

CNB Newsletter

10 / 2017

Dear CNB members,

With the CNB Newsletter, we would like to inform you about upcoming CNB events and ongoing projects. This time especially about the implementation of a new PhD track in Health Sciences.

We hope you enjoy reading the current edition.

Prof. Dr. Tobias Nef
President CNB

① PhD in Health Sciences (Clinical Sciences)



One of the goals of the CNB network is to promote young researchers. Besides more temporary initiations, such as the CNB Science Slam (see also page 5), we would like to invest in long term support and especially in fostering the research activity of young clinicians. Therefore, we are currently implementing the new track PhD in Health Sciences (Clinical Sciences).

Eligible candidates are allowed to pursue their clinical career, while working on a research project leading after 4 to 5 years to a PhD degree. Both activities should take up 50% of the working hours and benefit from each

other. I.e. clinically relevant questions should directly influence the definition of the research topic and the growing expert knowledge gained from the clinical routine helps to adjust the direction of the project during the education.

The new track will be integrated in the Graduate School for Health Sciences by establishing a third Expert Committee ("Clinical Science").

Eligibility criteria:

- Master in medicine, psychology or a related clinically oriented field
- Both a clinical position and a research position
- First experiences in clinical routine
- Strong interest in clinical research

If you are interested in entering the program or if you have any questions, please contact:

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② Review: CNB Annual Meeting 2017



CNB Poster Award Winners 2017, from left to right: Gerd Tinkhauser, Lukas Oesch, Sarah Rudolf (p.p.).

Clinical Neurosciences Bern are looking back at another successful CNB Annual Meeting. The two key notes by Prof. Lutz Jäncke (University of Zurich) and Dr. Fabien

Wagner (EPFL) were very well appreciated. We were also pleased to receive many high-quality abstracts for contributions to short talks, symposia and the poster session.

During the meeting, three young researchers were awarded with a poster prize:

- **Gerd Tinkhauser** (Clinical Research)
- **Lukas Oesch** (Basic Research Animal)
- **Sarah Rudolf** (Basic Research Human)

Congratulation to the winners!

The next CNB Annual Meeting will take place on the 25th of May 2018. You will be informed about the detailed program and call for abstracts soon. The call for symposia topics is already open. We are happy to receive your input.

③ Selected Research Groups

Prof. Dr. L. Marchal-Crespo

Motor Learning and Robotic Neurorehabilitation, ARTORG Center



Paralysis after stroke often has a negative impact on mobility and daily activities such as cooking, eating or dressing. Currently, patients receive physiotherapy or ergotherapy in order to train their mobility. Important factors that indicate the success of a therapeutic intervention are the intensity and duration of the therapy, in addition to how well the difficulty of the therapy is adapted to a patient's skill level.

There is increasing interest in using robotic devices to provide rehabilitation therapy following stroke. Robotic guidance is generally used in motor training to reduce performance errors while practicing. However, up to date, the functional gains obtained after robotic rehabilitation are limited. A possible explanation for this limited benefit is the inability of the controllers to adapt to the subjects' special needs. Research on motor learning has emphasized that movement errors are fundamental signals that drive motor adaptation. Thereby, robotic algorithms that augment errors rather than decrease them have a great potential to provoke better motor learning and neurorehabilitation outcomes, especially in initially more skilled subjects.

The Swiss National Science Foundation SNSF awarded funding for the professorship of Dr.-Ing. Laura Marchal-

Crespo at the ARTORG Centre for Biomedical Engineering Research of the University of Bern and at the Division for Cognitive and Restorative Neurology of the University Hospital for Neurology, Inselspital. Her research will focus on developing and testing new training regimes for existing therapeutic robots. These patient-specific strategies allow the therapeutic device to adapt the training difficulty to the needs of each patient. This is achieved by increasing or decreasing the error of movements in dependence of the abilities and age of the patient and the therapy regime.



Prof. Dr. Laura Marchal-Crespo develops new training strategies for existing therapeutic robots (Picture by Adrian Moser).

Representative publications:

- Marchal-Crespo L, Michels L, Jaeger L, Lopez-Oloriz J, Riener R. Effect of error augmentation on brain activation and motor learning of a complex locomotor task. *Frontiers in Neuroscience* (2017) doi: 10.3389/fnins.2017.00526.
- Marchal-Crespo L, Rappo N, Riener R. The effectiveness of robotic training depends on motor tasks characteristics. *Experimental Brain Research* (2017), Accepted.

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Dr. S. Sachidhanandam

Sensory Perception Group
Department of Physiology



Our group is interested in how sensory information from the outside world is processed and perceived. We are particularly interested in the neocortical circuits that underlie sensory perception and how their activity is modulated by the cognitive process of attention. We focus specifically on the posterior parietal cortex (PPC), a higher order sensory association cortex that together with the frontal eye field is part of the dorsal attention network responsible for stimulus selection.

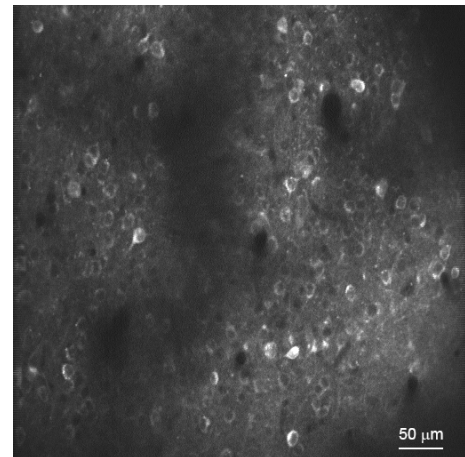
To achieve this, we record from genetically identified classes of neurons, under the visual guidance of 2-photon microscopy, using targeted whole-cell patch clamp electrophysiology as well as juxtosomal recordings in quiet awake mice as well as mice engaged in a task. We complement this with 2-photon calcium imaging at the single cell resolution over a large population of neurons, using genetically encoded calcium indicators (GECIs) and chronically implanted cranial windows. Our recent findings suggest that the PPC is involved in stimulus association and expectancy, as part of the fronto-parietal attention network. Through the manipulation of identified circuits via optogenetics, we hope to have a better understanding of their contribution to sensory perception and goal directed behavior.

Related references:

- S. Sachidhanandam, B.S. Sermet, C.C.H. Petersen. Parvalbumin-Expressing GABAergic Neurons in Mouse Barrel Cortex Contribute to Gating a Goal-

Directed Sensorimotor Transformation. *Cell Rep.* 15:700–706, 2016

- S. Sachidhanandam, V. Sreenivasan, A. Kyriakatos, Y. Kremer, C.C. Petersen. Membrane potential correlates of sensory perception in mouse barrel cortex. *Nat. Neurosci.* 16(11):1671-1677, 2013



2-photon image of mouse layer 2/3 neurons in the PPC expressing the GECI RCaMP1.07.

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Platform for Stem Cells and Regenerative Medicine

Prof. Eliane J Müller & Prof. Volker Enzmann



The CNB and the Platform for Stem Cells and Regenerative Medicine (SCRM) have partnered to link their respective networks and pursue common interests.

The SCRM Platform is a research cluster of the Department of BioMedical Research (DBMR) at the University of Bern founded in 2015 (www.stemcellsbern.ch). It comprises 37 member groups affiliated with the Medical Faculty and Inselspital University Hospital, the Vetsuisse and Phil.-nat. Faculty.

Mission Statement

The SCRM Platform connects scientists with activities in the fields of stem cell research and regenerative medicine with the goal to foster innovation through support of i) young researchers, ii) exchanges between established Bernese research groups, iii) national and international networking, and iv) seminal ideas.

Ultimately, **our Mission** is to support innovative research to efficiently and rapidly transfer basic findings into clinical applications with specific focus on cell therapy.

A Glimpse into the SCRM Network fostered Activities

Together with the Graduate School for Cellular and Biomedical Sciences (GCB), the SCRM platform sponsors a yearly PhD retreat where students meet outstanding mentors from research and industry, obtain advice and discuss their results independently of their supervisors. Brought to fruition, outstanding work of these young scientists is awarded by the SCRM Platform on the basis of the posters presented in the “Stem Cell Section” at the annual DBMR research day.

Exchange and networking between researchers is stimulated through monthly “Stem Cell Lunch Seminars” (second Tuesday of each month) under the responsibility of Dr. Marta Roccio and sponsored by the DBMR. To connect researchers beyond Bern, the SCRM platform hosts, with support of industrial partners, national and international meetings such as the Annual Meeting 2013 of the Swiss Stem Cell Network (SSCN) and the Cell Therapy Meeting last November, a joint venture between SCRM in collaboration with Sitem-Insel AG, and the Swiss Institute for Stem Cell Therapy (SICT) (see [article in UniAktuell](#)).

Hence, the SCRM network ranges from students and researchers in the stem cell and regenerative medicine field in Bern to cell therapy specialists in Switzerland and abroad, and connects them with private and public funding sources.

Exploiting the Network for Future Directions

The SCRM Steering Committee (supported by a Scientific Advisory and a Strategic Board) has recently been joined by two new young investigators (Prof. Benjamin Gantenbein and Dr. Amiq Gazdhar) which are proactive in establishing a curriculum for Stem Cells and Regenerative Medicine together with Prof. Volker Enzmann and the GCB. In extension of its active involvement in designing the GMP unit at Sitem-Insel, the SCRM Platform is also a driving force behind the foundation of a private/public Swiss-wide Cell Therapy Platform connecting Bern, under the umbrella of the national thematic networks and Biotechnet Switzerland, with University Centers for Cell Therapies in Geneva, Lausanne, Lugano, Basel and Zürich.

Finally, to pursue its goals of innovation and underscore its partnership with CNB, the SCRM Annual Meeting November 7th, 2017 announces the keynote lecture by Prof. Niels Kuster, the renowned founder and director of the IT'IS Foundation who is specialized in Computational Modeling of complex processes including applications for precision medicine and the impact of the electromagnetic fields (EMF) on the human body. The Bernese contributions at this meeting honors the outstanding work done by Dr. Sean Hall specialized in growth of lung organoids and by CNB members Profs. Antoine Adamantidis and Smita Saxena for their major contributions in brain research.

In conclusion, the SCRM Platform looks forward to an interesting and intense collaboration with CNB.



Impressions from the “Joint Meeting on New Cell Therapies” Bern, November 23rd 2016



SCRM Poster Price 2016 awarded to Michael Perny (right), Institute for Infectious Diseases and DBMR.



SCRM Steering Committee: left to right: Prof. Thomas Krause, Prof. Emeritus André Haerberli, Prof. Eliane J. Müller; Dr. Amiq Gazdhar, Prof. Volker Enzmann; missing on the picture: Prof. Benjamin Gantenbein.

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④ CNB Science Slam in a new format /
 Other upcoming events

12. - 16. March 2018	Brainweek Bern 2018
14. March 2018	CNB Science Slam 2018
25. May 2018	CNB Annual Meeting 2018 “Big Data in Clinical Neuroscience”

Due to the positive feedback obtained after this year’s CNB Science Slam, we plan to organize a similar event also in 2018.

The CNB Science Slam 2018 will again be part of the Brainweek Bern and take place on the evening of the 14th of March 2018 in the lecture room A003 and the foyer of the UniS.

Compared to last year, there will be more space, food and we also plan to implement some changes in the specific organization of the evening. Further, in 2018 the best contributions will be awarded with attractive prizes. An e-mail with detailed information about the CNB Science Slam 2018 will be sent shortly to all CNB research group leaders.

We are very much looking forward to interact with you during this networking event and hope that many groups can join.

For any inquiries regarding the CNB Science Slam or any other CNB business, please contact:

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