

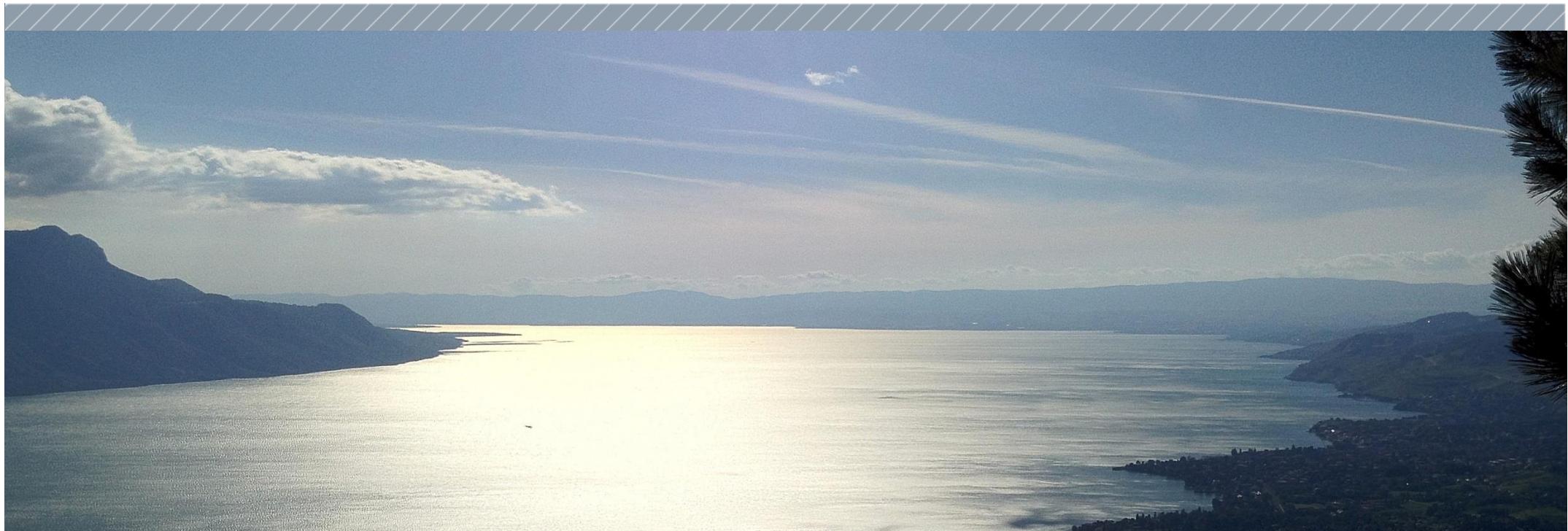


ÉCOLE POLYTECHNIQUE
FÉDÉRALE DE LAUSANNE

<http://cnp.epfl.ch>

CENTER FOR NEUROPROSTHETICS

School of Engineering (STI) & School of Life Sciences (SV)



Annual Retreat 10-11 OCTOBER 2013 – HILTON EVIAN-LES-BAINS



CNP RETREAT – 10-11 OCT. 2013 - PROGRAM

| Thursday Oct. 10th | | |
|---|---|---|
| 8:45 | Meeting Point CGN Lausanne-Ouchy | See details below* http://www.cgn.ch |
| 09:25 – 10:00 | <i>Croisière sur le Léman</i> | |
| 10:00 – 10:30 | Hotel registration and Coffee | Hilton Evian-les-Bains |
| 10:30 – 11:00 <i>Como + Genève</i> | Welcome Olaf Blanke | |
| 11:00 – 12:00 <i>Como + Genève</i> | Session 1 - Hand Neuroprosthetics Stanisa Raspopovic Roberto Martuzzi Aaron Gerratt Silvestro Micera | Session chair: Silvestro Micera Three presentations with discussion (10 + 5 minutes each) General discussion (15 minutes) |
| 12:00 – 13:30 <i>Cannelle</i> | Lunch | Poster preparation |
| 13:30 – 14:15 <i>Como + Genève</i> | Invited Lecture 1 - Prof. Kamiar Aminian Analysis of locomotion using wearable sensors: from bench to bedside | Presentation with discussion (30 + 15 minutes) |
| 14:15 – 15:15 <i>Como + Genève</i> | Session 2 - Stroke rehabilitation Robert Leeb Andrea Serino Martina Coscia José del R. Millán | Session chair: José del R. Millán Three presentations with discussion (10 + 5 minutes each) General discussion (15 minutes) |
| 15:15-17:30 | <i>Social event</i> | <i>Compétition de Pétanque & autres...</i> |
| 17:30-19:30 <i>Salon du Lac 2-3 ,Foyer</i> | Poster session | 1 st hour odd numbers, 2 nd hour even numbers. |
| 19:30 – 20:30 | <i>Free time</i> | |
| 20:30 – 22:00 <i>Cannelle</i> | Dinner | |
| 22:00 <i>Salon du Lac 3, Foyer</i> | <i>Party</i> | |

Friday Oct. 11th

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| 08:30 – 10:00 <i>Cannelle</i> | Breakfast | |
| 10:00 – 10:45 <i>Como + Genève</i> | Invited Lecture 2 - Prof Dimitri Van De Ville Dynamic functional networks: new frontiers in human brain mapping | Presentation with discussion (30 + 15 minutes) |
| 10:45 – 11:15 | Coffee break | |
| 11:15 – 12:15 <i>Como + Genève</i> | Session 3 - Locomotion and spinal cord repair Ivan Minev Quentin Barraud Ricardo Chavarriaga Grégoire Courtine | Session chair: Grégoire Courtine Three presentations with discussion (10 + 5 minutes each) General discussion (15 minutes) |
| 12:15 – 13:00 <i>Pick up in the lobby</i> | Standing lunch | Hotel check-out |
| 13:15 – 13:51 | <i>Croisière sur le Léman</i> | http://www.cgn.ch |
| 13:51 | End | Back at Lausanne-Ouchy* |

In green are the locations inside the Hilton Hotel

*Meeting point: CGN Débarcadère de Lausanne (Departure 8:45 Thursday Oct. 10th, Return ~14:00 Friday Oct. 11th)



CNP RETREAT – 10-11 OCT. 2013 – SEMINARS

Invited Speakers

Oct 10th 13:30 – 14:15

Prof Kamiar Aminian



Analysis of locomotion using wearable sensors: from bench to bedside

Movement restoring relies mainly on locomotion features, which are traditionally estimated with standard motion capture systems in laboratory conditions. Nowadays, body worn sensors allow movement monitoring outside of the lab, opening wide range of applications where locomotion features can be used to evaluate and tune the rehabilitation in real world conditions. This talk will present new techniques using wearable systems for clinical gait analysis in daily life conditions. Gait parameters are used to provide relevant feedbacks for intervention and for objective evaluation of movement disorders in aging, Parkinson disease, orthopaedics, stroke and patient with chronic pain.

Laboratory of Movement Analysis and Measurement

<http://lmam.epfl.ch/>

Oct 11th 10:00 – 10:45

Prof Dimitri Van De Ville



Dynamic functional networks: new frontiers in human brain mapping

State-of-the-art analysis of neuroimaging data such as functional magnetic resonance imaging (fMRI) and electroencephalography (EEG) is heavily based on advanced computational techniques adopted from signal processing and applied statistics. One important outstanding question in cognitive and clinical neurosciences is how to extract and characterize brain networks in terms of organization and interactions. In this talk, I will present some of our recent work for resting-state fMRI. First, "total activation" is a new method to identify bursts of spontaneous activity (~innovations) and to disentangle spatially-overlapping brain networks. Second, we propose a new approach to study fluctuations in functional connectivity in terms of "eigennetworks" and show their relevance for discriminating minimally-disabled multiple sclerosis patients. These new markers of brain dynamics can contribute to our understanding of non-stationarity, which is one of the key challenges for neuroprosthetics.

Medical Image Processing Laboratory

<http://miplab.epfl.ch>

SESSION 1 - Oct 10th 11:00 - 12:00

Hand Neuroprosthetics - Session chair: Silvestro Micera

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|  | Stanisa Raspopovic Restoring sensory feedback in hand prostheses | Micera Lab http://tne.epfl.ch |
|  | Roberto Martuzzi Touch and primary somatosensory cortex in healthy subjects and amputees | Blanke Lab http://lnco.epfl.ch |
|  | Aaron Gerratt Transducers for artificial skins | Lacour Lab http://lsbi.epfl.ch |

SESSION 2 - Oct 10th 14:15 - 15:15

Stroke rehabilitation - Session chair: José del R. Millán

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|---|--|---|
|  | Robert Leeb BCI-based motor and neglect rehabilitation | Millán Lab http://cnbi.epfl.ch |
|  | Andrea Serino Neglect rehabilitation through prism adaptation and non-invasive brain stimulation | Blanke Lab http://lnco.epfl.ch |
|  | Martina Coscia Experiments towards a personalized upper limb robot-based neuro-rehabilitation | Micera Lab http://tne.epfl.ch |

SESSION 3 – Oct 11th 11:15 – 12:15

Locomotion and spinal cord repair - Session chair: Grégoire Courtine

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|---|---|---|
|  | Ivan Minev Multimodal electrodes for Spinal Cord Interfaces | Lacour Lab http://lsbi.epfl.ch |
|  | Quentin Barraud Morphofunctional characterization of alpha2 receptors contribution in the production of locomotion following spinal cord injury | Courtine Lab http://courtine-lab.epfl.ch/ |
|  | Ricardo Chavarriaga Intelligent Neuroprosthetics: Mobility and Locomotion | Millán Lab http://cnbi.epfl.ch |

CNP RETREAT – 10-11 OCT. 2013 – POSTER SESSION

Thursday Oct. 10th, 17:30 – 19:30. Presenters of posters with an odd number should be available for questions during the first hour, and vice versa.

| # | Authors | Title |
|----|--|--|
| 1 | Asboth L., Barraud Q. & Kreider J. | Optogenetic activation of the motor cortex unmasks supraspinal access to locomotor circuits caudal to a severe spinal cord injury in mice. |
| 2 | Bassolino M., Finisguerra A., Canzoneri E., Serino A. & Pozzo T. | When the action is constrained: plasticity of body and space representations in a 1st person perspective. |
| 3 | Bello-Ruiz J., Herbelin B. & Blanke O. | Virtual reality applications and techniques for cognitive neuroscience. |
| 4 | Biasiucci A., Leeb R., Vuadens P., Al-Khadairy A., Schnider A., Guggisberg B. A. & Millán JdR. | Brain controlled functional electrical stimulation for upper limb motor recovery in chronic stroke patients. |
| 5 | Blefari M.L., Martuzzi R., Sobolewski A., Van der Zwaag W., Blanke O. & Millán JdR. | Brains of proficient and less than proficient BCI users: is there a difference? |
| 6 | Bonizzato M., Petrini F., Capogrosso M., Raspovic S., Rossini P.M. & Micera S. | MLP and HMM synergistic use in an sEMG-based control algorithm for a bidirectional prosthetic hand. |
| 7 | Bouzerda-Wahlen A., Nahum L., Liverani M.C., Guggisberg A. & Schnider A. | Segregation within source memory: an electrophysiological dissociation between context monitoring. |
| 8 | Capogrosso M., Raspovic S., Bassi Luciani L., Wenger N., Musienko P., Courtine G. & Micera S. | Selectivity of a multielectrode array for epidural electrical stimulation of the spinal cord: a rat computational model. |
| 9 | Carlson T., Saeedi S., Chavarriaga R. & Millán JdR. | On the need for both internal and external context awareness for reliable BCIs. |
| 10 | Chavarriaga R., Lew E., Beuchat N. J., Degallier S. & Millán JdR. | Decoding self-paced movements using EEG movement onset to muscle synergies. |
| 11 | Chavarriaga R., Gheorge L. A., Zhang H., Khaliliardali Z. & Millán JdR. | Detecting cognitive states for enhancing driving experience. |
| 12 | Coscia M. & Micera S. | Development of control algorithms and innovative rehabilitative strategies for neurorehabilitative robotic devices. |
| 13 | Crema A. & Micera S. | Towards wearable & robotics devices: applications for grasp rehabilitation. |
| 14 | DiGiovanna J., Dominici N., Rigosa J., Friedli L., Vollenweider I., Duis S., van den Brand R., Micera S. & Courtine G. | Cortical influence on complex locomotion: above and beyond accuracy. |
| 15 | Forget J., Martuzzi R., Lopez C., Tsimplanouli M.E., van der Zwaag W., Meuli R. & Blanke O. | Visuo-vestibular convergence in the retroinsular cortex: a 7T fMRI study. |
| 16 | Friedli L., Beauparlant J., Ulrich G., Ghazanfari S., Helleboid P.-Y., Baud L., Halimi N. & Courtine G. | Multi-system neurorehabilitation restores voluntary control of locomotion after a severe spinal cord contusion. |

| # | Authors | Title |
|----|---|---|
| 17 | Guex A., Watson D., Joris P., Verma R. U., Brown M., Renau P., Lee D. J. & Lacour S. P. | Flexible opto-electronic implants for auditory brainstem stimulation. |
| 18 | Khoa Nguyen T. A., DiGiovanna J., Perez-Fornos A., Merfeld D. & Micera S. | Towards a vestibular neuroprosthesis – vestibular evoked potentials and modulating rate or current. |
| 19 | Laurens J. & Angelaki D. E. | Neural representations of internal estimates of tilt and translation in the vestibulo-cerebellum during motion in three dimensions. |
| 20 | Leeb R., Perdikis S., Tonin L., Biasiucci A., Creatura M., Al-Khadairy A., Carlson T. & Millán JdR. | Neuroprosthetics control: from bench to bed-side and end-users' home. |
| 21 | Macku P., Pfeiffer C., Martuzzi R. & Blanke O. | Behavioral and functional neural correlates of the subjective first-person perspective. |
| 22 | Marchesotti S., Martuzzi R., Blefari ML., Evans N., Bleuler H. & Blanke O. | The sense of agency for imagined actions: an EEG-fMRI approach. |
| 23 | Moraud E., Wenger N., DiGiovanna J., Bonizzato M., Musienko P., Morari M., Courtine G. & Micera S. | Online optimization of multi-site electrical epidural stimulation increases consistency of stepping and limb control in spinal rats. |
| 24 | Noel J.-P., Galli G., Blanke O. & Serino A. | Audio-tactile multisensory integration as a proxy for full body peripersonal space. |
| 25 | Pirondini E., Coscia M. & Micera S. | Understanding the neural correlates of robot-mediated neurorehabilitation: towards a personalized therapy. |
| 26 | Raspopovic S., Petrini F., Capogrosso M., Bonizzato M., Rossini P.M. & Micera S. | Restoring natural sensory feedback in real-time bidirectional hand prostheses. |
| 27 | Rognini G., Pozeg P., Heydrich L., Hara M., Bleuler H. & Blanke O. | The stranger/phantom within: specific sensorimotor conflicts of own body representation induces the feeling of another person close by. |
| 28 | Ronchi R., Bello-Ruiz J., Schaller K. & Blanke O. | Alteration of interoceptive-exteroceptive integration after right insular lesion: a case report. |
| 29 | van den Brand R. | Clinical study setup – efficacy of spinal epidural electrical stimulation (EES) in combination with robot-assisted neurorehabilitation in patients with spinal cord injury. |
| 30 | Vollenweider I., Lang Y., Li Q., Borton D., Bezard E. & Courtine G. | A translational platform for neuromotor disease research and therapeutic validation: application to Parkinson's disease. |
| 31 | von Zitzewitz J., Asboth L., Vollenweider I., Vallery H., Hasse A. & Courtine G. | High-performance robotics facilitates advanced research on the sensory-motor system in animal research. |
| 32 | Zhang H., Chavarriaga Lozano R., Gheorghe L. A. & Millán JdR. | Inferring driver's turning direction through detection of error related brain activity. |
| 33 | Hirsch A., Minev I., Wenger N., Vachicouras N., Musienko P., Pavlova N., Gandar J., Courtine G. & Lacour S.P. | Silicone Neural Arrays for Mechanically Challenging Environments |

CNP RETREAT - 10-11 OCT. 2013 - VENUE



Débarcadère CGN d'Evian-les-Bains
2 Place du Port
74500 Evian-les-Bains

VENUE :
Hilton Evian-les-Bains
Quai Paul Léger
74500 Evian-les-Bains



La 'Place rouge'



Le Mur Blanc

