

**NCCR Robotics PIs contributing to IROS 2018**

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**Aude Billard**

**TuCTS6 Regular session, Room 1.L3**

**Human-Robot Interaction II**

14:48-14:51, Paper TuCTS6.7

*From Human Physical Interaction to Online Motion Adaptation Using Parameterized Dynamical Systems*

- Khoramshahi, Mahdi - EPFL
- Laurens, Antoine, Marin, Alix - EPFL
- Triquet, Thomas - EPFL
- Billard, Aude – EPFL

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**ThETS5 Regular session, Room 2.R3**

**Soft Robotics V**

17:06-17:09, Paper ThETS5.3

*An Origami-Inspired Reconfigurable Suction Gripper for Picking Objects with Variable Shape and Size*

- Zhakypov, Zhenishbek- École Pol. Fédérale De Lausanne (EPFL)
- Heremans, Florian - Vrije Univ. Brussel
- Billard, Aude - EPFL
- Paik, Jamie - Ec. Pol. Federale De Lausanne

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## Margarita Chli

### TuATS1 Regular session, Room 1.L5

#### Deep Learning I

09:03-09:06, Paper TuATS1.2

*Learning Context Flexible Attention Model for Long-Term Visual Place Recognition*

- Chen, Zetao - ETH Zurich
- Liu, Lingqiao - Univ. of Adelaide
- Sa, Inkyu - ETH Zurich
- Ge, Zongyuan Monash - Univ
- Chli, Margarita - ETH Zurich

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### ThFTS2 Regular session, Room 2.L5 KUKA

#### Sensorial Perception IX

10:00-10:03, Paper TuBTS2.1

*Asynchronous Corner Detection and Tracking for Event Cameras in Real-Time*

- Alzugaray, Ignacio - ETH Zürich
- Chli, Margarita - ETH Zurich

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### WeFTS3 Regular session, Room 1.L2

#### Swarm and Multi-Robots IV

18:09-18:12, Paper WeFTS3.4

*CVI-SLAM - Collaborative Visual-Inertial SLAM*

- Schmuck, Patrik - ETH Zurich
- Karrer, Marco - ETH Zurich
- Chli, Margarita - ETH Zurich

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### ThDTS1 Regular session, Room 1.L5

#### Aerial Systems VII

15:45-15:48, Paper ThDTS1.6

*VI-RPE: Visual-Inertial Relative Pose Estimation for Aerial Vehicles*

- Teixeira, Lucas - ETH Zurich
- Maffra, Fabiola - ETH Zurich
- Moos, Marco - ETH Zurich
- Chli, Margarita - ETH Zurich

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## Luca Gambardella

### WeCTS6 Regular session, Room 1.L3

## Human-Robot Interaction VII

12:39-12:42, Paper WeCTS6.4

*Robot Identification and Localization with Pointing Gestures*

- Gromov, Boris - IDSIA
- Gambardella, Luca - USI-SUPSI
- Giusti, Alessandro - IDSIA Lugano, SUPSI

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## Marco Hutter

**TuCTS1 Regular session, Room 1.L5**

### Deep Learning III

14:30-14:33, Paper TuCTS1.1

*Real-Time Dance Generation to Music for a Legged Robot*

- Bi, Thomas - ETH Zurich
- Fankhauser, Péter - ETH Zurich
- Bellicoso, C. Dario - ETH Zurich
- Hutter, Marco - ETH Zurich

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**TuDTS4 Regular session, Room 2.L2**

### Legged Robots I

17:21-17:24, Paper TuDTS4.8

*An Adaptive Landing Gear for Extending the Operational Range of Helicopters*

- Stolz, Boris - ETH Zürich
- Brödermann, Tim - ETH Zürich
- Castiello, Enea - ZHAW
- Englberger, Gokula - ETH Zürich
- Erne, Daniel - ETH Zürich
- Gasser, Jan - ETH Zürich
- Hayoz, Eric - ETH Zürich
- Müller, Stephan - ETH Zürich
- Mühlebach, Lorin - ETH Zürich
- Löw, Tobias - ETH Zürich
- Scheuer, Dominique - ZHAW
- Vandeventer, Luca - ETH Zürich
- Bjelonic, Marko - ETH Zurich
- Günther, Fabian - ETH Zürich
- Kolvenbach, Hendrik - ETHZ
- Höpflinger, Mark - Armasuisse
- Hutter, Marco - ETH Zurich

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### **WeATS3 Regular session, Room 1.L2**

#### **Localization and Mapping VI**

09:06-09:09, Paper WeATS3.3

*Probabilistic Terrain Mapping for Mobile Robots with Uncertain Localization*

- Fankhauser, Péterm - ETH Zurich
- Bloesch, Michael - Imperial College
- Hutter, Marco - ETH Zurich

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### **WeATS4 Regular session, Room 2.L2**

#### **Legged Robots III**

09:06-09:09, Paper WeATS4.3

*Towards a Passive Adaptive Planar Foot with Ground Orientation and Contact Force Sensing for Legged Robots*

- Käslin, Roman - ETH Zurich
- Kolvenbach, Hendrik - ETHZ
- Paez, Laura - KM-RoBoTa
- Lika, Klajd - National Tech. Univ. of Athens
- Hutter, Marco - ETH Zurich

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### **ThDTS6 Regular session, Room 1.L3**

#### **Motion and Path Planning II**

15:42-15:45, Paper ThDTS6.5

*Skating with a Force Controlled Quadrupedal Robot*

- Bjelonic, Marko - ETH Zurich
- Bellicoso, C. Dario - ETH Zurich
- Hutter, Marco - ETH Zurich
- Tiryaki, Mehmet Efe - ETH Zurich

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### **ThETS4 Regular session, Room 2.L2**

#### **Control V**

17:06-17:09, Paper ThETS4.3

*Trajectory Optimization with Implicit Hard Contacts*

- Carius, Jan - ETH Zurich
- Ranftl, Rene - Intel
- Koltun, Vladlen - Intel Labs
- Hutter, Marco - ETH Zurich

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### **ThFTS4 Regular session, Room 2.L2**

## **Control VI**

18:12-18:15, Paper ThFTS4.5

*Cable-Driven Actuation for Highly Dynamic Robotic Systems*

- Hwangbo, Jemin - Swiss Federal Inst. of Tech. Zurich
- Tsounis, Vassilios - Swiss Federal Inst. of Tech. in Zurich
- Kolvenbach, Hendrik - ETHZ
- Hutter, Marco - ETH Zurich

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## **Auke Ijspeert**

**WeATS6 Regular session, Room 1.L3**

**Human-Robot Interaction V**

09:03-09:06, Paper WeATS6.2

*Human Intention Detection As a Multiclass Classification Problem: Application in Physical Human-Robot Interaction While Walking*

- Lanini, Jessica - EPFL, Biorobotics Lab
- Razavi, Hamed - EPFL
- Urain, Julien - IK4 - Tekniker
- Ijspeert, Auke - EPFL

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**ThBTS10 Regular session, Room 4.R1**

**Special Session: Neurorobotics: Application From/to Brain Models To/from Robots**

Chair: Ijspeert, Auke - EPFL

Co-Chair: Nakamura, Yoshihiko - Univ. of Tokyo

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## **Jamie Paik**

**ThETS4 Regular session, Room 2.L2**

**Control V**

17:00-17:03, Paper ThETS4.1

*Towards Peak Torque Minimization for Modular Self-Folding Robots*

- Yao, Meibao - Harbin Inst. of Tech
- Cui, Hutao - Harbin Inst. of Tech
- Xiao, Xueming - Changchun Univ. of Science and Tech
- Belke, Christoph H. - École Pol. Fédérale De Lausanne
- Paik, Jamie - Ec. Pol. Federale De Lausanne

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**FrA4 Workshop, Room 1.R3**

### **WSFFD13 - Shape Changing Robotic Structures and Interfaces, Part I**

09:00-11:00, Paper FrA4.1

*Workshop on Shape Changing Robotic Structures and Interfaces*

- Wurdemann, Helge Arne - Univ. Coll. London
- Roudaut, Anne - Univ. of Bristol
- Dogramadzi, Sanja - Univ. of the West of England
- Paik, Jamie - Ec. Pol. Federale de Lausanne
- Girouard, Audrey - Carleton Univ.
- Althoefer, Kaspar - Queen Mary Univ. of London
- Ho, Van - Japan Advanced Inst. of Science and Tech.

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### **FrB4 Workshop, Room 1.R3**

#### **WSFFD13 - Shape Changing Robotic Structures and Interfaces, Part II**

11:30-13:30, Paper FrB4.1

*Workshop on Shape Changing Robotic Structures and Interfaces*

- Wurdemann, Helge Arne - Univ. Coll. London
- Roudaut, Anne - Univ. of Bristol
- Dogramadzi, Sanja - Univ. of the West of England
- Paik, Jamie - Ec. Pol. Federale de Lausanne
- Girouard, Audrey - Carleton Univ.
- Althoefer, Kaspar - Queen Mary Univ. of London
- Ho, Van - Japan Advanced Inst. of Science and Tech.

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### **FrC4 Workshop, Room 1.R3**

#### **WSFFD13 - Shape Changing Robotic Structures and Interfaces, Part III**

14:30-16:30, Paper FrC4.1

*Workshop on Shape Changing Robotic Structures and Interfaces*

- Wurdemann, Helge Arne - Univ. Coll. London
- Roudaut, Anne - Univ. of Bristol
- Dogramadzi, Sanja - Univ. of the West of England
- Paik, Jamie - Ec. Pol. Federale de Lausanne
- Girouard, Audrey - Carleton Univ.
- Althoefer, Kaspar - Queen Mary Univ. of London
- Ho, Van - Japan Advanced Inst. of Science and Tech.

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### **FrD4 Workshop, Room 1.R3**

#### **WSFFD13 - Shape Changing Robotic Structures and Interfaces, Part IV**

17:00-19:00, Paper FrD4.1

*Workshop on Shape Changing Robotic Structures and Interfaces*

- Wurdemann, Helge Arne - Univ. Coll. London



- Roudaut, Anne - Univ. of Bristol
- Dogramadzi, Sanja - Univ. of the West of England
- Paik, Jamie - Ec. Pol. Federale de Lausanne
- Girouard, Audrey - Carleton Univ.
- Althoefer, Kaspar - Queen Mary Univ. of London
- Ho, Van - Japan Advanced Inst. of Science and Tech.

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## Robert Riener

**WeDTS10 Regular session, Room 4.R1**

**Special Session: Symbiotic Exoskeletons - Exploring the Human Side**

14:39-14:42, Paper WeDTS10.4

*Robot-Supported Multiplayer Rehabilitation: Feasibility Study of Haptically Linked Patient-Spouse Training (I)*

- Baur, Kilian - ETH Zurich
- Wolf, Peter - ETH Zurich, Inst. of Robotics and Intelligent Systems
- Klamroth, Verena - ETH Zürich
- Bierbauer, Walter- Applied Social and Health Psychology, Department of Psychology
- Scholz, Urte - Applied Social and Health Psychology, Department of Psychology
- Riener, Robert - ETH Zurich
- Duarte, Jaime Enrique - ETH Zurich

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## Davide Scaramuzza

**WeCTS2 Regular session, Room 2.L5 KUKA**

**Sensor Fusion**

12:51-12:54, Paper WeCTS2.8

*On the Comparison of Gauge Freedom Handling in Optimization-Based Visual-Inertial State Estimation*

- Zhang, Zichao - Robotics and Perception Group, Univ. of Zurich
- Gallego, Guillermo - Univ. of Zurich
- Scaramuzza, Davide - Univ. of Zurich

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**WeFTS1 Regular session, Room 1.L5**

**Aerial Systems III**

18:03-18:06, Paper WeFTS1.2

*PAMPC: Perception-Aware Model Predictive Control for Quadrotors*

- Falanga, Davide - Univ. of Zurich
- Foehn, Philipp - Univ. of Zurich
- Lu, Peng - The Hong Kong Pol. Univ
- Scaramuzza, Davide - Univ. of Zurich



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#### **ThCTS10 Regular session, Room 4.R1**

##### **Special Session: Research Reproducibility and Benchmarking of Intelligent Robots**

12:36-12:39, Paper ThCTS10.3

*A Tutorial on Quantitative Trajectory Evaluation for Visual(-Inertial) Odometry (I)*

- Zhang, Zichao - Robotics and Perception Group, Univ. of Zurich
- Scaramuzza, Davide - Univ. of Zurich

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#### **ThDTS1 Regular session, Room 1.L5**

##### **Aerial Systems VII**

15:39-15:42, Paper ThDTS1.4

*Computing the Forward Reachable Set for a Multirotor under First-Order Aerodynamic Effects*

- Kim, Suseong - Univ. of Zurich
- Falanga, Davide - Univ. of Zurich
- Scaramuzza, Davide - Univ. of Zurich

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#### **FrA7 Workshop, Room 1.L5**

##### **WSFFD02 - Vision-Based Drones: What's Next? Part I**

09:00-11:00, Paper FrA7.1

*Vision-Based Drones: What's Next?*

- Loiano, Giuseppe - New York Univ.
- Scaramuzza, Davide - Univ. of Zurich
- Kumar, Vijay - Univ. of Pennsylvania

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#### **FrB7 Workshop, Room 1.L5**

##### **WSFFD02 - Vision-Based Drones: What's Next? Part II**

11:30-13:30, Paper FrB7.1

*Vision-Based Drones: What's Next?*

- Loiano, Giuseppe - New York Univ.
- Scaramuzza, Davide - Univ. of Zurich
- Kumar, Vijay - Univ. of Pennsylvania

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#### **FrC7 Workshop, Room 1.L5**

##### **WSFFD02 - Vision-Based Drones: What's Next? Part III**

14:30-16:30, Paper FrC7.1





### *Vision-Based Drones: What's Next?*

- Loiano, Giuseppe - New York Univ.
- Scaramuzza, Davide - Univ. of Zurich
- Kumar, Vijay - Univ. of Pennsylvania

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### **FrD7 Workshop, Room 1.L5**

#### **WSFFD02 - Vision-Based Drones: What's Next? Part IV**

17:00-19:00, Paper FrD7.1

### *Vision-Based Drones: What's Next?*

- Loiano, Giuseppe - New York Univ.
- Scaramuzza, Davide - Univ. of Zurich
- Kumar, Vijay - Univ. of Pennsylvania

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## **Roland Siegwart**

### **TuBTS3 Regular session, Room 1.L2**

#### **Localization and Mapping II**

10:15-10:18, Paper TuBTS3.6

### *LandmarkBoost: Efficient Visual Context Classifiers for Robust Localization*

- Dymczyk, Marcin Tomasz - ETH Zurich, Autonomous Systems Lab
- Gilitschenski, Igor - Massachusetts Inst. of Tech
- Nieto, Juan - ETH Zürich
- Lynen, Simon - ETH Zurich
- Zeisl, Bernhard - Google
- Siegwart, Roland - ETH Zurich

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### **TuBTS9 Regular session, Room 4.L1**

#### **Special Session: UAV Indoors Navigation**

10:06-10:09, Paper TuBTS9.3

### *C-Blox: A Scalable and Consistent TSDF-Based Dense Mapping Approach*

- Millane, Alexander James - ETH Zurich
- Taylor, Zachary Jeremy - ETH Zürich
- Oleynikova, Helen - ETH Zürich
- Nieto, Juan - ETH Zürich
- Siegwart, Roland - ETH Zurich
- Cadena Lerma, Cesar - ETH Zurich

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### **WeATS3 Regular session, Room 1.L2**

#### **Localization and Mapping VI**

09:12-09:15, Paper WeATS3.5

*Local Positioning System Using UWB Range Measurements for an Unmanned Blimp*

- Mai, Vincent - Univ. De Montréal
- Kamel, Mina - Autonomous Systems Lab, ETH Zurich
- Krebs, Matthias - ETH Zurich
- Schaffner, Andreas - ETH Zurich
- Meier, Daniel - ETH Zurich
- Paull, Liam - Univ. De Montréal
- Siegwart, Roland - ETH Zurich

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**WeBTS7 Regular session, Room 2.L3**

**Autonomous Vehicles I**

11:39-11:42, Paper WeBTS7.4

*PoseMap: Lifelong, Multi-Environment 3D LiDAR Localization*

- Egger, Philipp - ETH Zürich
- Borges, Paulo Vinicius Koerich - CSIRO
- Catt, Gavin - CSIRO
- Pfrunder, Andreas - ETH Zurich
- Siegwart, Roland - ETH Zurich
- Dubé, Renaud - ETH Zürich

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**WeCTS2 Regular session, Room 2.L5 KUKA**

**Sensor Fusion**

12:33-12:36, Paper WeCTS2.2

*Modular Sensor Fusion for Semantic Segmentation*

- Blum, Hermann - ETH Zurich
- Gawel, Abel Roman - Autonomous Systems Lab, ETH Zurich
- Siegwart, Roland - ETH Zurich
- Cadena Lerma, Cesar - ETH Zurich

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**WeETS7 Regular session, Room 2.L3**

**Video Session I**

17:09-17:12, Paper WeETS7.4

*Visual-Inertial Teach and Repeat Powered by Google Tango*

- Fehr, Marius - ETH Zürich
- Schneider, Thomas - ETH Zürich
- Siegwart, Roland - ETH Zurich

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### **WeFTS1 Regular session, Room 1.L5**

#### **Aerial Systems III**

18:06-18:09, Paper WeFTS1.3

*History-Aware Autonomous Exploration in Confined Environments Using MAVs*

- Witting, Christian Aamand - Tech. Univ. of Denmark
- Fehr, Marius - ETH Zürich
- Bähnemann, Rik - ETH Zürich
- Oleynikova, Helen - ETH Zürich
- Siegwart, Roland - ETH Zurich

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### **ThBTS1 Regular session, Room 1.L5**

#### **Aerial Systems V**

11:42-11:45, Paper ThBTS1.5

*Towards Autonomous Stratospheric Flight: A Generic Global System Identification Framework for Fixed-Wing Platforms*

- Lee, Jongseok German – Aerospace Center
- Muskardin, Tin - German Aerospace Center (DLR)
- RuizPaez, Cristina - German Aerospace Center
- Oettershagen, Philipp - ETH Zurich
- Stastny, Thomas - Swiss Federal Inst. of Tech. (ETH Zurich)
- Sa, Inkyu - ETH Zurich
- Siegwart, Roland - ETH Zurich
- Kondak, Konstantin - German Aerospace Center

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### **ThCTS2 Regular session, Room 2.L5 KUKA**

#### **Sensorial Perception VI**

12:51-12:54, Paper ThCTS2.8

*Incremental Object Database: Building 3D Models from Multiple Partial Observations*

- Furrer, Fadri - ETH Zurich
- Novkovic, Tonci - Autonomous Systems Lab, ETH Zurich
- Fehr, Marius - ETH Zürich
- Gawel, Abel Roman - Autonomous Systems Lab, ETH Zurich
- Grinvald, Margarita - ETH Zurich
- Sattler, Torsten - ETH Zurich
- Siegwart, Roland - ETH Zurich
- Nieto, Juan - ETH Zürich

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### **ThDTS1 Regular session, Room 1.L5**

#### **Aerial Systems VII**

15:33-15:36, Paper ThDTS1.2

*PaintCopter: An Autonomous UAV for Spray Painting on 3D Surfaces*

- Vempati, Anurag Sai - ETH Zurich, Disney Res. Zurich
- Kamel, Mina - Autonomous Systems Lab, ETH Zurich
- Stilinovic, Nikola - Disney Res. Zurich
- Zhang, Qixuan - ETH Zurich
- Reusser, Dorothea - Disney Res. Zurich
- Sa, Inkyu - ETH Zurich
- Nieto, Juan - ETH Zürich
- Siegwart, Roland - ETH Zurich
- Beardsley, Paul - Disney Res. Zurich

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**ThETS9 Regular session, Room 4.L1**

**Agriculture Robotics II**

17:09-17:12, Paper ThETS9.4

*Automatic Segmentation of Tree Structure from Point Cloud Data*

- Digumarti, Sundara Tejaswi ETH Zurich
- Nieto, Juan ETH Zürich
- Cadena Lerma, Cesar ETH Zurich
- Siegwart, Roland ETH Zurich
- Beardsley, Paul Disney Res. Zurich

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