JUNE 2024

NEUROSCIENCE
NEWSLETTER

Georg-August-Universität Göttingen · International Max Planck Research School

The Neuroscience Program

Celebrations – Challenges – Changes – Chances

Dear Students, Faculty, Friends, and Supporters,

here it is, the 11th Neuro-Newsletter of the Göttingen International MSc/PhD/MD-PhD Program and the International Max Planck Research School (IMPRS) Neurosciences!

Our program is approaching its 25th anniversary in 2025! Jointly with our sister IMPRS for Molecular Biology, we will honor this important milestone in Göttingen on September 12-14, 2025. Make sure to attend the celebrations! We are planning a grand reunion with our alumni, alumnae, and former faculty, and we are expecting many local and national dignitaries from science, science administration, and politics. Together, we will celebrate our illustrious 25-year history, which brought forward 167 MSc and 186 PhD graduates, and created an incredible connection between dedicated people all around the globe. It is time to come together, foster old (and new) friendships and look back at the impact our program has had on the lives of all of us . Do not miss this event!

Unfortunately, one reason not to miss our 25th anniversary is that it heralds a time of change that will force us to rethink our Neurosciences program. As many of you know, our program applied in 2023 for permanent IMPRS-funding by the Max Planck Society (MPG). Given our outstanding performance and proven excellence, we applied with great confidence, despite the fact that the neuroscience expertise at the local MPIs has gradually declined over the past 15 years, particularly due to the retirements of Erwin Neher, Gregor Eichele, and Reinhard Jahn.

Very sadly, but not entirely unexpectedly, the Max Planck leadership decided against permanent funding of our program. While it explicitly acknowledged the outstanding performance and excellence of our graduate education, the waning neurosciences expertise at the MPI for Multidisciplinary Sciences, with Klaus-Armin Nave and Nils Brose retiring until 2030, prevented permanent funding of a neurosciences IMPRS. Of course, this has been a massive blow to our ambition to continuously provide the best possible training for new generations of neuroscientists.

It goes without saying that we tried with all our might to soften this blow. And fortunately, we were able to negotiate a transient continuation of funding for our program. We could convince the MPG that our program with its well-established MSc curriculum and support structures deserves to be further supported in order to enable a safe transition to a self-sustaining MSc/PhD program in the neurosciences. We were able to secure a degressive funding of our IMPRS, allowing us to recruit and finance new MSc classes in 2024 and 2025, and to support all our PhD students via the IMPRS until 2030, so that all students starting their MSc in the IMPRS will be able to graduate before the end of IMPRS funding.

We are very grateful to the MPG for the unorthodox solution they offered to our program... they went out of their way to help us. But because this solution is transient, we are still facing a serious challenge that requires a long-term solution. We must now work even harder than before for the future of our program, implementing changes at the MSc and PhD levels alike. While the curriculum of our MSc program will not be affected by the change in funding, we will not be able to provide stipends to all MSc students anymore. Similarly, the support of our PhD students will have to be continued as part of GGNB and GAUSS, without external funding. To deal with these problems, we have started discussions at all relevant levels. And indeed, there may be alternative ways of funding, and there are many excellent ideas for the future graduate training in the neurosciences here in Göttingen. We will approach our new challenges as a chance for positive change – and we are confident that we will find good, sustainable solutions that will pave the way for a long-lasting and successful continuation of our program. Please help us wherever you can!

Nils Brose & Jonas Barth

CONTENT

IMPRINT

Publisher: Coordination Office of the international MSc/PhD/MD-PhD Neuroscience Program
Design: bioGrafik (Martin Nolte); Dr. Stefanie Klug (GAUSS Career Service)
Layout: Dr. Stefanie Klug
Disclaimer: The views expressed in this newsletter by the authors of articles are not necessarily those of the Neuroscience program. All reasonable measures have been taken to ensure that the material contained in this newsletter is correct. However, the Neuroscience program gives no warranty and accepts no responsibility for the accuracy or the completeness of the material.

Can a fly count seconds?

by Burak Gür

„Time“ is the most common word in English, and we all think we know what it is, but can we really explain it to someone else? Is it what our clocks show? Consider this: waiting in line at the supermarket for ten minutes can feel like an eternity, yet the same duration spent reading a captivating book passes in the blink of an eye. This disparity between subjective and “objective” time reveals the multifaceted nature of this concept. Even the time we call “objective” is relative to the circumstances. Time, as we all realize, is difficult to grasp, yet it is essential to our survival and being.

No matter what we think time is, our brains have the ability to perceive the passage of time and to estimate intervals and durations. Telling time, be it for anticipating events to processing the structure of sensory input and motor responses, is one of the most important skills of the brain. We can engage in conversation, play musical instruments, catch a ball and do many more behaviors thanks to our brain’s ability to process time. We can even accurately distinguish between durations (e.g. 3s vs 10s) without needing a clock. And it‘s not just us; numerous species, from monkeys to rats to even insects, exhibit similar temporal abilities. So how do brains do this? I will soon start working on this question for my postdoc at Basel (CH).

Time spans many orders of magnitude. There is the circadian timescale with slow daily changes where our brains and bodies track and adjust themselves accordingly. There are also very fast timescales (microseconds) used by our brains for sound localization. How the brain processes these extremes of time are relatively well understood yet we’re just beginning to understand how intermediate timescales ranging from hundreds of milliseconds to minutes are processed.

Initial theories on how the brain tracks time proposed the existence of dedicated clocks functioning similar to physical clocks. One popular model, the “pacemaker-accumulator”, worked via an accumulator integrating the signals coming from a central pacemaker (like summing the ticks of a clock). However, so far, biological evidence for such a clock has only been observed for circadian timekeeping. Recent studies propose an alternative: the brain tracks time via the changes in the activities of many neurons a.k.a. “neural trajectories”. Both sensory and motor circuits exhibit stable population activity across trials, encoding temporal information related to the sensory stimulus or the motor output. Nevertheless, causal evidence for this remains limited to a few tasks and brain regions.

There are many other big questions on how brains process time. For example, where does timekeeping happen? Is it localized to dedicated ‘time regions/circuits’ or intrinsic to all circuits? In other words, do neurons that, for example, recognize a tone also contain information about its temporal properties? Another interesting one is: can the brain internally track time or is interaction with the world necessary for this process? This idea traces back to the philosopher Henri Bergson and now some researchers propose that “spatializing time” through sensory inputs, like observing moving objects or generating motor outputs, such as stereotypical movements, is necessary for brains to estimate durations. Such exciting questions motivate ongoing research for understanding the elusive concept of time from the perspective of brains.

In my research, I’ll try to give causal insights into some of these questions about how the brain processes intermediate timescales using the fruit fly as a model organism. First though, I’ll start with an obvious but a hard one to answer: can a fly count seconds?

Burak GÜR is an alumnus of our IMPRS and completed his PhD at the lab of Marion Silies. Currently he is a postdoc at the Friedrich Miescher Institute (FMI) at Basel working in the laboratory of Johannes Felsenberg.

Friedrich Miescher Institute for Biomedical Research
Novartis Campus
Fabrikstrasse 24, 4056 Basel, Switzerland
https://burakgur.owlstown.net/ gurburak92@gmail.com

References

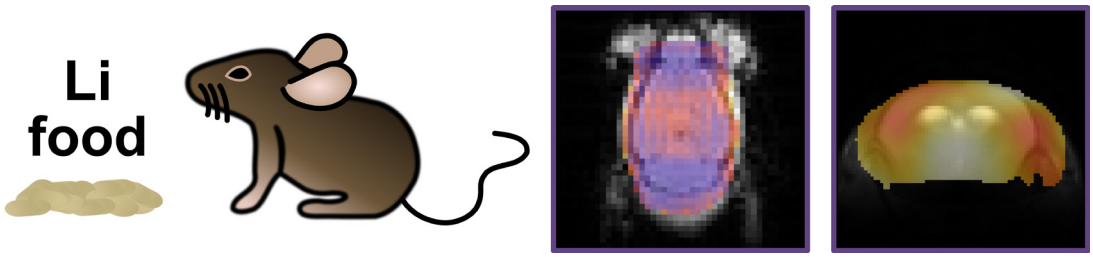
1. *Robbe, D. Lost in time: Relocating the perception of duration outside the brain. Neurosci. Biobehav. Rev. 153, 105312 (2023).*
2. *Tsao, A., Yousefzadeh, S. A., Meck, W. H., Moser, M.-B. & Moser, E. I. The neural bases for timing of durations. Nat. Rev. Neurosci. 23, 646–665 (2022).*
3. *Paton, J. J. & Buonomano, D. V. The Neural Basis of Timing: Distributed Mechanisms for Diverse Functions. Neuron 98, 687–705 (2018).*

Imaging lithium in the brain

In vivo ^{7}Li MRI in mice on a lithium-enriched diet[1] *by Tor Rasmus Memhave*

Lithium – commonly given in the form of lithium bicarbonate – is a frontline treatment for bipolar disorder. Despite its FDA approval in 1970, the precise mode of action and distribution of lithium in the brain remain incompletely understood. Evidence suggests that lithium affects individual brain regions differently[2]. These local effects may be related to a heterogeneous lithium distribution across the brain with large variations found between individuals[3,4]. When studying lithium in humans disentangling lithium's effect from the symptoms of bipolar disorder remains a challenge. Here, mouse models may serve to elucidate this difference better.

Yet, studying lithium's mode of action in transgenic mouse models has been hindered by the difficulty of imaging lithium. Until recently, non-invasive detection of lithium in the mouse brain was not possible. The primary isotope of lithium, lithium-7 (^{7}Li), is visible to magnetic resonance (MR) techniques thanks to a nuclear spin of 3/2. However, ^{7}Li MR imaging (MRI) and spectroscopy are challenging for three reasons. First, the lithium concentration in the brain is low (0.5-0.8 mM at therapeutic serum concentrations of 0.4-1.2 mM)[5]. In comparisons, proton concentrations used in conventional MRI are about five orders of magnitude higher. Secondly, ^{7}Li has a lower gyromagnetic ratio than protons and thirdly, ^{7}Li has longer longitudinal relaxation times – both of which result in a substantially lower signal.



4-hour SPIRAL ^{7}Li MRI with a resolution of 2×2×3 mm^3 acquired in both coronal (middle) and axial (right) orientations. The signal primarily originated from the brain.

In short, the expected signal of lithium is about 150,000 times lower than that achieved in conventional MRI.

Prior to *in vivo* measurements, demonstrating the feasibility of imaging brain lithium at therapeutic concentrations was necessary. For ^{7}Li MRI to be considered feasible in mice, image acquisition times needed to be no longer than 4 hours to enable *in vivo* acquisitions. Given the small size of the mouse brain, a minimum image resolution of 2×2×3 mm^3 was required for meaningful interpretation of lithium distribution. However, 2×2×3 mm^3 is a significantly higher resolution than previously reported in the literature. In order to solve this challenge, we employed a SPIRAL MRI sequence, which allows for fast and efficient image acquisition. SPIRAL MRI improved the image quality ~2.5-fold compared to conventional MRI sequences.

With the feasibility of ^{7}Li MRI confirmed at therapeutic concentrations, we fed mice a lithium-enriched diet for 4-5 weeks. Utilizing ^{7}Li spectroscopy, we estimated the lithium concentration in the brain to be 0.6 mM – falling within the therapeutic window.

Using a 4-hour SPIRAL sequence with a resolution of 2×2×3 mm^3, we acquired the first *in vivo* ^{7}Li MRI in mice. We observed a non-homogeneous distribution of lithium in the mouse brain, with high concentrations in central (cortex and ventricles) and basal brain regions, contrasted by lower lithium signal in the olfactory bulb and cerebellum. This

Tor Rasmus MEMHAVE did his Master's thesis and PhD thesis under the supervision of Prof. Dr. Susann Boretius in the Functional Imaging Laboratory at the German Primate Center (DPZ). He is now a postdoctoral researcher in the Functional Imaging Laboratory at the DPZ.

German Primate Center
Functional Imaging Laboratory
Kellnerweg 4, 37077 Göttingen
https://www.dpz.eu/en/unit/functional-imaging-laboratory/about-us.html
tmemhave@dpz.eu

Imaging lithium in the brain (continued)

marks the inaugural demonstration of the feasibility of *in vivo* ^{7}Li MRI in mice and unveils a non-homogeneous distribution similar to humans.

We showed for the first time that it is feasible (albeit with low image quality and coarse resolution) to image lithium non-invasively in the mouse brain. From here, there are two burning questions. First, can we improve the resolution to 1×1×1 mm^3 and thereby more precisely study the regional differences in lithium distribution *in vivo*? Second, do mice also exhibit MR-detectable changes in metabolism and diffusion, which may serve as biomarkers for lithium treatment? While the first question is fascinating and challenging – it still requires quite a bit of work. For the second, we believe we have an answer … but that is a story for another day.

References

1. *Memhave, T.R., Moussavi, A., and Boretius, S. (2024). SPIRAL MRI for in vivo lithium-7 imaging: a feasibility study in mice after oral lithium treatment. Sci Rep 14, 681. 10.1038/s41598-023-50841-7.*
2. *Alda, M. (2017). Who are excellent lithium responders and why do they matter? World Psychiatry 16, 319–320. 10.1002/wps.20462.*
3. *Smith, F.E., Thelwall, P.E., Necus, J., Flowers, C.J., Blamire, A.M., and Cousins, D.A. (2018). 3D 7Li magnetic resonance imaging of brain lithium distribution in bipolar disorder. Molecular Psychiatry 23, 2184–2191. 10.1038/s41380-018-0016-6.*
4. *Stout, J., Hozer, F., Coste, A., Mauconduit, F., Djebrani-Oussedik, N., Sarrazin, S., Poupon, J., Meyrel, M., Romanzetti, S., Etain, B., et al. (2020). Accumulation of Lithium in the Hippocampus of Patients With Bipolar Disorder: A Lithium-7 Magnetic Resonance Imaging Study at 7 Tesla. Biological Psychiatry 88, 1–8. 10.1016/j.biopsych.2020.02.1181.*
5. *Luo, H., Chevillard, L., Bellivier, F., Mégarbane, B., Etain, B., Cisternino, S., and Declèves, X. (2021). The role of brain barriers in the neurokinetics and pharmacodynamics of lithium. Pharmacological Research 166, 105480. 10.1016/j.phrs.2021.105480.*

Mice copy conspecifics when uncertain

A paradigm for studying neural representations of others during social decision-making
by Dimokratis Karamanlis

Picture this: you're taking a difficult exam, and you find yourself stumped by a question. Glancing around, you see a classmate confidently fill in an answer. Or perhaps you're in a dance class, trying to master a new step. When the view of the instructor is obstructed, you instinctively watch the other dancers for guidance. These scenarios illustrate a fundamental way we navigate uncertainty: by observing and sometimes copying others.

This type of social learning[1] extends far beyond the classroom or dance studio. Animals, including mice, often rely on cues from their peers (conspecifics) to inform their choices. Using social cues becomes especially important when the environment is unpredictable, or when an animal is unsure about its initial judgment. My recent work investigates exactly this phenomenon – how mice integrate social cues into their decision-making processes.

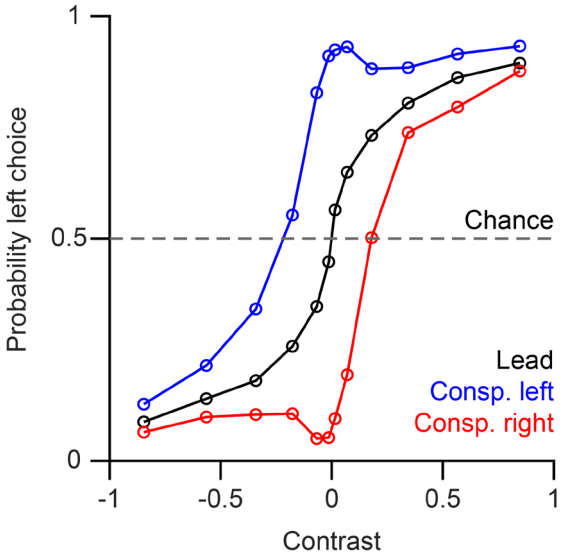
In our experiments, we trained pairs of freely moving mice to perform a two-alternative forced choice task where visual stimuli indicated the side mice would receive a water reward. In each trial, we manipulated stimulus contrast to introduce different levels of uncertainty independently for both mice. Using high-speed video recordings of mouse movements, we could pinpoint when one mouse clearly made a choice before its partner, or vice-versa. When faced with ambiguous visual information, mice were significantly more likely to follow their partner and copy their choice. This conclusion was obtained by examining psychometric curves describing mouse behavior (see Figure). Our findings underscore how social cues become critical when decision-making becomes difficult. We furthermore es-

Mice copy conspecifics when uncertain (continued)

tablished a paradigm for studying the "copy-when-uncertain" social learning strategy, which has been observed even in bumblebees[2].

To understand how the brain represents others during social decision-making, we combined detailed kinematic tracking with neural recordings during task performance. Briefly before indicating their own choice, we could show that mice extract information from their partner's movement. Using chronically implanted silicon probes or miniaturized microscopes, we accessed single neurons in frontal cortical areas, regions previously associated with decision-making and social processing[3]. Preliminary recordings revealed activity patterns tightly linked to mouse choices, with some neurons showing differential activity predictive of whether the mouse led or followed its partner. It is thus likely that active monitoring of a conspecific's movement is affecting the decision-making process.

This work underscores the powerful influence social information holds over our actions, even at the level of individual neurons. Social information is often communicated by body language, but the neural correlates of others' movements are still unclear. By unraveling the neural and behavioral basis of social decision-making, we may gain valuable tools to address challenges ranging from educational strategies to better understanding social disorders like autism, where the intuitive monitoring and imitation of others is often impaired.



Mouse choice behavior under different contrast conditions. The black psychometric curve shows the probability that a mouse chose the left side when it went first (10000 simulated trials). The colored curves show the probability that a mouse followed its partner's choice (blue for left, red for right) depending on the contrast level. In conditions with lower contrast (meaning the visual stimulus was harder to see), mice were more likely to copy their partner's choice.

References

1. *R. L. Kendal, N. J. Boogert, L. Rendell, K. N. Laland, M. Webster, P. L. Jones, Social Learning Strategies: Bridge-Building between Fields. Trends Cogn Sci 22, 651-665 (2018).*
2. *D. Baracchi, V. Vasas, S. Jamshed Iqbal, S. Alem, D. Papaj, Foraging bumblebees use social cues more when the task is difficult. Behavioral Ecology 29, 186-192 (2018).*
3. *R. Baez-Mendoza, Y. Vazquez, E. P. Mastrobattista, Z. M. Williams, Neuronal Circuits for Social Decision-Making and Their Clinical Implications. Front Neurosci 15, 720294 (2021).*

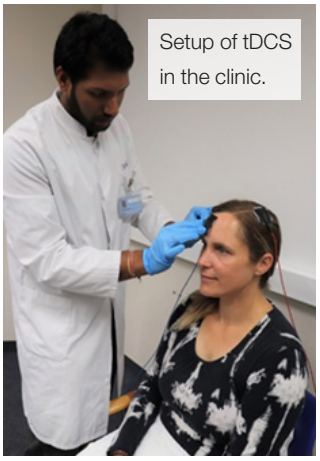
Dimokratis KARAMANLIS completed his PhD in the lab of Tim Gollisch at the University Medical Center Göttingen. Currently, he works as a postdoctoral researcher in the lab of Sami El-Boustani in the Department of Basic Neurosciences at the University of Geneva, Switzerland.

University of Geneva
Department of Basic Neurosciences
1 rue Michel Servet, 1206 Genève, Switzerland
https://dimokaramanlis.github.io
dimokratis.karamanlis@unige.ch

Stimulating the mindful brain in fibromyalgia

Is combined therapy always a better option? From conception to completion. *by Perianen Ramasawmy*

Affecting around 2.1% of the German population, fibromyalgia (FM) is a complex chronic pain disorder, characterized by widespread and persistent musculoskeletal pain and associated with symptoms such as chronic fatigue, psychological impairment, sleep disturbances, and emotional misbalance. Alongside the debilitating impact of the condition on the patient's quality of life, FM causes a financial burden on the healthcare system. An FM patient consumes triple the health resources of any other chronic patient, making them one of the costliest patients. Medication has only yielded limited therapeutic benefits in FM treatment. Non-pharmacological interventions, especially when delivered in combination, have been shown to be more effective in tackling the multifaceted nature of FM.


Setup of tDCS in the clinic.

Transcranial direct current stimulation (tDCS), pioneered in Göttingen, is a safe non-invasive brain stimulation technique comprising the delivery of a weak direct current (~1-2 mA) to the scalp via surface electrodes[1]. The current reaching the brain modulates the neuronal membrane potential at subthreshold levels. Repeated tDCS is believed to involve long-term potentiation- and long-term depression-like neuroplastic mechanisms, conducive to changes in cortical excitability at both local and network levels. The latest guidelines for the clinical applications of tDCS demonstrated a level A (effective) recommendation for anodal tDCS over the left primary motor cortex (M1) as an FM treatment[2]. With its roots in Hindu and Buddhist contemplative practices, mindfulness meditation (MM) is a cognitive practice, which fosters the detached, non-elaborative, and non-judgmental awareness of the present moment. Regular practice of MM in chronic pain, including FM, has shown analgesic benefits. Previous studies have shown that the net behavioral effects of tDCS depend on the brain state immediately before and during the stimulation. We utilized MM as a tool to alter the brain state, with the goal of boosting the benefits of tDCS in a synergistic or additive manner.

Previous studies have shown the efficacy of anodal tDCS paired with MM in patients with knee osteoarthritis and chronic migraine[3]. However, they lacked a training phase for MM making the claim of a successful combination difficult. We addressed this limitation by including mindfulness training in both studies we conducted.

First, we designed a pilot sham-controlled double-blinded randomized clinical trial to test the preliminary efficacy of combining 10 daily 20-minute sessions of anodal tDCS over the left M1 and MM in FM patients who received a 5-day training in meditation[4]. We included an active group (active tDCS + real MM), a sham group (sham tDCS + real MM), and a treatment-as-usual group. Patients in the active group showed clinically meaningful improvement in quality of life compared to the control groups. Self-reported pain intensity decreased moderately and sleep quality improved largely over time in all groups. Nevertheless, no reduction in pain intensity and changes in sleep pattern, as well as psychological impairments were observed among the groups. The combined therapy was well-tolerated by participants, with no reports of serious adverse events. The 5-day MM training did not significantly increase the self-reported mindfulness levels using the Freiburg Mindfulness Inventory, questioning the ability of the patients to learn MM. The major limitation of the study was the underpowered sample size.


Group session for combined tDCS and mindfulness meditation in the hospital during COVID-19.


Combined home-based tDCS and mindfulness meditation for the main study.

To address the limitations of the pilot clinical trial, we further investigated the therapeutic and mechanistic effects of pairing 10 daily 20-minute anodal tDCS over the left M1 with MM in FM patients trained in mindfulness in a triple-blinded Phase III clinical trial, with a three-month follow-up post combined intervention. The details of the trial can be found on the German Registry for Clinical Trials (https://drks.de/search/en/trial/DRKS00029024). Following the

Stimulating the mindful brain in fibromyalgia (continued)

Measurement of cortical excitability using transcranial magnetic stimulation of the motor cortex.

completion of a one-month mindfulness training tailored for FM, comprising of intense weekly online guided group training in mindfulness, daily MM practice, and daily mindful activity (walking, brushing teeth, eating, etc), included participants who were randomized to either receive MM paired with active or sham tDCS. First, we explored the effectiveness of the mindfulness training. Participants showed significant improvements in quality of life, verbal fluency, and resilience as well as reductions in pain intensity from baseline to post-training measures. Most importantly, the large increase in mindfulness level, measured by the more elaborate Five Facet Mindfulness Questionnaire, supports the adequacy of the mindfulness training to teach MM to the patients. Our pilot study required patients to visit the hospital daily to receive the combined treatment, which puts a big burden on participants and leads to higher drop-out rates. As recommended by different stakeholders in the field of non-invasive brain stimulation in our previous participatory research[5], we used a home-based combined intervention, whereby the participants received tDCS at home, while meditating using pre-recorded guided MM audio and were supervised by the investigator team. Following the 10 days of combined intervention, participants were asked to maintain regular MM practice (minimum thrice per week). We also implemented transcranial magnetic stimulation (TMS) paradigms, which serve as robust tools for exploring cortical, corticospinal, and intracortical excitability, offering valuable insights into mechanisms underlying specific interventions. Despite both groups demonstrating medium to large reductions in pain, depressiveness, stress, anxiety, and negative affect levels and improvements in quality of life, sleep quality, and mindfulness levels, we did not find any significant interactions between group and time. The group-independent changes in clinical outcomes were supported by only an increase in basal cortical excitability over time, which could be due to the daily mindfulness practice. Despite the lack of interaction effects between the intervention group and time, the improvements in clinical symptoms and mindfulness level hint towards a potential effect of the daily MM practice during the treatment, rather than a synergistic effect of tDCS and MM. Unlike previous studies in naïve meditators, our main study challenges the potential of combining tDCS and MM in fibromyalgia, especially in regular meditators.

I would like to convey my heartfelt gratitude to my supervisors, Prof. Andrea Antal (Non-Invasive Brain Stimulation Lab, Neurology Dept., UMG) and Prof. Frank Petzke (Anesthesiology Dept., UMG) for supporting me and making this research possible. My thanks to all my students and colleagues for their contribution to the projects.

References

1. *Antal, A. et al. Low intensity transcranial electric stimulation: Safety, ethical, legal regulatory and application guidelines. Clin. Neurophysiol. 128, 1774–1809 (2017).*
2. *Fregni, F. et al. Evidence-Based Guidelines and Secondary Meta-Analysis for the Use of Transcranial Direct Current Stimulation in Neurological and Psychiatric Disorders. Int. J. Neuropsychopharmacol. 24, 256–313 (2021).*
3. *Divarco, R. et al. Stimulated brains and meditative minds: A systematic review on combining low intensity transcranial electrical stimulation and meditation in humans. Int. J. Clin. Health Psychol. 23, (2023).*
4. *Ramasawmy, P. et al. Pain reduction in fibromyalgia syndrome through pairing transcranial direct current stimulation and mindfulness meditation: A randomized, double-blinded, sham-controlled pilot clinical trial. Front. Med. 9, (2022).*
5. *Maier, M. J. et al. STIMCODE Participative developed recommendations for non-invasive brain stimulation in the European Union. Fraunhofer-Publica. (2023)*

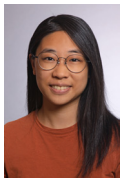
Perianen RAMASAWMY a.k.a. Krishna is currently doing his doctoral thesis on combining mindfulness meditation and non-invasive brain stimulation in the treatment of chronic pain under the supervision of Prof. Andrea Antal at the University Medical Center.

University Medical Center Göttingen
Deptartment of Neurology
Robert-Koch-Straße 40, 37075 Göttingen
perianen.ramasawmy@med.uni-goettingen.de

New Students

Master‘s class of 2023/24

Laura Alacán Ricardo
Cuba
University of Medical Sciences of Havana, Cuba
Doctor of Medicine (MD)
https://www.uni-goettingen.de/en/679050.html



Wing Sum Cheung
Hong Kong SAR
The Chinese University of Hong Kong, Hong Kong SAR
Bachelor of Science
https://www.uni-goettingen.de/en/679049.html

Andrea Alcaraz Ramírez
Spain
Complutense University of Madrid, Spain
Master of Sciences
https://www.uni-goettingen.de/en/678914.html

Anushka Deb
India
Tata Institute of Fundamental Research, Mumbai, India
Master of Science
https://www.uni-goettingen.de/en/679051.html

Mohamed Alebeed *
Sudan
University of Khartoum, Sudan
Bachelor of Medicine, Bachelor of Surgery (MBBS)
https://www.uni-goettingen.de/en/679045.html

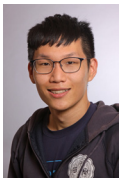
Esther Marie Grewe
Germany
Johannes Gutenberg Universität Mainz, Germany
Bachelor of Science
https://www.uni-goettingen.de/en/679064.html

Zeynep Büşra Ayar
Turkey
Bilkent University, Turkey
Bachelor of Arts
https://www.uni-goettingen.de/en/679042.html

Ece İdil
Turkey
Boğaziçi University, Turkey
Bachelor of Arts
https://www.uni-goettingen.de/en/679048.html

Andrea Fernanda Campos Pérez
Mexico
National Autonomous University of Mexico, Mexico
Bachelor of Science
https://www.uni-goettingen.de/en/679059.html

Sophie Christin Köber
Germany
Radboud University Nijmegen, Netherlands
Bachelor of Science
https://www.uni-goettingen.de/en/678920.html



Tsun-Kai Chang
Taiwan
National Taiwan University / National Cheng Kung University, Taiwan
Master of Science
https://www.uni-goettingen.de/en/679041.html

Hannah Mariedele Luksch
Germany
Georg-August-Universität Göttingen, Germany
Bachelor of Science
https://www.uni-goettingen.de/en/679053.html

Master's class of 2023/24 (continued)

Andrii Lysenko
Ukraine
Taras Shevchenko Kyiv National University, Ukraine
Master of Biology
https://www.uni-goettingen.de/en/678803.html

Antonios Ntolkeras
Greece
Aristotle University of Thessaloniki, Greece
Bachelor of Science
https://www.uni-goettingen.de/en/679063.html

Sage Martineau
USA
Duke University, USA
Bachelor of Science
https://www.uni-goettingen.de/en/679047.html

Aruna Yerlankyzy Nyssanbay
Kazakhstan
Nazarbayev University, Astana, Kazakhstan
Bachelor of Science
https://www.uni-goettingen.de/en/679062.html

André Mendes Costa
Portugal
University of Dundee, Scotland
Master of Science
https://www.uni-goettingen.de/en/679044.html

Ross Michael Oglesby
Ireland
Trinity College Dublin, Ireland
Bachelor of Arts
https://www.uni-goettingen.de/en/679043.html

Ruchi Rajesh Modgekar
India
Sophia College (Autonomous), Mumbai, India
Master of Science
https://www.uni-goettingen.de/en/678918.html

Beatriz Rodrigues Apgaua
Brazil
Federal University of Minas Gerais, Belo Horizonte, Brazil
Bachelor of Science
https://www.uni-goettingen.de/en/679056.html

Malak Nasr *
Egypt
Zewail City of Science and Technology, Egypt
Bachelor of Science
https://www.uni-goettingen.de/en/679066.html

Shreshth Shekhar
India
Indian Institute of Science Education and Research, Thiruvananthapuram, India
Bachelor/Master of Science (BS-MS)
https://www.uni-goettingen.de/en/678919.html

* **Neurasmus Students**
Neurasmus is an Erasmus Mundus Joint Master Degree program (EMJMD), which is based on the cooperation of 6 partner universities, comprising Université de Bordeaux/France, Vrije Universiteit Amsterdam/Netherlands, Charité – Universitätsmedizin Berlin/Germany, Université Laval/Canada, University of Göttingen/Germany, Universidad de Coimbra/Portugal. For details please refer to the Neurasmus website https://www.neurasmus.u-bordeaux.fr/

New Students

PhD projects started in 2023/2024

Namra Aamir
Representational turnover in Alzheimer's and beyond: Exploring the dynamics in hippocampus and sensory neocortex
Fred Wolf
Marc Aurel Busche
Silvio Rizzoli

Leon Bösche
Solving the dynamic intensity problem of hearing: deciphering and harnessing cochlear mechanisms of sound intensity coding
Tobias Moser
Silvio Rizzoli
Erwin Neher

Yixuan Chen
The role of novelty-induced dopamine release in silent synapses generation
Oliver Schlüter
Silvio Rizzoli
André Fischer

Natalia Evdokimova
Otoferlin structure and function in the context of temperature-sensitive auditory synaptopathy
Tobias Moser
Silvio Rizzoli
Nils Brose

Amir Mohammad Naderi
Dynamics and evolution of social behavior in *Drosophila*
Jan Clemens
Viola Priesemann
Ralf Heinrich

Vismitha Nadig
Interaction of resting-state and spike-related connectivity in patients with epilepsy during sleep and wakefulness
Niels Focke
Tiago Outeiro
Roberto Goya-Maldonado

Tarannomsadat Taghavi
Analysis of cell type specific LncRNA Dynamics in Neuropsychiatric and Neurodegenerative Diseases
André Fischer
Tiago Outeiro
Roberto Goya-Maldonado

Application Statistics 2023

In the year 2023, the Neuroscience program received 506 applications from 80 countries.

Germany	23	North Africa	25
other Western Europe	22	Central/South Africa	38
Eastern Europe	21	Asia / Near East	125
North America	13	Central Asia / Far East	211
Central/South America	28	Australia	0

Honors and Awards

Mateusz Ambrozkiewicz has been selected as scholar for the FENS-Kavli Network of Excellence for the next 4 years (September 2023).

Nils Brose has been elected as a member of the National Academy of Medicine, USA (October 2023).

Rubén Fernández-Busnadiego acquired a European Research Council (ERC) Consolidator Grant in 2023.

Stefan Hell received the Medal of Honor "In Publica Commoda" of the University of Göttingen.

Tobias Moser received an ERC Proof of Concept Grant

Luis Pardo received the lifetime achievement award "Egregie munia" from his Alma Mater University of Oviedo (School of Medicine) in 2024.

Viola Priesemann became member of the Göttingen Academy of Science and Humanities (2023) and received the prestigious „Young Scientist Award for Socio- and Econophysics" from the Deutsche Physikalische Gesellschaft in 2024.

Caspar Schwiedrzik acquired a European Research Council (ERC) Consolidator Grant in 2023.

Summa cum laude distinctions for their doctoral theses have been awarded to **Andrew Sasmita** and **Tor Rasmus Memhave**.

Congratulations!

Mateusz Ambrozkiewicz appointed as FENS-Kavli Network of Excellence Scholar

Alumnus **Mateusz Ambrozkiewicz** was selected as a scholar for the FENS-Kavli Network of Excellence (FKNE) in September 2023. The mandate is for the next 4 years. FKNE is a network of 30 scholars from all around Europe to strengthen Neuroscience research within the FENS community and the Kavli Foundation. Its members are highly engaged in outreach and science policy shaping.

Mateusz joint the IMPRS Neurosciences in 2010 and completed his PhD under the supervision of Prof. Nils Brose at the Max Planck Institute for Experimental Medicine in fall 2015.

He now is the head of the Proteostasis Group at the Institute of Cell Biology and Neurobiology at the Charité in Berlin, investigating how regulation of protein status, i.e. specific ways of protein synthesis and folding as well as defined degradation pathways orchestrate cortical development.

mateusz.cyryl@gmail.com

For further detailed information about the appointment and the FENS-Kavli Network of Excellence please see:
https://fenskavlinetwork.org/portfolio/mateusz-ambrozkiewicz/
https://fenskavlinetwork.org/who-we-are/goals-aims/

Students Graduated

The Masters of 2023

Namra Aamir
Machine learning (ML) methods to detect *Drosophila* courtship behaviours
(J. Clemens / M. Göpfert)

Eren Diniz
The role of RNA in synapse physiology and neurodegeneration
(A. Fischer / T. Outeiro)

Princy Kakani
Epigenetic regulation by H3K36 methyltransferase NSD2 in intermediate progenitor genesis and cortical development
(J. Staiger / A. Fischer)

Romy Maxine Aiken
Characterizing a mouse line for microglia-specific TurboID expression and proteom-biotinylation in organotypic hippocampal slice culture
(N. Brose / T. Dresbach)

Rebecca Divarco
Investigating subjective and cortical pain responses to non-invasive contact heat stimulation in musicians and non-musicians: A Pilot Study
(A. Antal / A. Pooresmaeili)

Ege Kingir
Decoding 'Attention to Motion' versus 'Attention to Color' based on human intracranial EEG recordings
(S. Treue / M. Wilke)

Cesar Mateo Bastidas Betancourt
An *in-vitro* and *in-silico* approach to identifying cross-species differentially expressed genes in primate neural progenitors
(M. Heide / M.P. Zafeiriou)

Thanh Thao Do
Investigating the ultrastructure of distinct synaptic states using cryo-electron tomography
(R. Fernández-Busnadiego / N. Brose)

Donatus Krah
Alpha-Synuclein in human serum as a potential biomarker for Parkinson's disease
(S. Rizzoli / R. Fernández-Busnadiego)

Leon Bösche
Testing the role of trans-synaptic signalling in the synaptic heterogeneity of inner hair cells in Runx1 conditional knock-out mice
(T. Moser / E. Neher)

Gökberk Günaydın
Investigating rhythms of feature-based attention in human intracranial EEG recordings
(S. Treue / C. Schwiedrzik)

Tejas Shaji Nair
Role of subcortical orexin/hypocretin circuits in ocular dominance plasticity in the visual cortex of juvenile mice
(S. Löwel / J. Rhee)

Uğur Coşkun
Mechanistic analysis of cell type specific lncRNAs identified by single cell sequencing of the human brain with potential role in neuropsychiatric diseases
(A. Fischer / T. Outeiro)

Robert Mihai Haret
Model-based analysis of temporal adaptation in responses of retinal ganglion cells to spatiotemporal stimulation
(T. Gollisch / J. Clemens)

Alba Milagros Navarro Flores
Functional Characterization of a Microglia Enriched Micro-RNA in two Major Psychiatric Disorders
(A. Fischer / T. Outeiro)

The Masters of 2023 (continued)

Elisa Panzeri
Exploring the molecular intermediaries of norepinephrine-induced Kv1.1 endocytosis in the dorsal CA1
(O. Schlüter / B. Carter)

Ekaterina Solyus
Development of a channelrhodopsin screening assay - mutant library generation and assessment of plasma membrane expression
(T. Moser / L. Pardo)

Marina Saade
Exocytosis in microglia
(N. Brose / K.-A. Nave)

Anna Celine Westhoff
Neuronal network function and dysfunction in bio-engineered neuronal organoids
(M.P. Zafeiriou / M. Heide)

The Doctors of 2023/24

Inés Hojas García-Plaza
Investigating ultrastructural and molecular correlates of short-term facilitation at the hippocampal mossy fiber synapse
(N. Brose / S. Rizzoli / B. Carter)

Aditi Methi
A comprehensive study of the adult mouse brain transcriptome: analysis of interindividual differences in cognitive aging and cell-type specific changes in the hippocampus upon voluntary exercise
(A. Fischer / T. Outeiro / J. Söding)

Andrew Octavian Sasmita
The contribution of oligodendrocytes to amyloid and tau pathologies in mouse models of Alzheimer's disease
(K.-A. Nave / T. Bayer / N. Brose)

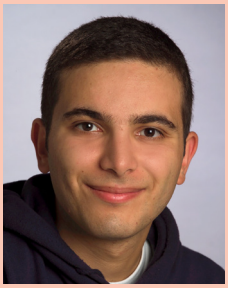
Tor Rasmus Memhave
Multi-nuclear magnetic resonance imaging and spectroscopy of lithium in the brain
(S. Boretius / H. Ehrenreich / S. Rizzoli)

Juan Diego Prieto Ramirez
Investigating a putative circuit motif in the inner retina
(T. Gollisch / S. Rizzoli / J. Clemens)

Asude Tura
Structural and functional connectivity in patients with major depressive disorder undergoing accelerated intermittent theta burst stimulation
(R. Goya-Maldonado / S. Boretius / A. Pooresmaeili)

From Neuroscience to software engineering

A journey from biology to bioinformatics to programming *by Cemil Kerimoglu*



Cemil KERIMOGLU did his PhD and postdoctoral work in the lab of Andre Fischer at the German Center for Neurodegenerative Diseases (DZNE). He is now a software engineer at PACETEQ.

During my time as a postdoc, I was gradually moving into bioinformatics data analysis. Especially in my last several years in academia, I ended up doing more programming than wet lab work. What is more, with time I realized that I am actually very good at programming and very much love the process. Which was a revelation of sorts about myself that I belatedly came to in the fourth decade of my life.

Also, independently from my growing involvement in bioinformatics, around the same time, I had discovered cryptocurrencies and blockchain technology. Consequently, in the last 5 years I have also immersed myself in these topics as a hobby; not only in terms of trading and investment, but also trying to understand the technology itself. Also, after a while, I started coding some side projects in my free time, like tokens and NFTs. This was another layer that brought me closer to tech and programming.

All in all, I started thinking that if I had a second life, I would choose to become a programmer. But it turned out that I don't need a second life for that. After entertaining the idea of a switch to becoming a full-fledged programmer, in 2022 I decided to finally act upon my usings and take up the challenge. In the meantime, I learned Javascript. My prior programming experience and know-ledge of R and Python certainly helped me in this new endeavor. After all, if you know one programming language it becomes easier to pick up others.

Soon after, an exciting opportunity presented itself – in a company called PACETEQ that provides data analytics and software solutions to elite motorsport, among them to Formula 1 teams. Data analysis and software development? For Formula 1? That seemed quite promising. My background in bioinformatics and experience of dealing with data came in very handy. Setting up the interfaces for receiving racing data in its tiniest details (e.g. which driver drew how fast in which section with what kind if tyres etc.), grouping and classifying the data, performing the statistics, all that was exciting. Yet at the same time, it didn't feel like something entirely different to what I had been doing before. I had been dealing with next-generation sequencing data – e.g. gene expression, differential binding, category analysis etc. Now it was racing data. The overarching principles are the same.

My restlessness, however, seemed to know no limits. At the time of this writing, I am organizing my relocation to a new job in Zurich, which I will start in April. The company where I will work provides software solutions for fintech and insurance industry. Apparently, my involvement with cryptocurrencies left an indelible mark on my consciousness, with some invisible hand dragging me relentlessly into the field of finance. In addition, in my new position I will get the opportunity to get my feet wet in AI, as it is becoming an indispensable tool in many different fields, particularly in enterprise solutions. So, this is yet another exciting challenge I am looking forward to taking. Here also, my knowledge of Python from my time in academia will prove to be very useful.

The opportunities for someone with a life science background are vast and, as shown by my own example, can be found in places that at first might seem far-fetched for prevailing wisdom. Oftentimes, however, such conventional thinking presents itself as deceptive. After all, science and tech require the same mindset and a common skillset, namely critical thinking, creativity, and problem-solving abilities. And most importantly, constant learning – this is indispensable. I can say with confidence that the most crucial skill that I took from my time in academia is the ability to learn constantly – be it new methods (in the wet lab or in the realm of data analysis), new concepts, new frameworks, new approaches and so on. And I internalized this mindset in my life in general.

This text is by no means meant to encourage people to leave science. On the contrary, we want you to stay in science. I still think that should be the default position of someone who chooses life sciences as their field of study. But life can take unexpected turns and people may discover hitherto unknown passions and potentialities within themselves. This essay depicting my journey aims to encourage you to always keep an open mind and continuously develop new skills. PhD and postdoc provide just that – i.e. the opportunity for constant learning and acquiring new knowledge. And who knows, maybe one day that new knowledge will prove to be life changing and open up new opportunities in front of you, which you thought were never possible before.

Half a year in the wilderness

Walking with a roughly 10 kg backpack on the Pacific Crest Trail *by Elsa Steinfath*

I am running through a hail and thunder storm, in a burnt forest, North California. There are no roads nearby, the next town is half a day away by walking but it's evening already. Within 2 minutes the ground is white with hailstones, the thunder shakes my body to the bones, lightning strokes scatter the shadows of former trees, now black pillars. I don't care that my hands get black with soot when I push off the fallen logs blocking my way, that I am completely soaked. I know that the next tree-free, flat spot is a kilometer away. When I reach it, I will put up the tent as fast as I can, exchange the dripping clothes for dry ones, snuggle into my sleeping bag and make a hot meal.

And weirdly my rushing mind asks if I would prefer to sit in a warm and dry office right now. My friend told me that I will miss the comfortable office soon enough when I told him about my hiking plans. And even though I enjoyed my PhD time, I rather wanted to run through that storm, just then – just for once.

Since I am sitting here, comfortably in front of a computer, typing this story, you can guess that I reached the tent spot. I was warm in that night and the dawn next morning was bright and clean.

Two months after my defense I was already on the Pacific Crest Trail. This long distance trail spans 4300 km and leads though California, Oregon and Washington. It usually takes half a year to hike it. I prepared by reading books and blog posts instead of papers and reviews. I bought ultra-light gear instead of soldering an optogenetics set-up. Because of exceptional conditions like heavy snow in California and wild fires in Washington as well as heavy foot pain (surprise) I managed to hike 75 % of this trail – that is 3200 km. I saw two black bears and was rattled at by a big ass rattle snake. Many nights I didn't put up my tent but just slept under the stars. I jumped into numerous crystal clearcrystal-clear lakes and took in the vastness of the wilderness. Although I started the journey by myself, I was hardly alone and never lonely. Actually, my dearest friend from the IMPRS program joined me for 160 km on trail.

The mental state of a wandering mind shifts on a long walk, just like it does on a short walk, I guess. Obviously, I was searching for truth and perspective on this trail. To my own and maybe your disappointment: neither wisdom nor answers struck me as clearly as I had hoped. Maybe just this:
We are told that by graduating with a PhD we are capable of executing long-term projects, dealing with frustration, making our way mainly by ourselves but also to ask for help or support when needed and to collaborate. After putting these skills to the test in a much different project, they still hold. Make the best of it – if you like!

Elsa Steinfath did her PhD in the Neural Computation and Behavior group with Jan Clemens at the European Neuroscience Institute. Although still fascinated by the brain and artificial intelligence, she just acquired the license to give rock climbing courses and will work as a climbing guide in South Portugal this year.
elsa.steinfath@yahoo.de

NeuroBridges: Ten years on

by Ahmed El Hady

Ahmed EL HADY did his PhD at the Max Planck Institute of Dynamics and Self-Organization in the research group of Fred Wolf. He did his postdoctoral work at the Princeton Neuroscience Institute in the lab of Carlos Brody. Currently he is a research group leader at the excellence cluster centre for advanced study of collective behavior at the University of Konstanz and the Max Planck Institute of Animal Behavior.
atarek1@gmail.com

"International gatherings of intellectuals […] respond to a deep-seated need. People seek out mutuality and friendship outside of structured groups, political frameworks, and nationalistic affinities", Emmanuel Levinas, 1957.

In 2014, Yonatan Loewenstein (a professor at the Hebrew University of Jerusalem, Israel) invited me to attend the Edmond Lily Safra Center for neuroscience retreat at kibbutz Ein Gedi in Israel. I happily accepted the invitation and it was a trip that would change my life. At this time, I just finished my doctoral studies at the IMPRS for Neuroscience in Göttingen and was staying as a postdoctoral fellow at the Max Planck Institute for Dynamics and Self-Organization. Apart from enjoying state of the art science during the retreat, I had the great opportunity to visit Israel which I could not visit otherwise. As Yonatan Loewenstein and I were hiking in the desert, we shared our anxieties about how Arabs and Israelis have little space to communicate beyond conflict. During this monumental hike, the idea of NeuroBridges was born. We thought that organizing a scientific event that brings scientists from across the middle east can act both as a medium for dissemination of scientific knowledge and dissemination of peace and understanding. Science as an intellectual endeavor powered with objective tools and critical analytical skills can solve unsurmountable problems. The first NeuroBridges took place in Göttingen at the Max Planck Institute for Dynamics and Self-Organization. We got amazing support from Prof. Tim Gollisch, Prof. Fred Wolf and Prof. Theo Geisel in addition to financial support from the German Research Foundation and the department of Prof. Stefan Hell.

Starting in 2014, NeuroBridges became a unique venue for scientific exchange in neuroscience. Scientists who participated in those meetings shared a deep and strong belief that researchers have a responsibility both to advance scientific education and to promote common understanding between people from different nations. The series of meetings, held from 2014 to 2017, convinced us that establishing personal relations between Middle Eastern scientists through scientific dialog and collaborations can help alleviate the political distress in the Middle East. We then decided to widen the scope of the initiative and organize a school that will train the next generation of middle eastern neuroscientists.

Since 2017, NeuroBridges school is held in the Fall in the magnificent medieval city of Cluny, Burgundy, France. The school brings together students and postdocs from the Middle East and the Mediterranean region, including Egypt, Iran, Israel, Palestinian Territories, Lebanon, Morocco, Syria and Turkey, as well as from other regions in the world. During ten days, the participants attend lectures delivered by leading neuroscientists, experimentalists as well as theoreticians, who address fundamental questions in system, computational and behavioral neuroscience. In addition to the lectures, the students work in groups on reading papers and perform small research projects.

Initiatives such as NeuroBridges are critical today in times when tension are heightened and meaningful channels of communication across peoples of the Middle East are lacking. I will always remember my time in Göttingen as a foundational step in establishing NeuroBridges. I also encourage scientists beyond neuroscience to establish similar initiatives in their fields, hoping that in the future, these events can create the peace we all dream of in the Middle East.

https://neurobridges.net/

A reunion 3000m above sea level

by Tanvi Butola

Fig. 1: Bright field image of four generations of alumni from the IMPRS program.

What is the most important thing that Göttingen has given me, apart from my PhD of course? Göttingen casts a very wide web of friends, and friends of friends. No matter where in the world I go, I can always find someone linked to the city of Science*. Just this one connection could open doors for you and even be your shelter in the storm. We all, in the IMPRS Neuroscience program start the same way. Coming from all over the world to our little scientific bubble starting with a bright flowerpot in hand. Not all of us finish our journeys the same way. However, our temporary stop at Göttingen gives us all something more permanent. No, not publications but peers – who will always be a part of our scientific origin story.

Next year, in 2025 the IMPRS program will celebrate its 25th anniversary. Remember how we missed out on popping the Sekt for the program's 20th anniversary? Blame it on a little thing called a global pandemic. But fear not, for our spirits remain uncrushed! Last year, in the beautiful Colombian city of Bogota, amidst the dizzying heights of 3000m above sea level, we staged our own mini-reunion. Four generations of alumni from the IMPRS program flew in from all over the world.

Why, you ask? To bear witness to the culmination of a love story that began in our beloved program, of course! Diego Giraldo and Sharlen Moore, two of our own, finally tied the knot after a decade-long courtship. And let me tell you, it was worth every second of the wait!

Fig. 2: One with the bride – Sharlen Moore. She is the one in white.

Diego serenaded us (mostly his bride) with a soul-stirring rendition of 'Bésame Mucho' on his saxophone, while Sharlen unleashed her vocal prowess, accompanied by a mariachi band boasting a harp! It was a celebration fit for royalty. The fact that all of us (Figs. 1-2) came together for this celebration is a testament not only to the love shared by the couple but also to the enduring bonds forged in the crucible of Göttingen.

Beyond the wedding celebration, our little reunion explored the heights of Bogota! Literally, we went up to the summit of Monserrate, a high mountain that looks over Bogota, for a grand view of the city below. In the evening, the wedding party took to the city streets in a party bus dancing and singing all night. It was a grand reunion, which we all hope to repeat with a larger Göttingen community someday.

Even though we started the same way, we have all branched out on own paths – academia, industry, media, consulting, writing, and so on. However, no matter how far and wide we branch out we

*This is not an exaggeration!

A reunion 3000m above sea level (continued)

Tanvi BUTOLA did her PhD in the lab of Tobias Moser at the Max Planck Institute of Biophysical Chemistry. She is currently wrapping up her postdoc at the NYU School of Medicine in New York, USA.

Basu Lab, SB1203, Science Building
Neuroscience Institute, NYU School of Medicine
435 E 30th Street, New York 10016, USA
tanvi.butola@nyulangone.org

remain connected by our shared roots. Individuals whom I knew peripherally in Göttingen have become cherished friends, supporting each other through life's challenges, from pandemic-induced isolation to the pursuit of faculty positions. The essence of Göttingen lies not in its buildings or accolades, but in its people—the ties that bind us, transcending time and distance.

So, what is the most important thing that Göttingen has given me? Without hesitation, I say it is the people.

Fig. 3: Atop the Monserrate, Bogota, Colombia

A jump into the world of an independent PI

by Nicolas Snaidero

I started my lab in September 2021, when I joined the Hertie Institute in Tübingen as an independent team leader. Our lab aims on understanding cortical neuron-glia interactions in health and pathologies focusing on oligodendroglia linage cells. We use longitudinal intravital imaging of preclinical disease models in rodents to address these aims and, ultimately, establish novel therapeutic strategies to improve remyelination and reduce neuronal pathologies.

From the idea that some have of starting your own lab – intense scientific work with students and collaborators – and the reality of sitting in the chair of the team leader and starting to build your lab from two empty rooms, the step is rather large (at least is has been for me, and it still is in some regards).

I guess most PIs will say the same when it comes to starting their independent team in an institute or department: one needs to extensively prepare the scientific targets, the tools you need, want and can establish, as well as the corresponding technical and administrative work. Looking back, I would say that I underestimated the time and huge amount of work required for administrative issues (particularly related to animal work) as well as the share that a family takes on your availability when you want to have a reasonable work/life balance.

Being an independent PI is definitely an exciting ride and a turning point in the scientific life. This is the moment when you choose the research direction and scientific questions that are exciting for you to pursue. But it is also important to note that it also comes with some heavy luggage, that I would most probably have traded, to remove this single word “independent” for a substantial support from the structure of a department instead. However, I have been most lucky to have the head of my former institute and PostDoc supervisor, Prof. Thomas Misgeld, supporting me

A jump into the world of an independent PI (continued)

Bavarian breakfast at the Neuron-Glia Interactions lab in 2023

in many ways, including having two PhD students that we co-supervise. This bridge-like situation was a valuable support when starting my new lab in Tübingen. Therefore, I strongly encourage asking for guidance and advice from more experienced scientists should you choose to become an independent PI.

At the beginning of building my lab, I wanted to create an environment that replicated the good aspects of my former labs, while avoiding conditions that were unproductive or even difficult to handle. At the end of the day, there are much more stakeholders than one may think of when you want to build the "perfect environment" and many of them are out of your control. Each combination of PI, students, institute and current politics in the host country will surely produce a different reality. Even though I believe things are rather fine in the lab, it is a constant effort from the entire team to go forward and improve the environment for building the fundaments of efficient scientific work. In my lab we have a policy of open communication that allows me, on one side, to learn a lot from my students, not only scientifically but also about what they think they need to perform at their best. On the other side, I do share with my team some aspects of the limitations that are imposed on me and the group (not obvious at all from the point of view of a young PhD student), explaining my frustration and the reason for some less pleasant choices done in the lab. This allows a better understanding from both sides and I receive a huge amount of support from my team – which is key for me to go on.

We are now starting the third year of the lab and while things are always too slow for everyone, it is fantastic to see most administrative barriers gone and experiments start running after having gone through complicated times. This allows me to witness our international team growing and developing as much personally as scientifically, and I am really looking forward to see what we can achieve together.

Nicolas SNAIDERO did his PhD work in the lab of Mikael Simons at the Max Planck Institute of Experimental Medicine and his Postdoc in the lab of Thomas Misgeld and Martin Kerschensteiner at the LMU and TUM. He is now independent team leader at the Hertie Institute for Clinical Brain Research in Tübingen.

Neuron-Glia Interactions lab
Hertie Institute for Clinical Brain Research
Otfried-Müller-Straße 25, 72076 Tübingen
nicolas.snaidero@uni-tuebingen.de

New Faculty

Joining the program in 2023

Raymundo Báez-Mendoza is a Junior Group Leader of the Social Neurobiology Lab at the German Primate Center (DPZ) and joined our program in late 2023. The ultimate goal of the lab is to understand the behavioral and neuronal mechanisms governing the formation and maintenance of friendships, through a multipronged approach. In our program, Raymundo started by supporting us in this year's selection procedure and offering lab rotation projects for our first year students.

Further information:
https://www.dpz.eu/en/unit/nwg-social-neurobiology/about-us.html

Niels Focke is Professor for Epileptology in the department of Clinical Neurophysiology at the University Medical Center Göttingen. Even before he became a faculty member of our program, Prof. Focke had been involved in teaching of our program since several years and participated in lectures and tutorials on Epilepsy. His major research interests are in the fields of structural and functional MRI and high-density EE with a particular focus on epileptology.

Further information:
https://www.uni-goettingen.de/en/581226.html

Thomas Frank was a student in our program and obtained his doctoral degree in the department of Tobias Moser in 2010. He spent several years at the Max Planck Institute of Neurobiology in Martinsried before he returned to Göttingen and became head of the "Olfactory Memory and Behavior Group". Thomas Frank and his colleagues try to understand how the nervous system processes smell and how that leads to specific behaviors, with the ultimate goal to understand how past experience, internal states, and environmental context change the way the different parts of the brain work together to process sensory information and influence behavior.

Further information:
https://eni-g.de/groups/neurobiology-zebrafish

Emilie Macé is a Max Planck Research Group Leader (MPI for Biological Intelligence, Martinsried) who moved to Göttingen last year, where she holds the professorship 'Dynamics of excitable cell networks' at the Department of Ophthalmology at the UMG. Her lab uses functional ultrasound imaging to follow neuronal activity in the mouse brain to better understand how cognitive processes arise in the brain across multiple scales and uncover dysfunctions of these networks in psychiatric disorders. She is a member of the Cluster of Excellence 'Multiscale Bioimaging' (MBExC).

Further information:
https://www.bi.mpg.de/mace
https://mbexc.de/emilie-mace-takes-up-new-professorship-for-dynamics-of-excitable-cell-networks/

Christian Tetzlaff's research profile is strengthening the Computational Neuroscience part of our program. His research group uses various mathematical and computational methods from physics, mathematics and computer science to identify and understand the principles of synaptic plasticity on time scales from milliseconds to days and from the molecular to the neuronal network level. In addition to modeling, the group analyzes and uses experimental data obtained by various methods (e.g. fluorescence microscopy, EM, MEAs, behavioral data and works on the technological transfer of such identified principles to novel computer technologies such as neuromorphic chips or robotics.

Further information:
https://www.uni-goettingen.de/en/540714.html

Leaving the program in 2023

André Fiala joined our program in 2008 when he became Professor of Molecular Neurobiology of Behavior at the University of Göttingen. He taught our students in the fields of "Vision" and "Olfaction & Gustation" and supervised a number of students during their lab rotation projects. In addition, Prof. Fiala supported our program in the selection procedures of the new students and accompanied two Master's thesis students and one PhD student on their career path. We thank Prof. Fiala for his commitment to our program over the years and wish him all the best.

Further information:
https://www.uni-goettingen.de/en/96474.html

Swen Hülsmann was a faculty member from the very beginning of the Neuroscience Program in the year 2000 until 2023. Already as a postdoctoral fellow and group leader in the department of Neurophysiology he introduced our students to the practical application of Physiology and gave classes on "Muscle & Spinal Motor Systems", which he continued until leaving us last year. We thank Prof. Hülsmann for his many years of support and wish him all the best.

Further information:
https://www.uni-goettingen.de/en/57984.html

Current faculty members

Andrea Antal
Raymundo Báez-Mendoza
Matthias Bähr
Thomas Bayer
Susann Boretius
Nils Brose
Wolfgang Brück
Gregor Bucher
Brett Carter
Jan Clemens
Peter Dechent
Thomas Dresbach
Hannelore Ehrenreich
Gregor Eichele
Rubén Fernández-Busnadiego
André Fischer
Alexander Flügel
Niels Focke
Thomas Frank
Alexander Gail
Tim Gollisch
Martin Göpfert
Michael Heide
Ralf Heinrich
Stefan Hell
Reinhard Jahn
Igor Kagan
Oleksiy Kovtun
Siegrid Löwel
Emilie Macé
Tobias Moser
Klaus-Armin Nave
Tiago Outeiro
Luis Pardo
Viola Priesemann
Jeong Seop Rhee
Silvio Rizzoli
Annekathrin Schacht
Hansjörg Scherberger
Oliver Schlüter
Caspar Schwiedrzik
Michael Sereda
Jochen Staiger
Christian Tetzlaff
Stefan Treue
Hauke Werner
Melanie Wilke
Sonja Wojcik
Fred Wolf
Fred Wouters

Associated lecturers
Maria-Patapia Zafeiriou
Olaf Jahn
Wiebke Möbius

For details regarding the research of all faculty members, please see
https://www.uni-goettingen.de/en/665804.html

PhD Retreat 2023

by Jonas Barth

For the Neurosciences PhD Retreat 2023, doctoral students, faculty, and staff gathered at the Harnack-Haus in Berlin to present their research, engage in scientific discussions, and build personal connections. In addition to inspiring talks and scientific dialogues, the retreat emphasized social interactions to counteract the negative impact of the pandemic on personal networks. Four alumni joined the retreat on Friday to share their individual career paths and stories with the PhD students. The importance of the personal exchange at the retreat is best summarized by statements from the participants:

"I had the chance to go on this retreat on the first week of my doctoral studies, and connect with all other candidates at this very early stage of my PhD. It was a great opportunity for me to present an introductory poster to my project, and this helped me learn how to talk about my project. Retreat was at a great location, and I will remember the amazing food for a very long time!"

"A fun and bonding retreat! Due to COVID-19, the network of PhD students was getting weak. With this retreat, we managed to create and strengthen our bonds with fun games, hikes, great food, engaging poster sessions and alumni talks-that too in the heart of Max Planck Society, the Harnack House in Berlin! Great retreat and looking forward to the next one!"

"The IMPRS retreat is indeed a great platform to bring everyone from the program together. It not only makes us aware of the work our fellow colleagues are involved in but also enables us to receive great multidisciplinary input. Alumni talks are also a great source of inspiration. The social events of course are a great way to unwind and relax as well."

"From deepening connections with fellow PhD students to learning about diverse career paths from program alumni, the IMPRS PhD Retreat 2023 has been an unforgettable event. I will remember this event with the serene hikes around the Dahlem Campus and the delightful dinner we had in Berlin!"

Whereabouts of our Neuro PhD Alumni

Current profession

Academia / Research	**(51%)**
Professor	12%
Group leader, PI	8%
Staff/ senior scientist	6%
Postdoc	22%
Science management	3%
Private & Public Sector	**(33%)**
Scientist, team leader, manager R&D	18%
Staff, team leader, manager non-R&D	9%
Science manager/ coordinator	2%
Consulting	4%
Other Profession	**(11%)**
Media, publishing	3%
Resident, Chief resident	4%
IT, software development	2%
Self-employment	2%
Other	**(5%)**
Other professions, internships, job applications, family management etc.	5%

Current location

Europe	**(74.4%)**
Austria	2.7%
Belgium	1.1%
Czech Republic	0.5%
Denmark	0.5%
Finland	0.5%
France	0.5%
Germany	53.2%
Hungary	1.1%
Ireland	0.5%
Liechtenstein	0.5%
Netherlands	2.2%
Portugal	0.5%
Spain	1.1%
Switzerland	5.4%
Turkey	1.1%
UK	3.2%
North America	**(17.2%)**
Canada	1.1%
USA	16.1%
Africa	**(1.5%)**
Egypt	0.5%
Ghana	0.5%
Lesotho	0.5%
Asia	**(6.9%)**
China	2.7%
India	0.5%
Israel	0.5%
Qatar	0.5%
Taiwan	2.2%
U.A.E.	0.5%

Neurofaces 2000 - 2023