The implementation of a trinational training campus in neuroscience was, as its name implies, the main aim of the Interreg V project “NeuroCampus” (launched in November 2015). Thanks to the strong involvement of scientists and clinicians of the 3 Neurex universities (& companies), the network has harnessed the complementary expertise of our laboratories to create transborder trainings which enrich the curriculum of our Masters, PhD students and postdoctoral fellows. Lab tours are one example: the second lab tour recently organized illustrated the different scientific approaches of research on sleep disorders performed by the CIRCSom in Strasbourg, the Sleep Research Center in Freiburg and the Chronobiology Center of the University Psychiatry Klinik in Basel. Psychiatry and cognition are in the spotlight during the second part of 2017. We would like to welcome Prof Katharina Domschke, who was recently appointed Medical Director by the Department of Psychiatry & Psychotherapy Freiburg. In November 2017, Prof Tebartz van Elst, from the same Department, will organize a meeting and a controversy debate where the ICD- and DSM-based psychiatric diagnosis of schizophrenia will be discussed. Classification in psychiatry raises several important issues: how a system of classification of psychiatric disorders may lead to a dead-end in terms of therapy, but also how and why it is a determining factor that may hamper the development of promising research models. This important question is also at the heart of the issues raised by Dr Jack Foucher (University of Strasbourg) who founded the Circle of Excellence of Psychosis which provides dedicated e-learning. English versions of the CEP’ educational series of lectures will now be available on the Neurex multimedia platform (created in the context of the Neurocampus project). Research on cognition is also at the forefront of the scene at the University of Basel where the teams of Prof Papassotiropoulos & Prof De Quervain (MCN, Molecular & Cognitive Neuroscience Transfaculty Research Platform) recently published in Nature Communications and Nature Human Behaviour the demonstration of a link between the Immune System, Brain Structure and Memory. Our network is rich of talented neuroscientists and clinicians who offer a solid basis for an attractive international training over a limited geographical area: take profit of it and join our events!
LAB TOUR 2017

SLEEP & SLEEP DISORDERS: A CORNERSTONE IN THE COMPLEMENTARY EXPERTISE OF OUR 3 NEUREX UNIVERSITIES

The Neurex LAB TOURS aim at illustrating the research approaches used by different laboratories - located on each side of our trinational Neurocampus - to investigate a common topic. After the event on memory in 2016, another tour took place on the 6th and 7th of September 2017. This year, it focused on sleep and sleep disorders.

Sleep (see Box 1, page 7) is a complex physiological function which has been suggested to play many important roles, such as energy restoration, brain repair, memory consolidation, metabolic clearance, or synaptic downscaling to cite a few of them. The alternance of sleep and wakefulness defines a sleep-wake cycle (see Box 2, page 7) which differs in timing across individuals (chronotype).

Sleep disorders include - but are not limited to - insomnias, circadian rhythm sleep disorders, sleep related breathing disorders, hypersomnias, sleep related movement disorders, etc.

Insomnias and circadian rhythm disorders may result in excessive daytime sleepiness and fatigue, a real burden which strongly impacts the quality of poor sleepers.

There is growing evidence that sleep disorders are observed in parallel or may even precede the occurrence of neuropsychiatric disorders as varied as Alzheimer’s disease, Parkinson’s disease, autism, depression, schizophrenia, etc. The study of insomnia and circadian rhythm disorders is at the heart of the activities of the respective research centers of Basel, Freiburg and Strasbourg and closely connected to research in psychiatry. It was presented at the 2017 lab tour on sleep & sleep disorders where a detailed presentation & visit of the 3 centers was organized during 2 days-tour in bus.

1. The lab tour began in Strasbourg at the CIRCSom (International Research Center for ChronoSomnology, University Hospital Strasbourg & INCI).
2. It continued the next morning at the Sleep Center of the Department for Psychiatry & Psychotherapy in Freiburg.
3. and concluded in the afternoon at the Chronobiology Centre of the UKP (University Psychiatry Klinik) in Basel.

These three centers address complementary technical and clinical platform unique in Europe. As we shall see below, research at the CIRCSom Strasbourg and the Centre for Chronobiology Basel is more focused on the circadian regulation of sleep and its disorders while the Sleep Center at the University of Freiburg puts more emphasis on insomnia and its therapy.

LAB TOUR 2017

There is a real need to characterize the regulatory mechanisms for sleep and alertness, and in particular the effects of light, the abundance of artificial light exposure nowadays and the high prevalence of sleep disorders, social jet lag as well as their impact on mood and cognition are a real burden in modern societies.

The circadian regulation of sleep (see Box 2, page 7) and its impact on sleep/vigilance and cognitive function in healthy volunteers and patients suffering from neuropsychiatric disorders is at the heart of the research activities of the Centre for Chronobiology (UKP, University of Basel) and the CIRCSom (University Hospital & INCI, Strasbourg). In these laboratories, sleep/vigilance and circadian regulation are studied under different well-controlled conditions. These conditions include lighting with different wavelengths (see pictures thereafter), temperature, different light/dark regimes and long/short photoperiods, etc. Sleep is assessed using polysonomographic EEG recording, in parallel with the measurement of several different parameters (qualitative analysis of sleep, subjective and objective evaluation of sleepiness and vigilance, biological sampling, hormone measurements, core body temperature, mood and cognition, etc).

ON THE 2ND OF OCTOBER, the Nobel Price 2017 has been attributed jointly to Jeffrey C. Hall, Michael Rosbash and Michael W. Young for their discoveries of molecular mechanisms controlling the circadian rhythm.

Their discoveries explain how plants, animals and humans adapt their biological rhythm so that it is synchronized with the Earth’s revolutions. Sleep is one of the fundamental physiological processes which displays a strong circadian rhythmicity.
The Centre for Chronobiology (UniBasel) focuses on circadian and homeostatic (see Box 2, page 7) regulation of human sleep, alertness, cognitive performance, mood, memory consolidation and thermoregulation, and on the study of these mechanisms in ageing and psychiatric disorders. Its research interests include (but are not limited to) the non-visual effects of light on circadian physiology, sleep and cognition, the cerebral mechanisms underlying the influence of age-related changes in circadian and homeostatic processes on cognition, sleep and cognitive function in older adults, the circadian rhythms and sleep regulation in psychiatric disorders (for example depression, schizophrenia, borderline personality disorder) as well as chronotherapy (e.g. light treatment) in psychiatric disorders.

Research at the Sleep Center (University of Freiburg) is focused more particularly on insomnia and its involvement in neuropsychiatric disease. Insomnia is defined by some difficulties falling asleep, difficulty staying asleep, early awakening or poor sleep quality.

Prof Riemann (Research at the Sleep Center (University of Freiburg)) is focused more particularly on insomnia and its involvement in neuropsychiatric disease. Insomnia is defined by some difficulties falling asleep, difficulty staying asleep, early awakening or poor sleep quality. Prof Riemann (Figure 4) and his team, studying the polysomnographic EEG of insomnia patients demonstrated in 2012 that "the polysomnographic sleep of many patients with insomnia is characterised by an increased frequency of brief events such as shifts in sleep stages between NREM and REM sleep and among NREM stages, brief periods of awakening and microarousals (brief and transient changes in EEG frequency suggestive of an awake state), and not by extremely long periods of wakefulness. Thus, although the macrostructure of sleep (cycling between NREM and REM periods) is only mildly affected, the microstructure within both NREM and REM periods strongly shows a disturbance of the switch between sleep and wakefulness... As compared with healthy sleepers, people with insomnia, have the most pronounced differences in the EEG fast frequency range (β power). This type of instability has also been suggested to be relevant for the disruption of REM sleep, which is known to be especially fragmented in insomnia patients, with microarousals." (Spiegelhalder, Bagen et al. 2003).

The Sleep Center Freiburg is also interested in the treatment of insomnia, in particular Cognitive Behavioural Therapy (Figure 5). Insomnia treatments include benzodiazepines, benzodiazepine-receptor agonists, and cognitive behavioural therapy. One facet of CBT is sleep restriction therapy which works for 60% of the patients. CBT has been shown to be equal to pharmacotherapy during acute treatment and more effective for long-term treatment.
CIRCsom is a joint project between the University Hospital Strasbourg and INC1. It is located within the Sleep Clinic of the Neurology Department and adjacent to the Psychiatry and Child Psychiatry Departments. The CIRCsom is interested in the study of sleep/vigilance and circadian regulation in healthy subjects, but also in patients with neuropsychiatric disorders, from children –i.e with autism spectrum disorder –to older adult patients affected by neurodegeneration (Parkinson disease, Lewy body dementia...). Research at CIRCsom is focused on the role of the direct effects of light on sleep and alertness, their interaction with other sleep regulatory mechanisms, the circadian drive and the sleep homeostatic process. Five bedrooms (including bathrooms) are equipped with a ceiling that gives the possibility to finely adjust spectrum and intensity of light, apply different light/dark regimes and long/short photoperiods (see Figure 6). The ultimate goal is to investigate the functional interactions between sleep/vigilance, circadian rhythm regulation, sleep homeostatic process and the role of light in neuropsychiatric disorders.

**LAB TOUR 2017**

THE CIRC SOM

INTERNATIONAL RESEARCH CENTER FOR CHRONOSOMINOLOGY, STRASBOURG

CIRCsom is a joint project between the University Hospital Strasbourg and INC1. It is located within the Sleep Clinic of the Neurology Department and adjacent to the Psychiatry and Child Psychiatry Departments. The CIRCsom is interested in the study of sleep/vigilance and circadian regulation in healthy subjects, but also in patients with neuropsychiatric disorders, from children –i.e with autism spectrum disorder –to older adult patients affected by neurodegeneration (Parkinson disease, Lewy body dementia...). Research at CIRCsom is focused on the role of the direct effects of light on sleep and alertness, their interaction with other sleep regulatory mechanisms, the circadian drive and the sleep homeostatic process. Five bedrooms (including bathrooms) are equipped with a ceiling that gives the possibility to finely adjust spectrum and intensity of light, apply different light/dark regimes and long/short photoperiods (see Figure 6). The ultimate goal is to investigate the functional interactions between sleep/vigilance, circadian rhythm regulation, sleep homeostatic process and the role of light in neuropsychiatric disorders.

**IN CONCLUSION**, the study of sleep and sleep disorders is a complex and multifaceted problem, but also a cornerstone in the complementary expertise of our 3 universities. The growing evidence that there is bidirectional relationship between sleep and psychiatric disorders offers the hope that sleep centers will contribute a hope to improve the treatment not only of sleep disorders, but may benefit some psychiatric disorders as well.

**BOX 1**

SLEEP is featured by marked changes in electroencephalogram (EEG) waves, which, when combined with measurements of the alterations in muscle tone and eye movements characterize different well-defined states. The different stages of sleep occur in a characteristic sequence. The waking state with the eyes open is characterized by high-frequency (15-60 Hz) low-amplitude (<50µV) beta activity. Relaxed wakefulness (once the eyes are closed and the brain no longer receives visual input) is characterized by a steady and rhythmic pattern of about 10Hz (alpha-waves). It is followed by a drowsy period (stage N1), transition to light sleep during which the frequency spectrum of the EEG is shifted toward lower values and the amplitude of the cortical waves slightly increases (theta waves). There is then (stage N2 sleep) a further decrease in the frequency of the EEG waves and an increase in their amplitude, together with intermittent high-frequency spike clusters (10-12 Hz for 1-2 seconds) called sleep spindles. EEG tracings also show a pattern called K-complex during that stage. In the deepest level of sleep (stage N3), low frequency (1-4Hz) high-amplitude fluctuations—called delta waves—predominate, hence its name Slow Wave Sleep (SWS). The entire sequence from drowsiness to sleep stage N3 sleep takes about an hour. These 5 sleep stages are called non-rapid eye movement (non-REM) sleep, its most prominent feature is the SWS (stage N3 sleep, considered to be the deepest stage of sleep). Following a period of SWS, the stages of sleep reverse, reaching a quite different state called Rapid Eye Movement (REM) sleep, during which Electroencephalograms (EEG) demonstrate the presence of rapid eye movements, hence its name. In REM sleep, the EEG recordings are remarkably similar to that of the awake state. After about 10 minutes in REM sleep, the brain typically cycles back through the non-REM sleep stages. Slow-wave sleep usually occurs again in the second period of this cycle, but not during the rest of the night. On average, 4 additional periods of REM sleep take place, of increasing duration.

**BOX 2**

On an evolutionary point of view, human beings are a diurnal species, meaning that their sleep-wake cycle consists of a sleep period during the night and awakensness during the day, in contrast to nocturnal species -such as rats or mice- which display an opposite pattern. The sleep-wake cycle is a complex process which has been suggested to result from the interactions between a biological clock (circadian pacemaker) and a sleep homeostatic process that depends on the prior time spent awake. This 2-process model applies not only to the sleep-wake cycle, but also to temporal patterns of nearly every neuroendocrine, physiological, and psychological function. Interestingly, the period of the human circadian rhythm slightly differs from the natural 24h-period alternance of day and night on earth. When submitted to constant conditions (so-called “free-running” period in humans averages about 24h and 20 minutes, but differs between individuals). In order to maintain an optimal synchronization (entrainment) between the internal clock and the solar day, periodic stimuli called Zeitgebers help to maintain an appropriate phase relation. The most important Zeitgeber is light, but food timing and social stimuli are also significant cues. The light input sensed by the retina influences the activity of the suprachiasmatic nuclei in the brain, impacting clock genes, and different outputs such as melatonin synthesis, thermoregulation, etc. These factors then interact with the sleep-wake homeostatic process to permanently adjust sleep propensity and architecture, influencing phenomena as different as mood and performance or hormonal output. Circadian rhythms are important in determining sleeping patterns and can be disturbed by shift work or time zone changes (jet-lag) for example. Phase shifts (phase advance or phase delay) may also affect the sleep-wake cycle architecture and strongly impact the quality of life.

**LAB TOUR 2017**

Special thanks to:

Prof Christian Cajochen, Chronobiology Center, University Psychology Clinic, Basel

Prof Dieter Riemann, Department of Psychiatry & Psychotherapy, Freiburg

Prof Patrick Bourgin, CIRCsom Strasbourg
and their team for kindly welcoming us for the scientific lectures of the tour.

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**REPORT**

MONOCROMATIC LIGHTS can be enriched in homogenous lighting conditions with control of number parameters. For example, a polychromatic white light that can be enriched in white light/white light, with intensity and color control (tetramixes -called color wheels- and environments). Other methods are also available to test different light/dark conditions, with transients as well as alternating light/dark conditions. (Figure 6)

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**Figure 6**/CIRCsom, Strasbourg
A special room in the Somhouse allows for homogeneous lighting conditions with control of number parameters. For example, a polychromatic white light that can be enriched in white light/white light, with intensity and color control (tetramixes -called color wheels- and environments). Other methods are also available to test different light/dark conditions, with transients as well as alternating light/dark conditions. (Figure 6)
On May 27, 2017, Michael Frotscher passed away, suddenly and unexpectedly, at the age of 69. We lost a good friend and great scientist. We will miss his kindly advice and inspiring personality, his great enthusiasm and his never-ending energy.

Michael Frotscher was an internationally renowned scientist in the fields of Neuroanatomy and Developmental Neuroscience. His scientific success was mirrored by many awards, including the Wolfgang Bargmann-Award of the Anatomical Society (1992), the Gottfried Wilhelm Leibniz-Award of the German Research Foundation (1993), the Max-Planck-Research Award (2000), the Ernst-Jung-Award (2002) and the Hertie-Senior-Research Professorship (2007).

From 1989 until 2011 Michael Frotscher was Director of the Institute of Neuroanatomy and Cell Biology at the University of Freiburg. From 1995 until 2007 he was the Coordinator of the DFG-funded Freiburg CRC 505: “Neuronal Differentiation and Neurotransmission”. In 2004, Michael was a founding member of the Freiburg Bernstein Center for Computational Neuroscience (BCCN). In 2011 he moved as Hertie-Senior-Professor to Hamburg, where he headed the Institute of Structural Neurobiology at the Center of Molecular Neurobiology Hamburg (ZMNN), University Clinic Eppendorf. After his departure to Hamburg, Michael served as the Chairman of the Scientific Advisory Board of the Bernstein Center Freiburg (BCSF).

Apart from his scientific work, Michael Frotscher was engaged in various societies and did enormous work for the German Research Foundation (DFG). Thus, Michael served as the Founding President of the German Neuroscience Society (NWG), Senator of the German Academy of Sciences Leopoldina, President of the German Anatomical Society, and member of the DFG Senate Committee for CRCs. Over the years, Michael was a strong supporter of the tri-national network for neuroscience Neurex.

Michael was not only a gifted scientist, but also a very talented and highly esteemed university teacher and mentor. His students invariably admired and respected him.

We mourn Michael Frotscher. We will miss his wise advice and inspiring energy. We wish he would have had more time.

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We mourn Michael Frotscher. We will miss his wise advice and inspiring energy. We wish he would have had more time.
The results of the two studies show that both brain structure and memory are linked to the activity of genes that also perform important immune regulatory functions in the blood. "Although the precise mechanisms behind the links we discovered still need to be clarified, we hope that this will ultimately lead to new treatment possibilities," says Professor Andreas Papassotiropoulos, co-Director of the University of Basel’s MCN research platform. The immune system can be precisely affected by certain medications, and such medications could also have a positive effect on impaired brain functions.

INNOVATIVE RESEARCH METHODS

These groundbreaking findings were made possible thanks to cutting edge neuroscientific and genetic methods at the University of Basel’s MCN research platform. Under the leadership of Professor Andreas Papassotiropoulos and Professor Dominique de Quervain, the research platform aims to help us better understand human brain functions and to develop new treatments for psychiatric disorders.
Amyotrophic Lateral Sclerosis (ALS) is a devastating incurable disease characterized by the degeneration of upper and lower motor neurons controlling skeletal muscles, leading to generalized paralysis and eventually respiratory failure. In about 10% of the patients, the disease is attributed to a familial form; disease-causing gene mutations have been identified in 80% of these patients. Mutations have been reported as causative in 5 to 10% of the remaining 90% of patients who display the sporadic form of the disease. ALS overlaps extensively with Frontotemporal Dementia (FTD), the second most common form of dementia in people under 65 years of age, especially at the genetic level. Approximately 10% of affected individuals develop FTD.

Over 20 genes have been linked to ALS; historically, the discovery in 1993 of mutations in SOD1 (an enzyme catalysing the detoxification of superoxide) marked the beginning of the era of ALS modelling, with the development of the famous rodent SOD1 model. This was followed in the following years by the identification of the involvement of several important mutations such as in the TDP-43 encoding gene (TARDBP; TAR DNA-binding protein 43), FUS (Fused in Sarcoma) and C9orf72 (which encodes chromosome 9 open reading frame 72). Many other genetic mutations have also been associated with ALS, even though less frequent. Both FTD and ALS can be caused by many mutations in the same set of genes; the most prevalent of these mutations is the GGGGCC repeat expansion in the first intron of C9orf72. Importantly, C9orf72 has been reported to underlie 10 - 15% of all ALS (vs 2% of ALS cases for SOD1; 0.9% of cases for TARDBP and 0.7% of cases for FUS mutations).

Unfortunately, the translation of therapeutic strategies conceived from model systems to the clinic has been unsuccessful so far: many of them, even though promising in rodent mutant SOD1 models, subsequently failed in clinical trials among the ALS population. In recent years, however, insights into the pathogenesis of motoneuron degeneration have improved. Thus, it has been suggested that missense mutations in SOD1 do not seem to cause ALS by a loss of dismutase activity, but instead, by a toxic gain-of-function of this protein. Later, TDP-43 was identified as a major constituent of the ubiquitin-positive aggregates found in the motorneurons of ALS patients (and of 50% of cases of FTD not associated with ALS). A mislocalization of TDP-43 and FUS in cytoplasmic protein aggregates and their subsequent nuclear depletion is an important hallmark of ALS. Thus, both the nuclear loss of TDP-43 and FUS function, and their cytoplasmic (and toxic) aggregation are believed to contribute to ALS pathogenesis.

If identifying the potential culprit genes involved in the development of these neurodegenerative diseases is a first very important step, addressing the pathophysiological mechanism of these mutations is the second fundamental aspect. A recent controversy debate was organized by José-Luis Gonzalez de Aguilar and Luc Dupuis (UMR_S Inserm 1118, University of Strasbourg) on the molecular mechanisms of toxicity of C9orf72. The UMR_S Inserm 1118, headed by Dr Luc Dupuis, is specialized in the study of Central & Peripheral mechanisms of neurodegeneration.

During this event, the organizers shared their expertise with renowned scientists to address the molecular pathophysiological mechanisms of ALS. We express our gratitude to the speakers, José-Luis Gonzalez de Aguilar and Luc Dupuis (UMR_S Inserm 1118, University of Strasbourg), Edor Kabashi (Sorbonne Université, Université Pierre et Marie Curie, Université de Paris 06, Unité Mixte 75, INSERM Unité 1127, CNRS UMR 7225, Institut du Cerveau et de la Moelle Épinière, Paris, France), Ludo van den Bosch (VIB-KU Center for Brain & Disease Research, Leuven, Belgium) and Ricardos Tabet (Massachusetts General Hospital, MasGeneral Institute for Neurodegenerative Diseases, Charlestown, USA).
On the 2nd of October 2017, a visit of the CROs Prestwick Chemical and Neurofit took place in Illkirch-Graffenstaden.

**Prestwick Chemical**, founded in 1999 by Professor C.G. Wermuth, is focused on early drug discovery. During the past decade, Prestwick Chemical has gained international recognition for its input to boost drug discovery process through tailor-made medicinal chemistry services (from hit discovery to lead optimization) and smart chemical screening libraries.

**Neurofit**, founded in 1996, is specialised in the evaluation of treatments for central and peripheral nervous system disorders. The CRO offers a comprehensive list of in vitro and in vivo models covering a wide range of indications, in order to facilitate preclinical drug development by proposing the best models.

The theoretical and technical know-how presented during that day illustrate distinct and complementary aspects of the 2 CROs in drug development. We would like to express our gratitude to Marie-Louise Jung (Prestwick Chemical, VP Business Development), DANIELA VERRA (Prestwick Chemical, Business Development & Market Intelligence), DR. CHRISTOPHE MORICE (Director of Medicinal Chemistry), DR. EMILE ANDRIAMBELOSON (Neurofit, Head of Research), Jonas Fizet (Neurofit, Business Developer) and Stéphanie Wagner (Neurofit, Neurobiology Group Leader).
FOCUS ON PSYCHIATRY

Fundamental and clinical research in psychiatry is very dynamic and complementary in the three Neurex universities of Basel, Freiburg and Strasbourg. The Department of Psychiatry and Psychotherapy in Freiburg has appointed a new Medical Director, while a meeting & controversy debate on schizophrenia will take place next November. The aim of these 2 events is to shed light on a very important issue in the field of psychiatry, namely how the classification of psychiatric diseases affects not only clinical practice, but also fundamental research. This question is also at the heart of the scientific issues raised by the Center of Excellence of Psychosis (Strasbourg), clinical practice, but also fundamental research. This question is also at the heart of psychiatry, namely how the classification of psychiatric diseases affects not only

3. Classification of psychiatric disease: difficulties, pitfalls and impact on clinical diagnosis, therapy & research approaches ................................................. P. 18

4. Dr. Jacq Foucher (University of Strasbourg) & research on psychosis at CEP, CEMNIS & Asylum Robotics............ P. 24

NEWS

A new Medical Director was appointed last December in Freiburg at the Department of Psychiatry & Psychotherapy to replace Prof Mathias Berger who recently retired. Katharina Domschke, MA, MD, PhD, is Full Professor of Psychiatry and Chair of the Department of Psychiatry and Psychotherapy, University of Freiburg, Germany, since December 2016.

Prof. Domschke completed her studies in medicine and psychology at the University of Muenster, Germany, and Trinity College Dublin, Ireland (M.D., 2004), as well as Boston University, Boston, MA, USA (M.P.A., 2002), and Maastricht University, The Netherlands (Ph.D., 2010). After her board certification as a psychiatrist in 2010 she worked as an attending physician and associate professor at the Department of Psychiatry, University of Muenster, Germany. In January 2012, she was appointed Full Professor of Psychiatry at the University of Wuerzburg, Germany; in October 2013 Executive Senior Physician, and in September 2014 Vice Chair of the Department of Psychiatry, Psychosomatics and Psychotherapy, University of Wuerzburg, Germany.

A NEW MEDICAL DIRECTOR APPOINTED

Department of Psychiatry and Psychotherapy in Freiburg:

Her research focus is on the identification of multilevel markers for the prediction, prevention and personalized treatment of mental disorders, particularly anxiety disorders and depression. Anxiety disorders and depression are among the most frequent mental disorders worldwide and confer a high socioeconomic burden. Twin studies indicate a considerable heritability of these disorders with contributions from several different genes, which interact with each other as well as with environmental and psychosocial factors in shaping the overall disease risk. Epigenetic mechanisms such as DNA methylation constitute a dynamic link between genes and the environment and have become a central focus in psychiatric research. Therefore, Prof. Domschke’s group investigates the role of genetic and epigenetic markers as well as their interactions with environmental factors in the development, prevention and treatment of mental disorders by applying genetic/epigenetic, imaging genetic, pharmacop(epi)genetic and therapy(epi)genetic approaches, as reflected by to date over 170 publications in international journals, one co-edited book, and 16 book chapters.

Prof. Domschke’s clinical focus is on diagnostics and therapy in adult psychiatry, particularly depression, anxiety disorders, stress-related disorders and obsessive-compulsive disorder.

Her work has been recognized by e.g. the Research Award of the World Federation of Societies of Biological Psychiatry (WFSBP), the Fellowship Award of the World Psychiatric Association (WPA), the Travel Award of the International Society of Psychiatric Genetics (ISPG), the Fellowship Award of the European College of Neuropsychopharmacology (ECNP), the Research Award of the German Society of Biological Psychiatry (DGBP), the Research Award of the German Society of Psychiatry, Psychotherapy and Neurology (DGPPN), the Research Award of the German Association of Women in Psychiatry, Psychotherapy and Neurology (DGBP), the Research Award of the German Society of Biological Psychiatry (DGPPN), the Research Award of the German Society of Biological Psychiatry (DGPPN), the Fellowship Award of the World Federation of Societies of Biological Psychiatry (WFSBP), the Fellowship Award of the World Psychiatric Association (WPA), the Travel Award of the International Society of Psychiatric Genetics (ISPG), the Fellowship Award of the European College of Neuropsychopharmacology (ECNP), the Research Award of the German Society of Biological Psychiatry (DGPPN), the Research Award of the German Society of Biological Psychiatry (DGPPN), the Research Award of the German Society of Psychiatry, Psychotherapy and Neurology (DGPPN) and secretary of the German Society of Anxiety Research (GAF).


Prof. Katharina Domschke.
The international classification tools currently designated as standards in psychiatry, namely the ICD 10 (International Classification of Diseases, 10th edition) and DSM 5 (Diagnostic and Statistical Manual of Mental Disorders, 5th edition) have a long evolution.

The ICD-10 classification was the first attempt at classification of mental disorders (Moriyama 2011). With the large-scale involvement of US psychiatrists in the selection and treatment of soldiers during the World War II, the focus was shifted away from mental institutions and traditional clinical perspectives. This led to a need of developing a classification of mental disorders for use specifically in the United States and to standardize confused mental disorders for use specifically in the United States and to standardize confused mental institutions. The WHO produced the ICD (International Classification of Diseases) consisting of assessing and refining the model, and suggest adapted treatments. The rigor of research is better defined either by its cause (for example the mutation of the CFTR gene in cystic fibrosis) or by its pathophysiology (for example a loss of motoneurons in ALS).

Indeed, if a disease is characterized by symptoms, this level of classification is not adapted to validate a scientific model. For example, a headache or a fever are not sufficient to define a disease; they are one of the features of many different diseases. A disease is better defined either by its cause (for example the mutation of the CFTR gene in cystic fibrosis) or by its pathophysiology (for example a loss of motoneurons in ALS). Such hypothetical models may be conceptualized and verified; then, the task of research consists of assessing and refining the model, and suggest adapted treatments. The refinement of the model itself influences in turn the definition of the disease and such cycle of optimization contributes in validating the model (Foucher and Bennouna-Green 2010). However, for purposes or reproducibility, no change in the classification of the ICD 10 & DSM 5 diagnostic tools in psychiatry is tolerated (ie due to self-censorship or to concerns of not being able to publish). If the definition of the disorder(s) is inappropriate, and if it can’t evolve theoretically, how good can be the basis for fundamental research? Such a rigid system may well constitute a dead-end in terms of research?

In the field of psychiatric disorders, this problem is at the heart of a debate that increasingly affects the concept of schizophrenia: WILL WE STILL CALL IT SCHIZOPHRENIA IN 100 YEARS?

Why? Why not?

Such question will be addressed during a controversy event held on MONDAY, THE 27TH OF NOVEMBER 2017, at the Department for Psychiatry & Psychotherapy (University of Freiburg).

This debate will follow a meeting entitled “The beginning & end of schizophrenia: does neuroscience terminate the era of schizophrenia?”. During these events, the speakers will discuss and present arguments explaining why and how diagnosis is so important in the field of schizophrenia, not only for clinic, but also for scientific research. Psychiatric disorders are at the heart of Prof Ludger Tebartz van Elst and Dr Jack Foucher’s interests. They detail in the following pages (see page 18 & page 24) their respective approaches and corresponding scientific rationale. This field of psychiatry is another example of common and complementary expertise, a real added-value that is also available to Neurex members using the multimedia platform. There, the interested readers may refer to (beginner & advanced level) lectures of the CEP (Circle of Excellence on Psychiatry, see page 24), as well as movies of these 2 events, for further information.

Bibliography:

At the University of Freiburg over the last decade a joint research group in collaboration between child adolescent and adult psychiatry and psychotherapy has been generated. The work of this research group follows the insight that many psychiatric disorders—even though their prominent onset is in adult life—have their roots in the first and second decade of the development of affected people. Prominent examples for this constellation are patients with ADHD, autism, tic disorders but also patients with schizophreniaform and personality disorders. The research group headed by Prof. Dr. Ludger Tebartz van Elst follows this insight and tries to disentangle the different causal roots and pathways that might lead to primary neurodevelopmental and personality disorders and sometimes secondary psychiatric syndromes in adult life (Tebartz van Elst et al. 2013; see bibliography at the end of this article).

The idea that psychiatric diagnoses like autism, ADHD, depression or schizophrenia do not represent true disease categories but rather are umbrella terms mainly focused on psychopathological syndromes (Tebartz van Elst et al. 2006, Tebartz van Elst 2016, 2017) have led to different clinical but also MRI based and laboratory based research projects trying to disentangle the different causal and pathogenetic roots and pathways that might lead to the psychopathological syndrome (i.e. psychiatric disorder in question) of interest (Francis et al. 2013; Kanal et al. 2015; Käfer et al. 2014; Maier et al. 2016; Oelrich et al. 2008; Rüscher et al. 2007, 2008; Tebartz van Elst et al. 2005, 2013, 2014a/b).

The different research endeavors of the Freiburg research groups can be grouped in clinical and technological projects. The clinical projects focus on a psychopathological differentiation of given psychiatric syndromes in that the issue of neurodevelopmental disorders has been developed and elaborated on.

A first main project was the discovery of the relevance of the neurodevelopmental disorder ADHD for subsequent secondary psychiatric disorders in the late 1990s (Philipsen et al. 2015). A further main effort into that direction was a creation of an autism project looking at the prevalence and role of high functioning autism for the subsequent development of psychiatric disorders like depression, anxiety, OCD, personality disorder and psychosis (Tebartz van Elst et al. 2013; https://www.uniklinik-freiburg.de/psych/medizinisch-klinische-schwerpunkte/asperger-autismus.html). Presently the same idea is being realized in generating a focus on the third big group of neurodevelopmental disorders i.e. the tic disorders.

A main insight from these clinically-focused projects is that in many cases adult depression, anxiety disorders, personality disorder or psychotic disorder developed on the background of clearly recognizable but sometimes also subsyndromal developmental disorders specificity ADHD, autism or tic disorders (Tebartz van Elst 2016). This insight leads to a clinical and psychopathological differentiation of the present psychiatric nosology where syndromal or subsyndromal neurodevelopmental disorders or personality patterns are recognized as relevant causal entities for subsequent depressive or psychotic reactions, personality abnormalities or anxiety disorders.

Over the last decade a new internal concept of classification of these different neurodevelopmental disorders has evolved in which primary and secondary disorders are being distinguished (i.e. primary vs. secondary ADHD, primary vs. secondary autism, primary vs. secondary psychosis) based on specific etiological and pathogenetic considerations in each case (Tebartz van Elst 2017).

In this concept secondary disorder is being diagnosed in case of clearly recognizable or at least probable etiopathogenetic causes for the syndrome of interest. For example a fragile-X syndrome or a 22q11 syndrome might by a secondary genetic cause for autism, ADHD or psychosis. Secondary acquired causes are recognized in form of inflammatory brain disease, epileptic or paraepileptic disorders or metabolic diseases like Niemann Pick C disease or acute intermittent porphyria.

On the other hand many patients with autism, ADHD or psychotic disorder do not have any evidence of secondary genesis of their clinical syndrome of interest but still there is a clearly positive family history. This is the typical constellation of a primary disorder with a common, generally multi genetic vulnerability to develop the syndrome of interest like psychosis, autism or ADHD. In this area of primary, multigenetic causation of psychiatric vulnerability there is often a dimensional rather than categorical phenotypical pattern with more or less severely affected phenotypes and common subsyndromal variants in affected families (Tebartz van Elst 2016, 2017).

Within this theoretical framework the Freiburg Center for Neurodevelopmental Disorders tries to disentangle the different etiologies and pathogenesis of the different neurodevelopmental syndrome of interest in the context of several clinical and basic science research projects.

1. Autism Spectrum Disorder
Since 2004, one subgroup of the research cluster focuses on the neurodevelopmental category of autism spectrum disorder. Over the last 15 years, we recognized that autism is a common basic disorder based on which secondary depression, anxiety, personality or psychotic disorder arises (Lübert et al. 2012; Riedel et al. 2016; Tebartz van Elst 2016). The recognition of high functioning and sometimes subsyndromal autism as the critical background for the subsequent development of other psychiatric syndromes often turns out to be a key concept for the understanding and acceptance of the patients’ symptom history. Different neurobiological research projects looking at brain structure, brain connectivity and brain neurochemistry as well as EEG and laboratory studies have

2. ADHD IN ADULTHOOD

In a structurally very similar project, the relevance of ADHD in adulthood has been a focus of another subgroup in Freiburg already since 1987. Like in autism, specific group psychotherapy projects had been developed and evaluated along with continuing neurobiological research focusing on brain imaging (Ahmed et al. 2011, Maier et al. 2015, Perlov et al. 2008, 2009, Philipson et al. 2015, Wilbertz et al. 2012).

3. SCHIZOPHRENIA AS A LATE ONSET NEURODEVELOPMENTAL DISORDER

Over the last 10 years, it became increasingly clear that there is yet to be understood link between the different classical neurodevelopmental disorders like autism, ADHD and tic disorders and the group of psychiatric disorders still being called schizophrenia. In an attempt to disentangle the different neurological causes and pathways behind the different schizophreniform syndromes, another subgroup of the Freiburg Research cluster has focused on the role of immunological processes such as limbic encephalitis or immunological encephalopathy (Hashimoto encephalopathy for example) in causing schizophreniform syndromes. In this context many different studies again focusing on brain imaging but also CSF research has been organized over the last years. Most importantly we were able to illustrate that at least on a single case level there are in fact quite a few patients who until recently would have been diagnosed as suffering from schizophrenia but now turn out to suffer from immunological encephalopathy, which can be treated more causally with immune modulatory interventions like cortisone, plasma exchange, IV-IG or Rituximab (Endres et al. 2015a/b, 2017a/b).

In trying to differentiate the psychopathology and neurobiology of the different psychiatric umbrella diagnoses (depression, schizophrenia, autism, ADHD etc.), the Freiburg research groups concentrate on a few methodological techniques:

1. MOLECULAR BRAIN IMAGING:

In our molecular brain imaging studies, we focused on the neurotransmitters and neurochemistry of the brain in groups of patients with autism, schizophrenia, ADHD and borderline personality disorder. A particularly important technological development in this context is the recently developed ability to not only measure the main excitatory neurotransmitter signal glutamate (Obrist et al. 2008, Tebartz van Elst et al. 2005, 2010a/b), but also the main inhibitory neurotransmitter signal, GABA and glutamine, using MR spectroscopy (MRS) (Endres et al. 2017). The advantage of this technology is that it now allows the non invasive assessment of the brains neurochemistry in vivo without employing radiation.

2. VISUAL NEUROSCIENCE:

Another technique which has been focused on a lot in another subgroup of the Freiburg research cluster is visual neuroscience. In this context we measure the electroretinogram (ERG) a kind of ECG of the eye in order to obtain objective signals of the neuronal network layer of the retina in different psychiatric disorders like depression, ADHD, autism and schizophreniform disorders. In this context we were able to demonstrate specific objective correlates of patients with depression (reduced contrast gain), ADHD (increased retinal noise) and also schizophrenia. The advantage of measuring the retina electrophysiology is that it allows an objective assessment of the neuropathology of the retina, which can be regarded as an output structure of the brain which might indicate systemic network dysfunction (Bubl et al. 2013, 2015, 2019a/b, Tebartz van Elst et al. 2015).

The overarching aim of the different research endeavors of the different research groups headed by Ludger Tebartz van Elst is to clinically and neurobiologically differentiate the present psychiatric diagnostic umbrella terms in form of the given psychiatric ICD diagnoses. By differentiating the psychiatric neuology and pathophysiology we hope to contribute to generating more specific and adequate psychiatric diagnoses and subsequent therapies.
FOCUS ON PSYCHIATRY
DR JACK FOUCHER
(UNIVERSITY OF STRASBOURG)
& RESEARCH ON PSYCHOSIS AT CEP,
CEMNI S & AXILUM ROBOTICS

Dr Jack Foucher is an associate professor and neuropsychiatrist at the university of Strasbourg. He was first trained in neurology and later in psychiatry, getting specialized in mood and psychotic disorders. Considering the poor pathophysiological foundation of neuropsychiatric disorders, he developed his research along two mainstems: a fundamental stream of research on naturally funded phenotypes and a practical stream with the development of personalized neuropsychiatric therapies with a special interest in repetitive transcranial magnetic stimulation (rTMS).

On the fundamental side, he turned towards the naturally defined phenotypes proposed by the Wernicke-Kleist-Leonhard School. Those have been elaborated on in electrophysiological observations, based on natural principles such as the longitudinal principle, i.e. one patient is assigned to one phenotype only and the family aggregation principle, i.e. in multiplex families, affected individuals are sharing the same phenotype. Their impressive reliability, predictive and differential validity already made them attractive, but he was further convinced by using them in his clinical practice as an expert in the schizophrenia reference center of Strasbourg. He founded a web site, the CER “Cercle d’Excellence sur les Psychoses” (http://www.cercle-d-excellence-psy.org), developed an e-learning based teaching for and organizes symposia with his colleagues to diffuse this powerful clinical tool in France. He also conducted recent anatomical and functional imaging studies supporting the superiority of those phenotypes relative to the classical single schizophrenia concept and proposing pathophysiological basis for some of them.

On the applied side, he first developed reliable imaging and analysis procedures to determine the functional basis of symptoms in a single subject approach. Secondly, he tried to correct these functional abnormalities with rTMS. Although the approach was successful, the manual placement of the coil was too exhausting for being applied in clinical setting. He thus initiated the development of a robotic positioning device, which has now reached the market with the creation of a spin off, Axilum Robotics (see Neurex Newsletter 20). While pursuing the validation of personalized rTMS protocol for psychosis and depression, he more recently opened the CEMNIS, the Noninvasive Neuro-modulation Center of Strasbourg, which concretized a decade of applied research in proposing personalized therapies in clinical settings.

With the CEMNIS, Jack Foucher ambitions to fuse his two streams of research. An example of this is given by the recent development of specific rTMS treatments for two psychotic phenotypes, i.e. periodic catatonia and cataphasia. In case of success, the fundamental distinction between these two phenotypes will not only be validated switching their status towards classical diseases, but this would also pave the way for a new generation of targeted therapies based on their pathophysiological basis.

FOCUS ON PSYCHIATRY
THE GUT BRAIN AXIS

The gut brain axis is a complex system that integrates (in a bottom-up and top-down direction) information from the brain, sympathetic, parasympathetic & enteric nervous system (ENS), gut, microbiota (the collection of microorganisms that inhabit the gastrointestinal tract) and immune system. Disturbances of the gut brain axis have been suggested to play a role in a wide range of disorders, including mood disorders, but also neurodegenerative and auto-immune diseases.

Co-morbid gut dysfunctions frequently occur in individuals with Autism Spectrum Disorder (ASD), schizophrenia, anorexia, anxiety, depression, Parkinson’s Disease (PD) and Multiple Sclerosis (MS). Distinctive gut microbiomes have been identified in ASD-affected children and a breakdown of the intestinal barrier (leaky gut) has been shown in IBS, ASD or depression. Enteric microbiota play a role in early programming, but also later response to acute and chronic stress, an important parameter in neuropsychiatric conditions, such as depression, ASD or schizophrenia. Stress is one top-down mechanism that may affect gut microbiota: moreover, stress has been reported to be one of the factors that may be associated to the occurrence of a psychic episode or development of MS (like in the two-hit hypothesis). Mice devoid of all commensal gut flora have dramatically attenuated susceptibility to Experimental Autoimmune Encephalomyelitis (EAE), a mouse model of human MS. A low-grade inflammatory state which has been suggested to stem from processes related to dysbiosis of the gut microbiome is prevalent in a subset of individuals with schizophrenia and bipolar disorder. In patients with PD, gastrointestinal motility dysfunction often precedes the onset of motor symptoms by many years and Lewy bodies, the typical α-synuclein positive inclusions present in PD brain, have also been found in neurons of the myenteric plexus and dorsal motor nucleus of the vagus, suggesting that the underlying pathological process might involve the autonomic nervous system. In Alzheimer’s Disease, epidemiological studies have reported a link between cognitive decline and infections to Helicobacter Pylori.

The bacterial commensals deeply influence many aspects of host physiology - including nutrient metabolism, resistance to infection and immune system development - through a bi-directional communication network with the brain. This bi-directional system is made up of neural pathways, such as the enteric nervous system (ENS), vagus, sympathetic and spiral nerves, and of humoral pathways, which include signaling cytokines, hormones, and neuropeptides.

90% of vagal fibres between the gut and brain are afferents to the brain; interestingly, it has been suggested that nerves that interconnect the ENS and CNS could also be conduits for disease spread.
These diseases? Might the gut brain axis be targeted to develop potential therapies for the treatment of these disorders? What are the main pathways which underlie the birectional communication between the gut and brain? Are gut dysfunctions an epiphenomenon or are they clearly involved in the aetiology of these disorders? How much do these psychiatric and neurological disorders involve gut dysfunctions? How much do these mechanisms prevail and potentially account for the development of these diseases? How might the gut brain axis be targeted to develop potential therapies for the treatment of these disorders?

Thus, viruses have been shown to be retrogradely transported from the CNS into the brain using peripheral nerves pathways. The neurotropic varicella-zoster virus (VZV) is able to enter into a latent state in enteric and autonomic neurons. VZV reactivation in these neurons is a clandestine cause of gastrointestinal disease, meningitis and stroke. A trans-synaptic cell to cell transfer of pathogens underlies the Braak’s hypothesis of PD which states that some pathological process might originate in the gut and spread to the substantia nigra. However, neural pathways also play an important role in restoring homeostasis by regulating immunity and inflammation. Thus, the vagus and spinal nerves - activated by inflammatory peripheral signals- are able to mount an anti-inflammatory reflex response which modulates both the innate and adaptive arms of the immune system. During an infection episode with pathogenic Salmonella, cætcholaminergic signaling to the small intestine - indirectly triggered by the activation of vagus afferent neurons - drives an anti-inflammatory program in muscularis macrophages.

Contrary to the traditional view that the brain is immunologically privileged, evidence has accumulated over the last two decades that systemic inflammation can exert a profound influence on the brain, leading to changes in mood, cognition and behaviour through a number of pathways. The humoral pathway involves the delivery of products of microbiota metabolism (such as short-chain fatty acids (SCFAs), Pathogen-Associated Molecular Patterns (PAMPs) & Damage-Associated Molecular Patterns (DAMPs), or immune molecules directed at them - such as cytokines - from a peripheral (gut, for example) site directly to the brain. Several mechanisms may then contribute to the diffusion of the signal into the brain: an active transport of signaling molecules across the blood-brain barrier (BBB), a volume diffusion into the brain or direct contact with brain parenchymal cells, at the choroid plexus (CP) and circumventricular organs that lie outside the BBB. These phenomena transpose the peripheral signal into a central neuroinflammatory response that mirrors the response at the periphery, but may last much longer. Such neuroinflammation has been suggested to play a potential role in the chain of events involved in neurodegenerative disorders. Interestingly, a substantial influence of host microbiota on microglia homeostasis has been reported in an animal model (germ-free mice). Microbiota-derived bacterial fermentation products, the SCFAs, have been shown to underlie the modulation of the microglia phenotype.

What are the main pathways which underlie the bi-directional communication between the gut environment & brain? Why are gastrointestinal co-morbidities so frequent in some psychiatric and neurological disorders? Are gut dysfunctions an epiphenomenon or are they clearly involved in the aetiopathogenesis of these disorders? How much do these mechanisms prevail and potentially account for the development of these diseases? How might the gut brain axis be targeted to develop potential therapies for the treatment of these diseases?
COMING EVENTS

BRIDGING PAIN AND DEPRESSION RESEARCH

Mood disorders such as anxiety and depression are recurrent mental illness predicted to become a foremost contributor to the worldwide burden of disease. Among precipitating factors, chronic pain is an important determinant with a prevalence rate around 50% for major depressive disorders. Accordingly, there is an enormous need for fundamental research to progress in the mechanistic understanding of chronic pain and mood disorders comorbidity.

A meeting entitled “Bridging Pain And Depression Research” will take place on the 30th & 31st of October 2017 in Strasbourg. By gathering outstanding researchers from pain and depression field, this symposium aims at bridging these two research fields.

We would like to express our gratitudefulness to all scientists who kindly agreed to participate in these programs and are looking forward to meeting you there!}

EARLY SIGNS OF MEMORY DECLINE

A workshop entitled “Early Signs of Memory Decline: Object or Place First?” will take place on the 4th & 5th of December 2017 in Strasbourg. Co-organized by Dr Chantal Mathis and Dr Céline Héraud, this event is specifically dedicated to the earliest signs of memory impairment in normal aging and Alzheimer’s disease. The aim of this workshop is to bring together researchers working on age-related memory decline with specific interests in different types of memory (eg, recognition and spatial memories) in animal models and in humans using a wide range of approaches from behavior to functional imagery. An open debate is awaited on which form of memory is affected first in normal aging and in pathological aging, and for each condition what are the underlying mechanisms leading to these deficits. In doing so, we hope to increase our knowledge on similarities and differences in initial steps of cognitive decline between the two types of aging. These issues are essential in regard to the development of targeted therapeutic approaches, the identification and validation of early biomarkers specific for each form of cognitive aging and the designing of clinical trials which focus now on the most early stages of Alzheimer’s disease.
OF GLIA AND MICROGLIA

A broad range of pathological conditions, including brain injury, acute infection, autoimmune disorders, or cancer, is heavily controlled by macroglia and microglia, which makes these cell types a concern of great importance for biomedical research. Macrogia play a major role in the development, function, and maintenance of the nervous system. Oligodendrocytes and Schwann glia ensheathe axonal tracts and are crucial for normal impulse conductivity; astrocytes are intimately involved in synaptic transmission, in brain repair and in supporting the blood-brain barrier. Microglia, which constitute the resident immune cells of the brain, are derived from a lineage of mesodermal embryonic blood progenitors and migrate into the brain during development. This provides further evidence that, although often regarded as independent, the nervous and the immune systems are intimately intertwined, the connection allowing us to respond and adapt to a continuously changing environment.

Interleukins also display cells that are commonly called glia and that play similar roles as macroglia during neural function and development, however it is not presently clear at all whether vertebrate and invertebrate cells are truly homologous, i.e., derived from a “macroglial cell” present in a common bilaterian ancestor. Moreover, interneurons glia accomplish the trophic and protective role of vertebrate microglia but also the immune role of microglia. In addition, the functional differences observed between interneurons and vertebrates are accompanied by structural and developmental differences, such as the absence of a compact myelin sheath in invertebrate glia, the glial rather than endothelial nature of the interneurons blood brain barrier and the lack of a common molecular glionicin pathway. The latter finding is particularly surprising, given the strong evolutionary conservation of the molecular pathway triggering neuronal differentiation.

These clues point to an intricate network of relationships between glia and blood cells, in terms of development and evolution across different animal taxa. The exact nature of this network is currently unknown, because there exists a large research gap: how similar are glia and blood cells from the molecular and functional standpoint? Furthermore, very little is known about the development of glia and blood cells, and genetic pathways controlling this process, in animal taxa outside the vertebrates and Drosophila. It seems important to get answers to these and many other related questions, and to develop a more complete picture of the shared molecular-genetic pathways active during the development and function of immune and glial cells, in order to improve our capability to manage pathologies affecting the nervous system.

A meeting entitled “Of glia and microglia” will take place on the 7th & 8th of December 2017 in Strasbourg.

This event is intended to address the existing knowledge gap, by initiating a dialogue between scientists at the frontline of research into glia and blood cell biology, in both vertebrate and invertebrate systems. We anticipate that this conference can mark the beginning of a continuing series of similar meetings.

A.G.
A NEW WEBSITE FOR NEUREX

The positive feedbacks on the new Neurex website witness the fact that our network deserved an embellished showcase, pleasant to the eye and easy to browse through. Launched last July 19th, the website displays the well-known presentation of the Events to come, and features several other important novelties.

THE RESEARCH NETWORK
All the laboratories and team leaders of the Neurex network are accessible within a few clicks, sorted by:
- CITY: all the laboratories of Strasbourg, Freiburg and Basel at a glance
- TOPIC: find the teams working on a specific research thematic, with up to three degrees for the refining of your search
N.B.: if you are not satisfied with the lab/PI pictures displayed, do not hesitate to send us better ones at contact@neurex.org.

NEUROCAMPUS
The ongoing Neurex project, NeuroCampus, aims to make accessible to our members the scientific activities happening in the network: conferences, workshops, controversies, lab-tours. This requires a multimedia platform, which allows us to present all kinds of pedagogical supports (written documents, photos and videos), classified by general thematics.

Having a Neurex account is the only condition to get access to all our activities and archives. Alas, the redesign of the website had its drawback: the deletion of all the previous accounts. Therefore, you must Create your account de novo, through the appropriate tab on the top right corner. Legend says it only takes 1 min...
During the past decade, Neurex has always worked toward implementation of cross-border collaboration research projects. To help further the development of Neurosciences within the Eucer Eurocampus, the University of Strasbourg supports our network and funded co-tutelle PhD fellowships along its Initiative of Excellence (IDEx) for the period 2017-2020. Early 2017, a call for collaborative projects was launched and Scientific Committee of Neurex selected two of them.

**NEURAL PROCESSING OF AMBIGUITY IN PATIENTS WITH AUTISM AND SCHIZOPHRENIA SPECTRUM DISORDERS AND HEALTHY CONTROLS**

This project is a collaboration of the following researchers: Dr Anne Giersch (Inserm U1114, University of Strasbourg), PD Dr. Jürgen Kornmeier (Institute for Frontier Areas of Perception in normal controls and psychiatric patients.

**COMPUTATIONAL MODELING OF THE NEURAL NETWORK DYNAMICS AND SYNAPTIC PLASTICITY IN NON-INVASIVE BRAIN STIMULATION**

This project is a collaboration of the following researchers: Ipek Yalcin (INCI, University of Strasbourg), Stefan Rotter (BCF, Faculty of Biology, University of Freiburg) and Claus Normann (Department of Psychiatry, Medical Center, University of Freiburg).

**ELLEN JOOS, doctoral fellow.**

To work on this project, the partner scientists have recruited Ellen Joos, a German citizen with a Master of Biology and experience in EEG techniques, memory and visual perception. The project aims at studying neural correlates of stable and unstable visual perception in normal controls and psychiatric patients.

**HAN LU, doctoral fellow.**

Han Lu, a former student of the Joint Master in Neuroscience, with a Bachelor degree of Psychology from China has been selected by the partners and offered the 3-year fellowship to work on this project.

We wish them both a lot of success with their respective projects!

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**OCTOBER 2017**

- 23rd / NEUREX MEETING «THE BRAIN-GUT AXIS & CHS DISORDERS»
  - BASEL, SWITZERLAND

- 30th - 31st / NEUREX MEETING «BRIDGING PAIN AND DEPRESSION RESEARCH»
  - STRASBOURG, FRANCE

**NOVEMBER 2017**

- 11th - 13th / ANNUAL MEETING SOCIETY FOR NEUROSCIENCE WASHINGTON, DC, USA

- 20th - 22nd / NEUREX-HEURALNET MINI-SCHOOL «SPATIAL PROGRAMMING, DATA ANALYSIS AND MODELLING»
  - STRASBOURG, FRANCE

- 27th - 28th / NEUREX-HEURALNET MEETING «ON TECHNICAL AND CONCEPTUAL ADVANCES FOR THE STUDY OF NEURAL NETWORKS»
  - STRASBOURG, FRANCE

- 27th / NEUREX MEETING «THE BEGINNING AND END OF SCHIZOPHRENIA: DOES NEUROPSYCHIATRY TERMINATE THE ERA OF SCHIZOPHRENIA?»
  - FREIBURG I. B., GERMANY

- 27th / NEUREX CONTROVERSY DEBATE «WILL WE STILL CALL SCHIZOPHRENIA IN 100 YEARS?»
  - FREIBURG I. B., GERMANY

**DECEMBER 2017**

- 4th - 6th / NEUREX MEETING «EARLY SIGNS OF MEMORY DECLINE»
  - STRASBOURG, FRANCE

- 6th / NEUREX WORKSHOP «NEUROHEMATOLOGY»
  - STRASBOURG, FRANCE

- 7th - 8th / NEUREX MEETING «ID-AS & MIGRANUS»
  - STRASBOURG, FRANCE

**FEBRUARY 2018**

- 2nd, WEB MEETING «BENCH TO BEDSIDE»
  - BASEL, SWITZERLAND

- 13th - 14th / NEUREX MEETING «OXYTOCIN: THE NEW LOVE POTION?»
  - STRASBOURG, FRANCE

**SPRING-SUMMER 2018 NEUREX MEETINGS**

- «ARCULATE NUCLEUS»
  - STRASBOURG, FRANCE

- «STEM CELLS»
  - BASEL, SWITZERLAND

- «ARTIFICIAL INTELLIGENCE»
  - FREIBURG I. B., GERMANY

- «PARKINSON»
  - BASEL, SWITZERLAND

- «COGNITION & THALAMUS»
  - STRASBOURG, FRANCE

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This description is not definitive, but lists the events which are ready or in preparation. Please check again on www.neurex.org or in the next newsletter for additional events.
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Editor in chief:
Piguet Pascale (P.P.), Basel

Assistant Editor:
Klipfel Stéphanie (S.K.), Strasbourg

Director of publication:
Pévet Paul, Strasbourg

Participated in the preparation and/or writing of this newsletter (in alphabetical order):
Aertsen Ad (A.A.), Freiburg
Boudard Domitille (D.B.), Strasbourg
Domschke Katharina (K.D.), Freiburg
Foucher Jack (J.F.), Strasbourg
Giangrande Angela (A.G.), Strasbourg
Hoss Carolin (C.H.), Freiburg
Klipfel Stéphanie (S.K.), Strasbourg
Mathis Chantal (C.M.), Strasbourg
Nexon Laurent (L.N.), Strasbourg
Papassotiropoulos Andreas (A.P.), Basel
Piguet Pascale (P.P.), Basel
Tebartz van Elst Ludger (L.T.v.E.), Freiburg
Yalcin Ipek (I.Y.), Strasbourg

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