Swiss National Centre of Competence in Research

COMMUNITY NEWSLETTER

Stuck at home with kids? Try robotics

Eigtheen suggestions for home activities that allow children to explore robotic, computer science and mathematics, compiled by our Educational Robotics team in the latest issue of their "newsletter robotique" (in French only). Read more



New spin offs

Two new companies have been awarded the NCCR Robotics spin fund grant: Frameless, a spin-off from Hutter's lab at ETH Zurich, develops a new torque sensor for robotics and automation; a team from Scaramuzza's lab at UZH will work on an Albased safety device for drones.

Managing Director

Tristan Piguet (pictured on the left) is the new Managing Director of NCCR Robotics. Before joining our team, he worked with EPFL's research office, where he led the team in charge of European Collaborative Projects. We take the opportunity to thank our former Managing Director Jan Kerschgens (right), for his very valuable contributions, and to congratulate him for his new role as Executive Director at EPFL's Center for Intelligent Systems (CIS).

DARPA SubT Challenge

The Cerberus team - which includes Marco Hutter'sand Roland Siegwart's groups as well as the NCCR spin-off flyability - competed in the urban segment of the DARPA subterranean challenge, ending at 5th place in the Systems competition and demonstrating the potential of heterogenous robot teams.

Swiss Robotics Industry Day

The next edition of our annual event will take place on 5 November 2020 at the SwissTech convention center in Lausanne. We will showcase the activities of NCCR Robotics and selected Swiss SMEs and start-ups active in the field of robotics. Save the date!

Paper in "Frontiers in Human Neuroscience"

A collaborative article involving the Paik, Gassert and Riener groups and based on research supported by NCCR Robotics was published in the "Sensory Neuroscience" section.

CYBATHLON postponed









Issue 55 March 2020 Public Version

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· Congratulations: Foldaway at CES, article cover, new ER project, Stefano Mintchev, Cybathlon, PhD Thesis award, control of prosthetic leg.

 NCCR Robotics open positions: postdoc in HRI, Sevensense, **ANYbotics**

· NCCR Robotics calls: grants for women, MESROB

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ROBOTICS WORLD

Top News

 Coronavirus: a call to action for the robotics community

- A robot taught itself to walk
- · Soft robot, unplugged
- · Starsky Robotics shuts down

External calls

· "Frontiers" special issue on hybrid actuators

· "Swarm intelligence": special issue on collective decision making

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

· How to run a start-up in the time of coronavirus: remote work, fundraising, loan guarantees.

· Venture leaders China roadshow - a unique 10-day programme to explore the Chinese market. Postponed to September, application deadline extended to 18 May.

Due to the COVID-19 emergency, CYBATHLON 2020 has been postponed to 19-20 September. On 17 September a symposium will take a closer look at the technologies in each discipline. Read More



EPFL's robots turn heads in Las Vegas

Tiny robots developed by NCCR spin-off Foldaway Haptics were at the center of the attention at the Consumer Electronics Show in Las Vegas, where 33 "bionic flaps," were installed on a concept car from German manufacturer Mercedes-Benz. Read more

Science Robotics Cover

Davide Scaramuzza's lab made the cover of the March issue with their paper describing the use of event cameras for fast obstacle avoidance in drones. The result could help drones fly faster, thus doing more work in less time in challenging environments.

CYBATHLON wins two Education Awards

The CYBATHLON approach was honoured at the "Reimagine Education" awards, the 'Oscars' of Education, winning in the categories "Best University-Employer Partnership" and "Global Education" (overall award). Read More

New educational project

At the Dillenbourg lab, the iReCHeCk project has been accepted for funding by the SNSF. Building upon the CoWriter achievements, the project 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 to the child and his/her writing performance, guiding him to improve his handwriting with a "learning-by-teaching" approach.

New Assistant Professor

Stefano Mintchev was appointed Assistant Professor in Environmental Robotics at ETH Zurich, starting from 1 April. Stefano has worked in the Floreano lab on multi-modal and foldable drones for the entire phase 2 of NCCR Robotics, as well as on the spinoff Foldaway with Marco Salerno from Jamie Pajk's lab. At ETH, he will develop a research line on multimodal robots for the environment.

PhD Thesis award

Henri Rebecq, from the Scaramuzza lab, was a finalist in the 2020 edition of the George Giralt European PhD Thesis Award, selected out of 60 applications. The award was announced during the recent European Robotics Forum in Malaga. Read more

Control of prosthetic e-leg

The Delbruck lab achieved the first-ever demonstration of hardware-accelerated control of a powered leg prosthesis. The paper was accepted for ICRA 2020, and is the result of a collaboration between UZH-ETH Zurich and Caltech started at the Telluride Neuromorphic Engineering workshop. Read more















Equal Opportunities Corner

 The Top 10 women in robotics industry

From driving rovers on Mars to improving farm automation, profiles of outstanding female researchers and entrepreneurs compiled by Analytics Insight.

 Best practices for promoting gender equity in research. The National

Academies of Sciences, Engineering

and Medicine in the US have released

a 200-page report on "Promising Practices for Addressing the Underrepresentation of Women" in the respective fields.

External positions

- · R&D Postdoc in vision-based robot control
- · Postdoc in robot navigation and mapping
- · Postdoc fellowship in AI and robotics

NCCR Robotics

Governance

Director: Prof. Dario Floreano (EPFL) Co-Director: Prof. Robert Riener (ETH Zurich)

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IMPRESSUM

Publisher NCCR Robotics Management Team Editor Nicola Nosengo **Contributing Editors** Tristan Piguet / Ana Caldas / Valeria Di Cola Web Editing Ana Caldas Desian Alternative Communication SA / Pascal Briod

NCCR ROBOTICS OPEN POSITIONS

PostDoc in human-robot interaction

The Dillenbourg lab is looking for a postdoctoral researcher in human-robot interaction (HRI), geared towards educational applications. She or he will supervise the project iReCHeCk, which aims to support children with severe handwriting difficulties in their therapy by designing an HRI scenario in which the behaviour of a social robot adapts and evolves over time with the progress and emotional status of the child. Applicants can contact prof. Dillenbourg: pierre.dillenbourg@epfl.ch.



Electrical engineer

The NCCR Robotics spin-off Sevensense is looking for an engineer to join their team and speed up the development of their core technology. The job requires excellent skills in electronics design, a good understanding of modern digital electronics and experience in development through to production. Read more



The company that develops the ANYmal robot has several open positions, including for electrical, mechanical, field robotics and certification engineers. Read more





NCCR ROBOTICS CALLS

Grants for keynote speakers and master students

NCCR is providing grants to fund the travel and accommodation of female keynote speakers to Switzerland. Funding is also provided to female master students to allow them to present their work in international conferences. Apply now! Read more

MESROB

The 7th edition of the International Workshop on Medical and Service Robots will be on 8-10 July at the University Hospital Basel. The conference will be preceded by a 2-day workshop where participants will get insights into medical robotics and experience the spirit of CYBATHLON. Early bird registration deadline: 15 April 2020. Read more

2020 EVENT UPDATE - WE WILL BE AT:

SmartToys++@idc2020

21 June 2020 - London (UK)

Workshop on Smart Toys, Smart Tangibles, Robots and other Smart Things for Children in conjuction with The ACM Interaction Design and Children (IDC) conference 2020 that will take place in London (UK) between June 21-24. Read more







Stories from the DARPA SubT challenge

IEEE Spectrum takes its readers backstage at the robotics competition, where the Hutter and Siegwart groups were part of the Cerberus team together with Flyability. Read more

Civilian drones at EPFL

A longread in PME magazine about the history of flying robots in Switzerland, with mentions of the seminal role of Floreano's lab and of NCCR Robotics spin-offs SenseFly and Flyability (in French). Read more

Dodging drone on Spektrum

The Science Robotics publication from the Scaramuzza lab was covered by several Germanspeaking media, including Spektrum. Read more

Aude Billard in Le Temps

The head of the Learning Algorithms and Systems Laboratory at EPFL was featured in an extensive interview in the French language newspaper, discussing how robotics will impact the future of work. Read more

ERC winners on RSI

Davide Scaramuzza was interviewed by Radio Svizzera Italiana about the projects he will develop with his ERC grant (in Italian, starts at 15:30). Hear more

Robogamis in Aeon magazine

An article penned by Jamie Paik describes the science and technology of origami-inspired robots, and why they - rather than the terminators and transformers of science fiction - are the future of robotics. Read more

Robotics master's video in IEEE Spectrum

A video showcasing many different aspects of robotics research and education at EPFL was featured in IEEE Spectrum "Video Friday" compilation. Read more

More press coverage available through NCCR Robotics website.

NEW VIDEOS

Dynamic obstacle avoidance for quadrotors with event cameras



DARPA SubT Challenge: urban circuit compilation

RNN control of a hybrid dynamic transfemoral prosthesis



Redesigning SLAM for arbitrary multi-camera systems









RSI





L NEW MEMBERS

Florian Fallegger (Lacour lab)

Florian is a PhD student working on soft interfaces to the neural system. He is focusing on the fabrication and application of electrode arrays made from silicones with stretchable interconnects to measure brain activity and stimulate the spinal cord.

Won Dong Shin (Floreano lab)

Won Dong is a PhD student with a mechanical engineering background. His focus is on developing a bioinspired, multimodal robotics platform, which is capable of aerial and terrestrial locomotion.

Haotian Chen (Lacour lab)

Haotian is a postdoc, and he will be working on wearable soft sensors at Stéphanie Lacour's lab at EPFL. His research interest focuses on high performance wearable electronics with novel materials and technologies.

Aileen Naef (Marchal-Crespo lab)

Aileen is a PhD student working on detection and treatment strategies for delirium in the intensive care unit. Her research is focused on using machine learning to predict delirium onset, and virtual reality as a method for prevention and treatment of delirium.

Negin Safaei (Dillenbourg lab)

Negin joined the CHILI lab as a PhD student on February 1st. She will work on the project iReCHeCk, developing a semi-autonomous system to help children improve handwriting with a "learning-by-teaching" approach.



G. Chang, R. Gehlhar, A. D. Ames, S-C. Liu, and T. Delbruck, "Recurrent Neural Network Control of a Hybrid Dynamic Transfemoral Prosthesis with EdgeDRNN Accelerator." arXiv, 2020.

M. Gehrig, S. Shrestha, D. Mouritzen, D. Scaramuzza, "Event-Based Angular Velocity Regression with Spiking Networks", *IEEE International Conference on Robotics and Automation (ICRA)*, 2020.

A. Guneysu Ozgur, B. Bruno, T. Asselborn and P. Dillenbourg, "Can Tangible Robots Support Children in Learning Handwriting?". *ERCIM News 120,* 20-21, 2020.

A. Güneysu Özgür, A. Özgür, T. Asselborn, W. Johal, E. Yadollahi, B. Bruno, ... & P. Dillenbourg, "Iterative Design and Evaluation of a Tangible Robot-Assisted Handwriting Activity for Special Education", *Frontiers in Robotics and AI*, 2020.

A. Güneysu Özgür, M.J. Wessel, J.K. Olsen, W. Johal, A. Özgür, F.C. Hummel, & P. Dillenbourg, "Gamified Motor Training with Tangible Robots in Older Adults: a











Feasibility Study and Comparison with Young", *Frontiers in Aging Neuroscience*, 2020.

J. Guzzi, R. O. Chavez-Garcia, M. Nava, L. M. Gambardella, A. Giusti, "Path Planning with Local Motion Estimations", *IEEE Robotics and Automation Letters*, 2020.

F. Haufe, R. Haji Hassani, R. Riener and P. Wolf, "The InSight Crutches: Analyzing the role of arm support during robot-assisted leg movements," *IEEE Robotics & Automation Magazine*, 2020.

J. Kuo, M. Muglikar, Z. Zhang, D. Scaramuzza, "Redesigning SLAM for Arbitrary Multi-Camera Systems", *IEEE International Conference on Robotics and Automation (ICRA)*, 2020.

A. Loquercio*, M. Segu*, D. Scaramuzza, "A General Framework for Uncertainty Estimation in Deep Learning", *Robotics and Automation Letters*, 2020.

N. Lotti, M Xiloyannis, G Durandau, E Garofalo, V Sanguinetti, L Masia, M Sartori, "Adaptive model-based myoelectric control for a soft wearable arm exosuit: A new generation of wearable robot control," *IEEE Robotics & Automation Magazine*, 2020.

A. Mazzoni et al., "Morphological Neural Computation Restores Discrimination of Naturalistic Textures in Trans-radial Amputees", *Scientific Reports*, 2020.

M. Muglikar, Z. Zhang, D. Scaramuzza, "Voxel Map for Visual SLAM", *IEEE International Conference on Robotics and Automation (ICRA)*, 2020.

J. Nasir, U. Norman, B. Bruno and P. Dillenbourg, "You Tell, I Do, and We Swap Until We Connect All the Gold Mines!", *ERCIM News* 120, 22-23, 2020.

H. Rebecq, R. Ranftl, V. Koltun, D. Scaramuzza, "High Speed and High Dynamic Range Video with an Event Camera", *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 2020.

C. Scheerlinck, H. Rebecq, D. Gehrig, N. Barnes, R. Mahony, D. Scaramuzza, "Fast Image Reconstruction with an Event Camera", *IEEE Winter Conference on Applications of Computer Vision (WACV)*, 2020.

R. Sugimoto, M. Gehrig, D. Brescianini, D. Scaramuzza, "Towards Low-Latency High-Bandwidth Control of Quadrotors using Event Cameras", *IEEE International Conference on Robotics and Automation (ICRA)*, 2020.

* Selected publications include those that have been notified 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.



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Images: Dodging drone: University of Zurich; SubT Challenge: DARPA/Cerberus team; Aude Billard: Le Temps.



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