Swiss National Centre of Competence in Research

COMMUNITY NEWSLETTER

Issue 52 October 2019 **Public Version**

INTEST NCCR NEWS

New NCCR Robotics Associate Pls

We welcome Stelian Coros (ETH Zurich) and Mirko Kovac (Empa) to the community, they will be involved in the 3rd Phase Rescue Robotics Grand Challenge. We also welcome Stanisa Raspopovic (ETH Zurich), Stanisa will be involved in the Wearable Robotics Grand Challenge.

Walter Karlen

We inform our readers that Prof. Walter Karlen (ETH Zurich) has ceased his activities with NCCR Robotics for the 3rd Phase. We take this opportunity to thank Walter for his most valuable contributions.

NCCR Robotics Pavilion

The NCCR Robotics Pavilion at the EPFL Open Days, on 14-15 September 2019, was a great success. Across the 400m2 area, 16 Core Pls, 3 Associate Pls and 6 spin-offs showcased their technologies. Overall, the Open Days attracted almost 40,000 visitors.

ARCHE Second Edition

After the success of ARCHE last year, from 1 to 5 July we again tested our search-and-rescue robots in Wangen an der Aare, where we also invited SAR experts and organized a summer school. The tests involved flying and legged robots, as well as algorithms for control. localisation and collective mapping.

CONGRATULATIONS

Promoted Full Professors

Grégoire Courtine (EPFL) and Roger Gassert (ETH Zurich) were named as Full Professors. Grégoire is known for his work in the field of neurorehabilitation and Roger conducts research at the interface between engineering, neuroscience and movement science.



We are proud to announce that Davide Scaramuzza has been elected to the grade of IEEE Senior Member.









In this issue...

- New NCCR Robotics Associate PIs
- · Walter Karlen
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· ARCHE Second Edition Congratulations: Promoted Full Professors, IEEE Senior Member, Best PhD & Postdoc Paper Award, Carine Rognon, Flyability, BRIDGE Proof Of Concept Project

· NCCR Robotics open positions: PhD Student & Postdoc Positions, Postdoc Fellowship on Soft Robotic Grippers, Fotokite

· NCCR Robotics calls: Game of Drones, Aerial Swarms Workshop **IROS 2019**

- · We will be at...
- · Press coverage
- New videos
- · New members
- · Departing members
- · Selected publications

ROBOTICS WORLD

Top News

- · 30 women in robotics you need to know about - 2019
- · A soft matter computer for soft robots
- · Deep dynamics models for dexterous manipulation
- · Complex lattices that change in response to stimuli open a range of applications in electronics, robotics,

· Sample efficient evolutionary algorithm for analog circuit design

World events

and medicine

- · RO-MAN (14-18 Oct)
- · Humanoids (15-17 Oct)
- · EXO Berlin (22-23 Oct)
- · ICOM (30-31 Oct)
- · ICSAI 2019 (2-4 Nov)
- · IROS (4-8 Nov)
- · ICRAE 2019 (22-24 Nov)

· The Al Lab (European ARTificial Intelligence Lab)

- IEEE Haptics Symposium
- Robotics and Artificial Intelligence
- Actuator 20

Start-up corner

Please find the following links related to start-up support. If you would like to promote your events through our channel, please contact us nccr-robotics@epfl.ch

· DART A new incubator in San Francisco. Their focus is on the next human-machine interaction, everything from AR, VR, MR, BCI, AI to robotics. · INNOSUISSE Start-up training -

aimed at entrepreneurs who have already founded their start-up.

· Swissnex Start-up bootcamps

Equal Opportunities Corner

· University of Vienna - REWIRE scheme for support excellent postdoctoral female researchers to foster their scientific development, to nurture their expertise and to make a profound impact on their future careers

External positions

 Research Associate in Wearable Soft Robotic Rehabilitation (two positions, University of Bristol)

· Assistant Professor (without Tenure Track in Machine Learning (W1) Karlsruher Institut für Technologie)

· Lecturer in Agri-Robotics (two positions) University of Lincoln

· Associate Prof. in Machine Learning (two permanent positions in Department of Informatics, University of Oslo)

· Postdoctoral Fellowship in Multi-Level Evolutionary Robotics (CSIRO) · Research Assistant / Associate (Postdoc in Aerial Robotics, Imperial College London)

NCCR Robotics Director Prof. Dario Floreano

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Best PhD & Postdoc Paper Award

Past Issues

Jenifer Miehlbradt (Micera Lab) received the NCCR Robotics Best PhD Paper Award for her paper entitled: Data-driven body-machine interface for the accurate control of drones. This year's winner of the Best Postdoc Paper Award was Jeff Delmerico (Scaramuzza Lab) for his paper: A Benchmark Comparison of Monocular Visual-Inertial Odometry Algorithms for Flying Robots. Read more

Carine Rognon

Carine Rognon's (Floreano lab) Ph.D. thesis defense entitled Wearable technologies for embodied humanrobot interaction, took place last August. Carine is planning to continue her career in her research area.

Flyability

NCCR Robotics spin-off Flyability came first in this year's TOP 100 Swiss Start-up Awards. The ranking is established every year by a panel of 100 startup experts from Switzerland. Read more

BRIDGE Proof Of Concept Project

Our alumnus Luca Randazzo (Millán lab) was one of the five young researchers who received the Proof of Concept support for his project Yago - A portable Hand Exoskeleton for Activities of daily living and Neurorehabilitation, currently hosted by lispeert lab. Luca is also co-founder of the initiative HackaHealth in Campus Biotech Geneva.

NCCR ROBOTICS OPEN POSITIONS

PhD Student & Postdoc Positions

Dillenbourg lab is looking for a PhD & a Postdoc for its new research project iReCHeCk which builds upon the CoWriter achievements. The research will focus on the development of a semi-autonomous system in which a social robot is able to interact in long-term settings and to adapt socially to the child, guiding him to improve his handwriting with a "learning-by-teaching" approach.

Postdoc Fellowship on Soft Robotic Grippers

The Floreano and Shea labs invite applications for a postdoctoral fellowship on instrumented soft robotic grippers. The goal is the development of a versatile compliant gripper including distributed sensing and localized variable stiffness for intelligent manipulation of deformable objects. Areas of interest include, but are not limited to, stretchable sensors, biosensors, variable stiffness materials, biocompatible... Read more













FULUKILE - Several Open FUSILIONS

NCCR Robotics Spin-off Fotokite has several open positions in Zurich and U.S.A. Read more



FOTOKITE

Game of Drones - Competition at

NeurIPS 2019

NCCR ROBOTICS CALLS

Game Of Drones

Davide Scaramuzza, Stanford University, and Microsoft organize the Drone Racing Competition at NeurIPS 2019. Game of Drones is a NeurIPS 2019 competition with the goal to push the boundary of building competitive autonomous systems through head-to-head drone races. Read more

Aerial Swarms Workshop IROS 2019

Recent advances in sensor technologies have greatly enhanced the capabilities of unmanned aerial vehicles (UAVs). One consequence of this has been the growing interest in multi-aerial robotic systems often simply called "aerial swarms". The interest in single aerial robotic systems is still bustling and attracting many researchers ... Read more

2019 EVENT UPDATE - WE WILL BE AT:

IROS

04-08 November 2019

MACAU

Read more

The FPV Drone Racing VIO Competition

8 November 2019

MACAU

Read more

NCCR Robotics 2019 Outreach Event: LEARN day "Technologies and robotics for innovation in education"

27 November 2019

BFRN Read more

Game of Drones Competition at NeurIPS 2019

08 December 2019

VANCOUVER

PRESS COVERAGE

Large Coverage For NCCR Robotics

Read more



Game of Drones – Competition a NeurIPS 2019

Jan Kerschgens

IMPRESSUM

Publisher NCCR Robotics Management Team Editor Mayra Lirot **Contributing Editors** Jan Kerschgens / Ana Caldas / Nicola Nosengo Web Editing Mayra Lirot / Ana Caldas Design Alternative Communication SA / Pascal Briod





FPV Drone Racing VIO Competition



RSS

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Past Issues

Dillenbourg (EPFL) and Patrick Thévoz (Co-founder of NCCR Robotics Spin-fund, Flyability).

Scaramuzza's Lab Foldable Drone

Scaramuzza's lab foldable drone, developed in collaboration with Floreano's lab, was featured in a documentary by the BBC News Arabic. Read more

Autonomous Flying Drones

In research on autonomously flying drones, the University of Zurich is playing a leading role worldwide. Now their Robotics team can prove themselves at an international drone race in the USA. Read more

A Smart Artificial Hand For Amputees Merges **User And Robotic Control**

"Scientists have successfully new tested neuroprosthetic technology that combines robotic control with users' voluntary control," ...Read more

La «Drone Valley» Suisse, Berceau De Robots **Futuristes**

Dans les laboratoires de l'EPFL et de l'EPFZ sont développées de nombreuses machines volantes de nouvelle génération. Voici quelques exemples à l'occasion des Drone Days qui se tiennent ce weekend à Lausanne. Read more / English translation

Test Réussi D'une Main Artificielle Intelligente

"Des chercheurs de l'EPFL sont parvenus à mettre au point une méthode inédite dans le domaine du contrôle des mains robotisées." Read more

Des Robots-Fourmis Qui Agissent Ensemble

"A l'EPFL, des roboticiens ont mis au point de petits robots capables de réaliser ensemble des tâches complexes." Read more / English translation

Insect-Inspired Drone Maker Tops Swiss Start-up Charts

A drone making company that takes its inspiration from flying insects has been named as Switzerland's best start-up at an annual awards event to recognize the best of Swiss innovation. Read more

More press coverage available through NCCR Robotics website.

NEW VIDEOS Video recordings of the 2nd International Workshop on Event-

End-to-End Learning of **Representations for Asynchronous Event-Based Data (ICCV'19)**



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Past Issues



EKLT: Asynchronous, Photometric Feature Tracking using Events and Frames (IJCV'19)

Feature tracking in low light



High Speed and High Dynamic Range Video with an Event Camera



👤 NEW MEMBERS

Barbara Bruno (Dillenbourg & Ijspeert lab)

Barbara is a postdoc working on the development and testing of robots for education. Having acquired expertise on Human-Robot Interaction and Human-Robot Cooperation in elderly assistance and manufacturing scenarios, she now investigates the impact of the robot, and of the Learner-Robot Interaction, on the learning process.



Giulia Dominijanni (Micera lab)

Giulia is a PhD student working on bidirectional Human-Machine Interfaces for augmentation of physical abilities. Her research focus on development of control strategies and sensory feedback approaches to ease embodiment of external devices aimed at human augmentation.



Flavio Raschellà (Courtine lab)

Flavio is a PhD student with a passion for neuroscience. His goal in life is to help people with motor impairments regain their independence. His work focuses on design, develop, and validate innovative neuromodulation strategies for restoration of locomotion in patients with Parkinson's disease.

Javier Hidalgo-Carrió (Scaramuzza lab)

Javier is a Postdoctoral researcher. He received his PhD at the University of Bremen and his MSc in Automation and Robotics Engineering from the Politécnica University of Madrid. He worked two years on robotics perception and field testing at the Robotics section of the European Space Agency (ESA). His research focuses on simultaneous localization and mapping and visual navigation for flying robots.





A General Framework for Uncertainty Estimation in Deep Learning

bject Recognition



DEPARTING MEMBERS

Stefan Schrade (Gassert lab)

Stefan left the ETH Zurich in July after successfully defending his PhD. He now works at ANYbotics as a field engineer to apply his knowledge of legged locomotion and compliant actuation in the field of inspection robotics.



SELECTED NCCR ROBOTICS PUBLICATIONS *

T. Asselborn, K. Sharma, W. Johal, P. Dillenbourg "*Bridging Multilevel Time Scales in HRI*", ACM Transactions on Human-Robot Interaction, 2019.

R. Auberger, M. F. Russold, R. Riener, H. Dietl "*Patient Motion Using a Computerized Leg Brace in Everyday Locomotion Tasks*", IEEE Transactions on Medical Robotics and Bionics, 2019.

T. Cieslewski, M. Bloesch, D. Scaramuzza "*Matching Features without Descriptors: Implicitly Matched Interest Points*", British Machine Vision Conference (BMVC), 2019.

T. Cieslewski, K. G. Derpanis, D. Scaramuzza "*SIPs: Succinct Interest Points from Unsupervised Inlierness Probability Learning*", IEEE International Conference on 3D Vision (3DV), 2019.

T. Cieslewski, A. Ziegler, D. Scaramuzza "*Exploration Without Global Consistency Using Local Volume Consolidation*", IFRR International Symposium on Robotics Research (ISRR), Hanoi, 2019.

L. Dejace, N. Laubeuf, I. Furfaro, S. Lacour "Gallium-Based Thin Films for Wearable Human Motion Sensors", Advanced Intelligent Systems, 2019.

J. Delmerico, S. Mintchev, A. Giusti, B. Gromov, K. Melo, T. Horvat, C. Cadena, M. Hutter, A. Ijspeert, D. Floreano, L. M. Gambardella, R. Siegward, D. Scaramuzza "*The current state and future outlook of rescue robotics*", Journal of Field Robotics, 2019.

R. Dubé, A. Cramariuc, D. Dugas, H. Sommer, M. Dymczyk, J. Nieto, R.Siegwart, C. Cadena "SegMap: Segment-based mapping and localization using data-driven descriptors", The International Journal of Robotics Research, 2019.

D. Gehrig, A. Loquercio, K. G. Derpanis, D. Scaramuzza "*End-to-End Learning of Representations for Asynchronous Event-Based Data*", IEEE International Conference on Computer Vision (ICCV), 2019.

D. Gehrig, H. Rebecq, G. Gallego, D. Scaramuzza "*EKLT: Asynchronous, Photometric Feature Tracking using Events and Frames*", International Journal of Computer Vision (IJCV), 2019.

M. Grimmer, R. Riener, C. J. Walsh, A. Seyfarth "*Mobility related physical and functional losses due to aging and disease – a motivation for lower limb exoskeletons*", Journal of NeuroEngineering and Rehabilitation, 2019.

A. Loquercio, E. Kaufmann, R. Ranftl, A. Dosovitskiy, V. Koltun, D. Scaramuzza "*Deep Drone Racing: From Simulation to Reality with Domain Randomization*", IEEE Transactions on Robotics, 2019.

F. Maffra, L. Teixeira, Z. Chen, M. Chli "*Real-Time Wide-Baseline Place Recognition Using Depth Completion*", IEEE Robotics and Automation Letters, 2019.

J. Nasir, U. Norman, W. Johal, J.K. Olsen, S. Shahmoradi, P. Dillenbourg "*Robot Analytics: What Do Human-Robot Interaction Traces Tell Us About Learning?*", IEEE International Conference on Robot and Human Interactive Communication

Subscribe Past Issues

H. Rebecq, R. Rantti, V. Koltun, D. Scaramuzza "High Speed and High Dynamic Range Video with an Event Camera", arXiv, 2019.

M. Robertson, F. Efremov J. Paik "*RoboScallop: A Bivalve Inspired Swimming Robot*", IEEE Robotics and Automation Letters, 2019.

C. Rognon, M. Koehler, C. Duriez, D. Floreano, A. Okamura "*Soft haptic device to render the sensation of flying like a drone*", IEEE Robotics and Automation Letters, 2019.

J. Santoso, E. Skorina, M. Salerno, S. de Rivaz, J. Paik, C. Onal "Single chamber multiple degree-of-freedom soft pneumatic actuator enabled by adjustable stiffness layers", Smart Materials And Structures, 2019.

M. Segu', A. Loquercio, D. Scaramuzza "*A General Framework for Uncertainty Estimation in Deep Learning*", RSS Workshop on Scene and Situation Understanding for Autonomous Driving (UAD), 2019.

H. A. Sonar, A. P. Gerratt, S. P. Lacour and J. Paik "*Closed-loop haptic feedback control using a self-sensing soft pneumatic actuator skin*", Soft Robotics, 2019.

T. Stoffregen, G. Gallego, T. Drummond, L. Kleeman, D. Scaramuzza "*Event-Based Motion Segmentation by Motion Compensation*", IEEE International Conference on Computer Vision (ICCV), 2019.

* Selected publications include publications which have been made known to the editor. All members are kindly encouraged to inform the management team of new publications. Read all publications.

NCCR Robotics

The Swiss National Centre of Competence in Robotics (NCCR Robotics) is a federally funded programme bringing together robotics laboratories from EPFL, ETH Zurich, University of Zurich, IDSIA, UNIBE and Empa to work on wearable, rescue and educational robots.



The National Centres of Competence in Research are a research instrument of the Swiss National Science Foundation.

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