harvard Univ), Doshi, Neel (Harvard), Jayaram, Kaushik (Harvard Univ), Koh, Je-Sung (Harvard Univ), Wood, Robert (Harvard Univ)

16:45-17:00 TuCT2.2

When Joggers Meet Robots: A Preliminary Study on Foot Strike Patterns.

Liu, George H. Z. (The Univ. of Hong Kong), Chen, Michael Z. Q. (Nanjing Univ. of Science and Tech), Chen, Yonghua (The Univ. of Hong Kong), Huang, Lixi (The Univ. of Hong Kong)

17:00-17:15 TuCT2.3

FLEGX: A Bioinspired Design for a Jumping Humanoid Leg.

D'Imperio, Mariapaola (Istituto Italiano Di Tecnologia), Ludovico, Daniele (Pol. Di Torino), PIZZAMIGLIO, CRISTIANO (Pol. Di Torino/DIMEAS), Canali, Carlo (Department of Advanced Robotics, Istituto Italiano Di Tecnologia), Caldwell, Darwin G. (Istituto Italiano Di Tecnologia), Cannella, Ferdinando (Istituto Italiano Di Tecnologia)

17:15-17:30 TuCT2.4

A 3-D Bio-Inspired Odor Source Localization and Its Validation in Realistic Environmental Conditions.

Rahbar, Faezeh (EPFL), Marjovi, Ali (EPFL), Kibleur, Pierre (EPFL), Martinoli, Alcherio (EPFL)

17:30-17:45 TuCT2.5

Morphological Optimization for Tensegrity Quadruped Locomotion.

Hustig-Schultz, Dawn (Univ. of California, Santa Cruz), SunSpiral, Vytas (SGT Inc. / NASA Ames Res. Center), Teodorescu, Mircea (UCSC)

17:45-18:00 TuCT2.6

Collision Selective LGMDs Neuron Models Research Benefits from a Vision-Based Autonomous Micro Robot.

Fu, Qinbing (Univ. of Lincoln), Hu, Cheng (Univ. of Lincoln), Liu, Tian (Univ. of Lincoln), Yue, Shigang (Univ. of Lincoln)

TuCT3	Room 116
Manipulation Planning	
Chair: O'Kane, Jason	Univ. of South Carolina
Co-Chair: Behnke, Sven	Univ. of Bonn

16:30-16:45 TuCT3.1

A Probabilistic Planning Framework for Planar Grasping under Uncertainty.

Zhou, Jiaji (Carnegie Mellon Univ), Paolini, Robert (Carnegie Mellon Univ), Johnson, Aaron (Carnegie Mellon Univ), Bagnell, James (Carnegie Mellon Univ), Mason, Matthew T. (Carnegie Mellon Univ)

16:45-17:00 TuCT3.2

Interleaving Motion in Contact and in Free Space for Planning under Uncertainty.

Sieverling, Arne (Tech. Univ. Berlin), Eppner, Clemens (Tech. Univ. Berlin), Wolff, Felix (Hasso Plattner Inst. Potsdam), Brock, Oliver (Tech. Univ. Berlin)

17:00-17:15 TuCT3.3

Efficient Stochastic Multicriteria Arm Trajectory Optimization.

Pavlichenko, Dmytro (Univ. of Bonn), Behnke, Sven (Univ. of Bonn)

17:15-17:30 TuCT3.4

Manipulation Planning with Directed Reachable Volumes.

McMahon, Troy (Texas A&M), Sandstrom, Read (Texas A&M Univ), Thomas, Shawna (Texas A&M Univ), Amato, Nancy (Texas A&M Univ)

17:30-17:45 TuCT3.5

Safe Robotic Grasping: Minimum Impact-Force Grasp Selection.

Mavrakis, Nikos (Univ. of Birmingham), Ghalamzan Esfahani, Amir Masoud (Univ. of Birmingham), Stolkin, Rustam (Univ. of Birmingham)

17:45-18:00 TuCT3.6

Inconsequential Improprieties: Filter Reduction in Probabilistic Worlds.

Saberifar, Fatemeh Zahra (Univ. of Amirkabir), O'Kane, Jason (Univ. of South Carolina), Shell, Dylan (Texas A&M Univ)

TuCT4	Room 114
Localization III	
Chair: Magnusson, Martin	Örebro Univ
Co-Chair: Fang, Lu	Tsinghua Univ

16:30-16:45 TuCT4.1

Planar Scan Matching Using Incident Angle.

LV, Jixin (Hangzhou Hikvision Digital Tech. Co., Ltd), Wang, Yue (Zhejiang Univ), WU, KANZHI (Univ. of Tech. Sydney), Dissanayake, Gamini (Univ. of Tech. Sydney), Kobayashi, Yukinori (Hokkaido Univ), Xiong, Rong (Zhejiang Univ)

16:45-17:00 TuCT4.2

Beyond SIFT Using Binary Features in Loop Closure Detection.

Han, Lei (Hong Kong Univ. of Science and Tech), ZHOU, Guyue (DJI), XU, Lan (Hong Kong Univ. of Science and Tech), Fang, Lu (Hong Kong Univ. of Science and Tech)

17:00-17:15 TuCT4.3

Semantic-Assisted 3D Normal Distributions Transform for Scan Registration in Environments with Limited Structure.

Zaganidis, Anestis (Univ. of Lincoln), Magnusson, Martin (Örebro Univ), Duckett, Tom (Univ. of Lincoln), Cielniak, Grzegorz (Univ. of Lincoln)

17:15-17:30 TuCT4.4

RGBD-Based Robot Localization in Sewer Networks.

Alejo, David (Univ. Pablo De Olavide), Caballero, Fernando (Univ. of Seville), Merino, Luis (Pablo De Olavide Univ)

17:30-17:45 TuCT4.5

Pose Graph-Based Precise Localization with Point and Lane Features.

Wu, Cong (Karlsruhe Inst. of Tech), Huang, Tiffany A. (Mercedes-Benz Res. & Development North America), Muffert, Maximilian (Mercedes-Benz RD North America), Schwarz, Tilo (Daimler AG), Gräter, Johannes (Karlsruher Inst. Für Tech. (KIT))

17:45-18:00 TuCT4.6

Markovian Jump Linear Systems-Based Filtering for Visual and GPS Aided Inertial Navigation System.

Inoue, Roberto (Federal Univ. of São Carlos), Guizilini, Vitor (Univ. of Sydney), Terra, Marco Henrique (Univ. of Sao Paulo), Ramos, Fabio (Univ. of Sydney)

TuCT5	Room 118
Legged Robots II	
Chair: Choi, Hyouk Ryeol	Sungkyunkwan Univ
Co-Chair: Remy, C. David	Univ. of Michigan

16:30-16:45 TuCT5.1

RAMone: A Planar Biped for Studying the Energetics of Gait.

Smit-Anseeuw, Nils (Univ. of Michigan), Gleason, Rodney (Univ. of Michigan), Zaytsev, Petr (Univ. of Michigan), Remy, C. David (Univ. of Michigan)

16:45-17:00 TuCT5.2

Foothold Placement Planning with a Hexapod Crawling Robot.

Cizek, Petr (Czech Tech. Univ. in Prague, Faculty of Electrical Engi), Masri, Diar (Czech Tech. Univ. in Prague, Faculty of Electrical Engi), Faigl, Jan (Czech Tech. Univ. in Prague)

17:00-17:15 TuCT5.3

Policy-Regularized Model Predictive Control to Stabilize Diverse Quadrupedal Gaits for the MIT Cheetah.

Bledt, Gerardo (Massachusetts Inst. of Tech. (MIT)), Wensing, Patrick (Univ. of Notre Dame), Kim, Sangbae (Massachusetts Inst. of Tech)

17:15-17:30 TuCT5.4

GOAT: A Legged Robot with 3D Agility and Virtual Compliance.

Kalouche, Simon (Stanford Univ. / Carnegie Mellon Univ)

17:30-17:45 TuCT5.5

Stealth Walking of 3-Link Planar Underactuated Biped.

Asano, Fumihiko (Japan Advanced Inst. of Science and Tech)

17:45-18:00 TuCT5.6

Development of Torque Controllable Leg for Running Robot, AiDIN-IV.

Lee, Yoon Haeng (Sungkyunkwan Univ), Lee, Young Hun (Sungkyunkwan Univ), Lee, Hyunyong (Sungskyunkwan Univ), Phan, Luong Tin (Sungkyunkwan Univ), Kang, Hansol (Sungkyunkwan Univ), kim, Yong Bum (Sungskyunkwan Univ), Choi, Hyouk Ryeol (Sungkyunkwan Univ)

TuCT6	Room 121
Human Detection and Tracking	
Chair: Perez Quintero, Camilo Alfonso	Univ. of Alberta
Co-Chair: Furukawa, Tomonari	Virginia Pol. Inst. and State Univ

16:30-16:45 TuCT6.1

Learn2Smile: Learning Non-Verbal Interaction through Observation.

Feng, Will (Facebook AI Res), Kannan, Anitha (Facebook), Gkioxari, Georgia (Facebook AI Res), Zitnick, Lawrence (Facebook AI Res)

16:45-17:00 TuCT6.2

Partially Transferred Convolution Neural Network with Cross-Layer Inheriting for Posture Recognition from Top-View Depth Camera.

Liu, An-Sheng (National Taiwan Univ), Li, Zi-Jun (National Taiwan Univ), Yeh, Tso-Hsin (National Taiwan Univ), Yang, Yu-Huan (National Taiwan Univ), Fu, Li-Chen (National Taiwan Univ)

17:00-17:15 TuCT6.3

Tracking a Varying Number of People with a Visually-Controlled Robotic Head.

BAN, Yutong (INRIA Grenonle Rhône-Alpes), Alameda-Pineda, Xavier (INRIA Grenoble Rhône-Alpes, Univ. Joseph Fourier), Badeig, Fabien (INRIA Grenoble Rhone-Alpes), Ba, Sileye (INRIA Rhône-Alpes), Horaud, Radu (INRIA Grenoble Rhone-Alpes)

17:15-17:30 TuCT6.4

Faster Robot Perception Using Salient Depth Partitioning.

Chan, Darren (Univ. of California, San Diego), Taylor, Angelique (Univ. of California, San Diego), Riek, Laurel D. (Univ. of California San Diego)

17:30-17:45 TuCT6.5

Fast and Robust Detection of Fallen People from a Mobile Robot.

Antonello, Morris (Univ. of Padova), Carraro, Marco (Univ. of Padua), Pierobon, Marco (IT+Robotics Srl), Menegatti, Emanuele (The Univ. of Padua)

17:45-18:00 TuCT6.6

Multi-Stage Bayesian Target Estimation by UAV Using Fisheye Lens Camera and Pan/Tilt Camera.

Furukawa, Tomonari (Virginia Pol. Inst. and State Univ), Kang, Changkoo (Virginia Tech), Li, Boren (Virginia Tech), Dissanayake, Gamini (Univ. of Tech. Sydney)

TuCT7 Room 122

Marine Robotics I

Chair: Sattar, Junaed — Univ. of Minnesota

Co-Chair: Shintake, Jun — École Pol. Fédérale De Lausanne

16:30-16:45 TuCT7.1

Online Model Identification for Underwater Vehicles through Incremental Support Vector Regression.

Wehbe, Bilal (German Res. Center for Artificial Intelligence - Robotic Inn), Fabisch, Alexander (Univ. of Bremen), Krell, Mario Michael (Univ. of Bremen)

16:45-17:00 TuCT7.2

Low-Cost Monocular Localization with Active Markers for Micro Autonomous Underwater Vehicles.

Buchan, Austin D (UC Berkeley), Solowjow, Eugen (Hamburg Univ. of Tech), Duecker, Daniel Andre (Hamburg Univ. of Tech), Kreuzer, Edwin (Hamburg Univ. of Tech)

17:00-17:15 TuCT7.3

Underwater Multi-Robot Convoying Using Visual Tracking by Detection.

Shkurti, Florian (McGill Univ), Chang, Wei-Di (McGill Univ), Henderson, Peter (McGill Univ), Islam, Md Jahidul (Univ. of Minnesota-Twin Cities), Gamboa Higuera, Juan Camilo (McGill Univ), Li, Jimmy (McGill Univ), Manderson, Travis (McGill Univ), Xu, Anqi (McGill Univ), Dudek, Gregory (McGill Univ), Sattar, Junaed (Univ. of Minnesota)

17:15-17:30 TuCT7.4

Development of Bio-Inspired Underwater Robot with Adaptive Morphology Capable of Multiple Swimming Modes.

Paschal, Thibaut (EPFL), Shintake, Jun (École Pol. Fédérale De Lausanne), Mintchev, Stefano (École Pol. Fédérale De Lausanne), Floreano, Dario (Ec. Pol. Federal, Lausanne)

17:30-17:45 TuCT7.5

Control of a Flexible, Surface-Piercing Hydrofoil for High-Speed, Small-Scale Applications.

Bousquet, Gabriel D (Massachusetts Inst. of Tech), Triantafyllou, Michael (MIT), Slotine, Jean-Jacques E. (Massachusetts Inst. of Tech)

17:45-18:00 TuCT7.6

Path-Following Control for Unmanned Surface Vehicles.

Li, Zhi (Memorial Univ. of Newfoundland), Bachmayer, Ralf (Memorial Univ. of Newfoundland), Vardy, Andrew (Memorial Univ. of Newfoundland)

TuCT8 Room 202

Aerial Systems: Perception and Autonomy II

Chair: Birchfield, Stan — Microsoft Corp

16:30-16:45 — TuCT8.1

Autonomous Flight for Detection, Localization, and Tracking of Moving Targets with a Small Quadrotor.

Thomas, Justin (Univ. of Pennsylvania), Welde, Jake (Univ. of Pennsylvania), Loianno, Giuseppe (Univ. of Pennsylvania), Daniilidis, Kostas (Univ. of Pennsylvania), Kumar, Vijay (Univ. of Pennsylvania)

16:45-17:00 — TuCT8.2

Robust Initialization of Monocular Visual-Inertial Estimation on Aerial Robots.

QIN, Tong (Hong Kong Univ. of Science and Tech), Shen, Shaojie (Hong Kong Univ. of Science and Tech)

17:00-17:15 — TuCT8.3

Spline-Based Initialization of Monocular Visual-Inertial State Estimators at High Altitude.

Liu, Tianbo (Hong Kong Univ. of Science and Tech), Shen, Shaojie (Hong Kong Univ. of Science and Tech)

17:15-17:30 — TuCT8.4

Toward Low-Flying Autonomous MAV Trail Navigation Using Deep Neural Networks for Environmental Awareness.

Smolyanskiy, Nikolai (NVIDIA), Kamenev, Alexey (NVIDIA), Smith, Jeffrey (NVIDIA), Birchfield, Stan (Microsoft Corp)

17:30-17:45 — TuCT8.5

Tracking Control of a UAV with a Parallel Visual Processor.

Greatwood, Colin (Univ. of Bristol), Bose, Laurie (Univ. of Bristol), Richardson, Thomas (Univ. of Bristol), Mayol, Walterio (Univ. of Bristol), Chen, Jianing (The Univ. of Manchester), Carey, Stephen J. (The Univ. of Manchester), Dudek, Piotr (The Univ. of Manchester)

17:45-18:00 — TuCT8.6

Low Cost Sensing and Communication System for Rotor Craft.

Gyongyosi, Marc (Northwestern Univ), Daley, Alexander (Northwestern Univ), Resnick, Blake (Northwestern Univ), Rubenstein, Michael (Northwestern Univ)

TuCT9	Room 204
Recognition	
Co-Chair: Gasteratos, Antonios	Democritus Univ. of Thrace
16:30-16:45	TuCT9.1
Two-Stream RNN/CNN for Action Recognition in 3D Videos.	
Zhao, Rui (Siemens AG & Ludwig Maximilian Univ. of Munich), Ali, Haider (Johns Hopkins Univ), van der Smagt, Patrick (TUM)	
16:45-17:00	TuCT9.2
High Order Visual Words for Structure-Aware and Viewpoint-Invariant Loop Closure Detection.	
Bampis, Loukas (Democritus Univ. of Thrace), Amanatiadis, Angelos (Democritus Univ. of Thrace), Gasteratos, Antonios (Democritus Univ. of Thrace)	
17:00-17:15	TuCT9.3
Belief Tree Search for Active Object Recognition.	
Malmir, Mohsen (Univ. of California San Diego), Cottrell, Garrison W. (Univ. of California, San Diego)	
17:15-17:30	TuCT9.4
Real-Time Salient Closed Boundary Tracking Via Line Segments Perceptual Grouping.	
Qin, Xuebin (Univ. of Alberta), He, Shida (Univ. of Alberta), Perez Quintero, Camilo Alfonso (Univ. of Alberta), Singh, Abhineet (Univ. of Alberta), Dehghan, Masood (National Univ. of Singapore), Jagersand, Martin (Univ. of Alberta)	
17:30-17:45	TuCT9.5
Stable Laser Interest Point Selection for Place Recognition in a Forest.	
Giamou, Matthew (Univ. of Toronto), Babich, Yaroslav (MIT), Habibi, Golnaz (Rice Univ), How, Jonathan Patrick (Massachusetts Inst. of Tech)	
17:45-18:00	TuCT9.6
MSM-HOG: A Flexible Trajectory Descriptor for Rigid Body Motion Recognition.	
GUO, Yao (City Univ. of Hong Kong), Li, You-Fu (City Univ. of Hong Kong), Shao, Zhanpeng (Zhejiang Univ. of Tech)	

TuCT10	Room 205
Swarms	
Chair: Werfel, Justin	Harvard Univ
Co-Chair: Hauert, Sabine	Univ. of Bristol

16:30-16:45 TuCT10.1

Algorithms for Shaping a Particle Swarm with a Shared Input by Exploiting Non-Slip Wall Contacts.

Shahrokhi, Shiva (Univ. of Houston), Mahadev, Arun (Univ. of Houston), Becker, Aaron (Univ. of Houston)

16:45-17:00 TuCT10.2

Towards Rapid Mechanical Customization of Cm-Scale Self-Folding Agents.

Weston-Dawkes, William (Univ. of California, San Diego), Ong, Aaron (Univ. of California, San Diego), Abdul Majit, Mohamad Ramzi (Univ. of California, San Diego), Joseph, Francis (Univ. of California, San Diego), Tolley, Michael Thomas (Univ. of California, San Diego)

17:00-17:15 TuCT10.3

Field Coverage and Weed Mapping by UAV Swarms.

Albani, Dario (Sapienza Univ. of Rome), Nardi, Daniele (Sapienza Univ. of Rome), Trianni, Vito (Consiglio Nazionale Delle Ricerche)

17:15-17:30 TuCT10.4

Robust Distributed Decision-Making in Robot Swarms: Exploiting a Third Truth State.

Crosscombe, Michael (Univ. of Bristol), Lawry, Jonathan (Univ. of Bristol), Hauert, Sabine (Univ. of Bristol), Homer, Martin (Univ. of Bristol)

17:30-17:45 TuCT10.5

Using Local Force Measurements to Guide Construction by Distributed Climbing Robots.

Melenbrink, Nathan (Wyss Inst. for Biologically Inspired Engineering, Harvard Un), Michalatos, Panagiotis (Harvard Univ), Kassabian, Paul (Simpson Gumpertz & Heger), Werfel, Justin (Harvard Univ)

17:45-18:00 TuCT10.6

Decentralized Stochastic Control of Robotic Swarm Density: Theory, Simulation, and Experiment.

Li, Hanjun (Univ. of California, Los Angeles), Feng, Chunhan (Nankai Univ), Ehrhard, Henry (Grinnell Coll), Shen, Yijun (Univ. of California, Los Angeles), Cobos, Bernardo (Univ. of California, Los Angeles), Zhang, Fangbo (Univ. of California, Los Angeles), Elamvazhuthi, Karthik (Arizona State Univ), Berman, Spring (Arizona State Univ), Haberland, Matt (Univ. of California, Los Angeles), Bertozzi, Andrea Louise (UCLA)

TuCT11 Room 207

Cognitve and Physical HRI

Chair: Cannata, Giorgio Univ. of Genova

Co-Chair: Tsagarakis, Nikos Istituto Italiano Di Tecnologia

16:30-16:45 TuCT11.1

Human Hand Recognition from Robotic Skin Measurements in Human-Robot Physical Interactions.

Albini, Alessandro (Univ. of Genova), Denei, Simone (Univ. of Genova), Cannata, Giorgio (Univ. of Genova)

16:45-17:00 TuCT11.2

Measurement and Prediction of Situation Awareness in Human-Robot Interaction Based on a Framework of Probabilistic Attention.

Dini, Amir (JOANNEUM Res. Forschungsgesellschaft Mbh), Murko, Cornelia (JOANNEUM Res. Forschungsgesellschaft Mbh), Paletta, Lucas (JOANNEUM Res. Forschungsgesellschaft Mbh), Hofbaur, Michael (Joanneum Res), Augsdörfer, Ursula (Graz Tech. Univ), yahyanejad, saeed (Joanneum Res)

17:00-17:15 TuCT11.3

Anticipatory Robot Assistance for the Prevention of Human Static Joint Overloading in Human-Robot Collaboration.

Kim, Wansoo (Istituto Italiano Di Tecnologia), Lee, Jinoh (Fondazione Istituto Italiano Di Tecnologia), Peternel, Luka (Istituto Italiano Di Tecnologia), Tsagarakis, Nikos (Istituto Italiano Di Tecnologia), Ajoudani, Arash (Advanced Robotics Department)

17:15-17:30 TuCT11.4

Velocity-Curvature Patterns Limit Human-Robot Physical Interaction.

Maurice, Pauline (Northeastern Univ), Huber, Meghan (Massachusetts Inst. of Tech), Hogan, Neville (Massachusetts Inst. of Tech), Sternad, Dagmar (Northeastern Univ)

17:30-17:45 TuCT11.5

EMG-Based Model Predictive Control for Physical Human-Robot Interaction: Application for Assist-As-Needed Control.

Teramae, Tatsuya (ATR Computational Neuroscience Lab), Noda, Tomoyuki (ATR Computational Neuroscience Lab), Morimoto, Jun (ATR Computational Neuroscience Labs)

17:45-18:00 TuCT11.6

Recognizing Actions During Tactile Manipulations through Force Sensing.

Subramani, Guru (Univ. of Wisconsin - Madison), Rakita, Daniel (Http: //graphics.cs.wisc.edu/WP/), Wang, Hongyi (Univ. of Wisconsin-Madison), Black, Jordan (Univ. of Wisconsin-Madison), Zinn, Michael (Univ. of Wisconsin - Madison), Gleicher, Michael (Univ. of Wisconsin - Madison)

TuCT12	Room 208
Sensor Fusion	
Co-Chair: Vardy, Andrew	Memorial Univ. of Newfoundland

16:30-16:45 TuCT12.1

Inertial-Based Scale Estimation for Structure from Motion on Mobile Devices.

Mustaniemi, Janne (Univ. of Oulu), Kannala, Juho (Aalto Univ), Särkkä, Simo (Aalto Univ. Finland), Matas, Jiri (Czech Tech. Univ), Heikkilä, Janne (Univ. of Oulu)

16:45-17:00 TuCT12.2

Robust Indoor/outdoor Navigation through Magneto-Visual-Inertial Optimization-Based Estimation.

Caruso, David (Ec. Pol), Eudes, Alexandre (ONERA), Sanfourche, Martial (ONERA), Vissiere, David (Sysnav), Lebesnerais, Guy (Onera)

17:00-17:15 TuCT12.3

Likelihood-Based Iterated Cubature Multi-State Constraint Kalman Filter for Visual Inertial Navigation System.

Nguyen, Trung (Memorial Univ. of Newfoundland), Mann, George K. I. (Memorial Univ. of Newfoundland), Vardy, Andrew (Memorial Univ. of Newfoundland), Gosine, Raymond G. (Memorial Univ. of Newfoundland)

17:15-17:30 TuCT12.4

State Observability in Presence of Disturbances: The Analytic Solution and Its Application in Robotics.

Martinelli, Agostino (INRIA Grenoble-Rhone-Alpes)

17:30-17:45 TuCT12.5

Generalized Center of Gravity Compensation for Multirotors with Application to Aerial Manipulation.

Fresk, Emil (Luleå Univ. of Tech), Wuthier, David (Luleå Univ. of Tech), Nikolakopoulos, George (Luleå Univ. of Tech)

17:45-18:00 TuCT12.6

Bias Estimation for Angle-Only Sensors in Distributed Multi-Target Tracking Systems.

Martin, Sean (Johns Hopkins Univ. APL), Peterson, Cammy (Univ. of Maryland)

TuCT13	Room 211
Motion and Path Planning IV	
Chair: Behnke, Sven	Univ. of Bonn
Co-Chair: Padir, Taskin	Northeastern Univ

16:30-16:45 TuCT13.1

On the Performance of Selective Adaptation in State Lattices for Mobile Robot Motion Planning in Cluttered Environments.

Napoli, Michael (Univ. of Rochester), Biggie, Harel (Univ. of Rochester), Howard, Thomas (Univ. of Rochester)

16:45-17:00 TuCT13.2

Anytime Hybrid Driving-Stepping Locomotion Planning.

Klamt, Tobias (Univ. of Bonn), Behnke, Sven (Univ. of Bonn)

17:00-17:15 TuCT13.3

Anytime Multi-Task Motion Planning for Humanoid Robots.

Long, Xianchao (Northeastern Univ), Wonsick, Murphy (Northeastern Univ), Dimitrov, Velin (Northeastern Univ), Padir, Taskin (Northeastern Univ)

17:15-17:30 TuCT13.4

A Distributed Exploration Algorithm for Unknown Environments with Multiple Obstacles by Multiple Robots.

Bravo, Luis (Univ. of Guanajuato), Ruiz, Ubaldo (CICESE), Murrieta-Cid, Rafael (Center for Mathematical Res), Aguilar, Gabriel (Centro De Investigacion En Matematicas), Chávez, Edgar (Cicese)

17:30-17:45 TuCT13.5

A Mixed-Integer Convex Optimization Framework for Robust Multilegged Robot Locomotion Planning Over Challenging Terrain.

Aceituno-Cabezas, Bernardo (Simon Bolivar Univ), Dai, Hongkai (Massachusetts Inst. of Tech), Cappelletto, Jose (Simón Bolívar Univ), Grieco, Juan Carlos (Simon Bolivar Univ), Fernandez-Lopez, Gerardo (Simon Bolivar Univ)

17:45-18:00 TuCT13.6

Calculating Human Reachable Occupancy for Guaranteed Collision-Free Planning.

Pereira, Aaron (Tech. Univ. München), Althoff, Matthias (Tech. Univ. München)

TuCT14	Room 217
Intelligent Transportation	
Chair: Johnson-Roberson, Matthew	Univ. of Michigan
Co-Chair: DAVID, JENNIFER	HALMSTAD Univ

16:30-16:45 TuCT14.1

Demand Estimation and Chance-Constrained Fleet Management for Ride Hailing.

Miller, Justin (MIT), How, Jonathan Patrick (Massachusetts Inst. of Tech)

16:45-17:00 TuCT14.2

Lane-Change Social Behavior Generator for Autonomous Driving Car by Non-Parametric Regression in Reproducing Kernel Hilbert Space.

Dong, Chiyu (Carnegie Mellon Univ), Zhang, Yihuan (TongjiUniversity), Dolan, John M. (Carnegie Mellon Univ)

17:00-17:15 TuCT14.3

Have I Reached the Intersection: A Deep Learning-Based Approach for Intersection Detection from Monocular Cameras.

Bhatt, Dhaivat (IIIT-Hyderabad), Sodhi, Danish (IIIT-Hyderabad), Pal, Arghya (Indian Inst. of Tech. Hyderabad), Balasubramanian, Vineeth (Indian Inst. of Tech. Hyderabad), Krishna, Madhava (IIIT Hyderabad)

17:15-17:30 TuCT14.4

Gradient Based Path Optimization Method for Autonomous Driving.

DAVID, JENNIFER (HALMSTAD Univ), Valencia, Rafael (Carnegie Mellon Univ), Philippsen, Roland (Google Inc), Bosshard, Pascal (V-ZUG), Iagnemma, Karl (MIT)

17:30-17:45 TuCT14.5

Real-Time Certified Probabilistic Pedestrian Forecasting.

Jacobs, Henry (Univ. of Michigan), Hughes, Owen (Frc 1076), Johnson-Roberson, Matthew (Univ. of Michigan), Vasudevan, Ram (Univ. of Michigan)

17:45-18:00 TuCT14.6

Vibration-Reducing End Effector for Automation of Drilling Tasks in Aircraft Manufacturing.

von Drigalski, Felix Wolf Hans Erich (Nara Inst. of Science and Tech), El Hafi, Lotfi (Nara Inst. of Science and Tech), Uriguen Eljuri, Pedro Miguel (Nara Inst. of Science and Tech), Garcia Ricardez, Gustavo Alfonso (Nara Inst. of Science and Tech. (NAIST)), Takamatsu, Jun (Nara Inst. of Science and Tech), Ogasawara, Tsukasa (Nara Inst. of Science and Tech)

TuCT15	Room 215
Biped Locomotion	
Chair: Sugihara, Tomomichi	Graduate School of Engineering, Osaka Univ
Co-Chair: Englsberger, Johannes	DLR (German Aerospace Center)

16:30-16:45 TuCT15.1

Balancing Stability and Maneuverability During Rapid Gait Termination in Fast Biped Robots.

Shield, Stacey Leigh (Univ. of Cape Town), Patel, Amir (Univ. of Cape Town)

16:45-17:00 TuCT15.2

Bipedal Walking Control against Swing Foot Collision Using Swing Foot Trajectory Regeneration and Impact Mitigation.

Ishikawa, Tatsuya (Univ. of Tokyo), Kojio, Yuta (The Univ. of Tokyo), Kojima, Kunio (The Univ. of Tokyo), Nozawa, Shunichi (The Univ. of Tokyo), Kakiuchi, Yohei (The Univ. of Tokyo), Okada, Kei (The Univ. of Tokyo), Inaba, Masayuki (The Univ. of Tokyo)

17:00-17:15 TuCT15.3

Artificial Invariant Subspace with Potential Functions for Humanoid Robot Balancing.

Deng, Xiang (Univ. of Pennsylvania), Miao, Fei (Univ. of Pennsylvania), Lee, Daniel D. (Univ. of Pennsylvania)

17:15-17:30 TuCT15.4

Foot-Guided Agile Control of a Biped Robot through ZMP Manipulation.

Sugihara, Tomomichi (Graduate School of Engineering, Osaka Univ), Yamamoto, Takanobu (Graduate School of Engineering, Osaka Univ)

17:30-17:45 TuCT15.5

A Stability Region Criterion for Flat-Footed Bipedal Walking on Deformable Granular Terrain.

Xiong, Xiaobin (Georgia Inst. of Tech), Ames, Aaron (California Inst. of Tech), Goldman, Daniel (Georgia Inst. of Tech)

17:45-18:00 TuCT15.6

Smooth Trajectory Generation and Push-Recovery Based on Divergent Component of Motion.

Englsberger, Johannes (DLR (German Aerospace Center)), Mesesan, George (German Aerospace Center (DLR)), Ott, Christian (German Aerospace Center (DLR))

TuCT16	Room 220
Impedance and Adaptive Control	
Chair: Carloni, Raffaella	Univ. of Twente
Co-Chair: Rojas, Juan	Guangdong Univ. of Tech

16:30-16:45 TuCT16.1

Forward Dynamics Compliance Control (FDCC): A New Approach to Cartesian Compliance for Robotic Manipulators.

Scherzinger, Stefan (FZI Res. Center for Information Tech), Roennau, Arne (FZI Forschungszentrum Informatik, Karlsruhe), Dillmann, Rüdiger (Karlsruhe Inst. of Tech. (KIT))

16:45-17:00 TuCT16.2

A New Kinematic Formulation of the RCM Constraint for Redundant Torque-Controlled Robots.

Sandoval, Juan Sebastián (Univ. D'orléans), Poisson, Gérard (Univ. D'orléans), Vieyres, Pierre (Lab. PRISME, Univ. Oforleans)

17:00-17:15 TuCT16.3

Mechatronic Design of a Variable Stiffness Robotic Arm.

Barrett, Eamon (Univ. of Twente), Reiling, Mark (Univ. of Twente), Barbieri, Giuseppe (Univ. of Twente), Fumagalli, Matteo (Aalborg Univ), Carloni, Raffaella (Univ. of Twente)

17:15-17:30 TuCT16.4

Robust Whole-Body Motion Control of Legged Robots.

Farshidian, Farbod (ETH Zurich), Jelavic, Edo (Swiss Federal Inst. of Tech. Zurich), Winkler, Alexander, Wayne (ETH Zurich), Buchli, Jonas (ETH Zurich)

17:30-17:45 TuCT16.5

Robust Damping of a Ropeway Gondola's Wind Oscillations with an Actuated Mass.

Estandia, Alvaro (ETH Zurich), Hutter, Marco (ETH Zurich)

17:45-18:00 TuCT16.6

Rebalance Control for Humanoid Walking Based on Online Foot Position Compensation.

Zhang, Tong (Tongji Univ), Liu, Chengju (Tongji Univ), Chen, Qijun (Tongji Univ)

TuCT17	Room 221
Physical Human-Robot Interaction	
Chair: Gosselin, Clement	Univ. Laval
Co-Chair: De Luca, Alessandro	Sapienza Univ. of Rome

16:30-16:45 TuCT17.1

Human-Robot Coexistence and Contact Handling with Redundant Robots.

Magrini, Emanuele (Sapienza Univ. of Rome), De Luca, Alessandro (Sapienza Univ. of Rome)

16:45-17:00 TuCT17.2

A Control Architecture for Physical Human-UAV Interaction with a Fully Actuated Hexarotor.

Rajappa, Sujit (Max Planck Inst. for Biological Cybernetics), Buelthoff, Heinrich H. (Max Planck Inst. for Biol. Cybernetics), Odelga, Marcin (Max Planck Inst. for Biological Cybernetics; Univ. of T), Stegagno, Paolo (Univ. of Rhode Island)

17:00-17:15 TuCT17.3

Design, Control and Experimental Validation of a Haptic Robotic Hand Performing Human-Robot Handshake with Human-Like Agility.

Arns, Moritz (Univ. Laval), Laliberte, Thierry (Univ. Laval), Gosselin, Clement (Univ. Laval)

17:15-17:30 TuCT17.4

Goal-Driven Dimensionality Reduction for Reinforcement Learning.

Parisi, Simone (TU Darmstadt), Ramstedt, Simon (TU Darmstadt), Peters, Jan (Tech. Univ. Darmstadt)

17:30-17:45 TuCT17.5

Prediction of ICP Pose Uncertainties Using Monte Carlo Simulation with Synthetic Depth Images.

Iversen, Thorbjørn Mosekjær (The Maersk Mc-Kinney Moller Inst. Univ. of Southern De), Buch, Anders Glent (Univ. of Southern Denmark), Kraft, Dirk (Univ. of Southern Denmark)

17:45-18:00 TuCT17.6

Incorporating Qualitative Information into Quantitative Estimation Via Sequentially Constrained Hamiltonian Monte Carlo Sampling.

Yi, Daqing (Carnegie Mellon Univ), Choudhury, Shushman (Carnegie Mellon Univ), Srinivasa, Siddhartha (Carnegie Mellon Univ)

TuCT18	Room 223
Assembly and Automation	
Chair: Komendera, Erik	NASA Langley Res. Center
Co-Chair: Schindlbeck, Christopher	Leibniz Univ. Hanover

16:30-16:45 TuCT18.1

Probabilistic Modeling of Programmable Stochastic Self-Assembly of Robotic Modules.

Haghighat, Bahar (EPFL), Thandiackal, Robin (EPFL), Mordig, Maximilian (EPFL), Martinoli, Alcherio (EPFL)

16:45-17:00 TuCT18.2

1D Printing of Recyclable Robots.

Cellucci, Daniel (Cornell Univ), MacCurdy, Robert (MIT), Lipson, Hod (Columbia Univ), Risi, Sebastian (IT Univ. of Copenhagen)

17:00-17:15 TuCT18.3

Structure Assembly by a Heterogeneous Team of Robots Using State Estimation, Generalized Joints, and Mobile Parallel Manipulators.

Komendera, Erik (NASA Langley Res. Center), Adhikari, Shaurav (Univ. of Michigan), Kishen, Ashwin (Univ. of Pennsylvania), Glassner, Samantha (Northeastern Univ), Quartaro, Amy (Univ. of Texas)

17:15-17:30 TuCT18.4

A Study on Life Cycle of Twisted String Actuators: Preliminary Results.

Usman, Muhammad (Korea Univ. of Tech. and Education), Seong, Hyeonseok (Korea Univ. of Tech), Suthar, Bhivraj (KOREATECH), Gaponov, Igor (Korea Univ. of Tech. and Education), Ryu, Jee-Hwan (Korea Univ. of Tech. and Education)

17:30-17:45 TuCT18.5

Increasing Milling Precision for Macro-Micro-Manipulators with Disturbance Rejection Control Via Visual Feedback.

Schindlbeck, Christopher (Leibniz Univ. Hanover), Janz, Alexej (Leibniz Univ. Hanover), Pape, Christian (Inst. F. Mess Und Regelungstechnik), Reithmeier, Eduard (Leibniz Univ. Hanover)

17:45-18:00 TuCT18.6

A Multi-Track Elevator System for E-Commerce Fulfillment Centers.

Hoffman, Rachel (Massachusetts Inst. of Tech), Asada, Harry (MIT)

TuAmPo	Ballroom Foyer
Tuesday Posters AM	
Chair: Lim, Angelica	SoftBank Robotics Europe
10:00-10:30	TuAmPo.1
How Much Energy Can Really Be Saved Using Series Elastic Actuators?.	
Bolivar, Edgar (Univ. of Texas at Dallas), Rezazadeh, Siavash (Univ. of Texas at Dallas), Gregg, Robert D. (Univ. of Texas at Dallas)	
10:00-10:30	TuAmPo.2
Unsupervised Generative Network to Enable Real-Time Color Correction of Monocular Underwater Images.	
Li, Jie (Univ. of Michigan), Skinner, Katherine A. (Univ. of Michigan), Eustice, Ryan (Univ. of Michigan), Johnson-Roberson, Matthew (Univ. of Michigan)	
10:00-10:30	TuAmPo.3
Design and Development of a Holonomic and Power Efficient Multi-Rotor UAV.	
Hedayatpour, Mojtaba (Univ. of Regina), mehrandezh, mehran (Univ. of Regina), Janabi-Sharifi, Farrokh (Ryerson Univ)	
10:00-10:30	TuAmPo.4
Bayesian Optimization with Automatic Prior Selection for Damage Recovery in Multiple Contexts.	
Pautrat, Remi (Inria Nancy Grand-Est), Chatzilygeroudis, Konstantinos (Inria Nancy Grand-Est), Mouret, Jean-Baptiste (Inria)	
10:00-10:30	TuAmPo.5
Quadruped Robots Benefit from Compliant Leg Designs.	
Willems, Brecht (Ghent Univ), Degrave, Jonas (Ghent Univ), Dambre, Joni (Ghent Univ), wyffels, Francis (Ghent Univ)	
10:00-10:30	TuAmPo.6
The Elastomeric Passive Transmission: A Low-Cost, 3D-Printed Transmission for Tendon-Driven Robotics and Prosthetics.	
O'Brien, Kevin (Cornell Univ), Levine, David (Univ. of Pennsylvania), Shepherd, Robert (Cornell Univ)	
10:00-10:30	TuAmPo.7
Robot Behavior Follows Maslow's Theory of Motivation.	
Hopper, Douglas (Colorado State Univ.)	
10:00-10:30	TuAmPo.8
Experiments on Robot Navigation among Humans As Dynamic Obstacles in Indoor Environments.	
Hekmati, Alireza (Simon Fraser Univ), Gupta, Kamal (Simon Fraser Univ)	
10:00-10:30	TuAmPo.9
Online Visual Water Differentiation Using Unmanned Aerial Vehicles.	
Medeiros, Thomas (Univ. of the Pacific), Watts-Willis, Tristan (Univ. of the Pacific), Basha, Elizabeth (Univ. of the Pacific)	
10:00-10:30	TuAmPo.10
Preliminary Evaluation of Radio-Based Wireless Communication Performance for Multi-Robot Applications.	
Liu, Yang (Case Western Res. Univ), Lee, Kiju (Case Western Res. Univ)	
10:00-10:30	TuAmPo.11

Crowdsourcing Swarms As Assembly Controllers.

Lin, Lillian (Univ. of Houston), Shahrokhi, Shiva (Univ. of Houston), Becker, Aaron (Univ. of Houston)

10:00-10:30 TuAmPo.12

A Binaural Beamforming Approach to Resolve Complex Auditory Scenes for Humanoid Robots.

Ilievski, Marko (Univ. of Lethbridge), Rea, Francesco (Istituto Italiano Di Tecnologia), Sandini, Giulio (Italian Inst. of Tech), Tata, Matthew (Univ. of Lethbridge)

10:00-10:30 TuAmPo.13

Exploration and Mapping with a Particle Swarm Controlled by Uniform Inputs on a Magnetic Setup.

Bao, Daniel (Univ. of Houston), Mahadev, Arun (Univ. of Houston), Becker, Aaron (Univ. of Houston)

10:00-10:30 TuAmPo.14

Cooperative Manipulation in Marine Environments in the Presence of Faults.

Oh, Hyunjoo (Univ. of Pennsylvania), Kularatne, Dhanushka (Drexel Univ), Hsieh, M. Ani (Univ. of Pennsylvania)

10:00-10:30 TuAmPo.15

Point-Cloud-Based Aerial Fragmentation Analysis for Application in the Minerals and Aggregates Industries.

Bamford, Thomas (Univ. of Toronto), Esmaeili, Kamran (Univ. of Toronto), Schoellig, Angela P. (Univ. of Toronto)

10:00-10:30 TuAmPo.16

Deploying Sensor Modules with Remotely Operated Underwater Robots for Marine Data Collection.

Lonsford, Jarrett (Univ. of Houston), Becker, Aaron (Univ. of Houston)

10:00-10:30 TuAmPo.17

Marine Data-Ferrying Using Swarms of Autonomous Underwater Robots to Network Sensor Modules with a Surface Ship.

Dodge, Austin (Univ. of Houston), Becker, Aaron (Univ. of Houston)

10:00-10:30 TuAmPo.18

Optimization of an MRI Controllable Gauss Gun.

Garcia Gonzalez, Javier (Univ. of Houston), Becker, Aaron (Univ. of Houston)

10:00-10:30 TuAmPo.19

Whole Body Control Architecture for Posture, Balance, and Gait Control of Quadruped Robots.

Cho, Jungsoo (Sogang Univ), Choi, Jungsu (Sogang Univ), Seo, Yeongsik (Sogang Univ), Kong, Kyoungchul (Sogang Univ)

10:00-10:30 TuAmPo.20

Robust LiDAR-Based Localization on the Basis of Accurate Modeling of Optical Characteristics.

KIM, JIWOONG (Korea Univ), Chung, Woojin (Korea Univ)

10:00-10:30 TuAmPo.21

Towards an Autonomous Fetch, Delivery, and Handover System with a Mobile Manipulator.

Hegedus, Michael James (Simon Fraser Univ), Gupta, Kamal (Simon Fraser Univ), mehrandezh, mehran (Univ. of Regina)

10:00-10:30 TuAmPo.22

Automatic Vessel Detection Technology for Laparoscopic Surgery Images Including Surgical Instruments.

Jo, Kyungmin (Asan Medical Center), Choi, Bareum (Asan Medical Center), Choi, Jaesoon (Asan Medical Center)

10:00-10:30 TuAmPo.23

Real-Time Vision-Based Autonomous 3D Navigation for MAVs in GPS-Denied Environments.

Bi, Yingcai (National Univ. of Singapore), Lan, Menglu (National Univ. of Singapore), Li, Jiaxin (National Univ. of Singapore), Chen, Ben M. (National Univ. of Singapore)

10:00-10:30 TuAmPo.24

Self-Growing Personalized Knowledge Graph for Human-AI Interactions.

Yang, Hua (Intel Labs), wang, zhigang (Intel Labs), Zhang, Yimin (Intel Corp)

10:00-10:30 TuAmPo.25

RONNY Boards the Elevator: Toward Multi-Floor Navigation.

Stephens, Trevor Keith (Univ. of Minnesota), ONeill, John (Univ. of Minnesota)

10:00-10:30 TuAmPo.26

Reconstruction Via Detection: Efficient and Automatic Reconstruction from Unorganized 3D Scans.

Birdal, Tolga (Tech. Univ. of Munich), Ilic, Slobodan (Tech. Univ. Munchen)

10:00-10:30 TuAmPo.27

Efficient Line Segment Merging Algorithm for Detecting Quadrangles.

Im, Hyun-Soo (Chungbuk National Univ), Kim, Gon-Woo (Chungbuk National Univ)

10:00-10:30 TuAmPo.28

Design of a Tendon-Based Haptic Mechanism for Underwater Manipulators.

Lee, Gihyeon (Seoul National Univ. of Science and Tech. (SEOULTECH)), Kim, Jinhyun (Seoul National Univ. of Science and Tech)

10:00-10:30 TuAmPo.29

Passively Adaptive Wheel-Based Mobile Platform for High-Speed Stair Climbing.

Kim, youngsoo (Seoul National Univ), Kim, Kijung (Seoul National Univ), Kim, Hwa Soo (Kyonggi Univ), Kim, Jongwon (Seoul National Univ)

10:00-10:30 TuAmPo.30

Hybrid Rocker-Bogie Based Mobile Robot Equipped with a Slide Joint for Efficient Stair Climbing.

Kim, Kijung (Seoul National Univ), Kim, Youngsoo (Seoul National Univ), Hong, Heeseung (Seoul National Univ), Kim, Hwa Soo (Kyonggi Univ), Kim, Jongwon (Seoul National Univ)

10:00-10:30 TuAmPo.31

De-Palletizing Method of Maximizing Number of Packages That Robot Handles Simultaneously for Complex Stacked Packages on RBPs.

Eto, Haruna (Toshiba Corp), Nakamoto, Hideichi (Toshiba Corp), Sonoura, Takafumi (Toshiba Corp), Tanaka, Junya (Toshiba Corp), OGAWA, AKIHITO (TOSHIBA Corp)

10:00-10:30 TuAmPo.32

A Basic Automation Approach for Hybrid Aerial/Terrestrial Robot.

premachandra, Chinthaka (Shibaura Inst. of Tech), Otsuka, Masahiro (Tokyo Univ. of Science)

10:00-10:30 TuAmPo.33

Affordance Learning and Reasoning Based on Vision-Speech Association in Developmental Robotics.

Yi, Chang'an (Foshan Univ), Min, Huaqing (South China Univ. of Tech), Zhu, Jinhui (South China Univ. of Tech), Yin, Pengshuai (South China Univ. of Tech)

10:00-10:30 TuAmPo.34

Autonomous Robotic Capturing of Space Non-Cooperative Targets.

Jia, Guanglu (Harbin Inst. of Tech. (Shenzhen)), Huang, Hailin (Harbin Inst. of Tech), Li, Guotao (Harbin Inst. of Tech. Shenzhen Graduate School), Li, Bing (Shenzhen Graduate School, Harbin Inst. of Tech)

10:00-10:30 TuAmPo.35

Novel 6-Bar Linkage Finger Clamping Device for Large Clamping Variance.

Jeon, Young Jae (Seoul National Univ. Mechanical Engineering), Chu, Kyungsung (Seoul National Univ), Kim, Kijung (Seoul National Univ), Kim, Jehyeok (Seoul National Univ), Kim, Jongwon (Seoul National Univ)

10:00-10:30 TuAmPo.36

Verification of UAV with Spokeless Two-Wheeled Cage for Bridge Inspections.

Yamada, Moyuru (Fujitsu Lab. LTD), Nakao, Manabu (Fujitsu Lab), Hada, Yoshiro (FUJITSU Lab. LTD), Sawasaki, Naoyuki (Fujitsu Lab)

10:00-10:30 TuAmPo.37

Experimental Validation of Connected Cruise Control Using Ground Robots.

Qin, Wubing B. (Univ. of Michigan), Wang, Zizhao (Univ. of Michigan-Ann Arbor), Orosz, Gabor (Univ. of Michigan)

10:00-10:30 TuAmPo.38

Parallel Mechanism Based Specimen Stage Design and Kinematic Analysis.

Lee, Sang-Chul (Korea Basic Science Inst), Jeong, Jongman (Korea Basic Science Inst), Kim, Jin-Gyu (Korea Basic Science Inst)

10:00-10:30 TuAmPo.39

A Low-Cost Vision-Based Real-Time Heart Rate Detection Method on Companion Robot Platform.

Wu, Han (Peking Univ), Wang, Tao (Peking Univ), Dai, Tuo (Peking Univ)

10:00-10:30 TuAmPo.40

Development of a Spherical, Jumping and Rolling Robot for Children with Developmental Disorder.

Mizumura, Yujiro (Waseda Univ), Ishibashi, Keitaro (Waseda Univ), Yamada, Soichi (Waseda Univ), Takanishi, Atsuo (Waseda Univ), ISHII, Hiroyuki (Waseda Univ)

10:00-10:30 TuAmPo.41

Parallel Imprecise Computation to Time-Dependent Planning.

Chishiro, Hiroyuki (Advanced Inst. of Industrial Tech)

10:00-10:30 TuAmPo.42

Towards Efficient Biased Searching for RRT-Based Algorithms Using Reinforcement Learning.

Deng, Hao (Shenzhen Inst. of Advanced Tech. CAS), Xiong, Jing (Chinese Acad. of Sciences), Xia, Zeyang (Chinese Acad. of Sciences)

10:00-10:30 TuAmPo.43

Accuracy and Reliability of Stochastic Estimation of Upper Limb 3-D Mechanical Impedance.

Jo, Hyunkyeong (UNIST), Kang, Sang Hoon (Ulsan National Inst. of Science and Tech. / Nort)

10:00-10:30 TuAmPo.45

Predictive Coding for Dynamic Visual Processing: Development of Functional Hierarchy in a Multiple Spatio-Temporal Scales RNN Model.

Choi, Minkyu (KAIST), Hwang, Jungsik (Korea Advanced Inst. of Science and Tech), Tani, Jun (Okinawa Inst. of Science and Tech), Ahmadi, Ahmadreza (KAIST)

10:00-10:30 TuAmPo.46

Virtual Ground Robot Driven by Reaction Force Sensing Series Elastic Actuator.

Lee, Hyunwook (DGIST), Kwak, Su-Hui (DGIST), Oh, Sehoon (DGIST (Daegu Gyeongbuk Inst. of Science and Tech)

10:00-10:30 TuAmPo.47

An Interactive Robotic System for Promoting Social Engagement.

Bevill, Rachael (The George Washington Univ), Javed, Hifza (George Washington Univ), Jeon, Myounghoon (Michigan Tech. Univ), Howard, Ayanna (Georgia Inst. of Tech), Park, Chung Hyuk (George Washington Univ)

TuPmPo	Ballroom Foyer
Tuesday Posters PM	
Chair: Lim, Angelica	SoftBank Robotics Europe

16:00-16:30 TuPmPo.1

A Flexible Tele-Manipulation System.

Dehghan, Masood (National Univ. of Singapore), Perez Quintero, Camilo Alfonso (Univ. of Alberta), Jagersand, Martin (Univ. of Alberta)

16:00-16:30 TuPmPo.2

Mobile Personal Space: A Personal Space Robot to Assist People with Social Anxiety.

Terada, Kazunori (Gifu Univ), Hara, Tomohito (Gifu Univ)

16:00-16:30 TuPmPo.3

Design of a Parallel Structure Gripper with an Angular Error Measurement System for Square Peg-In-Hole Task.

Kim, Jehyeok (Seoul National Univ), Kim, Keonwoo (Seoul National Univ), Kim, Jongwon (Seoul National Univ)

16:00-16:30 TuPmPo.4

Manipulation of Delicate Objects: A Soft Touch Helps!.

Strazzulla, Ilaria (Scuola Superiore Sant'Anna), Morachioli, Annagiulia (Istituto Di Biorobotica), Bonsignorio, Fabio Paolo (Heron Robots Srl and the Biorobotics Insitute Scuola Superiore S), Dario, Paolo (Scuola Superiore Sant'Anna)

16:00-16:30 TuPmPo.5

Data Collection Planning with Limited Budget for Dubins Airplane.

Váňa, Petr (Czech Tech. Univ. in Prague), Faigl, Jan (Czech Tech. Univ. in Prague), Sláma, Jakub (Czech Tech. Univ. in Prague), Pěnička, Robert (Czech Tech. Univ. in Prague)

16:00-16:30 TuPmPo.6

Caging Grasp Synthesis and Verification for Partially Deformable 3D Objects with Narrow Parts.

Varava, Anastasiia (KTH, the Royal Inst. of Tech), Kragic, Danica (KTH), Pokorny, Florian T. (KTH Royal Inst. of Tech)

16:00-16:30 TuPmPo.7

Exploring a "route Map" Model of Navigation Inspired by the Mammalian Brain.

Mitchinson, Ben (Univ. of Sheffield), Pearson, Martin (Bristol Robotics Lab), Prescott, Tony J (Univ. of Sheffield)

16:00-16:30 TuPmPo.8

Online Construction of Communication Maps for Robust Multirobot Deployments.

Quattrini Li, Alberto (Univ. of South Carolina), Penumarthi, Phani Krishna (Univ. of South Carolina), Banfi, Jacopo (Pol. Di Milano), Basilico, Nicola (Univ. of Milan), Amigoni, Francesco (Pol. Di Milano), Rekleitis, Ioannis (Univ. of South Carolina), O'Kane, Jason (Univ. of South Carolina), Nelakuditi, Srihari (Univ. of South Carolina)

16:00-16:30 TuPmPo.9

Distributed Relative Localization Using Ultra-Wideband Ranging.

Taylor, Chris (George Mason Univ), Sofge, Donald (Naval Res. Lab), Lofaro,

Daniel (George Mason Univ)

16:00-16:30 TuPmPo.10

Haptic Object Recognition: A Recurrent Approach.

Liu, Chang (Tsinghua Univ), Sun, Fuchun (Tsinghua Univ), Yuille, Alan (Johns Hopkins Univ)

16:00-16:30 TuPmPo.11

An Analysis of a Delay-Conscious Communication Model for Mobile Robot Navigation.

Tanaka, Mamiko (Tokyo Woman's Christian Univ), Kato, Yuka (Tokyo Woman's Christian Univ)

16:00-16:30 TuPmPo.12

SafeArm: A Framework to Make Robots Safe to Humans.

Du, Yuyang (Intel Labs), Yan, SHOUMENG (Intel), Wang, Dawei (Intel Labs)

16:00-16:30 TuPmPo.13

Noise Robust 2D Sound Source Localization Using Multiple Microphone Arrays in Bird Song Scene Analysis.

Gabriel, Daniel (Tokyo Inst. of Tech), Kojima, Ryosuke (Tokyo Inst. of Tech), Hoshiba, Kotaro (Tokyo Inst. of Tech), Nakadai, Kazuhiro (Honda Res. Inst. Japan Co., Ltd)

16:00-16:30 TuPmPo.14

RNN-Based Visual Obstacle Avoidance with a CPG Controlled Hexapod Walking Robot.

Cizek, Petr (Czech Tech. Univ. in Prague, Faculty of Electrical Engi), Faigl, Jan (Czech Tech. Univ. in Prague)

16:00-16:30 TuPmPo.15

Bioinspired Vision-Only Attitude Rate Estimation for Micro Aerial Robots Using Machine Learning.

Mérida Floriano, Macarena (Univ. Pablo De Olavide), Caballero, Fernando (Univ. of Seville), García Morales, Diana (CSIC), Casares, Fernando (CSIC), Merino, Luis (Pablo De Olavide Univ)

16:00-16:30 TuPmPo.16

Development of Soft Perching System Using Tilting Mechanism for Wall-Climbing Drone.

Myeong, Wancheol (KAIST), Song, Seungwon (KAIST), Jung, Kwangyik (Korea Advanced Inst. of Science and Tech), Myung, Hyun (KAIST (Korea Adv. Inst. Sci. & Tech)

16:00-16:30 TuPmPo.17

Regulating Priority in Mixed Initiative Human-Robot Collaboration.

Owan, Parker (Univ. of Washington), Garbini, Joseph (U. of Washington), Devasia, Santosh (Univ. of Washington)

16:00-16:30 TuPmPo.18

Stochastic Search Methods for Mobile Manipulator Calibration.

Amoako-Frimpong, Samuel (Marquette Univ), Medeiros, Henry (Marquette Univ), Marvel, Jeremy (National Inst. of Standards and Tech), Bostelman, Roger (National Inst. of Standards and Tech)

16:00-16:30 TuPmPo.19

Collection of Advective, Diffusive Harmful Algae or Microplastics Using a Robot Swarm with and without Agent-Specific Partitions.

Schroeder, Adam (Univ. of Toledo), Trease, Brian (Univ. of Toledo), Arsie, Alessandro (Pennsylvania State Univ)

16:00-16:30 TuPmPo.20

Anomaly Detection for Vision-Based Target Tracking Using Unmanned Aerial Vehicles.

Reznichenko, Yevgeniy (Marquette Univ), Medeiros, Henry (Marquette Univ)

16:00-16:30 TuPmPo.21

Closing the Gap in the Theory of PRM-Based Planners.

Solovey, Kiril (Tel Aviv Univ), Kleinbort, Michal (Tel Aviv Univ)

16:00-16:30 TuPmPo.22

Open Dataset for On-Road Vehicle Tracking in Beijing Highway.

Fang, Yongkun (Peking Univ), Wang, Chao (Peking Univ), Zhao, Huijing (Peking Univ), Zha, Hongbin (Peking Univ)

16:00-16:30 TuPmPo.23

Mapping ADL Motion Capture Data to BLUE SABINO Exoskeleton Kinematics and Dynamics.

Bitikofer, Christopher Bitikofer (Univ. of Idaho), Perry, Joel C. (Univ. of Idaho), Wolbrecht, Eric (Univ. of Idaho)

16:00-16:30 TuPmPo.24

Object Tracking with Sparse and Noisy Data Using Singular Spectrum Analysis.

Raschpichler, Cole (British Columbia Inst. of Tech), Calderbank, Terry (British Columbia Inst. of Tech), Baryshnikov, Vasiliy (British Columbia Inst. of Tech), Jenks, Andrew (British Columbia Inst. of Tech), Nakamura, Takashi (British Columbia Inst. of Tech)

16:00-16:30 TuPmPo.25

Robustness Margins and Robust Guided Policy Search for Deep Reinforcement Learning.

Summers, Tyler (Univ. of Texas at Dallas), Ogunmolu, Olalekan (Univ. of Texas at Dallas), Gans, Nicholas (Nick) (Univ. Texas at Dallas)

16:00-16:30 TuPmPo.26

Inferring Intent in Human-In-The-Loop Output-Tracking Tasks.

Warrier, Rahul Balakrishna (Univ. of Washington, Seattle), Devasia, Santosh (Univ. of Washington)

16:00-16:30 TuPmPo.27

One-Actuator Wheeled Robot Moving Like a Snakeboard and Its Propelling Experiments.

Ito, Satoshi (Gifu Univ), Nohara, Shumpei (Gifu Univ), Masuda, Yuya (Gifu Univ), Yabuki, Jun (Gifu Univ), Morita, Ryosuke (Gifu Univ)

16:00-16:30 TuPmPo.28

Data Driven Teleoperated Sanding for Health Risk Mitigation.

Piaskowy, W. Tony (Univ. of Washington), Garbini, Joseph (U. of Washington), Devasia, Santosh (Univ. of Washington), Devine, Cameron (Univ. of Washington), McCann, Lance (Univ. of Washington, Boeing), Aubin, Jack (The Boeing Company)

16:00-16:30 TuPmPo.29

Autonomous Surveillance Route Solutions from Minimal Human-Robot Interaction.

Reardon, Christopher M. (U.S. Army Res. Lab), Han, Fei (Colorado School of

Mines), Zhang, Hao (Colorado School of Mines), Fink, Jonathan (ARL)

16:00-16:30 TuPmPo.30

Human Upper-Body Pose Estimation Using Fully Convolutional Network and Joint Heatmap.

Koo, Jungmo (KAIST(Korea Advanced Inst. of Science and Tech), Lee, Seung Hee (KAIST), Kim, Hyungjin (KAIST(Korea Advanced Insititute of Science and Tech), Jung, Kwangyik (Korea Advanced Inst. of Science and Tech), Oh, Taekjun (KAIST), Myung, Hyun (KAIST (Korea Adv. Inst. Sci. & Tech)

16:00-16:30 TuPmPo.31

Fog Robotics: An Introduction.

GUDI, Siva Leela Krishna Chand (Univ. of Tech. Sydney), Ojha, Suman (Univ. of Tech. Sydney), Clark, Jesse (Univ. of Tech. Sydney), Johnston, Benjamin (Univ. of Tech. Sydney), Williams, Mary-Anne (Univ. of Tech. Sydney)

16:00-16:30 TuPmPo.32

Cross Domain Transfer Learning Using Target Apprentice.

Joshi, Girish (Univ. of Illinois Urbana Champaign), Chowdhary, Girish (Univ. of Illinois at Urbana Champaign)

16:00-16:30 TuPmPo.33

Autonomous Vehicles Moving As a Human Group.

Zanlungo, Francesco (Advanced Telecommunications Res. Inst), Yucel, Zeynep (ATR), Ferreri, Florent (ATR), Even, Jani (ATR), Morales Saiki, Luis Yoichi (Nagoya Univ), Kanda, Takayuki (ATR)

16:00-16:30 TuPmPo.34

Shape Sensing for Flexible Medical Instruments Using Fiber Bragg Grating Sensors in Multicore Optical Fibers.

Khan, Fouzia (Univ. of Twente), Denasi, Alper (Univ. of Twente), Misra, Sarthak (Univ. of Twente)

16:00-16:30 TuPmPo.35

Dynamic Dumbbell - Novel Training Machine.

Lee, Chan (DGIST (Daegu Gyeongbuk Inst. of Science and Tech), Oh, Sehoon (DGIST (Daegu Gyeongbuk Inst. of Science and Tech)

16:00-16:30 TuPmPo.37

Locomotion Algorithm for Variable Topology Truss.

Park, Sumin (Seoul National Univ), Kim, Jehyeok (Seoul National Univ), Seo, TaeWon (Yeungnam Univ), Yim, Mark (Univ. of Pennsylvania), Kim, Jongwon (Seoul National Univ)

16:00-16:30 TuPmPo.38

Distributed and Parallel Processing in Robot-Cloud System Using ROS-Compliant FPGA Component.

Ohkawa, Takeshi (Utsunomiya Univ), Sugata, Yuhei (Utsunomiya Univ), OOTSU, Kanemitsu (Utsunomiya Univ), Yokota, Takashi (Utsunomiya Univ)

16:00-16:30 TuPmPo.39

Development of Dual Mode Aerial Manipulator.

Jeong, Jongmin (Yonsei Univ), Kim, Jaeseung (Yonsei Univ), Lee, Donghyun (Yonsei Univ), Park, Jin Bae (Yonsei Univ), Sinha, Sudipta (Microsoft Res), Ikeuchi, Katsushi (Microsoft)

16:00-16:30 TuPmPo.40

Direct-Drive Linear Actuators for a Lower Extremity Exoskeleton.

Ruddy, Bryan P. (Univ. of Auckland), Laven, Robin C. (Univ. of Auckland), Greenslade, Mac (Univ. of Auckland), Taberner, Andrew J. (Univ. of Auckland)

16:00-16:30 TuPmPo.41

Real-Time Analysis of Tissue Trauma Using Mechanical Measures.

Jones, Dominic (Univ. of Leeds), Alazmani, Ali (Univ. of Leeds), Culmer, Peter Robert (Univ. of Leeds)

16:00-16:30 TuPmPo.42

New Deep Learning Based Hybrid Method for Elderly Fall Detection.

Kumar, Sachin (Univ. of Delhi)

16:00-16:30 TuPmPo.43

Hybrid Adaptive Control of Industrial Robots for Surface Exploration of Arbitrary Objects.

Nakhaeinia, Danial (Univ. of Ottawa), Payeur, Pierre (Univ. of Ottawa), Laganiere, Robert (Univ. of Ottawa)

16:00-16:30 TuPmPo.44

Functional Attribute Estimation Using Local Evidences and Semi-Global Surface Structure.

Akizuki, Shuichi (Chukyo Univ), IIZUKA, Masaki (Chukyo Univ), KOZAI, Kentaro (Chukyo Univ), Hashimoto, Manabu (Graduate School of Computer and Cognitive Sciences, ChukyoUniver)

Technical Sessions
Wednesday September 27, 2017

WeAT1	Room 109
Model Learning for Control	
Chair: Schoellig, Angela P.	Univ. of Toronto
Co-Chair: Au, Tsz-Chiu	Ulsan National Inst. of Science and Tech

10:30-10:45 WeAT1.1

Multi-Robot Transfer Learning: A Dynamical System Perspective.

Helwa, Mohamed K. (Univ. of Toronto), Schoellig, Angela P. (Univ. of Toronto)

10:45-11:00 WeAT1.2

Data-Efficient Control Policy Search Using Residual Dynamics Learning.

Saveriano, Matteo (Tech. Univ. of Munich), Yin, Yuchao (Tech. Univ. of Munich), Falco, Pietro (Tech. Univ. of Munich), Lee, Dongheui (Tech. Univ. of Munich)

11:00-11:15 WeAT1.3

Online Multi-Target Learning of Inverse Dynamics Models for Computed-Torque Control of Compliant Manipulators.

Polydoros, Athanasios S. (Univ. of Innsbruck), Boukas, Evangelos (Aalborg Univ. Copenhagen), Nalpantidis, Lazaros (Aalborg Univ)

11:15-11:30 WeAT1.4

A New Data Source for Inverse Dynamics Learning.

Kappler, Daniel (Max-Planck Inst. for Intelligent Systems), Meier, Franziska (Max Planck Inst. for Intelligent Systems), Ratliff, Nathan (Lula Robotics Inc), Schaal, Stefan (MPI Intelligent Systems & Univ. of Southern California)

11:30-11:45 WeAT1.5

Learning of Vehicular Performance Models for Longitudinal Motion Planning to Satisfy Arrival Requirements.

Nguyen, Ty (Ulsan National Inst. of Science and Tech), Nguyen, Dung (Ulsan National Inst. of Science and Tech), Au, Tsz-Chiu (Ulsan National Inst. of Science and Tech)

11:45-12:00 WeAT1.6

Why Did the Robot Cross the Road? - Learning from Multi-Modal Sensor Data for Autonomous Road Crossing.

Radwan, Noha (Univ. of Freiburg), Winterhalter, Wera (Univ. of Freiburg), Dornhege, Christian (Univ. of Freiburg), Burgard, Wolfram (Univ. of Freiburg)

WeAT2 Room 111

Compliant Joint/Mechanism I

Co-Chair: Tsagarakis, Nikos Istituto Italiano Di Tecnologia

10:30-10:45 WeAT2.1

Human-Inspired Compliant Strategy for Peg-In-Hole Assembly Using Environmental Constraint and Coarse Force Information.

Li, Xiaoqing (Univ. of Science and Tech. Beijing), Li, Rui (Inst. of Automation, Chinese Acad. of Sciences), Qiao, Hong (Inst. of Automation, Chinese Acad. of Sciences), Ma, Chao (Univ. of Science and Tech. Beijing), Li, Liang (Beijing Inst. of Spacecraft System Engineering)

10:45-11:00 WeAT2.2

Development and Control of a Variable Stiffness Actuator Using a Variable Radius Gear Transmission Mechanism.

Chang, Handdeut (KAIST), Kim, Sangjoon J. (KAIST), Na, Youngjin (Korea Advanced Inst. of Science and Tech. (KAIST)), Park, Junghoon (KAIST), Kim, Jung (KAIST)

11:00-11:15 WeAT2.3

Control of a Variable Stiffness Joint for Catching a Moving Object.

Bhole, Ajinkya (Birla Inst. of Tech. and Science, Pilani, Rajasthan), Kumle, Julian (Univ. of Twente), Groothuis, Stefan S. (Mourik International B.V), Carloni, Raffaella (Univ. of Twente)

11:15-11:30 WeAT2.4

What Is the Torque Bandwidth of This Actuator?.

Malzahn, Jörn (Istituto Italiano Di Tecnologia), Kashiri, Navvab (Istituto Italiano Di Tecnologia), Roozing, Wesley (Istituto Italiano Di Tecnologia), Tsagarakis, Nikos (Istituto Italiano Di Tecnologia), Caldwell, Darwin G. (Istituto Italiano Di Tecnologia)

11:30-11:45 WeAT2.5

On the Stiffness Selection for Torque Controlled Series-Elastic Actuators.

Roozing, Wesley (Istituto Italiano Di Tecnologia), Malzahn, Jörn (Istituto Italiano Di Tecnologia), Kashiri, Navvab (Istituto Italiano Di Tecnologia), Caldwell, Darwin G. (Istituto Italiano Di Tecnologia), Tsagarakis, Nikos (Istituto Italiano Di Tecnologia)

11:45-12:00 WeAT2.6

Design and Analysis of Planar Rotary Springs.

Georgiev, Nikola (Caltech), Burdick, Joel (California Inst. of Tech)

WeAT3	Room 116
Manipulation	

10:30-10:45 WeAT3.1

Robust Constraint-Based Robot Control for Bimanual Cap Rotation.

Parigi-Polverini, Matteo (Pol. Di Milano), Zanchettin, Andrea Maria (Pol. Di Milano), Incocciati, Francesco (Pol. Di Milano), Rocco, Paolo (Pol. Di Milano)

10:45-11:00 WeAT3.2

Inverse Dynamics Control of Bimanual Object Manipulation Using Orthogonal Decomposition: An Analytic Approach.

Shahbazi Aghbelagh, Mohammad (Istituto Italiano Di Tecnologia (IIT)), Lee, Jinoh (Fondazione Istituto Italiano Di Tecnologia), Caldwell, Darwin G. (Istituto Italiano Di Tecnologia), Tsagarakis, Nikos (Istituto Italiano Di Tecnologia)

11:00-11:15 WeAT3.3

A Vision-Guided Multi-Robot Cooperation Framework for Learning-By-Demonstration and Task Reproduction.

Huang, Bidan (Imperial Coll. London), Ye, Menglong (Imperial Coll. London), Lee, Su-Lin (Imperial Coll. London), Yang, Guang-Zhong (Imperial Coll. London)

11:15-11:30 WeAT3.4

Extracting Bimanual Synergies with Reinforcement Learning.

Luck, Kevin Sebastian (Arizona State Univ), Ben Amor, Heni (Arizona State Univ)

11:30-11:45 WeAT3.5

Model-Free Precise In-Hand Manipulation with a 3d-Printed Tactile Gripper.

Ward-Cherrier, Benjamin (Univ. of Bristol), Rojas, Nicolas (Imperial Coll. London), Lepora, Nathan (Univ. of Bristol)

11:45-12:00 WeAT3.6

Visual Task Outcome Verification Using Deep Learning.

Erkent, Ozgur (Innsbruck Univ), Shukla, Dadhichi (Univ. of Innsbruck), Piater, Justus (Univ. of Innsbruck)

WeAT4	Room 114
Optimization and Optimal Control I	
Chair: Hauser, Kris	Duke Univ
Co-Chair: Hur, Pilwon	Texas A&M Univ

10:30-10:45 WeAT4.1

Landmark Guided Probabilistic Roadmaps.

Paden, Brian (MIT), Nager, Yannik (ETH Zürich), Frazzoli, Emilio (Massachusetts Inst. of Tech)

10:45-11:00 WeAT4.2

A Unified Control Method for Quadrotor Tail-Sitter UAVs in All Flight Modes: Hover, Transition, and Level Flight.

ZHOU, Jinni (Hong Kong Univ. of Science and Tech), Lyu, Ximin (Hong Kong Univ. of Science and Tech), Li, Zexiang (Hong Kong Univ. of Science and Tech), Shen, Shaojie (Hong Kong Univ. of Science and Tech), Zhang, Fu (Hong Kong Univ. of Science and Tech)

11:00-11:15 WeAT4.3

Occupancy Grid Based Distributed MPC for Mobile Robots.

Mehrez, Mohamed W. (Memorial Univ. in Newfoundland), Sprodowski, Tobias (Univ. of Bremen), Worthmann, Karl (Tech. Univ. Ilmenau), Mann, George K. I. (Memorial Univ. of Newfoundland), Gosine, Raymond G. (Memorial Univ. of Newfoundland), Sagawa, Juliana Keiko (Production Engineering Department, Federal Univ. of São Car), Pannek, Jürgen (Univ. Bremen)

11:15-11:30 WeAT4.4

A Step towards Generating Human-Like Walking Gait Via Trajectory Optimization through Contact for a Bipedal Robot with One-Sided Springs on Toes.

Chao, Kenneth (Texas A&M), Hur, Pilwon (Texas A&M Univ)

11:30-11:45 WeAT4.5

A Data-Driven Indirect Method for Nonlinear Optimal Control.

Tang, Gao (Duke Univ), Hauser, Kris (Duke Univ)

11:45-12:00 WeAT4.6

Convexification and Real-Time On-Board Optimization for Agile Quad-Rotor Maneuvering and Obstacle Avoidance.

Szmuk, Michael (Univ. of Washington), Pascucci, Carlo Alberto (Univ. of Washington), Dueri, Daniel (Univ. of Washington), Acikmese, Behcet (Univ. of Washington)

WeAT5	Room 118
Legged Robots III	
Chair: Choi, Hyouk Ryeol	Sungkyunkwan Univ
Co-Chair: Semini, Claudio	Istituto Italiano Di Tecnologia

10:30-10:45 WeAT5.1

Development of Experimental Legged Robot for Inspection and Disaster Response in Plants.

Yoshiike, Takahide (Honda R&D Co., Ltd), Kuroda, Mitsuhide (Honda R&D Co., Ltd), Ujino, Ryuma (Honda R&D Co., Ltd), Kaneko, Hiroyuki (Honda R&D Co., Ltd), Higuchi, Hirofumi (Honda R&D Co., Ltd), Iwasaki, Shingo (Honda R&D Co., Ltd), Kanemoto, Yoshiki (Honda R&D Co., Ltd), Asatani, Minami (Honda R&D Co., Ltd), Koshiishi, Takeshi (Honda R&D Co., Ltd)

10:45-11:00 WeAT5.2

A Leg Design Method for High Speed Quadrupedal Locomotion.

Dallas, Spyridon (National Tech. Univ. of Athens), Machairas, Konstantinos (National Tech. Univ. of Athens), Koutsoukis, Konstantinos (National Tech. Univ. of Athens), Papadopoulos, Evangelos (National Tech. Univ. of Athens)

11:00-11:15 WeAT5.3

Foot Placement and Ankle Push-Off Control for the Orbital Stabilization of Bipedal Robots.

Zamani, Ali (Univ. of Texas at San Antonio), Bhounsule, Pranav (Univ. of Texas at San Antonio)

11:15-11:30 WeAT5.4

Online Payload Identification for Quadruped Robots.

Tournois, Guido Alexander (Delft Univ. of Tech), Focchi, Michele (Fondazione Istituto Italiano Di Tecnologia), Del Prete, Andrea (CNRS), Orsolino, Romeo (Istituto Italiano Di Tecnologia), Caldwell, Darwin G. (Istituto Italiano Di Tecnologia), Semini, Claudio (Istituto Italiano Di Tecnologia)

11:30-11:45 WeAT5.5

Trajectory Design and Control of Quadruped Robot for Trotting Over Obstacles.

Lee, Young Hun (Sungkyunkwan Univ), Lee, Yoon Haeng (Sungkyunkwan Univ), Lee, Hyunyong (Sungskyunkwan Univ), Phan, Luong Tin (Sungkyunkwan Univ), Kang, Hansol (Sungkyunkwan Univ), Kim, Uikyum (SungKyunKwan Univ), Jeon, Jeongmin (Sungkyunkwan Univ), Choi, Hyouk Ryeol (Sungkyunkwan Univ)

11:45-12:00 WeAT5.6

Active Stabilization of a Stiff Quadruped Robot Using Local Feedback.

Vasconcelos, Rui (Inst. Superior Técnico), Hauser, Simon (Biorob, EPFL), Dzeladini, Florin (EPFL, Biorob), Mutlu, Mehmet (École Pol. Fédérale De Lausanne (EPFL)), Horvat, Tomislav (EPFL), Melo, Kamilo (EPFL), Oliveira, Paulo (Inst. Superior Técnico), Ijspeert, Auke (EPFL)

WeAT6	Room 121
RGBD Perception I	
Chair: Kosecka, Jana	George Mason Univ
Co-Chair: Lauri, Mikko	Univ. of Hamburg

10:30-10:45 WeAT6.1

M³Net: Multi-Scale Multi-Path Multi-Modal Fusion Network and Example Application to RGB-D Salient Object Detection.

Chen, Hao (City Univ. of Hong Kong), Li, You-Fu (City Univ. of Hong Kong), Su, Dan (City Univ. of Hong Kong)

10:45-11:00 WeAT6.2

Label Propagation in RGB-D Video.

Reza, Md (George Mason Univ), zheng, hui (George Mason Univ), Georgakis, Georgios (George Mason Univ), Kosecka, Jana (George Mason Univ)

11:00-11:15 WeAT6.3

Learning How a Tool Affords by Simulating 3D Models from the Web.

Abelha, Paulo (Univ. of Aberdeen), Guerin, Frank (Univ. of Aberdeen)

11:15-11:30 WeAT6.4

Self-Supervised Online Learning of Appearance for 3D Tracking.

Lee, Bhoram (Univ. of Pennsylvania), Lee, Daniel D. (Univ. of Pennsylvania)

11:30-11:45 WeAT6.5

Saliency-Guided Adaptive Seeding for Supervoxel Segmentation.

Gao, Ge (Univ. of Hamburg), Lauri, Mikko (Univ. of Hamburg), Zhang, Jianwei (Univ. of Hamburg), Frintrop, Simone (Univ. of Hamburg)

11:45-12:00 WeAT6.6

Dense Piecewise Planar RGB-D SLAM for Indoor Environments.

Le, Phi-Hung (George Mason Univ), Kosecka, Jana (George Mason Univ)

WeAT7	Room 122
Biomimetics I	
Chair: Ma, Shugen	Ritsumeikan Univ
Co-Chair: Brock, Oliver	Tech. Univ. Berlin

10:30-10:45 WeAT7.1

Curved Excavation by a Sub-Seafloor Excavation Robot.

Tadami, Naoaki (Chuo Univ), Nagai, Mamoru (Chuo Univ), Nakatake, Toyoharu (Chuo Univ), Fujiwara, Ami (Chuo Univ), Yamada, Yasuyuki (Chuo Univ), Nakamura, Taro (Chuo Univ), Yoshida, Hiroshi (Japan Agency for Marine-Earth Science and Tech), SAWADA, HIROTAKA (JAXA), Kubota, Takashi (Jaxa Isas)

10:45-11:00 WeAT7.2

Human Mimetic Forearm Design with Radioulnar Joint Using Miniature Bone-Muscle Modules and Its Applications.

Kawaharazuka, Kento (The Univ. of Tokyo), Makino, Shogo (The Univ. of Tokyo), Kawamura, Masaya (The Univ. of Tokyo), Asano, Yuki (The Univ. of Tokyo), Kakiuchi, Yohei (The Univ. of Tokyo), Okada, Kei (The Univ. of Tokyo), Inaba, Masayuki (The Univ. of Tokyo)

11:00-11:15 WeAT7.3

An Underwater Electrosensor for Identifying Objects of Similar Volume and Aspect Ratio Using Convolution Neural Network.

Wang, Ke (Curtin Univ), Do, Khac Duc (Univ. of Western Australia), Cui, Lei (Curtin Univ)

11:15-11:30 WeAT7.4

Modelling and Analysis of the Passive Planar Rimless Wheel Mechanism in Universal Domain.

Jia, Wenchuan (Shanghai Univ), Yang, Jiang (Shanghai Univ), Bi, Liangyu (Shanghai Univ), Zhang, Quan (Shanghai Univ), Sun, Yi (Shanghai Univ), Pu, Huayan (Shanghai Univ), Ma, Shugen (Ritsumeikan Univ)

11:30-11:45 WeAT7.5

Inclined Surface Locomotion Strategies for Spherical Tensegrity Robots.

CHEN, LEE-HUANG (Univ. OF CALIFORNIA BERKELEY), Cera, Angelo Brian (UC Berkeley), Zhu, Edward (UC Berkeley), Edmunds, Riley (Univ. of California, Berkeley), Rice, Franklin (Univ. of California, Berkeley), Bronars, Antonia (UC Berkeley), Tang, Ellande (UC Berkeley), Malekshahi, Saunon Rod (Univ. of California, Berkeley), Romero, Osvaldo (Univ. Nacional Autónoma De México), Agogino, Adrian (UC Santa Cruz, NASA Ames Res. Center), Agogino, Alice (Univ. of California Berkeley)

11:45-12:00 WeAT7.6

Handshakiness: Benchmarking for Human-Robot Hand Interactions.

Knoop, Espen (The Walt Disney Company), Bächer, Moritz (Disney Res), Wall, Vincent (TU Berlin), Deimel, Raphael (TU Berlin), Brock, Oliver (Tech. Univ. Berlin), Beardsley, Paul (Disney Res. Zurich)

WeAT8	Room 202
Humanoid and Bipedal Locomotion I	
Chair: Kheddar, Abderrahmane	CNRS-AIST JRL (Joint Robotics Lab. UMI3218/CRT
Co-Chair: Suleiman, Wael	Univ. of Sherbrooke

10:30-10:45 WeAT8.1

Rotational Sliding Motion Generation for Humanoid Robot by Force Distribution in Each Contact Face.

Kojima, Kunio (The Univ. of Tokyo), Nozawa, Shunichi (The Univ. of Tokyo), Okada, Kei (The Univ. of Tokyo), Inaba, Masayuki (The Univ. of Tokyo), Ishiguro, Yasuhiro (The Univ. of Tokyo), Sugai, Fumihito (The Univ. of Tokyo), Kakiuchi, Yohei (The Univ. of Tokyo)

10:45-11:00 WeAT8.2

Control Strategy and Implementation for a Humanoid Robot Pushing a Heavy Load on a Rolling Cart.

Hawley, Louis (Univ. of Sherbrooke), Suleiman, Wael (Univ. of Sherbrooke)

11:00-11:15 WeAT8.3

3D Walking and Skating Motion Generation Using Divergent Component of Motion and Gauss Pseudospectral Method.

Takasugi, Noriaki (The Univ. of Tokyo), Kojima, Kunio (The Univ. of Tokyo), Nozawa, Shunichi (The Univ. of Tokyo), Okada, Kei (The Univ. of Tokyo), Inaba, Masayuki (The Univ. of Tokyo)

11:15-11:30 WeAT8.4

Frictional Constraints on the Sole of a Biped Robot When Slipping.

Takabayashi, Yusuke (Maebashi Inst. of Tech), Ishihara, Kosuke (Maebashi Inst. of Tech), Yoshioka, Masataka (National Inst. of Tech. Kochi Coll), Liang, Hongbo (Maebashi Inst. of Tech), Liu, Chang (Maebashi Inst. of Tech), Zhu, Chi (Maebashi Inst. of Tech)

11:30-11:45 WeAT8.5

Dynamic Walking Over Rough Terrains by Nonlinear Predictive Control of the Floating-Base Inverted Pendulum.

Caron, Stephane (Lirmm Cnrs), Kheddar, Abderrahmane (CNRS-AIST JRL (Joint Robotics Lab. UMI3218/CRT)

11:45-12:00 WeAT8.6

Almost Driftless Navigation of 3D Limit-Cycle Walking Bipeds.

Veer, Sushant (Univ. of Delaware), Shafiee Motahar, Mohamad (Univ. of Delaware), Poulakakis, Ioannis (Univ. of Delaware)

WeAT9	Room 204
Human Assistive Systems	
Chair: Zecca, Massimiliano	Loughborough Univ
Co-Chair: Artemiadis, Panagiotis	Arizona State Univ

10:30-10:45 WeAT9.1

Real-Time End-Effector Motion Behavior Planning Approach Using On-Line Point-Cloud Data towards a User Adaptive Assistive Bath Robot.

Dometios, Athanasios (National Tech. Univ. of Athens (NTUA)), Papageorgiou, Xanthi S. (National Tech. Univ. of Athens), Arvanitakis, Antonis (National Tech. Univ. of Athens), Tzafestas, Costas S. (ICCS - Inst. of Communication and Computer Systems), Maragos, Petros (National Tech. Univ. of Athens)

10:45-11:00 WeAT9.2

Towards a User-Adaptive Context-Aware Robotic Walker with a Pathological Gait Assessment System: First Experimental Study.

Chalvatzaki, Georgia (NATIONAL Tech. Univ. OF ATHENS), Papageorgiou, Xanthi S. (National Tech. Univ. of Athens), Tzafestas, Costas S. (ICCS - Inst. of Communication and Computer Systems)

11:00-11:15 WeAT9.3

Supervisory Control of a DaVinci Surgical Robot.

Chow, Der-Lin (Case Western Res. Univ), Xu, Peng (Case Western Res. Univ), Tuna, Eser Erdem (Case Western Res. Univ), HUANG, SIQI (Case Western Res. Univ), Cavusoglu, M. Cenk (Case Western Res. Univ), Newman, Wyatt (Case Western Res. Univ)

11:15-11:30 WeAT9.4

Step Sequence and Direction Detection of Four Square Step Test.

Kong, Weisheng (Waseda Univ), Waaning, Lauren (Loughborough Univ), Sessa, Salvatore (Waseda Univ), Zecca, Massimiliano (Loughborough Univ), Magistro, Daniele (Loughborough Univ), Takeuchi, Hikaru (Tohoku Univ), Kawashima, Ryuta (Tohoku Univ), Takanishi, Atsuo (Waseda Univ)

11:30-11:45 WeAT9.5

Multi-Modal Trip Hazard Affordance Detection on Construction Sites.

McMahon, Sean M (Queensland Univ. of Tech), Sünderhauf, Niko (Queensland Univ. of Tech), Upcroft, Ben (Queensland Univ. of Tech), Milford, Michael J (Queensland Univ. of Tech)

11:45-12:00 WeAT9.6

A Hybrid Brain-Machine Interface for Control of Robotic Swarms: Preliminary Results.

Karavas, George K. (Arizona State Univ), Larsson, Daniel (Arizona State Univ), Artemiadis, Panagiotis (Arizona State Univ)

WeAT10 Room 205

Object Detection, Segementation, and Categorization I

Chair: Triebel, Rudolph — Tech. Univ. Munich

Co-Chair: Pham, Trung — The Univ. of Adelaide

10:30-10:45 WeAT10.1

Autonomous Meshing, Texturing and Recognition of Object Models with a Mobile Robot.

Ambrus, Rares (Royal Inst. of Tech. (KTH) Stockholm Sweden), Bore, Nils (KTH Royal Inst. of Tech), Folkesson, John (KTH), Jensfelt, Patric (KTH - Royal Inst. of Tech)

10:45-11:00 WeAT10.2

Meaningful Maps with Object-Oriented Semantic Mapping.

Sünderhauf, Niko (Queensland Univ. of Tech), Pham, Trung (The Univ. of Adelaide), Latif, Yasir (Univ. of Adelaide), Milford, Michael J (Queensland Univ. of Tech), Reid, Ian (Univ. of Adelaide)

11:00-11:15 WeAT10.3

Selecting CNN Features for Online Learning of 3D Objects.

Ullrich, Monika (German Aerospace Center (DLR)), Ali, Haider (Johns Hopkins Univ), Durner, Maximilian (German Aerospace Center DLR), Marton, Zoltan-Csaba (German Aerospace Center (DLR)), Triebel, Rudolph (Tech. Univ. Munich)

11:15-11:30 WeAT10.4

Probabilistic 3D Multilabel Real-Time Mapping for Multi-Object Manipulation.

Wada, Kentaro (The Univ. of Tokyo), Okada, Kei (The Univ. of Tokyo), Inaba, Masayuki (The Univ. of Tokyo)

11:30-11:45 WeAT10.5

What Makes a Place? Building Bespoke Place Dependent Object Detectors for Robotics.

Hawke, Jeffrey (Univ. of Oxford), Bewley, Alex (Univ. of Oxford), Posner, Ingmar (Oxford Univ)

11:45-12:00 WeAT10.6

MFNet: Towards Real-Time Semantic Segmentation for Autonomous Vehicles with Multi-Spectral Scenes.

Ha, Qishen (The Univ. of Tokyo), Watanabe, Kohei (The Univ. of Tokyo), Karasawa, Takumi (The Univ. of Tokyo), Ushiku, Yoshitaka (Grad School of Information Science & Tech. the Univ), Harada, Tatsuya (The Univ. of Tokyo)

WeAT11 Room 207

Aerial Systems: Mechanics and Control I

Chair: Papanikolopoulos, Nikos Univ. of Minnesota

Co-Chair: Shen, Shaojie Hong Kong Univ. of Science and Tech

10:30-10:45 WeAT11.1

A Unified Approach to Configuration-Based Dynamic Analysis of Quadcopters for Optimal Stability.

Hedayatpour, Mojtaba (Univ. of Regina), mehrandezh, mehran (Univ. of Regina), Janabi-Sharifi, Farrokh (Ryerson Univ)

10:45-11:00 WeAT11.2

Wall Contact by Octo-Rotor UAV with One DoF Manipulator for Bridge Inspection.

Ikeda, Takahiro (Meijo Univ), Yasui, Shogo (Meijo Univ), Fujihara, Motoharu (Meijo Univ), Ohara, Kenichi (Meijo Univ), Ashizawa, Reiji (Meijo Univ), Ichikawa, Akihiko (Meijo Univ), Okino, akihisa (Okino Industries, LTD), Oomichi, Takeo (Meijo Univ), Fukuda, Toshio (Meijo Univ)

11:00-11:15 WeAT11.3

Enabling Robot Assisted Landing of Heavy UAV Rotorcraft Via Combined Control and Workload Sharing.

Maier, Moritz (German Aerospace Center (DLR)), Kondak, Konstantin (German Aerospace Center), Ott, Christian (German Aerospace Center (DLR))

11:15-11:30 WeAT11.4

A Hierarchical Control Approach for a Quadrotor Tail-Sitter VTOL UAV and Experimental Verification.

Lyu, Ximin (Hong Kong Univ. of Science and Tech), Gu, Haowei (Hong Kong Univ. of Science and Tech), ZHOU, Jinni (Hong Kong Univ. of Science and Tech), Li, Zexiang (Hong Kong Univ. of Science and Tech), Shen, Shaojie (Hong Kong Univ. of Science and Tech), Zhang, Fu (Hong Kong Univ. of Science and Tech)

11:30-11:45 WeAT11.5

Energy Characterization of a Transformable Solar-Powered Unmanned Aerial Vehicle.

Jenson, Devon (Cse, Umn), D'Sa, Ruben (Univ. of Minnesota), Henderson, Travis (Cse, Umn), Kilian, Jack (Cse, Umn), Schulz, Bobby (Univ. of Minnesota Twin Cities), Papanikolopoulos, Nikos (Univ. of Minnesota)

11:45-12:00 WeAT11.6

A Small Hybrid Ground-Air Vehicle Concept.

Morton, Scott (Univ. of Minnesota), Papanikolopoulos, Nikos (Univ. of Minnesota)

WeAT12	Room 208
Agricultural Robotics I	
Chair: Bhattacharya, Sourabh	Iowa State Univ
Co-Chair: Dayoub, Feras	Queensland Univ. of Tech

10:30-10:45 WeAT12.1

Semi-Supervised Online Visual Crop and Weed Classification in Precision Farming Exploiting Plant Arrangement.

Lottes, Philipp (Univ. of Bonn), Stachniss, Cyrill (Univ. of Bonn)

10:45-11:00 WeAT12.2

Online Detection of Occluded Plant Stalks for Manipulation.

Jenkins, Merritt (Carnegie Mellon Univ), Kantor, George (Carnegie Mellon Univ)

11:00-11:15 WeAT12.3

Smart Autonomous Grain Carts for Harvesting-On-Demand.

Tian, Yan (Iowa State Univ), Bhattacharya, Sourabh (Iowa State Univ)

11:15-11:30 WeAT12.4

A Transplantable System for Weed Classification by Agricultural Robotics.

Hall, David (Queensland Univ. of Tech), Dayoub, Feras (Queensland Univ. of Tech), Perez, Tristan (Queensland Univ. of Tech), McCool, Christopher Steven (Queensland Univ. of Tech)

11:30-11:45 WeAT12.5

In-Field Segmentation and Identification of Plant Structures Using 3D Imaging.

Sodhi, Paloma (Carnegie Mellon Univ), Vijayarangan, Srinivasan (Carnegie Mellon Univ), Wettergreen, David (Carnegie Mellon Univ)

11:45-12:00 WeAT12.6

Automatic Model Based Dataset Generation for Fast and Accurate Crop and Weeds Detection.

Di Cicco, Maurilio (Sapienza Univ. of Rome), Potena, Ciro (Sapienza Univ. of Rome), Grisetti, Giorgio (Sapienza Univ. of Rome), Pretto, Alberto (Sapienza Univ. of Rome)

WeAT13	Room 211
Motion and Path Planning V	
Chair: Manocha, Dinesh	Univ. of North Carolina at Chapel Hill
Co-Chair: Dai, Ran	Iowa State Univ

10:30-10:45 WeAT13.1

Towards Planning and Control of Hybrid Systems with Limit Cycle Using LQR Trees.

Rajasekaran, Siddharthan (Worcester Pol. Inst), Natarajan, Ramkumar (Worcester Pol. Inst), Taylor, Jonathan D. (Carnegie Mellon Univ)

10:45-11:00 WeAT13.2

Ergodic Coverage in Constrained Environments Using Stochastic Trajectory Optimization.

Ayvali, Elif (Carnegie Mellon Univ), Salman, Hadi (Carnegie Mellon Univ), Choset, Howie (Carnegie Mellon Univ)

11:00-11:15 WeAT13.3

Sampling-Based Coverage Motion Planning for Industrial Inspection Application with Redundant Robotic System.

Jing, Wei (Carnegie Mellon Univ), Polden, Joseph (Singapore Inst. of Manufacturing Tech. (SIMTech)), Goh, Chun Fan (Carnegie Mellon Univ), Rajaraman, Mabaran (Carnegie Mellon Univ), Lin, Wei (SIMTech, A*STAR), Shimada, Kenji (Carnegie Mellon Univ)

11:15-11:30 WeAT13.4

Static Force Distribution and Orientation Control for a Rover with an Actively Articulated Suspension System.

Cordes, Florian (DFKI Robotics Innovation Center Bremen), Babu, Ajish (German Res. Center for Artificial Intelligence (DFKI)), Kirchner, Frank (Univ. of Bremen)

11:30-11:45 WeAT13.5

Probabilistic Prioritization of Movement Primitives.

Paraschos, Alexandros (Tech. Univ. Darmstadt), Lioutikov, Rudolf (Tech. Univ. Darmstadt), Peters, Jan (Tech. Univ. Darmstadt), Neumann, Gerhard (Univ. of Lincoln)

11:45-12:00 WeAT13.6

Mission Planning for a Multi-Robot Team with a Solar-Powered Charging Station.

Kingry, Nathaniel (Iowa State Univ), Liu, Yen-Chen (Iowa State Univ), Simon, Benjamin (Iowa State Univ), Bang, Yun Qi (Iowa State Univ), Dai, Ran (Iowa State Univ)

WeAT14	Room 217
Humanoid Locomotion	
Chair: Poulakakis, Ioannis	Univ. of Delaware
Co-Chair: Asano, Fumihiko	Japan Advanced Inst. of Science and Tech

10:30-10:45 WeAT14.1

Distributed Torque Estimation Toward Low-Latency Variable Stiffness Control for Gear-Driven Torque Sensorless Humanoid.

Nagamatsu, Yuya (The Univ. of Tokyo), Shirai, Takuma (Tokyo Univ), Suzuki, Hiroto (The Univ. of Tokyo), Kakiuchi, Yohei (The Univ. of Tokyo), Okada, Kei (The Univ. of Tokyo), Inaba, Masayuki (The Univ. of Tokyo)

10:45-11:00 WeAT14.2

MPC-Based Humanoid Pursuit-Evasion in the Presence of Obstacles.

De Simone, Daniele (Sapienza Univ. of Rome), Scianca, Nicola (Sapienza Univ. of Rome), Ferrari, Paolo (Sapienza Univ. of Rome), Lanari, Leonardo (Sapienza Univ. of Rome), Oriolo, Giuseppe (Sapienza Univ. of Rome)

11:00-11:15 WeAT14.3

Steering a 3D Limit-Cycle Biped for Collaboration with a Leader.

Shafiee Motahar, Mohamad (Univ. of Delaware), Veer, Sushant (Univ. of Delaware), Poulakakis, Ioannis (Univ. of Delaware)

11:15-11:30 WeAT14.4

2D Omnidirectional Navigation of a Biped Robot Based on an Egocentric Orbit Following.

Atsuta, Hiroshi (Osaka Univ), Sugihara, Tomomichi (Graduate School of Engineering, Osaka Univ)

11:30-11:45 WeAT14.5

Biped Walking Stabilization Based on Foot Placement Control Using Capture Point Feedback.

Jeong, Hyobin (KAIST), Sim, Okkee (KAIST), Bae, Hyoln (KAIST, HuboLab), Lee, Kang Kyu (KAIST Hubolab), Oh, Jaesung (KAIST), Oh, Jun Ho (Korea Advanced Inst. of Sci. and Tech)

11:45-12:00 WeAT14.6

Modeling and Analysis of Sliding Passive Dynamic Walking with Semicircular Feet Considering Impulsive Frictional Effect.

Asano, Fumihiko (Japan Advanced Inst. of Science and Tech), Harata, Yuji (Hiroshima Univ)

WeAT15	Room 215
Aerial I	
Chair: Furukawa, Tomonari	Virginia Pol. Inst. and State Univ
Co-Chair: Waslander, Steven Lake	Univ. of Waterloo

10:30-10:45 WeAT15.1

Aerial Image Based Heading Correction for a Large Scale SLAM in an Urban Canyon.

roh, hyunchul (KAIST), Jeong, Jinyong (KAIST), Kim, Ayoung (Korea Advanced Inst. of Science Tech)

10:45-11:00 WeAT15.2

Image-Based UAV Localization Using Interval Methods.

Kenmogne, Ide-Flore (INRIA), Drevelle, Vincent (Univ. De Rennes 1, IRISA, INRIA Rennes), Marchand, Eric (Univ. De Rennes 1, IRISA, INRIA Rennes)

11:00-11:15 WeAT15.3

Distance Function Based 6DOF Localization for Unmanned Aerial Vehicles in GPS Denied Environments.

Unicomb, James (Univ. of Tech. Sydney), Dantanarayana, Lakshitha (Univ. of Tech. Sydney), Arukgoda, Janindu (Univ. of Tech. Sydney), Ranasinghe, Ravindra (Univ. of Tech. Sydney), Dissanayake, Gamini (Univ. of Tech. Sydney), Furukawa, Tomonari (Virginia Pol. Inst. and State Univ)

11:15-11:30 WeAT15.4

Circular Formation Control of Fixed-Wing UAVs with Constant Speeds.

Garcia de Marina, Hector (Ec. Nationale De L'aviation Civil (ENAC)), Sun, Zhiyong (Australian National Univ), Bronz, Murat (ENAC), Hattenberger, Gautier (ENAC, French Civil Aviation Univ)

11:30-11:45 WeAT15.5

A Decision-Theoretic Approach to Detection-Based Target Search with a UAV.

Gupta, Aayush (Saratoga High School), Bessonov, Daniel (Saratoga High School), Li, Patrick (Saratoga High School)

11:45-12:00 WeAT15.6

Using a Quadrotor to Track a Moving Target with Arbitrary Relative Motion Patterns.

Chen, Jing (Hong Kong Univ. of Science and Tech), Shen, Shaojie (Hong Kong Univ. of Science and Tech)

WeAT16	Room 220
Reactive and Sensor-Based Planning I	
Chair: Kleiner, Alexander	Irobot
Co-Chair: Englot, Brendan	Stevens Inst. of Tech

10:30-10:45 WeAT16.1

Belief Roadmap Search: Advances in Optimal and Efficient Planning under Uncertainty.

Shan, Tixiao (Stevens Inst. of Tech), Englot, Brendan (Stevens Inst. of Tech)

10:45-11:00 WeAT16.2

Reactive Synthesis for Finite Tasks under Resource Constraints.

He, Keliang (Rice Univ), Lahijanian, Morteza (Univ. of Oxford), Kavraki, Lydia (Rice Univ), Moshe, Vardi (Rice Univ)

11:00-11:15 WeAT16.3

Probabilistic Nod Generation Model Based on Estimated Utterance Categories.

liu, chaoran (Osaka Univ), Ishi, Carlos Toshinori (ATR), Ishiguro, Hiroshi (Osaka Univ)

11:15-11:30 WeAT16.4

Visual Navigation with Efficient ConvNet Features.

Jaspers, Hanno (Univ. of the Bundeswehr Munich), Fassbender, Dennis (Univ. of the Bundeswehr Munich), Wuensche, Hans J (UniBw Munich)

11:30-11:45 WeAT16.5

A Solution to Room-By-Room Coverage for Autonomous Cleaning Robots.

Kleiner, Alexander (Irobot), Baravalle, Rodrigo Guillermo (Irobot, CIFASIS-CONICET, Lab. for System Dynamics and Sign), Kolling, Andreas (Irobot Corp), Pilotti, Pablo (Irobot), Munich, Mario Enrique (Irobot)

11:45-12:00 WeAT16.6

Viscosity-Based Height Reflex for Workspace Augmentation for Quadrupedal Locomotion on Rough Terrain.

Focchi, Michele (Fondazione Istituto Italiano Di Tecnologia), Featherstone, Roy (Istituto Italiano Di Tecnologia), Orsolino, Romeo (Istituto Italiano Di Tecnologia), Semini, Claudio (Istituto Italiano Di Tecnologia), Caldwell, Darwin G. (Istituto Italiano Di Tecnologia)

WeAT17	Room 221
Redundant Robotics	
Chair: Takanishi, Atsuo	Waseda Univ
Co-Chair: Kovecses, Jozsef	McGill Univ

10:30-10:45 WeAT17.1

Linear Actuator Robots: Differential Kinematics, Controllability, and Algorithms for Locomotion and Shape Morphing.

Usevitch, Nathan (Stanford), Hammond, Zachary (Stanford Univ), Follmer, Sean (Stanford Univ), Schwager, Mac (Stanford Univ)

10:45-11:00 WeAT17.2

Interactive Null Space Control for Intuitively Interpretable Reconfiguration of Redundant Manipulators.

Mansfeld, Nico (German Aerospace Center (DLR)), Beck, Fabian (German Aerospace Center (DLR)), Dietrich, Alexander (German Aerospace Center (DLR)), Haddadin, Sami (Leibniz Univ. Hanover)

11:00-11:15 WeAT17.3

A Survey on Precision of Redundantly Actuated DELTA-Type Parallel Kinematic Mechanisms.

Shahidi, Seyed Amirreza (RWTH Aachen Univ), Lorenz, Michael (RWTH Aachen Univ), Charaf Eddine, Sami (RWTH Aachen Univ), Hüsing, Mathias (RWTH Aachen Univ), Corves, Burkhard (RWTH Aachen Univ)

11:15-11:30 WeAT17.4

A Method to Enforce Stiff Constraints in the Simulation of Articulated Multibody Systems.

Hewlett, Joseph (McGill Univ), Kovecses, Jozsef (McGill Univ), Angeles, Jorge (McGill Univ)

11:30-11:45 WeAT17.5

Improving the Performance of Biomechanically Safe Velocity Control for Redundant Robots through Reflected Mass Minimization.

Mansfeld, Nico (German Aerospace Center (DLR)), Djellab, Badis (German Aerospace Center (DLR)), Raldua Veuthey, Jaime (German Aerospace Center (DLR)), Beck, Fabian (German Aerospace Center (DLR)), Ott, Christian (German Aerospace Center (DLR)), Haddadin, Sami (Leibniz Univ. Hanover)

11:45-12:00 WeAT17.6

A Four-Limbed Disaster-Response Robot Having High Mobility Capabilities in Extreme Environments.

Hashimoto, Kenji (Waseda Univ), Matsuzawa, Takashi (Waseda Univ), Teramachi, Tomotaka (Waseda Univ), Uryu, Kazuhiro (Waseda Univ), Sun, Xiao (Waseda Univ), Hamamoto, Shinya (Waseda Univ), Koizumi, Ayanori (Waseda Univ), Takanishi, Atsuo (Waseda Univ)

WeAT18 Room 223

Failure Detection and Recovery

Chair: Tang, Hui Guangdong Univ. of Tech

Co-Chair: Rojas, Juan Guangdong Univ. of Tech

10:30-10:45 WeAT18.1

A Multimodal Execution Monitor with Anomaly Classification for Robot-Assisted Feeding.

Park, Daehyung (Georgia Inst. of Tech), Kim, HoKeun (Georgia Inst. of Tech), Hoshi, Yuuna (Georgia Inst. of Tech), Erickson, Zackory (Georgia Inst. of Tech), Kapusta, Ariel (Georgia Inst. of Tech), Kemp, Charlie (Georgia Inst. of Tech)

10:45-11:00 WeAT18.2

Force-Sensorless Fault Tolerant Detection and Switching Control of Tendon-Driven Mechanisms with Redundant Tendons.

Suehiro, Kiichi (Kubota Coporation), Ozawa, Ryuta (Ritsumeikan Univ), Van Heerden, Kirill (Ritsumeikan Univ)

11:00-11:15 WeAT18.3

Structure and Performance Analysis of the 7! Robots Generated from an Optimally Fault Tolerant Jacobian.

Xie, Biyun (Colorado State Univ), Maciejewski, Anthony A. (Colorado State Univ)

11:15-11:30 WeAT18.4

Online Robot Introspection Via Wrench-Based Action Grammars.

Rojas, Juan (Guangdong Univ. of Tech), Luo, Shuangqi (Guangdong Univ. of Tech), Zhu, DingQiao (Sun Yat Sen Univ), Huang, Zhenjie (Sun Yat Sen Univ), Lin, Hongbin (Guangdong Univ. of Tech), Du, Yunlong (Sun Yat Sen Univ), Kuàng, wen wei (Sun Yat Sen Univ), Harada, Kensuke (Osaka Univ)

11:30-11:45 WeAT18.5

Viewpoint Selection for Visual Failure Detection.

Saran, Akanksha (Univ. of Texas at Austin), Lakic, Branka (Duke Univ), Majumdar, Srinjoy (Univ. of Texas at Austin), Hess, Juergen Michael (Robert Bosch LLC), Niekum, Scott (Univ. of Texas at Austin)

11:45-12:00 WeAT18.6

Towards Adaptive Semantic Subscriptions for Stream Reasoning in the Robot Operating System.

de Leng, Daniel (Linköping Univ), Heintz, Fredrik (Linköping Univ)

WeBT1	Room 109
Deep Learning	
Chair: He, Hongsheng	Univ. of Tennessee
Co-Chair: Sa, Inkyu	ETH Zurich
14:30-14:45	WeBT1.1
Towards Visual Ego-Motion Learning in Robots.	
Pillai, Sudeep (MIT), Leonard, John (MIT)	
14:45-15:00	WeBT1.2
Robots That Anticipate Pain: Anticipating Physical Perturbations from Visual Cues through Deep Predictive Models.	
Sur, Indranil (SRI International), Ben Amor, Heni (Arizona State Univ)	
15:00-15:15	WeBT1.3
Control of a Quadrotor with Reinforcement Learning.	
Hwangbo, Jemin (Swiss Federal Inst. of Tech. Zurich), Sa, Inkyu (ETH Zurich), Siegwart, Roland (ETH Zurich), Hutter, Marco (ETH Zurich)	
15:15-15:30	WeBT1.4
Deep Visual Gravity Vector Detection for Unmanned Aircraft Attitude Estimation.	
Ellingson, Gary (Brigham Young Univ), Wingate, David (Brigham Young Univ), McLain, T.W. (Bringham Young Univ)	
15:30-15:45	WeBT1.5
Learning Deep Visual Object Models from Noisy Web Data: How to Make It Work.	
Massouh, Nizar (Sapienza Rome Univ), Babiloni, Francesca (Sapienza Rome Univ), Tommasi, Tatiana (Univ. of Rome Sapienza), Young, Jay (Univ. of Birmingham), Hawes, Nick (Univ. of Birmingham), Caputo, Barbara (Sapienza Univ)	
15:45-16:00	WeBT1.6
Learning Deep NBNN Representations for Robust Place Categorization.	
Mancini, Massimiliano (Sapienza Univ. of Rome), Rota Bulò, Samuel (Fondazione Bruno Kessler), Ricci, Elisa (Univ. of Perugia), Caputo, Barbara (Sapienza Univ)	

WeBT2	Room 111
Compliant Joint/Mechanism II	
Chair: Kashiri, Navvab	Istituto Italiano Di Tecnologia
Co-Chair: Tsagarakis, Nikos	Istituto Italiano Di Tecnologia

14:30-14:45 WeBT2.1

Tribot: A Deployable, Self-Righting and Multi-Locomotive Origami Robot.

Zhakypov, Zhenishbek (École Pol. Fédérale De Lausanne), Belke, Christoph H. (École Pol. Fédérale De Lausanne), Paik, Jamie (Ec. Pol. Federale De Lausanne)

14:45-15:00 WeBT2.2

COCrIP: Compliant OmniCrawler In-Pipeline Robot.

Singh, Akash (Visvesvaraya National Inst. of Tech), Sachdeva, Enna (IIIT Hyderabad), Sarkar, Abhishek (International Inst. of Information Tech. Hyderabad), Krishna, Madhava (IIIT Hyderabad)

15:00-15:15 WeBT2.3

Development of a Human Size and Strength Compliant Bi-Manual Platform for Realistic Heavy Manipulation Tasks.

Baccelliere, Lorenzo (Istituto Italiano Di Tecnologia), Kashiri, Navvab (Istituto Italiano Di Tecnologia), Muratore, Luca (Italian Inst. of Tech), Laurenzi, Arturo (Istituto Italiano Di Tecnologia), Kamedula, Malgorzata (Istituto Italiano Di Tecnologia), margan, alessio (Istituto Italiano Di Tecnologia), Cordasco, Stefano (Istituto Italiano Di Tecnologia (IIT)), Malzahn, Jörn (Istituto Italiano Di Tecnologia), Tsagarakis, Nikos (Istituto Italiano Di Tecnologia)

15:15-15:30 WeBT2.4

Open-Loop Torque Control of Series Clutch Actuators with a High Torque to Weight Ratio.

Wang, Yushi (Waseda Univ), Schmitz, Alexander (Waseda Univ), Kobayashi, Kento (Waseda Univ), Alvarez Lopez, Javier Alejandro (Waseda Univ. Sugano Lab), matsuo, yuki (Waseda Univ), Sakamoto, Yoshihiro (Waseda Univ), Sugano, Shigeki (Waseda Univ), Wang, Wei (Waseda Univ)

15:30-15:45 WeBT2.5

Soft Fluidic Rotary Actuator with Improved Actuation Properties.

Fraś, Jan (Industrial Res. Inst. for Automation and Measurements), Noh, Yohan (King's Coll. London), Wurdemann, Helge Arne (Univ. Coll. London), Althoefer, Kaspar (Queen Mary Univ. of London)

15:45-16:00 WeBT2.6

Flexible Ultrasonic Motor Using an Output Coil Spring Slider.

Kanada, Ayato (Toyohashi Univ. of Tech), Mashimo, Tomoaki (Toyohashi Univ. of Tech), Terashima, Kazuhiko (Toyohashi Univ. of Tech)

WeBT3	Room 116
Planning	
Chair: Rekleitis, Ioannis	Univ. of South Carolina

14:30-14:45 WeBT3.1

The Matroid Team Surviving Orienteers Problem: Constrained Routing of Heterogeneous Teams with Risky Traversal.

Jorgensen, Stefan (Stanford Univ), Chen, Robert (Northrop Grumman), Milam, Mark B. (California Inst. of Tech), Pavone, Marco (Stanford Univ)

14:45-15:00 WeBT3.2

Semi-Boustrophedon Coverage with a Dubins Vehicle.

Lewis, Jeremy (Univ. of South Carolina), Edwards, William (Univ. of South Carolina), Benson, Kelly (Univ. of South Carolina), Rekleitis, Ioannis (Univ. of South Carolina), O'Kane, Jason (Univ. of South Carolina)

15:00-15:15 WeBT3.3

A Study on Efficient Motion Design for Redundantly Actuated Parallel Kinematic Manipulators.

Lorenz, Michael (RWTH Aachen Univ), Paris, Jascha Normen (RWTH Aachen Univ), Haschke, Tobias (RWTH Aachen Univ), Schöler, Frederic Jean-Francois (RWTH Aachen Univ), Hüsing, Mathias (RWTH Aachen Univ), Corves, Burkhard (RWTH Aachen Univ)

15:15-15:30 WeBT3.4

On Close Enough Orienteering Problem with Dubins Vehicle.

Faigl, Jan (Czech Tech. Univ. in Prague), Pěnička, Robert (Czech Tech. Univ. in Prague)

15:30-15:45 WeBT3.5

Topologically Distinct Trajectory Predictions for Probabilistic Pursuit.

Shkurti, Florian (McGill Univ), Dudek, Gregory (McGill Univ)

15:45-16:00 WeBT3.6

Towards Optical Biopsy of Olfactory Cells Using Concentric Tube Robots with Follow-The-Leader Deployment.

Girerd, Cedric (ICube AVR, FEMTO-ST), Rabenorosoa, Kanty (FEMTO-ST Inst), Rougeot, Patrick (Univ. of Franche-Comté, FEMTO-ST Inst), Renaud, Pierre (ICube AVR)

WeBT4	Room 114
Optimization and Optimal Control II	
Chair: Kyrki, Ville	Aalto Univ
Co-Chair: Pajarinen, Joni	TU Darmstadt

14:30-14:45 WeBT4.1

Scalable Sparsification for Efficient Decision Making under Uncertainty in High Dimensional State Spaces.

Elimelech, Khen (Tech. – Israel Inst. of Tech), Indelman, Vadim (Tech. - Israel Inst. of Tech)

14:45-15:00 WeBT4.2

Constrained Unscented Dynamic Programming.

Plancher, Brian (Harvard Univ), Manchester, Zachary (School of Engineering and Applied Sciences, Harvard Univ), Kuindersma, Scott (Harvard Univ)

15:00-15:15 WeBT4.3

Kinodynamic Trajectory Optimization and Control for Car-Like Robots.

Rösmann, Christoph (TU Dortmund Univ), Hoffmann, Frank (Tech. Univ. Dortmund), Bertram, Torsten (Tech. Univ. Dortmund)

15:15-15:30 WeBT4.4

A Systematic Analysis of Spring Symmetry on Optimality of Antagonistic Variable Stiffness Actuation.

Kamadan, Abdullah (Sabanci Univ), Kiziltas, Gullu (Sabanci Univ), Patoglu, Volkan (Sabanci Univ)

15:30-15:45 WeBT4.5

Hybrid Control Trajectory Optimization under Uncertainty.

Pajarinen, Joni (TU Darmstadt), Kyrki, Ville (Aalto Univ), Koval, Michael (Carnegie Mellon Univ), Srinivasa, Siddhartha (Carnegie Mellon Univ), Peters, Jan (Tech. Univ. Darmstadt), Neumann, Gerhard (Univ. of Lincoln)

15:45-16:00 WeBT4.6

Fast Trajectory Optimization for Legged Robots Using Vertex-Based ZMP Constraints.

Winkler, Alexander, Wayne (ETH Zurich), Farshidian, Farbod (ETH Zurich), Pardo, Diego (ETH Zürich), Neunert, Michael (ETH Zurich), Buchli, Jonas (ETH Zurich)

WeBT5	Room 118
Surgical Robotics I	
Chair: Burgner-Kahrs, Jessica	Gottfried Wilhelm Leibniz Univ. Hannover
Co-Chair: Stoyanov, Danail	Univ. Coll. London

14:30-14:45 WeBT5.1

Robotic Knot Tying through a Spatial Trajectory with a Visual Servoing System.

LU, Bo (The Hong Kong Pol. Univ), Chu, Henry (The Hong Kong Pol. Univ), Cheng, Li (The Hong Kong Pol. Univ)

14:45-15:00 WeBT5.2

ToolNet: Holistically-Nested Real-Time Segmentation of Robotic Surgical Tools.

Garcia Peraza Herrera, Luis (Univ. Coll. London), Li, Wenqi (Univ. Coll. London), Fidon, Lucas (Univ. Coll. London), Gruijthuijsen, Caspar (KU Leuven, Department of Mechanical Engineering), Devreker, Alain (KU Leuven), Attilakos, George (Univ. Coll. London Hospitals), Deprest, Jan (Univ. Hospital Leuven), Vander Poorten, Emmanuel B (Katholieke Univ. Leuven), Stoyanov, Danail (Univ. Coll. London), Vercauteren, Tom (Univ. Coll. London (UCL)), Ourselin, Sebastien (Univ. Coll. London)

15:00-15:15 WeBT5.3

Magnetic Interactions of Neighbouring Stator Sets in Multi DOF Local Electromagnetic Actuation for Robotic Abdominal Surgery.

Leong, Ching Ying, Florence (Univ. of Melbourne), Mohammadi, Alireza (The Univ. of Melbourne), Tan, Ying (The Univ. of Melbourne), Thiruchelvam, Dhan (Department of Surgery, Univ. of Melbourne at St Vincent's H), Valdastri, Pietro (Vanderbilt Univ), Oetomo, Denny (The Univ. of Melbourne)

15:15-15:30 WeBT5.4

Dynamic Reconstruction of Deformable Soft-Tissue with Stereo Scope in Minimal Invasive Surgery.

Song, Jingwei (Univ. of Tech. Sydney), Wang, Jun (Univ. of Tech. Sydney), Zhao, Liang (Imperial Coll. London), Huang, Shoudong (Univ. of Tech. Sydney), Dissanayake, Gamini (Univ. of Tech. Sydney)

15:30-15:45 WeBT5.5

A Multi-Axis Force Sensor to Assess Tissue Properties in Real-Time.

Jones, Dominic (Univ. of Leeds), Wang, Hongbo (Univ. of Leeds), Alazmani, Ali (Univ. of Leeds), Culmer, Peter Robert (Univ. of Leeds)

15:45-16:00 WeBT5.6

Sensing Slip of Grasped Wet, Conformable Objects.

Burkhard, Natalie (Stanford Univ), Steger, Ryan (Intuitive Surgical), Cutkosky, Mark (Stanford Univ)

WeBT6 Room 121

RGBD Perception II

14:30-14:45 WeBT6.1

An Efficient Rotation and Translation Decoupled Initialization from Large Field of View Depth Images.

Martins, Renato (Inria), Fernández-Moral, Eduardo (INRIA), Rives, Patrick (INRIA)

14:45-15:00 WeBT6.2

Extrinsic Calibration of Multiple RGB-D Cameras from Line Observations.

Perez-Yus, Alejandro (Univ. De Zaragoza), Fernández-Moral, Eduardo (INRIA), Lopez-Nicolas, Gonzalo (Univ. De Zaragoza), Guerrero, Josechu (Univ. De Zaragoza), Rives, Patrick (INRIA)

15:00-15:15 WeBT6.3

A Motion Transmission Model for Multi-DOF Tendon-Driven Mechanisms with Hysteresis and Coupling: Application to a Da Vinci Instrument.

Anooshahpour, Farshad (Western Univ), Yadmellat, Peyman (The Univ. of Western Ontario), Polushin, Ilia G. (Western Univ), Patel, Rajnikant V. (The Univ. of Western Ontario)

15:15-15:30 WeBT6.4

Sensor Fusion for Fiducial Tags: Highly Robust Pose Estimation from Single Frame RGBD.

Jin, Pengju (Carnegie Mellon Univ), Matikainen, Pyry (Carnegie Mellon Univ), Srinivasa, Siddhartha (Carnegie Mellon Univ)

15:30-15:45 WeBT6.5

Depth-Aware Convolutional Neural Networks for Accurate 3D Pose Estimation in RGB-D Images.

Porzi, Lorenzo (Mapillary), Peñate-Sánchez, Adrián (Inst. De Robòtica I Informàtica Industrial, CSIC-UPC), Ricci, Elisa (Univ. of Perugia), Moreno-Noguer, Francesc (CSIC)

15:45-16:00 WeBT6.6

SegICP: Integrated Deep Semantic Segmentation and Pose Estimation.

Wong, Jay M. (Draper), Mariottini, Gian Luca (Draper Lab), Torralba, Antonio (MIT), Chipalkatty, Rahul (Georgia Inst. of Tech), Kee, Vincent (Massachusetts Inst. of Tech), Hebert, Mitchell (Univ. of Massachusetts Amherst), Zhou, Bolei (MIT), Le, Tiffany (MIT), Schneider, Abraham (Charles Stark Draper Lab), Johnson, David M.S. (Draper), Wu, Jimmy (Massachusetts Inst. of Tech), Wagner, Syler (The Charles Stark Draper Lab)

WeBT7 Room 122

Biomimetics II

Co-Chair: Jang, Junwon Samsung Electronics Co., Ltd

14:30-14:45 WeBT7.1

Snake Robots in Contact with the Environment: Influence of the Friction on the Applied Wrench.

Reyes, Fabian (Ritsumeikan Univ), Ma, Shugen (Ritsumeikan Univ)

14:45-15:00 WeBT7.2

Long-Legged Hexapod Giacometti Robot Using Thin Soft McKibben Actuator.

Mohd Faudzi, Ahmad `Athif (Univ. Teknologi Malaysia), Endo, Gen (Tokyo Inst. of Tech), Kurumaya, Shunichi (Tokyo Inst. of Tech), Suzumori, Koichi (Tokyo Inst. of Tech)

15:00-15:15 WeBT7.3

Antagonist Inhibition Control in Redundant Tendon-Driven Structures Based on Human Reciprocal Innervation for Wide Range Limb Motion of Musculoskeletal Humanoids.

Kawaharazuka, Kento (The Univ. of Tokyo), Kawamura, Masaya (The Univ. of Tokyo), Makino, Shogo (The Univ. of Tokyo), Asano, Yuki (The Univ. of Tokyo), Okada, Kei (The Univ. of Tokyo), Inaba, Masayuki (The Univ. of Tokyo)

15:15-15:30 WeBT7.4

A Novel Modular Compliant Knee Joint Actuator for Use in Assistive and Rehabilitation Orthoses.

Bacek, Tomislav (Vrije Univ. Brussel), Moltedo, Marta (Vrije Univ. Brussel), Langlois, Kevin (VUB), Rodriguez Guerrero, Carlos (Vrije Univ. Brussel), Vanderborght, Bram (Vrije Univ. Brussel), Lefeber, Dirk (Vrije Univ. Brussel)

15:30-15:45 WeBT7.5

Preliminary Study of Online Gait Recognizer for Lower Limb Exoskeletons.

Jang, Junwon (Samsung Electronics Co., Ltd), Kim, Kyungrock (Samsung Advanced Inst. of Tech. (SAIT)), Lee, Jusuk (Samsung Electronics Co., Ltd), Lim, Bokman (Samsung Electronics Co., Ltd), Cho, Joon-Kee (Samsung Advanced Inst. of Tech), Shim, Youngbo (Samsung Electronics)

15:45-16:00 WeBT7.6

A Pneumatic Artificial Muscle Manufactured Out of Self-Healing Polymers That Can Repair Macroscopic Damages.

Terryn, Seppe (Vrije Univ. Brussel (VUB)), Brancart, Joost (Vrije Univ. Brussel (VUB)), Lefeber, Dirk (Vrije Univ. Brussel - VUB), Van Assche, Guy (Vrije Univ. Brussel (VUB)), Vanderborght, Bram (Vrije Univ. Brussel)

WeBT8	Room 202
Humanoid and Bipedal Locomotion II	
Chair: Poulakakis, Ioannis	Univ. of Delaware
Co-Chair: Zanotto, Damiano	Stevens Inst. of Tech

14:30-14:45 WeBT8.1

Modeling Robot Geometries Like Molecules, Application to Fast Multi-Contact Posture Planning for Humanoids.

Faraji, Salman (EPFL), Ijspeert, Auke (EPFL)

14:45-15:00 WeBT8.2

Estimating CoP Trajectories and Kinematic Gait Parameters in Walking and Running Using Instrumented Insoles.

Zhang, Huanghe (Stevens Inst. of Tech), Zanotto, Damiano (Stevens Inst. of Tech), Agrawal, Sunil (Columbia Univ)

15:00-15:15 WeBT8.3

Adaptation of Limit-Cycle Walkers for Collaborative Tasks: A Supervisory Switching Control Approach.

Veer, Sushant (Univ. of Delaware), Shafiee Motahar, Mohamad (Univ. of Delaware), Poulakakis, Ioannis (Univ. of Delaware)

15:15-15:30 WeBT8.4

Optimal Control Based Push Recovery Strategy for the Icub Humanoid Robot with Series Elastic Actuators.

Hu, Yue (Heidelberg Univ), Mombaur, Katja (Heidelberg Univ)

15:30-15:45 WeBT8.5

Generation of Locomotion Trajectories for Series Elastic and Viscoelastic Bipedal Robots.

Werner, Alexander (German Aerospace Center (DLR)), Turlej, Wojciech (German Aerospace Center (DLR)), Ott, Christian (German Aerospace Center (DLR))

15:45-16:00 WeBT8.6

Snapbot: A Reconfigurable Legged Robot.

Kim, Joohyung (Disney Res), Alspach, Alexander (Disney Res), Yamane, Katsu (Disney)

WeBT9	Room 204
Calibration and Identification	
Chair: Triebel, Rudolph	Tech. Univ. Munich
Co-Chair: Chaumette, Francois	Inria Rennes-Bretagne Atlantique

14:30-14:45 WeBT9.1

A Method for Hand-Eye and Camera-To-Camera Calibration for Limited Fields of View.

Nissler, Christian (German Aerospace Center (DLR)), Marton, Zoltan-Csaba (German Aerospace Center (DLR)), Kisner, Hannes (Tech. Univ. Chemnitz), Thomas, Ulrike (Tech. Univ. of Chemnitz), Triebel, Rudolph (Tech. Univ. Munich)

14:45-15:00 WeBT9.2

Comparison of Trajectory Parametrization Methods with Statistical Analysis for Dynamic Parameter Identification of Serial Robot.

Abu-Dakka, Fares J. (Istituto Italiano Di Tecnologia), Diaz-Rodriguez, Miguel (Univ. De Los Andes)

15:00-15:15 WeBT9.3

Adaptive Estimation of Measurement Bias in Six Degree of Freedom Inertial Measurement Units: Theory and Preliminary Simulation Evaluation.

Spielvogel, Andrew Robert (Johns Hopkins Univ), Whitcomb, Louis (The Johns Hopkins Univ)

15:15-15:30 WeBT9.4

Optical Coherence Tomography Based 1D to 6D Eye-In-Hand Calibration.

Antoni, Sven-Thomas (Hamburg Univ. of Tech), Otte, Christoph (Hamburg Univ. of Tech), Savarimuthu, Thiusius Rajeeth (Univ. of Southern Denmark), Rajput, Omer (Hamburg Univ. of Tech), Schlaefer, Alexander (Hamburg Univ. of Tech)

15:30-15:45 WeBT9.5

A New Calibration Technique for Multi-Camera Systems of Limited Overlapping Field-Of-Views.

Xing, Ziran (ShanghaiTech Univ), Yu, Jingyi (Univ. of Delaware), Ma, Yi (Univ. of Illinois at Urbana-Champaign)

15:45-16:00 WeBT9.6

Application of Response Surface Methodology for Performing Kinematic Calibration of a 3-PSS/S Parallel Kinematic Mechanism.

Rahman, Taufiq (Agile Sensor Tech. Inc), Hicks, Dion (Memorial Univ. of Newfoundland), Hossain, Mohammed Raju (Memorial Univ. of Newfoundland), Krouglicof, Nicholas (Univ. of Prince Edward Island)

WeBT10 Room 205

Object Detection, Segementation, and Categorization II

Chair: Lizarralde, Fernando — Federal Univ. of Rio De Janeiro

14:30-14:45 WeBT10.1

Object-Based Affordances Detection with Convolutional Neural Networks and Dense Conditional Random Fields.

Nguyen, Anh (Inst. Italiano Di Tech), Kanoulas, Dimitrios (Inst. Italiano Di Tecnologia), Caldwell, Darwin G. (Istituto Italiano Di Tecnologia), Tsagarakis, Nikos (Istituto Italiano Di Tecnologia)

14:45-15:00 WeBT10.2

Efficient Stairway Detection and Modeling for Autonomous Robot Climbing.

Shu Chan, Derek Kevin (Federal Univ. of Rio De Janeiro), Silva, Rôb Klér (Federal Univ. of Rio De Janeiro), Monteiro, João Carlos (COPPE / Federal Univ. of Rio De Janeiro), Lizarralde, Fernando (Federal Univ. of Rio De Janeiro)

15:00-15:15 WeBT10.3

A Variational Approach for 3D Object Classification with Retrieval of Missing Data.

Yu, Hyeonwoo (Seoul National Univ), Lee, Beom-Hee (Seoul National Univ)

15:15-15:30 WeBT10.4

12, 000-Fps Multi-Object Detection Using HOG Descriptor and SVM Classifier.

Li, Jianquan (Inst. of Automation, Chinese Acad. of Sciences), Yin, Yingjie (Inst. of Automation Chinese Acad. of Sciences), Liu, Xilong (Chinese Acad. of Sciences), Xu, De (Chinese Acdamy of Sciences), Gu, Qingyi (Inst. of Automation, Chinese Acad. of Sciences)

15:30-15:45 WeBT10.5

Deep Learning of Directional Truncated Signed Distance Function for Robust 3D Object Recognition.

Liu, Hongsen (Chinese Acad. of Science), CONG, YANG (Chinese Acad. of Science, China), Wang, Shuai (Chinese Acad. of Science), Fan, Huijie (Shenyang Inst. of Automation), Tian, Dongying (Shenyang Inst. of Automation), Tang, Yandong (Shenyang Inst. of Automation, CAS)

15:45-16:00 WeBT10.6

Estimating Deformability of Objects Using Meshless Shape Matching.

Güler, Püren (KTH), Pieropan, Alessandro (KTH), Ishikawa, Masatoshi (Univ. of Tokyo), Kragic, Danica (KTH)

WeBT11 Room 207

Aerial Systems: Mechanics and Control II

Chair: Nakadai, Kazuhiro — Honda Res. Inst. Japan Co., Ltd
Co-Chair: Fuller, Sawyer — Univ. of Washington

14:30-14:45 WeBT11.1

Momentum Control of an Underactuated Flying Humanoid Robot.

Pucci, Daniele (Italian Inst. of Tech), Traversaro, Silvio (Istituto Italiano Di Tecnologia), Nori, Francesco (Istituto Italiano Di Tecnologia)

14:45-15:00 WeBT11.2

Quadrobee: Simulating Flapping Wing Aerial Vehicle Dynamics on a Quadrotor.

Chen, Yuyang (Univ. at Buffalo), Fuller, Sawyer (Univ. of Washington), Dantu, Karthik (Univ. of Buffalo)

15:00-15:15 WeBT11.3

An Intermediary Quaternion-Based Control for Trajectory Following Using a Quadrotor.

Marchand, Nicolas (GIPSA-Lab CNRS/U of Grenoble/INRIA), Colmenares-Vázquez, Josue (Univ. De Grenoble, GIPSA-Lab), Castillo, Pedro (Sorbonne Univ. Univ. De Tech. De Compiègne), Gomez Balderas, Jose Ernesto (GIPSA-Lab)

15:15-15:30 WeBT11.4

Design, Modelling and Hovering Control of a Tail-Sitter with Single Thrust-Vectored Propeller.

Wang, Wufan (Tsinghua Univ), Zhu, Jihong (Tsinghua Univ), Kuang, Minchi (Tsinghua Univ)

15:30-15:45 WeBT11.5

Multilinked Multirotor with Internal Communication System for Multiple Objects Transportation Based on Form Optimization Method.

Anzai, Tomoki (Univ. of Tokyo), ZHAO, MOJU (The Univ. of Tokyo), Chen, Xiangyu (The Univ. of Tokyo), Shi, Fan (The Univ. of Tokyo), Kawasaki, Koji (The Univ. of Tokyo), Okada, Kei (The Univ. of Tokyo), Inaba, Masayuki (The Univ. of Tokyo)

15:45-16:00 WeBT11.6

Development of Microphone-Array-Embedded UAV for Search and Rescue Task.

Nakadai, Kazuhiro (Honda Res. Inst. Japan Co., Ltd), Kumon, Makoto (Graduate School of Science and Tech. Kumamoto), Okuno, Hiroshi G. (Waseda Univ), Hoshiba, Kotaro (Tokyo Inst. of Tech), Wakabayashi, Mizuho (Kumamoto Univ), Washizaki, Kai (Kumamoto Univ), Ishiki, Takahiro (Kumamoto Univ), Gabriel, Daniel (Tokyo Inst. of Tech), Bando, Yoshiaki (Kyoto Univ), Morito, Takayuki (Tokyo Inst. of Tech), Kojima, Ryosuke (Tokyo Inst. of Tech), Sugiyama, Osamu (Tokyo Inst. of Tech)

WeBT12	Room 208
Agricultural Robtics II	
Chair: Kayacan, Erdal	Nanyang Tech. Univ
Co-Chair: Kermani, Mehrdad R.	Univ. of Western Ontario

14:30-14:45 WeBT12.1

Individual Leaf Identification from a Two-Dimensional Monocotyledon Image Based on Phytomorphological Graph Reconstruction.

Lee, Sang-Wook (Korea Inst. of Science and Tech), Kim, Jun-Sik (Korea Inst. of Science & Tech)

14:45-15:00 WeBT12.2

Grasp Evaluation Method for Applying Static Loads Leading to Beam Failure.

Abdeetedal, Mahyar (Western Univ), Kermani, Mehrdad R. (Univ. of Western Ontario)

15:00-15:15 WeBT12.3

A Robotic Vision System to Measure Tree Traits.

Tabb, Amy (USDA-ARS-AFRS), Medeiros, Henry (Marquette Univ)

15:15-15:30 WeBT12.4

Grasping by Wrapping: Mechanical Design and Evaluation.

Ho, Van (Japan Advanced Inst. of Science and Tech)

15:30-15:45 WeBT12.5

A Novel Building Post-Construction Quality Assessment Robot: Design and Prototyping.

Yan, Rui Jun (Ningbo Intelligent Manufacturing Industry Res. Inst), Kayacan, Erdal (Nanyang Tech. Univ), Chen, I-Ming (Nanyang Tech. Univ), Tiong, Lee Kong (Nanyang Tech. Univ)

15:45-16:00 WeBT12.6

Active View Planning for Counting Apples in Orchards.

Roy, Pravakar (Univ. of Minnesota), Isler, Volkan (Univ. of Minnesota)

WeBT13	Room 211
Task Planning	
Chair: Liu, Lantao	Indiana Univ
Co-Chair: Rovida, Francesco	Aalborg Univ. Copenhagen

14:30-14:45 WeBT13.1

An Approach to Robot Task Learning and Planning with Loops.

Mokhtari, Vahid (Univ. of Aveiro), Seabra Lopes, Luís (Univ. De Aveiro), Pinho, Armando (Univ. of Aveiro)

14:45-15:00 WeBT13.2

Synthesis of Correct-By-Construction Behavior Trees.

Colledanchise, Michele (KTH - the Royal Inst. of Tech), Murray, Richard (California Inst. of Tech), Ogren, Petter (Royal Inst. of Tech. (KTH))

15:00-15:15 WeBT13.3

Task-Based Behavior Generalization Via Manifold Clustering.

Garcia, Rafael (Federal Univ. of Rio Grande Do Sul), C. da Silva, Bruno (Federal Univ. of Rio Grande Do Sul (UFRGS)), Comba, João L. D. (Federal Univ. of Rio Grande Do Sul)

15:15-15:30 WeBT13.4

Identifying Good Poses When Doing Your Household Chores: Creation and Exploitation of Inverse Surface Reachability Maps.

Hertle, Andreas (Albert-Ludwigs-Univ. Freiburg), Nebel, Bernhard (Albert-Ludwigs-Univ. Freiburg)

15:30-15:45 WeBT13.5

Combining Neural Networks and Tree Search for Task and Motion Planning in Challenging Environments.

Paxton, Chris (Johns Hopkins Univ), Raman, Vasumathi (California Inst. of Tech), Hager, Gregory (Johns Hopkins Univ), Kobilarov, Marin (Johns Hopkins Univ)

15:45-16:00 WeBT13.6

Clustering-Based Algorithms for Multi-Vehicle Task Assignment in a Time-Invariant Drift Field.

Bai, Xiaoshan (Univ. of Gronengin), Yan, Weisheng (Northwestern Pol. Univ), Cao, Ming (Univ. of Groningen)

WeBT14	Room 217
Environment Monitoring	
Chair: Zhu, Delong	The Chinese Univ. of Hong Kong
Co-Chair: Zhou, Mingxi	Memorial Univ. of Newfoundland

14:30-14:45 WeBT14.1

Design of a Leak Sensor for Operating Water Pipe Systems.

Wu, You (MIT), Kim, Kristina (Massachusetts Inst. of Tech), Finn-Henry, Michael (MIT), Youcef-Toumi, Kamal (Massachusetts Inst. of Tech)

14:45-15:00 WeBT14.2

Hawkeye: Open Source Framework for Field Surveillance.

Zhu, Delong (The Chinese Univ. of Hong Kong), Du, Yegui (Harbin Inst. of Tech), Lin, Yuan (The Univ. of Auckland), Li, Hongxiang (Harbin Inst. of Tech), Wang, Chaoqun (The Chinese Univ. of HongKong), Xu, Xun (Univ. of Auckland), Meng, Max Q.-H. (The Chinese Univ. of Hong Kong)

15:00-15:15 WeBT14.3

Underwater Acoustic-Based Navigation towards Multi-Vehicle Operation and Adaptive Oceanographic Sampling.

Zhou, Mingxi (Memorial Univ. of Newfoundland), Bachmayer, Ralf (Memorial Univ. of Newfoundland), deYoung, Brad (Memorial Univ)

15:15-15:30 WeBT14.4

Robotic Experiments to Evaluate Ocean Plume Characteristics and Structure.

Fahad, Muhammad (Stevens Inst. of Tech), Guo, Yi (Stevens Inst. of Tech), Bingham, Brian (Naval Postgraduate School), Krasnosky, Kristopher (Univ. of Hawaii at Manoa), Fitzpatrick, Laura (Univ. of Hawaii at Manoa), Aragon Sanabria, Fernando (Univ. of Hawaii at Manoa)

15:30-15:45 WeBT14.5

UAV Assisted USV Visual Navigation for Marine Mass Casualty Incident Response.

Xiao, Xuesu (Texas A&M Univ), Dufek, Jan (Texas A&M Univ), Woodbury, Tim (Texas A&M Univ), Murphy, Robin (Texas A&M)

15:45-16:00 WeBT14.6

Data-Driven Selective Sampling for Marine Vehicles Using Multi-Scale Paths.

Manjanna, Sandeep (McGill Univ), Dudek, Gregory (McGill Univ)

WeBT15	Room 215
Computer Vision for Robotic Applications I	
Chair: Kheddar, Abderrahmane	CNRS-AIST JRL (Joint Robotics Lab. UMI3218/CRT
Co-Chair: Civera, Javier	Univ. De Zaragoza

14:30-14:45 WeBT15.1

Online Visual Robot Tracking and Identification Using Deep LSTM Networks.

Farazi, Hafez (Univ. of Bonn), Behnke, Sven (Univ. of Bonn)

14:45-15:00 WeBT15.2

Indoor Scan2BIM: Building Information Models of House Interiors.

Murali, Srivathsan (ETH Zurich), Speciale, Pablo (ETH), Oswald, Martin R. (ETH Zurich), Pollefeys, Marc (ETH Zurich)

15:00-15:15 WeBT15.3

A Multimodal Dataset for Object Model Learning from Natural Human-Robot Interaction.

Azagra, Pablo (Univ. of Zaragoza), Golemo, Florian (INRIA Bordeaux), Mollard, Yoan (Inria), Lopes, Manuel (Inst. Superior Tecnico), Civera, Javier (Univ. De Zaragoza), Murillo, Ana Cristina (Univ. of Zaragoza)

15:15-15:30 WeBT15.4

Nut Fastening with a Humanoid Robot.

Pfeiffer, Kai (CNRS-AIST JRL (Joint Robotic Lab. UMI3218/RL, Tsukuba, Ja), Escande, Adrien (Cnrs-Aist Jrl Umi3218/rl), Kheddar, Abderrahmane (CNRS-AIST JRL (Joint Robotics Lab. UMI3218/CRT)

15:30-15:45 WeBT15.5

Attentional Masking for Pre-Trained Deep Networks.

Wallenberg, Marcus (Linkoping Univ), Forssen, Per-Erik (Linkoping Univ)

15:45-16:00 WeBT15.6

Estimating the Leaf Area Index of Crops through the Evaluation of 3D Models.

Zermas, Dimitris (Cse, Umn), Morellas, Vassilios (U. of Minnesota), Mulla, David (Univ. of Minnesota), Papanikolopoulos, Nikos (Univ. of Minnesota)

WeBT16 Room 220

Reactive and Sensor-Based Planning II

Co-Chair: Robuffo Giordano, Paolo — Centre National De La Recherche Scientifique (CNRS)

14:30-14:45 WeBT16.1

Cost-Aware Path Planning under Co-Safe Temporal Logic Specifications.

Cho, Kyunghoon (Seoul National Univ), Suh, Junghun (Seoul National Univ), Tomlin, Claire (UC Berkeley), Oh, Songhwai (Seoul National Univ)

14:45-15:00 WeBT16.2

An Online Trajectory Generator on SE(3) with Magnitude Constraints.

Huber, Gerold (Tech. Univ. of Munich), Gabler, Volker (Tech. Univ. München), Wollherr, Dirk (Tech. Univ. München)

15:00-15:15 WeBT16.3

Online Velocity Planner for Laser Guided Vehicles Subject to Safety Constraints.

Raineri, Marina (Univ. of Parma), Perri, Simone (Univ. of Parma), Guarino Lo Bianco, Corrado (Univ. of Parma)

15:15-15:30 WeBT16.4

An Optical Tracking System Based on Hybrid Stereo/Single-View Registration and Controlled Cameras.

Cortes, Guillaume (Realyz), Marchand, Eric (Univ. De Rennes 1, IRISA, INRIA Rennes), Ardouin, Jérôme (Unafilliated), Lecuyer, Anatole (INRIA)

15:30-15:45 WeBT16.5

Exploration with Active Loop Closing: A Trade-Off between Exploration Efficiency and Map Quality.

Lehner, Hannah (German Aerospace Center (DLR)), Schuster, Martin Johannes (German Aerospace Center (DLR)), Bodenmueller, Tim (German Aerospace Center (DLR)), Kriegel, Simon (German Aerospace Center (DLR))

15:45-16:00 WeBT16.6

Vision-Based Minimum-Time Trajectory Generation for a Quadrotor UAV.

Penin, Bryan (Inria), Spica, Riccardo (Stanford Univ), Robuffo Giordano, Paolo (Centre National De La Recherche Scientifique (CNRS)), Chaumette, Francois (Inria Rennes-Bretagne Atlantique)

WeBT17 Room 221

Soft Material Robotics V

Chair: Choi, Hyouk Ryeol — Sungkyunkwan Univ

Co-Chair: Wang, Michael Yu — Hong Kong Univ. of Science & Tech

14:30-14:45 WeBT17.1

Differential Pressure Control of 3D Printed Soft Fluidic Actuators.

Kalisky, Tom (Univ. of California, San Diego), Wang, Yueqi (Univ. of California, San Diego), Shih, Benjamin (Univ. of California, San Diego), Drotman, Dylan (Univ. of California, San Diego), Jadhav, Saurabh (Univ. of California, San Diego), aronoff spencer, Eliah (Uc San Diego), Tolley, Michael Thomas (Univ. of California, San Diego)

14:45-15:00 WeBT17.2

Design and Fabrication of a Shape-Morphing Soft Pneumatic Actuator: Soft Robotic Pad.

Sun, Yi (National Univ. of Singapore), Guo, Jin (National Univ. of Singapore), Miller-Jackson, Tiana (National Univ. of Singapore), Liang, Xinquan (National Univ. of Singapore), Ang Jr, Marcelo H (National Univ. of Singapore), Yeow, Chen-Hua (National Univ. of Singapore)

15:00-15:15 WeBT17.3

Soft Pneumatic Gelatin Actuator for Edible Robotics.

Shintake, Jun (École Pol. Fédérale De Lausanne), Sonar, Harshal (Indian Inst. of Tech. Bombay), Piskarev, Egor (EPFL), Paik, Jamie (Ec. Pol. Federale De Lausanne), Floreano, Dario (Ec. Pol. Federal, Lausanne)

15:15-15:30 WeBT17.4

Euglenoid-Inspired Giant Shape Change for Highly Deformable Soft Robots.

Digumarti, Krishna Manaswi (Bristol Robotics Lab), Conn, Andrew (Univ. of Bristol), Rossiter, Jonathan (Univ. of Bristol)

15:30-15:45 WeBT17.5

A Novel Bioinspired Hexapod Robot Developed by Soft Dielectric Elastomer Actuators.

Nguyen, Canh Toan (Sungkyunkwan Univ), Phung, Hoa (Sungkyunkwan Univ), Hoang, Phi Tien (Sungkyunkwan Univ), Nguyen, Tien Dat (Sungkyunkwan Univ), Jung, Hosang (Sungkyunkwan Univ), Moon, Hyungpil (Sungkyunkwan Univ), Koo, Ja Choon (Sungkyunkwan Univ), Choi, Hyouk Ryeol (Sungkyunkwan Univ)

15:45-16:00 WeBT17.6

Design and Development of a Soft Gripper with Topology Optimization.

Zhang, Hongying (National Univ. of Singapore), Wang, Michael Yu (Hong Kong Univ. of Science & Tech), Chen, Feifei (National Univ. of Singapore), Wang, Yiqiang (Hong Kong Univ. of Science and Tech), Senthil Kumar, A. (National Univ. of Singapore), Fuh, Jerry (National Univ. of Singapore)

WeBT18	Room 223
Marine Robotics II	
Chair: Ma, Shugen	Ritsumeikan Univ
Co-Chair: Dudek, Gregory	McGill Univ

14:30-14:45 WeBT18.1

Experimental Verification of the Oscillating Paddling Gait for an Epaddle-EGM Amphibious Locomotion Mechanism.

Shen, Yayi (Ritsumeikan Univ), Sun, Yi (Shanghai Univ), Pu, Huayan (Shanghai Univ), Ma, Shugen (Ritsumeikan Univ)

14:45-15:00 WeBT18.2

FACON: A Flow-Aided Cooperative Navigation Scheme.

Song, Zhuoyuan (Univ. of Florida), Mohseni, Kamran (Univ. of Florida at Gainesville)

15:00-15:15 WeBT18.3

Design and Adaptive Depth Control of a Micro Diving Agent.

Solowjow, Eugen (Hamburg Univ. of Tech), Lange, Johann (Hamburg Univ. of Tech), Pick, Marc-André (Hamburg Univ. of Tech), Bessa, Wallace M. (Hamburg Univ. of Tech), Kreuzer, Edwin (Hamburg Univ. of Tech)

15:15-15:30 WeBT18.4

A Biomimetic Underwater Soft Robot Inspired by Cephalopod Mollusc.

Shen, Zhong (The Univ. of Hong Kong), Wang, Zheng (The Univ. of Hong Kong), NA, JUNHAN (The Univ. of Hong Kong)

15:30-15:45 WeBT18.5

Study of Sweep Angle Effect on Thrust Generation of Oscillatory Pectoral Fins.

Chew, Chee Meng (National Univ. of Singapore), Arastehfar, Soheil (National Univ. of Singapore), Gunawan, Gunawan (National Univ. of Singapore), Yeo, Khoon Seng (National Univ. of Singapore)

15:45-16:00 WeBT18.6

Self-Reconfiguration of Modular Underwater Robots Using an Energy Heuristic.

Furno, Lidia (Tech. Univ. of Denmark), Blanke, Mogens (Tech. Univ. of Denmark), Galeazzi, Roberto (Tech. Univ. of Denmark), Christensen, David Johan (Tech. Univ. of Denmark)

WeCT1	Room 109
Mobile Manipulation and Path Planning	
Chair: Asfour, Tamim	Karlsruhe Inst. of Tech. (KIT)
Co-Chair: Fraisse, Philippe	LIRMM

16:30-16:45 WeCT1.1

A Combined Approach for Robot Placement and Coverage Path Planning for Mobile Manipulation.

Paus, Fabian (Karlsruhe Inst. of Tech. (KIT)), Kaiser, Peter (Karlsruhe Inst. of Tech. (KIT)), Vahrenkamp, Nikolaus (Karlsruhe Inst. of Tech. (KIT)), Asfour, Tamim (Karlsruhe Inst. of Tech. (KIT))

16:45-17:00 WeCT1.2

A Framework for Intuitive Collaboration with a Mobile Manipulator.

Navarro, Benjamin (Univ. of Orléans), Cherubini, Andrea (LIRMM - Univ. De Montpellier CNRS), Fonte, Aicha (Univ. of Orleans), Poisson, Gérard (Univ. D'orléans), Fraisse, Philippe (LIRMM)

17:00-17:15 WeCT1.3

Dynamically Decoupling Base and End-Effector Motion for Mobile Manipulation Using Visual-Inertial Sensing.

Sandy, Timothy (ETH Zürich), Buchli, Jonas (ETH Zurich)

17:15-17:30 WeCT1.4

Deformed State Lattice Planning.

Ren, Zhongqiang (Carnegie Mellon Univ), Gong, Chaohui (Carnegie Mellon Univ), Choset, Howie (Carnegie Mellon Univ)

17:30-17:45 WeCT1.5

Online RRT and Online FMT*: Rapid Replanning with Dynamic Cost*.

Chandler, Bryant (Brigham Young Univ), Goodrich, Michael A. (Brigham Young Univ)

17:45-18:00 WeCT1.6

Learning Foresighted People Following under Occlusions.

Bayoumi, AbdElMoniem (Univ. of Bonn), Karkowski, Philipp (Univ. of Bonn), Bennewitz, Maren (Univ. of Bonn)

WeCT2	Room 111
Mechanism Design	
Chair: Choi, Hyouk Ryeol	Sungkyunkwan Univ
Co-Chair: Sugahara, Yusuke	Tokyo Inst. of Tech

16:30-16:45 WeCT2.1

A Novel POWERPACK for Robotic Application, Integrated Torque Sensor, Harmonic Drive and Motor.

kim, Yong Bum (Sungskyunkwan Univ), Kim, Uikyum (SungKyunKwan Univ), Seok, Dong-Yeop (Sungkyunkwan Univ), So, JinHo (Sungkyunkwan Univ), Lee, Yoon Haeng (Sungkyunkwan Univ), Choi, Hyouk Ryeol (Sungkyunkwan Univ)

16:45-17:00 WeCT2.2

Development and Grasp Analysis of a Sensorized Underactuated Finger.

Abdeetedal, Mahyar (Western Univ), Kermani, Mehrdad R. (Univ. of Western Ontario)

17:00-17:15 WeCT2.3

A Human-Powered Joint Drive Mechanism Using Regenerative Clutches.

Sugahara, Yusuke (Tokyo Inst. of Tech), Kikui, Kensuke (Tokyo Inst. of Tech), Endo, Mitsuru (Nihon Univ), Okamoto, Jun (Tokyo Women's Medical Univ), Matsuura, Daisuke (Tokyo Inst. of Tech), Takeda, Yukio (Tokyo Inst. of Tech)

17:15-17:30 WeCT2.4

Design and Analysis of a Novel Planar Robotic Leg for High-Speed Locomotion.

Kamidi, Vinaykarthik (Robotics and Mechatronics Lab), Saab, Wael (Virginia Tech), Ben-Tzvi, Pinhas (Virginia Tech)

17:30-17:45 WeCT2.5

Design Optimization of a Direct-Drive Linear Actuator Assistive Device for Stroke.

Haji Hosseinnejad, Soroosh (Univ. of Auckland), Besier, Thor F. (Auckland Bioengineering Inst), Taberner, Andrew J. (Univ. of Auckland), Ruddy, Bryan P. (Univ. of Auckland)

17:45-18:00 WeCT2.6

3D Printable Origami Twisted Tower: Design, Fabrication, and Robot Embodiment.

Liu, Tao (Case Western Res. Univ), Wang, Yanzhou (Case Western Res. Univ), Lee, Kiju (Case Western Res. Univ)

WeCT3	Room 116
Force Control and Tactile Sensing	
Chair: Niemeyer, Günter	Disney Res
Co-Chair: Lepora, Nathan	Univ. of Bristol

16:30-16:45 WeCT3.1

Object Exploration Using Vision and Active Touch.

Yang, Chuanyu (Univ. of Bristol), Lepora, Nathan (Univ. of Bristol)

16:45-17:00 WeCT3.2

Multilayered Center-Of-Pressure Sensors for Robot Fingertips and Adaptive Feedback Control.

Suzuki, Yosuke (Kanazawa Univ)

17:00-17:15 WeCT3.3

A Tactile-Based Framework for Active Object Learning and Discrimination Using Multi-Modal Robotic Skin.

Kaboli, Mohsen (Tech. Univ. of Munich (TUM)), Feng, Di (Tech. Univ. of Munich), Yao, Kunpeng (Tech. Univ. of Munich), Lanillos, Pablo (Tech. Univ. München), Cheng, Gordon (Tech. Univ. of Munich)

17:15-17:30 WeCT3.4

Toward Torque Control of a KUKA LBR IIWA for Physical Human-Robot Interaction.

Chawda, Vinay (The Walt Disney Company), Niemeyer, Günter (Disney Res)

17:30-17:45 WeCT3.5

Robust Set Invariance for Implicit Robot Force Control in Presence of Contact Model Uncertainty.

Parigi-Polverini, Matteo (Pol. Di Milano), Nicolis, Davide (Pol. Di Milano), Zanchettin, Andrea Maria (Pol. Di Milano), Rocco, Paolo (Pol. Di Milano)

17:45-18:00 WeCT3.6

Haptic Guidance in Dynamic Environments Using Optimal Reciprocal Collision Avoidance.

Lisini Baldi, Tommaso (Univ. of Siena), Scheggi, Stefano (Univ. of Twente), Aggravi, Marco (Univ. of Siena), Prattichizzo, Domenico (Univ. of Siena)

WeCT4	Room 114
Simulation and Animation	
Chair: Manocha, Dinesh	Univ. of North Carolina at Chapel Hill
Co-Chair: Li, Sheng	Peking Univ

16:30-16:45 WeCT4.1

Visualizing Robot Behaviors As Automated Video Annotations: A Case Study in Robot Soccer.

Zhu, Danny (Carnegie Mellon Univ), Veloso, Manuela (Carnegie Mellon Univ)

16:45-17:00 WeCT4.2

Fast Simulation of Vehicles with Non-Deformable Tracks.

Pecka, Martin (Czech Tech. Univ. in Prague), Zimmermann, Karel (Czech Tech. Univ. Prague), Svoboda, Tomas (Faculty of Electrical Engineering, Czech Tech. Univ. In)

17:00-17:15 WeCT4.3

Multi-Contact Frictional Rigid Dynamics Using Impulse Decomposition.

Li, Sheng (Peking Univ), Zhang, Tianxiang (Peking Univ), Wang, Guoping (Peking Univ), Sun, Hanqiu (CUHK), Manocha, Dinesh (Univ. of North Carolina at Chapel Hill)

17:15-17:30 WeCT4.4

Loosely-Constrained Volumetric Contact Force Computation for Rigid Body Simulation.

Wakisaka, Naoki (Osaka Univ), Sugihara, Tomomichi (Graduate School of Engineering, Osaka Univ)

17:30-17:45 WeCT4.5

Evaluation of Regular Planar Meshes for Modular Active Cell Robots (MACROs).

Nawroj, Ahsan (Yale Univ), Dollar, Aaron (Yale Univ)

WeCT5	Room 118
Surgical Robotics II	
Chair: Alterovitz, Ron	Univ. of North Carolina at Chapel Hill
Co-Chair: Simaan, Nabil	Vanderbilt Univ

16:30-16:45 WeCT5.1

Towards MRI-Guided and Actuated Tetherless Milli-Robots: Preoperative Planning and Modeling of Control.

Kensicher, Thibault (Univ. of Houston), Leclerc, Julien (Univ. of Houston), Biediger, Dan (Univ. of Houston), Shah, Dipan J. (Houston Methodist DeBakey Heart & Vascular Center), Seimenis, Ioannis (Democritus Univ. of Thrace), Becker, Aaron (Univ. of Houston), Tsekos, Nikolaos (Univ. of Houston)

16:45-17:00 WeCT5.2

Minimal Visual Occlusion Redundancy Resolution of Continuum Robots in Confined Spaces.

Sarli, Nima (Vanderbilt Univ), Simaan, Nabil (Vanderbilt Univ)

17:00-17:15 WeCT5.3

A Model of Vertebral Motion and Key Point Recognition of Drilling with Force in Robot-Assisted Spinal Surgery.

Jiang, Zhongliang (Shenzhen Inst. of Advanced Tech), Sun, Yu (Shenzhen Inst. of Advanced Tech. Chinese Acad. of S), Zhao, Shijia (Shenzhen Inst. of Advanced Tech. Chinese Acad. of S), HU, Ying (Shenzhen Inst. of Advanced Tech. ShenZhen, China), Zhang, Jianwei (Univ. of Hamburg)

17:15-17:30 WeCT5.4

Motion Planning for Continuum Reconfigurable Incisionless Surgical Parallel Robots.

Kuntz, Alan (Univ. of North Carolina at Chapel Hill), Mahoney, Art (Vanderbilt Univ), Peckman, Nicolas (Univ. of North Carolina at Chapel Hill), Anderson, Patrick (Vanderbilt Univ), Maldonado, Fabien (Vanderbilt Univ), Webster III, Robert James (Vanderbilt Univ), Alterovitz, Ron (Univ. of North Carolina at Chapel Hill)

17:30-17:45 WeCT5.5

On the Merits of Helical Tendon Routing in Continuum Robots.

Starke, Julia (Leibniz Univ. Hannover), Amanov, Ernar (Leibniz Univ. Hannover), Chikhaoui, Mohamed Taha (Leibniz Univ. Hannover), Burgner-Kahrs, Jessica (Gottfried Wilhelm Leibniz Univ. Hannover)

17:45-18:00 WeCT5.6

User Interface of Force-Controlled Arm for Endoscopic Surgery.

Kasai, Takara (Sony Corp), NAGAO, Daisuke (Sony Corp), Kuroda, Yohei (Sony Corp), Miyamoto, Atsushi (Sony Corp), Matsuda, Yasuhiro (Sony Corp), Fukushima, Tetsuharu (Sony Corp)

WeCT6	Room 121
RGBD Perception III	
Chair: Kaess, Michael	Carnegie Mellon Univ
Co-Chair: Johnson-Roberson, Matthew	Univ. of Michigan

16:30-16:45 WeCT6.1

Robotic Ironing with 3D Perception and Force/Torque Feedback in Household Environments.

Estevez, David (Univ. Carlos III De Madrid), Victores, Juan G. (Univ. Carlos III De Madrid), Fernandez, Raul (Univ. Carlos III De Madrid), Balaguer, Carlos (Univ. Carlos III De Madrid)

16:45-17:00 WeCT6.2

RGB-D Fusion Enhancement by Mode Filter for Surfel Cloud Segmentation.

Monica, Riccardo (Univ. of Parma), Zillich, Michael (Vienna Univ. of Tech), Vincze, Markus (Vienna Univ. of Tech), Aleotti, Jacopo (Univ. of Parma)

17:00-17:15 WeCT6.3

A Probabilistic Framework for Intrinsic Image Decomposition from RGB-D Streams.

Kim, Wonhui (Univ. of Michigan), Johnson-Roberson, Matthew (Univ. of Michigan)

17:15-17:30 WeCT6.4

GravityFusion: Real-Time Dense Mapping without Pose Graph Using Deformation and Orientation.

Puri, Puneet (Carnegie Mellon Univ), Jia, Daoyuan (School of Computer Science, Carnegie Mellon Univ), Kaess, Michael (Carnegie Mellon Univ)

17:30-17:45 WeCT6.5

Active High Dynamic Range Mapping for Dense Visual SLAM.

Barat, christian (Univ. of Nice Sophia-Antipolis), Comport, Andrew Ian (CNRS-I3S/UNS)

17:45-18:00 WeCT6.6

A Fast Search Algorithm Based on Image Pyramid for Robotic Grasping.

Ren, Guangli (Capital Normal Univ), Shao, Zhenzhou (Capital Normal Univ), guan, yong (Capital Normal Univ), Qu, Ying (Northeastern Univ), Tan, Jindong (Univ. of Tennessee, Knoxville), Wei, Hongxing (Beihang Univ), Tong, Guofeng (Northeastern Univ)

WeCT7	Room 122
Climbing Robots	
Chair: Rubenstein, Michael	Northwestern Univ
Co-Chair: Chou, Jui Jen	National Taiwan Univ

16:30-16:45 WeCT7.1

Bridge Risk Investigation Diagnostic Grouped Exploratory (BRIDGE) Bot.

Sirken, Aaron (Univ. of Maryland, Coll. Park), Knizhnik, Gedaliah (Univ. of Maryland, Coll. Park), McWilliams, Jessica (Univ. of Maryland Coll. Park), Bergbreiter, Sarah (Univ. of Maryland, Coll. Park)

16:45-17:00 WeCT7.2

Flippy: A Soft, Autonomous Climber with Simple Sensing and Control.

Nagpal, Radhika (Harvard Univ), Malley, Melinda (Harvard Univ), Rubenstein, Michael (Northwestern Univ)

17:00-17:15 WeCT7.3

Claw-Wheel: A Transformable Robot for Search and Investigation in Amphibious Environment.

Huang, Chun-Yi (National Taiwan Univ), Kuo, Che-Nan (National Taiwan Univ), Pan, Li-Han (National Taiwan Univ), Lin, Szu-Yu (National Taiwan Univ), Chou, Jui Jen (National Taiwan Univ)

17:15-17:30 WeCT7.4

Planning and Control of Stable Ladder Climbing Motion for the Four-Limbed Robot "WAREC-1".

Sun, Xiao (Waseda Univ), Hashimoto, Kenji (Waseda Univ), Teramachi, Tomotaka (Waseda Univ), Matsuzawa, Takashi (Waseda Univ), Kimura, Shunsuke (Waseda Univ), Sakai, Nobuaki (Waseda Univ), Hayashi, Syota (Waseda Univ), Yoshida, Yuki (Waseda Univ), Takanishi, Atsuo (Waseda Univ)

17:30-17:45 WeCT7.5

Robust Control of a Brachiating Robot.

Nguyen, Kim-Doang (South Dakota State Univ), Liu, Dikai (Univ. of Tech. Sydney)

17:45-18:00 WeCT7.6

Design and Development of a Mobile Crawling Robot with Novel Halbach Array Based Magnetic Wheels.

Fernando, Nipuna Rasandun (Univ. of Moratuwa), Amarasinghe, Indika (Univ. of Moratuwa), Stepson, Volanka (Univ. of Moratuwa), Amarasinghe, Ranjith (Ritsumeikan Univ)

WeCT8	Room 202
Social Human Robot Interaction	
Chair: Zanchettin, Andrea Maria	Pol. Di Milano
Co-Chair: Wang, Yue	Clemson Univ

16:30-16:45 WeCT8.1

Interpreting Uncertain Information Related to Relative References for Improved Navigational Command Understanding of Service Robots.

Muthugala Arachchige, Viraj Jagathpriya Muthugala (Univ. of Moratuwa), Jayasekara, A.G.B.P. (Univ. of Moratuwa)

16:45-17:00 WeCT8.2

Trust-Based Leader Selection for Bilateral Haptic Teleoperation of Multi-Robot Systems.

Saeidi, Hamed (Clemson Univ), Mikulski, Dariusz (U.S. Army RDECOM-TARDEC), Wang, Yue (Clemson Univ)

17:00-17:15 WeCT8.3

Leveraging Commonsense Reasoning and Multimodal Perception for Robot Spoken Dialog Systems.

Lu, Dongcai (Univ. of Science and Tech. of China), Zhang, Shiqi (The Univ. of Texas at Austin), Stone, Peter (Univ. of Texas at Austin), Chen, Xiaoping (Univ. of Science and Tech. of China)

17:15-17:30 WeCT8.4

Differences in Interaction Patterns and Perception for Teleoperated and Autonomous Humanoid Robots.

Bennett, Maxwell (Kindred Inc), Williams, Tom (Tufts Univ), Thames, Daria (Tufts Univ), Scheutz, Matthias (Tufts Univ)

17:30-17:45 WeCT8.5

Probabilistic Inference of Human Arm Reaching Target for Effective Human-Robot Collaboration.

Zanchettin, Andrea Maria (Pol. Di Milano), Rocco, Paolo (Pol. Di Milano)

17:45-18:00 WeCT8.6

Upper Limb Motion Intent Recognition Using Tactile Sensing.

Stefanou, Thekla (Bristol Robotics Lab. Univ. of Bristol, Univ. O), Turton, A.J. (Bristol Robotics Lab), Lenz, Alexander (Bristol Robotic Lab), Dogramadzi, Sanja (Univ. of the West of England)

WeCT9	Room 204
Sensor Network	
Chair: La, Hung	Univ. of Nevada at Reno
Co-Chair: Martinelli, Agostino	INRIA Grenoble-Rhone-Alpes

16:30-16:45 WeCT9.1

Jointly Optimizing Placement and Inference for Beacon-Based Localization.

Schaff, Charles (Toyota Tech. Inst. at Chicago), Yunis, David (Univ. of Chicago), Chakrabarti, Ayan (Toyota Tech. Inst. at Chicago), Walter, Matthew (Toyota Tech. Inst. at Chicago)

16:45-17:00 WeCT9.2

A Glove-Based System for Studying Hand-Object Manipulation Via Joint Pose and Force Sensing.

Liu, Hangxin (Univ. of California, Los Angeles), Xie, Xu (UCLA), Millar, Matthew (UCLA), Edmonds, Mark (Univ. of California, Los Angeles), Gao, Feng (Univ. of California, Los Angeles), ZHU, YIXIN (Univ. of California, Los Angeles), Santos, Veronica J. (Univ. of California, Los Angeles), Rothrock, Brandon (Jet Propulsion Lab. California Inst. of Tech), Zhu, Song-Chun (UCLA)

17:00-17:15 WeCT9.3

Robust Multiple Object Tracking in RGB-D Camera Networks.

Zhao, Yongheng (Univ. of Padova), Carraro, Marco (Univ. of Padua), Munaro, Matteo (Univ. of Padua), Menegatti, Emanuele (The Univ. of Padua)

17:15-17:30 WeCT9.4

Relay Vehicle Formations for Optimizing Communication Quality in Robot Networks.

Rahman, Md Mahbubur (Florida International Univ), Bobadilla, Leonardo (Florida International Univ), Abodo, Franklin (Florida International Univ), Rapp, Brian (United States Army Res. Lab)

17:30-17:45 WeCT9.5

A Multi-Robot Sensor-Delivery Planning Strategy for Spatio-Temporally Optimized Static-Sensor Networks.

Kashino, Zendai (Univ. of Toronto), Nejat, Goldie (Univ. of Toronto), Benhabib, Beno (Univ. of Toronto)

17:45-18:00 WeCT9.6

A Distributed Control Framework for a Team of Unmanned Aerial Vehicles for Dynamic Wildfire Tracking.

Pham, Huy (Univ. of Nevada, Reno), La, Hung (Univ. of Nevada at Reno), Feil-Seifer, David (Univ. of Nevada, Reno), Deans, Matthew (NASA Ames Res. Center)

WeCT10	Room 205
Mapping and Localization	
Chair: Mourikis, Anastasios	Univ. of California, Riverside
Co-Chair: Rekleitis, Ioannis	Univ. of South Carolina

16:30-16:45 WeCT10.1

Deja Vu: Scalable Place Recognition Using Mutually Supportive Feature Frequencies.

Jacobson, Adam (Queensland Univ. of Tech), Scheirer, Walter (Harvard Univ), Milford, Michael J (Queensland Univ. of Tech)

16:45-17:00 WeCT10.2

Keyframe-Based Visual-Inertial Online SLAM with Relocalization.

Kasyanov, Anton (RWTH Aachen), Engelmann, Francis (RWTH Aachen Univ), Stückler, Jörg (RWTH Aachen Univ), Leibe, Bastian (RWTH Aachen Univ)

17:00-17:15 WeCT10.3

Edge-Based Visual-Inertial Odometry.

Yu, Hongsheng (UC Riverside), Mourikis, Anastasios (Univ. of California, Riverside)

17:15-17:30 WeCT10.4

Closed-Form Full Map Posteriors for Robot Localization with Lidar Sensors.

Luft, Lukas (Freiburg Univ), Schaefer, Alexander (Freiburg Univ), Schubert, Tobias (AIS Univ. Freiburg), Burgard, Wolfram (Univ. of Freiburg)

17:30-17:45 WeCT10.5

Analyzing the Quality of Matched 3D Point Clouds of Objects.

Bogoslavskyi, Igor (Univ. of Bonn), Stachniss, Cyrill (Univ. of Bonn)

17:45-18:00 WeCT10.6

Looking Forward: A Semantic Mapping System for Scouting with Micro-Aerial Vehicles.

Maturana, Daniel (Carnegie Mellon Univ), Arora, Sankalp (Carnegie Mellon Univ), Scherer, Sebastian (Carnegie Mellon Univ)

WeCT11	Room 207
Sensing and Perception	
Chair: Shen, Shaojie	Hong Kong Univ. of Science and Tech
Co-Chair: Prescott, Tony J	Univ. of Sheffield

16:30-16:45 WeCT11.1

Single-Shot Clothing Category Recognition in Free-Configurations with Application to Autonomous Clothes Sorting.

Sun, Li (Univ. of Birmingham), Aragon-Camarasa, Gerardo (Univ. of Glasgow), Rogers, Simon (School of Computing Science, Univ. of Glasgow), Stolkin, Rustam (Univ. of Birmingham), Siebert, Jan Paul (Univ. of Glasgow)

16:45-17:00 WeCT11.2

Evaluation of Keypoint Detectors and Descriptors in Arthroscopic Images for Feature-Based Matching Applications.

Marmol, Andres (Queensland Univ. of Tech), Peynot, Thierry (Queensland Univ. of Tech. (QUT)), eriksson, anders (Queensland Inst. of Tech), jaiprakash, Anjali (Australian Centre for Robotic Vision, Queensland Univ. of T), Roberts, Jonathan (Queensland Univ. of Tech), Crawford, Ross (Queensland Univ. of Tech)

17:00-17:15 WeCT11.3

Dual-Fisheye Omnidirectional Stereo.

GAO, Wenliang (Hong Kong Univ. of Science and Tech), Shen, Shaojie (Hong Kong Univ. of Science and Tech)

17:15-17:30 WeCT11.4

Monocular 3D Metric Scale Reconstruction Using Depth from Defocus and Image Velocity.

Shiozaki, Tomoyuki (Univ. of Tech. Sydney), Dissanayake, Gamini (Univ. of Tech. Sydney)

17:30-17:45 WeCT11.5

Multi-Step-Ahead Information-Based Feedback Control for Active Binaural Localization.

Bustamante, Gabriel (LAAS-CNRS and Univ. De Toulouse, UPS, INPT), Danès, Patrick (Univ. Toulouse - LAAS-CNRS - UPS)

17:45-18:00 WeCT11.6

Adaptive Perception: Learning from Sensory Predictions to Extract Object Shape with a Biomimetic Fingertip.

Martinez-Hernandez, Uriel (Univ. of Leeds), Prescott, Tony J (Univ. of Sheffield)

WeCT12	Room 208
Slam Iv	
Chair: Leutenegger, Stefan	Imperial Coll. London
Co-Chair: Civera, Javier	Univ. De Zaragoza

16:30-16:45 WeCT12.1

Dense RGB-D-Inertial SLAM with Map Deformations.

Laidlow, Tristan (Imperial Coll. London), Bloesch, Michael (Imperial Coll), Li, Wenbin (Imperial Coll. London), Leutenegger, Stefan (Imperial Coll. London)

16:45-17:00 WeCT12.2

Null-Space-Based Marginalization: Analysis and Algorithm.

Yang, Yulin (Department of Mechanical Engineering, Univ. of Delaware), Maley, James (U.S. Army Res. Lab), Huang, Guoquan (Univ. of Delaware)

17:00-17:15 WeCT12.3

RGBDTAM: A Cost-Effective and Accurate RGB-D Tracking and Mapping System.

Concha, Alejo (Univ. De Zaragoza), Civera, Javier (Univ. De Zaragoza)

17:15-17:30 WeCT12.4

NOctoSLAM: Fast Octree Surface Normal Mapping and Registration.

Fossel, Joscha-David (Univ. of Liverpool), Tuyls, Karl (Univ. of Liverpool), Schnieders, Benjamin (Univ. of Liverpool), Claes, Daniel (Maastricht Univ), Hennes, Daniel (German Res. Center for Artificial Intelligence (DFKI))

17:30-17:45 WeCT12.5

VinySLAM: An Indoor SLAM Method for Low-Cost Platforms Based on the Transferable Belief Model.

Huletski, Arthur (The Acad. Univ. Saint-Petersburg), Kartashov, Dmitriy (The Acad. Univ), Krinkin, Kirill (Saint-Petersburg Electrotechnical Univ)

17:45-18:00 WeCT12.6

GraphTinker: Outlier Rejection and Inlier Injection for Pose Graph SLAM.

Xie, Linhai (Univ. of Oxford), Wang, Sen (Heriot-Watt Univ), Markham, Andrew (Oxford Univ), Trigoni, Niki (Univ. of Oxford)

WeCT13	Room 211
Planning, Scheduling, and Coordination	
Chair: Rovida, Francesco	Aalborg Univ. Copenhagen
Co-Chair: Liu, Lantao	Indiana Univ

16:30-16:45 WeCT13.1

A Spatio-Temporal Representation for the Orienteering Problem with Time-Varying Profits.

Ma, Zhibei (Univ. of Southern California), Yin, Kai (HomeAway), Liu, Lantao (Univ. of Southern California), Sukhatme, Gaurav (Univ. of Southern California)

16:45-17:00 WeCT13.2

Extended Behavior Trees for Quick Definition of Flexible Robotic Tasks.

Rovida, Francesco (Aalborg Univ. Copenhagen), Grossmann, Bjarne (Aalborg Univ. Copenhagen), Kruger, Volker (Aalborg Univ)

17:00-17:15 WeCT13.3

Towards an Online Heuristic Method for Energy-Constrained Underwater Sensing Mission Planning.

Tsiogkas, Nikolaos (Heriot Watt Univ), De Carolis, Valerio (Heriot-Watt Univ), Lane, David (Heriot-Watt Univ)

17:15-17:30 WeCT13.4

Coordinated Recharging of Mobile Robots During Exploration.

Rappaport, Micha (Univ. of Klagenfurt, Austria), Bettstetter, Christian (Univ. of Klagenfurt)

17:30-17:45 WeCT13.5

Socially Competent Navigation Planning by Deep Learning of Multi-Agent Path Topologies.

Mavrogiannis, Christoforos (Cornell Univ), Blukis, Valts (Cornell Univ), Knepper, Ross A (Cornell Univ)

17:45-18:00 WeCT13.6

Mixed-Initiative Planning, Replanning and Execution: From Concept to Field Testing Using AUV Fleets.

Chrpa, Lukas (Czech Tech. Univ. in Prague), Pinto, José (Faculty of Engineering, Porto Univ), Sá Marques, Tiago (Faculdade De Engenharia Da Univ. Do Porto), Ribeiro, Manuel António (Faculdade De Engenharia Univ. Do Porto), Sousa, João (Univ. Porto - Faculdade Engenharia)

WeCT14	Room 217
Aerial II	
Chair: Schoellig, Angela P.	Univ. of Toronto
Co-Chair: Zhang, Ketao	Imperial Coll. London

16:30-16:45 WeCT14.1

Prediction of Air-To-Ground Communication Strength for Relay UAV Trajectory Planner in Urban Environments.

Ladosz, Pawel (Loughborough Univ), Oh, Hyondong (UNIST), Chen, Wenhua (Loughborough Univ)

16:45-17:00 WeCT14.2

Robust Real-Time Visual Tracking Using Dual-Frame Deep Comparison Network Integrated with Correlation Filters.

Chaudhary, Krishneel Chand (The Univ. of Tokyo), ZHAO, MOJU (The Univ. of Tokyo), Shi, Fan (The Univ. of Tokyo), Chen, Xiangyu (The Univ. of Tokyo), Okada, Kei (The Univ. of Tokyo), Inaba, Masayuki (The Univ. of Tokyo)

17:00-17:15 WeCT14.3

Estimation and Optimization of Fully-Actuated Multirotor Platform with Nonparallel Actuation Mechanism.

Jiang, Guangying (Purdue Univ), Voyles, Richard (Purdue Univ), Sebesta, Kenneth Dale (CyPhy Works), Greiner, Helen (CyPhy Works, Inc)

17:15-17:30 WeCT14.4

SpiderMAV: Perching and Stabilizing Micro Aerial Vehicles with Bio-Inspired Tensile Anchoring Systems.

Zhang, Ketao (Imperial Coll. London), Chermprayong, Pisak (Impeiral), Alhinai, Talib (Imperial Coll. London), Siddall, Robert (Imperial Coll. London), Kovac, Mirko (Imperial Coll. London)

17:30-17:45 WeCT14.5

An Origami-Inspired Cargo Drone.

Kornatowski, Przemyslaw Mariusz (Ec. Pol. Federale De Lausanne (EPFL)), Mintchev, Stefano (École Pol. Fédérale De Lausanne), Floreano, Dario (Ec. Pol. Federal, Lausanne)

WeCT15 Room 215

Computer Vision for Robotic Applications II

Co-Chair: Rosman, Guy Massachusetts Inst. of Tech

16:30-16:45 WeCT15.1

Improving Condition and Environment-Invariant Place Recognition with Semantic Place Categorization.

Garg, Sourav (Queensland Univ. of Tech), Jacobson, Adam (Queensland Univ. of Tech), Kumar, Swagat (Tata Consultancy Services), Milford, Michael J (Queensland Univ. of Tech)

16:45-17:00 WeCT15.2

A Point Sampling Algorithm for 3D Matching of Irregular Geometries.

Birdal, Tolga (Tech. Univ. of Munich), Ilic, Slobodan (Tech. Univ. Munchen)

17:00-17:15 WeCT15.3

Visual Inertial Odometry Using Coupled Nonlinear Optimization.

Hong, Euntae (Hanyang Univ), Lim, Jongwoo (Hanyang Univ)

17:15-17:30 WeCT15.4

Backtracking Regression Forests for Accurate Camera Relocalization.

Meng, Lili (Univ. of British Columbia), Chen, Jianhui (Univ. of British Columbia), Tung, Frederick (Univ. of British Columbia), Little, James J. (UBC), Valentin, Julien (Perceptive IO), de Silva, Clarence (The Univ. of British Columbia)

17:30-17:45 WeCT15.5

Hybrid Control and Learning with Coresets for Autonomous Vehicles.

Rosman, Guy (Massachusetts Inst. of Tech), Paull, Liam (Massachusetts Inst. of Tech), Rus, Daniela (MIT)

17:45-18:00 WeCT15.6

Mono-Camera Based Simultaneous Obstacle Recognition and Distance Estimation for Obstacle Avoidance of Power Transmission Lines Inspection Robot.

Yoo, Ju Han (Korea Inst. of Science and Tech), Kim, ChangHwan (Korea Inst. of Science and Tech), Kim, Dong Hwan (Korea Inst. of Science and Tech)

WeCT16 Room 220
Wheeled Robotics

16:30-16:45 WeCT16.1

Design Analysis of TuskBot: Universal Stair Climbing 4-Wheel Indoor Robot.

Jonghun, Choe (KAIST), Kwon, Ukjin (Seoul National Univ), Nah, Moses C. (Seoul National Univ), Kim, Hyeongkeun (KAIST)

16:45-17:00 WeCT16.2

Path Following for Robotic Rollators Via Simulated Passivity.

Andreetto, Marco (Univ. of Trento), Divan, Stefano (Univ), Fontanelli, Daniele (Univ. of Trento), Palopoli, Luigi (Univ. of Trento), Zenatti, Fabiano (Univ. of Trento)

17:00-17:15 WeCT16.3

Tire Force Estimation of Unmanned Ground Vehicles on Off-Road Terrains for Navigation Decisions.

Wilson, Graeme Neff (Univ. of Calgary), Ramirez-Serrano, Alejandro (4Front Robotics), Sun, Qiao (Univ. of Calgary)

17:15-17:30 WeCT16.4

Dual-Task Performance Assessment Robot.

Yorozu, Ayanori (Keio Univ), Tanigawa, Ayumi (Keio Univ), Takahashi, Masaki (Keio Univ)

17:30-17:45 WeCT16.5

Static Fracture Tolerance of Human Metatarsal in Being Run Over by Robot.

fujikawa, tatsuo (Japan Automobile Res. Inst), Asano, Yoichi (Japan Automobile Res. Inst), Nishimoto, tetsuya (Coll. of Engineering, Nihon Univ), Nishikata, Rie (Fukushima Medical Univ)

17:45-18:00 WeCT16.6

Towards Position-Only Time-Delayed Control for Uncertain Euler-Lagrange Systems: Experiments on Wheeled Mobile Robots.

Roy, Spandan (Indian Inst. of Tech. Delhi, New Delhi, India), Kar, Indra Narayan (Electrical Engineering Dept, Indian Inst. of Tech), Lee, Jinoh (Fondazione Istituto Italiano Di Tecnologia)

WeCT17	Room 221
Kinematics	
Chair: Merlet, Jean-Pierre	INRIA
Co-Chair: Smith, Claes Christian	KTH Royal Inst. of Tech

16:30-16:45 WeCT17.1

Segmenting Humeral Submovements Using Invariant Geometric Signatures.

Krishnan, Rakesh (KTH (Royal Inst. of Tech), Björsell, Niclas (Univ. of Gävle), Smith, Claes Christian (KTH Royal Inst. of Tech)

16:45-17:00 WeCT17.2

Evolutionary Multi-Objective Inverse Kinematics on Highly Articulated and Humanoid Robots.

Starke, Sebastian (Univ. of Hamburg, Dept. of Informatics), Hendrich, Norman (Univ. of Hamburg), Krupke, Dennis (Univ. of Hamburg), Zhang, Jianwei (Univ. of Hamburg)

17:00-17:15 WeCT17.3

On Integrating Manipulability Index into Inverse Kinematics Solver.

Dufour, Kévin (Univ. of Sherbrooke, Canada), Suleiman, Wael (Univ. of Sherbrooke)

17:15-17:30 WeCT17.4

Direct Kinematics of CDPR with Extra Cable Orientation Sensors: The 2 and 3 Cables Case with Perfect Measurement and Sagging Cables.

Merlet, Jean-Pierre (INRIA)

17:30-17:45 WeCT17.5

Development of a Novel Switchable Omnidirectional Wheel for Performing Cooperative Tasks Using Differential Drive Mobile Robots.

Canete, Luis (Fukushima Univ), Takahashi, Takayuki (Fukushima Univ)

WeCT18	Room 223
Social Aspects	
Chair: Sanfeliu, Alberto	Univ. Pol. De Cataluyna
Co-Chair: Manocha, Dinesh	Univ. of North Carolina at Chapel Hill

16:30-16:45 WeCT18.1

A Two-Layer Tactical System for an Air-Hockey-Playing Robot.

Shimada, Hideaki (The Univ. of Electro-Communications), Kutsuna, Yusuke (The Univ. of Electro-Communications), Kudoh, Shunsuke (The Univ. of Electro-Communications), Suehiro, Takashi (The Univ. of Electro-Communications)

16:45-17:00 WeCT18.2

The HERA Approach to Morally Competent Robots.

Lindner, Felix (Univ. of Freiburg), Bentzen, Martin Mose (Tech. Univ. of Denmark), Nebel, Bernhard (Albert-Ludwigs-Univ. Freiburg)

17:00-17:15 WeCT18.3

Motion Analysis in Vocalized Surprise Expressions and Motion Generation in Android Robots.

Ishi, Carlos Toshinori (ATR), Minato, Takashi (ATR), Ishiguro, Hiroshi (Osaka Univ)

17:15-17:30 WeCT18.4

Learning to Pour.

Huang, Yongqiang (Univ. of South Florida), Sun, Yu (Univ. of South Florida)

17:30-17:45 WeCT18.5

Aerial Social Force Model: A New Framework to Accompany People Using Autonomous Flying Robots.

Garrell, Anais (UPC-CSIC), Garza-Elizondo, Luis (Inst. De Robòtica I Informàtica Industrial, CSIC-UPC), Villamizar, Michael (CSIC-UPC), Herrero Cotarelo, Fernando (Iri, Csic-Upc), Sanfeliu, Alberto (Univ. Pol. De Cataluyna)

17:45-18:00 WeCT18.6

SocioSense: Robot Navigation Amongst Pedestrians with Social and Psychological Constraints.

Bera, Aniket (Univ. of North Carolina at Chapel Hill), Randhavane, Tanmay (Univ. of North Carolina at Chapel Hill), Prinja, Rohan (Univ. of North Carolina at Chapel Hill), Manocha, Dinesh (Univ. of North Carolina at Chapel Hill)

WeAmPo	Ballroom Foyer
Wednesday Posters AM	
Chair: Lim, Angelica	SoftBank Robotics Europe
10:00-10:30	WeAmPo.1
Evo-ROS: Integrating Evolutionary Robotics and ROS.	
Moore, Jared (Grand Valley State Univ), Clark, Anthony (Missouri State Univ), Simon, Glen (Michigan State Univ), McKinley, Philip (Michigan State Univ)	
10:00-10:30	WeAmPo.2
Unsupervised Spatial-Semantic Maps for Human-Robot Collaboration in Communication-Constrained Environments.	
Doherty, Kevin (Massachusetts Inst. of Tech), Girdhar, Yogesh (Woods Hole Oceanographic Inst)	
10:00-10:30	WeAmPo.3
Performance Boost with Hybrid Cloud Robotics.	
Farokhi, Soodeh (C2RO | Coll. Cloud Robotics), Vargas, Aldo (C2RO | Coll. Cloud Robotics), Khanbeigi, Nazli (C2RO Robotics), Fox, Geoffrey (Indiana Univ)	
10:00-10:30	WeAmPo.4
IKBT: Autonomous Symbolic Inverse Kinematics Solver.	
Zhang, Dianmu (Univ. of Washington), Hannaford, Blake (Univ. of Washington)	
10:00-10:30	WeAmPo.5
Closed-Loop Force Control of BLDC Motors with Applications to Multi-Rotor Aerial Vehicles.	
Chung, Joseph (Johns Hopkins Univ), Garimella, Gowtham (Johns Hopkins Univ), Sheckells, Matthew (Johns Hopkins Univ), Kobilarov, Marin (Johns Hopkins Univ)	
10:00-10:30	WeAmPo.6
Robotics Education for K-12 Students for Enhancing Skill Sets Prior to Entering University.	
Nabeel, Muhammad (Korea Univ. of Tech. and Education), Ovais Latifee, Hiba (NED Univ.), Naqi, Obaid (EDVON), Aqeel, Kashan (EDVON), Sheikh, Huzaifa (EDVON), Arshad, Muhammad (EDVON), Khurram, Muhammad (NED Univ.)	
10:00-10:30	WeAmPo.7
How Robots Help Eradicate Rework in the Industry.	
Reed, Benjamin (Veerum Inc), Ramesh, Megnath (Veerum Inc)	
10:00-10:30	WeAmPo.8
Interval Capture Basin for Robust Robotic Collision Avoidance.	
LE MENEC, STEPHANE (MBDA)	
10:00-10:30	WeAmPo.9
ROS 2 Security.	
DiLuoffo, Vincenzo (Worcester Pol. Inst. (WPI)), Michalson, William R. (Worcester Pol. Inst), Sunar, Berk (Worcester Pol. Inst. (WPI))	
10:00-10:30	WeAmPo.10
Registration of Lidar-Based Point Cloud Maps Using Spatial Position of Visual Features.	

Kim, Jaeseung (Yonsei Univ), Shin, Minhwan (Yonsei Univ), Jeong, Jongmin (Yonsei Univ), Park, Jin Bae (Yonsei Univ), Ikeuchi, Katsushi (Microsoft), Sinha, Sudipta (Microsoft Res)

10:00-10:30 WeAmPo.11

Origami Wheel Transformer: A Variable Diameter Wheel-Drive Robot Using an Origami Structure.

Lee, Dae-young (Seoul National Univ), Cho, Kyu-Jin (Seoul National Univ. Biorobotics Lab)

10:00-10:30 WeAmPo.12

Learning Deformable Linear Object with Finite Element and Real-Time Measurements of the 3D Deformation.

zhang, tianxue (THE CHINESE Univ. OF HONGKONG), Liu, Yunhui (Chinese Univ. of Hong Kong)

10:00-10:30 WeAmPo.13

Accurate and Robust Micro Sun Sensor Using Black Sun Effect.

Lee, Sukhan (Sungkyunkwan Univ), Saleem, Rashid (Sungkyunkwan Univ), Kim, Jaewoong (SungKyunKwan Univ)

10:00-10:30 WeAmPo.14

Grasping with Wet Adhesion: Preliminary Approach.

Ho, Van (Japan Advanced Inst. of Science and Tech), Huynh, Ngoc Van (Japan Advanced Inst. of Science and Tech)

10:00-10:30 WeAmPo.15

End to End Memory Networks for Planning.

Khan, Arbaaz (Univ. of Pennsylvania), Zhang, Clark (Univ. of Pennsylvania), Atanasov, Nikolay (Univ. of Pennsylvania), Karydis, Konstantinos (Univ. of California, Riverside), Kumar, Vijay (Univ. of Pennsylvania), Lee, Daniel D. (Univ. of Pennsylvania)

10:00-10:30 WeAmPo.16

Musical Audio Signal Restoration Using Bi-Directional LSTM.

Taniguchi, Ryosuke (Tokyo Inst. of Tech), Hoshiba, Kotaro (Tokyo Inst. of Tech), Nakadai, Kazuhiro (Honda Res. Inst. Japan Co., Ltd)

10:00-10:30 WeAmPo.17

A Neuromorphic System for Tactile Pattern Recognition Using Extreme Learning Machine.

Rasouli, Mahdi (National Univ. of Singapore), Cabibihan, John-John (Qatar Univ), Thakor, Nitish (National Univ. of Singapore)

10:00-10:30 WeAmPo.18

A Decentralized Trust-Minimized Cloud Robotics Architecture.

Simovic, Alessandro (Univ. of Zurich), Kaestner, Ralf (ETH Zurich), Rufli, Martin (IBM Res. GmbH)

10:00-10:30 WeAmPo.19

Human-Inspired Internal Models for Robot Arm Motions.

Luo, Dingsheng (Peking Univ), Hu, Fan (Peking Univ), Zhang, Tao (Peking Univ), Deng, Yian (Peking Univ), Nie, Mengxi (Peking Univ), Wu, Xihong (Peking Univ)

10:00-10:30 WeAmPo.20

A High Torque Modular Actuator Design for a Lower Limb Exoskeleton.

Grandmaison, Christian (Inst. of Biomedical Engineering - UNB), Quinn,

Nathan (Univ. of New Brunswick), Losier, Yves (Univ. of New Brunswick), Sensinger, Jonathon (Univ. of New Brunswick)

10:00-10:30 WeAmPo.21

Implementation of an Autonomous Mobile Platform for Loading Explosives in Mining Applications.

Tavares Ferreira, Jhony Alan (Vale Inst. of Tech. - ITV), Xavier Fidêncio, Aline (Vale Inst. of Tech), Azpúrua, Héctor Ignacio (Univ. Federal De Minas Gerais), Freitas, Gustavo Medeiros (ITV - Inst. Tecnológico Vale), Miola, Wilson (VALE Inst. OF Tech)

10:00-10:30 WeAmPo.22

Applications of Hardware Embedded Reduced Intricacy (HERI) Hand.

Ren, Zeyu (Istituto Italiano Di Tecnologia), Zhou, Chengxu (Fondazione Istituto Italiano Di Tecnologia), Tsagarakis, Nikos (Istituto Italiano Di Tecnologia)

10:00-10:30 WeAmPo.23

Research on the Third Arm: Proposal of a Face Vector Interface for Voluntary and Intuitive Control of a Wearable Robot Arm.

Iwasaki, Yukiko (Waseda Univ), Iwata, Hiroyasu (Waseda Univ)

10:00-10:30 WeAmPo.24

Towards a Cooperative Method for 3D Magnetic Maps Generation Using Small and Autonomous Aerial Robots.

Azpúrua, Héctor Ignacio (Univ. Federal De Minas Gerais), Potje, Guilherme Augusto (Univ. Federal De Minas Gerais), Frota Rezeck, Paulo Alfredo (Federal Univ. of Minas Gerais), Freitas, Gustavo Medeiros (ITV - Inst. Tecnológico Vale), Uzeda Garcia, Luis Guilherme (Inst. Tecnológico Vale), Nascimento, Erickson (Univ. Federal De Minas Gerais (UFMG)), Guimarães Macharet, Douglas (Univ. Federal De Minas Gerais), Campos, Mario Montenegro (Univ. Federal De Minas Gerais), Pimentel, Bruno (Univ. Federal De Minas Gerais)

10:00-10:30 WeAmPo.25

High Precision Control of 3D Printed Field Robots in the Presence of Unknown Traction Coefficients.

Kayacan, Erkan (Univ. of Illinois at Urbana-Champaign), Chowdhary, Girish (Univ. of Illinois at Urbana Champaign)

10:00-10:30 WeAmPo.26

Towards a Robust Control Paradigm for Steady-State and Transient Walking with Active Transfemoral Prostheses.

Rezazadeh, Siavash (Univ. of Texas at Dallas), Gregg, Robert D. (Univ. of Texas at Dallas)

10:00-10:30 WeAmPo.27

Development of a Miniature, Low-Cost Robot for a Laboratory-Scale Underwater Collectives Testbed.

Berlinger, Florian (Harvard Univ), Dusek, Jeff (Harvard Univ), Gauci, Melvin (Harvard Univ), Nagpal, Radhika (Harvard Univ)

10:00-10:30 WeAmPo.28

Machine Learning for Prediction of Communication Strength for Relay UAV Trajectory Planner.

Ladosz, Pawel (Loughborough Univ), Oh, Hyondong (UNIST), Chen, Wenhua (Loughborough Univ)

10:00-10:30 WeAmPo.29

Coordination, Symmetry and Grouping of Redundant Movement Strategies.

Huzaifa, Umer (Univ. of Illinois at Urbana-Champaign), LaViers, Amy (Univ. of Illinois at Urbana-Champaign)

10:00-10:30 WeAmPo.30

Aerial Robots: An Impact Study of Human-Drone Interaction to Accompany People.

Garrell, Anais (UPC-CSIC), Sanfeliu, Alberto (Univ. Pol. De Cataluyna)

10:00-10:30 WeAmPo.31

Dynamic Whole Body Imitation of Human Motions in Humanoid Robot.

SRIPADA, ADITYA SUDHAKAR (SRM Univ), RAMAYEE, HARISH ASOKAN (SRM Univ), RAMASAMY, SRIDHAR (Assistant Professor, SRM Univ), WARRIER, ABHISHEK (SRM Univ)

10:00-10:30 WeAmPo.32

A Platform-Invariant Architecture for High-Level Spatial Robotic Commands.

Huzaifa, Umer (Univ. of Illinois at Urbana-Champaign), Jang Sher, Anum (Univ. of Illinois at Urbana-Champaign), Jain, Varun (Univ. of Illinois at Urbana-Champaign), Li, Jialu (Univ. of Illinois at Urbana-Champaign), Zurawski, Alex (Univ. of Illinois at Urbana-Champaign), LaViers, Amy (Univ. of Illinois at Urbana-Champaign)

10:00-10:30 WeAmPo.33

Design of Shoe Plate and Experimental Validation for Small Hopping Rover on Granular Media.

Maeda, Takao (Chuo Univ), Kunii, Yasuharu (Chuo Univ), Yoshikawa, Kent (JAXA), Otsuki, Masatsugu (Japan Aerospace Exploration Agency), Yoshimitsu, Tetsuo (Japan Aerospace Exploration Agency), Kubota, Takashi (Jaxa Isas)

10:00-10:30 WeAmPo.34

Operator-Centered Human-Robot Interaction for Robotic Intervention in Harsh and Hazardous Environments.

Lunghi, Giacomo (CERN), DI CASTRO, Mario (CERN), Marin, Raul (Jaume I Univ), Masi, Alessandro (CERN (European Organization for Nuclear Res)

10:00-10:30 WeAmPo.35

Learning Point-To-Point Motions Using Partial Contraction Analysis.

Ravichandar, Harish chaandar (Univ. of Connecticut), Salehi, Iman (Univ. of Connecticut), Dani, Ashwin (Univ. of Connecticut)

10:00-10:30 WeAmPo.36

Integrated 3D Sensing and Augmented-Reality for Teleoperation.

Park, Young Soo (Argonne National Lab), Kim, Joohee (Illinois Inst. of Tech), Choi, Byung-Seon (Korea Atomic Energy Res. Inst)

10:00-10:30 WeAmPo.37

Serpentine Robotic Tails for Maneuvering and Stabilizing Mobile Robots.

Rone, William (Virginia Tech), Saab, Wael (Virginia Tech), Ben-Tzvi, Pinhas (Virginia Tech)

10:00-10:30 WeAmPo.38

HeRo: An Open Platform for Robotics Research and Education.

Frota Rezeck, Paulo Alfredo (Federal Univ. of Minas Gerais), Azpúrua, Héctor Ignacio (Univ. Federal De Minas Gerais), Chaimowicz, Luiz (Federal Univ. of Minas Gerais)

10:00-10:30 WeAmPo.39

Experimental Error Compensation of the Linear Inverted Pendulum Model for Humanoid Robot TEO.

Garcia, Juan Miguel (Carlos III Univ. of Madrid), Martinez, Santiago (Univ. Carlos III De Madrid), Pinel, Maria Dolores (Univ. Carlos III De Madrid), Balaguer, Carlos (Univ. Carlos III De Madrid)

10:00-10:30 WeAmPo.40

Using Emergency Maps to Add Not yet Explored Places into SLAM.

Mielle, Malcolm (Örebro Univ), Magnusson, Martin (Örebro Univ), Andreasson, Henrik (Örebro Univ), Lilienthal, Achim J. (Örebro Univ)

10:00-10:30 WeAmPo.41

K-Means Geometric Deployment for Optimal Cooperative Coverage Algorithm in Cluttered Area for a Fleet of Quadrotors.

BOUZID, Yasser (Univ. D'evry Val D'essonne), Bestaoui, Yasmina (Univ. of Evry), SIGUERDIDJANE, Houria (CentraleSupelec)

10:00-10:30 WeAmPo.42

SafeDrive: A Robust Lane Tracking System for Autonomous and Assisted Driving under Limited Visibility.

Mo, Jiawei (Univ. of Minnesota, Twin Cities), Sattar, Junaed (Univ. of Minnesota)

WePmPo	Ballroom Foyer
Wednesday Posters PM	
Chair: Lim, Angelica	SoftBank Robotics Europe
16:00-16:30	WePmPo.1
Humanoid Hopping Based on Centroidal Dynamics and Heuristic Foot Placement.	
Xin, Songyan (Istituto Italiano Di Tecnologia (IIT)), You, Yangwei (Istituto Italiano Di Tecnologia), Zhou, Chengxu (Fondazione Istituto Italiano Di Tecnologia), Tsagarakis, Nikos (Istituto Italiano Di Tecnologia)	
16:00-16:30	WePmPo.2
Long-Term Robotic Area Coverage Mission Planning.	
Li, Bingxi (Michigan Tech. Univ), Moridian, Barzin (Michigan Tech. Univ), Mahmoudian, Nina (Michigan Tech. Univ)	
16:00-16:30	WePmPo.3
Underwater Cave Mapping: Stereo Visual SLAM with IMU and Sonar.	
Rahman, Sharmin (Univ. of South Carolina), Quattrini Li, Alberto (Univ. of South Carolina), Rekleitis, Ioannis (Univ. of South Carolina)	
16:00-16:30	WePmPo.4
Early Studies of a Transmission Mechanism for MR-Guided Interventions.	
Zhao, Haoran (Univ. of Houston), Liu, Xin (Univ. of Houston), Zaid, Habib (Univ. of Houston), Shah, Dipan J. (Houston Methodist DeBakey Heart & Vascular Center), Heffernan, Michael (GuidaBot, LLC), Becker, Aaron (Univ. of Houston), Tsekos, Nikolaos (Univ. of Houston)	
16:00-16:30	WePmPo.5
Cognitive Mapping, Spatial Awareness and Goal Memory for a Mobile Robot Navigation System.	
Zeno, Peter (Univ. of Bridgeport), Patel, Sarosh (Univ. of Bridgeport), Sobh, Tarek (Univ. of Bridgeport)	
16:00-16:30	WePmPo.6
Evaluation Methodology for Teleoperation Interfaces.	
Xavier Fidêncio, Aline (Vale Inst. of Tech), Tavares Ferreira, Jhony Alan (Vale Inst. of Tech. - ITV), Freitas, Gustavo (Federal Univ. of Rio De Janeiro), de Barros Monteiro, Paulo Marcos (Federal Univ. of Ouro Preto), Azpúrua, Héctor Ignacio (Univ. Federal De Minas Gerais), Rigueira Campos, Felipe (Univ. Federal De Ouro Preto), Miola, Wilson (VALE Inst. OF Tech)	
16:00-16:30	WePmPo.7
Interactive Perception Based on Gaussian Process Classification Applied to Household Object Recognition & Sorting.	
khan, aamir (Univ. of Glasgow), Aragon-Camarasa, Gerardo (Univ. of Glasgow), Siebert, Jan Paul (Univ. of Glasgow)	
16:00-16:30	WePmPo.8
Learning a Visuomotor Controller for Real World Robotic Grasping Using Simulated Depth Images.	
Viereck, Ulrich (Northeastern Univ), ten Pas, Andreas (Northeastern Univ), Saenko, Kate (ICSI & UC Berkeley EECS), Platt, Robert (Northeastern Univ)	
16:00-16:30	WePmPo.9
Category Level Pick and Place Using Deep Reinforcement Learning.	

Gualtieri, Marcus (Northeastern Univ), ten Pas, Andreas (Northeastern Univ), Platt, Robert (Northeastern Univ)

16:00-16:30 WePmPo.10

Autonomous UAVs for Structural Health Monitoring Using Ultrawide Band Beacons.

Dong Ho, Kang (Univ. of Manitoba), Cha, Young-Jin (Univ. of Manitoba)

16:00-16:30 WePmPo.11

Robust Real-Time Hands-And-Face Detection for Human Robot Interaction.

MohaimenianPour, SeyedMehdi (Sepehr) (Simon Fraser Univ), Vaughan, Richard (Simon Fraser Univ)

16:00-16:30 WePmPo.12

Soft Pneumatic Actuator Skin for Wearable Bidirectional Tactile Interface.

Sonar, Harshal (Indian Inst. of Tech. Bombay), Joshi, Sagar (Indian Inst. of Tech. Bombay), Robertson, Matthew (EPFL), Paik, Jamie (Ec. Pol. Federale De Lausanne)

16:00-16:30 WePmPo.13

Experimental Validation of Dynamic Legged Locomotion Utilizing a Single-DOF Robotic Leg.

Kamidi, Vinaykarthik (Robotics and Mechatronics Lab), Ben-Tzvi, Pinhas (Virginia Tech)

16:00-16:30 WePmPo.14

New Medical Robotics Standards – Aiming for Autonomous Systems.

Haidegger, Tamas (Obuda Univ. (OU)), Rudas, Imre J. (Óbuda Univ)

16:00-16:30 WePmPo.15

Smartphone-Based Interfaces for Articulated Robots.

Rodriguez, Diego (Univ. De Los Andes), Perez Quintero, Camilo Alfonso (Univ. of Alberta), Jagersand, Martin (Univ. of Alberta), Figueroa, Pablo (Univ. of Los Andes)

16:00-16:30 WePmPo.16

Robust Grasp Planning Using Domain Randomization and Deep Generative Models.

Tobin, Joshua (UC Berkeley), Duan, Yan (Univ. of California Berkeley), Welinder, Peter (California Inst. of Tech), Zaremba, Wojciech (OpenAI), Abbeel, Pieter (UC Berkeley)

16:00-16:30 WePmPo.17

Feasibility of Automated Assessment of Manual Dexterity in Parkinson's.

Oña Simbaña, Edwin Daniel (Univ. Carlos III of Madrid), Jardon Huete, Alberto (Univ. CARLOS III DE MADRID), Balaguer, Carlos (Univ. Carlos III De Madrid)

16:00-16:30 WePmPo.18

Unsupervised Learning of Hierarchical Models for Hand-Object Interactions Using Tactile Glove.

Xie, Xu (UCLA), Liu, Hangxin (Univ. of California, Los Angeles), Edmonds, Mark (Univ. of California, Los Angeles), Gao, Feng (Univ. of California, Los Angeles), QI, SIYUAN (Univ. of California, Los Angeles), ZHU, YIXIN (Univ. of California, Los Angeles), Rothrock, Brandon (Jet Propulsion Lab. California Inst. of Tech), Zhu, Song-Chun (UCLA)

16:00-16:30 WePmPo.19

Textile Identification Using Fingertip Motion and 3D Force Sensors in an

Open-Source Gripper.

von Drigalski, Felix Wolf Hans Erich (Nara Inst. of Science and Tech), Gall, Marcus (Karlsruhe Inst. of Tech. - KIT), Cho, Sung-Gwi (Nara Inst. of Science and Tech), Ding, Ming (Nara Inst. of Science and Tech), Takamatsu, Jun (Nara Inst. of Science and Tech), Ogasawara, Tsukasa (Nara Inst. of Science and Tech), Asfour, Tamim (Karlsruhe Inst. of Tech. (KIT))

16:00-16:30 WePmPo.20

Swarming in ROS: From Design to Practical Deployment.

St-Onge, David (Ec. Pol. De Montreal), Varadharajan, Vivek shankar (Pol. Montréal), Beltrame, Giovanni (Ec. Pol. De Montreal)

16:00-16:30 WePmPo.21

Biologically Inspired Dynamic Object Tracking by Mobile Robots with a Neuromorphic Vision Sensor.

Mishra, Abhishek (SiNAPSE, NUS), Ghosh, Rohan (National Univ. of Singapore), Thakor, Nitish (National Univ. of Singapore)

16:00-16:30 WePmPo.22

Fast Multi-Contact Frictional Rigid Dynamics.

Li, Sheng (Peking Univ), Zhang, Tianxiang (Peking Univ), Wang, Guoping (Peking Univ), Sun, Hanqiu (CUHK), Manocha, Dinesh (Univ. of North Carolina at Chapel Hill)

16:00-16:30 WePmPo.23

Minimally Invasive Soft Robotic Tissue Manipulator for Safe Autonomous Surgery.

Schroeder, Tyler (Univ. of Maryland), Opfermann, Justin (Children's National Medical Center), Sachyani, Ela (Hebrew Univ. of Jerusalem), Yuanfang, Zhang (Singapore Univ. of Tech. and Design), Ge, Qi (Singapore Univ. of Tech. and Design), Magdassi, Shlomo (Hebrew Univ. of Jerusalem), Krieger, Axel (Univ. of Maryland)

16:00-16:30 WePmPo.24

Development of a Smaller Size Modular Unit for Soft Robotics.

Lee, Jun-Young (Seoul National Univ), Cho, Kyu-Jin (Seoul National Univ. Biorobotics Lab)

16:00-16:30 WePmPo.25

A Tip-Extending Catheter for Endovascular Surgery.

Hawkes, Elliot Wright (Univ. of California, Santa Barbara), Morimoto, Tania K. (Stanford Univ), Simpson, Cole Stewart (Stanford Univ), Heit, Jeremey (Stanford Medical School)

16:00-16:30 WePmPo.26

DeepIntent: Adversarial Learning for Modeling Pedestrian Intent in Autonomous Driving Interactions.

Gujjar, Pratik (Simon Fraser Univ), Vaughan, Richard (Simon Fraser Univ)

16:00-16:30 WePmPo.27

End-To-End Learning of Optical-Flow and Correlation Filters for Visual Tracking.

Zhu, Zheng (Inst. of Automation, Chinese Acad. of Sciences), Li, Jianquan (Inst. of Automation, Chinese Acad. of Sciences)

16:00-16:30 WePmPo.28

CNN Based SLAM for Monitoring Coral Reef.

Modasshir, Md (Univ. of South Carolina), Rekleitis, Ioannis (Univ. of South

Carolina)

16:00-16:30 WePmPo.29

Mobility Analysis of a Speleologist Robot with Flexible Locomotion System.

SANTOS ROCHA, FILIPE AUGUSTO (Inst. TECNOLOGICO VALE), Freitas, Gustavo (Federal Univ. of Rio De Janeiro), Magalhães, Paulo Henrique Vieira (Univ. Federal De Ouro Preto), Miola, Wilson (VALE Inst. OF Tech), Araujo, Ramon Nunes (Vale S.A), Brandi, Iuri Viana (Vale S.A)

16:00-16:30 WePmPo.30

"Human-Like" Emergent Behavior in an Evolved Agent for a Cooperative Shepherding Task.

Nalepka, Patrick (Univ. of Cincinnati), Patil, Gaurav (Univ. of Cincinnati), Annand, Colin (Univ. of Cincinnati), Weber, Brian (Univ. of Cincinnati), Kallen, Rachel W (Center for Cognition Action & Perception, Univ. of Cincinna), Minai, Ali (Univ. of Cincinnati), Richardson, Michael (Univ. of Cincinnati)

16:00-16:30 WePmPo.31

Exploring Communicative Arm Motion for Human-Robot Interaction.

Kebude, Dogancan (Koc Univ), Sezgin, Tevfik Metin (Koc Univ), Akgun, Baris (Koc Univ)

16:00-16:30 WePmPo.32

Robust Adaptive Control of Quadrotor System with Uncertainties and Limited Authority.

Emran, Bara (The Univ. of British Columbia), Najjaran, Homayoun (Univ. of British Columbia)

16:00-16:30 WePmPo.33

Training Wheels: Two-Phase Supervised and Reinforcement Transfer Learning Applied to Map Exploration.

nikdel, payam (Simon Fraser Univ), Shrestha, Rakesh (Simon Fraser Univ), Vaughan, Richard (Simon Fraser Univ), shamshirdar, Faraz (Simon Fraser Univ)

16:00-16:30 WePmPo.34

Event-Based Robust Feature Detector under Dynamic Lighting Conditions.

Lee, Alex (Korea Advanced Inst. of Science and Tech. (KAIST)), Kim, Ayoung (Korea Advanced Inst. of Science Tech)

16:00-16:30 WePmPo.35

FlatFish - a Compact Resident AUV.

Mimoso, Geovane (SENAI CIMATEC), Trocoli, Tiago (Brazilian Inst. of Robotics, SENAI CIMATEC), Neves, Gustavo (Brazilian Inst. of Robotics, SENAI CIMATEC), Cesar, Diego (Brazilian Inst. of Robotics, SENAI CIMATEC), Cerqueira, Romulo (Brazilian Inst. of Robotics, SENAI CIMATEC), Britto, João (Brazilian Inst. of Robotics, SENAI CIMATEC), Silva, Lucas (Brazilian Inst. of Robotics, SENAI CIMATEC), Santos, Jessivaldo (Brazilian Inst. of Robotics, SENAI CIMATEC), brito, rafael (Brazilian Inst. of Robotics, SENAI CIMATEC), Arjones, Gabriel (Brazilian Inst. of Robotics, SENAI CIMATEC), Lima, Camila (Brazilian Inst. of Robotics, SENAI CIMATEC), Albiez, Jan (Brazilian Inst. of Robotics, SENAI CIMATEC), Reis, Marco (Brazilian Inst. of Robotics, SENAI CIMATEC)

16:00-16:30 WePmPo.36

Simple and Fast Pointing Gesture Detection in RGB-D Images.

Azari, Bita (Simon Fraser Univ), MohaimenianPour, SeyedMehdi (Sepehr)

(Simon Fraser Univ), Vaughan, Richard (Simon Fraser Univ)

16:00-16:30 WePmPo.37

Towards Full Autonomy for Humanoid Robots.

Jagtap, Vinayak (Worcester Pol. Inst), Gavarraju, Sumanth Nirmal (Worcester Pol. Inst), Agarwal, Shlok (Worcester Pol. Inst), Kejriwal, Sahil (Worcester Pol. Inst), Devadoss, Samyuktha (Worcester Pol. Inst), Gennert, Michael (Worcester Pol. Inst)

16:00-16:30 WePmPo.38

Efficient Factor Graph Fusion for Multi-Robot Mapping.

Natarajan, Ramkumar (Worcester Pol. Inst), Gennert, Michael (Worcester Pol. Inst)

16:00-16:30 WePmPo.39

Glass and Non-Glass Objects Classification Using Laser Rangefinders for Mobile Robots in Indoor Environments.

Jiang, Jun (The Univ. of Tokyo), Miyagusuku, Renato (The Univ. of Tokyo), Yamashita, Atsushi (The Univ. of Tokyo), Asama, Hajime (The Univ. of Tokyo)

16:00-16:30 WePmPo.40

On-Line Tracking and Ejection System for Investigating Dynamic Behavior of Running Insects.

Kawahara, Tomohiro (Kyushu Inst. of Tech), Sato, Daiki (Kyushu Inst. of Tech), Ahmad, Belal (Kyushu Inst. of Tech), Ohtsuka, Hirofumi (National Inst. of Tech. Kumamoto Coll)

16:00-16:30 WePmPo.41

Touchscreen Visual Servo Hopping: A Low-Attention UAV Interface.

Ghasemi Toudeshki, Amirmasoud (Simon Fraser Univ), Vaughan, Richard (Simon Fraser Univ)

16:00-16:30 WePmPo.42

Flexible Links for Flexible Interaction.

D'Imperio, Mariapaola (Istituto Italiano Di Tecnologia), Ludovico, Daniele (Pol. Di Torino), PIZZAMIGLIO, CRISTIANO (Pol. Di Torino/DIMEAS), Canali, Carlo (Department of Advanced Robotics, Istituto Italiano Di Tecnologia), Muscolo, Giovanni Gerardo (Italian Inst. of Tech), Caldwell, Darwin G. (Istituto Italiano Di Tecnologia), Cannella, Ferdinando (Istituto Italiano Di Tecnologia)

ThFW1 109

Vision-Based Agile Autonomous Navigation of UAVs (Workshop)

Chair: Loianno, Giuseppe — Univ. of Pennsylvania

09:00-17:30 — ThFW1.1

Loianno, Giuseppe (Univ. of Pennsylvania), Scaramuzza, Davide (Univ. of Zurich), Kumar, Vijay (Univ. of Pennsylvania)

ThFW2 111

Workshop on Medical Imaging Robotics (Workshop)

Chair: Hennersperger, Christoph — Tech. Univ. München

09:00-17:30 — ThFW2.1

Hennersperger, Christoph (Tech. Univ. München), Stoyanov, Danail (Univ. Coll. London), Krupa, Alexandre (INRIA Rennes - Bretagne Atlantique)

ThFW3 117

Folding in Robotics (Workshop)

Chair: Felton, Samuel — Northeastern Univ

09:00-17:30 — ThFW3.1

Felton, Samuel (Northeastern Univ.), Aukes, Daniel (Arizona State Univ.), Cho, Kyu-Jin (Seoul National Univ. Biorobotics Lab.), Ozcan, Onur (Bilkent Univ.), Paik, Jamie (Ec. Pol. Federale de Lausanne), Tolley, Michael Thomas (Univ. of California, San Diego)

ThFW4 114

International Workshop on Lines, Planes and Manhattan Models for 3-D Mapping (LPM17) (Workshop)

Chair: Calway, Andrew — Univ. of Bristol

09:00-17:30 — ThFW4.1

Calway, Andrew (Univ. of Bristol), Kaess, Michael (Carnegie Mellon Univ.), Ramalingam, Srikumar (Univ. of Utah)

ThAW5 118

Smart Mechanics: Fusion of Softness and Rigidity in Robot Mechanism (Workshop)

Chair: Mochiyama, Hiromi — Univ. of Tsukuba

09:00-12:30 — ThAW5.1

Mochiyama, Hiromi (Univ. of Tsukuba), Suzuki, Kenji (Univ. of Tsukuba), Aiyama, Yasumichi (Univ. of Tsukuba)

ThFW6 121

Adaptive Control Methods in Assistive Technologies (Workshop)

09:00-17:30 — ThFW6.1

Dallali, Houman (California State Univ. Channel Islands), Demircan, Emel (California State Univ. Long Beach), Rastgaar, Mo (Michigan Tech.)

ThFW7 122

Synergies between Learning and Interaction (Workshop)

Chair: Akgun, Baris — Koc Univ

09:00-17:30 ThFW7.1

Akgun, Baris (Koc Univ.), Bullard, Kalesha (Georgia Inst. of Tech.), Chu, Vivian (Georgia Inst. of Tech.), Fitzgerald, Tesca (Georgia Inst. of Tech.), Gombolay, Matthew (Massachusetts Inst. of Tech.), Huang, Chien-Ming (Yale Univ.), Scassellati, Brian (Yale)

ThFW8 202

Shared Autonomy - Joint Learning in Human-Robot Collaboration (Workshop)

Chair: Schilling, Malte Bielefeld Univ

09:00-17:30 ThFW8.1

Schilling, Malte (Bielefeld Univ.), Burgard, Wolfram (Univ. of Freiburg), Lasota, Przemyslaw A. (MIT), Ritter, Helge Joachim (Bielefeld Univ.), Shah, Julie A. (MIT), Wrede, Britta (Bielefeld Univ.)

ThFW9 204

Best Practices in Designing Effective Roadmaps for Robotics Innovation (Workshop)

Chair: Siegel, Hallie Open Roboethics Inst

09:00-17:30 ThFW9.1

Siegel, Hallie (Open Roboethics Inst.), Moon, AJung (Univ. of British Columbia), Barfoot, Timothy (Univ. of Toronto), Croft, Elizabeth (Univ. of British Columbia), Gosselin, Clement (Univ. Laval), Kulic, Dana (Univ. of Waterloo)

ThFW10 205

Robotics-Inspired Biology (Workshop)

Chair: Gravish, Nicholas Harvard Univ

09:00-17:30 ThFW10.1

Gravish, Nicholas (Harvard Univ.), Marvi, Hamidreza (Arizona State Univ.), Li, Chen (Johns Hopkins Univ.), Astley, Henry (Georgia Inst. of Tech.)

ThFW11 207

Embodied Brain Systems Science –from Body Representation in Human Brain Toward Rehabilitation Technology– (Workshop)

Chair: An, Qi The Univ. of Tokyo

09:00-17:30 ThFW11.1

An, Qi (The Univ. of Tokyo), Ota, Jun (The Univ. of Tokyo), Asama, Hajime (The Univ. of Tokyo), Kondo, Toshiyuki (Tokyo Univ. of Agriculture and Tech.)

ThFW12 208

Assistance and Service Robotics in a Human Environment (Workshop)

Chair: Colas, Francis Inria Nancy Grand Est

09:00-17:30 ThFW12.1

Colas, Francis (Inria Nancy Grand Est), Amirat, Yacine (Univ. of Paris Est Créteil (UPEC)), Daney, David (Inria Bordeaux - Sud Ouest), Luo, Ren (National Taiwan Univ.), Mohammed, Samer (Univ. Paris Est Créteil, UPEC, France)

ThAW13 211

Agricultural Robotics: Learning from Industry 4.0 and Moving into the Future (Workshop)

Chair: Kounalakis, Tsampikos — Aalborg Univ

09:00-12:30 — ThAW13.1

Kounalakis, Tsampikos (Aalborg Univ.), Van Evert, Frits K. (Wageningen Univ. & Res.), Ball, David (Queensland Univ. of Tech.), Kootstra, Gert (Wageningen Univ.), Nalpantidis, Lazaros (Aalborg Univ.)

ThFW14 217

Frontiers in Contact-Rich Robotic Interaction: Modeling, Optimization and Control Synthesis (Workshop)

Chair: Zhou, Jiaji — Carnegie Mellon Univ

09:00-17:30 — ThFW14.1

Zhou, Jiaji (Carnegie Mellon Univ.), Posa, Michael (Univ. of Pennsylvania), Mason, Matthew T. (Carnegie Mellon Univ.)

ThFW15 215

Complex Collaborative Systems: Closing the Loop, Learning, and Self-Confidence (Workshop)

Chair: Mian, Zohaib Tariq — United Tech. Res. Center

09:00-17:30 — ThFW15.1

Mian, Zohaib Tariq (United Tech. Res. Center), Scherer, Sebastian (Carnegie Mellon Univ.), Choudhury, Sanjiban (Carnegie Mellon Univ.)

ThFW16 220

Human Movement Understanding for Humanoid and Wearable Robots (Workshop)

Chair: Kulic, Dana — Univ. of Waterloo

09:00-17:30 — ThFW16.1

Kulic, Dana (Univ. of Waterloo), Mombaur, Katja (Heidelberg Univ.)

ThFW17 221

Workshop on Physical Human-Robot and Human-Telerobot Interaction: From Theory to Application for Neuro-Rehabilitation (Workshop)

Chair: Atashzar, Seyed Farokh — Western Univ. (The Univ. of Western Ontario)

09:00-17:30 — ThFW17.1

Atashzar, Seyed Farokh (Western Univ. (The Univ. of Western Ontario)), Shahbazi, Mahya (Wetsern Univ. (UWO)), Tavakoli, Mahdi (Univ. of Alberta), Patel, Rajnikant V. (The Univ. of Western Ontario)

ThFW18 223

The 2nd Workshop on Machine Learning Methods for High-Level Cognitive Capabilities in Robotics (Workshop)

Chair: Inamura, Tetsunari — National Inst. of Informatics

09:00-17:30 — ThFW18.1

Inamura, Tetsunari (National Inst. of Informatics)

ThBW5	118
HoloLens As a Perception Platform for Robotics (Tutorial)	
Chair: Pollefeys, Marc	ETH Zurich
14:00-17:30	ThBW5.1
Pollefeys, Marc (ETH Zurich)	

ThBW13	211
Learning for Localization and Mapping (Workshop)	
Chair: Gilitschenski, Igor	ETH Zurich
14:00-17:30	ThBW13.1
Gilitschenski, Igor (ETH Zurich), Cadena Lerma, Cesar (ETH Zurich), Leonard, John (MIT), Pillai, Sudeep (MIT), Ramos, Fabio (Univ. of Sydney), Sünderhauf, Niko (Queensland Univ. of Tech.)	

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C,CC: Session Chair, Co-Chair
*: Presentation without Publication

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MADRID 2018 IROS

October, 1-5, 2018
Madrid, Spain

Towards a Robotic Society

2018 IEEE/RSJ International Conference on Intelligent Robots and Systems

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Conference Schedule

Vancouver, BC, Canada
September 24-28, 2017

SUNDAY
Sep 24, 2017

Workshops/ Tutorials
9:00 – 12:30

Lunch Break
12:30 – 14:00

Workshops/ Tutorials
14:00 – 17:30

Welcome Reception
19:00 - 21:00
Ballroom Foyer

MONDAY
Sep 25, 2017

Conference

Plenary I
Ballrooms B&C 9:00 – 10:00
Dieter Fox

Coffee Break & Poster Session
10:00 – 10:30

Technical Sessions MoA
10:30 - 12:00

Lunch Break
12:00 – 13:00

Keynote Sessions
13:00 - 14:30

Room 211 13:00 Edwin Olson	Room 109 13:00 Brian Gerkey	Room 118 13:00 Frank Park
Room 211 13:45 Julie Shah	Room 109 13:45 Josh Bongard	Room 118 13:45 David Hsu

Technical Sessions MoB
14:30 - 16:00

Coffee Break & Poster Session
16:00 - 16:30

Technical Sessions MoC
16:30 - 18:00

Exhibits (Ballroom A)/Robot Competitions (Exhibition Hall A)

OC/iCPRB Appreciation Dinner
19:00 - 21:00
(By Invitation Only)

TUESDAY
Sep 26, 2017

Conference

Plenary II
Ballrooms B&C 9:00 – 10:00
Fei-Fei Li

Coffee Break & Poster Session
10:00 – 10:30

Technical Sessions TuA
10:30 - 12:00

Lunch Break
12:00 – 13:00

Keynote Sessions
13:00 - 14:30

Room 211 13:00 Nick Roy	Room 109 13:00 Lynne Parker	Room 118 13:00 Oliver Brock
Room 211 13:45 Hiroshi Ishiguro	Room 109 13:45 Vincent Hayward	Room 118 13:45 Steve Waslander

Technical Sessions TuB
14:30 - 16:00

Coffee Break & Poster Session
16:00 - 16:30

Technical Sessions TuC
16:30 - 18:00

Exhibits (Ballroom A)/Robot Competitions (Exhibition Hall A)

Conference Banquet
19:00 - 22:00
Ballrooms B, C, and D

WEDNESDAY
Sep 27, 2017

Conference

Plenary III
Ballrooms B&C 9:00 – 10:00
Maja Mataric

Coffee Break & Poster Session
10:00 – 10:30

Technical Sessions WeA
10:30 - 12:00

Awards Luncheon
12:00 - 13:45

Keynote Sessions 13:45 - 14:30

Room 211 13:45 Joey Durham	Room 109 13:45 Tim Salcudean	Room 118 13:45 Cecelia Laschi

Technical Sessions WeB
14:30 - 16:00

Coffee Break & Poster Session
16:00 - 16:30

Technical Sessions WeC
16:30 - 18:00

Exhibits (Ballroom A)/Robot Competitions (Exhibition Hall A)

Farewell Reception
19:00 - 21:00
Ballroom Foyer

THURSDAY
Sep 28, 2017

Workshops/ Tutorials
9:00 – 12:30

Lunch Break
12:30 – 14:00

Workshops/ Tutorials
14:00 – 17:30

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