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CNB Newsletter 12 / 2025

Dear CNB members,

With the CNB Newsletter, we intend to inform you about upcoming CNB events, ongoing projects and provide insights into the research topics of selected CNB members. In this edition, we look back on the 20th Annual Meeting and look ahead to the Brain Week 2026, which will take place from March 16th to 19th, 2026. The topic of this year's Brain Week is "Das Menschliche Gehirn im digitalen Wandel", which focuses on various influences such as the digital world and AI on the brain. The upcoming event will highlight multiple aspects of this topic through inspiring lectures and lively discussions.
The Brain Week will once again organize again a researchers' night with a poster session, which is open to all young researchers.
Please note that graduate students may obtain academic credit for presenting their posters.

The CNB continues to offer excellent opportunities for interdisciplinary collaboration within the University of Bern neuroscience community. In this issue, we introduce three new CNB research group leaders from different fields. Prof. Dr. med. Georg Kägi focuses on the classification and treatment of hyperkinetic movement disorders and Parkinson's disease. He has conducted pioneering work with MRgFUS and has established a movement disorder registry. PD Dr. Marc Alain Züst brings expertise in memory consolidation, aging, and dementia prevention using closed-loop, non-invasive neurostimulation approaches. His work bridges mechanistic sleep physiology, EEG analytics, and translational clinical applications targeting older adults at risk for cognitive decline. PD Dr. phil. Anja Gysin-Maillart is the co-developer of the Attempted Suicide Short Intervention Program (ASSIP) and works on understanding the mechanisms of action of suicide-specific brief therapies and their clinical implementation. Her research focuses on suicidal ideation and behavior, psychotherapy mechanisms, neuropsychological correlates of suicidality, and innovative, scalable interventions including ASSIP flex and the development of a national suicide prevention toolbox.

Please reach out to us, if you would like to showcase your research in the next newsletter. Please also indicate if new groups should be included in the CNB platform.

Please also note that we are updating and upgrading the CNB-Website, so please feel free to contact Ms. Sarah Mischler (sarah.mischler@unibe.ch) if you want to make changes on your research group-site (e.g. add photos, videos, members etc.).

If you follow us on X (formerly Twitter), we are happy to repost your research articles to spread the word about your science. The X handle is @clin_neurobern.

We hope you enjoy reading the December 2025 edition.

Prof. Dr. Mirjam Heldner
President CNB

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20th CNB Annual Meeting – Brain & Body

Friday, 5th of September, 9.00 – 16.30

This year's Annual Meeting took place at the Inselspital, in the Ettore Rossi Auditorium. The event opened with a video welcome address by former Strategic Board Member Claudio Bassetti, who warmly welcomed the audience on behalf of the CNB, introduced the CNB and its executive committee, highlighted the focus areas, and announced his resignation while formally handing over responsibilities to Urs Fischer.

The morning program continued with the first keynote lecture by Prof. Dr. med. Bogdan Draganski, who spoke about *The brain–body connection – what we have learned from epidemiological studies.* His talk sparked an active and engaging discussion.

Afterwards, four selected abstracts were presented by young investigators:

"Ventral Hippocampal Microcircuits Underlying Ethologically Relevant Anxiety Behaviors" – Kaizhen Li

His talk focused on how anxiety is encoded within specific spatial and temporal patterns in the brain, with particular emphasis on ventral hippocampal microcircuits. Using a multi-modal approach—combining in vivo calcium imaging in freely moving mice, optogenetics, and detailed behavioral analyses — he showed how these circuits engage during anxiety-related behaviors such as stretch-attend postures, head dips, grooming, and climbing. His findings revealed that distinct neuronal ensembles are recruited during specific anxiety states, and that optogenetic inhibition of these circuits can alter innate anxiety responses. This work offers a more comprehensive framework for understanding how anxiety is represented in the brain.

"Sleep Modulates Neural Timescales and Spatiotemporal Integration in the Human Cortex" – Riccardo Cusinato

He presented his work on how neural timescales—patterns in how brain activity unfolds over time—are organized across the cortex and how they differ between wakefulness and sleep. Using intracranial EEG recordings from 106 epilepsy patients, he examined two complementary measures derived from broadband activity and gamma power. He demonstrated that both types of timescales become globally longer during sleep but follow different gradients across the cortex. His results further showed that slow waves contribute to these changes and that the spatial integration of neural activity shifts across brain states. Together, these findings highlight how neural populations operate on distinct timescales shaped by anatomy and modulated by the sleep–wake cycle.

"Cognitive impairment in individuals with chronic spinal cord injury: a Flanker task-based functional magnetic resonance imaging study" – Jothini Sritharan

Her talk addressed how spinal cord injury (SCI) affects executive functions and what changes in brain activity accompany these impairments. She presented an fMRI study where individuals with and without SCI performed a Flanker task. Participants with SCI showed fewer correct responses and exhibited altered activity in the insula and precuneus—

regions crucial for response inhibition and higher-order cognitive processing.

"Spatial propagation of movement-related synchronisation in the subthalamic nucleus predicts parkinsonian motor states" – Alberto Averna

His presentation focused on how high-frequency neural signals in the subthalamic nucleus (STN) can inform and optimize Deep Brain Stimulation (DBS) in Parkinson's disease. Using LFP recordings from 46 patients during rest and a simple hand-movement task, he demonstrated that different gamma and high-frequency sub-bands exhibit distinct spatial "hotspots" and propagation patterns. Notably, propagation above 110 Hz was inversely related to dopamine-related motor improvement, suggesting potential compensatory mechanisms. His findings offer valuable insights for more personalized DBS therapies.

After a short coffee break, the second keynote was delivered by Michalina Gora-Gioux, PhD from the Wyss Center for Bio and Neuroengineering in Geneva. Her talk, Neuroscience Methods Meet the Gut, provided an exciting perspective on cutting-edge methodological approaches.

Following the morning program, the multimedia talk and lunch offered young researchers an excellent opportunity to exchange ideas and discuss ongoing projects. It was a fantastic showcase of local neuroscience research in Bern. At the end of the multimedia session, three talk awards were presented by the Poster Award Committee.

1. Natascha Stoffel (Category : Clinical Research)
   Title: "Attenuated Heartbeat-evoked Potentials and Attention Difficulty are Associated with Functional Neurological disorders"

2. Leonardon Benjamin (Category:Basic Research Animal)
   Title: "Dopaminergic modulation of astrocytes in the anterior cingulate cortex gates innate fear induced avoidance learning"

3. Korian Wicki (Category: Basic Research Human)
   Title: "Preventing cognitive decline using portable, non-invasive sleep enhancement."

In the afternoon, three parallel symposia provided diverse insights into cutting-edge research topics:

- *Perinatal Brain Injury in the Context of Preterm Birth: Mechanisms of Injury, Novel Treatment Approach, and Long-Term Outcomes*
  Chairs: Prof. Andreina Schoeberlein PhD & Prof. Andrea Klein MD

- *Brain stimulation in Major Depression: Recent findings from studies using tDCS, TMS, or ECT*
  Chair: Prof. Dr. Jessica Peter

- *Measuring and targeting disability progression in people with MS – the next milestone*
  Chair: PD Dr. med. Robert Hoepner

During the Group Leader's Meeting, PD Dr. phil. Anja Gysin-Maillart, PD Dr. Marc Züst, Prof. Dr. Jennifer Inauen and PD Dr. med. Georg Kägi were warmly welcomed as new Research Group Leaders of the CNB. The group leaders further discussed the outlook for 2025 and

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2026, including plans for the upcoming Annual Meeting and Brain Week, as well as the integration of additional new members.

Please consider updating your information on the CNB website (www.neuroscience.unibe.ch).
Thank you all once again for contributing to an excellent Annual Meeting filled with inspiring talks, engaging interac tions, and outstanding poster presentations. We are already looking forward to next year!

The next Annual Meeting will take place on **October 16, 2026.**

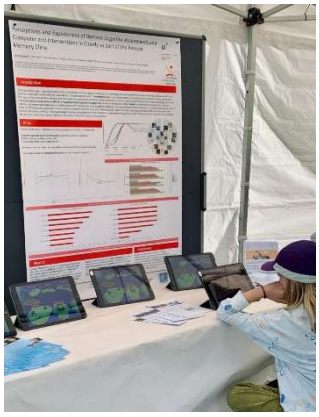
The program and further details will be published on our website (www.neuroscience.unibe.ch) and shared via email. If you would like to participate as a speaker, assist with the organization, or share your ideas for the next Annual Meeting, please do not hesitate to reach out to any member of the Executive Committee. We are excited to receive your input, suggestions, and support.

Nacht der Forschung

Saturday, 6th of September, 16.00 – 23.00

In the context of the 20th CNB Annual Meeting, the CNB also took part in the "Nacht der Forschung."

On Saturday, 6 September 2025, the Nacht der Forschung took place at the University of Bern. Several thousand visitors took the opportunity to engage in conversations with researchers. Around 800 scientists presented their work across more than 80 projects, giving attendees a chance to experience science firsthand through experiments, talks, and interactive stations.



The CNB was represented with several research projects — ranging from digital training games to stroke prevention — fully in line with the motto "Hands-on Neuroscience."

From dog brains to stroke prevention: at four stations, research and diagnostic methods related to both the human and animal brain were brought to life using sensors, games, ultrasound, and comparative models.

The next "Nacht der Forschung" is planned for **2028**, and the CNB is already looking forward to participating again and showcasing new developments in neuroscience.

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Introduction of the new CNB research group leaders

Prof. Dr. med. Georg Kägi

Head of movement disorders center Inselspital Bern, Bern University Hospital, Switzerland

Academic and clinical background

After studying medicine and obtaining his doctorate in Bern (Prof. Ludin), he completed his specialist training at the Kantonsspital St.Gallen and at the National Hospital for Neurology and Neurosurgery (UCL). He is specialized in Movement Disorders as well as vascular neurology. His main clinical and scientific interests are the classification and treatment of hyperkinetic movement disorders and Parkinson's disease including MRgFUS and DBS. He completed a two-year fellowship in the field of Movement Disorder under supervision of Prof. Niall Quinn and Prof. Kailash Bhatia at the National Hospital for Neurology and Neurosurgery.

Research focus

Dystonia: Temporal sensory discrimination ability in patients with dystonia

The deficient temporal sensory discrimination ability of dystonia patients is a phenomenon that is still not fully understood, but pathophysiologically it is likely a fundamental factor contributing to the development of dystonia. Research on temporal sensory discrimination in dystonia and sensory tricks ultimately led to a project supported by the Baasch Medicus Foundation: "The Role of the Sensory Trick in Gating Multimodal Afferents in Adult-Onset Idiopathic Cervical Dystonia."

MR guided high intensity focussed ultrasound (MRgFUS) for movement disorders

I have done pioneering work, both politically and methodologically, for this method. In 2013, we successfully treated the first patient using this technique as part of our own study (EVAL-FUS). The breakthrough came when we were awarded the Déjeurine Dubois Prize for the best "basic science" abstract at the SFCNS (Swiss Federation of Clinical Neuro-Societies) Congress with our well-documented and published series on tremor patients treated by MRgFUS.

Since spring 2025, we have been able to offer this method in close collaboration with PD Marc Gallay from Sifus AG. We have submitted projects focusing on the treatment of Parkinson's disease using this method and are planning further studies in dystonia and tremor. The data will be compared to DBS outcome data, allowing us to define the value of this method within the treatment armamentarium of movement disorders

National Movement Disorder Registry

Last but not least, I have set up a movement disorder registry, which has now become the national movement disorder registry. As PI of the national registry, many studies in the field of movement disorders will be conducted via this registry, ensuring significant scientific impact. For the registry, I have secured funding to enable structured coordination. The registry is fully operational and covers all types of movement disorders, including the minimal datasets for HSM procedures (DBS), for rare movement disorders, as well as for the GP2 genetic project.

Dysphagia in patients with stroke or movement disorders

Based on our own registry of swallowing disorders after stroke, we were able to identify the brain regions that predominantly cause swallowing disorders and develop a

risk score based on our data, which we also validated in a multicenter study. This work has been published in JAMA Neurology.
Building on this preliminary work, we have launched a multicenter therapeutic study for post-stroke dysphagia: "Capsaicin for Post-Stroke Dysphagia (CADYS)."

Institutional, political activities

In 2017, I was co-founder of the Swiss Movement Disorders Society, of which I have been president since 2025. My goal as president of this young society is to bring together the movement disorders community in Switzerland, establish the movement disorders registry, and position the society as a well-known, interdisciplinary, and interprofessional organization responsible for movement disorders in Switzerland. I am also a board member of Parkinson Schweiz and president of the Research Committee of Parkinson Schweiz.

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Introduction of the new CNB research group leaders

PD Dr. Marc Alain Züst, PhD

Group Leader "Sleep and cognitive functions in old age"
Group Leader at University Hospital of Old Age Psychiatry and Psychotherapy, affiliated with the Clinical Neuroscience Bern (CNB) network.

Profile

Cognitive neuroscientist and sleep researcher specializing in memory consolidation, aging, and dementia prevention using closed-loop, non-invasive neurostimulation approaches. His work bridges mechanistic sleep physiology, EEG analytics, and translational clinical applications targeting older adults at risk for cognitive decline.

Biography

Marc Alain Züst studied psychology at the University of Zurich, earning an MSc with a major in cognitive- and neuropsychology and a minor in biology. He completed his PhD at the University of Bern under the supervision of Prof. Dr. Katharina Henke (Institute for Psychology), focusing on unconscious and sleep-assisted memory formation.

Following postdoctoral positions in neuroimaging and high-density EEG research, he has held a long-standing lecturer role in neurophysiology, and in 2025 completed his habilitation in psychology at the University of Bern. His academic work focuses on sleep and neurodegeneration, as well as leadership roles in large-scale sleep electrophysiology projects and collaborations with international research networks in sleep, neurodegeneration, and biomarkers.

Research Group Focus

As we age, our sleep quality tends to decline. This is a normal part of aging, but if the decrease becomes severe, it can be a warning sign of impending dementia. At the same time, dementia leads to even more decreased sleep quality, leading to faster progression of dementia. This vicious cycle must be broken, and one way to do it could be by increasing sleep quality.
We focus on the relationship between healthy sleep, memory functions, and the clearance of metabolic waste products, such as amyloid beta. By employing non-invasive techniques to enhance sleep, we try to break this vicious cycle.
We utilize phase-locked acoustic stimulation (PLAS) to present quiet sounds to sleeping individuals, aiming to enhance their sleep quality. Our results show that PLAS induces physiological responses during sleep that resemble enhanced slow wave activity, and the magnitude of these induced responses correlates with memory gains across the intervention in a dose-dependent manner. These effects were associated with beneficial changes in plasma amyloid beta 42/40 ratios.
Our goal is to restore an electrophysiological profile typically seen in younger brains. Our studies could pave the way for PLAS-capable home-use devices as an affordable, non-invasive tool to combat cognitive decline, potentially leading to novel preventive applications for memory clinics and relieving their clinical burden, thereby improving public health.

Ongoing Research Themes

- Sleep-memory-dementia interface in healthy older adults, Mild Cognitive Impairment (MCI), and Subjective Cognitive Decline (SCD)

- Metabolic clearance dynamics of amyloid-β (42/40 ratios) and other neurodegenerative blood biomarkers
- Translational feasibility of closed-loop neurostimulation and other non-invasive approaches at scale beyond the sleep laboratory

Core Methodological Toolkit

- Phase-Locked Acoustic Stimulation (PLAS) to amplify deep-sleep slow waves (home-device and lab-PSG implementations)
- High-density EEG analytics, including time-frequency methods, coupling metrics, topographies, and EEG-brain-age estimation
- Biomarker partnerships with Amsterdam UMC to profile amyloid-β, pTau, GFAP, and NfL responses
- Gold-standard polysomnography (PSG) for multimodal sleep-health phenotyping

Flagship Projects

1. **Sound-enhanced deep sleep to delay cognitive decline** (3-night PLAS intervention, now extended to older adults with MCI/SCD): dose-dependent physiological responses correlate with memory benefits and favorable plasma amyloid-β response.
2. **Portable, 12-week home-based PLAS trial**: tablet-delivered serious games + sleep EEG for ecological, longitudinal testing and neural "rejuvenation" tracking via EEG-brain-age readouts.

Mentoring & Training

My goal is to empower a new generation of scientists passionate about sleep physiology and preventive mental health in aging. I aim to improve personalization of care in memory-clinic-relevant trajectories, while reducing clinical burden through scalable home-based sleep interventions.

Funding & Recognition

Project grants and career awards from:

- Swiss National Science Foundation
- Dementia Research – Synapsis Foundation Switzerland

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Introduction of the new CNB research group leaders

PD Dr. phil. Anja Gysin-Maillart

Head of the Suicide Research Group and the Swiss Competence Center for Suicide Prevention at the University Hospital of Psychiatry and Psychotherapy Bern;
Co-developer of the Attempted Suicide Short Intervention Program (ASSIP).

Biography

PD Dr. phil. Anja C. Gysin-Maillart is a senior psychologist and psychotherapist at the University Hospital of Psychiatry and Psychotherapy Bern, where she heads the Swiss Competence Center for Suicide Prevention and leads several national and international research projects. She is the co-developer of the Attempted Suicide Short Intervention Program (ASSIP) and works on understanding the mechanisms of action of suicide-specific brief therapies and their clinical implementation. Her research focuses on suicidal ideation and behavior, psychotherapy mechanisms, neuropsychological correlates of suicidality, and innovative, scalable interventions including ASSIP flex and the development of a national suicide prevention toolbox. Dr. Gysin-Maillart is a Privatdozentin at the University of Bern, teaches regularly at universities in Switzerland and abroad, and has contributed extensively to the scientific literature on suicide prevention

Competency Profile and Research Focus

Anja C. Gysin-Maillart's expertise lies in clinical suicide research, psychotherapy process research, and clinical neuroscience. Her work focuses on identifying the mechanisms that underlie the effectiveness of suicide-specific brief therapies. Her competency profile includes the conceptualization and evaluation of mechanism-informed treatment components, with particular attention to therapeutic alliance, self-efficacy, memory reconsolidation, affective–cognitive processes in suicidal crises, and the transition from ideation to action. She also evaluates flexible intervention formats such as ASSIP flex and contributes to national suicide prevention strategies, including the development of a Swiss suicide prevention toolbox.
Her research further examines suicidal ideation and behavior from a neuroscience perspective, investigating neuropsychological mechanisms associated with suicidality as well as cognitive (including implicit) and biological markers. She has extensive experience leading interdisciplinary research teams, developing scalable clinical models, and translating mechanism-based insights into routine psychiatric care. In addition, she collaborates internationally to strengthen evidence-based, mechanism-focused clinical practice and translational suicide research.

Working Group

The *Swiss Competence Center for Suicide Prevention,* led by Dr. Gysin-Maillart at the University Hospital of Psychiatry and Psychotherapy Bern, coordinates treatment, training, and research in the field of suicide prevention.
A central component of the center's clinical work is *ASSIP*, a suicide-specific, evidence-based brief therapy for individuals following a suicide attempt. ASSIP has demonstrated significant effectiveness in reducing the risk of repeated suicidal behavior and has been integrated into standard care in several clinics across Switzerland.
Within the *ASSIP flex* project, the intervention is delivered in a flexible format—whether inpatient, outpatient, or in the patient's personal environment—to ensure low-threshold access and address critical gaps in transitional care. Additional project goals include building a nationwide network and raising awareness of suicide prevention among professionals, relatives, and individuals with lived experience.
The Swiss Competence Center for Suicide Prevention also offers a range of training opportunities, including information events for diverse target groups (e.g., professionals, relatives, affected individuals) and continuing education programs such as the ASSIP advanced training course.

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In parallel, multiple scientific research projects aim to deepen the understanding of the (neuro)psychological mechanisms underlying suicidal experiences and behavior, and to identify factors that influence the transition from suicidal thoughts to suicidal actions. Current studies focus on neuropsychological aspects relevant to suicidality—such as inhibitory control and attentional biases—in individuals who have attempted suicide, with comparisons to clinical and non-clinical populations. Further research examines how these (neuro)psychological patterns change over the long term through ASSIP.

These findings support the advancement of early detection and intervention strategies for suicidal ideation and behavior. Moreover, the systematic investigation of mechanisms of change in evidence-based psychotherapeutic interventions such as ASSIP enables continuous refinement and optimization of therapeutic approaches.

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Upcoming events

16th-19th March 2026	Brain week Bern
18th March 2026	CNB Poster Session with Apéro
16. October 2026	21st Annual Meeting

For any inquiries, please contact:

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