LEMANIC NEURO SCIENCE ANNUAL MEETING

PROGRAM

LNAM 2015

Fonds Jean Falk-Vairant

Association Amicitia

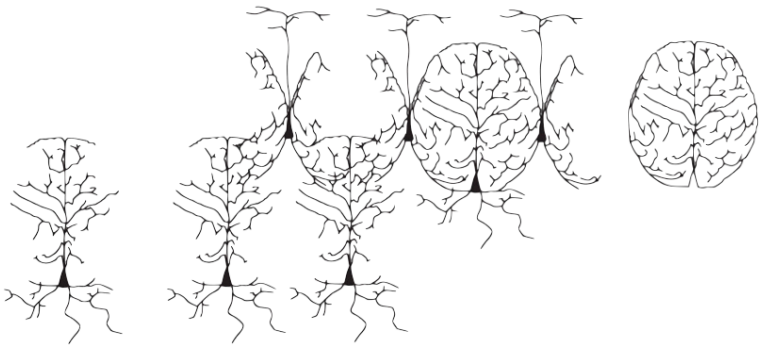
BIOTELLIGENCES

Les Diablerets, Switzerland
August 28-29, 2015

Organizing Committee:
Anne-Lise Giraud, Narly Golestani, Sophie Schwartz, Christoph Michel, Dimitri van de Ville and Patrik Vuilleumier @ Campus Biotech Geneva

Students' Committee:
Jacques Anken, Marie-Laure Bielser, Kirsten Emmert, Elsa Juan, Elena Pedrazzini, Raphael Thèzè

Coordination: Ulrike Toepel



Friday, August 28- Morning Session

Chair: Christoph Michel and Narly Golestani

09:08 Train arrives at Les Diablerets
09:15-09:45 Registration & coffee
09:45-10:10 Opening remarks

10:10-11:00 **PLENARY LECTURE**
John Donoghue (**Director of the Wyss Center for Bio- and Neuro-Engineering, Campus Biotech Geneva**)
"The promise and reality of Brain Computer Interfaces to restore lost motor function"

11:00-11:20 Coffee break

11:20-12:30 **SHORT TALKS by Lemanic PhD students** (10min each #)

- **Simon Badoud (#83)**
- **Marios Abatis (#88)**
- **Elsa Meylan (#26)**
- **Elisa Scariati (#73)**
- **Chiara Pellegrini (#57)**
- **Subashika Govindan (#50)**
- **Guillaume Sierro (#31)**

12:30-13:00 **TALKS by Lemanic PI's**
Pascal Senn (Western Switzerland University Cochlear Implants Center HUG & Inselspital Bern)
"*NANOCI - Nanotechnology based cochlear implant with gapless interface to auditory neurons*"

13:00-14:00 Lunch

Abstract numbers as in separate LNAM abstract book

Friday, August 28- Afternoon Session

Chair: Anne-Lise Giraud and Patrik Vuilleumier

14:00-15:20 **SHORT TALKS by Lemanic PhD students** (10min each#)

- **Elsa Juan (#13)**
- **Valeria Kebets (#64)**
- **Jing Cui (#40)**
- **Renaud Marquis (#27)**
- **Mari Virtanen (#60)**
- **Sebastiano Bariselli (#59)**
- **Elias Gebara (#54)**
- **Zeinab El Hajj (#68)**

15:20-16:00 Coffee break

16:00-17:00 **SHORT TALKS by Lemanic PhD students** (10min each#)

- **Ben Boury-Jamot (#38)**
- **Clara Rossetti-Marcon (#65)**
- **Anthony Carrard (#36)**
- **Cécile Meunier (#70)**
- **Nicolas Merienne (#69)**
- **Mirko Schnider (#23)**

17:00-19:00 **Poster session & Apéro**

17:15 - Odd, black numbers
18:15- Even, red numbers

20:00-22:00 Dinner at the Hotel Victoria
With award for the poster best displaying experimental design and quantitative analysis of outstanding quality, including biostatistics (awarded by Biotelligences LLC)

22:00-... Party at your favourite bar in town (but be back at 9:30 the next morning!)

Abstract numbers as in separate LNAM abstract book

Trains leave Les Diablerets at 19:04, 20:47 and 21:47

Saturday, August 29

Chairs: Dimitri van de Ville, Anthony Holtmaat and Jean-Pierre Hornung

09:00-09:30 **Doctoral school consultation: Suggestions and questions regarding the doctoral program**

09:30-10:20 **PLENARY LECTURE**
Andres M. Lozano (Toronto Western Research Institute & Techna Institute for the Advancement of Technology for Health, Canada)
"*Modulating the Structure and Function of the Brain with Deep Brain Stimulation*"

10:20-10:50 **Foundation Jean Falk-Vairant**

- Presentation of the foundation and report of a recent awardee
- Awards for the best basic and the best clinical neuroscience poster or presentation at the LNAM2015

10:50-11:20 Coffee break

11:20-13:00 **SPECIAL LECTURE & ROUNDTABLE**
***"Translating outcomes of neuroscientific research into clinical applications"* with Markus von Kienlin and Thomas Mueggler (Preclinical Imaging @ Roche Neuroscience); moderated by Ron Stoop**

13:00-13:15 **Amicitia Foundation**

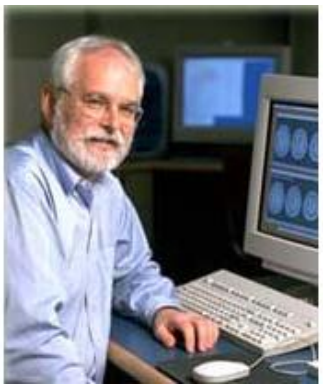
- Presentation of the foundation and this year's awardee of the Amicitia Excellence Prize in recognition of outstanding scientific research in all areas of neuroscience aiming to support Lemanic neuroscience graduates continuing their scientific career at an international academic institution.

13:15-15:00 Farewell words followed by the famous BBQ Lunch

15:00- **Social Activities:** hike etc.

Trains leave Les Diablerets at 12:48, 13:47, 15:06, 15:47, 17:06 and 17:48

- *Check the LNAM notice board for car sharing opportunities -*



PLENARY LECTURE (Friday, August 28, 10:10-11:00)

John Donoghue (**Wyss Center for Bio- and Neuro-Engineering, Campus Biotech Geneva**)

The promise and reality of Brain Computer Interfaces to restore lost motor function

Just over a decade ago Matt Nagle became the first human to use the collective activity of an ensemble of neurons in his motor cortex to willfully control a computer. This accomplishment was also remarkable because Matt was fully paralysed for years before this feat. A decade later more than a dozen people have used a similar brain computer interface (BCI) and demonstrated that people with paralysis can control computers to communicate and robot arms to reach and grasp, even years after a stroke, spinal cord injury, or onset of Amyotrophic Lateral Sclerosis (ALS). But there is not a commercial product available yet. What are the barriers and unmet goals of the BCIs? I will discuss the past accomplishments, ways to meet current challenges, and the future promises of BCIs to help people unable to move independently.

PLENARY LECTURE (Saturday, August 29, 09:30-10:20)

Andres M. Lozano (Toronto Western Research Institute & Techna Institute for the Advancement of Technology for Health, Canada)

Modulating the Structure and Function of the Brain with Deep Brain Stimulation

Advances in functional imaging and in neurophysiology have led to greater understanding of the pathological activity in brain circuits leading to the signs and symptoms of neurologic and psychiatric disorders. This has in turn opened the possibility of using deep brain stimulation (DBS) to probe these dysfunctional circuits and to test the effects of modulating their activity with electrical stimulation. This approach is well established for patients with movement disorders, including Parkinson's disease and tremor and is being applied to a large number of brain targets for other conditions including depression, obsessive compulsive disorder, pain, epilepsy, anorexia and Alzheimer's disease. Further, there is accumulating evidence that stimulating these circuits has important cellular and biological effects. DBS is providing new insights into the function brain circuits while at the same time leading to new hope for the treatment of neurologic and psychiatric disorders that can continue to disable many patients.

Key Words: Brain stimulation, circuits, behavior, electrophysiology, neurogenesis

TALKS by Lemanic PI's (Friday, August 28, 12:30-13:00)

Pascal Senn[1,2] and partners of the NANOCI consortium (www.nanoci.org)

[1]Dept. of ORL, HNS, Inselspital and Dept. of Clinical Research, University of Bern, Switzerland
[2]Service of Oto-Rhino-Laryngology, HNS, Dept. of Clinical Neurosciences, University hospital of Geneva, Faculty of Medicine, University of Geneva

NANOCI - Nanotechnology based cochlear implant with gapless interface to auditory neurons

Cochlear implants have become the gold standard treatment for deafness worldwide. Despite the tremendous success, some limitations remain. The bottleneck for optimal stimulation is caused by the anatomical gap between the electrode array and the auditory neurons in the inner ear. As a consequence, current devices are limited through (i) low frequency resolution, hence poor sound quality and (ii), strong signal amplification, hence high energy consumption responsible for significant battery costs and for impeding the development of fully implantable systems. Recent findings indicate that auditory nerve fibres can grow under neurotrophin stimulation towards the electrodes, which opens the door to address all issues simultaneously.
The EU-FP7 – NMP- funded collaborative project NANOCI (www.nanoci.org) aims at developing a neuroprosthesis with a gapless interface to auditory nerve fibres. The initial attraction of neurites is provided by an innovative, nanostructured gel-matrix containing diffusible and surface-bound neurotrophins. The long-lasting operation without interface degradation, reduced biofouling and improved conductivity is approached by nanostructuring the array surface using (i) various functional nanomaterials, including carbon nanotubes, combined with (ii) structuration methodologies such as ion implantation and sacrificial nanoparticle embedding in parylene, SOLID (solid on liquid deposition) encapsulation, and sonochemistry. In the last months of the 3yer project, all the components have been validated in appropriate bioassays including human auditory and vestibular neurons in vitro. In parallel, software models have been developed to exploit the bidirectional, gapless interface. Fusing all developments, an animal-grade, pilot nanoCI-device has been manufactured and tested in vivo. The aim of the presentation is to show the concept of the project and to highlight the results of own experiments performed within the framework of the NANOCI project, where the neuron-electrode interface has been studied on multi-electrode arrays in vitro.

Keywords: cochlear implant, man:machine interface, nanotechnology, stem cells, neurotrophins, inner ear regeneration, future CI technology.
Acknowledgements: This work has been sponsored by the EU in the 7th framework programme (NANOCI, grant agreement no. 281056)

SPECIAL LECTURE & ROUNDTABLE moderated by Ron Stoop (Saturday, August 29, 11:20-12:30)

Markus von Kienlin and Thomas Mueggler (Preclinical Imaging @ Roche Neuroscience)

"Translating outcomes of neuroscientific research into clinical applications"

Markus von Kienlin is heading the Magnetic Resonance Imaging (MRI) group at Roche Neuroscience. He is responsible for the profiling of drug candidates in the advanced drug discovery portfolio, and for the development of imaging biomarkers for early clinical development.
Markus studied electrical engineering at the TU Munich (Germany) and medical technology at the U Grenoble (France). He received his Ph.D. from the Institut National Polytechnique in Grenoble, applying novel MRI/MRS instrumentation to study cerebral tumors. He then had 3 years of post-doctoral training at the NIH in Bethesda (USA), before joining the Dept. of Biophysics at U Würzburg (Germany). In 1999, Markus joined Hoffmann-La Roche in Basel (Switzerland), to build the company's first MRI laboratory. His current research focuses on functional neurocircuitry.

Furthermore, Markus von Kienlin is chairing the Roche Internships for Scientific Exchange (RiSE) program designed to allow talented PhD and MD-level students to work together with Roche scientists in Basel, Switzerland on projects in neuroscience, ophthalmology and rare diseases. The program is an effort of Roche Pharma Research and Early Development (pRED) to allow young people to gain insight into commercial pharmaceutical research.